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MEDICAL AND SANITARY REPORTS FROM OFFICERS ATTACHED TO THE JAPANESE AND RUSSIAN FORCES IN THE FIELD.

Errata.

P. 525, 4th line, for 8 August read 26 August.

General Staff,
War Office,
April 1908.

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NOTE.

THIS volume contains a selection of reports, principally by Lieut.-Colonel W. G. Macpherson, C.M.G., Royal Army Medical Corps, which have a special bearing upon the medical services and sanitary conditions in Manchuria during the Russo-Japanese war. Two other reports of interest—one on the organization of the Japanese Red Cross Society, and the other on the physical measurements of the Japanese soldier—have already been published in the *Journal of the Royal Army Medical Corps* for April 1906 and April 1905, and it has not been thought necessary, therefore, to reprint them here.

E 54846. 2000.—7/08. Wt. 4295. E. & S.

THE RUSSO-JAPANESE WAR.

Medical and Sanitary Reports from Officers attached to the Japanese and Russian Forces in the Field.

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C.—MEDICAL SERVICES AND ESTABLISHMENTS IN JAPAN.

D.—JAPANESE SANITARY REGULATIONS AND REPORTS.

E.—THE RUSSIAN ARMY.

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MAPS AND SKETCHES.

(In back pocket.)

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THE RUSSO-JAPANESE WAR.

Medical and Sanitary Reports from Officers attached to the Japanese and Russian Forces in the Field.

(1) Field Medical Regulations of the Japanese Army.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps. Manchuria, 20th August 1905.

Appendices.

COVERING MINUTE.

The accompanying documents are a free translation of the Field Medical Regulations of the Japanese Army and the appendices of these regulations.

The translation of the first 40 or 50 paragraphs was made with the assistance of the Japanese interpreter at the British Legation, Tokio, Mr. Koseki, and that of the remaining paragraphs with the assistance of Mr. Hatakenaka, one of the interpreters attached to the foreign officers with the Second Army in the field. I am specially indebted to him for his valuable help.

The forms in the appendices were worked out in the field hospitals of the 6th Division, mainly with the aid of Mr. Usa, one of the interpreters on the head-quarter staff of the division.

The tables of contents of panniers, &c., were completed without the assistance of interpreters, but medical officers of the Army kindly helped from time to time to clear up doubtful points, not only with regard to these but also with regard to the translation generally.

The Tables of establishments, which are appended, do not form part of the regulations. Such matters are not published, and application to obtain an official statement of the establishment of the medical units has invariably been refused.

The tables appended, therefore, have been prepared from personal observation of the units in the field, and must be regarded as only approximately correct, for much secrecy and reticence are maintained in connection with matters of organization. They are sufficiently accurate, however, to give a general idea of the extent and character of the field medical units of the Japanese Army.

A short vocabulary of terms used in connection with the medical service is also appended. Many of the Japanese medical officers know German, but it is more useful to acquire the habit of speaking of their medical units, &c., by the terms which they themselves use, as, for example, "*Heitan-Byoin*" instead of *Etappen-Lazaret*, or "*Yasen-Byoin*" instead of *Feld-Lazaret*, and so on. A more complete vocabulary, including names of instruments, appliances, drugs, diseases, &c., can be submitted separately, and might be found useful in enabling medical officers of our service to interchange with those of the Japanese service should the occasion arise.

A perusal of the regulations will be found of much value in studying the medical service in the field. They have been modelled on the lines of the German Army Medical Field Regulations, but they are much shorter, less detailed and less cumbrous than these. They have now been thoroughly tested in the field, and have proved as perfect a machinery for the purposes of this war, at any rate, as can well be devised.

The following short summary of the Japanese medical service will serve to explain many points in the regulations and the meaning of some of the paragraphs, which might not be clear without explanatory note.

The diagram appended has been prepared as a key in studying the service and the regulations.

The Regulations.

1. *Administration.*

The regulations refer frequently to the Principal Medical Officer of the Field Forces, seldom to the Director-General of the Army Medical Service. But as regards this war, at any rate, they are one and the same person, namely, Surgeon-General Koike, who was Director-General before the war broke out. He works, however, in two offices. As Director-General, he is in direct touch with the Minister for War and has to control supplies and expenditure. As Principal Medical Officer of the Field Forces, he is an officer attached to the General Staff and is in direct touch with the Commander in-Chief carrying out the duties, in the interior of Japan, of receiving, distributing, and dealing generally with personnel, sick and

wounded returning from the field; reserve hospitals; preparation of hospital ships, trains, and so on; in fact all the points in the medical service which the war has thrown on the Home Territory. He also inspects the general condition of the medical service in the field, and has already paid two or three visits to the Head-Quarters of the Commander-in-Chief in Manchuria and to the Head-Quarters of the Field Armies for the purpose.

The other administrative medical officers are :—

(1) The Principal Medical Officers of Depôt Divisions in Japan. There are 13 of these, and the posts may be held by senior retired officers of the regular medical service. The rank is Surgeon-Colonel or Surgeon-General. When fortresses are isolated, the Senior Medical Officer becomes a Principal Medical Officer.

(2) Principal Medical Officers of central lines of communication, such as that extending from Mukden to Dalny. The rank is Surgeon-Colonel. The post is held by an officer on the active list.

(3) Principal Medical Officers on the line of communication of an army. The rank is Surgeon-Colonel, and the post may be held by an officer retired from the active list and brought back for duty during the war.

(4) The Principal Medical Officers of the Field Armies, which may consist of two, three, or more divisions. The rank is Surgeon-General, and the post is held by an officer on the active list.

(5) The Principal Medical Officers of Divisions. The rank is that of Surgeon-Colonel or Surgeon-Lieut.-Colonel. The post is held by officers on the active list.

There is no administrative medical officer with the Head-Quarters of the Manchurian Armies, Field-Marshal Oyama's Head-Quarters. As already noted, the administrative medical officer for this purpose is the Principal Medical Officer of the Field Forces, who has his office with the General Staff in the Home Territory.

2. *Medical Service with Units.*

Each Principal Medical Officer has two junior medical officers as assistants or secretaries, and the medical charge of the Head-Quarters Staff of armies, divisions, &c., is held by one or other of them. Sometimes the work is shared, the Principal Medical Officer having full power to assign to them such duties as he thinks fit.

A special medical officer is attached to the Head-Quarters of the Commander-in-Chief for the medical charge of the staff.

All these medical officers have also charge of the escort and followers of their respective Head-Quarters, and perform the duties of sanitary officers for the locality in which the Head-

Quarters are situated. For example, the medical officer in charge of the Commander-in-Chief's Head-Quarters had to exercise control over the sanitary duties of the city of Mukden, because the Head-Quarter Staff was the only unit quartered within the city. He was given, of course, special assistance for the occasion.

Brigade Head-Quarters have no attached medical officer. Medical duties connected with the brigade staff are performed by medical officers of the nearest battalion.

The medical charge of regimental units is held by medical officers of rank below that of field officer. There are two medical officers with each battalion of infantry, and one with smaller units, such as a battery of artillery. In standing camps or cantonments, they form Regimental Infirmaries or "Sick Rooms," and, in action, Relief or Aid Stations and Temporary Dressing Stations. They have sanitary charge of the locality where their unit is stationed, including villages in the vicinity not occupied by other units.

3. *Hospital Service.*

The classes of hospitals, established in war, are the following:—

Field Hospitals.
Stationary Field Hospitals.
Line of Communication Hospitals.
Reserve Hospitals.
Fortress Hospitals.

Subsidiary establishments in the field are:—

Cantonment Hospitals, formed by one or more Field Hospitals in standing camps or cantonments.

Rest Stations, formed along the line of evacuation within the Line of Communication Area by Stationary Field Hospital establishments or by Line of Communication establishments.

Infectious Diseases Hospitals, which form sections of Cantonment Hospitals or Line of Communication Hospitals.

The Field Hospitals are mobile divisional units. In this war most of the divisions have had four Field Hospitals, but some have had only two or three. In cantonments one or more remains open as a cantonment hospital for the whole division. As a rule, one only has been so opened. During an engagement, the number that is opened depends entirely upon circumstances. They are seldom opened simultaneously on the commencement of an engagement, but one after another as the occasion demands. This feature is illustrated in the medical reports on the battles of Liao-yang, the Sha Ho, and Mukden.

Stationary Field Hospitals are only opened as such during or after an engagement, and remain open until such time as the line of communication extends into the area and Line of Communication Hospitals can be established. A special mobile unit,

the Reserve Medical Personnel, is formed for the purpose of opening Stationary Field Hospitals, that is to say, for the purpose of taking over the work of the Field Hospitals and allowing them to move on. One Reserve Medical Personnel Unit is formed for each division, but does not accompany its division into the area of field operations. It is always held under the line of communication command, and is pushed forward as required. As will be noted in the regulations, it may take part in the formation of Line of Communication Hospitals. In fact, the transition from a Stationary Field Hospital to a Line of Communication Hospital is frequently a matter of time only, and not necessarily of personnel and equipment, at any rate, in the earlier periods. The Reserve Medical Personnel Unit is more or less the equivalent of three Field Hospitals, and is divisible into three identical sections, each of which may open separate Stationary Field Hospitals. The sections may also be used in opening Rest Stations. An Army of three divisions will thus have a reserve on the line of communication of the three Reserve Medical Personnel Units or the equivalent of nine Field Hospitals. The value of these reserve units always ready to be pushed up as required, either for field or line of communication purposes, cannot be emphasised too strongly.

The Line of Communication Hospitals are not fixed permanent units. They are opened at points, where they may be most useful, by such establishments as may be obtained from unoccupied units of the Reserve Medical Personnel, or from Japan, or by using relief sections of the Red Cross Society or local resources. They are established usually at the head of the line of communication and the principal garrisons along the line. Their function is mainly to receive the local sick and wounded, as noted in the regulations, but they are also kept busy, especially after engagements, in treating serious cases of sick and wounded that are being evacuated down the line. This was the case with the Line of Communication Hospitals opened at Wa-fang-tien after the battle of Te-li-ssu, at Kai-ping after the battle of Ta-shih-chiao, at Hai-cheng during the Liao-yang operations, at Liao-yang after the operations and during and after the battle of the Sha Ho, and at Mukden after the battle of Mukden. Smaller and more temporary Line of Communication Hospitals were opened at several other points.

The Reserve Hospitals in Japan are the real equivalent of our Base or General Hospitals, as regards the nature of their work. They are simply the fixed and permanent garrison hospitals of the Divisional District Head-Quarters in Japan. The sick and wounded, not likely to recover soon, find their way as quickly as possible out of the area of field operations, down the line of communication, through the various medical units, until they are landed in the Reserve Hospital of the division to which they belong. It is there that the complete

treatment of the more serious and important cases, with a view to ultimate recovery or invaliding from the service, takes place.

These Divisional Reserve Hospitals have been enormously expanded during the war, as noted, for example, in the reports, submitted, on the Reserve Hospitals in Tokio and Hiroshima. Equally great and important hospitals are now open in all the 12 Divisional Districts in Japan.

The Fortress Hospitals are the permanent garrison hospitals of the fortresses, and need no special description.

4. *Evacuation of Sick and Wounded.*

Apart from the work performed within the regimental units and by hospital trains and ships, the duty of collecting and evacuating sick and wounded is carried out by two distinct units, namely, the Bearer Battalion and the Sick and Wounded Transport Department.

The regulations are sufficiently precise to give a clear conception of the Bearer Battalion and its duties. The reports on the battles of Liao-yang, the Sha Ho and Mukden will also help to exemplify the work and organization. The organization of a Bearer Battalion is of special interest, as it gives a better idea of what such a unit should be than the organization of the small Bearer Companies of our Army, at any rate for the purposes of big battles.

Each division forms one Bearer Battalion, the strength of which is nearly 500. But even this strength has not been found sufficient in the big battles for the double duty, imposed upon the battalion, of evacuating from the fighting line to the Dressing Stations and from the Dressing Stations to the Field Hospitals. In the opinion of most medical and staff officers, a third company must be formed and added to the battalion, making it a three- instead of a two-company battalion. The strength would then be about 650, or about 6½ per cent. of the troops in the fighting line.

The special work of the Bearer Battalion is confined entirely to work during engagements. At other times officers and men appear to have no more or no less to do than the officers and men of the fighting battalions in cantonments, that is to say, they are kept exercised in their duties, the men, especially, in the work of improvising stretchers. They may, however, be employed in carrying sick from the regimental Sick Rooms to the Cantonment Hospitals. During an action, they have never been seen taking part in the work of evacuating from a Field Hospital. Their limit of duties is sharply defined there, and it is there that their responsibility for evacuating wounded ceases.

It may be mentioned that the Dressing Station establishment, which is entirely medical, proved adequate for the work it had to do during the heaviest fighting.

The Sick and Wounded Transport Department is a unit which has no equivalent in our medical service. It is worthy of serious study, as the success and rapidity of the evacuation from the Field Hospitals to the line of communication and down the line to railway trains and ships are due to this organization.

As in the case of the Reserve Medical Personnel, each division forms one Sick and Wounded Transport Department Unit, which is kept under the line of communication command and pushed up to the area of operations as required. Thus an Army of three divisions has three Sick and Wounded Transport Department Units on its line of communication. The usual procedure is to distribute them along sections of the line. In this way one unit may be employed in collecting the wounded from the Field Hospitals and taking them to the Stationary Field Hospitals, another in evacuating from the Stationary Field Hospitals to the Line of Communication Hospital at the head of the line, and the third in working along the line to the rail head. While an Army is cantonned, one of the units is usually employed in evacuating from the cantonment hospitals to the Line of Communication Hospitals or nearest railway station, while the other units work down the line.

The establishment and equipment of the unit are extremely small, considering the work it has to do of evacuating large numbers of sick and wounded by road, possibly over many stages, as was the case down to Hai-cheng until the railway was opened for traffic. It is, however, the duty of the unit to utilize local resources both of personnel and transport material, and adapt them to requirements. In Manchuria, with its large coolie population and great resources in the way of country carts and draught animals, the work of the department was easy. In countries without these resources special provision would no doubt be made. In such a case the unit would probably become a large unit both in personnel and transport material.

Hospital Trains and Ships are specially formed units, and do not come under the Sick and Wounded Transport Department. So far, no Hospital Trains have been placed on the railway in Manchuria by the Japanese, but the number of Hospital Ships that have been formed is large, amounting at one time probably to twenty. These are formed in Japan.

5. *Medical and Surgical Supplies.*

A line of Medical and Surgical Supply is organized to extend from the supply factories up to the very front. The regulations give a somewhat clear conception of the organization. There are large private factories at Osaka and Tokio under government inspection. They supply the bulk of the material. A large quantity of roller bandages and first field dressings are prepared by the members of the ladies Volunteer

Association Branch of the Red Cross Society, which has its branches throughout the country, and which receives orders from the War Office to send in definite supplies of such material on given dates.

Supplies are collected at a central depôt in Tokio under the Director-General of the Army Medical Service, and are there packed in uniformly-sized easily-handled wooden cases, suitable if necessary for pack transport, and addressed to the receiving units. The cases are despatched to the ports of embarkation, where they are handled and despatched to a supply depôt at the sea base or bases in Manchuria, and, as is now the case, to a supply depôt in Mukden. These supply depôts also collect and distribute clothing and equipment to the armies as well as medical and surgical material. They are moved from time to time to central positions up the line in conformity with the general advance of the armies.

From these central depôts the medical and surgical material is distributed to line of communication hospitals direct, but the medical units in the area of field operations are supplied from the central field depôts through special mobile units, called the Medical and Surgical Reserve Depôts.

Each division forms one of these reserve depôts. The unit has a large establishment for transport, and like the reserve personnel is divisible into three sections and kept under the line of communication command, being pushed up into the area of operations as required.

The mobility of these units is noteworthy. This is due to their being under the command of an officer of the train and to their inalienable transport material. An army of three divisions has three of these units, or nine mobile sections, for the purpose of supplying medical and surgical material, hospital clothing, &c., to any required point. It will be noted that, according to the regulations, they supply the field hospitals and bearer battalions only, as a routine practice, but that they may be called on to supply line of communication units also, by order from the Principal Medical Officer of the Line of Communication.

The regimental units are supplied from the Field Hospitals or Bearer Battalion, but Principal Medical Officers of divisions are of opinion that it would be better to allow the regimental units to go for their supplies direct to the Medical and Surgical Reserve Depôts, in order to save time in some cases and also to give Principal Medical Officers a better control over expenditure.

6. *Establishments.*

The regulations throw little light on the manner in which the medical service establishments are formed. The following notes may serve to supplement them in this respect:—

Every medical unit, no matter where it is situated or by whom it is manned, must be under the command of a medical officer of the regular medical service. There are three exceptions

to this, namely, the Bearer Battalion, which is commanded by a major of the infantry or train; the Sick and Wounded Transport Department Unit, which is commanded by an infantry or other major, from the retired list; and the Medical and Surgical Reserve Depôt Unit, which is commanded by a subaltern of the train.

The mobile medical units, namely, the Bearer Battalions, the Field Hospitals, the Reserve Medical Personnel, the Sick and Wounded Transport Department, and the Medical and Surgical Reserve Depôts have to submit returns of establishment and animals to the officer commanding their Divisional Train Battalion in the case of the two first, and to the Inspector of the Line of Communication in the case of the three last; but, in all medical matters, these units come under the direct control of the Principal Medical Officers of their sphere of action.

The tables of establishment show how these composite units are made up.

The stretcher-bearers of the Bearer Battalion are obtained from the 1st Class Reserve. Each infantry battalion is passing 16 men annually during peace into the reserve, trained as stretcher-bearers within their units. A large reserve is thus built up, within the Divisional District, of reservists, who in time of war form the establishments of the stretcher bearer companies of the Bearer Battalion.

The rank and file of the medical service are not recruited direct, and with the exception of a cadre of non-commissioned officers, who perform wardmaster and clerical duties in the Garrison Hospitals and with regimental units, do not exist as a corps in time of peace. What happens is this. Each infantry battalion has two men of each company under training annually for the duties of the "medical-service-corporal" of the company or "medical-service-sergeant" of the battalion, who work under the medical officers of the battalion and in the regimental sick rooms. These must be men who have been specially selected after completing one year's service. They are trained partly by the medical officers of the battalion and partly in the Divisional Garrison Hospitals, and it is this latter training that is referred to in paragraph 262 of the regulations. When the training is complete, they are promoted to the rank of corporal in the medical service, or pass into the reserve, after completing their service with the colours, as privates of the medical service. In this way, as in the case of stretcher bearers, a number of men are passing into the reserve annually, trained for the medical service. It is they who, when war breaks out, are mobilized to form the establishments of Field Hospitals and other medical units in the field. The Garrison Hospitals in peace time employ civil sick attendants for nursing duties, and as the enlisted reserve of trained men for medical services is gradually used up for the field units, these civil employés are moved up to the Line of Communication Hospitals. Their place in the Garrison Hospitals (now become the Reserve Hospitals) is taken by the

male or female "relief sections" of the Red Cross Society, the composition of which will be found fully detailed in the report,* submitted last year, on the organization of that society.

Once the elements of medical service establishments in war are understood, it will be seen that the principle on which the service is based is simple and straightforward, and consists in keeping the field units supplied only with trained and enlisted non-commissioned officers and men of the active list or reserve, of filling up the line of communications, when the supply of these is exhausted, with civil sick attendants from the peace establishments of the military hospitals in the home territory and by male relief sections of the Red Cross Society, and by filling the Reserve Hospitals in the Home Territory, as the civil sick attendant establishments are moved up to the line of communication, with female relief sections of the Red Cross Society. These last never proceed to the line of communication, but may be employed on board hospital ships. In all units, however, there remained one or more non-commissioned officers of the medical service as a cadre for clerical and ward-master duties.

The establishment of medical officers is made up from the following elements :—

(1) The medical officers of the regular service on the active list. One of these must be in charge of each medical unit or section of a medical unit or hospital, both in the field and on the line of communication or home territory. He is also in charge of battalion units.

(2) Medical officers of the regular service on the retired list. These may become Principal Medical Officers of depôt divisions or of lines of communication. Some of them, who are eminent in civil life, as, for example, Surgeon-General Sato, Baron Kikuchi,† and Baron Hashimoto, may be employed as consulting surgeons in the reserve hospitals.

(3) Medical Officers of the Reserve. These are medical men who, when medical students, were drawn for compulsory service with the colours, and were permitted to serve one year only, on condition of going into the reserve as medical officers when they qualified.

(4) Civil practitioners, who volunteered to enter the reserve of medical officers when war was declared.

(5) The medical officers of the Red Cross Society's Relief Sections.

(6) Civil practitioners, who are doing duty only in the military hospitals in the Home Territory, and who do not wish to volunteer for the reserve and come under military dicipline.

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* *See* report, printed in the Journal of the Royal Army Medical Corps, April 1906.

† Baron Kikuchi became afterwards medical officer of the First Army in the Field. This was an unusual instance of a retired officer taking up duty with the Field Army.

Classes (3) and (4) are commissioned medical officers during the war, hold rank commencing with that of 2nd lieutenant, and wear the same uniform as the officers of the regular medical service. They serve with all units, Bearer Battalions, Field Hospitals, &c.

Class (5) wear the uniform of the Red Cross Society and have no military rank. Those belonging to male relief sections may serve on the Line of Communication Hospitals, those belonging to the female relief sections on ships and in the Reserve Hospitals.

Class (6) have no rank and wear their ordinary civil dress.

At the time war was declared there were 1,076 officers in Class (1) and 2,317 in Class (3). Class (5) had about 300. It may be estimated then, that, with the addition of Classes (2), (4), and (6), some 4,000 or 5,000 medical officers are available. As the Japanese estimate of requirements is one medical officer for the charge of 50 hospital patients, the numbers available are capable of undertaking the care of at least 200,000 sick and wounded at one time.

The Apothecaries are commissioned officers, and the Compounders are non-commissioned officers of the medical service, who are trained by them. The former are highly qualified scientific chemists, many of them being university graduates in chemical science. They are, in fact, more scientific than pharmaceutical chemists. In this capacity they act as analytic chemists for the Army, take charge of laboratories, and take over all responsibility for the care, supply, issue, and replenishing of medical and surgical material, hospital bedding and clothing, disinfectants, and so on. They are not associated with medical officers in the Medical and Surgical Supply Depôts, but take full responsibility themselves.

The Intendance Officers or subordinates, who are attached to medical units, relieve the medical officers in charge of the units of all trouble and responsibility, except that of command and supervision, in the matter of food supplies, local transport material, local purchases of all kinds, and pay duties.

Dentists are not provided for in the establishments of units, but, recently, one has been attached to each Army in the field. He visits divisions and units, as required, from Head-Quarters.

7. *Equipment.*

The general character of the medical and surgical equipment is shown in the tables of the contents of the various panniers and boxes of the several units. But in addition to these, the Reserve Medical Personnel and the Medical and Surgical Reserve Depôts get up as much material, as they want, in bulk, packed in the wooden cases in which the material is sent out from the central depôt in Japan.

Line of Communication and Reserve Hospitals have no permanent equipment, and obtain what they want from the supply depôts in Japan, from the general depôts in the field, or from the Depôt Division Medical and Surgical Stores.

In addition to the material carried in their panniers, the Field Hospitals, the Medical and Surgical Reserve Depôts, and the Reserve Medical Personnel Units carry a number of tarpaulin packages or bales containing sets of hospital clothing (*i.e.*, one *kimono*, one sash, and one pair of slippers) and sets of bedding, namely, one mattress case and one pillow case. The number of sets that have been carried latterly by Field Hospitals has been 300. In winter, however, large quantities of padded quilts, *kimonos* and blankets were carried, twenty or more country carts being added to the transport for the purpose.

Many accessory articles of medical and surgical material have also been carried by Field Hospitals, according to the personal wishes of the medical officers in charge or of the principal medical officers of divisions. Thus, a portable Roentgen Ray apparatus with dynamo formed an accessory equipment of one Field Hospital of the 5th Division, and all the Field Hospitals of the 4th Division are supplied, from division funds, with a Leitz microscope, magnifying up to 1,500 diameters, and a special bacteriological cabinet. Details of these and of other special equipment will be submitted in a separate report.*

The chief point to note in connection with equipment is the completeness, compactness, and mobility of the equipment of the mobile units and the lack of mobility and organization of material for the line of communication units. The latter, in fact, are allowed to build themselves up gradually, while the field service units are always kept replenished and ready for any emergency.

As regards sick and wounded transport material, the chief point in the organization is the complete absence of any special wheeled transport for ambulance purposes, and the extensive employment of country carts and improvised stretchers or litters. In a country without the resources of Manchuria, the Japanese sick and wounded Transport Service would break down unless it were provided with special equipment, but no doubt the service with its special units would prove equal to the occasion.

In the details of hospital applicances, as given in the tables of contents of panniers, it may be noticed that there is an entire absence of bed-urinals and only a very limited supply of bed-pans. Large numbers of the latter are, however, sent up, as required, in bulk, and as regards the former the empty meat tins (1 lb. tins) are utilized throughout the whole hospital system, both on the line of communication and in the field, for the purpose.

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* *See* report (22), page 363.

8. *Sanitary Organization.*

It will be observed that the regulations contain no chapter which is specially devoted to sanitary duties of the medical service in the field, 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. The sanitary regulations form special regulations or are contained in Army and Divisional Orders, translations of which have already been submitted.*

9. *Statistical Returns and other Documents.*

A study of the forms in the Appendix will give the best idea of the nature of the returns that have to be submitted by the several units. Paragraphs 101 and 127 of the regulations also indicate the kind of reports that are sent in, in connection with engagements and the active work of mobile units.

Attention may be specially directed to the ten-day and monthly returns† of sick and wounded, which have to be submitted by regimental units as well as by hospitals. Indeed the latter have to submit both sets of returns, one for their establishments and the other for their admissions. This explains the reference in Note 17 of the Monthly Return Form.† These separate returns are due to the fact that the Japanese, like most continental armies, have a system of regimental medical service with regimental "sick rooms," where the more trivial cases are treated.

Attention is also directed to such returns as the monthly returns of expenditure of medical and surgical material,† the ten-day returns of personnel and establishment of mobile units,† the returns and receipts for sick and wounded convoys,† and the forms for noting the killed on the field.†

The impression will be gathered that the Japanese medical service has as elaborate a system of returns to maintain in the field as any other army. As a matter of fact, the work in this respect is far more elaborate and careful than has been observed elsewhere, and much of the completeness of the preparations for war, the anticipations of events during the war, and the constant maintenance of the field units in a state of efficiency at all times, with the greatest possible economy, are due to this system of returns. They do not interfere with, but add to, the efficiency of the medical service in the field.

Combined returns are only made by the Divisional Principal Medical Officers. The Army Principal Medical Officers simply forward the divisional returns after perusal.

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* *See* reports (24), (25), (26), (27) and (30), pages 387, 395, 403, 413 and 424.

† *See* Appendices.

Reference is occasionally made in the regulations to patients of the 1st, 2nd, or 3rd Class. This refers to the classification of diseases or injuries into those caused by duty, those not so caused but caused by circumstances over which the patient had no control, and those over which he had control. This is the classification referred to under paragraph (283).

But there is another classification, in the regimental units, into 1st, 2nd and 3rd Class, according to the severity of the injury or disease. Thus patients of the 1st Class are those who must be admitted into the regimental "sick rooms" in cantonments or carried on wagons or horseback during a march. Those of the 2nd Class are excused duty, but must come up daily for treatment in cantonments, and, on the march, have their rifles and knapsacks carried for them. Those of the 3rd Class are given medicine and duty in cantonments, and are not relieved of their accoutrements on the march, although they are allowed to march out of the ranks. They must pass into one or other of the two first classes if they report sick three days running. This is the classification referred to in Note 10 of the Monthly Return Form.*

10. *Conclusion.*

The above notes are only intended as a guide to the organization and to the regulations. Numerous points will no doubt be discovered that require elucidation, but any more detailed set of notes might only lead here to confusion. It has been intentionally, therefore, that they have not dealt with the facts in greater detail.

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* *See* Appendix.

APPENDIX B.

Translation of the Field Regulations of the Japanese Army Medical Service.

(Published by the Minister for War, October 5th, 1903.)

Contents.

Appendices.

Tables of Contents of Medical and Surgical Panniers, &c.

FIELD REGULATIONS OF THE ARMY MEDICAL SERVICE.

Chapter I.—General Principles.

Sub-Chapter 1.—*General Duties of the Medical Service.*

(1.) The Army Medical Service is concerned with the preservation of the health of the troops, with the care of the sick and wounded, and with all matters connected with these subjects.

Medical officers must act in accordance with the Regulations, and it is their duty to make recommendations to the officers commanding units on matters connected with the health of the troops.

Sub-Chapter 2.—*Financial Considerations.*

(2.) Officers, non-commissioned officers and men, civilians employed by the Army, and natives of Japan, who are injured or contract disease during war, will receive medical and surgical attendance at the public expense.

This does not apply to those who enter other than military hospitals, or who are attended by private practitioners for their own convenience.

Others than those enumerated above may receive medical and surgical attendance at the public expense according to circumstances.

(3.) The same rules apply to the sick and wounded of allies or to sick and wounded prisoners, but the recovery of expenses in connection with them will be arranged by agreement with the Governments concerned.

Sub-Chapter 3.—*The Geneva Convention and Badge of Neutrality.*

(4.) The personnel of the Army Medical Service will wear brassards with a red cross on a white ground, and medical and surgical stores will be marked with the same badge.

(5.) Dressing stations and field hospitals will hoist a red cross along with the national flag and, during the night, a red lantern.

(6.) The sick and wounded of the enemy will be protected in accordance with the Convention.

When it is impossible, during a retreat, to carry away the sick and wounded, a sufficient personnel of the medical service and stores, marked with the red cross, will be left with them, and will rely on the protection afforded by the Convention.

Sub-Chapter 4.—*General Duties of Personnel of the Medical Service.*

(7.) Surgeons-captain are subordinate to the officers commanding their units. They will direct the medical duties within the unit, and supervise the work of surgeons-lieutenant and lower ranks.

The senior surgeon-captain with a regiment will supervise the medical work within the regiment.

(8.) Surgeons-lieutenant are subordinate to the officers commanding units, and will assist the surgeons-captain in the medical duties of the unit. Their duties will be as laid down in the previous paragraph if there is no surgeon-captain with the unit.

(9.) Apothecaries are under the command of the officers commanding units and are charged with the receipt, issue, and care of medical and surgical stores and the compounding of medicines. They must supervise the work of any non-commissioned officer or other ranks of the medical service under them, and carry out physical and chemical analyses and experiments, if required.

They will take special care of instruments, see that they are kept clean and in good repair, and exchange those that are unfit for use. They will also be responsible for the local purchases of medical and surgical material.

(10.) Surgeons-captain, surgeons-lieutenant, and apothecaries are under the direction of the Principal Medical Officer of the division to which they belong.

(11.) Hospital sergeants are under the command of their immediate superiors, and will supervise the work of hospital corporals and orderlies.

In each medical unit and in field hospitals one hospital sergeant will have the custody of documents under the officer commanding.

Hospital sergeants, who act as compounders, will compound medicines, issue and receive stores, keep ledgers under the apothecary, and will also supervise the work of instrument cleaners. In the event of a unit or field hospital dividing they may be required to act as apothecaries under the medical officers.

(12.) Hospital corporals perform their duties under their immediate superiors, and will supervise the work of hospital orderlies.

(13.) Instrument cleaners are charged with the cleaning, repair, &c., of instruments, under their immediate superiors, and with handling and taking care of instruments in the operating room.

If required, they must also pack the instruments.

Sub-Chapter 5.—General Regulations for Medical Duties with Regimental Units.

Section 1.—General Principles.

(14.) The medical staff attached to a regimental unit consists of surgeons-captain and lieutenant, hospital sergeants, and hospital corporals.

In addition to this staff a certain number of soldiers are instructed as stretcher bearers in the infantry and artillery. They may be charged with the duties of applying first aid and of carrying sick and wounded. When they are so employed they are called assistant stretcher bearers.

Section 2.—Medical Duties on the March and at the Halt.

(15.) The medical duties on the march and when troops are stationary do not differ materially from the duties during peace.

(16.) Slight cases, that are temporarily unfit to march, will be permitted to take off their arms and accoutrements, wear sandals, and be carried on carts or horse-back, if possible.

Cases of illness or injury requiring longer treatment will be reported to the commanding officer and sent to a military hospital, a rest station, or a local civil hospital. In the last event the unit concerned will report the fact to the nearest military authority on the line of communication.

(17.) During a halt, the medical officers will take special care to see that the condition of billets and cantonments is sanitary. They will inquire into the prevalence of infectious disease, examine the quality of the water supplies, and make recommendations to the officers commanding.

(18.) Medical officers will establish regimental sick rooms during a halt, where slight cases may be received for treatment. When the regiment advances these cases will be disposed of as noted in paragraph 16.

Regimental medical officers may be called upon to do duty in any military hospital that has been opened in the locality, should the occasion demand their services.

Section 3.—Medical Service during an Engagement.

(19.) During an engagement the medical officers attached to regiments will establish relief posts immediately behind the fighting line and under cover. They will direct the hospital sergeants and others in collecting and giving first aid to the wounded.

Relief posts may be indicated by special marks, if necessary, provided that they do not offer a mark for the enemy.

(20.) The medical staff with a cavalry regiment will make arrangements for medical aid during a charge under the instructions of the commanding officer. With artillery, relief posts will be established near the guns and, if possible, out of range of the enemy's guns.

(21.) During the progress of an engagement, if the main dressing station has not been established or is too far off, temporary dressing stations will be formed by regimental medical officers, and they will collect and dress the wounded there.

A sufficient establishment from the units will be left at these temporary dressing stations, and the remainder of the medical establishment of the units will continue with the units.

It is convenient to bring to such dressing stations the wounded of other units in the vicinity.

(23.) Temporary dressing stations will be established by the order of the officer commanding the unit, but, in the event of no order being received, the medical officer will, if he thinks it necessary, recommend the establishment of a temporary dressing station, and if there is no time to receive the required order he will establish the station on his own responsibility and report the facts afterwards.

(24.) The officer commanding the unit will give the orders for the employment of the assistant stretcher bearers, but the medical officers may recommend their employment without waiting for the order. Assistant stretcher bearers employed will leave their arms and knapsacks at the temporary dressing station, put on a red cloth brassard on the right upper arm, take up stretchers and surgical havresacks and proceed to the fighting line, where they will give first aid and carry the wounded back to the dressing station. They will obtain the surgical haversacks from the hospital corporals attached to the unit, who may be doing duty at the temporary dressing station.

The assistant stretcher bearers are not entitled to the protection of the Geneva Convention.

(25.) In batteries of artillery the gunners may not be instructed as stretcher bearers except by the order of the officer commanding.

(26.) The surgeons-lieutenant will direct the work of the hospital non-commissioned officers in the fighting line. In order that the wounded may be properly removed to the rear, they will distinguish between those that are able to walk and those that require to be carried.

(27.) The temporary dressing stations will be established as near to the fighting line as possible, and where it may be convenient to receive the wounded and forward them to the rear. They must not be placed where they will interfere with the movements of the fighting line, they should be near a water supply and out of range of fire. In the selection of a site, however, proximity to artillery must be considered unavoidable. Suitable direction indicators will be put up if necessary.

(28.) Straw, hay, &c., will be collected in the greatest quantities available for the wounded to lie on, and carts and other vehicles will be requisitioned. Blankets, matting, baskets, &c., will be collected for the purpose of making improvised stretchers.

(29.) The work at a temporary dressing station will be similar to that of a main dressing station. The senior medical officer may arrange any deviation at his discretion.

(30.) Rations for the temporary dressing stations will be supplied by the units to which they belong, or by units in the vicinity.

If blankets are required, an application must be made to the officer commanding the unit, and his orders awaited.

(31.) Temporary dressing stations will be closed when the bearer battalion has commenced to work. If necessary, the medical officers of the temporary dressing stations will proceed to the main dressing station and assist in the work there. The other medical personnel and the assistant stretcher bearers will rejoin their unit as quickly as possible. The pack animals will also return to the unit and join the first line baggage animals.

Temporary dressing stations may remain open, if the circumstances demand, even after the main dressing station has been established.

Section 4.—Identification Tallies.

(32.) Identification tallies are used to identify officers, non-commissioned officers and men, as well as civil employés, who may be killed or wounded.

The hospital non-commissioned officers and orderlies who make the entries in the daily returns of killed and wounded (Form I, Appendix)* will obtain the details from the soldier's small book, clothing marks or identification tallies, whenever the soldier is killed or unable to give the details himself.

The identification tally must not be removed from the killed and wounded.

Sub-Chapter 6.—Punishment for Violation of the Regulations.

(33.) The Principal Medical Officer of the Field Forces, the Principal Medical Officers of Armies and divisions, the officers commanding hospitals and bearer battalions, and the commanders of other units will report the cases of violation of the orders to the authorities concerned after they have made the necessary investigation and if the offence comes under the penal code.

If the offence can be dealt with as a matter of discipline only, they may dispose of it themselves.

Chapter II.—Medical Service of the General Staff.

(34.) The Principal Medical Officer of the Field Forces is under the Inspector-General of the Lines of Communication, directs all matters connected with the medical arrangements in the field, and exercises control over them.

(35.) He will be in constant communication with the War Office in order to ensure the prompt execution of all matters connected with his duties. He will submit his requirements to the War Office.

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* *See* Appendix 1.

(36.) He will make arrangements for receiving and conveying sick and wounded, for the distribution of medical establishments, and for replenishing medical stores. He will keep constantly in touch with the line of communication, transport, and telegraphic authorities.

(37.) He is also authorized to issue orders to the Chairman of the Committee of Management and other authorities of the Red Cross Society with regard to the employment of the Relief Sections of the Society.

(38.) He will make the necessary arrangements for the medical charge of the General Head-Quarters Staff.

(39.) He will forward all documents and reports submitted to him by the Principal Medical Officers of Armies in the field and of lines of communication, immediately after examination, to the Director-General of the Army Medical Service at the War Office, or to the Inspector-General of the Lines of Communication.

Chapter III.—Medical Service with the Field Army.

Sub-Chapter 1.—*Medical Service with the Head-Quarters of an Army.*

(40.) The Principal Medical Officer of an Army in the field is under the General Officer Commanding the Army. He is charged with the duties of making the medical arrangements for the Army and of controlling and superintending the work of the medical service. So far as the appointment of officers of the medical service and other professional matters are concerned, he is under the direction of the Principal Medical Officer of the Field Forces.

(41.) Principal Medical Officers of field Armies must make themselves thoroughly acquainted with the orders issued by the general officers commanding, and must carry out their duties in a manner consistent with the plan of campaign and other matters connected therewith.

(42.) In consultation with the chiefs of the staff and with their assistance, they will make complete preparations for the personnel, horses, stores, and quarters required for the care of the sick and wounded.

(43.) They will be in constant communication with the Principal Medical Officers of divisions and of lines of communication, with a view to facilitating the evacuation of the sick and wounded, and thus avoiding interference with the execution of the operations.

(44.) They may recommend to their general officers commanding that one or more of the field hospitals be transferred to the lines of communication, so long as no inconvenience to

the operating forces is caused thereby. They will order the transfer as a temporary measure when they receive the necessary authority.

(45.) They are authorized to issue orders to the Managers of the Red Cross Society, who may be attached to the armies in the field; but when these have been definitely appointed to work in the line of communication command, they are not empowered to issue orders to them direct.

(46.) Principal Medical Officers of Armies in the field will examine all documents submitted by Principal Medical Officers of divisions or lines of communication, and afterwards forward them without delay to the Principal Medical Officer of the Field Forces or to the general officers commanding the Armies.

(47.) Whenever the communication is interrupted between the Principal Medical Officers of Armies and the Principal Medical Officer of the Field Forces, the former will carry on the functions of the latter until communication is restored, and will then report the particulars of all occurrences that took place during the period of interruption.

(48.) The Principal Medical Officer of an Army in the field will make the necessary arrangements for the medical charge of the Head-Quarters Staff of the Army.

(49.) On demobilization, the Principal Medical Officers of Armies will make a report on the medical work of their Armies, giving their own opinions and comments, and submit it to the Director-General of the Army Medical Service at the War Office.

Sub-Chapter 2.—*Medical Service with the Head-Quarters of a Division.*

(50.) The Principal Medical Officer of a division is under the general officer commanding the division, and is responsible for the entire medical service of the division.

As regards medical personnel and professional duties, he is, however, directly under the Principal Medical Officer of the Army to which the division belongs.

(51.) He must be given full information and orders regarding the main points of the plan of operations, &c., and matters relating thereto, which are given to the various other units in the division, and he will make the necessary medical arrangements in accordance with the information and orders given him.

(52.) He must be prepared with plans for immediate and prompt action in connection with the medical work during a march and during prolonged halts, more especially with regard to the anticipation of epidemic diseases and their prevention.

(53.) Whenever there is no military or local hospital available and the communications are cut, or if other causes prevent him evacuating the sick and wounded during an advance, he will report the facts to the general officer commanding the division, noting some place which would be suitable for the establishment of a rest station. In the establishment of such a rest station for sick and wounded, he will utilize the personnel and equipment of a field hospital, which will remain stationary at the spot until the sick and wounded can be handed over to the line of communication, when it will continue to advance.

(54.) When the whole or part of a division halts for a prolonged period in any locality, a Cantonment Hospital may have to be opened. He will then report the facts to the general officer commanding, and in consultation with the chief of the staff arrange the details for establishing as satisfactory a cantonment hospital as possible. He will also arrange in the same manner the details for establishing an Isolation Hospital, when necessary, which will be a section of the Cantonment Hospital.

The personnel and material for these hospitals will be obtained from a field hospital, and if necessary other medical personnel may be ordered to do duty in them. When the division continues its advance, he will report to the general officer commanding and hand over the Cantonment Hospital without delay to the line of communication authorities.

(55.) When an engagement is imminent, the Principal Medical Officer of a division will consult with the chief staff officer and select the field hospitals that are to accompany the first line. He will also submit to the general officer commanding the orders which he considers necessary for the general medical service during the engagement.

In an emergency, when there is no time to wait the issue of orders by the general officer commanding, the Principal Medical Officer will take the responsibility of issuing orders to the medical units himself and report afterwards to the general officer commanding.

(56.) When he anticipates that the engagement will be prolonged, he will consult the chief of the staff and get ready personnel and material for the evacuation of the wounded, if necessary making use of the bearer battalion for the purpose.

(57.) He will inform the Principal Medical Officer of the Army, to which the division belongs, where field hospitals are opened and closed, and submit copies of the orders issued. If necessary, he will also give the same information to the Principal Medical Officer of the line of communication.

(58.) With the approval of the chief of the staff, he may attach personnel of bearer companies and field hospitals to other bearer companies and field hospitals, if stress of work demands that this should be done.

(59.) He will see that waste is prevented and economy ensured in the expenditure of medical and surgical material, both by the field medical units and by the regimental units. He will take the necessary steps to have the material replenished before it becomes exhausted.

(60.) After an engagement, he will collect the reports required in accordance with the regulations of the Imperial Head-Quarters Staff (*see* paragraphs 101 and 127 of these regulations), and forward them to the general officer commanding the division and to the Principal Medical Officer of the Army to which it belongs.

(61.) He will examine all the reports submitted by the medical units and by medical officers with regimental units. He will bring to the notice of the general officer commanding the division, or the Principal Medical Officer of the Army, without delay, anything in them that requires to be brought to notice.

(62.) Whenever communication between the offices of the Principal Medical Officer of a division and the Principal Medical Officer of the Army to which it belongs is interrupted, the former will carry on the functions of the latter until communication is restored, when he will immediately report in minute detail all occurrences that took place during the time communications were closed.

(63.) The Principal Medical Officer of a division will make the necessary arrangements for the medical charge of the Head-Quarters Staff of the division.

(64.) In the event of a division acting as an independent command, the Principal Medical Officer will also carry on the duties of a Principal Medical Officer of an Army.

(65.) On demobilization, the Principal Medical Officer of a division will record his opinions regarding the medical work of his division, and submit them direct to the Director-General of the Army Medical Service at the War Office.

Sub-Chapter 3.—*The Bearer Battalion.*

Section 1.—*General Principles.*

(66.) The duties of a bearer battalion are to establish a main dressing station behind the fighting line, collect and dress the wounded there, and send them back from the fighting line.

If necessary, a bearer battalion may be required to help in the work of a field hospital.

(67.) As regards their movements, the bearer battalions are under the orders of the general officers commanding their divisions, and as regards their professional work under the orders of the Principal Medical Officers of their divisions.

(68.) It is the duty of a bearer battalion to keep up with the fighting line, but as its dressing station is not so mobile, a certain number of the personnel must be left behind until the wounded can be handed over to a field hospital when the rest of the battalion advances.

Section 2.—Organization.

(69.) A bearer battalion consists of a staff and two companies. The battalion baggage remains with the staff, and will contain rations for 100 wounded in addition to that required for the personnel and horses of the unit.

(70.) Each bearer battalion is designated by the number of the division to which it belongs. Its companies are designated No. 1 Company and No. 2 Company.

When a bearer battalion is divided into two units working independently, No. 1 Company is designated No. 1 Half Battalion, and No. 2 Company No. 2 Half Battalion.

(71.) Each company is divided into two sections, each section into two half sections, and each half section into two squads.

Section 3.—Duties of the Personnel.

A.—*The Personnel of the Staff.*

(72.) Under the general officer commanding the division the officer commanding the bearer battalion comes under the authority of the officer commanding the train battalion. He is responsible for the good conduct and strict attention to duties of the subordinate officers, rank and file; but as regards the medical service within the battalion, the personnel of the medical service, professional duties, and medical and surgical material, come under the authority of the Principal Medical Officer of the division, and with regard to these he will receive orders from the Principal Medical Officer.

(73.) When he receives orders to open the dressing station, he will select a site in consultation with the senior medical officer, and place him in charge of it. He will then order the company officers to proceed to collect and bring the wounded back to the dressing station. Should he consider it necessary to establish the dressing station before his orders to do so arrive, he will open the dressing station in consultation with the senior medical officer, and report the fact at once to the general officer commanding the division.

(74.) He will instruct his men to adhere strictly to the Geneva Convention, and will prevent them using their side-arms without cause, so as to avoid losing the neutrality conferred on them by the Convention.

(75.) In the absence of the officer commanding the battalion, the senior company officer will command. When the battalion is divided, the company officer will carry on the duties of a battalion commanding officer for his half battalion.

(76.) The senior medical officer will have command over the personnel of the medical service within the battalion, and will be responsible for seeing that the work of the dressing station is properly carried on. He will also take command of any members of the medical service that may be attached temporarily to the dressing station.

(77.) The senior medical officer of the battalion will distribute the dressing station duties amongst the medical personnel, and he will keep them instructed in the methods of collecting and evacuating wounded, and in laying out and getting ready medical and surgical material as expertly and expeditiously as possible.

(78.) He will superintend all departments of the dressing station when it is being opened, and will himself take charge of the department for the serious cases.

He will see that the personnel mutually help one another according to the amount of work falling on each department.

(79.) In the absence of the senior medical officer, he will be represented by the next senior, who will also act as the senior medical officer of a battalion for No. 2 Half Battalion.

B.—*Personnel of the Companies.*

(80.) The company commander commands the company, and is responsible that the wounded are properly carried in.

(81.) The work of bringing in the wounded to the dressing station will be commenced on the order being given by the officer commanding the battalion, or at the request of the senior medical officer.

(82.) The section commanders command the sections, and are responsible for the work of their section in collecting and bringing in the wounded.

(83.) The distribution and movements of the sections are under the control of the company commander, but the commanders of sections may, if necessary, alter the direction of the movement of their sections on their own responsibility, in order to keep touch between temporary dressing stations and collecting stations. The section commanders will place the squad commanders at the disposal of the medical service personnel attached to the companies, and will endeavour to keep in touch with them.

Section 4.—The Work of the Dressing Station.

(84.) The work of the dressing station is to give whatever treatment may be necessary as expeditiously as possible to the wounded brought in from the fighting line, and then send them on to the rear.

The dressing station must endeavour, by rapid opening, working and closing, to keep up with the fighting line and co-operate with it as it advances or retires.

(85.) The site selected for opening the dressing station should be within one kilometre of the fighting line, and it must be sufficiently open ground to allow for arrangements for bringing in and evacuating the wounded. It should not be in the direction of the enemy's fire, but its position should not be concealed. The site should be near water supplies and where the wounded can be protected from rain, snow, sun, or cold.

(86.) At the time the dressing station is being opened, as much straw, hay, &c., as possible will be collected for the wounded, country carts and other means of transport requisitioned, and blankets, matting, baskets, &c., suitable for improvising stretchers accumulated.

(87.) The dressing station will be divided into four departments, namely, (*a*) The Admission and Discharge Department, (*b*) The Department for Serious Cases, (*c*) The Department for Light Cases, and (*d*) The Apothecary's Department. Each department will be indicated by coloured plates as follows:—Navy blue for (*a*), white for (*b*), red for (*c*), and black for (*d*).

(88.) Department (*a*) will have two sections—one for the reception of the wounded, and the other for the despatch of the wounded to the rear.

The wounded are brought into the reception section; the nature of the wounds will be examined into here, and the wounded separated into serious and light cases. They will then be passed on to the departments for these cases, the serious cases being attended to first. Should there be cases that require no immediate treatment, a diagnosis tally* will be affixed and the case sent direct to the discharge section of department (*a*.)

In the discharge section the wounded will be evacuated under the following rules:—

1. Lightly wounded who are able to walk a long distance without risk will be paraded, in order, and placed under the command of the senior amongst them. They will then be marched off to the place where the Sick and Wounded Transport Department is stationed, or to the nearest hospital on the line of communication.

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* *See* Appendix 2.

2. The remainder of the wounded will be divided into those who are able to walk and those that must be carried. They will then be handed over to the company of the bearer battalion that has to work between the dressing station and the field hospitals. Those who can walk will be put under the charge of the senior amongst them, as in the case of the previously mentioned class of lightly wounded.

In the case of wounded who arrive unconscious at the reception section, the money and valuables in their possession will be noted and a list made out on the form shown in Appendix 3,* giving the description and number of each article. The list, along with the money and valuables, will be handed over for safe custody to the senior Intendance Subordinate Officer, and, when the patient is sent back from the dressing station, the list and articles will be handed over to the individual in charge of the patient, who will attach his signature and seal to a receipt copied into the note book of the Intendance Subordinate Officer. The arms and equipment of the wounded will also accompany them, as a rule, to the rear.

A list of the wounded received into and discharged from the department will be kept. The personnel of the department will consist, as a rule, of one surgeon-captain, one surgeon-lieutenant, and a few non-commissioned officers of the medical service.

(89.) In Department (*b*) the wounded will receive temporary treatment and, when the dressing of the case is finished, a diagnosis tally will be attached and the patient handed over to the discharge section of Department (*a*) for transfer to the rear. The personnel of the Department for Serious Cases will consist of the Senior Medical Officer, one surgeon-captain, and two surgeons-lieutenant, along with a few non-commissioned officers of the medical service.

(90.) In the Department for Light Cases minor dressings and treatment will be given, the diagnosis tally affixed, and the patient handed over to the discharge section of Department (*a*) for transfer to the rear.

The personnel of the Department for Light Cases will consist, as a rule, of three surgeons-lieutenant and a few non-commissioned officers of the medical service.

(91.) In the Apothecaries Department, the medical and surgical panniers will be opened, and the contents arranged for the issue of the necessary material. The personnel of the department will consist of the apothecary and a few non-commissioned officers or compounders of the medical service.

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* *See* Appendix 3.

Section 5.—The Work of the Companies.

(92.) The duties of the companies of the bearer battalion consist in searching for, affording first aid to, and bringing in the wounded to the rear.

These duties are divided into two sections of work, namely, the front service and the rear service. The duty of the former is to convey the wounded from the fighting line to the dressing station, and the duty of the latter to convey them from the dressing station to the field hospitals or similar positions.

(93.) The work of the front service commences simultaneously with the order for the bearer battalion to commence work. The work of the rear service commences, as a rule, when the work of the front service begins to slacken.

(94.) In conveying wounded from the fighting line to the dressing station, an exchange of stretchers may be made at an intermediate point according to the distance, condition of the ground or progress of the fighting, or an exchange may be made to country carts, &c., according to circumstances; but in order to effect these exchanges there must be no delay in the removal of the wounded to the dressing station.

When the dressing station is concealed, or the road to it liable to be mistaken, a direction sign must be put up.

(95.) During the time the stretcher bearers are at work they will leave their knapsacks at or in the vicinity of the dressing station. One stretcher and one surgical haversack will be taken by each squad of four men. The stretchers will be issued by the apothecary and handed back to him when the work is finished.

(96.) A stretcher squad will, as a rule, consist of four men, but in times of great pressure of work it may consist of three or even of two men only. The bearers from the squad so reduced will be employed in carrying men in by hand-seats, or in assisting men who come in on foot, or in making improvised stretchers.

(97.) The squads of the front service will go up to the fighting line without delay, search for wounded there, and give temporary first aid treatment, or any attendance that may be necessary at the relief posts, and then carry them back to the dressing station.

The ammunition of the wounded must be removed and handed to men in the fighting line. The arms and equipment of the wounded will be carried back by the stretcher squads, those wounded who are able to do so carrying as much as possible themselves. Care must be taken to remove the ammunition from rifles that are loaded.

(98.) Even though a man appears to be dying, care must be taken to carry him in carefully. When the stretcher bearers

are unable to determine whether a man is dead or not they must consult one of the medical service establishment with them.

(99.) Under certain circumstances, the bearer battalion may be required to do temporary duty at a field hospital or in the rear of a field hospital.

Section 6.—The Diagnosis Tally.

(100.) A diagnosis tally* must invariably be attached to the wounded, a white tally to the serious cases, and a red tally to the light cases.

The chief particulars of the treatment at the dressing station and the precautions to be taken during transport must be noted on the tally. Should the patient be unable to give the particulars regarding name, &c., the procedure laid down in paragraph 32 will be followed.

Section 7.—Report on the Work of the Bearer Battalion.

(101.) A report of the work accomplished will be submitted at the close of each engagement by the senior medical officer for the dressing station, and by the company officers for the companies. The officer commanding the bearer battalion will collect these reports, add his own remarks and submit them to the Principal Medical Officer of the division.

The reports will give the following details, but an approximate summary of the number of killed and wounded according to rank, &c. will be sent in immediately after the engagement :—

(*a*) Dressing Station Report.

1. Date, weather, time of opening and closing, name of district and locality, with a sketch plan if possible.
2. Whether the whole or only the half battalion dressing station was employed.
3. The names of the regiments to which the wounded brought in belonged, and the numbers for each. The nature of the wound and the name of the wounded must be given in the case of officers or of killed; the kind of wounds, the parts of the body hit, and the nature of the treatment given at the time of the injury. In the case of engagements lasting more than one day, each separate date must be noted.
4. The number of surgical operations performed. In the case of major operations, the nature and site of the wound.
5. The medical and surgical material issued and expended.

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* *See* Appendix 2.

6. The names and ranks of the officers working in each of the departments, including those appointed to assist from other units; the number of non-commissioned officers and others employed in each department. Names of these will not be entered.

(*b*) Companies' Reports

1. Date, weather time of commencing and ending work, and name of locality.
2. The distance and condition of the road over which the wounded were carried, and the fitness of the bearers for the work.
3. The total number of the wounded brought in. The number of those who were able to walk and the number carried.
4. An account of the material used in the carrying of wounded.

Sub-Chapter 4.—*The Field Hospital.*

Section 1.—*General Principles.*

(102.) The chief duties of a field hospital are to receive the wounded from the dressing station and fighting line, carry on whatever treatment is necessary, and transfer them to the rear.

(103.) The orders for the moving, opening and closing of a field hospital are issued by the general officer commanding the division, and instructions regarding professional duties by the Principal Medical Officer of the division.

(104.) When a field hospital is employed within the line of communication, the orders will be issued by the Inspector of the Line of Communication, and the professional instructions by the Principal Medical Officer of the line.

Section 2.—*Organization.*

(105.) A field hospital is provided with army medical and other auxiliary personnel and equipment, sufficient for the treatment of 200 wounded. It has also reserve rations both for the personnel and patients.

A field hospital may be divided, if necessary, into two sections, capable of carrying on the work as field hospitals independent of one another.

(106.) The number and name of the division will be affixed to the field hospitals belonging to it. When a field hospital is divided, the section to which the senior medical officer is attached is named No. 1 half, and the other No. 2 half of the field hospital.

Section 3.—Duties of the Personnel.

(107.) The officer commanding a field hospital, under the general officer commanding the division, is placed under the authority of the officer commanding the divisional train battalion, and is responsible for the proper management of the hospital and of the establishment. He is under the authority of the Principal Medical Officer of the division as regards the personnel of the medical service, professional duties, and medical and surgical equipment.

He will keep in touch with the Sick and Wounded Transport Department, and the nearest head-quarters station on the line of communication. He will see that a constant evacuation of sick and wounded is maintained.

(108.) He will distribute the duties amongst the rest of the establishment, but he is responsible himself for the treatment of the more serious cases.

(109.) He will cause the senior intendance subordinate to obtain and get ready carts, horses, coolies, &c., for the transport of the patients, whenever necessary, but if he finds that these are not procurable he will await the decision of the Principal Medical Officer as to the course to be pursued.

(110.) In his absence he will be represented by the next senior medical officer; and, when the hospital is divided into two, a surgeon-captain will be appointed to command No. 2 half and carry out the duties in it of an officer commanding a field hospital.

Section 4.—Duties on the March and at the Halt.

(111.) It is the duty of a field hospital to supply the necessary establishment and equipment, whenever a rest station has to be formed during an advance, under paragraph 53, or a cantonment hospital, under paragraph 54, during a halt.

(112.) The name of the locality will be affixed to each rest station or cantonment hospital, and the rest station or cantonment hospital will be known as the Rest Station or Cantonment Hospital of such and such a locality.

In establishing a rest station or cantonment hospital, buildings previously used as hospital buildings or other suitable buildings will be taken up, and their situation will be noted on a placard at the entrance to the town or village, in the public square or at the railway station, the direction being indicated, if necessary, by signs.

(113.) Patients who are not likely to recover rapidly and are able to walk or to bear transport will be transferred back as soon as possible. For this purpose the officer in charge of the cantonment hospital will keep in touch with the Sick

and Wounded Transport Department and with the headquarters of the line of communication, and effect the necessary transfer.

(114.) With regard to the duties inside a cantonment hospital, the regulations for the reserve hospitals in the Home Territory will be followed as much as possible.

(115.) The personnel of a cantonment hospital will wait until they are relieved, when their division continues to advance, and will then rejoin the division on the march.

The method of handing over a cantonment hospital or rest station will be in accordance with the instructions in Paragraphs 122 and 123.

Section 5.—Opening a Field Hospital.

(116.) On instructions being received to open a field hospital, the officer commanding will take steps to inform the officer commanding the bearer battalion and the Principal Medical Officer whenever he is ready to receive patients.

(117.) The site of a field hospital should, as far as possible, be near the dressing station, out of range of fire, readily seen, in a locality with plenty of water, and with facilities for the transport of wounded. A good site is the proximity to a railway or to a river, down which the wounded can be carried.

If the site is concealed or the road easily mistaken, road indicators should be put up.

(118.) The local hospital or other suitable building should be selected for a field hospital, but the crowding of patients into one building or scattering them over many buildings should be avoided as much as possible.

On a field hospital being opened, as large a quantity of rugs, straw, hay, &c., as possible should be collected to form bedding for the patients, as well as other suitable articles of equipment and material for transport of sick and wounded.

(119.) The following departments of a field hospital will be arranged, but the wards will be further divided into sections according to the number and nature of the disease and wounds:—

(*a*) Administration.
(*b*) Statistics.
(*c*) Wards.
(*d*) Operations.
(*e*) Apothecary.
(*f*) Disinfection.
(*g*) Kitchen.
(*h*) Ablution.
(*i*) Mortuary.
(*j*) Stables.
(*k*) Wagon park.

Section 6.—Measures to be taken on Advancing and Retreating.

(120.) Field hospitals will advance and retire in conformity with the movements of their division, and the opening and closing of field hospitals must be carried out as quickly as possible and with the least possible confusion.

(121.) Field hospitals should hand over their buildings and patients without delay to the reserve medical personnel, but if the whole of the hospital cannot be transferred at one time a report, stating the facts of the case, must be sent to the Principal Medical Officer of the division, and one half-hospital will advance while the other half remains.

In carrying out the transfer from a field hospital to the reserve medical personnel, the transfer should not be so hurried as to interfere with the proper treatment of the patients.

(122.) The main point to attend to in effecting the transfer of patients is to give a verbal statement of each case to the medical officer of the reserve personnel who takes it over, and at the same time to hand to him, complete in every detail, the Case and Prescription Sheets. As far as possible, the senior medical officer of the line of communication station should be present to witness the transfer.

(123.) Bedding and clothing and any medical or surgical material used by the patients will be handed over with the patients, and fresh articles will be received in their place.

The list of arms, clothing, equipment, &c., and also the list of money and valuables will be handed over with each patient and a receipt obtained.

(124.) Should the reserve medical personnel fail to arrive to take over a field hospital when the division advances in consequence of the communications with the head-quarters of the division having been cut or having become uncertain, the officer commanding the field hospital will report the facts to the Inspector of the Line of Communication and await his orders.

The Inspector of the Line of Communication will repeat the information to the Head-Quarters of the Army and of the division and send up the reserve medical personnel as quickly as possible.

(125.) When the transfer of a field hospital has been completed, the fact will be reported to the Principal Medical Officers of the division and of the line of communication, the report being signed by the senior medical officers of the field hospital and of the reserve medical personnel concerned in the transfer.

(126.) When a division retreats the field hospitals should retire as quickly as possible in front of the troops; but should the transport of the sick and wounded along this

line interfere with the movement of the division, the field hospitals should, if possible, change their route.

Section 7.—Report on the Work of a Field Hospital.

(127.) When a field hospital is closed or transferred, the officer commanding will send in a written report on the following points to the Principal Medical Officer of the division. The nominal return of surgical operations* will be attached. Immediately after an engagement a rough statement will also be sent in, showing the number and ranks of the wounded dealt with and of the deaths in the hospital:—

(*a*) Date of opening and closing, state of weather, condition of the locality, name of the locality, condition of buildings used, and a rough sketch plan of the hospital.

(*b*) The name of the regiments to which the patients belong and the number in each. In the case of officers and of patients who have died, the name of the patient and the nature of his wound or disease will be entered.

(*c*) The number of patients admitted.

(*d*) The number of patients transferred.

(*e*) The circumstances under which the hospital was closed or transferred.

(*f*) An account of the medical and surgical material received and expended.

(*g*) A statement of the supplies obtained and issued.

(*h*) The rank and name of the medical officers, including those from other units, who took part in the work.

(*i*) Other points of interest or importance.

Sub-Chapter 5.—Medical Service with the Head-Quarters of a Line of Communication.

(128.) The Principal Medical Officer of a Line of Communication is under the authority of the Inspector of the Line of Communication, and is responsible for the supervision and command of the line.

He will receive instructions regarding his duties from the Principal Medical Officer of the Army, to which the line of communication belongs, but, as regards the duties of evacuating sick and wounded to the Home Territory and the employment of relief sections of the Red Cross Society, &c., he will receive instructions from the Principal Medical Officer of the Field Forces.

In order that his duties may be carried out with greater facility, he will be in direct communication with the Principal Medical Officers of divisions.

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* *See* Appendix 4.

(129.) He supervises and commands all the medical personnel, doing duty temporarily or permanently within the line of communication, and he may make use of any members of field hospitals that may be temporarily within the line.

(130.) He will cause the reserve medical personnel to take over from the field hospitals and establish stationary field hospitals as quickly as possible.

(131.) He will plan the arrangements for the evacuation of sick and wounded down the line, leaving the details for carrying out his plans in the hands of the Sick and Wounded Transport Department so that the latter may carry on the evacuation as rapidly as possible.

(132.) On becoming aware of any deficiency in medical personnel within the line of communication, he will endeavour to engage doctors, apothecaries, and sick-attendants locally.

(133.) In the ordinary course of events, he has charge of the distribution of medical and surgical material to the army in the field, and should make himself acquainted with the existing condition and sufficiency of the material in the medical and surgical reserve depôts. He should meet the requisitions of the various units and see that there is a proper distribution of material.

He should prepare requisitions for the necessary supply of men, animals, boats, carts, &c., for forwarding medical and surgical material, when necessary, and consult and obtain the assistance of the Head-Quarter Staff of the line of communication in carrying this out.

(134.) He will keep the Principal Medical Officer of the Army, and also the Principal Medical Officers of Divisions and other units whom it may concern, informed of the position of the medical and surgical reserve depôts, the reserve medical personnel, and the sick and wounded transport department units. He will also inform them, whenever a field hospital, located within the sphere of the line of communication, has been removed from or restored to the sphere of the army operating in the field.

(135.) He will examine all reports submitted by the medical units within the sphere of the line of communication, and forward them to the Principal Medical Officer of the Field Forces, sending copies to the Principal Medical Officer of the army to which he belongs and to the Inspector of the line of communication.

(136.) The officers of the medical service within the line of communication will receive their orders from the Principal Medical Officer of the line. Their duties will consist in investigating the healthiness or unhealthiness of localities, in facilitating the rapid transport of sick and wounded down the line, in watching the course of the operations and bringing up

the reserve medical personnel to relieve the army at the front, and take over the sick and wounded from the field hospitals with accuracy and expedition.

(137.) The Principal Medical Officer of a Line of Communication will make suitable arrangements for the medical charge of the head-quarters staff of the line of communication.

(138.) He will submit a detailed report of his work to the Director-General of the Army Medical Service at the War Office on demobilisation.

Sub-Chapter 6.—Medical Service with a Station Staff on the Line of Communication.

(139.) Rest stations will be established, as required, for the proper care of sick and wounded passing down the line of communication. They may be established as sections of a line of communication hospital.

(140.) The station staffs of a line of communication will get ready suitable material for the service of the transport of sick and wounded.

(141.) When a station staff officer requires any additional medical personnel, he will apply through the Inspector of the Line.

Sub-Chapter 7.—Line of Communication Hospitals.

(142.) Line of communication hospitals will be established, as required, for the reception and treatment of the sick of units marching along the line or units stationed within the area of the line, and also for the reception and treatment of those sick and wounded who are being evacuated down the line but who are unable to continue the journey.

(143.) When it is necessary to open a line of communication hospital at any station, the Principal Medical Officer will make an application to the Inspector of the Line, and consult with the officer commanding the station with regard to the supply of personnel and material.

In addition to the personnel appointed to the station staff command for a line of communication hospital, as much use as possible will be made in the hospital of the relief sections of the Red Cross Society and of local medical practitioners; but the officer in charge of the hospital must invariably be an officer of the regular Army Medical Service.

The personnel of the reserve medical personnel units, and of the sick and wounded transport department units, may be called upon to assist in the work of a line of communication hospital.

(144.) Line of communication hospitals will beopened in accordance with the regulations for the opening of a field hospital.

The medical duties in the line of communication hospitals will be regulated by the Principal Medical Officer of the line, but questions of discipline and supply will come under the jurisdiction of station commanding officers.

Sub-Chapter 8.—*The Reserve Medical Personnel.*

(145.) The Reserve Medical Personnel is a unit formed for the purpose of establishing, with the necessary medical and surgical panniers, &c., stationary field hospitals.

(146.) The personnel will also take part in the work of the line of communication hospitals and of the Sick and Wounded Transport Department.

(147.) The officer commanding a reserve medical personnel unit is under the authority of the Inspector of the Line of Communication, but receives orders on professional matters from the Principal Medical Officer of the line.

(148.) A reserve medical personnel unit is usually divisible into three sections, but it is also capable of division in several sections. In each case of division, the senior medical officer in the section will carry on the duties in it of an officer commanding a reserve medical personnel unit.

(149.) When a unit of the reserve medical personnel is not actively employed, the Inspector of the Line of Communication will arrange for their cantonment, which will be as near the front as possible.

(150.) When the reserve medical personnel takes over from a field hospital, they are responsible for supplying deficiencies in the medical and surgical material of the latter as far as possible.

Sub-Chapter 9.—*Stationary Field Hospitals.*

(151.) When a field hospital is closed and the transfer of its sick and wounded to the reserve medical personnel is completed, a stationary field hospital will be established and designated by the name of the locality in which it is situated.

(152.) When the stationary field hospital is established the senior medical officer will report the fact to the Principal Medical Officer of the Line of Communication, attaching to his report a list of the personnel. If additions to the personnel are required, he will send in a requisition for them, stating the circumstances of the case.

(153.) A stationary field hospital will continue its work in the same place until all the patients have been discharged or transferred.

Should it be necessary to change the locality or to enlarge the hospital, the senior medical officer will report the circumstances to the Principal Medical Officer of the Line of Communication.

(154.) The provisions of paragraph 144 are applicable to stationary field hospitals.

Sub-Chapter 10.—*Medical and Surgical Reserve Depôts.*

Section 1.—*General Principles.*

(155.) The duties of a medical and surgical reserve depôt is to supply and distribute medical and surgical material and hospital clothing to the units in the field and on the line of communication.

Section 2.—*Organization.*

(156.) A medical and surgical reserve depôt is organized with an establishment of personnel, animals and panniers, &c., for keeping, carrying, and distributing the reserve medical and surgical stores.

Section 3.—*Duties of the Personnel.*

(157.) The officer in charge of a medical and surgical reserve depôt is responsible to the Inspector of the Line of Communication that the duties of the officers and men of the unit are correctly performed. In regard to medical duties he is responsible to the Principal Medical Officer of the line.

(158.) He will give the apothecary every facility for carrying on his duties.

(159.) The Apothecary is under the command of the officer in charge of the depôt, and it will be his duty to maintain, receive, and issue medical and surgical material and hospital clothing and to replenish expenditure. He must be ready to meet the demands of each unit as soon as the requisitions are received.

Section 4.—*Position and Work of a Medical and Surgical Reserve Depôt.*

(160.) The position of a medical and surgical reserve depôt should be at the principal station on the line of communication or some convenient place in the vicinity of it, so that the work of forwarding, distributing, and replenishing medical and surgical material may be carried on as expeditiously as possible. In the event of the distance from this station to the field army being considerable, a medical and surgical reserve depôt may be moved

up to the front in part or in whole. The medical and surgical depôts will also come up to the front when the demands from the field armies are likely to be great.

(161.) In the event of a portion of an army being detached for independent work, one medical and surgical reserve depôt, or a portion of one, will be sent on with it, under orders from the head-quarters of the Army.

(162.) When a medical and surgical reserve depôt or a portion of one is detached to join the field army, it will be designated a branch depôt of such and such a division. The line of communication staff will be responsible for supplying it with the necessary personnel, animals, and transport material.

Section 5.—Distribution of Medical and Surgical Material.

(163.) Boats, carts, and other suitable means of transport will be employed to distribute medical and surgical material as quickly as possible. In the case of supplies to the field army the most rapid means of delivery will be employed.

(164.) Care will be taken in packing material for distribution to see that no loss or damage can arise during transport. If, however, the material is intended for distribution to a unit in the vicinity, the unit will send its own packing cases and transport for the articles.

(165.) Application for boats, carts, coolies, &c., for the conveyance of material will be made to the Principal Medical Officer of the Line of Communication, or direct to the commandant of the line of communication station.

Sub-Chapter 11.—The Supply Depôt.

(166.) The Principal Medical Officer of the Field Forces will be consulted regarding the despatch of medical service supplies that are stored in the supply depôt and also regarding the manner of dealing with articles, received from voluntary contributors, for the benefit of the sick and wounded.

Sub-Chapter 12.—The Sick and Wounded Transport Department.

Section 1.—General Principles.

(167.) The chief duty of the Sick and Wounded Transport Department is to carry out the transport of sick and wounded within the sphere of the Inspector of the Line of Communication during the process of evacuation from the front.

(168.) Reception rooms for sick and wounded will be established in connection with the work of the department.

Section 2.—Organization.

(169.) The Sick and Wounded Transport Department units are organized with a commanding officer, a medical service personnel, and medical and surgical equipment.

Section 3.—Duties of the Personnel.

(170.) The commanding officer is under the command of the Inspector of the Line of Communication and is responsible for the work of the unit and the supervision of the personnel. He will receive instructions from the Principal Medical Officer of the line as regards medical work.

(171.) The medical officers of the unit are under the command of the officer commanding. They will arrange for the care of the sick and wounded and will make recommendations regarding methods of transport.

Section 4.—Position and Work of a Sick and Wounded Transport Department Unit.

(172.) It is the duty of the Inspector of the Line of Communication to select a place for the office of a Sick and Wounded Transport Department unit. A place where communication is easy and which is convenient for the collection of men, horses, and transport material will be selected.

On the Army advancing, the Inspector of the Line of Communication will advance all or a portion of the Sick and Wounded Transport Department units to a convenient position up the line.

Should there be an unexpected accumulation of wounded in some unforeseen place, after an engagement has commenced, and should there be no time to obtain orders, a unit or portion of a unit of the Sick and Wounded Transport Department will advance towards the spot and commence work there, the reasons for so doing being reported to the office of the Inspector of the Line of Communication.

(173.) Whenever a place has been selected for the operations of a unit of the Sick and Wounded Transport Department, the officer commanding, after consultation with the officer commanding the station, will prepare a room for the reception of the sick and wounded as speedily as possible. When it appears necessary to establish a line of communication hospital at the station, he will transmit his views to the Principal Medical Officer of the Line of Communication. He will provide a supply of pure drinking water, restoratives, and, if necessary, food and bedding at the reception room. In cold weather means of warming will also be provided.

(174.) The officer commanding a unit of the Sick and Wounded Transport Department, in consultation with the

officer commanding the station, will get ready, in anticipation of the arrival of sick and wounded, boats, carts, coolies, horses and other suitable means of carrying patients, and prepare his plans for the transport of the sick and wounded.

In the case of transport by road he will maintain constant communication with the station commandants, in the case of transport by rail or by sea, with the military officer in charge of the railway or the military officer in charge of the embarkation staff.

(175.) When the Sick and Wounded Transport Department units are ready to commence work, the fact will be communicated to the Principal Medical Officer, Line of Communication, to division head-quarters and also, if possible, to the field hospitals.

(176.) In the reception room, the patients will be examined, and those who are able to bear transport will be passed down the line continuously; severe cases and those unable to bear the journey will be passed on to the line of communication hospital.

(177.) The medical personnel of the unit will carry out the duties of the reception room in addition to their other duties.

They will also be available for duty in the line of communication hospital or rest station of the locality so long as this does not interfere with their regular duties. They are not permitted to be employed on duties on railway trains or on ships.

(178.) When the personnel is not sufficient for the care of the sick and wounded during transport by road, application will be made to the Inspector of the Line of Communication for assistance, or relief sections or other employés of the Red Cross Society may be utilized. If the transport is for a short distance only, assistance should be obtained from a stationary field hospital and application for it made to the hospital direct.

(179.) Material for the transport of the sick and wounded must be obtained locally. Should the supply be insufficient, instructions must be awaited from the Inspector of the Line of Commnnication.

Sub-Chapter 13.—*Transport of Sick and Wounded by Rail.*

Section 1.—*General Principles.*

(180.) Arrangements will be made for the use of hospital trains or of ordinary trains, especially prepared for the transport of sick and wounded, in conveying sick and wounded by rail.

(181.) It is the duty of the Principal Medical Officer of the Field Forces to have ready the medical and other personnel and equipment required for hospital trains and for ordinary trains. The kind and quantity of equipment will be considered, and the method of issuing and replenishing it planned.

(182.) The scale of personnel for a hospital train will be two or three medical officers and 10 or 20 sick attendants for every 100 patients, in addition to the medical officer in charge.

It may be necessary to employ the relief sections of the Japanese Red Cross Society or other employés of the Society in order to supply the medical officers and attendants, but the medical officer in charge must be an officer of the Army Medical Service.

(183.) The medical officer in charge will command the personnel of the medical service or other personnel attached to the hospital train. He will have direct charge of all duties required by the Army Medical Service and of all important cases amongst the sick and wounded. Otherwise he will not interfere with the work of the personnel.

(184.) The medical officer in charge will also perform the duties of officer commanding the transport personnel in addition to his other duties.

(185.) Under the instructions of the medical officer in charge the civil or other doctors will take care of and treat the patients, and they will also maintain order within the train and supervise the work of the sick attendants.

(186.) The sick attendants will be employed in nursing duties, under the orders of the doctors, in assisting in the treatment, in issuing medical comforts, &c., and in the various duties connected with cleansing and disinfecting the compartments.

(187.) The medical officer in charge will prepare, at the end of each journey, a transport report on the condition of the patients during the journey, on the nature of the supplies, on the medical work generally, and on the expenditure of medical and surgical material. He will submit his report, along with the Sick Return,* to the Principal Medical Officer of the Field Forces.

(188.) When the number of sick and wounded requiring conveyance by train is small, part of a military train will be used for the purpose, or an application will be made to send them by ordinary train. In the latter case, as regards the indenting for and preparation of carriages, the Army Transport Regulations will be followed. The special arrangements, however, for the care of the sick and wounded will be made by the staff of a hospital.

(189.) When the railway is used for the transport of sick and wounded in the enemy's territory, the officer appointed to organize the medical service of the district in question will carry out the regulations of this *sub-chapter* in consultation with the officer appointed to organize the railway service.

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* *See* Appendix 5.

Section 2.—Hospital Trains.

(190.) A hospital train is a train specially constructed for the conveyance of sick and wounded, or ordinary trains, temporarily requisitioned for the purpose of hospital trains and specially prepared and equipped for the conveyance of sick and wounded only. They are under the authority of the Principal Medical Officer of the Field Forces, who will arrange their journeys in consultation with the officer in charge of the Department of Transport by Land.

(191.) A hospital train will be composed of carriages for the patients, a carriage for the attendants and dispensary, a kitchen car, and a car for medical and surgical stores. The number of carriages will be fixed by the Principal Medical Officer of the Field Forces, in consultation with the officer in charge of the Transport Department, according to the state of the rolling stock. A carriage for infectious diseases and a mortuary car will be kept isolated from the carriages for sick and wounded.

(192.) A red cross, one foot in length, will be painted on a white ground in the centre of the sides of each carriage, to indicate that the train is a hospital train.

(193.) Hospital trains will be used solely for the purpose of carrying patients suffering from serious wounds, or from sickness requiring lying down accommodation, or for the carriage of cases of infectious disease.

(194.) Hospital trains will carry their own supplies, which will be replenished by station staffs on the line of communication. They may also be replenished, on application, from the supply depôts.

(195.) When a hospital train has completed its service, the medical officer in charge will send his field diary, the medical case sheets, and other documents to the Principal Medical Officer of the Field Forces.

Section 3.—Ordinary Trains for Transport of Sick and Wounded.

(196.) Ordinary trains for the transport of sick and wounded will be provided by the nearest head-quarters command of the railway line, on the requisition of a hospital or sick and wounded Transport Department unit. They will consist of ordinary railway carriages and they will be arranged to run, as a rule, once daily.

(197.) The composition of the train will depend on the number of patients and on the cars available.

(198). These trains are intended for light cases of wounds or cases of sickness that are able to sit up. As a rule, cases of infectious or mental disease will not be carried on these trains.

(199.) In requisitioning for a train, the rank and number of the patients, the place of departure and the destination, and the kind of food required will be clearly stated.

(200.) The general regulations for military railway traffic will be followed in connection with these trains.

Sub-Chapter 14.—*Transport of Sick and Wounded by Sea.*

(201.) As a rule, hospital ships are prepared, in accordance with regulations, for the conveyance of sick and wounded by sea.

(202.) By a hospital ship is meant a ship specially constructed for the conveyance of sick and wounded or a hired ship, specially fitted for the purpose of carrying sick and wounded only, and manned with an establishment from the Army Medical Service along with special hospital equipment.

When an ordinary ship is hired for the purpose, the medical staff appointed to it will assist the port authorities in making the necessary arrangements on board.

(203.) When sick and wounded are conveyed on an ordinary transport, in case of special necessity, a medical staff and equipment will be put on board as a temporary measure; but serious cases of wounds or disease and cases of infectious or mental disease will not be conveyed by an ordinary transport.

(204.) Ships will be chartered and requisitioned as hospital ships by the Inspector-General of Communications on the application of the Principal Medical Officer of the Field Forces.

(205.) The Inspector-General of Communications will decide the port command to which the hospital ship shall belong, but the service of the ship shall be under the command of the Principal Medical Officer of the Field Forces.

(206.) On the application of the Principal Medical Officer of the Field Forces, the Inspector-General of Communications will issue orders to the port authorities for the fitting and movements of hospital ships, but the port authorities will make the necessary arrangements for the sailing of the ship without waiting orders from the Inspector-General of Communications.

(207.) The Principal Medical Officer of the Field Forces will consult with the Inspector-General of Communications whenever it is necessary to place sick and wounded on board an ordinary transport.

(208.) A hospital ship will be distinguished by having its hull painted white with a green band, 1½ metres (4·9 feet) wide, round the beading, and by flying the national flag and the Red Cross flag from the mast-head.

Ships' boats and launches for the auxiliary service of the vessel will be painted in the same manner.

(209.) The ship will be arranged, between decks, for office, ordinary wards, infectious disease wards, mental disease wards, operation room, mortuary, disinfecting room, dispensary, medical and surgical stores, &c. The ordinary wards will be divided into surgical and medical wards, and these again into serious and light case wards. The infectious disease wards will be isolated.

(210.) The ward cots will be fixed in such a way as to minimize the effects of the ship's rolling and pitching. As a rule, a position athwart the deck is best for the patient, but a fore-and-aft position for nursing. The cots should be arranged as is most convenient, according to the condition of the deck. When the upper deck has to be used for sick and wounded, only light cases should be put on it, and it should be covered with an awning.

(211.) The establishment and the kind and amount of equipment will be determined by the Principal Medical Officer of the Field Forces. All the staff, except the senior medical officer, may be members of relief sections or other employés of the Red Cross Society. This rule applies also to the staff appointed temporarily to ordinary transports when sick and wounded are carried on them.

(212.) The senior medical officer of a hospital ship (in the case of an ordinary transport, the senior medical officer of the temporary medical staff) will supervise the embarkation and disembarkation of the patients, and will also be in disciplinary charge of the staffs and patients. In the event of any offence being committed, he will investigate the circumstances and report the facts, through the port authorities, to the unit to which the offender belongs. As regards the medical establishments, he will be guided by the provisions of paragraphs 183 to 186.

(213.) On board transports, medical and surgical panniers and emergency cases will be placed, if necessary, in the custody of the purser; and the medical officer, apothecary, or other member of the medical service will apply to him for them when they are required.

(214.) Refreshment rooms, with sleeping accommodation and arrangements for meals if necessary, will be provided at the ports of embarkation and disembarkation.

(215.) These refreshment rooms will come under the charge of the line of communication, and will be prepared by line of communication authorities. The medical officers will be obtained from the medical staff on the line of communication, and assistance may be obtained from other medical units on the line.

(216.) Before patients are embarked the authorities of the hospital from which they are being transferred, or the embarkation staff officer will consult with the senior medical officer of

the ship and with the port authorities; and the embarkation will not be proceeded with until everything is ready on board for the reception of the patients.

(217.) Those patients who cannot get on board by means of the ladder will be hoisted on board by means of davits, derricks, or other suitable arrangements.

(218.) According to the length of the voyage and the size of the ship, a certain number of coffins will be put on board. They must be made of strong hard word, closely jointed, and the joints caulked with turpentine or other suitable putty, in order to prevent decomposing fluids from the corpses leaking through. Corpses will be surrounded with lime when they are placed in the coffins. In the case of death from infectious disease, the corpse will also be wrapped in a white sheet soaked in a solution of perchloride of mercury.

(219.) Hospital ships and transports conveying sick and wounded will be thoroughly cleansed in every part, and if necessary disinfected, at the end of each voyage. In the case of hospital ships this duty will be carried out by the hospital establishment under the direction of the senior medical officer; in the case of transports, by the authorities of the port command to which it belongs. In the event of there being cases of infectious disease among the patients carried, the lighters, &c., used in embarking and disembarking must be disinfected each time they have been used.

(220.) The senior medical officer of a hospital ship, or of a transport conveying sick and wounded, will prepare a voyage report at the end of each voyage, noting the condition of the patients during the voyage, the nature of the supplies, the state of the medical service, and the expenditure of medical and surgical material, and will forward it along with the Return of Sick* to the Principal Medical Officer of the Field Forces through the port authorities.

(221.) When a hospital ship has completed its service, the senior medical officer will prepare a report on its work, and forward it along with the field diary, medical case sheets, and other documents to the Principal Medical Officer of the Field Forces through the port authorities.

(222.) When patients are conveyed by rivers the general principles of these regulations will be followed. Should the vessels employed belong to the line of communication they will be prepared by the authorities of that line, who, if necessary, will consult and be assisted by the port authorities.

The conveyance of the sick and wounded will be under the direction of the line of communication command, and the medical arrangements and duties under the direction of the Principal Medical Officer of the Line of Communication.

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* *See* Appendix 5.

Sub-Chapter 15.—*Transport of Sick and Wounded by Road.*

(223.) When sick and wounded have to be conveyed by road the duties will be carried out by the Sick and Wounded Transport Department; but when the line of communication is prolonged, and that department is fully occupied by the service at the front of the line, the duties futher down the line will be carried out by the line of communication staffs.

(224.) As regards material for the carriage of sick and wounded, stretchers, waggons, litters, and other improvised means of transport, and any local transport material, will be selected and used, according to the character of the disease or wounds, whether light or severe, and the state of the weather and roads.

(225.) The preparation of transport material will rest with the Sick and Wounded Transport Department or with the line of communication station staff, as the case may be; but orders will be issued on the subject, if necessary, by the Inspector of the Line of Communication.

(226.) The number of the medical personnel with a convoy of sick and wounded, and the necessity or otherwise of a guard, will be determined by the inspector of the line of communication, or by the station staff, according to circumstances.

Chapter IV.—The Medical Service in Fortresses.

Sub-Chapter 1.—*General Principles.*

(227.) The medical service in fortress garrisons and in Tsushima will be determined by the size of the garrison. In the case of large garrisons, the provisions of sub-chapters 2 to 5 of this chapter are applicable; in the case of small garrisons and the garrison of Tsushima there are no special regulations, but the general principles of these sub-chapters will be followed.

Sub-Chapter 2.—*The Medical Service with the Head-Quarters of a Fortress Garrison.*

(228.) The Principal Medical Officer of a fortress garrison is under the command of the officer commanding the garrison, and is responsible for the medical service within the garrison and of the fortress hospital.

(229.) He will be responsible for the application of martial law to the local medical service from the day when it is proclaimed, in accordance with the orders issued by the officer commanding the garrison.

(230.) When communications are not entirely severed, he will receive orders with regard to medical matters and personnel

from the Principal Medical Officer of a division or depôt division in whose command the fortress is situated; but should the circumstances not permit of his waiting for orders he will consult the chief of the staff, and with the sanction of the fortress commandant take whatever steps are necessary.

(231.) He will make himself clearly acquainted with the intention of the orders issued by the fortress commandant, and will take the necessary steps to carry out his duties in conformity with the plan of defence and the conditions of the fighting.

(232.) According to instructions of the fortress commandant he will organize, if necessary, a bearer battalion out of the available medical officers, apothecaries, rank and file of the medical service and auxiliary train, belonging to the garrison. A bearer battalion, so organized, will provide the material necessary for the transport of sick and wounded.

(233.) The Principal Medical Officer of a fortress is authorized to employ the personnel of a bearer battalion, dressing station staff, or relief sections of the Red Cross Society in the work of the fortress hospital or in other medical services, but he is not permitted to use the latter in the fighting line.

(234.) He will make arrangements for the preservation of the health of the garrison and of the civil population in the locality. His provisions in this respect will be most strictly followed, and he will have authority over the fortress sanitary commission and the local medical service.

The sanitary commission will be composed of an Army medical officer as chairman, a certain number of Army and civil medical officers, civil apothecaries, and other military and civil officials.

(235.) The Principal Medical Officer of a fortress will make arrangements for the reception of sick and wounded, and will take the necessary steps to expand the fortress hospital, or detail establishments to open sections of the hospital in other places.

In time of war, a fortress hospital must be organized to receive 12 per cent. (1 in 8) of the garrison fighting troops.

(236.) The Principal Medical Officer of a fortress will apply to the fortress commandant regarding the employment of Relief Sections of the Red Cross Society, civil practitioners, apothecaries and sick attendants.

(237.) He will take steps to ensure the replenishment of medical and surgical material, and, in consultation with the chief of the staff, make preparations for the reception of the sick and wounded. No obstacles shall be placed in the way of his preparations.

(238.) He will apply to the fortress commandant for the necessary supply of men of the auxiliary train and material for

the purposes of the transport of sick and wounded, and for the medical services.

(239.) He will make every effort to have the sick and wounded removed to the fortress hospital, as quickly as possible, by means of the bearer battalion and by carts or boats supplied to it.

(240.) He will take advantage of railway trains and of ships to send out of the fortress all sick and wounded that are not likely to recover, before a state of siege is established.

(241.) After each engagement, the Principal Medical Officer of a fortress will collect the reports of the bearer battalion and fortress hospital, and forward a report to the fortress commandant and to the Principal Medical Officer of the division (depôt division).

(242.) He will examine the reports from the medical units and forward them through the Principal Medical Officer of the division (depôt division), to the Principal Medical Officer of the Field Forces or Director-General of the Army Medical Service at the War Office. He will also forward any reports that may concern him to the fortress commandant.

(243.) He will make suitable arrangements for the charge of the head-quarters staff of the fortress.

(244.) At the time of demobilization, he will submit to the Director-General of the Army Medical Service at the War Office a detailed statement of the work of the fortress medical services with his own opinions thereon.

Sub-Chapter 3.—*The Fortress Bearer Battalion.*

(245.) The duty of a fortress bearer battalion is to open a dressing station immediately behind the fighting line, and, after receiving and treating the wounded there, to send them back to the fortress hospital as quickly as possible.

The personnel of a fortress bearer battalion will assist in the work of the fortress hospital or of the regimental units so long as this does not interfere with their own special duties.

(246.) The movements of the bearer battalion will be regulated by the fortress commandant, the medical duties by the principal medical officer.

(247.) The work of a bearer battalion of a fortress garrison will be carried out in accordance with the provisions of the regulations affecting the bearer battalion of a division in the field.

Sub-Chapter 4.—*The Fortress Hospital.*

(248.) The senior medical officer of a fortress hospital will be responsible for organizing the medical duties in the hospital, and for supervising the work of officers and men under him.

(249.) He will apply to the Principal Medical Officer of the fortress for the men and transport material necessary for the transfer of sick and wounded from his hospital.

(250.) Instruction will be given in the fortress hospital to those non-commissioned officers and privates of regimental units, who have been selected for admission into the Army Medical Service.

(251.) The regulations, affecting reserve hospitals, will be followed with regard to the method of discharging patients and dealing with those who are unfit for further service.

(252.) Special rules will be prepared for the interna administration of the hospital.

Sub-Chapter 5.—Medical Duties with Garrison Regiments.

(253.) In addition to the regulations, contained in chapter I. sub-chapter 5, relating to the medical duties with troops, the following special regulations will be applicable to the medical service with garrison regiments :—

(*a*) Personnel of the medical service, attached to garrison regimental units, may be employed at the fortress hospital, or with a neighbouring unit, by the order of the Principal Medical Officer of the fortress.

(*b*) Regimental infirmaries will be established when necessary by units in combination, and the sick and wounded of a unit that has no regimental infirmary of its own will be received into them.

(*c*) Regimental dressing stations will transfer their wounded direct to the hospital of the fortress in accordance with arrangements made by the commanding officer of the locality or of the unit.

Chapter V.—The Medical Service with the Depôt Troops.

Sub-Chapter 1.—The Medical Service with the Head-Quarters of a Depôt Division.

(254.) The Principal Medical Officer of a depôt division is under the command of the general officer commanding the division, and is responsible for the medical services of each unit in the division.

With the exception of any special regulations that may be issued, he will carry out his duties in accordance with the peace regulations.

(255.) He will make inspections from time to time of each unit in the division, submit recommendations, and see that the duties are carried out properly and in accordance with regulations.

(256.) He will cause the reserve hospital of the division to be expanded, if necessary, and make arrangements for establishing sections of the reserve hospital on the plan of detached hospitals.

(257.) He will make an estimate of the number of officers and men required in proportion to the number of patients, and will apply to the general officer commanding when he requires the services of relief sections of the Red Cross Society or others.

(258.) He will carry out the duties connected with reinforcements for the medical service, and for the instruction of non-commissioned officers and men selected for admission into the medical service.

Sub-Chapter 2.—Medical Service with the Regimental Reserve Units.

(259.) The duties of the medical service with the regimental reserve units will be the same as those laid down for battalion medical officers in time of peace.

Sub-Chapter 3.—Reserve Hospitals.

(260.) Sick and wounded, invalided from the field Army, and the sick of the local troops, will be admitted into the reserve hospitals; but officers and men, as well as military employés and others, who may be passing through or resident in the district, may be admitted.

(261.) The senior medical officer of a reserve hospital is responsible, under the general officer commanding the depôt division, for organizing the work of the hospital, and for seeing that those under him carry out their duties properly.

(262.) After orders for mobilization have been issued, all the instruction of non-commissioned officers and men, appointed to the medical service, will be carried out at the reserve hospitals.

(263.) Patients, discharged from hospital, will be handed over to their own reserve unit. Those, whose reserve unit is not stationed in the district, will be dealt with according to orders received from the divisional staff of the depôt.

(264.) When there is no clothing or equipment at the hospital for any patients who are about to be discharged, a report will be sent to their unit and the necessary articles obtained from it. When their unit is not in the district, or is stationed at a distance from the hospital, instructions on the subject will be received from the divisional staff.

(265.) Patients unfit for further service will be dealt with according to the regulations in force in time of peace.

(266.) Special rules will be drawn up to regulate the duties within the hospitals.

Chapter VI.—Management and Treatment of Patients in Hospital.

Sub-Chapter 1.—*Rules for dealing with Admissions to Hospitals.*

A.—The Admission and Discharge Department.

(267.) When sick and wounded come to a hospital, they will first of all be received into the Admission and Discharge Department. Their papers and other articles will be taken over there, and their names entered on admission and discharge sheets, the details of the entry being compared with the details on the medical case sheet or diagnosis tally of the patient.

The patients will then be distributed to wards according to the nature of the case, whether wound or disease, and light or severe. Severe cases of wounds or disease must be attended to first, and the light cases afterwards.

Lists of each ward will be kept in the department, showing at a glance the number of patients in it and the number of vacant beds, in order to facilitate the distribution of those newly admitted.

(268.) When there is not sufficient transport material for rapid evacuation of the hospital and fresh cases are pouring in continuously, the severe cases only will be admitted, and the light cases told to go on by themselves to the next hospital in the rear.

(269.) The arms and equipment of patients will be entered in form, Appendix 3. After the articles are compared with the entries, a tag will be attached, showing the unit, rank, name, and index number of the patient, to whom the articles belong, in the admission and discharge sheets. The clothing of patients, who have been given hospital clothing, will be kept with their arms and equipment.

The material used for the tags must be made of strong but flexible paper, or of cloth or wood.

As regards the custody of arms, these must be kept well oiled, especially the lock and barrel of the rifle.

Money and valuables will be counted in the presence of the patient and entered in the form, Appendix 3. They will be handed over to the senior intendance subordinate or officer for safe custody. Articles, forwarded with the patient on transfer from another hospital, will be dealt with in the same manner.

(270.) The arms and equipment of those patients who are not likely to recover quickly will be handed over to the nearest staff office on the line of communication. A list of the articles will be handed over at the same time and a receipt obtained.

Any ammunition brought in with patients will be handed over as quickly as possible to the nearest line of communication staff office.

(271.) When a patient is fit for discharge, the particulars will be sent to the Admission and Discharge Department and the necessary points entered in the admission and discharge sheets. A discharge ticket will then be made out for the patient. The articles entered in the list of articles and valuables belonging to him will then be handed back to him and a receipt obtained. The patient will then proceed to his regiment or to the nearest staff office on the line of communication, according to circumstances.

(272.) Should any patient die on the way to a hospital, the senior intendance officer or subordinate will make arrangements for disposing of the body in accordance with paragraphs 301 and 305 to 307. A certificate of death will be prepared in the Admission and Discharge Department of the hospital, and will be signed and forwarded by the senior medical officer.

B.—The Wards.

(273.) When a patient is admitted to a ward, the particulars of cause of admission, unit, rank, and name will be entered, as may be most convenient, in a list of patients in the ward, the particulars being taken from the medical case sheet or diagnosis tally. A bed-head ticket will be prepared according to the form in Appendix 6, and hung up at his bed. The medical officer in charge of the case will write up the medical case sheets and the prescription sheet. The diagnosis tally will be handed into the office of the senior medical officer.

(274.) Patients in hospitals at the front should wear uniform in hospital as much as possible. Those who are put into hospital clothing will have their uniform kit made into a bundle, a tag attached, and the bundle handed in to the Admission and Discharge Department.

(275.) When the patient has been got into bed, he will be carefully examined by the medical officer in charge of the ward, and the principal points noted in the medical case sheet, and the treatment noted in the prescription sheet. The latter will be sent to the Apothecary's Department, and the Kitchen Department will be informed of the kind of food required.

Whenever a diagnosis has been established, or a change in diagnosis made, information will be sent from the ward to the Admission and Discharge Department.

(276.) When patients are about to be discharged, either as recovered, or as transferred to other hospitals, the medical officer in charge of a ward will prepare a list, showing separately

the cases of wounds and of disease, and the light and severe cases. The lists will be handed in to the senior medical officer for signature, and they will then be sent to the Admission and Discharge Department.

The medical officer in charge of a case will enter the year, month, and day of discharge, in the case of a transfer the year, month, and day of transfer to such and such a hospital, at the end of the medical case sheet and prescription sheet of a patient who is discharged as recovered, or as a transfer to other hospitals. After signing them, he will send the documents through the senior medical officer to the Admission and Discharge Department.

(277.) When a patient dies, the body will be taken at once to the mortuary, the Admission and Discharge Department informed, and a guard placed over it. The medical officer in charge of the case will prepare the death certificate and hand it to the senior medical officer, who will examine it to see that it is correctly made out and then sign it. The original certificate will be sent to the Admission and Discharge Department and a duplicate kept in the office of the senior medical officer.

The medical case sheet and the prescription sheet will be disposed of as laid down in paragraph 276, but the cause and time of death must be carefully entered in the former.

(278.) The senior medical officer will issue orders for the maintenance of cleanliness and discipline in the wards and for protection against fire, and he will be responsible that the patients and hospital establishment adhere strictly to the orders.

Sub-Chapter 2.—*The Dieting of the Patients.*

(279.) The diet of patients will consist of rice boiled in the ordinary way, rice boiled soft, eggs, and vegetables, but other articles of diet may be added according to the requirements of the case.

(280.) The wardmaster will enter daily on the diet requisition form the number and kind of diets required for the ward from the midday meal to next morning's breakfast meal, according to the medical officer's instructions on the prescription sheet. He will hand his requisition sheet in to the Kitchen Department, and one of the ward orderlies or civil sick attendants will draw and distribute the diets at meal times.

Soldiers' canteens will be used in hospitals which are not provided with ward utensils.

(281.) When a large number of patients arrive unexpectedly at hospital, and there is no time to carry out the provisions of the previous paragraph, the Admission and Discharge Department will inform the Kitchen Department of the number of diets likely to be required, and the food will be got ready as soon as possible. Similar arrangements will be made for feeding patients who arrive at and leave the hospital without entering the wards.

(282.) The senior intendance officer or subordinate is responsible for having suitable food ready to meet all emergencies, and will supervise the Kitchen Department.

Sub-Chapter 3.—*Discharge of Convalescents to other Localities, to their Homes, or on Sick Furlough.*

(283.) When patients in a reserve or fortress hospital or in the hospital of the Tsushima garrison are convalescent and no longer in need of hospital treatment, they may be sent to other localities for change of air, or to their homes, or they may be given sick furlough to go where they like.

By change of air to other localities is meant the sending of convalescents to the sea-side or to mineral baths, where complete recovery may be hastened.

By sending convalescents to their homes is meant the discharge of those patients who are not likely to recover quickly, and who are entitled, as patients of the 1st class, to pensions. They must therefore appear periodically at the pay office and have an address that is known.

By granting sick furlough is meant permission to those convalescents to leave hospital, who have not to appear periodically at any office, or who are of the 1st, 2nd, and 3rd class and not likely to recover completely, and who desire to leave hospital or are to be discharged finally from the service.

(284.) The method of dealing with these three classes of convalescents, namely, those sent to other localities, those sent home, and those granted sick furlough, is governed by special regulations for each class.

An invaliding form, Appendix 8, will be given to each patient sent to his home or granted sick furlough.

Chapter VII.—The Evacuation of Sick and Wounded to the Base.

(285.) Patients in field hospitals, stationary field hospitals, and line of communication hospitals will be sent back to the reserve hospitals, as quickly as possible, in order to keep the hospitals empty for the reception of fresh casses of wounds or disease from the Army in the front, and also to place the patients where they can be most easily treated, and prevent crowding the area of operations with sick and wounded.

(286.) In selecting patients for evacuation, the medical officer in charge of a hospital will take into consideration their physical and general condition, the distance of the journey, and the treatment that can be given on the way.

(287.) In transferring cases of infectious disease the instructions for dealing with infectious disease will be strictly followed.

Hospital ships and hospital trains are authorized to be used in evacuating cases of infectious disease.

(288.) Special care will be taken in the transfer of insanes, or persons mentally afflicted, to avoid accidents to the patients or attendants.

(289.) Sick and wounded belonging to the enemy, who are not likely to recover during the war, or who are unfit for further military service, will be handed over to the local representatives of the enemy, as far as possible.

(290.) When a batch of sick and wounded are about to be transferred, the patients will be classified into sick and wounded and light and severe cases, and the number of each class notified to the authorities, to whom they are being transferred. In the case of infectious disease, the name of the disease and the number of cases will be notified separately.

Light cases are those who are able to walk or travel in a sitting position in carts, &c. Severe cases are those, who must be carried in a stretcher, or travel lying down.

When sick and wounded are being transferred by sea, the senior medical officer of a hospital ship, or the senior medical officer or civil surgeon of an ordinary transport or vessel, will notify the details by telegram to the authorities to whom the cases are being transferred. The telegrams will be sent from any convenient intermediate port.

(291.) Sick and wounded transferred down the line will be accompanied by a guard, except in the case of evacuation by railway trains or ships to which officers and men of the medical service are attached.

The nominal roll of the patients transferred,* the medical case sheets, prescription sheets, the list of articles belonging to the patients, and, in severe cases, the list of money and valuables, will also accompany the patients. All of these documents will be handed over to the authorities receiving the patients, and a receipt will be obtained on voucher B of the list of sick and wounded, and on voucher B of the list of articles, money, and valuables.

(292.) When unavoidable circumstances necessitate the sick and wounded being handed over at a place which is not their regular destination, or when a patient dies during the journey, the provisions of paragraph 291 will be carried out as regards the patients handed over, and, as regards patients who have died, the body, equipment, and property of the deceased will be handed over to the next station staff officer on the line of communication, who will give the necessary receipts. A note will also be made in the nominal roll of sick and wounded, voucher A, showing the cause of death, and a report of the facts will be sent to the station from which the patient was

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* *See* Appendix 9.

transferred. Further, the time, date, and place of death will be entered in the medical case sheet and the medical case sheet and prescription sheet will be sent back to the station from which the patient was transferred.

When the authorities at the station from which the patient was transferred receive the report and the documents, the death will be reported and a certificate of death forwarded. The medical case sheet and prescription sheet will be retained by the authorities concerned.

(293.) When sick and wounded are transferred, a military travelling warrant for patients and escort will be given to the latter by the nearest station staff officer on the line of communication, on demand from the transferring authorities.

(294.) In the case of evacuation by railway or by sea, the transferring authorities will inform the railway staff or the port staff, and obtain from them the hours at which the trains or ships leave.

In the case of transport by rail, the patients must be at the railway station one hour before the departure of the train; in the case of transport by sea, they must arrive on the wharf two hours before the departure of the ship.

Until actual embarkation has been completed, the transferring authorities are responsible for making all arrangements for the conveyance of patients.

(295.) In the case both of trains and of ships, the severe cases will be put on board first, in loading or embarking, and the light cases last. In unloading or disembarking, the light cases will leave a train first but a ship last. Cases of infectious disease will, on all occasions, embark and disembark last.

(296.) Food for patients travelling by rail will be prepared at stations where there are refreshment rooms, under the authority of the railway section commanders. The transferring authorities will inform the station staff at the station where the patients start from of the number and kind of diets required, should any special diets be needed for any of the cases transferred. The station staff will then inform the refreshment rooms in advance and also state the number of ordinary diets required.

(297.) At the end of a journey by rail or by sea, the patients will be received by a committee of the authorities to whom they are transferred. This committee will be responsible for the conveyance of the patients from the railway station or place of disembarkation to their destination. The requisite number of men, transport material, and other preparations for the purpose will be ready in advance, in accordance with the information sent by the transferring authorities.

(298.) When patients are handed over to this committee or to the authorities, to whom they are transferred, the nominal

rolls, the medical case sheets, the prescription sheets, the equipment, personal effects, money, and valuables of the patients, and the vouchers for these will be examined and checked. Voucher B of the nominal rolls, and of the list of effects, money, and valuables will be signed and returned as a receipt for the patients' documents and effects.

Chapter VIII.—Disposal of the Dead, and Wills of Patients.

(299.) Each regimental unit is responsible for searching for and disposing of the bodies of those of the unit who have been killed in the fighting line. The bearer battalion, therefore, should not carry away the killed, but, if possible, the bodies should be collected in a convenient place or some mark put up to draw attention to the place where bodies are lying.

(300.) When a man dies at a temporary dressing station, the death certificate, arms, equipment, and personal effects will be sent to the unit, to which the deceased belongs, and the unit concerned will be responsible for disposing of the body.

(301.) When anyone dies on the way to a dressing station or field hospital, or immediately after admission there, the body will be handed over to the unit to which the deceased belongs or to the nearest line of communication station staff, according to circumstances; or the general officer commanding the division may issue orders for its burial on the spot.

(302.) The body of any patient who dies in hospital, or when under the care of the Sick and Wounded Transport Department, will be handed over to the nearest line of communication station staff.

(303.) The body of any patient who dies during transport by rail will be handed over to the railway station staff at the end of the journey, or at any intermediate station where there is a halt of at least thirty minutes, and where there is a line of communication station staff in the vicinity.

(304.) The body of a patient dying at sea will be handed over to the station staff at the port of disembarkation, or at any intermediate port. When no other course is open the body may be buried at sea.

(305.) The body of a patient dying in a reserve hospital will be handed over to the unit or the depôt unit to which the patient belongs. Should the unit not be quartered in the district, or be stationed at a distance from the hospital, the hospital authorities may themselves carry out the necessary measures for disposal of the body, or they may hand it over to any relative who may apply for it.

(306.) The unit concerned will, if possible, cremate all bodies of patients who have died of infectious disease. Should it be

necessary to dispose of the body otherwise, the clothing worn will be saturated with a solution of perchloride of mercury or carbolic acid, or the body will be wrapped in a sheet thoroughly saturated with these solutions.

(307.) The arms, equipment, clothing, will, personal effects, money, and valuables, along with the lists of the personal effects, money, and valuables, will be handed over to the unit concerned along with the body. A receipt will be given for the body, will, personal effects, money, and valuables. In the case of bodies disposed of according to the provisions of paragraphs 304 and 305, the death certificate will also be handed over at the same time.

(308.) The unit that receives a dead body will cremate it, if possible, and forward the hair and bones, along with the will, personal effects, money, and valuables of the deceased by the safest route to the depôt division of the district in which his name is registered, or to his division head-quarters. In the case of deaths in Formosa, or in the Pescadores Islands, the articles will be sent to the Formosa vice-regal office.

(309.) The death certificate will also be sent to the depôt division, division, or Formosa vice-regal office, as the case may be, by the senior medical officer of the hospital in the case of deaths in hospital, by the nearest line of communication command in the case of deaths occurring as noted in paragraphs 304 and 305, and in other cases by the officer commanding the unit, or the nearest line of communication station staff.

The offices receiving the certificates will forward them to the relatives, who may have applied for information regarding the death, through the mayor of a city or town, the headman of a village, or similar local representative. A duplicate, however, will be kept, along with the medical case sheet and prescription sheet, in the office of the unit which prepared the death certificate.

In the case of men dying from causes classified in the 1st class, two death certificates will be forwarded, one for transmission as above, the other with a slip attached, to the effect that it is to be detained for purposes of pensions in the offices of the depôt division, division, or vice-regal office in Formosa.

(310.) The officer commanding a unit will give informatian regarding a death, according to the previous paragraph, to the depôt division of the district to which the deceased belonged, or to the head-quarters of the division, or to the vice-regal office in Formosa. In the case of a body being handed over with the effects of the deceased to a line of communication station staff by a dressing station, the unit to which the man belonged must be informed of the fact.

(311.) Wills of patients will be drawn up according to the provisions of Chapter 5, Section 6, paragraph 2, of the Civil Code.

Chapter IX.—Method of Replenishing Personnel, Animals, and Medical and Surgical Material.

(312.) Each medical officer will carry a pocket case of surgical instruments, each sergeant of the medical service a medical haversack, and each corporal and private a surgical haversack. Each sergeant and corporal of the medical service will also carry in his knapsack three triangular bandages and 10 wooden splints, and he will also carry a special water bottle.

One stretcher bearer in each stretcher squad will carry a surgical haversack, and every soldier in every unit will carry a first-aid package in the left-hand skirt of his tunic. This will be the only dressing required in the fighting line.

(313.) In the case of cavalry and engineers, when these dressings are not sufficient during an engagement, more material may be obtained from the medical and surgical panniers of the nearest unit.

(314.) A supply of blankets for the use of sick and wounded will be carried with the reserve clothing of each unit. The blankets will be kept in the regimental infirmary at the village where the unit is cantonned, but they may be issued to meet the requirements of a temporary or main dressing station, &c.

Blankets and hospital clothing are not provided for dressing stations, but, if they are necessary, they may be obtained on application to the nearest unit, to whom they must be returned when no longer required.

(315.) In order to replenish the medical and surgical material mentioned above, each medical officer of a unit, and the senior medical officers of medical units, will have custody of and issue material under the instructions of their commanding officers.

(316.) The following methods of replenishing medical and surgical material will be adopted:—

(*a*) Each regimental unit of a division, exclusive of the bearer battalion and field hospitals, will make application to the Principal Medical Officer of the division in accordance with article A of paragraph 28 of the regulations for replenishing stores in the field. On the application being received, the Principal Medical Officer may order the field hospitals or bearer battalion to issue the supplies, or, on occasions, he may apply to the Principal Medical Officer of the line of communication to have them issued direct from the medical and surgical reserve depôt of the division.

(*b*) The field hospitals and bearer battalion will send their applications to the Principal Medical Officer direct, without going through the officer commanding the train battalion. The Principal Medical Officer of the division will then apply to the Principal Medical

Officer of the line of communication, who will order the articles to be supplied by the medical and surgical reserve depôt. In case of emergency he may order the medical and surgical reserve depôts of other divisions to issue the supplies.

Units on the line of communication, except the medical and surgical reserve depôts, will make application to the Principal Medical Officer of the line of communication in accordance with article C, paragraph 28, of the regulations for replenishing stores in the field. He will order the articles to be supplied by the hospitals on the line of communication or by the medical and surgical reserve depôts.

(*c*) In the case of units attached to the Imperial Head-Quarters or to the Head-Quarters of an Army, the application will be sent to the Principal Medical Officer of the Field Forces or to the Principal Medical Officer of the Army concerned, who will order the Principal Medical Officer of a division or of a line of communication to take steps to issue the necessary supplies, in accordance with (*a*) and (*b*) of this paragraph.

In the case of units attached to the Imperial Head-Quarters in Japan, the application will be made to the Principal Medical Officer of the division, in whose district the Imperial Head-Quarters may be stationed, and he will order the necessary supplies to be issued by the reserve hospital of the division.

(*d*) In the case of units of a fortress garrison, the application will be made to the Principal Medical Officer of the garrison, in accordance with article D of paragraph 28 of the regulations for replenishing stores in the field, if there is no Principal Medical Officer of a higher command in the locality, and he will order the fortress hospital to make the necessary issues. Should the fortress hospital not have sufficient material, the Principal Medical Officer of the fortress garrison will apply to the Principal Medical Officer of the depôt division, who will then have to take the necessary steps to meet the demand. When the communications with a fortress are cut off, the Principal Medical Officer will take steps to collect all the material he can, under the instructions of the commandant.

(*e*) In the case of units of the 2nd Reserve or of the National Army, application will be made to the Principal Medical Officer of the locality or district, in accordance with paragraph 28 of the regulations for replenishing stores in the field, and the necessary issues will be made according to (*b*), (*c*), and (*d*) of this paragraph, as the nature of the case determines.

(*f*) The issue of medical and surgical material, &c. to the medical and surgical reserve depôts will be made by the line of communication supply depôt, on application through the Principal Medical Officer of the line of communication.

(*g*) The line of communication supply depôt will apply to the War Office to have its stores replenished, and the latter will order medical and surgical material to be forwarded from the medical and surgical central store depôt, or from the stores of the nearest divisional depôt.

When the Principal Medical Officer of a line of communication has ordered a medical and surgical reserve depôt to issue supplies, the fact must be reported to the Inspector of the Line of Communication.

(317.) The procedure mentioned in the previous paragraph may be modified, when there is great urgency in replenishing the medical and surgical material, and when there is no time to consider the facilities or difficulties of the means of communication and supply, but any units or departments, forming the regular channel of communication of supply, that may have been passed over, must be informed of the circumstances.

(318.) When medical and surgical material is requisitioned or purchased locally, the Principal Medical Officer will co-operate with the chief intendance officer of the division, and they will act in accordance with the rules for their respective departments. When time does not permit of local purchases in this way, the medical officers attached to units are authorized to act in co-operation with the intendance personnel attached to the unit, in accordance with the regulations for officers commanding units. In this case a report must be sent without delay to the heads of the respective departments, stating the list of articles, their quantity, and the locality where they were purchased or requisitioned.

(319.) The medical officers or apothecaries of units are responsible that medical and surgical material is not allowed to deteriorate, and they are authorized to order any subordinate under the rank of sergeant of the medical service to clean and take care of the articles.

(320.) When small repairs are necessary or surgical instruments, &c. have to be cleaned and sharpened amongst the regimental units or bearer battalion, application will be made to have this done in a field hospital. In the case of extensive repairs or when articles are unfit for use, the field hospital will apply to have the repairs carried out at a medical and surgical reserve depôt, or the articles exchanged or replaced by local purchase.

(321.) In replenishing hospital clothing, the provisions of paragraph (316) will be followed, with the following additions:—

(*a*) Reserve hospitals, fortress hospitals, and the Tsushima garrison hospital will apply to their respective intendance departments, and the intendance department will forward the application to the supply depôt or to the War Office.

(*b*) The reserve of clothing in the supply depôt will be replenished by the War Office on application, orders being given to the Army clothing factory or to the intendance department of the depôt division to supply the articles requisitioned for.

(322.) The procedure for replenishing personnel, transport, animals, &c. is laid down in the Regulations for Replenishing Stores, &c. in the Field.

Chapter X.—Financial Instructions.

(323.) The officers commanding bearer battalions, the officers commanding reserve medical personnel units, the officers commanding medical and surgical reserve depôts, the officers commanding Sick and Wounded Transport Department units, the medical officers in charge of hospital ships and of hospital trains, and of all hospitals, will make an approximate estimate monthly of their requirements during the month and all other cash expenditure. They will then prepare an imprest account and attach a receipt for the month, forwarding it to their own intendance department and sending the officer or non-commissioned officer attached to the unit for the purposes of pay and accounts to draw the money. They will detail the manner in which the money is to be kept in custody, and will supervise all payments.

As a rule, the cash will be kept in the safe, but in order to facilitate small payments, a small sum may be kept by the accountant in accordance with the regulations of the intendance department. A petty cash balance will be shown for this at the end of the month.

(324.) Patients in hospital will receive their pay on a fixed date. Those about to be discharged will be paid up to and including the day previous to discharge. The pay of patients who die in hospital will be paid over by the hospital authorities up to and including the day of death. In the case of the latter no fixed day is appointed for the payment, but the sum due will be transferred to the personal effects account.

When anything occurs to prevent a patient leaving hospital from receiving his pay as above, the fact will be reported to his unit.

In the case of patients who have not been paid up to the date of entry into hospital, only such as can produce evidence of the fact will be paid the balance due to them.

In paying the patients, each ward will make out a list of the patients, showing the rank and name, and will have the seal or thumb mark stamped against each name in acknowledgment of receipt.

(325.) In the case of patients discharged from reserve hospitals, or fortress hospitals, or the Tsushima garrison hospital, who require money to meet travelling expenses, the money will be supplied by the hospital concerned.

(326.) The special regulations relating to payments and presentation of accounts will be followed, in addition to the preceding paragraphs.

Chapter XI. — Relief Sections of the Japanese Red Cross Society and Contributions from Benevolent Individuals.

Sub-Chapter 1.—*Relief Sections of the Red Cross Society.*

(327.) Relief sections of the Japanese Red Cross Society will be employed by order of the Minister for War. The establishments of relief sections will be determined by the Principal Medical Officer of the Field Forces or by the Director-General of the Army Medical Service at the War Office, the former reporting to the Inspector-General of Communications, and the latter to the Minister for War.

(328.) The relief sections employed will be under the command of the Inspector-General of Communications, the inspectors of lines of communication in the field, the general officers commanding the depôt divisions, fortress commandants, the commandant of the Tsushima garrison, or officers connected with transport and communications.

As regards their duties, they are under the direction of the Principal Medical Officer of the Field Forces, the Principal Medical Officers of Armies and the officers commanding the medical units to which they are attached.

(329.) The badge of neutrality under the Geneva Convention may be worn only by members of relief sections that form detachments for military duty.

(330.) Members of relief sections must submit to Army regulations and discipline, and are held responsible for obedience to orders.

(331.) The pay, travelling expenses, bedding, clothing, &c. of relief sections are provided out of the funds of the Red Cross Society. In certain circumstances, quarters, rations, and transport by land and sea may be provided at the public expense.

(332.) In other respects the members of the relief sections of the Red Cross Society will follow the general regulations, rules for attendance on sick and wounded in war, and the bye-laws of the Society.

Sub-Chapter 2.—Contributions from Benevolent Individuals.

(333.) Military hospitals are authorized to accept contributions from benevolent individuals, so long as these do not interfere with the treatment or discipline of the patients.

When money is offered the sanction of the officer in charge of the hospital must be obtained, before it may be accepted.

(334.) Officers in charge of military hospitals will enter all contributions of money or articles in a book kept for the purpose, noting the particulars, such as the name and address of the contributor, and the number and character of the articles contributed. Each article will be valued and a return sent monthly to the Minister of War, noting in the return the index number of the entry in the ledger.

(335.) From amongst the articles contributed for the benefit of the soldiers generally, only those that are approved by the medical officers will be issued to patients in hospital. The nature of the articles will be marked upon the packages, and they will be handed in at the War Office, and from there distributed through the proper channels.

Chapter XII.—Documents, Books, Diaries, and Reports.

(336.) The documents and books noted in Appendix 14 will be kept in custody of the units concerned, and properly entered up.

(337.) The Principal Medical Officer of the Field Forces, the Principal Medical Officers of Armies, lines of communication, divisions, and fortresses, the officers commanding hospitals, with the exception of reserve hospitals, bearer battalions, reserve medical personnel units, medical and surgical reserve depôts, Sick and Wounded Transport Department units, hospital trains and hospital ships, will keep field diaries, and the Principal Medical Officer of a depôt division and the medical officer in charge of a reserve hospital will keep a depôt diary.

The officers commanding bearer battalions, reserve medical personnel units, medical and surgical reserve depôts, Sick and Wounded Transport Department units, and field hospitals will submit a return of the personnel and animals of their unit on the 10th, 20th, and last day of each month; in the case of the bearer battalions, and field hospitals, to the officer commanding the train battalions and in the case of the other units, to the Inspector of the Line of Communication.

(338.) The method of dealing with the returns of each unit is shown in Appendix 15.

APPENDIX C.

Specimens of Forms and Returns.

Appendix 1.

Form for Return of Killed.

(Front.)

	Nature of Wound.
	Name of Killed.
	Branch of Service and Rank.
Co. No. Batt. No.____ (Infantry, &c.) _____ Regt. No.____	Regtl. Number of Unit.
	Name of Place, where Wound was received.
Day_____ Month_____	Date of Wound

(Back.)

Notice.

The place and date columns need not be entered on the spot. They can be completed afterwards.

The name must be written very clearly. The unit, branch of Service, rank, and nature of wound can be filled in afterwards.

An entry will be made in the first column, stating whether the man was "Killed outright" or "Died after being taken to the Dressing Station."

Notes.

This is the size of the pages in the books, kept for the purpose of sending in Returns of Killed.

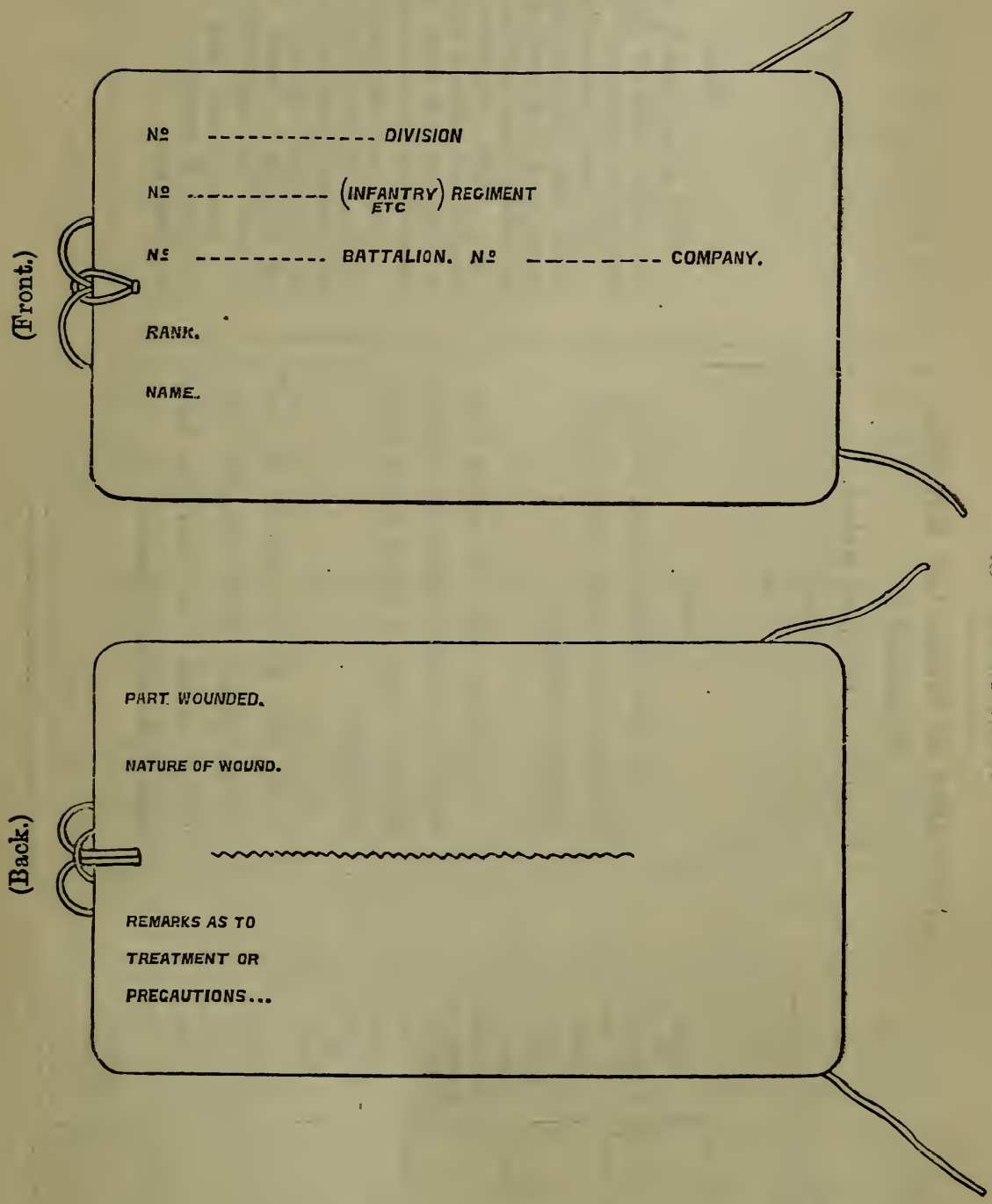
The form is printed, as above, on both sides. It is of stiff European paper, and each book of forms contains 50 forms, perforated for tearing out. Each regimental surgeon, hospital sergeant, or corporal of the medical service must carry one of these books during an engagement.

After each engagement the senior medical officer of the regiment will collect the forms, that are filled in, and prepare a general nominal roll of "Killed"; which is submitted to the officer commanding.

These forms may be used as evidence in making out applications for pensions.

Appendix 2.

Diagnosis Tally



Notes.

The above is the natural size of the Diagnosis Tally.

The material of which it is made is a stout, water-proof paper, capable of being written upon with a lead pencil.

The tallies are of two colours, white for serious wounds, and red for light wounds.

A tape, 19 inches long, is looped, as shown above, through a hole in the tally, for tying the tally to the coat or elsewhere. The tapes are of the same colour as the tally.

oil Receipt Forms.

Notes.—(1) Tluables must be entered at the Dressing Station. (2) When the list is used for money ac. will be entered at the place from which the patient is transferred. (4) When a patien

B.

No. 1.

A.

List of Personal Effects of Patient.
(List of Money and Valuables.)

Received the personal effects (money or valuables) according to the list

from

Number of Articles. (Number of Valuables.)	Nature of Article. (Nature of Valuables.)	Number of Articles. (Number of Valuables.)	Nature of Article. (Nature of Valuables.)
Total.			

Name of Unit _____ Branch of Service _____
Battalion _____ Co. _____
Rank _____ Name _____

Index No. _____

(Seal of Officer who receives the articles.)

Seal.

(Seal of Officer who first receives the Articles.)

Seal.

Unit from which patient is transferred } _____

the foil.

Appendix 3.

List of Personal Effects, Money, or Valuables of Patients, with Foil and Counterfoil Receipt Forms.

Notes.—(1) These foils will be filled in when the patient is first admitted to hospital, or may be used on subsequent occasions. Money and valuables must be entered at the Dressing Station. (2) When the list is used for money and valuables the words "List of Personal Effects of Patient" will be erased. (3) In the B. counterfoils the name of unit, &c. will be entered at the place from which the patient is transferred. (4) When a patient is transferred, either he or the attendant receiving the articles must sign the voucher in the list of articles.

B.

No. 1.

(Seal of Officer who receives the articles.) ..... Seal.

B.

No. 2.

Received the personal effects (money or valuables) according to the list from _____

Unit _____ Rank _____ Name _____ Seal ○

Unit _____ Rank _____ Name (of patient) _____

(Seal of Officer who receives the articles.) ..... Seal.

B.

No. 3.

Received the personal effects (money or valuables) according to the list from _____

Unit _____ Rank _____ Name _____ Seal ○

Unit _____ Rank _____ Name (of patient) _____

(Seal of Officer who receives the articles.) ..... Seal.

B.

No. 4.

Received the personal effects (money or valuables) according to the list from _____

Unit _____ Rank _____ Name _____ Seal ○

Unit _____ Rank _____ Name (of patient) _____

(Seal of Officer who receives the articles.) ..... Seal.

B.

No. 5.

Received the personal effects (money or valuables) according to the list from _____

Unit _____ Rank _____ Name _____ Seal ○

Unit _____ Rank _____ Name (of patient) _____

(Seal of Officer who receives the articles.) ..... Seal.

A.

List of Personal Effects of Patient.
(List of Money and Valuables.)

Remarks.	Total.							
								Nature of Article. (Nature of Valuables.)
							Number of Articles. (Number of Valuables.)	Index No. _____
						Nature of Article. (Nature of Valuables.)		
					Number of Articles. (Number of Valuables.)			

Name of Unit _____ Branch of Service _____
Battalion _____ Co. _____
Rank _____ Name _____

Unit from which patient is transferred } _____ Seal. (Seal of Officer who first receives the Articles.)

There are five counterfoils in each sheet, perforated as shown for tearing off from the foil.

Appendix 4.

Specimen page of Return of Surgical Operations.

Note.—In the original Japanese Form the columns are from right to left, instead of, as translated here, from left to right.

			Name and Place of Hospital.	Nominal Roll of Operations Performed.			
Name of Patient.		Name of Operation.	Description of the Operation.	Date of Operation.	Date of Wound.	Nature of Wound.	
Name.	Rank.						

ployés, &c.)

		44	Rifle Wounds.
		45	Shrapnel and Artillery Fire Wounds.
	Total.	46	Sword Wounds.
Ranks.		47	Bayonet Wounds.
		48	Explosion Wounds.
		49	Fractures.
Generals.		50	Dislocations.
Colonels and Lieut.-Colonels.		51	Burns and Scalds.
Majors.		52	Frost-bite.
Captains.		53	Other Injuries.
Lieutenants.		54	Drowning.
Probationer Warrant Officers.		55	Other Accidents.
N.C.Os.		56	Self-inflicted Injuries.
Privates.		57	Suicides.
Civil Officers.		58	Murders.
Civil Employés.		59	No appreciable Disease.
Others.		60	Not yet diagnosed.
Total.			

Injuries and Accidents.

Other Diseases.

—

the proper columns.

Consecutive Number of Return _____.

Monthly Return of Sick and Wounded. (For Units, Hospitals, Civil Employés, &c.)

Appendix 5.

Monthly Return of Sick and Wounded.
From _____ to _____

Name of Locality _____

Name of Unit _____.

Remaining.	Discharged as Invalided or Convalescent.	Transferred to other Hospitals.	Died.	Discharged as Recovered.	Days under Treatment.	Total.	Transferred from other Hospitals.	Fresh Admissions.	Remained last Return.	Index No. of Disease (as above).
										Total.

Remaining.	Invalided.	Transferred to	Died.	Recovered.	Days under Treatment.	Total.	Remained from last Return.	Transferred from	Admitted.	Effective Strength.	Ranks.
											Generals.
											Colonels and Lieut.-Colonels.
											Majors.
											Captains.
											Lieutenants.
											Probationer Warrant Officers.
											N.C.Os.
											Privates.
											Civil Officers.
											Civil Employés.
											Others.
											Total.

Average Daily Number in Hospital } _____.

Average Daily Percentage of Sick to Strength } _____.

Number of Cases of Change of Disease } _____.

Remarks.

Index No. of Disease.	Name of Disease.	
1	Small-pox.	Infectious and Specific Febrile Diseases.
2	Measles.	
3	Scarlet Fever.	
4	Typhus Fever.	
5	Relapsing Fever.	
6	Plague.	
7	Diphtheria.	
8	Enteric Fever.	
9	Cholera.	
10	Malaria.	
11	Dysentery.	
12	Influenza.	
13	Beri-Beri.	
14	Ptomaine Poisoning.	
15	Sunstroke.	
16	Other General Diseases.	
17	Mental Diseases.	Nervous System.
18	Other Diseases of Nervous System.	
19	Pneumonia.	Respiratory System.
20	Pleurisy.	
21	Tubercle.	
22	Other Diseases.	
23	All Diseases.	Circulatory System.
24	Gastro-Intestinal Catarrh.	Digestive System.
25	Other Intestinal Diseases.	
26	Inflammation of Liver and Spleen.	
27	Other Diseases.	
28	All Diseases.	Urinary.
29	All Diseases.	Venereal.
30	Ophthalmia and Infectious.	Eye.
31	Non-infectious Diseases.	
32	All Diseases.	Ear.
33	Parasitic.	Skin.
34	Inflammatory.	
35	Other Diseases.	
36	Periosteum and Bone.	Organs of Locomotion.
37	Muscles.	
38	Tendons.	
39	Riding Sores.	Injuries and Accidents.
40	Kicks from Horses.	
41	Blisters, &c. from Shoes.	
42	Contusions.	
43	Incised and Contused Wounds.	
44	Rifle Wounds.	
45	Shrapnel and Artillery Fire Wounds.	
46	Sword Wounds.	
47	Bayonet Wounds.	
48	Explosion Wounds.	
49	Fractures.	
50	Dislocations.	
51	Burns and Scalds.	
52	Frost-bite.	
53	Other Injuries.	
54	Drowning.	
55	Other Accidents.	
56	Self-inflicted Injuries.	Other Diseases.
57	Suicides.	
58	Murders.	
59	No appreciable Disease.	
60	Not yet diagnosed.	

Note.—Series of instructions for preparing the Return are given on another sheet. The Disease Index Number only is entered, not the Disease. There is a wide column for Remarks at the end of the Return. In the Japanese Form the columns are reversed, and read from right to left.

Notes on the Monthly Return of Sick and Wounded.

(1.) The Index No. of the disease and not the name of the disease will be entered. If then there are not enough columns, a fresh sheet will be added; but each sheet will be totalled, and the total carried forward to the next.

For fortresses, Tsushima garrison, and reserve hospitals, separate returns are used for the Admissions by Diseases, &c., and for the Summary according to ranks.

(2.) The senior medical officer is responsible that the Index Nos. correspond with the classification, and will sign the return.

(3.) A unit will send in a complete return for voyages by sea, viz., from a Japanese to another port, from one port to another, and from a port abroad to a Japanese port.

(4.) In voyage returns the name of the ports entered, and of the ship will be given with dates; on land the name of the places, and dates of arrival and departure.

(5.) Reserve hospitals will send in two returns, one for the local sick, and one for sick and wounded from the field Armies.

(6.) When a reserve hospital receives sick and wounded of other divisions, separate returns will be made out for the sick and wounded of each.

(7.) Hospitals on the line of communication will send in separate returns for the local sick and wounded, and for those admitted during Evacuation.

(8.) Patients who are admitted direct to hospital, without passing through the regimental medical officers, will be noted in the next return from the latter, when they get information of the fact.

(9.) A portion of a month will be regarded as a whole month in case of broken periods. Hospital ships and hospital trains will submit returns for each voyage.

(10.) Patients of 2nd and 3rd Class, if they are more than one day under treatment, will be shown in the returns.

(11.) The column of "Admissions" is for patients received from or admitted direct from field regimental units. The column "Transferred from" is for those admitted from other hospitals, or from sick convoys, by road, rail, or sea.

(12.) The days under treatment will include the day of "Transfer from," but not the day of "Transfer to," "Recovery," or "Invaliding."

(13.) Wounded who die on the field, before being received into a dressing station or temporary dressing station, or who may have been admitted then as hopeless cases and received some temporary treatment before dying, will not be included in the return.

These cases will come under the heading of "Deaths on the Field" and will be noted in the column of remarks. Similarly, those who die on the field without treatment, and have been examined after death by a medical officer, will be noted in the column of remarks as "Killed Instantly." The number, nature of wound, and ranks of these cases will be noted.

(14.) Separate returns will be submitted for enlisted soldiers and for civilian employés and others, except in the case of the combatant units, to which civilian and other employés may be attached. In these, however, the number of cases, days under treatment, and transfers to hospital, as well as names, will be noted in column of remarks.

(15.) Care must be taken to see that the various ranks are entered in the proper columns.

(16.) In the returns from hospital ships, hospital trains, and similar units, the effective strength and average daily percentage of sick to strength need not be entered.

(17.) In the case of personnel of a hospital, who are admitted, these will be shown in the return from the unit as "Transfers to" and in the hospital return as "Fresh Admissions."

(18.) Men who, after completing their period of service, die while on convalescent leave, will be returned in the column of "Died," except in the case of fortress, Tsushima garrison, and reserve hospitals.

(19.) A Return, similar to this, will be submitted for enemy's sick and wounded, who may be received and treated in units or hospitals.

(20.) A margin, sufficient for binding, must be left.

Appendix 6.

Form of Bed-Head Ticket.

Index No.		Index No. in A. and D. Book.
Rank and Name.	Unit.	Nature of Wound.

Note.—The above is natural size, with columns arranged as in the Japanese Form.

The material is stout paper.

Appendix 7.

Form of Death Certificate.

Certificate of Death.

Division_____ Regiment_____ Battalion_____ Co._____

Rank_____ Name_____

The above-named received (here state nature of) wound, or contracted (here state nature of) disease, in (here state name of) place, on (here state year, month, and day), and was admitted to (here state name of) Hospital, from (here state name of) Hospital on (here state year, month, and day). He was under treatment, but symptoms of (here state nature) occurred, and he died at (here state hour) o'clock on this day.

Place_____

Date_____

Rank _____ Name_____ (Seal.)

Notes.

(1.) The Certificate will be signed by the senior medical officer of the hospital or unit concerned.

(2.) The dates and the hours are to be in words and not in figures; and the wording is to be exactly as in the form, and is not to be abbreviated.

(3.) When a patient dies during transport, the driver or attendant who was with him at the time will describe the symptoms to the medical officer, and the latter will state in the Certificate that such and such symptoms "are supposed to have occurred, according to the statements made."

(4.) In the case of persons killed or found dead, the medical officer will examine the body and the form of Certificate will be: "Post-mortem "examination of Body.—I examined the above-named and found that he "was killed by (such and / such a) wound, or died from (such and / such a) disease in "(such and / such a) condition."

(5.) The home address of the deceased will be entered at the end of the form.

Appendix 8.

Form of Statement of Case for Invaliding.

Statement of Case of Invalid.

Division_____ Regiment_____ Battalion_____ Co._____

Rank_____ Name_____

The statement will be written and will contain the following facts:—the nature, place, and date of contracting of the wound or disease; the date of admission to a Field Hospital, the date of transfer to the Reserve Hospital; recommendation for discharge as unfit for further service, or for sick furlough, and the period of furlough recommended. The recommendation will be preceded by a statement of the man's present condition.

Date_____

Rank_____ Name_____

Seal.

Notes.

(1.) This statement is given to the invalid.
(2.) He must bring it with him each time he is summoned to appear for medical examination.
(3.) In cases discharged as unfit for further service, the date of appearance for further medical examination is not entered.
(4.) Further particulars than those noted above, which are only a guide to medical officers, may be noted.

Appendix 9.

Forms used as Sick Convoy Notes.

Voucher A.

Sick Convoy Note.	Place of Despatch } _____ Date of Despatch } _____	Name of Unit from which Transferred.	—
	Place of Arrival } _____ Date of Arrival } _____		

Wound or Disease.	Regiment, &c.	Rank.	Name.	Remarks.

Voucher B.

Sick Convoy Note.

Classification of Patients.	Number.	Remarks on Condition, &c. during Transport.
Wounds.		
Disease.		
Total.		

I certify that I took over the number of patients noted in the above columns.

Date _____ Hour _____ Rank _____

Place _____ Name _____

Appendix 10.

Form of Return of Sick and Wounded for 10-*day Periods.*

Date_____ From_____ To_____	Hospital or Unit } _____	Name of Locality } _____

Classification of Patients.	Officers, and those Ranking as such.			Non-Commissioned Officers and Men.			Numbers remaining.		
	Admitted.	Died.	Discharged.	Admitted.	Died.	Discharged.	Officers, &c.	Rank and File.	Total.
Injuries in Action -									
Injuries other than in Action.									
Infectious Diseases -									
Other Diseases - -									
Total - - -									

Remarks.

Notes.

(1.) The above return is submitted three times in each month; for the periods 1st to 10th, 11th to 20th, and 21st to last day of month. In a 31-day month the last period is an 11-day period. If a hospital closes before a period is completed a return will be sent in for the broken period, noting the fact in the remarks.

(2.) "Injuries in Action" mean wounds caused by the enemy, "Injuries other than in Action" mean all other injuries. "Infectious Diseases" mean the eight scheduled infectious diseases. "Other Diseases" mean all other cases of sickness.

(3.) Anyone unfit for duty for more than four days must be shown in the return.

(4.) Civil officers and others not enlisted soldiers will be shown in the return, but their ranks, &c. will be noted in the remarks.

(5.) The name and number of cases of each infectious disease, and the number of cases of beri-beri and sunstroke, will be noted in the remarks.

(6.) In the returns from reserve hospitals, sick and wounded from the field armies will be distinguished from the ordinary sick of the locality by being entered in red ink. The number of vacant beds must also be noted.

The Japanese Form is approximately the size of the above; the columns in it are reversed, *i.e.*, from right to left and vertical instead of horizontal.

Appendix 11.

Form of Monthly Return of Receipts and Expenditure of Medical and Surgical Material.

Unit.	Locality.	Date of Return. For the month of_____ year_____
_____	_____	

Total remaining.	Issues.			Total Receipts.	Receipts.		Remaining from last Month.	Quantities.	Articles.
	Issued to other Units.	Condemned or Destroyed.	Expended.		Purchased locally.	Received from other Units.			
									Remarks (at end of list).

Notes.

(1.) A return must be sent in for any broken period, if month is not completed.

(2.) The nomenclature must be that of the Official War Office List of Pharmaceutical Preparations. The nomenclature of instruments will be as noted in the contents of field panniers. The issue and receipt of gauze, wool, bandages, &c. will be specially noted in column for remarks as the end of the return.

(3.) The issues of clothing need not be entered, but will be noted in the remarks.

(4.) The general condition of the stores must be noted in the remarks.

The above is only a specimen page of the return, which is long, and, as a rule, has the list of articles printed on it. The columns read from right to left.

Appendix 12.

Form of Monthly Return of Sick and Wounded Evacuated.

Monthly Report of Transport of Sick and Wounded for Month_____ Year_____	Locality. _____	Sick and Wounded Transport Department of _____ Division.

Classification of Transport.		Number of Wounded.	Number of Sick.		Total.	Remarks in connection with the Journey.
			Infectious Diseases.	Ordinary Diseases.		
Road	On foot					
	Otherwise					
Rail	Lying down.					
	Sitting up.					
Water	Severe Cases.					
	Light Cases.					

General Remarks—

Notes.

(1.) A return as above must be submitted for broken monthly periods.
(2.) Infectious diseases are the eight scheduled diseases.
(3.) In the columns for remarks will be noted the stages of the journeys, the kind and efficiency of the transport material, and damages to transport material.

		Total.			

Appendix 13.

Return of Personnel and Horses of Medical Mobile Units.

Return of Personnel and Horses.

Of Bearer Battalion _____ of _____ Division.
(Field Hospital _____ of _____ "
Reserve Medical Personnel _____ of _____ "
Medical and Surgical Reserve Depôt _____ of _____ "
Sick and Wounded Transport Department) _____ of _____ "

Date _____ Day _____ Month _____ Year _____
Rank _____ Name _____
of Officer Commanding _____ Seal.

Horses.				Personnel.																								
					Rank and File.													Officers and Persons holding Officers' Rank.									Ranks. / Distribution.	
Total.	Draught.	Pack.	Saddle.	Total.	Total.	Instrument Cleaner.	Soldier Servants.	Grooms.	Train Soldier.	Intendance N.C.O.	Civil Sick Attendant.	Hospital Private.	Hospital Corporal.	Hospital Sergeant.	Private.	Corporal or Sergeant.	Sergeant-Major.	Total.	Surgeon-Probationer.	Surgeon-Lieutenant (1st or 2nd).	Surgeon-Captain.	Surgeon-Major.	Warrant Officer.	1st or 2nd Lieutenant.	Captain.	Major.		
																											Number Remaining from last Return.	
																											Additions.	
																											Killed in Action.	Casualties.
																											Died of Disease.	Casualties.
																											Transferred or Discharged.	Casualties.
																											Admitted to Hospital.	Casualties.
																												Casualties.
																											Total.	Casualties.
																											Number Remaining.	
																											Wounded.	Non-Effectives.
																											Sick.	Non-Effectives.
																											Prisoners.	Non-Effectives.
																												Non-Effectives.
																											Total.	Non-Effectives.
																											Effective Strength.	
																											Excess.	Excess or Deficiency of Fixed Establishment.
																											Deficient.	Excess or Deficiency of Fixed Establishment.

Remarks.

Notes.

(1.) Cases of frostbite or seasonal complaints, even if under short periods of treatment, must be specially noted and entered in the return.
(2.) Men, &c. slightly wounded and likely to recover shortly will also be entered in one of the blank columns.
(3.) Men, &c. temporarily absent from the unit will be shown amongst "Effectives," but will be noted in the remarks.
(4.) The blank columns may be used for entering other particulars, which should be noted.
(5.) A note will be made in remarks of changes in rank by promotion, &c.
(6.) The figures in the last column, "*Deficient*," must be made in red ink.
(7.) Notes on movements, food, state of health, &c., may be made in remarks or on a separate sheet.
(8.) Apothecaries will be shown in the columns for surgeons with "Y" added. Men of the train battalion will be marked with a "C."

The original Form measures 9 inches by 12 inches approximately. The return is submitted three times monthly, *i.e.*, on 10th, 20th, and last day of month.

e Field.

Name of Uni	Instructions in First Aid, published by Japanese Red Cross Society.	Military and Civil Law.	Code of Military Punishments.	Requisition and Financial Regulations.	Regulations for dealing with Infectious Disease.	Regulations for dealing with Epidemics in the Army.	Regulations regarding Death Reports and Certificates.	Regulations regarding Burying of the Dead.	Instructions regarding the Custody and Care of Medical and Surgical Material.	Regulations for Apothecary's Department of the War Office.	Army List of Seniority.	Army Post Office Regulations.
Office of P.M.(	1	1	1	1	1	1	1	1	1	1	1	1
Office of P.M.(	1	1	1	1	1	1	1	1	1	1	1	1
Bearer Battali	—	2	2	2	2	2	2	2	—	2	—	1
Field Hospital	2	2	2	2	2	2	2	2	2	2	—	1
Reserve Perso	3	3	3	3	3	3	3	3	3	3	—	1
Medical and S Depôt.	1	1	1	1	—	1	—	—	1	1	—	1
S. and W. Tra	1	1	1	1	1	1	1	1	—	1	—	1
Hospital Train	1	1	1	1	1	2	1	1	1	1	—	—
Hospital Ship	1	1	1	—	1	2	1	1	1	1	—	1

Appendix 14 (1).

List of Books, &c. to be in the possession of Medical Units in the Field.

Name of Unit. / Name of Book.	Regulations of Imperial Head-Quarters Staff.	Field Organisation.	Duties of Commanding Officer in War.	Field Medical Regulations.	Regulations for Ammunition Columns.	Regulations for Train Battalion.	Regulations for Line of Communications.	General Organisation of other than Medical Units.	Field Regulations for Men of the Reserve and Conscripts.	Regulations for Transport by Rail.	Regulations for Transport by Sea.	Regulations for Fortress Defence.	Clothing Regulations.	Intendance Department Regulations.	Telegraphic Code for Medical Supplies, and Army Code.	Notes and Explanation of the Geneva Convention.	Articles applying Geneva Convention to Naval Warfare.	Customs and Laws of War on Land.	Instructions in First Aid, published by Japanese Red Cross Society.	Military and Civil Law.	Code of Military Punishments.	Requisition and Financial Regulations.	Regulations for dealing with Infectious Diseases.	Regulations for dealing with Epidemics in the Army.	Regulations regarding Death Reports and Certificates.	Regulations regarding Burying of the Dead.	Instructions regarding the Custody and Use of Medical and Surgical Material.	Regulations for Apothecary's Department of the War Office.	Army List of Seniority.	Army Post Office Regulations.
Office of P.M.O. Field Force -	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Office of P.M.O. of each Army	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bearer Battalion - -	—	—	1	4	2	2	1	2	1	—	—	—	—	2	2	2	—	2	—	2	2	2	2	2	2	2	—	2	—	1
Field Hospital - -	—	—	1	4	2	2	1	2	1	—	—	—	—	2	2	2	—	2	2	2	2	2	2	2	2	2	2	2	—	1
Reserve Personnel - -	—	—	1	6	—	—	1	3	1	—	—	—	—	3	3	3	—	3	3	3	3	3	3	3	3	3	3	3	—	1
Medical and Surgical Reserve Depot.	—	—	1	2	—	—	1	3	1	1	1	—	1	1	1	1	—	1	1	1	1	1	—	1	—	—	1	1	—	1
S. and W. Transport Section	—	—	1	2	—	—	1	1	1	1	1	—	—	1	1	1	—	1	1	1	1	1	1	1	1	1	—	1	—	1
Hospital Train -	—	—	1	2	—	—	1	1	1	1	1	—	—	1	1	1	—	1	1	1	1	1	1	2	1	1	1	1	—	—
Hospital Ship - -	—	—	1	2	—	—	1	1	1	1	2	—	—	1	1	1	1	1	1	1	1	—	1	2	1	1	1	1	—	1

Remarks.

(1) Officers commanding units may add any other books they like.
(2) Officers are responsible for the care of these books.

Field.

e for the records in their charge.)

Name of Ur	Ledger of Issue and Receipt of Expendable and Miscellaneous Articles.	Ledger of Issue and Receipt of Hospital Clothing.	Ledger of Issue and Receipt of Money.	Requisition Book.	Ration Account Book.	Requisitions for Money.	List of Moneys and Valuables of Patients.	List of Effects of Patients.	Ledger of Issue and Receipt of Medicines.
Office of P.M	—	—	—	—	—	—	—	—	—
Office of P.M	—	—	—	1	—	—	—	—	—
Bearer Batta	1	—	1	1	—	1	1	1	1
Field Hospit	1	—	1	1	1	1	1	1	1
Reserve Pers	1	—	1	1	1	1	1	1	1
Medical and Depôt.	1	—	1	1	—	1	—	—	1
S. and W. Tr	—	—	1	1	—	1	1	1	—
Hospital Tra	—	—	—	1	1	1	1	1	1
Hospital Shi	—	—	—	1	1	1	1	1	—

Appendix 14 (2).

List of Records that have to be kept by each Medical Unit in the Field.

(The officer commanding a unit may add to the list, as he thinks fit. Officers are responsible for the records in their charge.)

Nature of Record. / Name of Unit.	Diary.	Register of Letters and Telegrams.	Record of Services and Confidential Reports on Officers.	Record of Services and Confidential Reports on N.C.O.'s and Men.	Alphabetical List of Officers, N.C.O.'s and Men.	List of Horses.	Orders issued by Commanding Officers.	Orders issued by General Officer Commanding Division.	Punishment Book.	Register of Arrival and Departure of Establishment Personnel.	Tallies for Index of Rifles and Side-Arms, &c.	Medical Diary of Cases.	Admission and Discharge Book.	List of Medical and Surgical Material authorised.	Ledger of Issue and Receipt of Surgical Instruments.	Ledger of Issue and Receipt of Expendable and Miscellaneous Articles.	Ledger of Issue and Receipt of Hospital Clothing.	Ledger of Issue and Receipt of Money.	Requisition Book.	Ration Account Book.	Requisitions for Money.	List of Moneys and Valuables of Patients.	List of Effects of Patients.	Ledger of Issue and Receipt of Medicines.
Office of P.M.O. Field Force	1	1	1	1	1	1	1	1	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
Office of P.M.O. of each Army	1	1	1	1	1	1	1	1	1	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—
Bearer Battalion	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	—	1	1	—	1	1	1	1
Field Hospital	1	1	1	1	1	1	1	1	1	1	—	1	1	1	1	1	—	1	1	1	1	1	1	1
Reserve Personnel	1	1	1	1	1	1	1	1	1	1	—	1	1	1	1	1	—	1	1	1	1	1	1	1
Medical and Surgical Reserve Depôt.	1	1	1	1	1	1	1	1	1	1	—	1	—	1	1	1	—	1	1	—	1	—	—	1
S. and W. Transport Section	1	1	1	1	1	1	1	1	1	1	—	1	—	—	—	—	—	1	1	—	1	1	1	—
Hospital Train	1	1	1	1	1	—	1	1	1	1	—	1	1	—	—	—	—	—	1	1	1	1	1	1
Hospital Ship	1	1	1	1	1	—	1	1	1	1	—	1	1	—	—	—	—	—	1	1	1	1	1	—

Appendix 15.

List of Returns, &c., that are Submitted by Medical Units in the Field.

Nature of Return.	By Whom Submitted and Remarks.
Medical Diary of Cases -	All Medical Officers of Units, and the S.M.O. of Field Medical Units, Hospital Ships, Trains, &c., keep these. Submitted at end of War.
Case Sheets - - -	Ditto.
10-day Return of Sick of Units.	Ditto.
Monthly Return of Sick of Units.	Ditto.
Report of Work during a Battle.	M.O.s of all Units, and S.M.O. of Bearer Battalion, Field Hospitals, and Reserve Personnel, after each Battle.
Return of Surgical Operations	S.M.O.s of Field Hospitals and Reserve Personnel, after each Battle.
Patients' Effects, Money, and Valuables Vouchers.	S.M.O.s of Bearer Battalion, Field Hospitals, and Reserve Personnel.
Return of Killed and Wounded daily.	M.O.s of Regimental Units only. (*See* Notes.)
Monthly Return of Sick and Wounded Evacuated.	S.M.O. of Sick and Wounded Transport Section only.
Prescription Sheets - -	Field Hospitals and Reserve Personnel M.O.s.
Admission and Discharge Books.	Bearer Battalion, Field Hospitals, and Reserve Personnel.
10-day Return of Admissions to Hospital.	Field Hospitals and Reserve Personnel. Submitted to P.M.O. Field Force.
Monthly Return of Admissions to Hospital.	Field Hospitals and Reserve Personnel. Submitted to D.G., A.M.S., War Office.
Monthly Return of Receipts, Issues, and Expenditure of Surgical and Medical Material.	Field Hospitals, Reserve Personnel, and Medical and Surgical Reserve Depôt. Prepared by Senior Apothecary and Submitted to D.G., A.M.S.
Monthly Return of Receipts and Issues of Surgical Instruments and Hospital Clothing.	Senior Apothecary, Medical and Surgical Reserve Depôt only. Submitted to D.G., A.M.S., War Office.
Return of Sick and Wounded carried by Railway Trains or Ships.	S.M.O. Hospital Ships and Transports, Hospital and Ordinary Trains. Submitted to P.M.O. Field Force.
Return of Personnel and Horses.	Bearer Battalion, Field Hospitals, Reserve Personnel, Medical and Surgical Reserve Depôt, and Sick and Wounded Transport Section. Submitted by O.C.s of these units, the two first to the O.C. Train Battalion of the Division, and the last three to the Inspector-General, Lines of Communication.

APPENDIX D.

(1) *List of Contents of the Medical and Surgical Panniers of a Field Hospital.*

(There are two sets of six panniers, each set being identical with the other. The list is for one set.)

(N.B.—In fortresses the 1st class set of panniers is identical with these.)

Description of Article. / Description of Pannier.		(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	Total.
MEDICINES.								
Carbolic Acid	grms.	250·0	—	—	—	1350·0	—	1600·0
Hydrargyr. Perchlor.	soloids.	300	—	—	—	—	700	1000
Hydrarg. Perch. c. Sod. Chlor.	grms.	—	—	—	1350·0	—	1350·0	2700·0
Iodoform	„	250·0	—	—	—	—	—	250·0
Boric Acid	„	—	—	—	—	—	450·0	450·0
Potass. Chlorate	„	—	—	—	—	—	225·0	225·0
Tannic Acid	„	—	—	—	—	—	100·0	100·0
Potass. Permangan.	„	—	—	—	—	—	250·0	250·0
Hydrochloric Acid	„	—	—	—	—	225·0	—	225·0
Tartaric Acid	„	100·0	—	—	—	—	—	100·0
Bismuth Subnit.	„	200·0	—	—	—	—	250·0	450·0
Soda, Bicarb.	„	200·0	—	—	—	—	250·0	450·0
Gastric powder (Gentian and Sod. Bicarb.)	„	225·0	—	—	—	—	675·0	900·0
Opium	„	—	—	—	—	—	30·0	30·0
Tinct. Opii	„	150·0	—	—	—	150·0	—	300·0
Starch powder	„	—	—	—	—	—	450·0	450·0
Sod. Salicylas	tabloids	250	—	—	—	—	—	250
Quinine	pills	2000	—	—	—	—	—	2000
Dover's powder	powders	—	—	—	—	—	300	300
Ipecacuanha powder	grms.	—	—	—	—	—	50·0	50·0
Digitalis leaves	„	—	—	—	—	—	200·0	200·0
Apomorphine	tabloids	15	—	—	—	—	—	15
Aq. Laurocerasi	grms.	—	—	—	—	450·0	—	450·0
Antifebrin, 0·2 grm.	tabloids	—	—	—	—	—	100	100
Chloral Hydrate	grms.	50·0	—	—	—	—	—	50·0
Chloroform	„	250·0	—	—	—	650·0	—	900·0
Potass. Bromide	„	—	—	—	—	—	225·0	225·0
Potass. Iodide	„	—	—	—	—	—	225·0	5·0

(1) *List of Contents of the Medical and Surgical Panniers of a Field Hospital*—continued.

Description of Article. / Description of Pannier.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	Total.
MEDICINES—*cont.*							
Potass. Nitrate - - grms.	—	—	—	—	—	225·0	225·0
Santonin - - - tabloids	30	—	—	—	—	—	30
Cocaine - - - ,,	200	—	—	—	—	800	1000
Morphine - - ,,	100	—	—	—	—	900	1000
Nitrate of Silver - grms.	—	—	—	—	—	10·0	10·0
Zinc Sulphate - - ,,	—	—	—	—	—	50·0	50·0
Nitrate of Silver and Potash ,,	—	—	—	—	—	25·0	25·0
Atropine - - tabloids	15	—	—	—	—	—	15
Plaster of Paris - - grms.	—	—	—	—	—	4500·0	4500·0
Collodium - - - ,,	30·0	—	—	—	—	—	30·0
Rubber plaster - - sq. ins.	390	—	1950	—	—	—	2340
Sticking plaster - - ,,	200	—	400	—	—	—	600
Resin plaster - - grms.	—	—	—	—	—	300·0	300·0
Boric ointment - - ,,	—	—	—	—	—	450·0	450·0
Vaseline - - - ,,	—	—	—	—	—	450·0	450·0
Glycerine - - - ,,	—	—	—	—	450·0	—	450·0
Olive oil - - - ,,	150·0	—	—	—	300·0	—	300·0
Zinc Oxide - - ,,	—	—	—	—	—	100·0	100·0
Tinct. Iodi - - - ,,	100·0	—	—	—	—	—	100·0
Sp. Camphor - - ,,	—	—	—	—	450·0	—	450·0
Oil Camphor (for hypodermic use) ,,	100·0	—	—	—	100·0	—	200·0
Balsam Peru - - ,,	—	—	—	—	225·0	—	225·0
Refined Camphor - - ,,	—	—	—	—	—	225·0	225·0
Brandy - - - ,,	250·0	—	—	—	3500·0	—	3750·0
Menthol and Brandy - ,,	—	—	—	—	150·0	—	150·0
Menthol - - - ,,	—	—	—	—	—	200·0	200·0
Red Wine - - - ,,	—	—	—	—	—	1400·0	1400·0
Mustard powder - - ,,	—	—	—	—	—	200·0	200·0
Magnesia Sulphate - - ,,	—	—	—	—	—	450·0	450·0
Ol. Ricini - - - ,,	—	—	—	—	450·0	—	450·0
Calomel - - - tabloids	150	—	—	—	—	—	150
Rectified spirit - - grms.	150·0	—	—	—	750·0	—	900·0
Condensed Milk - tins	—	—	—	—	5	—	5
Sod. Chloride - - grms.	—	—	—	—	—	225·0	225·0
Sod. Carbonate - - ,,	—	—	—	—	—	200·0	200·0
Distilled water - - ,,	250·0	—	—	—	200·0	—	450·0
White Sugar - - ,,	—	—	—	—	—	900·0	900·0

(1) *List of Contents of the Medical and Surgical Panniers of a Field Hospital*—continued.

Description of Pannier. / Description of Article.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	Total.
SURGICAL INSTRUMENTS AND APPLIANCES.							
Surgical pocket case - No.	—	1	—	—	—	—	1
Surgical case - - - „	—	1	—	—	—	—	1
Tooth instruments - - „	—	1	—	—	—	—	1
Anæsthesia case - - „	—	2	—	—	—	—	2
Elastic bandage (for bloodless operation) - „	—	1	—	—	—	—	1
Elastic tourniquet (for bloodless operation) - „	—	2	—	—	—	—	2
Bullet forceps - - - „	—	2	—	—	—	—	2
Probe—long - - „ short - - - „	—	3	—	—	—	—	3
Artery forceps - - „	—	5	—	—	—	—	5
Bulb syringe - - „	2	—	—	—	—	—	2
Hypodermic syringe - „	—	3	—	—	—	—	3
Transfusion apparatus for salt solution injections - „	—	—	1	—	—	—	1
Enema apparatus - - „	—	1	—	—	—	—	1
Glycerine enema syringe - „	—	2	—	—	—	—	2
Nelaton's catheters set Nos. 7 to 12	—	1	—	—	—	—	1
Gum elastic catheters - set of six	—	1	—	—	—	—	1
Silver catheters - „	—	1	—	—	—	—	1
Silver bougies - - „	—	1	—	—	—	—	1
Irrigators - - set of three	—	1	2	—	—	—	3
Pus basins - „ „	—	1	2	—	—	—	3
Thermometer, Clinical - No.	—	10	—	—	—	—	10
Tongue forceps - - „	—	1	—	—	—	—	1
Stethoscope - - „	—	1	—	—	—	—	1
Rectum speculum - „	—	1	—	—	—	—	1
Scissors for Plaster of Paris „	—	1	—	—	—	—	1
Plaster of Paris knife - „	—	1	—	—	—	—	1
Plaster of Paris saw - „	—	1	—	—	—	—	1
Long splint - - - „	—	3	—	3	—	—	6
Volkmann's splint - - „	—	—	—	—	1	2	3
Copper wire netting for splints - - sheets	—	10	—	—	20	—	30
Cloaks for operating surgeons - - - No.	—	8	—	—	—	—	8
Lamp for operation room - „	1	—	—	—	—	—	1
Spirit lamp - - - „	—	—	1	—	—	—	1
Air cushion (circular pad) „	—	1	—	—	—	—	1
Room thermometer - -	1	1	—	—	—	—	2
Tape measure (metre) - „	—	1	—	—	—	—	1

(1) *List of Contents of the Medical and Surgical Panniers of a Field Hospital*—continued.

Description of Article. / Description of Pannier.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	Total.
SURGICAL INSTRUMENTS AND APPLIANCES—*cont.*							
Bed pans - - - - No.	—	—	—	—	2	—	2
Dissecting instruments - set	—	—	—	1	—	—	1
Water analysis case - No.	—	—	—	—	—	1	1
Hone - - - „	—	—	—	1	—	—	1
Pestle and mortar - - „	1	—	1	—	—	—	2
Spoon, copper - - - „	4	—	—	—	—	—	4
„ horn - - - „	4	—	—	—	—	—	4
Scales and weights: Small, to 10 grms. - - „	1	—	—	—	—	—	1
Medium, to 500 grms. - „	—	—	—	—	1	—	1
Corkscrew - - - „	1	—	—	—	—	—	1
Ointment slab - - - „	2	—	—	—	—	—	2
Pill slab - - - „	—	—	—	—	1	—	1
Measure glasses: 100 cc. - - - „	1	1	—	—	—	—	2
10 cc. - - - „	1	2	—	—	—	—	3
Funnel - - „	—	—	1	—	—	—	1
Medicine spoon - - - „	1	—	—	—	—	—	1
SURGICAL DRESSINGS AND EXPENDABLE MATERIALS.							
Throat brush - - - No.	2	—	—	—	—	—	2
Eye droppers - - - „	4	—	—	—	—	—	4
Bandages, triangular - „	20	—	—	30	—	—	50
„ loose wove roller „	20	—	—	130	—	50	200
„ starch - - „	—	—	20	—	30	—	50
Calico - - - piece	1	1	1	—	1	—	4
Sublimate gauze - - grms.	1,800	200	—	—	—	—	2,000
Absorbent wool - - „	1,000	—	—	1,500	—	—	2,500
Absorbent gauze - - „	500	—	—	1,000	—	—	1,500
First Field dressings - No.	—	—	—	30	—	—	30
Sublimate silk (for ligatures, sizes 1 to 5) - grms.	50	—	—	—	—	—	50
Sublimate bag for carbonised straw dressings: Large - - - No.	50	—	—	50	—	—	100
Medium - - - „	50	—	—	100	—	—	150
Small - - - „	50	—	—	50	—	—	100
Drainage tube: Large - - - feet	—	6	—	—	—	—	6
Medium - „	—	6	—	—	—	—	6
Small - - „	—	3	—	—	—	—	3

(1) *List of Contents of the Medical and Surgical Panniers of a Field Hospital*—continued.

Description of Article. / Description of Pannier.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	Total.
SURGICAL DRESSINGS, &c. —*cont.*							
Gooch's splints - - pieces	—	15	—	—	—	—	15
Thin wooden splints - „	—	—	50	—	—	50	100
Pasteboard splints - „	—	—	—	—	—	5	5
Nail brush - - - No.	—	4	—	—	—	—	4
Skin brush - - - „	—	1	—	—	—	—	1
Soap - - - cakes	—	5	15	—	—	—	20
Sponge - - - - No.	—	10	—	—	—	—	10
Safety pins - - - „	150	—	—	—	—	—	150
Oil paper - packets of 6 sheets	—	10	10	10	10	10	50
Ice-bags - - - - No.	—	20	—	—	—	—	20
Cotton wool - - grms.	—	—	—	—	1,200	2,800	4,000
Paraffin (solid) for lamp „	—	—	—	1,800	—	—	1,800
Wick for lamp - - mètres	1	—	—	—	—	—	1
Linen - - - grms.	600	—	—	—	—	—	600
Powder papers - - pieces	—	—	1,500	—	—	—	1,500
Labels:							
"Internal Use" - - No.	300	—	—	—	—	—	300
"External Use" - - „	100	—	—	—	—	—	100
Plaster papers - in bundles of 8	150	—	—	—	—	—	150
Small medicine bottles with corks - - No.	—	—	—	—	10	—	10
Corks (assorted) - - „	—	—	—	60	—	—	60
Shells for ointments, &c. - „	—	—	30	—	—	—	30
MISCELLANEOUS AND EXPENDABLE ARTICLES.							
Compass Dividers - - No.	1	—	—	—	—	—	1
Compass with pen - - „	1	—	—	—	—	—	1
Scissors - - - „	—	2	—	—	—	—	2
Folding lantern - - „	2	—	4	—	—	—	6
Canvas bucket - - „	—	—	3	—	—	—	3
Tin pails - - - „	—	—	2	—	—	—	2
Basins - - - sets of 3	—	—	2	—	—	—	2
Hand towels - - - No.	—	1	—	2	—	—	3
Kettles - - - - „	—	—	1	—	—	—	1
Copper pan - - - „	—	—	1	—	—	—	1
Carpenter's tools - - set	—	—	1	—	—	—	1
Red Cross flag (large) - No.	1	—	—	—	—	—	1
National flag - - - „	1	—	—	—	—	—	1

(1) *List of Contents of the Medical and Surgical Panniers of a Field Hospital*—continued.

Description of Pannier. / Description of Article.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	Total.
MISCELLANEOUS AND EXPENDABLE ARTICLES—*cont.*							
Red lamp - - - No.	—	—	—	1	—	—	1
Road indicators (Red Cross) „	—	2	—	—	—	—	2
Cups, wooden - „	2	18	—	—	—	—	20
„ glass - - - „	—	—	3	—	—	—	3
Tin placards - - „	—	2	—	—	—	—	2
Ink-case - - - „	3	—	—	—	—	—	3
Knife with screw driver, &c. „	3	—	—	—	—	—	3
Bags for sand - - „	—	—	10	—	—	—	10
Candles (sperm) - - „	12	—	18	30	—	—	60
Matches (boxes) - - „	12	—	—	—	—	—	12
Soap (washing) - - pieces	—	—	3	—	—	—	3
Hemp rope - - métres	—	—	50	—	—	—	50
„ string - - „	—	150	—	—	—	—	150
„ thread - - grms.	—	30	—	—	—	—	30
Cotton thread (black) (white) - - „	—	10	—	—	—	—	10
Needles - - - No.	—	10	—	—	—	—	10
Pencils with rubber - „	10	—	—	—	—	—	10
Ink brush: Long - - - „	10	—	—	—	—	—	10
Short - - - „	14	—	—	—	—	—	14
Temp. charts - - „	—	100	—	—	—	—	100
Certificate, form of discharge from hospital - - „	—	—	—	100	—	—	100
Envelopes - - - „	50	—	—	—	—	—	50
Invaliding forms - - „	—	—	—	250	—	—	250
Paper - - - quires	—	—	—	5	—	—	5
Book of 100 labels (for sick during march) - - No.	—	1	—	—	—	—	1
Medical Diary or Register of patients - book of 50 sheets	—	2	—	—	—	—	2
Admission and Discharge Book „	—	1	—	—	—	—	1
Case sheets: No. I. - - - No.	—	200	—	—	—	—	200
No. II. - - - „	—	200	—	—	—	—	200
Prescription sheets No. I. - - „	—	150	—	—	—	—	150
No. II. - - - - „	—	300	—	—	—	—	300
Operation Returns: No. I. - - - „	—	—	—	40	—	—	40
No. II. - - - „	—	—	—	20	—	—	20
Effects and Valuables Vouchers - - - „	—	—	—	300	—	—	300

(1) *List of Contents of the Medical and Surgical Panniers of a Field Hospital*—continued.

Description of Pannier. / Description of Article.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	Total.
MISCELLANEOUS AND EXPENDABLE ARTICLES—*cont.*							
Travelling rolls - - No.	—	—	—	25	—	—	25
10-day Sick Returns - „	—	—	—	100	—	—	100
Monthly „ „ - - „	—	—	—	50	—	—	50
Monthly Return of Drugs - „	—	—	—	20	—	—	20
Medicine Ledger (100 pages) „	—	—	—	1	—	—	1
Surgical Material Ledger (100 pages) - - - „	—	—	—	1	—	—	1
Surgical Instrument Ledger (70 pages) - - - „	—	—	—	1	—	—	1
Requisition Book (50 pages) „	—	—	—	1	—	—	1

Remarks.

Each medical officer carries a set of keys and a surgeon's pocket case of instruments.

The National flag is not carried in the equipment of fortress panniers.

(2) *List of Contents of the Medical and Surgical Panniers of a Bearer Battalion.*

(A Bearer Battalion has two sets of eight panniers each, one set for each company. The sets are identical with one another. The list is for one set.)

Description of Pannier. / Description of Article.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	(G.)	(H.)	Total.
MEDICINES.									
Acid, Carbolic - - - - grms.	250·0	250·0	—	—	900·0	—	—	—	1400·0
Hyd. Perchlorid. - - soloids	200	200	—	—	—	600	—	—	1,000
Hyd. Perchlor. c. Sod. Chlor. - grms.	—	—	—	—	—	1350·0	—	900·0	2250·0
Iodoform - - - - - „	200·0	—	—	—	—	250·0	—	—	450·0
Acid, Boric - - - - „	—	300·0	—	—	—	150·0	—	—	450·0
Acid, Tartaric - - - - - „	30·0	—	—	—	—	—	—	—	30·0
Bismuth Subnit. - - - „	—	300·0	—	—	—	450·0	—	—	750·0
Gastric powder (Sod. Bicarb. and Gentian) - - - „	—	—	—	—	—	900·0	—	—	900·0
Opium - - - - - - „	—	4·0	—	—	—	8·0	—	—	12·0
Antifebrin, 0·2 grms. - tabloids	—	—	—	—	—	100	—	—	100
Sod. Salicylas - - - - - „	—	300	—	—	—	200	—	—	500
Quinine - - - - - pills	—	2 000	—	—	—	—	—	—	2,000
Dover's powder - - - tabloids	—	—	—	—	—	400	—	—	400
Apomorphine - - - - „	—	10	—	—	—	—	—	—	10

(2) *List of Contents of the Medical and Surgical Panniers of a Bearer Battalion*—continued.

Description of Article. / Description of Pannier	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	(G.)	(H.)	Total.
MEDICINES—*cont.*									
Chloroform - - - - grms.	225·0	—	—	—	225·0	—	—	—	450·0
Santonin - - - powders	—	20	—	—	—	—	—	—	20
Cocaine - - - - - tabloids	150	—	—	—	—	100	—	—	250
Morphine - - - „	50	—	—	—	—	—	—	—	50
Argent. Nitras - - - - grms.	5·0	—	—	—	—	—	—	—	5·0
Zinc Sulphate - - - „	—	10·0	—	—	—	—	—	—	10·0
Arg. et Potass. Nitras - - „	—	10·0	—	—	—	—	—	—	10·0
Atropine - - - tabloids	—	10	—	—	—	—	—	—	10
Plaster of Paris - - - grms.	—	—	—	—	500·0	—	1350·0	1350·0	3600·0
Rubber plaster - - sheets	—	250	—	—	—	250	—	—	500
Gum plaster - - - - „	—	250	—	—	—	250	—	—	500
Resin plaster - - - grms.	—	—	—	—	—	200·0	—	—	200·0
Boracic ointment - - - „	—	—	—	—	—	200·0	—	—	200·0
Olive oil - - - „	250·0	—	—	—	—	—	—	—	250·0
Tinct. Iodi - - - - - „	150·0	—	—	—	—	—	—	—	150·0
Camphor oil (for hypodermic use) - - - - „	50·0	—	—	—	100·0	—	—	—	150·0
Brandy - - - - - - „	225·0	—	—	—	3500·0	—	—	—	3725·0
Menthol Brandy - - „	—	100·0	—	—	—	—	—	—	100·0
Menthol - - - - - - „	—	—	—	—	—	100·0	—	—	100·0
Magnes. Sulphas. - - „	—	—	—	—	—	450·0	—	—	450·0
Calomel - - - - - - tabloids	—	100	—	—	—	—	—	—	100
Rectified spirit - - - grms.	225·0	—	—	—	900·0	—	—	—	1225·0
Distilled water - - - „	225·0	—	—	—	450·0	—	—	—	675·0
SURGICAL INSTRUMENTS AND APPLIANCES.									
Surgical pocket case - - No.	1	—	—	—	—	—	—	—	1
Surgical Instrument case - - „	—	1	—	—	—	—	—	—	1
Anæsthesia case - - - „	—	1	—	—	—	—	—	—	1
Elastic bandage (for bloodless operations) - - - - „	1	—	—	—	—	—	—	—	1
Elastic tourniquet (for bloodless operations) - - - „	—	2	—	—	—	—	—	—	2
Rubber bulb syringe - - - „	—	2	—	—	—	—	—	—	2
Hypodermic syringe - - „	3	—	—	—	—	—	—	—	3
Enema apparatus - - - „	—	1	—	—	—	—	1	—	2
Nelaton's catheters - sets 7 to 12	—	1	—	—	—	—	—	—	1
Gum elastic catheters - - set	—	1	—	—	—	—	—	—	1
Irrigators - - - - - „	1	—	—	—	—	—	1	—	2
Pus basins - - - - - „	1	—	—	—	—	—	2	—	3
Clinical thermometers - - No.	3	—	—	—	—	—	—	—	3

(2) *List of Contents of the Medical and Surgical Panniers of a Bearer Battalion*—continued

Description of Article. / Description of Pannier.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	(G.)	(H.)	Total.
SURGICAL INSTRUMENTS AND APPLIANCES—*cont.*									
Tongue forceps - - - No.	1	—	—	—	—	—	—	—	1
Splints, long - - - - - „	—	—	3	—	—	2	5	—	10
Copper wire netting for splints sheets	—	—	—	15	—	15	10	—	40
Operator's cloak - - - No.	—	—	3	3	—	—	—	—	6
Operation lamp - - - - „	1	—	1	—	—	—	—	—	2
Thermometer (room) - - „	1	—	—	—	—	—	—	—	1
Water analysis case - - „	—	—	—	—	—	—	—	—	1
Strop (leather) - - - - „	—	1	—	—	—	—	—	—	1
Pestle and mortar - - - „	1	—	—	—	—	—	—	1	2
Copper spoon - - - - - „	2	—	—	—	—	—	—	—	2
Horn spoon - - - - - „	1	—	—	—	—	—	—	—	1
Medicine spoon - - - - „	1	—	—	—	—	—	—	—	1
Scales and weights: to 10 grms. - „	1	—	—	—	—	—	—	—	1
Scales and weights: to 500 grms.- „	—	—	—	—	—	1	—	—	1
Corkscrew - - - - - „	1	—	—	—	—	—	—	1	2
Ointment slab - - - - „	1	—	—	—	—	—	—	—	1
Measure glasses:									
100 cc. - - - - - „	1	—	—	—	—	—	—	1	2
10 cc. - - - - - „	1	—	—	—	—	—	—	1	2
Funnel - - - - - „	—	—	—	1	—	—	—	—	1
EXPENDABLE DRESSINGS AND APPLIANCES.									
Throat brush - - - No.	3	—	—	—	—	—	—	—	3
Eye dropper - - - - - „	2	—	—	—	—	—	—	—	2
Triangular bandage - - „	10	—	10	—	—	20	10	50	100
Roller bandage - - - - „	20	—	50	—	70	80	—	80	300
Cotton cloth - - - piece	1	—	—	—	—	—	—	3	4
Absorbent wool - - - grms.	200·0	700·0	500·0	—	—	700·0	—	—	2100·0
Sublimate gauze - - - „	400·0	900·0	1000·0	—	—	1600·0	—	—	3900·0
First field dressings - - - No.	—	—	—	—	—	20	—	—	20
Sublimate silk - - grms.	—	30·0	—	—	—	—	—	—	30·0
Sublimate bags (for carbonised straw dressings):									
Large - - - - - No.	—	30	100	—	—	—	—	—	130
Medium - - - - „	—	40	150	—	—	—	—	—	190
Small - - - - - „	—	30	100	—	—	—	—	—	130
Drainage tube (assorted) of each size: Large - - - Medium - - - Small - - - feet	—	6	—	—	—	—	—	—	6
Gooch splints - - - No.	—	—	20	—	—	—	—	—	20

(2) *List of Contents of the Medical and Surgical Panniers of a Bearer Battalion*—continued.

Description of Article. / Description of Pannier.		(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	(G.)	(H.)	Total.
EXPENDABLE DRESSINGS AND APPLIANCES—*cont.*										
Nail brush	No.	4	—	—	—	—	—	2	—	6
Skin brush	„	1	—	—	—	—	—	—	—	1
Soap	„	6	—	—	—	—	—	—	6	12
Sponge	„	5	5	—	—	—	—	—	—	10
Safety pins	„	100	—	—	—	—	—	100	—	200
Oil paper	„	—	—	7	—	3	3	3	4	20
Cotton wool	grms.	—	—	400·0	600·0	2000·0	400·0	1600·0	1200·0	6200·0
Paraffin for lamp	„	—	—	1800·0	—	—	—	—	—	1800·0
Wicks for lamp	No.	1	—	—	—	—	—	1	—	2
Powder papers	sheets	—	200	—	—	—	—	—	—	200
Labels for bottles:										
Medicines—										
Internal use	packets	—	20	—	—	—	—	—	—	20
External use	„	—	10	—	—	—	—	—	—	10
Plaster paper	pieces	—	100	—	—	—	—	—	—	100
Small bottles with corks	No.	—	—	—	—	—	—	—	5	5
Corks	„	—	—	—	—	—	—	30	—	30
MISCELLANEOUS AND EXPENDABLE ARTICLES.										
Scissors:										
Large	No.	2	—	—	—	—	—	1	—	3
Small	„	1	—	—	—	—	—	1	—	2
Folding lantern	„	1	—	—	2	—	—	—	—	3
Lantern, bull's-eye	„	—	—	—	2	—	—	3	—	5
Canvas bucket	„	—	—	—	2	—	—	—	—	2
Tin pail	„	—	—	—	2	—	—	—	—	2
Basin	„	—	—	—	1	—	—	—	—	1
Towels	„	1	—	2	—	—	—	—	—	3
Kettles:										
Large	„	—	—	—	1	—	—	—	—	1
Small	„	—	—	—	1	—	—	—	—	1
Carpenter's tools	set	—	—	—	1	—	—	—	—	1
Red Cross flag	No.	1	—	—	—	—	—	—	—	1
National flag	„	1	—	—	—	—	—	—	—	1
Red lamp	„	—	—	—	—	—	—	1	—	1
Coloured plates (for marking departments)	set	—	1	—	—	—	—	—	—	1
Red Cross road indicators	No.	—	—	—	3	—	—	—	—	3
Horn cup	„	3	—	—	—	—	—	—	7	10
Glass cup	„	—	—	—	—	—	—	—	2	2
In case	„	—	1	2	—	—	—	—	—	3

(2) *List of Contents of the Medical and Surgical Panniers of a Bearer Battalion*—continued.

Description of Article. / Description of Pannier.	(A.)	(B.)	(C.)	(D.)	(E.)	(F.)	(G.)	(H.)	Total.
MISCELLANEOUS AND EXPENDABLE ARTICLES—*cont.*									
Knife with screwdriver, &c. - No.	1	—	—	—	—	—	—	—	1
Candles - - - - „	12	—	30	60	—	—	40	30	180
Matches - - - - boxes	12	—	—	—	—	—	12	—	24
String, stout (rope) - - - metres	—	—	—	50	—	—	—	—	50
String, medium - - - „	—	—	—	60	—	—	—	—	60
String, fine - - - - grms.	—	100·0	—	—	—	—	—	—	100·0
Cotton thread - - - „	—	20·0	—	—	—	—	—	—	20·0
Needles - - - - No.	—	10	—	—	—	—	—	—	10
Pencil and rubber - - - „	10	—	—	—	—	—	—	—	10
Long ink brush - - - „	4	—	—	—	—	—	—	—	4
Short ink brush - - - „	3	—	—	—	—	—	—	—	3
Envelopes - - - - „	—	100	100	—	—	—	—	—	200
Paper - - - - „	—	—	10	—	—	—	—	—	10
Sick labels (for use during the march) - - { book of 100 sheets }	—	1	—	—	—	—	—	—	1
Diagnosis tallies:									
White - - - - No.	—	150	—	—	—	—	—	—	150
Red - - - „	—	400	—	—	—	—	—	—	400
Admission and Discharge Book (50 sheets) - - - „	—	1	—	—	—	—	—	—	1
Medical Diary (50 sheets) - „	—	1	—	—	—	—	—	—	1
Medical Case Sheets - - - „	—	150	—	—	—	—	—	—	1
Register of Effects and Valuables (Books of) - - - - - „	—	—	30	—	—	—	—	—	30
10-day Sick Returns - - „	—	—	50	—	—	—	—	—	50
Monthly Sick Returns - - „	—	—	30	—	—	—	—	—	30
Receipt and Issue of Medicines Book (100 sheets) - - - „	—	—	1	—	—	—	—	—	1
Receipt and Issue of Dressings Material Book (100 sheets) - „	—	—	1	—	—	—	—	—	1
Receipt and Issue of Instruments Book (70 sheets) - „	—	—	1	—	—	—	—	—	1
Requisition Books (50 sheets) - „	—	—	1	—	—	—	—	—	1

Remarks.

Each medical officer also carries two surgical instrument pocket cases and sets keys, in case one set should be lost.

(3) *List of Contents of the Medical and Surgical Boxes of Infantry Units.*

(Each Infantry Unit has a pair of these boxes, in addition to a pair of the smaller boxes called "Medicine Panniers" or "Yakuzai Kori.")

Description of Box. / Description of Article.	(A.)	(B.)	Total.
Medicines.			
Carbolic Acid - - - grms.	250	—	250
Hydrarg. Perchlor. - - - soloids	400	—	400
Hyd. Perchl. c. Sod. Chl. - - grms.	300	—	300
Iodoform - - - - ,,	100	—	100
Boric Acid - - - - ,,	450	—	450
Tartaric Acid - - - ,,	50	—	50
Sod. Bicarb. - - - - ,,	200	—	200
Gastric powders - - - ,,	500	--	500
Quinine - - - - - pills	5,000	—	5,000
Chloroform - - - - grms.	80	—	80
Cocaine - - - - tabloids	100	—	100
Morphine - - - - ,,	150	—	150
Nitrate of Silver and Potash - - grms.	15	—	15
Rubber plaster - - - sq. ins.	250	—	250
Gum plaster - - - ,,	200	—	200
Olive oil - - - - grms.	30	—	30
Sp. Camphor - - - - ,,	225	—	225
Ol. Camphor. (for hypodermic injection) ,,	80	—	80
Brandy - - - - ,,	150	—	150
Menthol Brandy - - - ,,	80	—	80
Menthol - - - - ,,	20	—	20
Calomel - - - - tabloids	200	—	200
Distilled water - - - grms.	200	—	200
Surgical Instruments, &c.			
Surgical pocket case - - - No.	—	1	1
Anæsthesia case - - - - ,,	—	1	1
Elastic tourniquet - - - ,,	—	2	2
Rubber bulb syringe - - - ,,	2	—	2
Hypodermic syringe - - - ,,	2	—	2
Enema apparatus - - - - ,,	—	1	1
Nelaton's catheters - - 8 and 10	2	—	2
Irrigators - - - - set of 3	—	1	1
Pus basins - - - - set of 3	—	1	1
Clinical thermometer - - - No.	2	—	2
Copper wire, splint material - - sheets	—	20	20
Operation lamp - - - - No.	—	1	1
Room thermometer - - - ,,	1	—	1
Pestle and mortar - - - ,,	1	—	1
Copper spoon - - - - ,,	1	—	1
Horn spoon - - - - ,,	1	—	1
Scales and weights, to 10 grms. - ,,	1	—	1
Corkscrew - - - - ,,	1	—	1
Ointment slab - - - - ,,	1	—	1
Measure glass, 100 cc. - - - ,,	1	—	1
,, ,, 10 cc. - - - ,,	1	—	1

(3) *List of Contents of the Medical and Surgical Boxes of Infantry Units*—continued.

Description of Article.	Description of Box.	(A.)	(B.)	Total.
Surgical Material.				
Throat brushes	No.	3	—	3
Eye dropper	,,	3	—	3
Triangular bandages	,,	20	—	20
Roller bandages	,,	20	30	50
Calico	pieces	—	1	1
Absorbent wool	grms.	1,300	600	1,900
Sublimate gauze	,,	2,600	1,200	3,800
Sublimate silk	,,	10	—	10
Gooch splints	No.	—	20	20
Nail brush	,,	—	2	2
Soap	pieces	—	4	4
Sponge	No.	—	5	5
Safety pins	,,	50	—	50
Oil paper	packets of 6 sheets	3	3	6
Paraffin, solid, for lamps	grms.	—	900	900
Wick	metres	—	1	1
Powder papers	No.	200	—	200
Small corked bottles	,,	2	—	2
Miscellaneous Articles.				
Scissors	No.	1	—	1
Lantern	,,	—	2	2
Canvas bucket	,,	—	1	1
Carpenter's tools	set	—	1	1
Small Red Cross flag	No.	—	1	1
Wooden cup	,,	2	—	2
Ink case	,,	—	1	1
Knife with screwdriver, &c.	,,	1	—	1
Candles, sperm	,,	—	36	36
Matches	boxes	—	6	6
String	metres	—	60	60
Pencil and rubber	No.	10	—	10
Long ink brush	,,	3	—	3
Short ink brush	,,	2	—	2
Envelopes	,,	50	—	50
Sick labels	book of 100	1	—	1
Killed and Wounded Returns	books	7	—	7
Diagnosis tallies—red	No.	100	—	100
,, ,, white	,,	50	—	50
Medical Diary (50 pages)	,,	2	—	2
Case Sheets, No. 1	,,	50	—	50
10-day Sick Return	,,	50	—	50
Monthly Sick Return	,,	20	—	20
Requisition Book (50 pages)	,,	1	—	1

Remarks.

Each medical officer carries a surgeon's pocket case of instruments.

(4) *List of Contents of Medical and Surgical Box for Ammunition Column Units.*

Articles.	Quantity.
Medicines.	
Carbolic Acid - - grms.	250
Hyd. Perchlor. - soloids	150
Hyd. Perchl. c. Sod. Chl. grms.	450
Iodoform - - „	50
Boric Acid - - „	100
Tartaric Acid - - „	50
Bismuth Subn. - „	100
Sod. Bicarb. - - „	200
Gastric powders - „	450
Opium - - „	10
Zinc Sulphate - - „	30
Nitrate of Silver and Potash - - „	10
Antifebrin - - tabloids	30
Sod. Salicylate - „	100
Apomorphine - „	10
Quinine - - pills	2,000
Dover's powder - tabloids	150
Chloroform - - grms.	50
Santonin - - - „	20
Cocaine - - „	30
Morphine - - „	50
Nitrate of Silver - „	5
Sp. Camphor - - „	100
Ol. Camphor (for hypodermic injection) - „	50
Atropine - - tabloids	10
Rubber plaster - sq. ins.	250
Gum plaster - - „	150
Resin plaster - - grms.	200
Boric ointment - - „	200
Olive oil - - „	30
Brandy - - - „	100
Menthol Brandy - „	50
Menthol - „	20
Mag. Sulphate - - „	450
Calomel - - tabloids	50
Distilled water - - No.	100
Surgical Instruments, &c.	
Surgical pocket case - No.	1
Anæsthesia case - - „	1
Elastic tourniquet - „	1
Rubber bulb syringe - „	1
Hypodermic syringe - „	2
Enema apparatus - „	1
Nelaton's catheters, Nos. 8 and 10 - - „	2
Irrigators - - set of 3	1
Pus basins - - „	1
Clinical thermometer - No.	2
Copper wire for splints - „	6
Room thermometer - „	1

Articles.	Quantity.
Surgical Instruments—*cont.*	
Pestle and mortar - - No.	1
Copper spoon - - „	1
Horn spoon - - „	1
Scales and weights, to 10 grms. - - „	1
Corkscrew - - „	1
Ointment slab - - „	1
Measure glass:	
100 cc. - - „	1
10 cc. - - - „	1
Surgical Material.	
Throat brush - - No.	3
Eye dropper - - „	2
Triangular bandage - „	1
Roller bandage - „	15
Calico - - - pieces	21
Absorbent wool - grms.	300
Sublimate gauze - „	600
Sublimate silk - - „	6
Soap - - - - No.	3
Sponge - - - „	2
Safety pins - - - „	30
Nail brush - - „	3
Oil paper - - - „	3
Powder papers - - „	200
Plaster papers - - „	70
Small corked bottles - „	5
Miscellaneous Articles.	
Scissors - - - No.	1
Lantern - - - „	2
Canvas bucket - - „	1
Small Red Cross flag - „	1
Horn cup - - - „	2
Ink-case - - - „	1
Knife, with screw-driver, &c. - - „	1
Candles - - - „	18
Matches - - boxes	12
String - - - metres	60
Pencil and rubber - No.	5
Long ink-brush - „	3
Short ink-brush - - „	2
Envelopes - - „	20
Sick labels - book of 100	1
Killed and Wounded Returns - - books	3
Medical Diary Book - No.	1
Case Sheets, No. 1 - - „	50
10-Day Sick Returns - „	50
Monthly Sick Returns - „	20

(5) *List of Contents of the Medical and Surgical Boxes for Artillery Units.*

(Each Battery has a set of these.)

Description of Article. / Description of Box.		(A.)	(B.)	(C.)	Total.
Medicines.					
Carbolic Acid	grms.	250	250	500	1,000
Hyd. Perchlor.	soloids	400	—	400	800
Hyd. Perch. c. Sod. Chl.	grms.	300	—	450	750
Iodoform	,,	100	—	225	325
Boric Acid	,,	—	200	450	650
Tartaric Acid	,,	50	—	—	50
Bismuth Subnit.	,,	225	—	450	675
Sod. Bicarb.	,,	200	—	450	650
Gastric powder	,,	—	450	—	450
Opium	,,	10	—	20	30
Antifebrin	tabloids	50	—	—	50
Sod. Salicyl.	,,	—	225	—	225
Quinine	pills	2,000	—	2,000	4,000
Dover's powder	powders	150	—	150	300
Apomorphine	tabloids	—	10	—	10
Chloroform	grms.	80	—	225	305
Santonin	tabloids	50	—	—	50
Cocaine	,,	100	—	100	200
Morphine	,,	100	—	100	200
Nitrate of Silver	grms.	—	5	—	5
Zinc Sulphate	,,	—	30	—	30
Nitrate of Silver and Pot.	,,	10	—	—	10
Atropine	tabloids	—	10	—	10
Rubber plaster	sq. ins.	250	—	780	1,030
Gum plaster	,,	150	—	400	550
Resin plaster	grms.	—	300	—	300
Boric ointment	,,	—	200	225	425
Olive oil	,,	200	—	225	425
Sp. Camph.	,,	225	—	225	450
Camph. oil (for hypodermic njection)	,,	80	—	100	180
Brandy	,,	250	—	700	950
Menthol Brandy	,,	—	80	—	80
Menthol	,,	20	—	—	20
Mag. Sulphate	,,	—	450	—	450
Calomel	tabloids	100	—	—	100
Distilled water	grms.	200	—	225	425
Surgical Instruments, &c.					
Surgical pocket case	No.	—	1	—	1
Anæsthesia case	,,	—	1	—	1
Elastic tourniquet	,,	—	2	—	2
Rubber bulb syringe	,,	1	—	—	1
Hypodermic syringe	,,	2	—	—	2
Enema apparatus	,,	—	1	—	1
Nelaton's catheter (8 and 10)	,,	2	—	—	2
Irrigators	set of 3	—	1	—	1
Pus basins	,,	—	1	—	1
Clinical thermometer	No.	2	—	—	2
Copper wire for splints	,,	—	20	—	20
Operation lamp	,,	—	1	—	1

(5) *List of Contents of the Medical and Surgical Boxes for Artillery Units*—continued.

Description of Article. / Description of Box.		(A.)	(B.)	(C.)	Total.
SURGICAL INSTRUMENTS, &c.—*cont.*					
Room thermometer	No.	1	—	—	1
Copper spoon	„	1	—	—	1
Horn spoon	„	1	—	—	1
Scales and weights to 10 grms.	„	1	—	—	1
Pestle and mortar	„	1	—	—	1
Corkscrew	„	1	—	—	1
SURGICAL MATERIAL.					
Throat brushes	No.	3	—	—	3
Eye dropper	„	3	—	—	3
Triangular bandage	„	10	10	15	35
Roller bandage	„	20	20	30	70
Calico	pieces	1	—	2	3
Absorbent wool	grms.	800	700	1,000	2,500
Sublimate gauze	„	1,700	1,500	2,000	5,200
Sublimate silk ligature	„	10	—	—	10
Gooch splints	pieces	—	20	20	40
Nail brush	No.	—	2	—	2
Soap	cakes	—	4	6	10
Sponge	No.	—	5	—	5
Safety pins	„	50	—	—	50
Oil paper	packet 6 sheets	3	3	6	12
Paraffin for lamp	grms.	450	450	900	1,800
Wicks	metres	—	1	—	1
Powder papers	No.	300	—	200	500
Small corked bottles	„	5	—	5	10
Plaster papers	„	100	—	—	100
MISCELLANEOUS ARTICLES.					
Scissors	No.	1	—	—	1
Lantern	„	1	1	—	2
Canvas bucket	„	1	—	—	1
Carpenter's tools	set	—	1	—	1
Small Red Cross flag	No.	1	—	—	1
Medicine glass	„	1	—	—	1
Ink-case	„	1	—	—	1
Knife, with screwdriver, &c.	„	1	—	—	1
Candles	„	12	12	24	48
Matches	boxes	—	12	6	18
String	metres	—	60	—	60
Pincel and rubber	No.	10	—	—	10
Long ink-brush	„	3	—	—	3
Short ink-brush	„	2	—	—	2
Envelopes, with paper	„	30	—	—	30
Sick labels	book of 100	1	—	—	1
Medical Diary Book (50 pages)	No.	1	—	—	1
Killed and Wounded Returns	books	5	—	—	5
Case Sheets, No. I.	No.	50	—	—	50
10-day Sick Returns	„	50	—	—	50
Monthly Sick Return	„	20	—	—	20
Requisition Book (50 pages)	„	1	—	—	1

(6) *List of Contents of the "Medicine Panniers" of Infantry Units, Engineers, &c.*

(Each Infantry Battalion, &c. has a pair of these boxes.)

Description of Article. / Description of Box.	(A.)	(B.)	Total.
MEDICINES.			
Carbolic Acid - - - - grms.	230	250	450
Hydrarg. Perchlor. - - soloids	200	—	200
Hydrarg. Perch. c. Soda Ch. - grms.	300	—	300
Iodoform - - - - - ,,	50	—	50
Boric Acid - - - - ,,	200	—	200
Bismuth Subn. - - - ,,	—	450	450
Gastric powder - - ,,	225	500	725
Opium - - - - - - ,,	4	16	20
Sod. Salicyl. - - tabloids	200	450	650
Antifebrin - - 0·2 grm.-tabloids	—	100	100
Quinine - - - - pills	2,000	—	2,000
Dover's powder - - - powders	100	300	400
Apomorphine - - - tabloids	—	10	10
Santonin - - - - ,,	—	100	100
Cocaine - - - ,,	50	—	50
Morphine - - - - ,,	100	—	100
Nitrate of Silver - - grms.	—	5	5
Zinc Sulphate - - - ,,	30	30	60
Nitrate of Silver and Potash - ,,	10	—	10
Atropine - - - tabloids	—	10	10
Rubber plaster - - - sq. ins.	250	—	250
Gum plaster - - - ,,	300	—	300
Resin plaster - - - - grms.	—	450	450
Boric ointment - - ,,	—	450	450
Olive oil - - - - - - ,,	30	—	30
Sp. Camphor - - ,,	100	—	100
Ol. Camphor for hypodermic injection - - - ,,	50	—	50
Menthol and Brandy - - ,,	100	—	100
Menthol - - - ,,	20	—	20
Magnesia Sulph. - - - ,,	—	450	450
Calomel - - - tabloids	100	—	100
Distilled water - - - grms.	100	—	100
SURGICAL INSTRUMENTS, &c.			
Surgical pocket case - - - No.	1	—	1
Elastic tourniquet - - ,,	1	—	1
Hypodermic syringe - - - ,,	1	—	1
Irrigator - - - ,,	1	—	1
Pus basin - - - - ,,	2	—	2
Clinical thermometer - - ,,	2	—	2
Corkscrew - - - - ,,	1	—	1
Measure glass :			
100 cc. - - - ,,	1	—	1
10 cc. - - - - ,,	1	—	1
Pestle and mortar - - ,,	1	—	1
Room thermometer - - - ,,	1	—	1
Horn spoon - - - ,,	1	—	1
Scales and weights to 10 grms. - ,,	1	—	1

(6) *List of Contents of the "Medicine Panniers" of Infantry Units, Engineers, &c.*—continued.

Description of Box. / Description of Article.	(A.)	(B.)	Total.
SURGICAL MATERIAL.			
Eye dropper - - - - No.	2	5	7
Triangular bandages - - ,,	5	—	5
Roller bandages - - - - ,,	10	—	10
Absorbent wool - - grms.	500	1,200	1,700
Sublimate gauze - - - ,,	1,000	2,600	3,600
Gooch splints - - - No.	10	—	10
Nail brush - - - - ,,	1	—	1
Safety pins - - - ,,	10	—	10
Oiled paper - packets of 6 sheets	2	—	2
Powder papers - - - No.	300	400	700
Plaster papers - - - - ,,	—	150	150
Small corked bottles - - ,,	—	3	3
MISCELLANEOUS ARTICLES.			
Scissors - - - - - No.	1	—	1
Small Red Cross flag - - ,,	1	—	1
Wooden cup - - - - ,,	1	—	1
Pencil, with rubber - - ,,	2	—	2
Killed and Wounded Returns - books	4	—	4
Sick labels - - - book of 100	1	—	1
Medical Diary Book (50 pages) - No.	1	—	1
Case Sheets, No. 1 - - ,,	3	—	3
10-day Sick Returns - - ,,	50	—	50
Monthly Sick Returns - - ,,	20	—	20
Requisition Book (50 pages) - ,,	1	—	1

Remarks.

In addition, Box B carries an operation lamp and 450 grms. solid paraffin, with Infantry Units; Box A carries 20 Monthly Return forms of Sick and Wounded Convoys, with Sick and Wounded Transport Sections.

(7) *List of Contents of Extra Medical and Surgical Panniers of Medical Reserve Personnel.*

(The Medical Reserve Personnel carries in each of its three sections two panniers, identical with A and B panniers of Field Hospitals, and this extra pannier.)

Article.	Quantity.
Medicines.	
Carbolic Acid - - grms.	450
Hydrarg. Perchlor. - soloids	400
Acid Hydrochlor. - grms.	225
Bism. Subnitrate - ,,	225
Sod. Bicarbonate - ,,	225
Gastric powders - - ,,	450
Opium - - - ,,	30
Antifebrin (0·2 grms. in each) - } tabloids	5
Dover's powder - ,,	150
Cocoaine - - ,,	200
Morphine - - ,,	300
Nitrate of Silver - - grms.	10
Zinc Sulphate - - ,,	20
Nitrate of Silver and Potash ,,	30
Rubber plaster - - sq. ins.	1,950
Gum plaster - - - ,,	1,000
Resin plaster - - grms.	1,000
Vaseline - - - ,,	225
Glycerine - - - - ,,	225
Olive oil - - - ,,	150
Refined Camphor - ,,	60
Brandy - - - ,,	1,400
Ol. Ricini - - - ,,	225
Calomel - - - tabloids	50
Mag. Sulphate - - grms.	450
Surgical Instruments, &c.	
Hypodermic syringe - No.	1
Transfusion apparatus - ,,	1
Glycerine Enema-syringe ,,	1
Irrigator - - - ,,	1
Pus basin - - - - ,,	1
Copper wire for splints pieces	5
Operators' cloaks - - No.	2
Scales, weights to 500 grms. - } - ,,	1
Pill slab - - - ,,	1
Surgical Material.	
Throat brush - - No.	5
Eye droppers - - - ,,	3
Triangular bandage - - ,,	20
Roller bandage - - ,,	30
Calico - - - pieces	3
Absorbent wool - - grms.	700

Article.	Quantity.
Surgical Material—*cont.*	
Sublimate gauze - - grms.	700
Gooch splints - - No.	10
Nail brush - - - ,,	2
Skin brush - - - - ,,	1
Soap - - - cakes	3
Oil paper - - sheets of six	10
Ice bags - - No.	5
Paraffin for lamps - - grms.	900
Powder papers - - - No.	500
Labels:	
"Internal use" - ,,	200
"External use" - ,,	100
Small stoppered bottles - ,,	10
Miscellaneous Articles.	
Lantern - - - No.	
Canvas bucket - - - ,,	2
Hand towels - - ,,	1
Carpenter's tools - - - set	1
Candles - - - No.	1
Pencil - - - - ,,	48
Long ink-brush - - ,,	5
Short ink-brush - - - ,,	5
Paper - - quires, rolls	10
Case Sheets:	3
No. I. - - - No.	
No. II. - - - - ,,	100
Prescription Sheets:	300
No. I. - - - ,,	
No. II. - - - ,,	100
Temp. Charts - - ,,	300
Operation Returns:	100
No. I. - - - ,,	
No. II. - - - ,,	20
Invaliding Forms - - ,,	40
Effects and Valuables }	250
Voucher - } ,,	150
Travelling rolls - - ,,	30
Medical Certificates - ,,	100
10-day Sick Returns - ,,	70
Monthly Sick Returns - ,,	30
Monthly Drug Returns - ,,	20
Medicines Ledger - - ,,	1
Surgical Material Ledger ,,	1
Surgical Instrument Ledger ,,	1
Requisition Books - - ,,	1

Remarks.

Each medical officer carries a set of keys and a surgeon's pocket case of instruments.

(8) *List of Contents of Medical and Surgical Panniers of a Medical and Surgical Reserve Depôt.*

(There are 21 panniers altogether in a set. The first six are lettered as the six of half a Field Hospital and are identical with them. The remaining panniers are numbered 1 to 15; all but No. 8 being in identical pairs as shown below. Pairs 7 and 15 are not exactly identical, under Miscellaneous Articles, where articles marked * are in 7 only, and those marked † in 15 only. Each of the three sections of a depôt has a set.)

Pairs of Panniers, &c. / Article.	1 and 9.	2 and 10.	3 and 11.	4 and 12.	5 and 13.	6 and 14.	7 and 15.	8.	Total of Pairs.
MEDICINES.									
Carbolic Acid - - - grms.	—	2,250	—	—	—	—	—	—	4,500
Hyd. Perchlor. - - - soloids	—	—	—	—	2,000	—	—	—	4,000
Hyd. Perch. c. Sod. Chl. - grms.	—	—	4,500	—	—	—	—	—	9,000
Iodoform - - - - „	—	—	—	—	450	—	—	—	900
Boric Acid - - - - - „	—	—	1,350	—	—	—	—	—	2,700
Pot. Chlorate - - „	—	—	450	—	—	—	—	—	900
Tannic Acid - - - „	—	—	100	—	—	—	—	—	200
Potass. Permang. - - - „	—	—	450	—	—	—	—	—	900
Acid, Hydrochlor. - - - „	—	450	—	—	—	—	—	—	900
Acid, Tartaric - - - „	—	—	—	—	900	—	—	—	1,800
Bismuth, Subnit. - - - „	—	—	4,500	1,350	—	—	—	—	11,700
Sod. Bicarbonate - - - „	—	—	2,250	—	2,250	—	—	—	9,000
Gastric powder - - - „	—	—	—	—	4,500	—	4,500	—	18,000
Opium - - - - - „	—	—	—	—	200	—	—	—	400
Tinct. Opii - - - - „	—	450	—	—	—	—	—	—	900
Starch powder - - - „	—	—	—	—	2,250	—	—	—	4,500
Antifebrin - - 0·2 grm. tabloids	—	—	300	—	—	—	—	—	600
Sod. Salicyl. - - - tabloids	—	—	—	1,000	—	—	—	—	2,000
Quinine - - - - pills	—	—	20,000	—	—	—	—	—	40,000
Dover's Powder - - - tabloids	—	—	5,000	—	—	—	—	—	10,000
Pulv. Ipecac. - - - grms.	—	—	60	—	—	—	—	—	120
Fol. Digitalis - - - „	—	—	100	—	—	—	—	—	200
Apomorphine - - - tabloids	—	—	10	—	—	—	—	—	20
Aq. Laurocerasi - - „	—	900	—	—	—	—	—	—	1,800
Chloral Hydrate - - „	—	—	900	—	—	—	—	—	1,800
Chloroform - - - „	—	2,250	—	—	—	—	—	—	4,500
Pot. Bromide - - - grms.	—	—	—	—	450	—	—	—	900
Pot. Iodide - - - - „	—	—	—	—	450	—	—	—	900
Pot. Nitrate - - - „	—	—	450	—	—	—	—	—	900

(8) *List of Contents of Medical and Surgical Panniers of a Medical and Surgical Reserve Depôt*—continued.

Article. / Pairs of Panniers, &c.	1 and 9.	2 and 10.	3 and 11.	4 and 12.	5 and 13.	6 and 14.	7 and 15.	8.	Total of Pairs.
MEDICINES—*cont.*									
Santonin - - - - tabloids	—	—	—	30	—	—	—	—	60
Cocaine - - - "	—	—	800	—	—	—	—	—	1,600
Morphine - - - "	—	—	900	—	—	—	—	—	1,800
Nitrate of Silver - - grms.	—	—	28	—	—	—	—	—	56
Zinc Sulph. - - - - - "	—	—	50	—	—	—	—	—	100
Nitrate of Silver and Potas. - "	—	—	28	—	—	—	—	—	56
Atropine - - - tabloids	—	—	15	—	—	—	—	—	30
Plaster of Paris - - - grms.	—	—	—	4,500	—	—	—	—	9,000
Collodium - - - - - "	—	225	—	—	—	—	—	—	450
Rubber plaster - - - sq. ins.	—	—	—	—	—	—	11,700	—	23,400
Gum plaster - - "	—	—	8,800	—	—	—	7,200	—	32,000
Resin plaster - - grms.	—	—	—	1,350	—	—	—	—	2,700
Boric ointment - - "	—	—	1,350	—	—	—	—	—	2,700
Vaseline - - - "	—	—	1,350	—	—	—	—	—	2,700
Glycerine - - - - - "	—	900	—	—	—	—	—	—	1,800
Olive oil - - - - - "	—	1,350	—	—	—	—	—	—	2,700
Zinc Oxide - - - - - "	—	—	100	—	—	—	—	—	200
Tinct. Iodi. - - - - "	—	450	—	—	—	—	—	—	900
Sp. Camphor - - - - "	—	450	—	—	—	—	—	—	900
Balsam Peru - - - - "	—	450	—	—	—	—	—	—	900
Refined Camphor - - - - "	—	—	—	450	—	—	—	—	900
Oil Camphor (for hypodermic use) - - - - "	—	200	—	—	—	—	—	—	400
Brandy - - - - - bottles	—	4	—	5	—	—	—	—	18
Menthol Brandy - - grms.	—	450	—	—	—	—	—	—	900
Menthol - - - - - "	—	—	225	—	—	—	—	—	450
Red Wine - - - bottles	—	3	—	—	—	—	—	—	6
Mustard powder - - grms.	—	—	—	1,350	—	—	—	—	2,700
Magn. Sulphate - - "	—	—	—	—	4,500	—	—	—	9,000
Castor Oil - - - - "	—	1,350	—	—	—	—	—	—	2,700
Calomel - - - tabloids	—	—	1,000	—	—	—	—	—	2,000
Rectified spirit - - grms.	—	3,600	—	—	—	—	—	—	7,200
Condensed milk - - tins	—	—	—	12	15	—	—	8	62
White sugar - - - grms.	—	—	900	—	—	—	—	—	1,800
Sod. Chloride - - - "	—	—	—	—	450	—	—	—	900
Sod. Bicarbonate - - "	—	—	—	450	—	—	—	—	900
Distilled water - - - "	—	2,250	—	—	—	—	—	—	4,500

(8) *List of Contents of Medical and Surgical Panniers of a Medical and Surgical Reserve Depôt*—continued.

Article. / Pairs of Panniers, &c.		1 and 9.	2 and 10.	3 and 11.	4 and 12.	5 and 13.	6 and 14.	7 and 15.	8.	Total of Pairs.
Surgical Instruments and Appliances.										
Surgical pocket case	No.	5	—	—	—	—	—	—	—	10
Surgical case	„	1	—	—	—	—	—	—	1	3
Field Med. havresac	„	—	—	—	—	1	—	—	—	2
Field Surgical havresac	„	—	—	—	—	1	—	—	—	2
Anæsthesia case	„	3	—	—	—	—	—	—	—	
Elastic bandage (bloodless operation)	„	1	—	—	—	—	—	—	—	
Elastic tourniquet	„	6	—	—	—	—	—	—	—	12
Hypodermic syringe	„	4	—	—	—	—	—	—	—	8
Glycerine enema syringe	„	4	—	—	—	—	—	—	—	8
Irrigators	sets of 3	2	—	—	—	—	—	2	—	8
Pus basins	„	2	—	—	—	—	—	2	—	8
Clinical thermometer	No.	60	—	—	—	—	—	—	—	120
Copper wire splint setting	pieces	—	—	—	—	—	—	10	—	20
Operators' cloaks	No.	16	4	—	—	4	—	—	—	48
Cloaks for attendants on infectious cases	„	—	—	—	10	—	—	—	—	20
Operation lamp	„	—	—	—	—	—	2	—	—	4
Water analysis case	„	—	—	—	—	—	1	—	—	2
Hone	„	—	—	—	—	—	1	—	—	2
Pestle and mortar	„	2	—	—	—	—	—	—	—	4
Metal spoon	„	2	—	—	—	—	—	—	—	4
Medicine spoon	„	2	—	—	—	—	—	—	—	4
Ointment slabs	„	1	—	—	—	—	—	—	—	2
Surgical Material.										
Eye droppers	No.	5	—	—	—	—	—	—	—	10
Roller bandages	„	—	—	—	—	—	110	50	20	340
Starch bandages	„	—	—	—	—	—	—	25	—	50
Calico	pieces	—	—	—	—	3	—	—	—	6
Sublimate gauze	grms.	—	—	—	—	—	1,000	—	500	2,500
Absorbent wool	„	—	—	—	—	—	900	—	—	1,800
Absorbent gauze	„	—	—	—	—	—	1,200	2,500	3,300	10,700
1st Field dressings	No.	—	—	—	—	—	20	—	20	60
Sublimate ligature silk	grms.	25	—	—	—	—	—	—	—	50
Drainage tubes: Large	feet	3	—	—	—	—	—	—	—	6
Medium	„	6	—	—	—	—	—	—	—	12
Small	„	6	—	—	—	—	—	—	—	12
Gooch splints	No.	—	—	—	—	—	—	30	—	60
Thin wooden splints	„	—	—	—	—	—	—	50	—	100

(8) *List of Contents of Medical and Surgical Panniers of a Medical and Surgical Reserve Depôt*—continued.

Article. / Pairs of Panniers, &c.	1 and 9.	2 and 10.	1 and 11.	4 and 12.	5 and 13.	6 and 14.	7 and 15.	8.	Total of Pairs.
SURGICAL MATERIAL—*cont.*									
Mill board splints - - pieces	—	—	—	—	—	—	4	4	12
Nail brush - - - No.	10	—	—	—	—	—	—	—	20
Skin brush - - - „	5	—	—	—	—	—	—	—	10
Oil paper - - packets of 6 sheets	20	—	10	10	10	5	5	10	130
Cotton wool - - - grms.	—	—	—	2,000	2,000	—	—	3,000	11,000
Paraffin (lamp) - - „	—	—	—	3,600	—	—	—	1,800	9,000
Wicks - - - - metres	2	—	—	—	—	—	—	—	4
Linen - - - - grms.	—	—	—	—	1,000	—	—	—	2,000
Powder papers - - - No.	—	—	—	—	—	—	1,000	—	2,000
Labels:									
"Internal Use" - - „	—	—	—	—	—	—	300	—	600
"External Use" - - - „	—	—	—	—	—	—	100	—	200
Sublimate bags (for carbonized straw dressings):									
Large - - - No.	—	—	—	150	50	—	—	—	400
Medium - - - „	—	—	—	100	100	—	—	—	400
Small - - - „	—	—	—	150	50	—	—	—	400
Plaster papers - - bundles of 8	—	—	—	—	—	—	150	—	300
Small stoppered bottles - - No.	—	—	—	—	—	—	10	—	20
Corks - - - - - - „	—	—	—	—	—	—	100	—	200
Medicine (ointment) shells - „	—	—	—	—	—	—	50	—	100
MISCELLANEOUS ARTICLES.									
Scissors - - - - No.	4	—	—	—	—	—	—	6	14
Lanterns - - - - „	—	—	—	—	—	—	3	—	6
Canvas buckets - - - „	—	—	—	—	—	—	3	3	9
Carpenter's tools - - - set	—	—	—	—	—	—	1	—	2
Large Red Cross flag - - No.	—	—	—	—	—	1	—	—	2
Small „ „ - - „	—	—	—	—	—	1	—	1	3
National flag - - - - „	—	—	—	—	—	2	—	—	4
Red lamp - - - - „	—	—	—	—	—	—	1	—	2
Medicine glass - - - „	10	—	—	—	—	—	—	—	20
Candles - - - - „	—	—	—	—	—	—	36	24	96
Hemp rope - - - metres	—	—	—	—	—	20	—	15	55
„ string - - - „	100	—	—	—	—	—	—	—	200
„ thread - - grms.	20	—	—	—	—	—	—	—	40
Cotton „ - - - „	10	—	—	—	—	—	—	—	20
Needles - - - - No.	10	—	—	—	—	—	—	—	20
Labels (for Sick during march) - - - books of 100	—	—	—	—	—	—	30*	—	30
Killed and Wounded Returns - - - books of 50	—	—	—	—	—	—	20*	—	20

(8) *List of Contents of Medical and Surgical Panniers of a Medical and Surgical Reserve Depôt*—continued.

Article. / Pairs of Panniers, &c.	1 and 9.	2 and 10.	3 and 11.	4 and 12.	5 and 13.	6 and 14.	7 and 15.	8.	Total of Pairs.
MISCELLANEOUS ARTICLES—*cont.*									
Diagnosis tallies: White - - - No.	—	—	—	—	—	—	250*	—	250
Red - - - „	—	—	—	—	—	—	500*	—	500
Medical Diary of Cases - - books of 50 sheets	—	—	—	—	—	—	20*	—	20
Admission and Discharge Sheets „ „	—	—	—	—	—	—	2*	—	2
Case Sheets: No. I. - - - - No.	—	—	—	—	—	—	—	200	200
No. II. - - - - „	—	—	—	—	—	—	—	400	400
Prescription Sheets: No. I. - - - - „	—	—	—	—	—	—	—	200	200
No. II. - - - - „	—	—	—	—	—	—	—	400	400
Temp. charts - - - „	—	—	—	—	—	—	—	500	500
Operation Returns: No. I. - - „	—	—	—	—	—	—	—	50	50
No. II. - - - - „	—	—	—	—	—	—	—	100	100
Invaliding Forms - - - „	—	—	—	—	—	—	—	500	500
Effects and Valuables Vouchers - „	—	—	—	—	—	—	—	1,000	1,000
Sick Convoy Rolls - - - „	—	—	—	—	—	—	—	100	100
Medical Certificate Forms - - „	—	—	—	—	—	—	—	250	250
10-day Sick Returns - - „	—	—	—	—	—	—	300†	—	300
Monthly Sick Returns - - „	—	—	—	—	—	—	100†	—	150
„ Return of Drugs - - „	—	—	—	—	—	—	50†	—	50
„ „ Instruments - „	—	—	—	—	—	—	20†	—	20
„ „ Hospital Clothing - „	—	—	—	—	—	—	20†	—	20
Drug Ledger - - 100 sheets	—	—	—	—	—	—	1†	—	1
Surgical Material Ledger - „ „	—	—	—	—	—	—	1†	—	1
„ Instrument Ledger 50 „	—	—	—	—	—	—	1†	—	1
Hospital Clothing Ledger - 20 „	—	—	—	—	—	—	1†	—	1
Requisition Books - - 50 „	—	—	—	—	—	—	1†	—	1

(9) *List of Contents of Pair of Medical and Surgical Panniers No. II., for Fortresses.*

(No. I. set of panniers for Fortresses is identical with those of a Field Hospital.)

Articles.		(A.)	(B.)	Total.
Carbolic Acid	grms.	500	—	500
Hyd. Perchlor.	tabloids	500	—	500
Hyd. Perch. c. Sod. Chl.	grms.	300	—	300
Iodoform	,,	200	—	200
Boric Acid	,,	200	—	200
Tartaric Acid	,,	50	—	50
Bismuth Sub.	,,	225	—	225
Sod. Bicarb.	,,	300	—	300
Gastric powder	,,	450	—	450
Opium	,,	10	—	10
Antifebrin	tabloids	50	—	50
Sod. Salicylate	,,	225	—	225
Quinine	pills	2,000	—	2,000
Dover's powder	tabloids	150	—	150
Apomorphine	,,	10	—	10
Chloroform	grms.	450	—	450
Santonin	tabloids	50	—	50
Cocaine	,,	100	—	100
Morphine	,,	100	—	100
Argent. Nitrate	,,	5	—	5
Zinc Sulph.	,,	30	—	30
Atropine	,,	10	—	10
Rubber plaster	sq. ins.	780	—	780
Gum plaster	,,	400	—	400
Boric ointment	grms.	200	—	200
Olive oil	,,	225	—	225
Oil Camphor (for hypodermic use)	,,	50	—	50
Menthol Brandy	,,	150	—	150
Magn. Sulph.	,,	450	—	450
Calomel	tabloids	100	—	100
Rectified spirit	grms.	450	—	450
Distilled water	,,	225	—	225
Surgical pocket case	No.	1	—	1
Surgical case	,,	—	1	1
Anæsthesia case	,,	1	—	1
Elastic bandage	,,	—	1	1
,, tourniquet	,,	2	—	2
Rubber syringe	,,	2	—	2
Hypodermic syringe	,,	1	—	1
Enema apparatus	,,	1	—	1
Nelaton's catheters (8 & 10)	,,	2	—	2
Irrigator	set of 3	—	1	1
Pus basins	,,	—	2	2
Clinical thermometer	No.	2	2	4
Room ,,	,,	1	—	1
Copper wire for splints	picces	—	10	10
Operators' cloaks	No.	—	3	3
Operation lamp	,,	1	—	1
Pestle and mortar	,,	1	—	1
Metal spoon	,,	1	—	1
Horn ,,	,,	1	—	1
Scales and weights. to 10 grms.	,,	1	—	1
Corkscrew	,,	1	—	1
Ointment slab	,,	1	—	1
Measure glasses:				
100 cc.	,,	1	—	1
10 cc.	,,	1	—	1

(9) *List of Contents of Pair of Medical and Surgical Panniers No. II., for Fortresses*—continued.

Articles.		(A.)	(B.)	Total.
Throat brush	No.	3	—	3
Eye dropper	„	3	—	3
Triangular bandage	„	—	20	20
Roller bandage	„	10	40	50
Calico	pieces	—	2	2
Sublimate gauze	grms.	1,500	1,500	3,000
Absorbent wool	„	1,400	600	2,000
Sublimate silk	„	10	—	10
Drainage tube:				
Large	feet	—	2	2
Medium	„	—	4	4
Small	„	—	3	3
Gooch splint	pieces	—	3	3
Nail brush	No.	—	3	3
Skin brush	„	—	1	1
Soap	cakes	4	—	4
Safety pins	No.	50	—	50
Oil paper	packets	—	6	6
Paraffin	grms.	450	—	450
Wicks	metre	1	—	1
Labels:				
"Internal"	No.	20	—	20
"External"	„	10	—	10
Powder papers	„	300	—	300
Small stoppered bottles	„	—	5	5
Scissors	„	1	—	1
Lantern	„	—	2	2
Bull's-eye lantern	„	—	2	2
Small kettle	„	—	1	1
Canvas bucket	„	—	1	1
Basins	set of 3	—	1	1
Carpenter's tools	set	—	1	1
Red Cross flag	small	—	1	1
Red lamp	No.	—	1	1
Medicine glass	„	5	—	5
Ink-case	„	1	—	1
Knife, with screwdriver, &c.	„	1	—	1
Candles	„	6	18	24
Matches	boxes	12	—	12
Pencil and rubber	No.	10	—	10
Long ink-brush	„	3	—	3
Short „ „	„	2	—	2
Returns of Killed and Wounded	„	3	—	3
Diagnosis tallies:				
Red	„	50	—	50
White	„	20	—	20
A. and D. Book	„	1	—	1
Medical Diary Book	„	1	—	1
Case sheets, No. I.	„	30	—	30
10-day Returns of Sick	„	50	—	50
Monthly Returns of Sick	„	20	—	20
String	metres	60	—	60
Envelopes and paper	No.	30	—	30

Remarks.

Each medical officer carries a pocket case of instruments and set of keys.

(10) *List of Contents of the Medical and Surgical Haversacks.*

(Each sergeant of the Medical Service carries a "Medical," and each corporal of the Medical Service and each stretcher squad a "Surgical" haversack.)

Articles.	Medical Havresac.	Surgical Havresac.
Gastric powders (0·7 grm. each) Sodi. Bicarb. (2 parts), Gentian (1 part). No.	50	—
Quinine - - - - pills	200	—
Morphine - - - tabloids	300	—
Calomel - - - "	10	—
Dover's powder - - "	50	—
Distilled water - - - grms.	15	—
Sublimate gauze - packages of 3 pieces of 1 ft. each.	5	5
Wooden cup - - - No.	1	—
Triangular bandages - - "	3	5
Sponges - - - - "	2	—
Elastic tourniquet - - - "	1	1
Menthol Brandy - - grms.	30	30
Oil Camphor (for hypodermic injections). "	15	—
Hydrarg. Perchlor. - - soloids	10	—
Gum plaster - - sq. in.	65	200
Safety pins - - - - No.	5	5
Roller bandages - - - "	1	6
Pencil and rubber - - - "	1	—
Envelopes and paper - - "	10	—
Hypodermic syringe - - "	1	—
Probe - - - "	1	—
Artery forceps - - - "	1	—
Scissors - - - - "	1	1
Clinical thermometer - - "	1	—
Pus basin - - - "	1	—
Horn cup - - - - "	—	1
Remarks. Each N.C.O. of the Medical Service carries an elastic tourniquet round his waist or bandolier fashion.	*Remarks.* Each N.C.O. of the Medical Service carries also a water can (copper lined with aluminium) 6″ × 3½″ × 2½″ in size, and 10 wooden splints in a special compartment at the top of his knapsack, and 5 triangular bandages in his knapsack.	*Remarks.* If necessary 20·5 grms. of Dover's powder, 20 Gastric powders, and 10 envelopes and paper may be carried in the Surgical havresac.

(11) *List of Contents of the "Surgical Box" and "Medical and Surgical Pannier" for use on Transports at Sea.*

Articles.		Surgical Box.	Medical and Surgical Pannier.
Carbolic Acid	grms.	450	150
Hydrar. Perchlor.	soloids	200	200
Hydrarg. Perch. c. Sod. Chl.	grms.	300	50
Iodoform	,,	50	100
Gastric powder	,,	200	450
Dover's powder	tabloids	100	200
Cocaine	,,	20	30
Morphine	,,	30	100
Gum plaster	sq. ins.	150	150
Boric ointment	grms.	200	450
Olive oil	,,	30	150
Sp. Camphor	,,	100	—
Oil Camphor (for hypodermic injection)	,,	50	30
Menthol Brandy	,,	100	100
Menthol	,,	20	—
Calomel	tabloids	100	100
Distilled water	grms.	100	100
Resin plaster	,,	200	—
Pot. Chlorate	,,	—	100
Bismuth Subnitrate	,,	—	450
Soda Bicarbonate	,,	—	100
Opium	,,	—	30
Refined Camphor	,,	—	30
Sod. Salicylate	tabloids	—	200
Quinine	pills	—	1,000
Nitrate of Silver	grms.	—	10
Zinc Sulphate	,,	—	28
Atropine	tabloids	—	10
Rubber plaster	sq. ins.	—	250
Boric Acid	grms.	—	225
Magn. Sulph.	,,	—	450
Apo-morphine	tabloids	—	10
Acid Hydrochlor.	grms.	—	150
Santonin	tabloids	—	100
Surgical pouch	No.	1	1
Hypodermic syringe	,,	1	1
Elastic tourniquet	,,	3	1
Irrigator	,,	1	3
Pus basin	,,	2	3
Long splints	,,	5	—
Horn spoon	,,	1	1
Corkscrew	,,	1	1
Measure glass :			
100 cc.	,,	1	1
10 cc.	,,	1	1
Clinical thermometer	,,	—	1
Room ,,	,,	—	1
Pestle and mortar	,,	—	1
Scales and weights to 10 grms.	,,	—	1
Ointment slab	,,	—	1
Eye dropper	,,	2	5
Triangular bandage	,,	10	10
Roller bandage	,,	20	40
Sublimate gauze	grms.	2,000	2,000
Absorbent wool	,,	600	2,000
Gooch splints	No.	20	10
Nail brush	,,	2	1

(11) *List of Contents of the "Surgical Box" and "Medical and Surgical Pannier" for use on Transport at Sea*—continued.

Articles.		Surgical Box.	Medical and Surgical Pannier.
Safety pins	No.	10	30
Oil paper	packet of 6 sheets	2	2
Plaster papers	packet of 8 sheets	150	—
Calico	piece	—	1
Powder papers	No.	—	300
Small stoppered bottles	"	—	3
Scissors	"	1	1
Wooden cup	"	—	2
Ink-case	"	—	1
Paper punch	"	—	1
Pocket knife	"	—	1
Ruled paper	rolls	—	3
Medical Diary Book (50 sheets)	No.	—	1
Case sheets:			
No. I.	"	—	10
No. II.	"	—	10
Return of Killed and Wounded	"	2	—
Monthly Sick Return	"	—	20
Requisition Book (50 sheets)	"	—	1
Pencil and rubber	"	—	2
Envelopes	"	—	50
Field Medical Regulations	"	—	1

APPENDIX E.

Tables of Establishments.*

(1) *Summary of the Personnel of a Division for Medical Services.*

Branch of Service to which Personnel belongs.	Medical Service.			Intendance.		Train.			Stretcher Bearers and Miscellaneous.				Total of Services Auxiliary to the Medical Services.		
Units.	Officers and Apothecaries.	Warrant and N.C.O.s.	Privates.	Warrant Officers.	N.C.O.s.	Officers.	N.C.O.s.	Privates.	Officers.	N.C.O.s.	Stretcher Bearers.	Miscellaneous.	Officers.	Warrant and N.C.O.s.	Privates.
Head-Quarters Staff - -	3	3	—	—	—	—	—	6	—	—	—	—	—	—	6
Regimental Units—															
Infantry - - -	24	60	—	—	—	—	—	—	—	—	192	—	—	—	192
Cavalry - - -	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—
Artillery - - -	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—
Train - - -	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—
Engineers (including Telegraph Company).	3	5	—	—	—	—	—	—	—	—	—	—	—	—	—
Ammunition Column -	5	10	—	—	—	—	—	—	—	—	—	—	—	—	—
Total Staff and Regimental Units - -	43	86	—	—	—	—	—	6	—	—	192	—	—	—	198
Medical Units—															
Bearer Battalion - -	9	39	—	1	1	—	2	54	3	20	350	10	3	24	414
Field Hospitals - -	28	72	144	4	4	—	4	148	—	—	—	32	—	12	180
Reserve Personnel -	16	40	120	1	3	—	1	24	—	—	—	10	—	5	34
Transport Section - -	3	3	8	—	—	—	—	6	1	—	—	3	1	—	9
Reserve Depôt - -	1	2	2	—	1	1	2	57	—	—	—	—	1	3	57
Total Medical Units -	57	156	274	6	9	1	9	289	4	20	350	55	5	44	694
Grand Total for Division	100	242	274	6	9	1	9	295	4	20	542	55	5	44	892
	Medical Service.			Auxiliary Services.											

* These tables do not form part of the Regulations; they have been compiled from personal observation and must be regarded as only approximately correct; they are, however, sufficiently accurate to give a general idea of the organization of the field medical units of the Japanese Army.

(2) *Administrative and Regimental Medical Establishments.*

(For Medical and Surgical equipment, *see* Tables of Contents. Transport is Head-Quarters Transport, or Regimental.)

Personnel.		Remarks.
Ranks, &c.	No.	
Army Head-Quarters:		
Surgeon-General - -	1	P.M.O. of Army.
Surgeon-Captain - - -	1	Employed as Secretaries and in Medical charge of Head-Quarters Staff.
Surgeon-Captain or Surgeon-Lieutenant.	1	
Sergeants of Medical Service -	3	The number varies with each Army; the rule being one for each Division.
Corporals of Medical Service -	2	
Civil Clerks - - -	2	
Servants - - -	3	For officers. All are mounted. The P.M.O. uses one horse only.
Grooms - - - -	3	
Divisional Head-Quarters:		
Surgeon-Colonel or Surgeon-Lieut.-Colonel.	1	P.M.O. of Division.
Surgeon-Captain - -	1	Secretary, or In charge of Head-Quarters' Staff.
Surgeon-Lieutenant - -	1	
Sergeants of Medical Service -	3	
Servants - - - -	3	For officers. All are mounted.
Grooms - - -	3	
Each Battalion of Infantry:		
Surgeon-Captain, - - or	1	The medical officers are mounted.
Surgeon-Lieutenant - -	1	
Sergeants of Medical Service -	5	1 senior sergeant for the Battalion, and 1 sergeant for each Company.
Assistant stretcher bearers -	16	4 soldiers of each Company, with one stretcher for each Company.
Other Units: *See* Remarks.	*See* Remarks.	No other units have stretcher bearers. A Cavalry and Engineer Battalion have each 2 medical officers, the former 2 and the latter 3 sergeants of the Medical Service exclusive of Telegraph Companies. An Artillery and Train Battalion have 3 medical officers and 3 sergeants of the Medical Service. Smaller units have 1 or 2 medical officers and hospital sergeants according to their character.

(3) *Personnel, Transport, and Principal Equipment of a Bearer Battalion (Ei-sei-Tai).*

Personnel.		Transport.		Remarks on Equipment, &c.
Ranks, &c.	No.	Riding Horses.	Pack Ponies.	
Dressing Station Establishment:				
Surgeon-Captains -	2	2	—	*Pack animals* for officers' kit and panniers are included in general transport of the Bearer Companies.
Surgeon-Lieutenants	6	6	—	
Apothecary - -	1	—	—	*Equipment* is generally 4 tents, 16 Medical and Surgical panniers, and 2 sets of field cooking apparatus.
Sergeants - -	13	—	—	
Corporals - -	26	—	—	Each N.C.O. has a "Medical" or "Surgical" haversack.
Cooks - -	2*	—	—	* Soldiers of Reserve. Not Medical Service.
Grooms - - -	8†	—	—	† Soldiers of Train. Not Medical Service.
Intendance (Pay and Supplies) Establishment:				These do duty for both the Dressing Station and Bearer Companies.
Warrant Officer -	1	—	—	When the Bearer Companies work separately, the warrant officer remains with one and the N.C.O. goes with the other.
N.C. Officer -	1	—	—	
Two Bearer Company Establishments:				
Major* - -	1	1	—	* Commands the Battalion.
Captains or Lieutenants.†	2	2	—	† 1 in command of each Company.
Warrant and Non-Commissioned Officers.	20	—	—	This establishment, along with the officers, belongs to the Infantry or Train Reserve.
Buglers - -	2	—	—	4 field cooking apparatus is carried for the Battalion.
Cooks - -	4	—	—	The number of regulation stretchers is indefinite; but 80 squads are formed.
Stretcher Bearers -	350	—	—	Stretchers are supposed to be improvised. As a rule 80 regulation stretchers are carried.
Tailors - -	1	—	—	
Shoemakers -	1	—	—	Each stretcher squad carries a "Surgical Haversack."
Saddlers - -	1	—	—	
Veterinary Shoeing-smith.	1	—	—	
Grooms - -	4	—	—	This establishment belongs to the Train.
Horse attendants or drivers.	40	—	40	The transport in the present war has been pack horses or ponies; but 24 1-horse Japanese wagons may take their place.
N.C.O of Train in charge of horses and horse attendants.	2	2	—	

(4) *Personnel, Transport, and Principal Equipment of a Field Hospital (Yasen-Byo-in).*

Personnel.		Remarks on Transport and Equipment.
Ranks, &c.	No.	
Surgeon-Major - - -	1	*Riding Horses.*—All the medical officers and the N.C.O. of the Train are mounted.
Surgeon-Captain - - -	1	
Surgeon-Lieutenants - -	4	*Draught Horses.*—One for each 1-horse waggon which forms the transport. 24 such wagons, with 4 horses in reserve. The number may be increased.
Apothecaries - - -	1	
Sergeants of Medical Service -	10	*Equipment:* *Stretchers.*—The number is indefinite. But 8 are usually carried. *Tents.*—Four usually carried, but a larger number was used before Port Arthur, where village houses were not so numerous. *Field Cooking Apparatus.*—4 sets carried. *Medical and Surgical Panniers.*—12 in number. *Packages of Bedding and Clothing.*—8 in number.
Corporals „ „ -	8	
Privates „ „ -	35	
Instrument repairers of Medical Service.	1	
Cooks of Medical Service -	6	
Intendance Warrant Officer -	1	
Intendance N.C.O. - -	1	The whole of the Personnel, Equipment, and Transport is divisible into two practically identical sections, to work, if necessary, separately.
Train N.C.O. - - -	1	
Grooms of Train - -	7	
Drivers „ - - -	28	
Shoeing-smith of Train - -	1	
Saddler of Train - - -	1	
Tailor „ - - -	1	
Shoemaker „ - - -	1	

(5) *Personnel, Transport, and Principal Equipment of the Reserve Medical Personnel (Eisei-Yobi-In).*

Personnel.		Remarks on Transport and Equipment.
Ranks, &c.	No.	
Surgeon-Major - - -	1	The Surgeon-Major is in command, and the personnel, equipment, &c., are divisible into three practically identical sections.
Surgeon-Captains - - -	3	*Riding Horses.*—All the medical officers and the N.C.O. of the Train, are mounted.
Surgeon-Lieutenants - -	9	*Draught Horses.*—There are 10 1-horse Japanese wagons for the panniers and bedding and clothing packages; but local transport is requisitioned for most of the equipment.
Apothecaries - - -	3	*Stretchers.*—The number is indefinite.
Sergeants of Medical Service -	40	*Tents.*—The number is indefinite.
Corporals ,, ,, -	Nil.	*Field Cooking Apparatus.*—6 sets.
Privates ,, ,, -	120	*Medical and Surgical Equipment.*—9 Medical and Surgical panniers and 9 packages—in addition to an indefinite supply of material from the Line of Communication, in wooden boxes.
Cooks ,, ,, -	10	
Intendance Warrant Officer -	1	
,, N.C.O.s - -	3	
Train N.C.O.s - - -	1	
Grooms of Train - - -	14	
Drivers ,, - - -	10	
Special duty soldiers - -	Indefinite.	

(6) *Personnel, Transport, and Equipment of the Sick and and Wounded Transport Section (Kan-ja-Yu-so-Bu).*

Personnel.		Remarks on Transport and Equipment.
Ranks, &c.	No.	
Major (or Captain) of Infantry Reserve or Train.	1	The Infantry or Train Reserve Field Officer is in command.
Surgeon-Captains or Surgeon-Lieutenants.	3	*Riding Horses.*—All the officers are mounted.
Sergeants of Medical Service -	3	*Draught Horses.*—Local transport is requisitioned.
Privates ,, ,, -	8	*Stretchers.* — Improvised stretchers are employed usually, but during this war the Sick and Wounded Transport Sections have provided themselves with an indefinite number of regulation stretchers, dandies, &c.
Soldiers for special duties -	3	
Grooms - - - -	4	
Drivers - - - - -	—	*Tents.*—Indefinite, but usually 3.
Soldiers of Train - -	2	*Medical and Surgical Material.*—2 "Medicine panniers," as supplied to Infantry and Engineer units, &c.

(7) *Personnel, Transport, and Principal Equipment of a Medical and Surgical Reserve Depôt (Ei-sei-Zai-ryo-Yobi-sho).*

Personnel.		Remarks on Transport and Equipment.
Ranks, &c.	No.	
Apothecary - - - -	1	*Riding Horses.*—The Officer Commanding is mounted. Also the N.C.O.s of Train.
Sergeant Compounders - -	2	*Draught Horses.*—50 draught horses with 50 one-horse carts for material, bedding, and clothing.
Instrument repairers - -	2	*Tents.*—8, but indefinite.
Lieutenant of Train* - -	1	*Panniers for Medical and Surgical Equipment.*—3 sets of 21 (carried in 21 waggons).
N.C.O. „ - - -	2	*Packages of Bedding, Hospital Clothing, &c.*—30 (carried in 28 waggons).
Groom „ - -	3	*Other Medical and Surgical Equipment.*—The principal part of the equipment is carried in small wooden packing cases; many contain only one class of article only, such as gauze, bandages, Carbolic Acid, Perchloride of Mercury Soloids, &c. They are brought up by means of local transport, country carts, &c.
Drivers „ - - -	50	
Shoeing-smith „ - -	1	
Saddler „ - - -	1	
Tailor „ - -	1	
Shoemaker „ - - -	1	
Intendance—N.C.O. - -	1	

* Commands the unit.

APPENDIX F.

Vocabulary of Terms used in connection with Medical Organisation.

Field Medical Units or Formations.

Relief Posts - - -	*Kyu-go-chi.*
Temporary Dressing Station -	*Kari-Ho-tai-sho.*
Dressing Station - - -	*Ho-tai-sho.*
Bearer Battalion - - -	*Eisei-tai.*
„ „ Company -	*Tanka-Chu-tai.*
„ „ Staff - -	*Eisei-tai-Hombu.*
Field Hospital - - -	*Yasen-Byoin.*
Stationary Field Hospital - -	*Senchi-Teh-ritsu-Byoin.*
Rest Station - - -	*Ryo-yo-sho.*
Reception or Refreshment Room -	*Kanja-Shu-go-sho.*
Reserve Medical Personnel -	*Eisei-Yobi-in.*
Sick and Wounded Transport Department - - -	*Kanja-Yuso-bu.*
Medical and Surgical Reserve Depôt	*Eisei-Zai-ryo-Yobi-sho.*
Line of Communication Hospital -	*Heitan-Byoin.*
Hospital Train - - -	*Byoin-Ressha.*
Train carrying Sick - - -	*Kania-Ressha.*
Hospital Ship - - -	*Byoin-sen.*
Transport carrying Sick - -	*Kanja-Yuso-Senpaku.*
Reserve Hospital - - -	*Yobi-Byoin.*
Fortress „ - - -	*Yosai-Byoin.*
Infectious Disease Hospital -	*Densen-Byoin.*
Regimental Sick-Room - -	*Rentai-Byosha*
Cantonment Hospital - -	*Sha-ei-Byoin.*
Relief Section of the Red Cross Society - - - -	*Seki-juji-sha Kyu-go-in.*

Administrative Offices.

Army Medical Service - -	*Eisei-kimmu.*
Medical Department at War Office	*Riku-gun-i-mu-kyoku.*
Director-General A.M.S. - -	*Riku-gun-i-mu-kyoku-cho.*
P.M.O. of the Field Forces - -	*Yasen-Eisei-sho-kan.*
„ of an Army - -	*Gun-gun-i-bu-cho.*
„ of a Division - - -	*Shidan-gun-i-bu-cho.*
„ Line of Communication -	*Heitan-gun-i-bu-cho.*
Senior Medical Officer - -	*Kosan-gun-i.*

Establishments.

Surgeon-General (Director-General)	*Gun-i-sho-kan* (Relative Rank Lieut.-General).
Surgeon-General - - -	*Gun-i-kan* (Relative Rank Maj.-General).
Surgeon-Colonel - - -	*Itto-gun-i-sei.*
Surgeon-Lieut.-Colonel - -	*Nito-gun-i-sei.*
Surgeon-Major - - -	*Santo-gun-i-sei.*
Surgeon-Captain - - -	*Itto-gun-i.*
Surgeon-1st Lieutenant - -	*Nito-gun-i.*
Surgeon-2nd Lieutenant - -	*Santo-gun-i.*
Surgeon on Probation - -	*Gun-i-ko-ho-sei* (Warrant Officer Rank).
Apothecary - - - -	*Yaku-zai-kwan.*
1st Class Hospital Sergeant -	*Itto-kango-cho.*
2nd Class „ „ - -	*Nito-Kango-cho.*
Hospital Corporal - - -	*Kango-shu.*
„ Orderly - - -	*Kango-sotsu.*
Compounder - - -	*Yaku-zai-shu*
Instrument Cleaner - - -	*Ma-ko.*
Civil Sick Attendant - -	*Kango-nin.*
Female Nurse - - -	*Kango-fu.*
Stretcher-Bearer - - -	*Tanka-sotsu.*
Assistant Stretcher-Bearer - -	*Ho-jo-tanka-sotsu.*

Equipment Terms.

Stretcher - - - -	*Tanka.*
First Field Dressing - - -	*Ho-tai Tsu-tsumi.*
Pocket Case of Instruments -	*Geika-no.*
Medical Haversack - - -	*I-ryo-no.*
Surgical „ - - -	*Ho-tai-no.*
Medical and Surgical Panniers -	*I-kyu.*
„ Panniers - - -	*Yaku-zai-kori.*
Surgical Dressings Case - -	*Ho-tai-hako.*
Panniers for use on Ships - -	*Sen-yo-i-kyu.*
Medicines - - - -	*Yaku-butsu.*
Dressings - - - -	*Ho-tai.*
Instruments and Appliances -	*Chi-ryo-cho-zai-kikkai.*
Materials - - - -	*Zai-ryo.*
Red Cross Brassard - -	*Chu-ritsu-no-Hyo-sho* (literally Badge of Neutrality).
„ Flag - - -	*Ei-sei-ki* (literally Army Medical Flag).
National Flag - - -	*Kok-ki.*

Documents and Returns.

Daily Return of Killed - -	*Shi-sho-nishi.*
Diagnosis Tallies - -	*Sho-hyo.*
Identification Tallies - -	*Nin-shiki-hyo.*
Medical Diary - - -	*Chin-tam-bo.*
„ Case Sheets - - -	*Byo-sho-nishi.*
Prescription „ - -	*Sho-ho-roku.*
Death Certificate - - -	*Shi-bo-sho-byo.*
Case of Invalid - - -	*Byo-kyo-sho.*
Bed-head Ticket - - -	*Byo-sho-hyo.*
Admission and Discharge Sheets -	*Niu-in-kanja-mei-bo.*
Temperature Chart - - -	*Tai-on-hyo.*
Ten-day Return of Sick, &c. of Units - - - -	*Bu-tai kanja-jun-po.*
Ten-day Sick Return of Admissions to Hospital - - -	*Niu-in-kanja-jun-po.*
Monthly Sick Return (Units) -	*Bu-tai kanja-geppo.*
„ „ „ (Hospitals) -	*Niu-in kanja-geppo.*
Monthly Return of Medicines -	*Yaku-butsu-geppo.*
List of Personal Effects - -	*Kanja-fataku-hin-hyo.*
List of Money and Valuables -	*Kinsen - kicho - hin - hin-moku-hyo.*
Sick Convoy Note - - -	*Yuso-ho-roku.*
„ „ Report - -	*Kanja-ho-roku.*
Report of Work of a Unit - -	*Gyu-mu-ho-roku.*
Return of Personnel and Horses -	*Jin-ba-gen-in-hyo.*
Field Medical Regulations - -	*Yasen-ei-sei-kimmu-rei.*

Connected with the work of Medical Units.

Admission and Discharge Department - - - -	*Hatchaku-bu.*
Office of Senior Medical Officer -	*In-cho-hombu.*
Wards - - - -	*Byo-shitsu.*
Operation Room - - -	*Shu-jitsu-shitsu.*
Mortuary - - - -	*Shi-shitsu.*
Ablution Room - - -	*Yoku-shitsu.*
Kitchen - - - -	*Sui-ji-ba.*
Disinfection Room - - -	*Sho-doku-shitsu.*
Dispensary - - -	*Yaku-shitsu.*
Apothecary's Department in a Dressing Station - - -	*Cho-zai-bu.*
Patients - - - -	*Kanja.*
Wounded - - - -	*Sho-sha.*
Seriously Wounded - -	*Ju-sho.*
Lightly Wounded - - -	*Kei-sho.*
Sick - - - -	*Byo-sha.*

Connected with the work of Medical Units—continued.

Killed in the Field - - -	*Sen-shi.*
Died - - - -	*Shi-sha.*
Deaths from Disease - - -	*Byo-shi.*
Admissions - - -	*Kanja-niu-in.*
Discharged - - - -	*Chi-yu.*
Admitted as Transfers - -	*Ten-niu.*
Discharged as „ - -	*Ten-so.*
„ to Sick Furlough -	*Seika-ryo-yo.*
„ to Convalescent Homes	*Ten-chi-ryo-yo.*
„ to their own Homes -	*Ki-kyo-ryo-yo.*
Convoy of Sick and Wounded -	*Kanja-sojo* (*okuri-jo*).

(2) Medical Notes on the Japanese Army.*

Report by Captain B. VINCENT, Royal Field Artillery.
Tokio, 17th May 1905.

1. The medical officer with each infantry battalion is held responsible that all necessary sanitary precautions are recommended to the officer commanding. He is assisted in his duties by a sergeant-major and corporal of the sanitary corps, and a medical corporal with each company.

The officer commanding the medical department of a division is in the same way held responsible that the general officer commanding division is kept informed of the sanitary state of his command, and that, whenever necessary, advice from a medical point of view is given.

It is his duty to consult with his subordinates with the battalions regarding the health of the troops and to keep the general officer commanding informed.

He has to stand his trial for an outbreak of disease.

For instance, as a precaution against the spread of *kakke* (beri-beri), the medical officers recommended that cut barley should be mixed with the rice ration in the proportion of 1 to 2.

The necessary orders were then issued to this effect.

2. Outside the hospital medical officers have no executive authority. All orders must come from the officer commanding unit, who has to take the responsibility of not acting on the medical officer's advice. If his recommendations are agreed to, orders to that effect are published.

In fact, even when armed with the authority of the officer commanding to have a thing done, medical officers avoid, if possible, having to give orders themselves.

The medical officer with the Japanese army has a very well-defined position. His social status is the same as that of officers of any other branch of the service. He is proud of his profession, which is considered by the whole army to be a highly honourable one.

3. Throughout the war, troops have as far as possible been quartered in farms and villages, the Chinese inhabitants having

* This report was sent in reply to a request from the Director General, Army Medical Service, for information on the subjects contained in it.

been turned out or relegated to certain quarters to make room for the troops.

On entering a village the medical officer with the battalion is sent on ahead to make a thorough examination of the premises, especially with a view to the detection of disease.

The officer commanding unit then orders the place to be cleaned, and details fatigue parties from his command for the purpose.

The medical officer constantly looks round, and if disease is discovered, that particular house or group of houses is isolated, and a notice posted on the walls or gateway giving particulars of the disease.

For this purpose different coloured papers are used, *e.g.*, white for smallpox (a very common disease among the Chinese), red for dysentery, and yellow for cholera; of the latter disease, however, I have not yet heard of a single case.

The Chinese very often feign disease in order to avoid having to give up their houses, and the medical officers have a lot of trouble with them on this account.

Where troops are quartered for any length of time, latrines are dug near every house. The latrine consists merely of a trench with two boards for the men to stand on. Lime is sometimes scattered about.

The Japanese soldiers always contrive to have a hot bath, and on this subject no orders are necessary. Through long custom, among even the poorest classes in Japan, a daily bath in water at very nearly boiling point is considered almost as great a necessity as food. On service the soldiers generally manage to bathe every other day, and even in the coldest weather a naked soldier standing in the open, drying himself by the bath, is a common sight. All through the winter this bathing was kept up. The large earthen jars about 4 feet by 2 feet, which are to be found near every Chinese house, are requisitioned for the purpose, a charcoal or wood fire being lighted underneath.

When a house is occupied, the ceiling, floors and *kangs* (raised platforms with flue underneath for heating the room, and on which everybody sleeps) are cleaned. Paper is pasted over the last to defeat the bugs, with which the houses swarm. The paper windows are also repaired with old newspaper if nothing else is available.

The officer commanding unit is responsible for all sanitary details.

4. (*a*) Certain wells or portions of a stream, on the recommendation of the medical officer, are set apart for drinking purposes. A notice is put up, and as a rule a sentry is posted by order of the officer commanding unit to safeguard them from contamination until everybody has settled down.

(*b*) Drinking water, when the troops are in quarters or on the line of communication, is always boiled. For this purpose

the large iron rice cauldrons (*kama*), Chinese boilers, or the men's iron water bottles are used.

If the water after being boiled is muddy, alum is used, a supply of which is carried by the head-quarters of each battalion.

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.

(*c*) Strict attention is paid to the boiling of vegetables. The Chinese, like the Japanese, use liquid manure to a large extent in their lettuce and onion beds, hence the necessity for boiling everything.

There is a weekly medical inspection of all soldiers and followers, *naked*, and a sick parade daily, but urgent cases are attended to immediately.

Flies, which during the summer months (June to October) are a perfect curse in Manchuria, are combatted as much as possible by gauze nets over the windows and muslin head-pieces for each man.

5. The officer commanding a unit is responsible that orders relating to the preservation of health and prevention of disease are carried out.

A company commanding officer in peace time can give two weeks' C.B. and in war time extra fatigue work for the same length of time.

When troops are in quarters, the order to drink boiled water only is carried out; but during a battle, or on the march, this rule is apparently relaxed altogether.

The First Army, from the Ya-lu to the present time, has never left the mountains, and water has always been good and plentiful. The rivers are clear and shallow, and filter over sandy, shingly beds. The village wells are deep and well built around with stones.

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.

Regiments and divisions vary to a certain extent in the matter of sanitary arrangements. At times I have observed conditions of neglect which, in any climate less healthy than that of Manchuria, would most certainly have led to an outbreak of disease. This remark refers chiefly to non-regimental units.

The Japanese soldiers, however, are naturally very cleanly in their habits, and intelligent in recognizing the importance of sanitation.

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, the medical officer of a battalion lectures 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.

In addition to this, the company and section officers pay great attention to the health of their men, and take every possible opportunity of talking to them on this 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 that if the spirit is weak, disease attacks.

In the same way, when Russians are taken prisoners, the company officers take the opportunity of telling their men what a disgraceful thing it is to surrender.

6. In the eyes of the regimental officers and soldiers, illness is divided under three heads:—

Ittōshō (1st class illness) comprises wounds, or any illness caused through hardship or exposure on service.

A blister on the foot comes under this category, but at the same time is considered a shameful thing. When a soldier becomes so footsore that he cannot march in boots, he is allowed with the permission of his section officer, to wear *waraji* or grass sandals, the natural footgear of the peasantry of Japan, which are made privately by the men. *Waraji* may never be worn without the authority of an officer.

Nitōshō (2nd class illness) includes all ordinary diseases.

Santōshō (3rd class illness) comprises disease or sickness brought on by the individual's own carelessness or disobedience of orders; for instance, sickness from eating unripe fruit or drinking dirty water.

It also includes venereal disease, which is considered most shameful in the case of a soldier on service, and a man contracting it incurs the penalty of a fine—*bakkin* (literally "punishment money").

Owing to the weekly medical inspection, concealment of venereal disease is impossible. I am told that in this war venereal disease has been very rare.

In the Japanese army soldiers do not require close supervision on the part of their officers to ensure any sanitary or other regulations being carried out.

A wonderful level of physical stamina and intelligence is attained among the rank and file of the army; only the most suitable material is chosen in the first instance, and the system of training soon produces a high average, physically and mentally.

This fitness as soldiers is never allowed for a moment to slack off, though necessary periods of rest after extraneous exertion are allowed, and the work is varied as much as possible to avoid monotony.

In peace time, soldiers have to do one hour's physical training daily, and in war time the men, wherever they may be—in camp, or in their rooms in Chinese houses—are put through physical drill before breakfast.

In addition to this, there are the ordinary parades, attack and skirmishing drill, &c.

The Japanese are not naturally fond of exercise, and if left to themselves neither officers nor men would ever take it on its own account. It is all done "by order," and sufficient work is given to all ranks to maintain them in health.

It is the spirit of patriotism and self-sacrifice, however, which makes the army such an efficient fighting instrument, and which not only ensures success in the attack, but causes the men to look after themselves in camp or in quarters.

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(3) Dentistry in the Japanese Army.

REPORT by Colonel W. H. BIRKBECK, C.B., Head-Quarters, Third Japanese Army, 5th August 1905.

Covering Letter by Lieut.-General C. J. Burnett, C.B.

I suggested that this report should be made because it might prove of interest to the Director-General, Army Medical Service.

This special dentistry forms no part of the Japanese organization of an army in the field. The dentists' services are requisitioned as required by the general officer commanding the army on the recommendation of his medical adviser. The Japanese Government pay all expenses, except material for crowning, which the patient pays for.

REPORT.

My experiences of dentistry in Manchuria may be of interest to the Director-General, Army Medical Service.

In May I unfortunately lost the gold crown of a back tooth. I asked the medical officer if anything could be done to fill temporarily the stump, and was told that one of the doctors belonging to one of the divisions of this Army was a sufficiently expert dentist, and would shortly be coming in to Army head-quarters and would attend to me.

This officer had all the necessary instruments for cleaning out and filling teeth with cement, and he fixed me up most carefully and thoroughly, saying that a regular dentist was shortly expected to arrive.

In July the dentist arrived and fixed up a complete operating room with all the paraphernalia of a first-class dentist's consulting room.

This gentleman was a civilian practitioner specially engaged to visit the Army in the field, and give officers and men who had been many months in the field an opportunity of having their teeth looked to.

He made me a new crown and filled it as well, if not better than, the first-class London man whose crown I had lost. I attach a photograph of the dentist and his assistant* in their consulting room, of which the scrupulous cleanliness was a remarkable feature. They are now visiting the divisions of this Army.

The Japanese, as a nation, take the greatest care of their teeth, and are most particular about brushing them.

* Not reproduced.

(4) Battle of Liao-yang. Medical Arrangements of the Second Japanese Army during its advance from Hai-cheng to Liao-yang, 26th August—4th September 1904.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, Manchuria, 30th October 1904.

Plate.

Map showing positions of hospitals, dressing stations, &c. (not reproduced). *See* instead Maps 2 and 3.

*General Description of the Operations.**

For the purpose of the following account of the medical arrangements of the Second Army, the military operations during the advance from Hai-cheng to Liao-yang may be divided into three periods.

I. From 26th to 28th August, or the period from the commencement of the advance from Hai-cheng to the occupation of An-shan-tien.

II. From 29th to 31st August, or the period covering the operations from An-shan-tien to the final assault on the Russian positions at Shou-shan-pu.

III. From 1st to 4th September, or the period covering the operations between the Shou-shan-pu positions and Liao-yang, which led to the occupation of the latter place.

During the first of these periods there was little opposition, and the number of casualties was small. The ground for the first half of the distance was an undulating country, studded with villages and thickly cultivated with millet and beans, the crops of which were still standing. The second half of the distance was over some low foot-hills and a somewhat enclosed valley leading to the An-shan-tien defile, through which one wing at least of the Army marched before reaching the railway station on the plain to the north of the defile. The weather during the period was variable, hot and broiling on the 26th (maximum in shade, 86° F.), chilly and wet on the 27th (maximum 70° F.), and fresh and fine on the 28th (maximum 78° F.). The roads were of the roughest description, and in many places little better than quagmires. Two rivers of considerable size had to be forded, one about 4 miles north of Hai-cheng and the other in the An-shan-tien defile.

During the second period, the 29th August was a day of rest, in the course of which the Army took up a position along the Sha Ho, a river running east to west about 10 miles south of Liao-yang. The 30th and 31st August were, on the other

* *See* Map 2.

hand, days of continuous fighting against strong Russian positions, along a line of low hills, running from the hill known as the Shou Shan in a S.E. direction about 5 miles south of Liao-yang. The Army, which had come in touch with this line of opposition on the morning of the 30th, made little or no perceptible advance during the period, until the occupation of the Shou Shan position during the night of the 31st August. The distance from the Sha Ho, where the main body rested on the 29th, to these positions is about 5 miles. The weather during the period was very wet, rain commencing to fall on the afternoon of the 29th, being almost continuous on the 30th, and falling in short heavy thunder-showers on the 31st. The maximum shade temperature was 82° F. on the 29th, and 76° F. on the 30th and 31st. The area of the operations between the line of the Sha Ho and the Shou Shan positions was a plain thickly cultivated with millet, and after the rain the roads were in a state of quagmire. There were several Chinese villages in the area, distinguished in the landscape by the clumps of willow and poplar trees amongst which they were situated. The Sha Ho was the only river that had to be crossed, but there were one or two nullahs across the area, which were more or less impassable except where there were roads. The roads themselves were, however, almost impassable on account of the mud.

The third period commenced with a rest for the main body on the 1st September, followed by two days of continuous fighting on the 2nd and 3rd, against strong opposition, with a final advance into Liao-yang on the morning of the 4th. The distance from the halt of the main body on the 1st to Liao-yang was about 5 miles. During this period the weather was fine, with a broiling sun. The maximum shade temperature was 84° F. on the 1st, 86° F. on the 2nd and 3rd, and 84° F. on the 4th September. The country was again a plain, covered with millet crops with villages amongst trees, and with the roads in a state of quagmire. There were no rivers. The roads were, however, little better than rivers of mud, and the difficulties of transport were great.

The line of railway between Hai-cheng and Liao-yang may be regarded as the central line of the advance of the Second Army, which took place in three columns, one to the west of the line, one astride the line, and the third to the east of the line. No locomotives were, however, available for transport purposes, and the only use of the railway line was for the movement of trucks, pushed, or rather pulled, by coolies, and as a roadway for troops on the march.

Casualties.

During the three periods the number of casualties was, approximately, 9,621 for the Second Army. Of this number 7,347 were wounded and 2,274 were killed. The strength of the fighting force is not yet disclosed. It consisted of three

divisions, the 3rd, 6th, and 4th, with a Reserve brigade, cavalry brigade and corps artillery regiment. Approximately, the wounded may be regarded as being 13 per cent. of the fighting force.

The distribution of the casualties from wounds amongst the three divisions and during each of the three periods is, approximately, as follows:—

Division.	1st Period.				2nd Period.				3rd Period.					Grand Total.
	26th.	27th.	28th.	Total.	29th.	30th.	31st.	Total.	1st.	2nd.	3rd.	4th.	Total.	
3rd	5	9	75	89	—	—	—	2,600	—	—	—	—	383	3,072
4th	41	—	1	42	—	—	—	315	—	—	—	—	1,087	1,444
6th	2	15	87	104	—	—	—	1,800	—	—	—	—	595	2,499
Res. Bde.	—	—	—	—	—	—	—	332	—	—	—	—	—	332

General Description of the Medical Arrangements.

In the following account of the arrangements for dealing with these numbers, full details of medical organization, material, transport, &c. are purposely omitted. Such details may be more fitly dealt with in separate reports, as the object of this account is to give a general view, so far as they came under personal observation, of the movements of the various medical mobile units during operations in which large numbers of wounded had to be taken under their care, the time taken to bring all the wounded into the medical formations, and eventually to evacuate them down the lines of communication. In other words, my object is to add a note on the medical arrangements, which may be read in conjunction with the general description of the combatant operations submitted by other officers.

It is necessary, however, to enter into a few details of the Japanese field medical organization, in order to make the account more intelligible.

The lines of medical assistance in the Japanese army are as follows:—

(1) The battalion or regimental units.
(2) The stretcher bearer battalions.
(3) The field hospitals.
(4) The reserve medical personnel.
(5) The sick transport committees.
(6) The reserve medical store depôts.
(7) The line of communication hospitals.
(8) The hospital ships.
(9) The hospitals in the home territory, *i.e.*, the military hospitals of the country expanded to meet requirements, and called "reserve hospitals."

During engagements the regimental units confine themselves to the application of the first field dressing, splints, and minor work. If the action is prolonged, and more or less stationary, the regimental units may form minor or temporary dressing stations. Diagnosis tallies may be attached here.

The stretcher bearer battalions form the main dressing stations within a mile or so (strictly, 1 kilometre) of the fighting line, and convey the wounded from that line to the dressing station and from the dressing station to the field hospitals. At the dressing stations only urgent operations are undertaken, but, as a rule, all the wounds are examined and dressed, splints applied, &c., and diagnosis tallies, distinguishing between slight and severe wounds, attached.

At the field hospitals all the wounds are carefully examined, full records are made, and the medical case sheets, which accompany the patient wherever he goes, and which are written up from day to day, are commenced. Hospital clothing is issued to a certain proportion of the cases, and surgical operations are undertaken at leisure.

The reserve personnel is a formation which advances to relieve the field hospitals when it is necessary for them to keep up with the movements of their division. The personnel, as a rule, takes over the field hospital *en bloc*, and enables the latter to pack up and move on. The hospital formed thus is called a stationary field hospital.

The sick transport committee makes all the arrangements for the conveyance of the wounded down the lines of communication, obtaining transport material and personnel from local resources.

The reserve medical store follows the reserve personnel and conforms closely to its movements. It replenishes the regimental units, field hospitals, bearer battalions, and the stationary hospitals formed by the reserve personnel.

The line of communication hospitals are the equivalent of our stationary and general hospitals.

As regards the actual amount of assistance available under these different formations, the following is a general view of the arrangements with the Army with which this account deals.

The regimental unit consists of two medical officers with each battalion, with an equipment of four medical and surgical panniers, and one non commissioned officer of the medical service for each company with a surgical haversack and small wooden arm splints in his knapsack. There are also four stretcher bearers with one stretcher in each company.

The bearer battalion is formed of two bearer companies and a dressing station staff. The battalion is under a combatant officer, or officer of the train (transport service). There are 160 bearers in each companywith 40 stretchers.* They belong to

* Stretcher-bearer and other establishments noted here are only approximately correct.—W. G. M.

the combatant reserve, and are men who have served as regimental stretcher bearers. The dressing station staff is entirely composed of members of the medical service, viz., 8 medical officers, 2 apothecaries (or 1 apothecary and 1 compounder), and 40 non-commissioned officers and men. The equipment is in 16 medical and surgical panniers, and in one surgical haversack for each man of the medical service and for each stretcher squad. Each division has one such battalion, and the Reserve brigade has a modified battalion equal to one half of a divisional battalion. The dressing station staff of each bearer battalion is divisible into two exactly similar sections, both as regards personnel and equipment.

The field hospitals are organized for 200 beds, with equipment in 12 medical and surgical panniers, the material being calculated to suffice for 200 wounded for two weeks. The medical staff is 6 medical officers, 2 apothecaries (or 1 apothecary and 1 compounder), and 40 non-commissioned officers and men. Each division has nominally six field hospitals, but there were only four with each of the divisions of the Second Army. They are numbered No. 1, No. 2, No. 3, and No. 4 of each division. Each field hospital is divisible into two sections, each exactly similar as regards personnel and equipment.

The medical reserve personnel consists of 14 medical officers, 3 apothecaries, and 120 men (?), with nine panniers of medical and surgical material, calculated to be sufficient for 600 patients for one week. Each division has one such reserve personnel. They are each organized to take over the wounded of at least three field hospitals. Each reserve personnel is divisible into three similar sections.

The sick transport committee is a small unit of one combatant officer and one medical officer with a few non-commissioned officers and men of the medical service. They have no equipment for medical work except battalion panniers and haversacks, nor have they any transport material, except such as can be improvised out of the local resources. Each division has one such committee, which is at the disposal of the line of communication command.

Each division has also one reserve medical store, which has to be prepared to replenish the field hospitals, &c. in the area of engagements. These stores are also at the disposal of the line of communication command.

The line of communication hospitals vary in size and number according to the length and nature of the communications. They are usually an expansion of the stationary field hospitals formed by the reserve personnel. Along the line between these hospitals there are rest stations for the sick and wounded at each halting stage, usually 10 to 15 miles apart.

Hospital ships vary according to circumstances, as do also the reserve hospitals. There are at present seven of the former engaged in the work of evacuation.

There are no hospital trains.

Throughout the whole period the accommodation for wounded with the field units was in Chinese village huts, with such bedding as could be made of mattings, straw, or blankets.

Details of the Movements of the Medical Units.

1st Period.—Hai-cheng to An-shan-tien.

Before the Army moved from Hai-cheng a line of communication hospital had been opened at the railway station there, in buildings that had been constructed according to European ideas for the Russian railway guards. They were large, well-constructed, well-lighted and well-ventilated barracks with opposite windows, and roof partially of glass. They were the best buildings procurable in the locality for hospital purposes. The line of communication hospital had been opened there on the 11th August, and by the time the Army moved, had gradually expanded to accommodate some 500 patients, keeping up a constant evacuation of sick and wounded down the line of communication, and clearing the mobile medical units of all their sick.

On the 26th August all the bearer battalions and field hospitals moved off with their divisions, but only one bearer battalion dressing station, and one field hospital were opened, the former that of the 6th Division, or central column, and the latter one of the field hospitals of the 4th Division, or left column. The wounded were few, the action was only concerned with driving in the enemy's outposts, and the distance from the fighting line to the line of communication hospital at Hai-cheng was only about 8 miles. On this account field hospitals and dressing stations were not opened, the wounded being sent in some instances direct to the hospital in Hai-cheng from the fighting line. Chinese carts were employed for transferring some of the wounded, who were seen on their way to Hai-cheng at one o'clock in the afternoon, having received their injuries about seven o'clock in the morning.

On the 27th August the dressing stations of the 3rd and 6th Divisions were opened, the former at the village of Hsin-tai-tzu, about 14 miles from Hai-cheng and close to the railway line, and the latter at Kuan-feng-tzu, about 3 miles west of Hsin-tai-tzu. Both of these positions are at the foot of low foot-hills facing the An-shan-tien defile. The casualties were again very small, but a movement took place in the afternoon, in pursuit of the enemy, who were reported to be retreating from An-shan-tien. The second field hospital of the 3rd Division was accordingly moved up to Hsin-tai-tzu during the day and took over the wounded of the dressing station there, enabling the latter to move on with the troops in pursuit. One half of No. 1 Field Hospital of the 6th Division was also moved up and opened at Yang-h-iang-tun, a village about 2½ miles south

of its dressing station. These were the only medical units outside the battalion units that took active part in the operations of the day. The other field hospitals were seen in column of route moving in rear of their main bodies. Two of these moved up with the divisional transport column and were seen to halt during the day at a village about 4 miles distant from the advanced line. They left this position in the evening when the main body moved on towards An-shan-tien, having halted from 9 a.m. till about 5 p.m. During the halt they took up a position in front of an ammunition column.

On the 28th August the dressing station of the 3rd Division opened at the village of Chang-chuang-pu,* about 5 miles north of the railway station of An-shan-tien, on the east of the railway line. This position was considerably in advance of the Japanese artillery which was firing on the retreating enemy, and also more than usually in advance of the field hospital that was eventually to come up to take over its wounded.

On the same day the 6th Division dressing station divided, one company of the bearer battalion going to the village of Hou-san-tai-tzu and the other to Fan-chia-pu. The former of these villages is about 2½ miles west of the railway on the same line as the dressing station of the 3rd Division, and the latter about 2 miles north-west of the An-shan-tien railway station.

The dressing stations, or, to use a more correct designation, the medical staff of the bearer battalions, had marched about 14 miles from their previous positions before again opening.

One field hospital of the 6th Division and one of the 3rd Division were also moved up into positions for opening the former to Pei-kuan-pu, a village on the road leading to the dressing stations of the division and about 2 miles south of the nearer of them, and the latter to the barrack of the Russian railway guards at the station of An-shan-tien. This barrack had been also used as a hospital by the Russians, and had all the appearance of having been vacated only a day or two previously.

These were the only medical formations opened on the 28th August, the bearer battalion of the 4th Division remaining in column of route. The field hospitals of this division and also the field hospitals of the other divisions, with the exception of those just mentioned, also remained in column of route.

2nd Period.—From the Line of the Sha Ho to the Line of the Shou-shan-pu Hills. (*See* Plate 15 I.)

On the 29th August, the wounded who had been received into the dressing stations of the 3rd and 6th Divisions at Kao-chuang-pu, Hou-san-tai-tzu and Fan-chia-pu were removed

* Not on Map 2; about the position of Pa-kua-kou (E. ¾).

during the day by the bearer battalions to the field hospitals opened at An-shan-tien railway station and at Pei-kuan-pu, and prepared for a forward movement on the following day. The field hospitals that were in column of route also moved up and took up their position in the echelon of their respective divisions, which were assembled along the line of the Sha Ho from the village of Sha-ho westwards beyond the railway. The medical work during this day consisted in evacuating the dressing stations mentioned above, and in examining and recording the wounds in the field hospitals at An-shan-tien and Pei-kuan-pu.

On the 30th August the bearer battalion of the 3rd Division moved across the Sha Ho to the village of the same name about 7 a.m. and there divided, one half going on along the main road to the village of Tu-tai-tzu and the other half breaking off, to the east, to the village of Hei-niu-chuang, where it remained throughout the period. Both these villages are within a mile and a half of the Russian positions, and were exposed to heavy artillery fire. The dressing stations were opened during the forenoon. They were each about 2 miles from the village of Sha-ho, which was afterwards to become an important post in the line of evacuation of the wounded to the line of communication.

The bearer battalion of the 6th Division opened its dressing station in the afternoon at Hsiao Chiao-chia-tai (A/B 4),* a village about 2 miles from the Russian positions, 1 mile west of the railway, and 4 miles from the Sha Ho.

The 4th Division was in reserve, but was called upon to send a detachment to support the 6th Division, and one half of its bearer battalion was consequently opened at Hsiao Chiang-lao-kou (B 3), about 2 miles north-west of Shou-shan-pu and more in advance in the direction of Liao-yang than the dressing stations of the other divisions of the Second Army.

No field hospitals were opened on the 30th August, but No. 3 of the 3rd Division was moved up to the dressing station position at Tu-tai-tzu (B 5) for the purpose of taking over the wounded collected there.

On the 31st, the 3rd Division dressing station left Tu-tai-tzu for a village, Yang-chia-lin-tzu (B 5), about three-quarters of a mile nearer the Russian position. The reason of this move was that the Russian artillery fire had been specially directed against the former village, behind which a battery of Japanese artillery had taken up its position, and several casualties occurred among the dressing station staff. For the same reason No. 3 Field Hospital was moved to Hou-chia-tun (A/B 5), a village about three-quarters of a mile west of Tu-tai-tzu.

The dressing station of the 6th Division remained where it had been opened on the previous day.

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* *See* Map 3.

The second half of the 4th Division dressing station was opened at Fu-chia-chuang (A 4), 2½ miles west of Shou-shan-pu, while the first half, that had opened the previous day, was moved back to Pai-chia-lao-kou (B 3), a village about 1 mile south of its previous position.

The field hospitals now began to come up and open at several villages in the area of the operations. No. 3 of the 3rd Division, as we have already seen, opened at Hou-chia-tun (A/B 5). No. 1 went to the village of Sha-ho (A 6) and was ready to receive the wounded in the evening. The lighter cases went to the latter from the dressing stations at Yang-chia-lin-tzu (B 5) and Hei-niu-chuang (B 5), while the more severe cases were transferred from Tu-tai-tzu (B 5), where they had lain from the previous day, to the former.

In the 6th Division, No. 2 Field Hospital was opened at Hsiao Chiao-chia-tai (A/B 4), and took over the wounded from the dressing station there, enabling the latter to move during the night.

No. 2 Field Hospital of the 4th Division was opened at Hsin-lin-tai (A 4), where the main body of the division had stayed.

All these hospitals were busily engaged both day and night, with the exception of No. 1 of the 3rd Division, whose busy time commenced the following day.

During this period—a period in which there was severe fighting both day and night—the wounded as a rule remained with their battalions, or with temporary dressing stations formed by the battalion surgeons, and were conveyed to the dressing stations some hours after they had received their injuries. So far as I could gather they were kept with the battalion till evening, and then removed by the bearer companies. The cases, however, that were able to walk were sent back to the dressing station as soon as they had been attended to by their battalion medical units.

Thus two important regimental or temporary dressing stations were opened on the 31st August, one at a village south-west of Ta-yao (D 5), under cover of the hills where the left wing of the 3rd Division was fighting, and the other at Hsiao-yang-ssu (C 5), where the right wing was operating. It was on the hills near these that the greatest number of casualties took place during the day of the 31st. Thus, in one battalion there were 390 killed and wounded before noon, one company having 30 killed and 85 wounded. Another battalion lost 280 men, while a third battalion lost all its officers (9 killed and 10 wounded) and 567 of the rank and file (263 killed and 304 wounded). This last battalion belonged to a different regiment from the two former battalions, and the regiment to which it belonged had about 480 killed and 740 wounded in all.

The field hospitals, therefore, had just begun to receive the wounded of the second period when the third period commenced.

3rd Period.—From the Shou-shan-pu Hills to Liao-yang.

The 1st September was employed in a general clearing of the wounded into the field hospitals. The dressing stations, however, remained at work as follows:—The two halves of the 3rd Division dressing station came together at Hsiao-yang-ssu (C 5), which was a good central position for attending to the large number of casualties, to which reference has just been made. The 6th Division dressing station moved to an unnamed village close to the railway, about one mile south-west of the Shou Shan. The 4th Division dressing station continued in two halves; the first half returning to its original position at Hsiao Chiang-lao-kou (B 3), and the second half moving to the village of Ta Chiao-chia-tai (B 4), about 1½ miles nearer the Shou Shan.

Mention should have been made of the dressing station of the Reserve brigade, which had to take part in the actions of the previous days. This dressing station was opened on the 31st August at Ta-tzu-yin (B 4), a village close to the Russian position, immediately south of Shou-shan-pu. There were regimental dressing stations here also, and, although the official reports mention this dressing station as being at this village on the 31st, it is not likely to have come there before dark, and the wounded must have been received into it during the night of the 31st and early morning of the 1st. It was on the latter day, therefore, that the work was principally carried out, and this was personally observed at the time, large numbers of wounded being seen at this station during the forenoon of that day.

Practically all of the field hospitals of the Army were now opened, and their positions were as follows:—

Of the 3rd Division hospitals, No. 1 remained at Sha-ho, occupying many of the Chinese houses there. No. 2 had marched from An-shan-tien, having handed over there to the reserve personnel, and had taken over the wounded, *i.e.*, the severe cases, which it was inadvisable to move, from the dressing station at Yang-chia-lin-tzu (B 5), when the latter moved to Hsaio-yang-ssu (C 5). No. 3 remained where it was at Hou-chia-tun (A/B 5), and No. 4 was opened at Hei-niu-chuang (B 5), where it took over the serious cases left there by the dressing station moving to Hsiao-yang-ssu.

In the 6th Division No. 2 remained at Hsaio Chiao-chia-tai (A/B 4). No. 3 moved up to Ta Chiao-chia-tai (B 4) and set free the dressing station of the 4th Division, which had opened there early in the day, or rather during the night. No. 4 was moved to the village of Yu-shu-tun (B 4), on the east of the

railway about half a mile west of the dressing station of the Reserve brigade and received wounded from the latter. No. 1 Field Hospital of this division was still at Pei-kuan-pu,* but was now in a position to evacuate to the stationary field hospital formed by the reserve personnel at An-shan-tien.

In the 4th Division, No. 2 Field Hospital was moved back from Hsin-lin-tai (A 4), for some reason or other which I have been unable to ascertain, and remained at a village, Chang-kang (A 5) about 2 miles further south. Its place was taken by one half of No. 3, the other half going on and setting free the first half of the divisional dressing station at Hsiao Chiang-lao-kou (B 3). No. 4 remained unopened, but was in readiness to proceed to the 3rd Division, to which it was to be temporarily attached. No. 1 was also in reserve.

By the evening all three divisional dressing stations were practically relieved, as No. 4 Field Hospital of the 4th Division was on its way to Hsiao-yang-ssu (C 5) to take over the wounded under the care of the dressing station of the 3rd Division. It will also be observed that the whole of the area covered by the operations of the second period was now studded with field hospitals, and that the area of the first period was being freed of field hospitals and being provided with stationary field hospitals.

A reserve medical store was also moved up to the area of the second period, and was established at Sha-ho. A sick transport committee also opened its office there at this time.

On the 2nd September the dressing station of the 3rd Division left Hsiao-yang-ssu and halted for the day at the village of Shou-shan-pu, where it did not open. The dressing station of the 6th Division remained where it was and appears to have received a considerable number of wounded, although it was much further than is usual from the fighting line. The dressing station of the 4th Division, which had up till now been working in two halves, was united and proceeded to Wang-pao-shan (C 2), a village about 3 miles west of Liao-yang railway station.

The dressing station of the Reserve brigade was closed.

The field hospitals of the three divisions remained where they were.

On the 3rd September the dressing stations of both the 3rd and 6th Divisions were opened in the village of Hsi Pa-li-chuang (C/D 3) on the Liao-yang main road, about 2½ miles south of the city. The 4th Division dressing station remained at Wang-pao-shan (C 2).

None of the field hospitals moved from the positions where they were at work, but two more were opened, namely No. 1 of the 4th Division, which went to Wang-pao-shan and took over the wounded at the dressing station there, and No. 4 of the same division, which opened at Hsiao-yang-ssu (C 5), and

* Near An-shan-tien (Map 2)

received the wounded that were being sent back from the dressing stations at Hsi Pa-li-chuang. These cases were the lighter cases, and those that could walk. The roads were far too bad for carrying wounded back from that village.

On the 4th September, the date of the occupation of Liao-yang, the dressing stations of the 3rd and 6th Divisions were closed. The dressing station of the 4th Division moved on with its division, which was in pursuit of the enemy, and opened at Tao-shih-chuang (D 1), a village north of Liao-yang.

The following movements of field hospitals took place. No. 1 of the 3rd Division handed over its wounded to the reserve personnel at Sha-ho, which was thus converted into a stationary field hospital, and proceeded to Hsi Pa-li-chuang (C/D 3), where it took over the wounded from its dressing station there. No. 1 of the 6th Division came up from Pei-kuan-pu,* having evacuated all its wounded to Hai-cheng or An-shan-tien, and took over the wounded of its dressing station also at Hsi Pa-li-chuang. The first half of No. 3 of the 4th Division left Hsin-lin-tai (A 4) and joined the other half at Hsiao Chiang-lao-kou (B 3). The other field hospitals remained where they were, but No. 2 of the 4th Division was on the way to relieve the dressing station in advance of Liao-yang.

It will be observed that this was the first day during the series of engagements between Hai-cheng and Liao-yang on which all the field hospitals of the Army were open, and the preceding account may serve to show how they were gradually brought into work until they covered the area where the fighting had taken place and where the more serious cases were temporarily kept. There was thus to the last one or two hospitals in reserve, in case a new area had to be occupied.

It will also be noted that the large expenditure of dressing material was anticipated by the movement of the reserve medical stores, one being stationed at An-shan-tien during the second period, and one at Sha-ho during the third period. The arrival of reserve personnel at these places also added to the resources of dressing material.

The Work of Clearing the Field Hospitals.

The evacuation of the wounded down the line of communication was carried out continuously from the very first. A large hospital was formed in the village of Sha-ho, and all the wounded in the hospitals south of the Shou-shan-pu hills were sent there, whence they were moved down the line by the transport committee there. Sha-ho also received wounded from the Fourth Army, which had its line of communication through Pan-chia-lu and Chin-chia-ling-tzu† respectively, 5 and 8 miles

* Near An-shan-tien (Map 2).

† Wounded that went down the line to Chin-chia-ling-tzu were carried to the railway station at An-shan-tien by one of the Transport Committees of the Fourth Army; Pan-chia-lu only evacuated to Sha-ho. —W. G. M.

east of the railway. The hospitals north of the Shou-shan-pu hills evacuated to Liao-yang, where a large line of communication hospital was opened without delay in some 30 Russian houses near the railway station. A large number of wounded from the Fourth Army and from the First Army was also sent to Liao-yang for evacuation down the line of railway.

Every available means of transport was employed, regulation and improvised stretchers, a dandy called the "Annam" stretcher, Chinese carts, &c., and many wounded marched down the line. But the chief transport was by rail. No locomotives were available, but every day about 50 trucks and vans were pulled down the line by Chinese coolies, doing about 10 to 15 miles a day. The wounded stayed at night at Sha-ho or at An-shan-tien or remained in the trucks at a siding at Hsin-tai-tzu on their way to the line of communication hospital at Hai-cheng. From there they proceeded in the same manner to Ta-shih-chiao,* where there was another line of communication hospital. Here the more serious cases went to hospital ships at Ying-kou, or to a line of communication hospital there, while the lighter cases continued by stages down the line to Liu-shu-tun (Ta-lien-wan), where they embarked for Japan.

Chinese coolies were alone employed in this work, and I estimate that, for the train work alone as far as Ta-shih-chiao, from the 6th to the 14th September, nearly 4,000 coolies were employed daily. After the 14th September the railway line was being narrowed between Ta-shih-chiao and Hai-cheng, and locomotives were eventually employed from there from the 20th. The section to Liao-yang was closed for narrowing from the 24th, and locomotives were employed from the 2nd October. Locomotives commenced running from Ta-shih-chiao to Liu-shu-tun (Ta-lien-wan) from the 12th September. The total number sent down from Liao-yang by coolie push-trains between the 6th and the 24th September was 9,000, approximately. The evacuation is still going on, but all the field hospitals had been closed by the 14th September, except one in each division. At present these are now closed, but one in each division is acting as a "cantonment hospital" which can be evacuated at once to the line of communication at Liao-yang, whenever the divisions move again.

Conclusion.

The present position of the medical units, while the Army is waiting fresh developments, is as follows :—

The bearer companies are ready packed with their divisional main bodies. The field hospitals are also, with the exception of those mentioned above, ready packed and cantonned in various villages. The reserve personnel are assisting at the line of communication hospitals at Liao-yang, Hai-cheng, and

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* *See* Map 1.

Ta-shih-chiao. The reserve depôts are at Liao-yang and the transport committees at Liao-yang, Sha-ho, and An-shan-tien.

The line of communication hospitals at An-shan-tien and Sha-ho have been closed since the locomotives commenced running, and the hospitals on the line are now at Liu-shu-tun (Ta-lien-wan), Wa-fang-tien (Te-li-ssu), Ta-shih-chiao, Ying-kou, Hai-cheng, and Liao-yang.

Up till now, it may be interesting to mention, voluntary aid has taken no part in any of these formations, except in supplying three hospital "relief sections,"* one of which is now at Ta-lien-wan, one at Wa-fang-tien (Te-li-ssu), and the third at Hai-cheng, working in the hospitals there. These sections are all male sections, and up till now the female nurses have had their work confined to the hospitals in Japan and to the hospital ships.

The whole of the vast amount of work incident on the operations between Hai-cheng and Liao-yang has been, therefore, carried out by the Army Medical Service and its reserves unaided. The organisation has been so good that at no time was any severe strain detected, and I observed no lack of supplies. Roughly speaking, the mobile units were all ready to advance about the 14th September, or 10 days after the final action in the operations. They could have been ready much sooner if necessary, and were only kept open to avoid moving unnecessarily those wounded whom it was inadvisable to move.

One remarkable feature of the operations is the fact that scarcely any Russian wounded were taken. The Russians must have had a very complete system of removing their wounded back from Liao-yang, and made careful preparations for doing so.

Illustrative map† and a table showing the work of the dressing stations and field hospitals from the 30th August to 4th September are appended. The figures in the latter do not correspond with the table of casualties given in the body of this Report.‡ Some wounded are counted in more than one field hospital, some of the field hospitals received wounded from dressing stations of the adjoining Army, which overlapped the 3rd Division in the neighbourhood of Hsiao-yang-ssu and Hei-niu-chuang, and many wounded went direct from regimental dressing stations to field hospitals, and are therefore not shown in the work of the divisional dressing stations.

Finally it may be stated that the percentage of wounds from the different weapons was:—

	Per cent.
Rifle fire - - - -	91·35
Shell fire - - - -	7·99
Bayonets - - - -	·66
Total - -	100·00

* *See* Report on the Red Cross Society of Japan, printed in the Journal of the Royal Army Medical Corps, April, 1906.

† See instead Maps 2 and 3. ‡ Page 142.

Other missiles employed were explosive mines and rocks, but no injuries from these came to the hospitals, so far as can be ascertained.

The casualties among the medical units were as follows:—

Medical Officers:

Killed - - - - None.
Wounded - - - - 5
(4 in fighting line, 1 with dressing station.)

Medical Service—Non-Commissioned Officers and Men:

Killed - - - - - 2
Wounded - - - - 2

Stretcher Bearers of Bearer Battalions:

Killed - - - - - 2
Wounded - - - - 30

Regimental Stretcher Bearers:

Killed - - - - - 5
Wounded - - - - 23

NOTE.—In the accompanying map* it would be possible to show the area to the east of the Second Army—an area similarly studded with the positions of dressing stations and field hospitals, but up till now, the information I have received as regards their detailed movements is incomplete.

Table showing the Work of the Dressing Stations and Field Hospitals of the Second Japanese Army during the Operations in the vicinity of Liao-yang.

Number of Wounded received into the various Medical Units.

Unit.	August.		September.				Total.
	30th.	31st.	1st.	2nd.	3rd.	4th.	
3rd Division:—							
Dressing Station -	214	561	385 518	—	206	353	2,237
Field Hospital No. 1	—	32	307	109	104	374	926
,, ,, No. 2	—	—	333	22	—	—	355
,, ,, No. 3	—	359	306	8	11	1	685
,, ,, No. 4	—	—	211	482	208	—	901
,, ,, No. 4 (4th Div. attached.)	—	—	—	—	293	149	442

* Not reproduced.

Unit.	August.		September.				Total.
	30th.	31st.	1st.	2nd.	3rd.	4th.	
4th Division:—							
Dressing Station -	30	170	99	51	199	48	1,063
Field Hospital No. 1	—	—	—	—	304	241	545
,, ,, No. 2	—	257	1	—	2	77*	337*
,, ,, No. 3	—	—	146	205	241	26	618
6th Division:—							
Dressing Station -	163	475	280	68	122	109	1,217
Field Hospital No. 1	—	—	—	—	—	269	269
,, ,, No. 2	—	1,081	251	—	—	—	1,332
,, ,, No. 3	—	3	259	207	1	1	471
,, ,, No. 4	—	—	134	250	23	—	407
Reserve Brigade:—							
Dressing Station -	—	—	75 257	—	—	—	332

* Includes six received on the 5th September.

The hospitals received wounded occasionally from other Armies as well as lightly wounded direct from regimental dressing stations.

(5) The Medical Service of the Second Japanese Army during and after the Battle of the Sha Ho. (10th to 16th October 1904.)

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps.

Head Quarters, Manchuria, 22nd February, 1905.

Plates.

Appendices.

1. After the occupation of Liao-yang by the Second Army on the 4th September, the Army gradually took up a position on the north bank of the Tai-tzu Ho and remained cantoned in the villages west of the railway, between the river and a line drawn through the villages Nan-tai, Ta Chi-tai-tzu and Hou Kou-chen-pao to Chang-chia-wo-peng,† with their outposts at Ta Tung-shan-p'u, Liu-tiao-chia and Kuang-yin-ko. On the 5th October, the Russians commenced an advance against this line from south of Mukden, and on the 10th October the

* Not reproduced. *See* instead Map 4.
† *See* Map 4 (C. 4) and Reference Table on next page.

To face page 157.]

REFERENCE TABLE TO PLATE 4.

Chang-chia-wo-peng	B 4
Chang-liang-pu	D 2
Chang-yu-tien	E 2
Chiang-hu-tun	E 2
Chien Ta-lien-tun	D 2
Chien Tung-hua-tien	E 2
Chih-hsiang-tun	D 2
Ching-tui-tzu	C 3
Chiu-chia-liu-tang-kou	D 2
Erh-shih-chia-tzu	D 3
Erh-tai-tzu	D 3
Hei-lin-tun	C 2
Ho-chia tun	C 3
Hou-ko-chen-pao	C 4
Hou-tai	E 2
Hsiao Chien-kou	D 3
Hsiao Shuang-tai-tzu	D 1 to 2
Hsiao-tai	C 2
Hsiao Tung-shan-pu	C 3
Hsiao-tung-tai	D 3
Hsiao Yu-chung-pu	C 3
Hsin-li-tun	D 4
Hsing-chia-tai	C 2
Hsiu-hsiang-tun	D 2
Huang-hua-tien	E 2
Huang-pao-shan	E 2
Hung-ling-pu	D 2
Kang-chia-tai	C 4
Kang-chia-tien-tzu	C 3
Kuan-lin-pu	D 1
Ku-chia-tzu	E 2; C 3; E 4
Kuang-yin-ko	B 3
La-mu-tun	E 2
Lang-tzu chieh	D 3
Li-san-chia-tzu	D 2
Li-ta-jen-tun	C 2
Lin-sheng-pu	D 2
Liu-tang-kou	D 2
Liu-tiao-chia	C 3
Men-hu-lu-tun	D 3/4
Nan-kuan-tzu	D 3
Nan-tai	C 4
Pa-chia-tzu	E 2
Pan-chiao-pu	E 2
Pao-tzu-yen	D 2
Pei Wu-li-chieh	D 3
Pei Yen-tai	D 2
San-chia-lin-tzu	C 3
San-chia-tzu	D 2; C 3; C 4; E 2
San-tao-kang-tzu	E 2
Sha-ho-pu	E 2
Sha-ho-pu Station	D 2
Shen-tan-pu	B 2/3
Shih-li-ho	D/E 3
Shuang-tai-tzu	D 3
Shu-lin-tzu	D 2
Ssu-fang-tai	D 1
Ta Chi-tai-tzu	C 4
Ta Chu-kuei-pu	D 2
Ta Huang-tun	C 4
Ta-tai	C 2
Ta Tung-shan-pu	C 3
Ta Yu-chung-pu	C 3
Tai-ping-chuang	C 2
Wan-chia-yuan-tzu	C/D 2
Wu-chia-wa-tzu	E 2
Wu-li-tai-tzu	D 3
Yang-chia-wan	C/D 3
Yao-tun	E 2
Yen-tai	D 4
Yin-te-niu-lu	D 3

Japanese Armies were ordered to check this advance and drive the enemy beyond the line of the Sha Ho.

2. During the interval between the 4th September and the time when this movement took place, a large *Etappen* Hospital had been established in some thirty of the Russian houses of the Railway Station Settlement, Liao-yang, and the sick and wounded of all three armies converged there before being sent down to the sea-bases for embarkation. A short account of these evacuation arrangements has been submitted already;* and at the time when the Sha Ho movement took place, the armies were practically free from the encumbrance of the large number of casualties sustained by them at the end of August and the beginning of September. Some sickness had, however, commenced, and an outbreak of enteric fever was causing anxiety, but fortunately it did not get hold of the army to any great extent.

The Bearer Battalions were at this time cantoned with their divisions, and the Field Hospitals were in the area, south of the Tai-tzu Ho, over which the troops had fought before occupying Liao-yang. One Field Hospital only of each division remained open, acting as a cantonment hospital for the treatment of such sick and wounded from the division as would be fit to return to the ranks in a few days. The medical and surgical reserve depôts had also moved to Liao-yang and its vicinity.

Apart from the fact that as many of the sick and wounded as possible were removed to Japan, where alone were there any hospitals the equivalent of our General Hospitals, the Medical Administration of the Field Armies was still further relieved before the 10th October by the conversion of all the Manchurian province south of Liao-yang into a Garrison Administration; and the responsibility of the medical work of the long line of communication was thus transferred from the Principal Medical Officers of the Field Armies to the Principal Medical Officer of the Garrison of occupation. A short line of communication only remained under the former, namely, along the line of railway from Yen-tai and along the roads in the district north of the Tai-tzu Ho to Liao-yang.

4. This, briefly, was the situation from the medical point of view on the day on which the battle of the Sha Ho commenced.

5. In the events which followed I was permitted to move very much more freely amongst the medical units than during the series of engagements leading to the occupation of Liao-yang. On the 10th October I joined the headquarters of the 6th Division at Hsiao Tung-shan-p'u,† and stayed with this division,

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* Report on the medical arangements during the operations from Hai-cheng to Liao-yang, page 140.

† C 3 of Map 4.

not only throughout the battle but also in cantonments with it at Pa-chia-tzu, until the 14th December.

During the days of the fighting and so long as the Dressing Stations were open I was in one or other of them daily as well as during the night, and I also visited as many of the Field Hospitals as possible when they were at work. I was also permitted to visit the front lines and outposts on the Sha Ho, and had an opportunity of seeing a Battalion Dressing Station at work there.

Narrative of Events and Movements of Medical Units.

6. As in the advance from Hai-cheng to Liao-yang, the Second Army consisted of the 3rd Division, 6th Division, and 4th Division, forming respectively the right, centre, and left wings. The Fourth Army was on its right, and the First Army still further east in the hills in the vicinity of the coal mines of Yen-tai. Cavalry occupied the area from the left of the Second Army to the Hun Ho.

October 10. 7. Early in the morning of the 10th October, the 3rd and 4th Divisions had moved towards the line stretching through Hsin-li-tun,* Shuang-tai-tzu, Erh-tai-tzu, Ta Tung-shan-p'u, Kang-chia-tien-tzu, and Ho-chia-tun. The orders were to advance to the line Pan-chia-p'u on the east to Tai-ping-chuang on the west. The 3rd Division was to keep to the area between the railway and a line half way between it and the Sha Ho, the 6th Division was to move up over the area between this line and the Sha Ho, and the 4th Division was to take the right bank of the Sha Ho and the country to the west.

8. In this advance, the 3rd and 6th Divisions were vigorously opposed, the former by heavy artillery fire from the hills east of Wu-li-tai-tzu and the vicinity of Shih-li-ho. It was unable to advance beyond Hsin-li-tun and Shuang-tai-tzu. The latter division engaged the enemy at Ching-tui-tzu and Hsiao Tung-shan-p'u, and occupied Ta Tung-shan-p'u and Erh-tai-tzu by nightfall. An attempt was made before dark in conjunction with the 3rd Division to force the enemy out of Yang-chia-wan, Yin-te-niu-lu and San-chia-lin-tzu, but failed. The 4th Division occupied Kang-chia-tien-tzu and Ho-chia-tun by night without much opposition; and the cavalry main body went on to Shen-tan-p'u,† also without serious opposition.

At the end of the day the Russian main body in front of the Second Army occupied the line from Shih-li-ho to Yang-chia-wan, holding the villages and banks of the river between these two.

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* Map 4, D 4. † Map 4, B 2/3.

9. Very few of the Field Medical units were opened. In the 3rd Division the dressing station of one company of the Divisional Bearer Battalion was opened at Shuang-tai-tzu, but not till sunset, and only 20 wounded were received by it. None of the Divisional Field Hospitals were opened. In the 6th Division also one company of the Bearer Battalion only opened, viz., at Hsiao Tung-shan-p'u, where it received 18 wounded. One half of No. 4 Field Hospital of this division was opened at Kang-chia-tai, the village immediately to the south of the Dressing Station, and received 21 wounded. None of the 4th Division units were opened.

10. On the 11th October the orders for the Second Army were to drive the Russians from their positions along the river between Shih-li-ho and Yang-chia-wan to beyond the Sha Ho and occupy the line of the latter river from Sha-ho-p'u, through La-mu-tun, to Ling-shen-p'u and the villages west of it. The 3rd Division was to take the area between Shih-li-ho and Yin-te-niu-lu, the 6th Division the area between the latter and Yang-chia-wan, and the 4th Division the line Ta Yu-chung-p'u westwards, threatening the enemy's flank. **October 11.**

11. The operations resulted in severe fighting throughout the whole day, the Japanese failing to break the Russian line but holding stubbornly to every inch of ground that they could gain. The right wing of the 3rd Division attacked and took Wu-li-tai-tzu from Men-hu-lu-tun ; but could not advance beyond Hsiao Chien-kou, about one mile further north on the Mukden highway. Its left wing experienced the severest opposition in advancing from Shuang-tai-tzu on Nan-kuan-tzu and Yin-te-niu-lu. They did not occupy the former till 5.30 p.m. ; and, although they succeeded in getting a foot-hold in the latter, they were driven out again after severe hand-to-hand fighting and spent the night in close proximity to the enemy. The advance of the 6th Division from Erh-tai-tzu co-operated with the attack on Nan-kuan-tzu, but was held in check by counter attacks and by cross fire from Yang-chia-wan and Yin-te-niu-lu. Its left wing succeeded in taking San-chia-lin-tzu in the early morning, but their objective, Yang-chia-wan, the next village, was not occupied till late in the afternoon. They were then ordered to capture Lang-tzu-chieh on the other side of the river, but the strength of the enemy prevented them moving beyond Yang-chia-wan before dark. The 4th Division advanced to Ta Yu-chung-p'u and Li-ta-jen-tun, but could not carry out its flank movement in the direction of Lin-sheng-p'u on account of the enemy's strength, the flat nature of the ground, and the danger of exposing its flank.

12. During this day, No. 1 company of the 3rd Division kept its Dressing Station open at Shuang-tai-tzu, as on the previous day, and No. 2 Company opened at Wu-li-tai-tzu, the former receiving 17 and the latter 58 wounded. No. 2 Company of

the 6th Division moved to Ta Tung-shan-p'u and received 105 wounded there, but No. 1 Company remained still in reserve. No. 1 Company of the 4th Division opened its Dressing Station at Ching-tui-tzu and received 167 wounded, No. 2 Company remaining in reserve.

13. Only one fresh Field Hospital was opened, namely, No. 2 half of the 3rd Field Hospital of the 3rd Division, which opened at Ku-chia-tzu, a village half way between Yen-tai and Wu-li-tai-tzu. The Half Field Hospital of the 6th Division continued at Kang-chia-tai: 184 and 105 wounded were sent back to these Field Hospitals during the day.

October 12. 14. The orders for the 12th October were to continue to drive the enemy back over the Sha Ho in a N.E. direction towards the village of Sha-ho-p'u, on the Mukden highway. The movement was to be commenced by night attacks. So far as the Second Army was concerned, the night attacks failed, but on learning of their success along the lines of the Fourth and First Armies, its commander ordered the fighting to be continued at all hazards.

In the subsequent advance, the 6th Division, which was acting as the pivot for the other two divisions, took the lead, and by a series of irresistible rushes took one village after another with its left wing. Erh-shih-chia-tzu was occupied shortly before noon, then Hsiao-tung-tai. The river was then crossed, the enemy partially surrounded at Lang-tzu-chieh, two batteries captured there, and the Russians forced to retreat across the triangular area between the railway and the junction of the Shih-li and Liu-tang-kou rivers. While pursuing the enemy across this area, the troops were subjected to three strong counter-attacks first at Lang-tzu-chieh, then between it and Chiu-chia-liu-tang-kou, and lastly by a force coming from Ta Chu-kuei-p'u. This counter-attack was made just as the pursuing troops were about to cross the river at Chiu-chia-liu-tang-kou, and succeeded in checking the pursuit.

In the meantime the right wing of the 6th Division was engaged in co-operating with the left wing of the 3rd Division in attacking Yin-te-niu-lu, where the Russians were in greatest force. The resistance was at first very strong, but it gave way about 1 p.m., and the left wing of the 3rd Division pursued and occupied the village of Pei Wu-li-chieh by sunset. The right wing of this division attacked and occupied Shih-li-ho village about the same time that Yin-te-niu-lu was captured and pursued to Pan-chia-p'u, where they halted for the night.

15. The 4th Division west of the Sha Ho attempted to take up a position against the Russian right flank along a line from Pei-yen-tai through Hung-ling-p'u to Chien Ta-lien-tun and Kuan-lin-p'u. A strong force opposed its advance at Pei Yen-

tai, Ta-tai and Hsiao-tai. The last named was taken in the morning, but the attacks on the others were constantly frustrated, and in the afternoon the Russians took the offensive. The Japanese succeeded in getting to Pei Yen-tai at 4.30 p.m., but the enemy still occupied Ta-tai and were attacking Hsiao-tai, when its opposition suddenly gave way under artillery fire and Ta-tai was rushed and occupied by sunset.

16. During the whole of this day the fighting was of the most stubborn character, and the casualties on both sides were great. The Russians left 1,800 dead on the field in front of the Second Army and 20 of their guns were captured. The 3rd Division Bearer Battalion continued to work with its companies acting separately, No. 1 moving its dressing station up to Yin-te-niu-lu and No. 2 to Hsiao Chien-kou. The former received 498 and the latter 103 wounded. No. 2 Company of the 6th Division, after treating some 72 wounded during the night, closed and accompanied the pursuing force without again opening. No. 1 Company of this Division's Bearer Battalion opened at Yang-chia-wan and received 342 wounded. No. 2 Company of the 4th Division Bearer Battalion opened at Hsiao Yu-chung-p'u, and No. 1 Company continued to work at Ching-tui-tzu. Together they received 214 wounded.

17. Not many fresh field hospitals, however, were opened. Thus in the 3rd Division, while No. 2 Half of the 3rd Field Hospital remained at Ku-chia-tzu, No. 1 Half opened at Shuang-tai-tzu, where the dressing station had been, 330 and 364 being received in each respectively; but no other field hospital of the division was opened, although No. 1 Half of No. 2 went to Yin-te-niu-lu to relieve the dressing station there late in the day.

In the 6th Division the whole of No. 1 Field Hospital opened at Erh-tai-tzu and received 180 wounded. No other hospital of the division was opened, but the Half Hospital remained at Kang-chia-tai, receiving 65 patients.

In the 4th Division No. 1 and No. 4 Field Hospitals were opened, the former at Ta Tung-shan-p'u on the right bank of the Sha Ho, receiving 97, and the latter at Ta Huang-tun, receiving 179 wounded. It will be noticed that the latter hospital was opened unusually far back, although it received the majority of the wounded. This circumstance may be explained by the doubtful nature of the fighting along the line from Hsiao-tai to Pei Yen-tai, which rendered evacuation from the Dressing Station to Ta Huang-tun best in the interests of the wounded.

October 13.

18. After the 12th October it took four more days continuous fighting on the part of the Second Army to accomplish its task of occupying the line of the Sha Ho, from Sha-ho-p'u westwards through La-mu-tun and Lin-sheng-p'u. On the 13th October,

the 3rd Division was ordered to pursue the enemy along the Mukden highway from Pan-chiao-p'u, the 6th Division was to co-operate and advance from Liu-tang-kou on La-mu-tun, while the 4th Division was to occupy Lin-sheng-p'u if possible. The enemy, however, frustrated this by appearing in great strength on the flanks of the 4th Division and also against the Fourth Army in the neighbourhood of Huang-hua-tien. The right wing of the 6th Division had to be transferred temporarily to Huang-hua-tien to assist the Fourth Army; and this weakened the strength available for attacking La-mu-tun and co-operating with the 3rd Division. This division (the 3rd) occupied the prominent hill Huang-pao Shan east of Pan-chiao-p'u, without resistance early in the morning, but was unable to advance along the Mukden road further than Chang-yu-tien on account of heavy artillery fire.

The left wing of the 6th Division pursued the enemy as far as Ta Chu-kuei-p'u, and a detachment crossed the Sha Ho at Hung-ling-p'u, and, surprising two battalions of the enemy asleep there, occupied the village without much opposition. They were, however, checked in advancing from there at the next village to the north, Hsiu-hsiang-tun.

The right wing of the 6th Division took no part in the fighting of the 13th October, as it was being moved to the vicinity of Huang-hua-tien, under cover of the Liu-tang-kou river ravine.

The right wing of the 4th Division occupied Hung-ling-p'u about the same time as the detachment of the 6th Division, and then advanced under heavy artillery fire to Chih-hsiang-tun and Chang-liang-p'u, but was repulsed in one attack after another, which it made from these villages on Lin-sheng-p'u.

The left wing of the 4th Division was threatened in the early morning by a Russian advance from Wan-chia-yuan-tzu on Hsiao-tai and Ta-tai. The enemy were repulsed, and the wing succeeded in occupying eventually the villages Pao-tzu-yen and Wan-chia-yuan-tze.

On this day the main body of the cavalry moved from Shen-tan-p'u to Li-ta-jen-tun and Hei-lin-tun, meeting with little opposition.

19. The movements and work of the Field Medical Units during this day were as follows:—The Bearer Battalion of the 3rd Division opened no dressing stations. No. 1 Company of the 6th Division Bearer Battalion moved from Yang-chia-wan to Lang-tzu-chieh, and there attended to 79 wounded left in the village from regimental units or collected during the preceding night. It then closed and moved on with the right wing along the Liu-tang-kou River ravine.

No. 2 Company opened at Ta Chu-kuei-p'u and received 37 wounded there. The 4th Division dressing stations were closed, ready to proceed to the vicinity of Chang-liang-p'u, to open there next day.

20. Of the Field Hospitals already open, No. 1 Half of the 3rd Field Hospital of the 3rd Division remained at Shuang-tai-tzu, but received no fresh cases. The 2nd Half of the same Hospital also remained where it was at Ku-chia-tzu and received only 12 cases. The 1st Half of No. 2 Hospital of the division took over from the dressing station at Yin-te-niu-lu and admitted 242 wounded, while No. 2 Half of this Hospital was moved up to Wu-li-tai-tzu, but did not receive wounded till the following day. In the 6th Division, No. 1 Field Hospital remained open at Erh-tai-tzu and admitted 160 cases. No. 2 Half of No. 4 received two fresh cases at Kang-chia-tai, and then prepared to close and join No. 1 Half, which had opened at Yang-chia-wan, taking over from the dressing station. 193 wounded were admitted into the latter Half Hospital there during the day. No fresh Field Hospitals were opened in the 4th Division, nor did Nos. 1 and 4, already open, move their positions. They received respectively 129 and 9 cases.

21. On the 14th October the orders for the Second Army were simply to go on fighting in order to gain the banks of the Sha Ho and the villages of La-mu-tun and Lin-sheng-p'u. The fighting in the direction of these two villages was extremely severe. The Russian artillery fire and counter-attacks from La-mu-tun prevented the Japanese lines from advancing, in that direction, beyond Shu-lin-tzu and the Sha Ho railway station. The Japanese attack was made from Ta Chu-kuei-p'u by a portion of the left wing of the 6th Division. The remainder of the wing was engaged in co-operation with the right wing of the 4th Division in attacking Lin-sheng-p'u from Chang-liang-p'u and San-chia-tzu. **October 14.**

The 6th Division troops managed to obtain a footing in the south-east corner of Lin-sheng-p'u at 3.20 p.m., and for the rest of the day carried on street fighting. After dark they were subjected to one counter-attack after another, but retained their foothold in the village during the night.

The 4th Division was attacked all along its line from San-chia-tzu and Chang-liang-p'u to Pao-tzu-yen and Wan-chia-yuan-tzu; and it was not until sunset that it was able to hold that line of villages with any sense of security. For the 4th Division this was the most desperate day's fighting during the battle, and the small area around Lin-sheng-p'u and towards the right bank of the Sha Ho to the south-west was the scene of some of the hottest fire during the whole series of engagements. The cavalry also on this flank was subjected to a Russian attack by an unknown force from the north-west and was driven in from Li-ta-jen-tun to Tai-ping-chuang.

22. On the Mukden highway and eastwards, the 3rd Division rushed the villages of Wu-chia-wa-tzu and Hou-tai in the early morning and then occupied the hill to the north, capturing 23 guns. They then pursued the enemy into Sha-ho-p'u and

Ku-chia-tzu, the former village being taken by 7 a.m. They were, however, in danger of being surrounded and cut off there by counter-attacks from La-mu-tun and the area west of Wu-chia-wa-tzu; and, beyond holding their ground, they were unable to assist the 6th Division, as intended, in the attack on La-mu-tun.

23. The right wing of the 6th Division, which had joined the Fourth Army on the previous day, succeeded in clearing Huang-hua-tien and the hills to the north-east by 11 a.m. They were then ordered to hand over the positions to the Fourth Army and assemble at Chien Tung-hua-tien. Counter-attacks were made on them at Huang-hua-tien in the afternoon, but these were repulsed without much difficulty.

24. The work of the Medical Units on the 14th October was distributed as follows:—The Bearer Battalion of the 3rd Division was divided, No. 1 Company opening its Dressing Station at Hou-tai, and No. 2 at Chang-yu-tien, receiving respectively 509 and 246 wounded. The companies of the 6th Division were also working separately and were widely apart, No. 1 Company's dressing station being opened at Chien Tung-hua-tien in the direction of the Fourth Army, and No. 2 at Shu-lin-tzu near the Sha Ho railway station. The former received 82 and the latter 318 wounded during the day. The Bearer Battalion of the 4th Division worked as one unit with its Dressing Station at Chang-liang-p'u, and received 430 wounded.

25. Of the Field Hospitals in the 3rd Division, Nos. 2 and 3 remained open in their old positions, the two halves of the former at Yin-te-niu-lu and Wu-li-tai-tzu receiving 23 and 399 cases respectively, and the two halves of the latter at Shuang-tai-tzu and Ku-chia-tzu receiving one and nine. No 1 Hospital of this division opened at Chang-yu-tien, and prepared practically the whole village for the reception of wounded. Only 32, however, came in during the day. No. 4 Hospital of the division was still in reserve.

26. In the 6th Division, No. 1 and the 1st Half of No. 4 remained as before at Erh-tai-tzu and Yang-chia-wan, receiving 70 and two patients respectively. No. 2 was opened at Liu-tang-kou and prepared the whole village for hospital purposes; 36 wounded only were sent back to it, however, during the day. No. 3 remained in reserve.

27. Notwithstanding the severe fighting in the 4th Division its Field Hospitals received very few of the wounded. No. 1 received six only, and was then closed with a view to retiring to Hsiao Tung-shan-p'u. No. 4 was also being cleared, and received no fresh cases. No. 2 was *en route* to Lang-tzu-chieh, to open there next day; and No. 3 was in reserve. Apparently the

right bank of the Sha Ho was not considered desirable for the establishment of Field Hospitals while the flank of the division was being threatened.

28. On the 15th October the First and Fourth Armies had already accomplished their task, but the Second Army had not yet succeeded in occupying its line. Its commander accordingly ordered an attack along the whole line on that day. The right wing of the 6th Division resumed its place between its left wing and the 3rd Division, in order to assist in the attack on La-mu-tun from the area west of the Mukden highway. The 3rd Division was to co-operate; and the 4th Division was to hold its line and make the occupation of Lin-sheng-p'u secure. **October 15.**

29. The left wing of the 3rd Division, assisted opportunely by a portion of the Fourth Army, managed after severe fighting to clear its flank as far as Yao-tun and the hills to the east, but failed to occupy San-tao-kang-tzu, which was its objective.

The attack on La-mu-tun was ineffective on the west, until the 6th Division had been reinforced by its right wing from Huang-hua-tien and until the village had been bombarded by 16 batteries of artillery, formed into a special command for the purpose, and ranged in positions from Chang-yu-tien to San-chia-tzu, the village on its west. This took place in the afternoon, and, about 4.30, La-mu-tun was rushed from the railway station, the enemy hurriedly clearing out and leaving 500 dead behind.

30. In the Lin-sheng-p'u vicinity, the portion of the left wing of the 6th Division that was holding the village, was kept busy all day by determined and almost overpowering counter-attacks. One of these attacks occurred early in the morning and led to severe bayonet fighting. The Russians on that occasion left some 500 killed and wounded where they fell, and neither side could collect them under the severe rifle fire that was continued.

These attacks also prevented the detachment of the 6th Division in Lin-sheng-p'u from assisting in the attack on La-mu-tun. The 4th Division were also subjected to counter-attacks on the line from Lin-sheng-p'u to Wan-chia-yuan-tzu but the enemy did not push the attacks home. The cavalry failed to re-occupy Li-ta-jen-tun during the day, but the enemy retired during the night and the place was entered the next morning.

31. On this day, the Bearer Battalion of the 3rd Division retained one of its dressing stations at Hou-tai and brought the other up to Wu-chia-wa-tzu from Chang-yu-tien, where it had been relieved on the previous day by No. 1 Field Hospital. The number of wounded received at the Hou-tai dressing station during the day was 136 and the number received at Wu-chia-wa-tzu 145. The 2nd Company dressing station of the 6th Division remained at Shu-lin-tzu and attended to 324

wounded. The 1st Company opened its dressing station at San-chia-tzu, the village between Chang-yu-tien and the railway, and received 29 wounded. The 4th Division Bearer Battalion retained its dressing station at Chang-liang-p'u and received 51 wounded.

32. Of the Field Hospitals, No. 1 of the 3rd Division received 655 wounded at Chang-yu-tien, and the second half of No. 2, 73 at Wu-li-tai-tzu. The other hospitals of the division were being cleared or in reserve.

33. No. 1 of the 6th Division was closed and on its way to Ta Chu-kuei-p'u. No. 2 received 448 wounded at Liu-tang-kou. No. 4 Field Hospital of the Division remained at Yang-chia-wan and received only five fresh cases. No. 3 was opened for the first time at Hsin-chuang, a village to the south of the Hung-pao-shan, and received 112 wounded, who had been evacuated from the dressing station of the division at Chien Tung-hua-tien during the previous day and night.

34. The only Field Hospital of the 4th Division that received wounded during the 15th October was No. 2 at Lang-tzu-Chieh, where 425 were received. The other hospitals of the division were being cleared or in reserve.

October 16. 35. Although the line on the Sha Ho, which was the objective of the Second Army was now practically gained, some severe fighting was continued on the 16th October and following days, especially in front of the 3rd and 4th Divisions. The former division had been ordered to attack and occupy North Sha-ho-p'u, and the attack was assisted by a flank movement against San-tao-kang-tzu from Ku-chia-tzu and Hou-tai, in which a detachment of the Fourth Army took part. The movement succeeded in so far that the Japanese took San-tao-kang-tzu and gained the right bank of the river; but large reinforcements of the enemy checked any further advance. There were also large bodies of the enemy and strong defensive works in front of North Sha-ho-p'u, and the attack on that village had to be abandoned, the troops making the flanking movement being ordered to retire after dark on Ku-chia-tzu and Hou-tai. In their retreat one battalion was surrounded and had to cut its way though at the point of the bayonet, losing 280 officers and men; 14 guns were also lost in this retreat.

36. In front of the 4th Division there were six strong counter-attacks on Lin-sheng-p'u and an organized attack on the positions at Wan-chia-yuan-tzu and Ta-tai. About 60 of the enemy's guns kept pouring shells against this flank of the Army from the villages Ssu-fang-tai, Hsiao Shuang-tai-tzu, Kuan lin-p'u, San-chia-lin-tzu and Hsing-chia-tai. These attacks were repulsed by sunset on the 16th October with heavy losses.

37. This day, the 16th October, is regarded as the date on which the battle of the Sha Ho came to an end, as the Japanese made no further attempt to advance its line after that date, but proceeded to construct defensive works and hold them for an indefinite period. During the progress of these works the line was exposed to constant counter-attacks especially during the night, and to artillery fire during the day. The opposing lines and works were in many instances not more than one hundred yards from one another.

38. Consequently, from the 16th October and for some days subsequently, the Bearer Battalions and the Field Hospitals were still actively working. Thus the Dressing Station of the 1st Company of the 3rd Division came up to Ku-chia-tzu from Hou-tai on the 16th, remained there over the 17th, returned to Hou-tai on the 18th October and then closed. During these three days it received 80, 140, and 109 wounded respectively. No. 2 Company's Dressing Station of the same division remained at Wu-chia-wa-tzu, and also closed after the 18th October. It received 20 wounded on the 16th, none on the 17th, and 27 on the 18th.

39. The 6th Division Dressing Stations also worked in separate companies, No. 2 as before at Shu-lin-tzu, and No. 1 at San-chia-tzu, where it arrived from Chien Tung-hua-tien on the night of the 15th October. The latter received 48 wounded on the 16th, 17 on the 17th, and 4 on the 18th October, and the former 204, 20 and 9 on each of these days respectively.

40. The Dressing Station of the 4th Division remained at Chang-liang-p'u and received 54, 53, and 5 wounded on these days.

41. Since the 18th October the number of wounded in each division of the Second Army has amounted to two or three daily, and this casualty list may be said to have continued till the end of the year. Indeed, it has only recently been broken by the Russian raid on Ying-kou on the 11th January, and the more serious engagement on the Hun Ho on the 25th to 28th of the month. During the whole period night attacks mainly against Lin-sheng-p'u and La-mu-tun have been made. During the day, 4-inch and 6-inch mortar and howitzer shells have been constantly thrown into the villages occupied by the Japanese in the front line, and the field guns search the area, leading to them, with shrapnel.

42. The Bearer Battalions have remained, however, in cantonments since the end of October, that of the 3rd Divisiou in Chiang-hu-tun, that of the 6th Division in Ta Chu-kuei-p'u and that of the 4th Division in Erh-shih-chia-tzu.

43. The Field Hospitals that were working on the 16th October and following days, and the general disposition subsequently of Divisional Field Hospitals, are as follows :—

44. In the 3rd Division, No. 1 remained at Chang-yu-tien till the 19th October, when it retired to South Pan-chiao-p'u in consequence of its being constantly subjected to artillery fire at the former village. On the 16th it received 126, on the 17th 193, on the 18th 94, and on the 19th and 20th, at Pan-chiao-p'u, 165 and 60 wounded and sick. This Hospital has remained open at Pan-chiao-p'u, as a Cantonment Hospital, until now. No. 1 Half of No. 2 received 2 patients on the 16th and 2 on the 17th October. It then closed and joined its other half at Wu-li-tai-tzu, which had received 10, 84, and 20 patients respectively on the 16th, 17th and 18th. The complete hospital remained open for a short time at this village, admitting 319 on the 19th and 82 on the 20th October.

No. 4 Field Hospital opened at Hou-tai on the 16th, and remained at Hou-tai till the 19th October, receiving 359, 62, and 82 wounded on the 16th, 17th, and 18th. But No. 1 Half of this Hospital was detached and sent to Li-san-chia-tzu, a village west of the railway, on the 17th; and on that date and the 18th received 296 and 370 wounded and sick. It was joined on the 19th by No. 1 Half, and, on the 20th, 70 more patients were admitted. This Hospital was subsequently closed and its place taken by No. 2 Half of No. 3 of the 6th Division on the 22nd October. No. 3 of the 3rd Division was closed during the whole period.

45. In the 6th Division, No. 1 Field Hospital opened at Ta Chu-kuei-p'u on the 16th and received at Ta Chu-kuei-p'u, on the 16th 441, on the 17th 54, on the 18th 13, on the 19th 25, and on the 20th 8 wounded. It closed on the 25th October and retired to Erh-tai-tze, where it has since remained in cantonments, its quarters at Ta Chu-kuei-p'u being occupied as the cantonments of the Bearer Battalion of the division. No. 2 Field Hospital, after receiving nine patients on the 16th, closed at Liu-tang-kou and handed over the village to the reserve personnel, who established there a Stationary Field Hospital, which has occupied the village ever since. No. 3 remained at Hsin-chuang till the 21st October, receiving about 60 patients since the 16th. No. 1 Half then closed, but No. 2 Half, as already mentioned, went to Li-san-chia-tzu, where it has remained ever since as a Cantonment Hospital for the division. No. 1 Half went into cantonments at Erh-tai-tzu. No. 4 Field Hospital of the division remained closed throughout the period.

46. In the 4th Division, No. 1 was closed and had gone into cantonments at Ching-tui-tzu; No. 2 remained at Lang-tzu-chieh and received 55 patients on the 16th October. It then ceased

to receive and went into cantonments at Hsiao Tung-shan-p'u. No. 3 opened at Erh-shih-chia-tz on the 16th and received 39, 82, 15, 21, and 5 patients on that and the subsequent days. It has remained open as a cantonment hospital for the division ever since. No. 4 was closed and had gone into cantonments at Yang-chia-wan during the period.

47. A Table is appended* showing all these details of the Dressing Stations and Field Hospitals from the 10th to the 20th October. In comparing this Table with other statistics, it should be noted that the admissions to Field Hospitals included sick as well as wounded, and that the former would not, as a rule, be shown in the Dressing Station returns. The latter returns do not necessarily correspond with the total casualty returns, because an indefinite number of the wounded is apt to go direct to the Field Hospitals from the regiments. This is more particularly liable to occur in the case of the slightly wounded, who make their own way back to the rear.

Weather Conditions.

48. The weather was on the whole pleasant and favourable during the operations. The 10th October was sunny, but a north wind made it chilly and cold, the morning shade temperature being 54° F. and the afternoon temperature 56°. On the 11th the morning temperature was 40°, and the afternoon temperature 64°. The day was pleasant and sunny, becoming warm and somewhat cloudy in the afternoon with a threatening of rain. The 12th was a clear, warm and sunny day, with a morning temperature of 46° and afternoon temperature of 56° F.

During the night of the 12th to 13th there was a heavy thunderstorm, and it rained afterwards till daylight. Afterwards the sky cleared, and the 13th was one of the mildest and sunniest of days, the shade temperature being 56° in the morning and 70° in the afternoon, with a mild south-west wind. The 14th was also warm, but there were heavy thunderstorms during the day and evening. The morning temperature was 54°, the afternoon temperature was not recorded. On the 15th the wind changed to the north, and the day was cloudy and chilly, with a morning temperature of 46° and an afternoon temperature of 49°. The morning of the 16th was still and misty, with the temperature at 34°. It became warm and sunny in the afternoon and the temperature rose to 56°.

49. Meteorological Tables have already been submitted showing the weather conditions both during these and subsequent to these dates.†

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* Appendix I., page 191. † *See* page 518.

Physical Features of the Area of Operations.

50. West of the Mukden highway the country over which the battle was fought is a wide alluvial plain, with occasional broad, shallow undulations. It is intersected by the deep nullahs of the streams mentioned in the narrative of events. Immediately to the east of the highway there is a line of isolated quartz hills running parallel with the highway. The highest peak on this line is that east of Wu-li-tai-tzu, which is about 200 feet above the plain. The other prominent peaks are the Huang-pao Shan, also about 200 feet, and the low peak north of it, east of Wu-chia-wa-tzu and overlooking Sha-ho-p'u village. East of this line of hills there are valleys and deeper undulations leading to mountainous country.

51 With the exception of the operations of the right wing of the 6th Division on the 14th October in the Huang-hua-tien valley, and those of the co-operating wing of the 3rd Division in the hills to the north-east of Wu-chia-wa-tzu, all the fighting of the Second Army was done, as will be seen on the map, over the plain west of the Mukden highway. The whole of this area is studded with villages, shaded by high willow and poplar trees, now cut down for firewood. A similar fate has befallen the groves of pines and willows in the open fields, which marked the sites of the Chinese cemeteries, but, during the battle, the whole country, in consequence of these, had a picturesque, wooded appearance. The fields between the villages are fields of high millet (*kaoliang*) low millet and peas, but a considerable portion of the crops had been cut before the operations commenced. The roots and high stalks of the cut millet, of which about nine inches were left, were obstacles to both horse and man in crossing the fields. The fields were also furrowed, and this made progression slow and awkward. These features had some effect in increasing the number of injuries from other causes than weapons, the hard stalks of the millet being apt to injure the feet by staking or by causing tripping and sprains on the uneven surface.

Apart from the nature of the crops, the general features of this plain at the time of the battle resembled in a marked degree the features of the area in the *Eure et Loir*, over which the French Military Manœuvres of 1900 took place.

52. The soil is a somewhat lighter soil than that seen further south, there being a considerable mixture of sand in it. It is nevertheless heavy and sticky in wet weather.

53 Surface water is found everywhere in wells about 30 or 40 feet from the surface. In nearly every village there are ponds of considerable size; and in the area between the Sha Ho and the Hun Ho, occupied by the 4th Division and cavalry, there are many swamps.

54. The rivers, shown on the map, formed an important feature. The Shih-li Ho, Liu-tang-kou River* and Sha Ho run in almost parallel lines, east to west, across the area, until the last-named turns southwards and receives the two former as tributaries. These run in deep ravines. All but the Sha Ho are narrow streams, with their beds quagmires and practically unpassable, except at fords. The Sha Ho, on the other hand, as its name implies, has a sandy bed, is much wider, and is fordable at most points. The Hun Ho, which formed the extreme flank of the Second Army during the battle, runs parallel with the Sha Ho, but did not come under personal observation.

55. There are numberless roads and pathways between the villages and across the fields. In dry weather they are moderately good for the transport of sick and wounded by wheeled carriage, but in wet weather they are slippery and difficult. The railway line, which runs parallel to the Mukden highway, at a distance of about one mile west, rests on an embankment throughout the area, but it is crossed at several places by level crossings with easy approaches. The Mukden highway itself, although the widest and most important route, is the worst track of all from the point of view of sick transport. It is a wide, broken, furrowed track, full of cart ruts, which cross and re-cross one another.

Casualties.

56. The following are the casualties from the 10th to the 16th October inclusive.

—	Killed.	Wounded	Missing.	Total.
Officers - -	44	178	4	226
Rank and file -	970	5,294	216	6,480
Total -	1,014	5,472	220	6,706

57. The above figures refer to the Second Army only. It is stated that in front of this Army 8,000 Russian dead were counted. This shows a remarkable difference between the casualties on either side, which can only be accounted for by the fierce counter-attacks and stubborn resistance of the Russians against an overwhelming artillery and rifle fire.

58. The proportion of killed to wounded in the Second Army is estimated at 1 to 5. In previous battles it is estimated at 1 to 4.

* This river is unnamed in maps and reports. I have given it this name for facility of description and because the Chinese know it by that name.—W. G. M.

59. Excluding the wounds of those killed outright, the percentage of wounds from different causes is as follows :—

Rifle fire	-	80·2	per cent.	of total	wounded.
Artillery fire	-	8·6	„	„	„
Bayonet, &c.	-	6·1	„	„	„
Other injuries	-	5·1	„	„	„
Total	-	100·0	„	„	„

60. The comparatively small number wounded by artillery fire is attributed to three causes :—

(1) The fact that many of the wounds were obtained during night attacks, when there was no artillery fire.

(2) The fact that men who are hit by artillery are more frequently killed outright than in the case of those who are hit by rifle fire.

(3) The bursting of the Russian shells too high.

61. The percentage of bayonet wounds, &c., including wounds from lance and sword, is higher then in previous engagements, on account of the fierce night attacks and hand-to-hand fighting in the villages.

62. Other injuries in the above list include injuries to the feet from *kaoliang* stalks, sprains, fractures, &c., from falls from horseback and from crossing the *kaoliang* fields and river ravines at night. The percentage of such injuries is exceptionally high. The amount of work done in the dark has been one of the features of these modern battles. The nights during this battle were very dark, the new moon appearing first on the 12th October.

63. It is impossible to give any idea of the number of wounded who succumbed to their wounds after entering hospital, but the Japanese say that the number has been extremely small in connection with this battle, on account of the favourable weather, and the fact that their advances were victorious. These contributed largely to rapid collection of the wounded and to rapid evacuation to the more stationary hospitals on the line of communication.

Detailed Notes on Points of Medical Interest.

64. During this battle I was permitted, as I have already stated, to remain in much closer contact with the field units than during the previous operations between Hai-cheng and Liao-yang. Under the circumstances some notes on points that came under my own observation may be of interest. I have ventured to group these notes under the headings of the several units in the field and on the line of communication; and I

have also added some notes on the working of the Geneva Convention and on the general condition of the medical service at the present moment, when a further engagement is considered imminent.

The Work of the Regimental Units.

65. The medical assistance with these consisted of two surgeons and one N.C.O. of the medical service with each battalion, one N.C.O. of the medical service and four stretcher bearers (assistant stretcher bearers) with each company. The medical and surgical equipment with these consisted of a first field dressing with each man, a surgical haversack with each N.C.O. of the medical service and a less elaborate surgical haversack with one of the stretcher bearers of each company. The medical N.C.O.'s of the company also carried, in a special compartment at the top of their valises, 10 pieces each of Gooch splint material, and round their waists or *en bandoulière* an elastic tourniquet. The surgeons had two medical and surgical panniers, and each carried a surgeon's pocket case of instruments. The details of these will be submitted later, as special tables, and need not load this report.

66. During the engagement, the chief duty of the surgeons is to form temporary dressing stations, to which the wounded are removed by the regimental stretcher bearers. The formation of one of these is shown in the Appendix to this Report.* The work of such a station is to adjust more completely the splints, &c., of the more serious cases for transport, to affix diagnosis tallies, and to determine those who are unable to find their way back on foot and who must be kept for the bearer battalion bearers to carry to the main dressing station.

The surgeons, as a rule, are not found with the fighting line, although they may be called into it. The first field dressing is not applied usually by them, but by the wounded man himself, or by his comrade, or by the medical N.C.O. of his company. Every man is trained in the use of this dressing, and, in fact, the regimental bearers do most of the work between the place where the man fell and the temporary dressing stations. (It is usual to find small trenches, dug along the line of an advance under fire, indicating temporary cover made for men who had been left wounded at the spot, until they could be picked up by these bearers.)† The medical N.C.O.'s have a special duty to perform in noting the name, &c., of men who are killed. For this purpose each carries with him a small book of 50 foils. On each foil not only must the particulars

* Appendix No. III., page 194.

† Although these trenches were seen and Japanese officers explained them as being shelters for the wounded, further information leads one to doubt this explanation, and to question whether such trenches were ever made for wounded, at any rate in the first instance.—W.G.M.

of name, &c., be entered, but also the nature of the wound must be examined and a description entered. In this way information is available regarding the wounding missile and the part of the body hit.

67. At the end of the day all these foils are collected by the surgeons, and a table is prepared of the killed, which is submitted to the regimental commander, and which afterwards is an important help in tabulating causes of death, and the effect of different kinds of fire. Surgeons also carry books of these foils for use in the case of any killed who may come under their own direct notice.

Work of Bearer Battalions.

68. The Bearer Battalion ("*Ei-sei-tai*"), is a divisional unit, divisible into two companies. Whether the battalion works as a whole or in separate companies, it works in three distinct sections—(1) a body of bearers for the purpose of carrying the wounded from the fighting units to the main dressing station ("*Ho-tai-jo*"); (2) the "*Ho-tai-jo*" or Dressing Station itself; (3) a body of bearers for carrying the wounded from (2) to the Field Hospitals.

The bearers are all reservists who had served as regimental bearers with the colours. There are four to each stretcher, with one surgical haversack to each squad. The number of stretchers with each company is 40, and there are therefore 160 bearers to each company, or 80 stretchers and 320 bearers to each Divisional Bearer Battalion. The battalion is commanded by a combatant officer, who ranks as major, with a subaltern combatant officer in charge of each company.

During the fighting I did not see the officers go out into the field with the squads. They remained at the Dressing Station, which is regarded as the head-quarters of the battalion, or of the company, when the companies acted independently, as was always the case in the 6th Division to which I was attached. The close combatant relationship between these officers and the combatant units may be gathered from the fact that the major commanding the 6th Division Bearer Battalion was transferred, while I was with the battalion, to command a battalion of infantry in the trenches at La-mu-tun. All these bearers wear the Geneva Convention brassard. The regimental bearers do not. They wear instead a simple red band round their right arms.

69. The physical labour undergone by the bearers is severe. Thus 342 wounded had to be taken on the 12th October from the fields around Lang-tzu-chieh to the Dressing Station at Yang-chia-wan by one company. Fortunately many were able to

walk, but it is calculated that each of the squads must have covered backwards and forwards a distance of some 10 miles.

It was a remarkable fact that during the Sha Ho fighting the work of conveying wounded from the Dressing Station to the Field Hospitals was scarcely ever done by these bearers, although the prescribed order of work is for each company to divide into two sections, one working between the front and the Dressing Station and the other between the latter and the Field Hospitals. This latter duty was almost entirely carried out by improvised arrangements, such as the employment of Chinese carts, coolies, &c., and a large number of wounded found their way to the Field Hospitals on foot. In fact, one might see a long straggling line of wounded marching from Dressing Station to Field Hospital throughout the whole period. The reason of this was that the Japanese staff and medical authorities have come to the conclusion that the Bearer Battalion, as at present constituted, is not sufficiently strong to carry out the duties imposed upon it, in engagements with so large a number of wounded, and they contemplate adding another company at least to its strength. In the meantime they have ceased to divide the companies into sections working over different areas, and make the whole company engage in the work of conveying wounded to the Dressing Stations, at any rate during the progress of an engagement.

It should be noted that the Japanese have no special wheeled transport for wounded. What they use is improvised from local resources. They are also experts in improvising stretchers, and can with the aid of hired coolies readily supply the transport necessary for the conveyance of wounded from the Dressing Stations to the Field Hospitals. Their chief difficulty lay in getting the coolies to undertake a service which brought them under fire, such as was experienced at the Dressing Stations on some occasions.

70. The chief work, however, of medical interest is at the main Dressing Station. Here the whole medical staff is assembled. None go to any other part of the field.* They were distributed amongst four Departments for work—(1) the Receiving Department; (2) the Department for "severe cases"; (3) the Department for "light cases"; (4) the Apothecary's Department.

71. The spot selected for the Dressing Station was invariably one of the Chinese houses in the village next to the fighting line.

The Receiving Department consisted of a table placed as a rule, at the gate or entrance to the compounds of the house.

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* The Dressing Station of each company of the Bearer Battalion has four medical officers.—W. G. M.

A medical officer and two clerks would preside at this table and take down the particulars of each case as it came in. Two others, an N.C.O. and private of the medical service, would also belong to this department and take charge of and label the rifle and accoutrements of each man. The case would then be passed on to either (2) or (3) according to the colour of the diagnosis tally affixed at the regimental dressing station, a white tally indicating a "severe" and a red tally a "light" case.

72. These two departments worked alongside one another: in fine weather in the open air, and in cold weather and at night in adjoining rooms of the house. The operation table (or rather dressing table, for operations are not, as a rule, performed here), was one of the solid Chinese cupboards usually found in the Chinese houses here. Two surgeons work together at the "severe" case table and the other remaining surgeon by himself at the "light" case table Five N.C.O.'s or privates assisted at each table, one of them being employed in making notes of each case, as dictated by the surgeon while he was dressing it. Thus each case was noted as either "rifle" or "artillery" fire wound, &c., and also classified as a "graze," a "penetrating" wound or a wound in which the missile remained "lodged." As a rule, the part of the body affected was also indicated on a graphic diagram. The other assistants had charge of dressings, instruments, bandages, &c.

73. Whenever the case was dressed he was made as comfortable as possible on the Chinese *kang** of the room where the dressing took place or in an adjoining room, outhouse, or other building, fresh houses being taken up as the number of the wounded increased.

74. The Apothecary's Department took general charge of the medical and surgical panniers and other equipment, and established itself usually in one of the outhouses. Its establishment consisted of the Apothecary and three N.C.O. compounders. They had not only to issue and note the expenditure of material during the work, but were also responsible for the packing and unpacking of the panniers and other packages, in anticipating future requirements, and in submitting necessary requisitions for the same.

75. The above departments were marked off by labels of different colours, namely, dark blue for the "Receiving," white for the "Severe" case, red for the "Light" case and black for the Apothecary's Department. The personnel of each, as mentioned above, is for the Dressing Station of a company and

* "Oven bed," *i.e.*, a brick platform enclosing an oven or the flues of a fireplace.—W. G. M.

not for the Dressing Station of the whole Bearer Battalion, but each company is identical, and when the two companies work together, they simply establish duplicates in each department, *e.g.*, in the "severe" case department four surgeons would be working at two tables instead of two at one, each table having its identical establishment of assistants.

76. While the surgeons are at work the battalion commanding officer or the company officers would be engaged in collecting transport for the removal of cases to the Field Hospitals, and, as soon as this was ready, evacuation commenced and was kept up continually.

77. Surgeons from units that might happen to be in the neighbourhood waiting orders were sometimes called in to assist the Dressing Station surgeons, but generally speaking, the work went on more smoothly without aid than with it, simply because each table had its proportion of trained assistants and the addition of extra surgeons did not mean the addition of a table staff for them. In almost every instance the surgeons were able to dress the cases as quickly as the bearers brought them in.

78. As regards the surgical work, the principle which the surgeons were obliged to follow was to avoid undertaking major or even any operation, and to interfere with the wound as little as possible. Their duty was to see that the wound was protected from contamination and immobilized, if necessary, for transport. If this had been satisfactorily done regimentally, the dressings were not, in several cases, touched. I saw no bullets extracted or even wounds probed to determine their position. But, if deleterious bodies, such as pieces of clothing, &c., were plainly in the wound and capable of being removed easily, they were removed. Severe bleeding was checked by graduated compresses. I did not see any operation performed for ligaturing arteries.

Neither were any craniotomy or laparatomy operations performed. Notwithstanding the urgent need of immediate operations in the case of many of the skull injuries which I saw brought in, the Japanese authorities consider that the best interests of the wounded, as a whole, are considered by not devoting time to these operations in the field units. On the other hand not many survive till they reach other units. Wounds of the lungs were treated in the simplest manner, namely, by a compress of gauze kept in place by strips of rubber plaster and by a hypodermic injection of morphia. The dressing was simply that of a trochar puncture, and the results of these wounds were, as a rule, no worse than a puncture wound. Wounds of the abdomen were similarly treated at the dressing stations.

79. In fact, the more important surgical work consisted of applying long splints to fractured thighs. I only saw two amputations performed, one at the upper arm for complete shattering of the elbow joint by a shell, and the other at the thigh for a similar injury to the knee joint. Even these operations should not have been performed there, in the opinion of the Divisional Principal Medical Officer, with whom I afterwards spoke on the subject, and I saw similar cases sent on to the Field Hospitals without operation.

Whenever an order came to advance, the Dressing Station packed up, left its wounded behind in charge of an N.C.O. or sometimes a surgeon, until transport for their removal arrived; or, as frequently happened, until a Field Hospital arrived on the spot and took them over. As a rule none of the cases remained in a Dressing Station more than 24 hours, evacuation commencing immediately the case was dressed, the rifles, side arms, ammunition, &c., accounted for and labelled, and documents to accompany the sick prepared, and so on, all of these details being carried out by a regular organization during the time the cases were being dressed.

80. In connection with the work of the Bearer Battalions, it may be of interest to note that, so far as I could see, they did not undertake the duties of searching for wounded. If any organized search was made at all, it was made by regimental units, but it may be accepted as a fact, that the Japanese do not organize search parties for work of this kind, equipped with special flaring lights for night work, as is the case in some European armies. The German Bearer Companies, for example, carry torches with them for this purpose.

81. On the night of the 12th October I had an opportunity of seeing some of the work of searching the area over which severe fighting had been carried on. This was the area around Lang-tzu-chieh, where the Russian guns had been captured by the 6th Division. In advancing towards dark with the head-quarters of the division, I had my attention arrested by low moans from one of a number of apparently dead that had been left on the field. On waiting to give what aid I could, I found myself afterwards left behind in the dark, and lost my way in attempting to rejoin my party. Fortunately, I fell in with a search party of cavalry, and remained with them. They were engaged in searching for Russian wounded and others. They used only the small collapsible Japanese field lantern, which throws the light downwards instead of forwards. Several Russian wounded were discovered and their positions noted and reported. One of them, a peculiar case, was brought to me during the night to be dressed, and in the morning I found a considerable number of Japanese and Russians collected in an adjoining house, waiting the arrival of a Bearer Company and its Dressing Station. All

these cases had been already dressed by one of the regimental units in the village. It was apparent that the regimental units had to perform this duty of searching the field and attending to wounded left there, and not the Bearer Battalions.

82. Another point of interest is that the Dressing Stations of the Bearer Battalions carried on their work during the night without any more powerful light than that of sperm candles. They had with them, it is true, a number of Scharlach's acetylene bicycle lamps and solid petroleum lamps, but the surgeons found the ordinary candle more convenient and reliable. I worked one night with them, and found five candles quite sufficient for the work of two dressing tables and of the assistants who were engaged in taking down the records of the cases. This was in the room of a Chinese house, the superficial area of the room being about 20 feet by 15 feet. The large flaring lights, which have been experimented with at home, and which I think form part of the Austrian Dressing Station, are certainly unknown in this Army. They make good pictorial effects, but I doubt very much whether the Japanese would use any light that was likely to indicate any of their positions to the enemy, such as this light would do, especially as they have found the candle sufficient and other methods of lighting Dressing Stations, in this war at least, merely luxuries. Where there are no houses they pitch tents for the dressing station, and are thus protected from the weather.

Work of Field Hospitals.

83. Field Hospitals are organized for the care of 200 wounded at one time, but during the Sha Ho fighting, as indeed during all the large engagements in this war, one Half Field Hospital has had to handle double or treble that number.

84. Field Hospitals are divisible into two sections, each section being exactly similar to the other. During the Sha Ho fighting most of the Field Hospitals of the Second Army were so divided. Each Half Hospital formed a complete unit by itself, and took up a position often widely apart from the other half. More frequently one Half only would be advanced and opened, the other Half remaining behind in reserve.

85. Although not every man wounded found his way to the Bearer Battalion Dressing Station, all eventually came to one or other of the Field Hospitals—all, that is to say, who were not so slightly wounded as to remain with their fighting unit.

The first duty of the Field Hospital is to carefully examine and record each case. The record is entered in a Medical Case Sheet, which accompanies the patient wherever he goes, and which is written up day by day in whatever hospital or other unit of the Medical Service he may be. These sheets eventually

go to the War Office, and form the records for the medical and surgical history of the war, as also part of the documents on which questions of pension, gratuities, &c., are determined. They are kept most carefully, and the fact that the entries are made to the dictation of the surgeon as he is dressing or operating on a case prevents the surgeon being overwhelmed with clerical work of this kind, while the records themselves are more accurate and complete than they would otherwise be.

86. During the process of recording the facts, wounds are dressed, foreign bodies extracted, major operations performed, admission and discharge books entered up, and the patients classified for immediate evacuation.

87. The site selected for a Field Hospital was invariably one or other of the numerous villages behind the first line. The distance from this line varied considerably. In some instances it was opened almost on the same line as a Dressing Station, as for example the opening of No. 1 of the 6th Division at Ta Chu-kuei-p'u on the 16th October and No. 1 of the 3rd Division at Chang-yu-tien on the 14th. Both these hospitals, however, had to retire further back, as they were exposed to a considerable amount of artillery fire.

88. Each Hospital or Half Hospital is required by regulation to open in 11 departments:—(1) Office of S.M.O., (2) Receiving Department, *i.e.*, Admission and Discharge Department, (3) Wards, (4) Operation Room, (5) Dispensary or Apothecary's Department, (6) Disinfection Department, (7) Kitchen, (8) Bath or Ablution Department, (9) Mortuary, (10) Stables, (11) Wagon Park.

89. In all cases the first five of these were invariably well organized. The Receiving Department was similar to that of the Dressing Station. The Wards were the village houses. Often the whole village would be taken over. Thus, No. 1 Field Hospital of the 3rd Division occupied 18 houses at Chang-yu-tien on the 15th October. Matting, blankets or straw would be spread on the *kangs* and floors of these houses and also of the out-houses, and the wounded would be made as comfortable as possible on these. A certain amount of hospital clothing, as described in notes on the Japanese Medical Service in the Report on the Medical Services of the Allied Armies in North China, was issued, but not to such an extent as I had noticed in the Liao-yang engagements. The officers and some of the more serious cases only received this clothing. No doubt in the hospitals further back the issues were more comprehensive, but, in those near the front line, the principle seemed to be to unpack as little as possible and evacuate as quickly as possible. The Apothecary's Department had charge of all such issues.

90. The principle of unpacking as little as possible was also carried out in connection with the Operation Room. The heavy Chinese furniture was used as operation and dressing tables, &c., instead of the Field Hospital equipment for these purposes.

91. The other departments were not organized in any special manner. There was no special organization, for example, except as regards personnel, of kitchen, and no special equipment for bath, ablution rooms, latrines, &c. Places were simply set apart for these and the other accessory functions. Thus the mortuary would be any small shed or granary store in the compound of the village house, the stables would be the village picketing place, the wagon park would be the compound itself or an adjoining compound, latrines a small trench dug conveniently near, and the bath or ablution arrangements either *nil* or a large Chinese earthenware jar placed on the ground in the open air. The kitchen would also be in the open air, and would consist of the ordinary field cooking utensils. I did not see any special disinfection department.

With regard to these accessories, my experience with the Japanese units is that they evolve gradually after a spot has been occupied for some time, and is likely to remain occupied. Then one begins to notice touches of improvement day by day, until after a prolonged period of occupation a fair standard of perfection, from our point of view is reached. This applies to all units, on the lines of communication as well as in the field. But at first, in the Field Hospitals at any rate, nothing of the kind is attempted, all efforts being directed towards correct recording and handling of the wounds and rapid clearing of the hospital for a further advance. Although this has not yet occurred in the case of the Second Army Field Hospitals, preparation for a retreat is included in these matters.

92. The staff of the Half Field Hospital consisted of 3 medical officers, 1 apothecary, 1 paymaster or intendance officer, 5 senior N.C.O.'s of the Medical Service, one of whom was employed in the Apothecary's Department, 4 junior N.C.O.'s and 22 privates. In addition, there were 3 soldiers from a non-medical unit, for the Kitchen Department, and 1 N.C.O. and 14 drivers of the Train Battalion in charge of the Field Hospital Transport (Departments 10 and 11). There was no material for transport of wounded. As already explained, the Bearer Battalion is responsible for this up to the Field Hospital. From the Field Hospital backwards, this is the duty of a special department, the Sick and Wounded Transport Department. There was one slight difference in the personnel of the otherwise identical Second Half of a Field Hospital. The apothecary, intendance officer, and N.C.O. of the train were replaced by a senior N.C.O., a N.C.O. and a private respectively.

93. As regards the principles of surgical work in the Field Hospitals, these differ in some important respects from those of the Dressing Stations. In the first instance, a correct diagnosis must be established, and the medical officer who first makes the examination to establish this has his name entered at the commencement of the case in the Medical Case sheet. Next, the wound has to be made aseptic, if possible. In the case of simple penetrating wounds or wounds with bullets lodged, when there is no evidence of contamination by clothing, or by other foreign bodies likely to have introduced septic matter, the interior of the wound is regarded as aseptic and is not interfered with. In cases where contamination is suspected, the interior may be swabbed out with tampons of cotton wool dipped in an antiseptic solution, but irrigation is considered detrimental to rapid healing, and is seldom employed. In all cases the skin surrounding the wound is cleansed with cotton wool swabs and, as a rule, too, the edges of the wound. Afterwards, the only dressing applied is a pad of aseptic gauze with a pad of aseptic cotton wool over it, the whole being secured with a roller bandage or by strips of rubber plaster. The essential principle throughout is to treat the wound no longer with antiseptic but with aseptic dressings.* The principle succeeds undoubtedly in obtaining more rapid healing in the case of simple wounds, but I cannot discover that it has succeeded so well in the case of more complicated wounds or even in the case of shrapnel wounds. The point will be worth attention when the records of the surgical cases and field practice are published.

94. Another point is that the dressings are invariably applied dry. I have never seen a single wet dressing of any description.

95. A further point, and perhaps the most important point, so far as field medical service is concerned, is the limiting of all dressing material to one or two simple forms. One might sum up the whole dressing material by saying that it consists (1) of plain sterilized gauze, (2) of absorbent sterilized cotton wool, (3) of plain gauze bandages, and (4) of rubber plaster. The first is placed directly over the wound, the second, if necessary, as a pad over that, and the third and fourth are used, as seems most suitable, for keeping the other dressings in place. The sterilization of dressings is carried out by the field hospital itself. A large apparatus is carried for this purpose in a special box, which measures 21½ by 11½ by 13½ inches and weighs when packed about 30 lbs. Economy is considered in the use of the

* I ought to mention that the surgeons, not only in the Field Hospitals but also in the Dressing Stations, invariably wore white cotton or linen operating aprons, with sleeves and caps; and that their hands were kept scrupulously clean and constantly dipped in sublimate or carbolic lotion. (*See* articles 1, 2, 3, 4, and 5, as arranged at Dressing Station, shown in Appendix III.)—W. G. M.

dressings. Thus bandages may be washed and sterilized, and used over and over again. A large quantity of Russian paper dressing material was found at one time, and, in order to economize the Japanese dressings, this was used instead of the cotton wool. The Japanese found that the paper could be sterilized in their sterilizer without losing its quality as a dressing.

96. This great simplicity and the uniformity of surgical dressings throughout the service must be recognized as one of immense importance in connection with the supply of surgical materials to an army in the field.

97. As regards the performance of major operations in the Field Hospitals, it may be stated generally that as few as possible are undertaken. I never saw or heard of either craniotomy or laparatomy operations being performed in the Field Hospitals of the Second Army. I did hear recently of such operations being performed in the Field Hospitals of the Army besieging Port Arthur. But the Japanese medical authorities consider it unjustifiable to perform these operations in any mobile medical unit. On talking the matter over with one of the Divisional Principal Medical Officers here, the remark made was that a besieging army is more or less stationary, and that such operations might in that case be performed without detriment to the general duty of field hospitals, which was to handle the wounded so as to obtain asepsis as soon as possible, and to keep clear for advance or retreat. He considered that when an army is advancing the time required for such major operations as laparotomy or craniotomy interfered with the main duties of the field hospital, and he himself had given orders that they should not be performed, although the younger surgeons were inclined to oppose him. Judging from what I myself saw, I should say that some of the skull injuries might have been operated on in these mobile units, if the cases were to be saved.

98. With regard to amputations, the Japanese field surgery is eminently conservative; in fact, the principle was carried out to an almost unjustifiable extent, mainly, I think, for economical purposes, that is to say, in order to preserve any limb which might otherwise have to be compensated for by the State or prevent the man earning a livelihood, which amounted very much to the same thing. Thus at one operation at which I assisted, the metacarpal bones and phalanges of the right hand, with the exception of those of the thumb and index finger, had been shattered by a shell, and there was a large lacerated wound of the soft tissues on the dorsum of the hand. I strongly advised the removal of all the metacarpals and phalanges, except those of the two uninjured digits. The medical officer, who was performing the operation, agreed that this would give the best flap and the best result, but in his anxiety to adhere to the regulation, which compelled him to save every limb if possible,

he contented himself with removing the middle and ring finger metacarpals and phalanges only, leaving, of course, a broad hand, but also a flap which remained open between the webs of the fingers and a metacarpal bone, which was badly splintered and likely to come away later in necrosed portions.

99. It has been said that the Japanese military medical officer does not get fully trained or practised in the work of surgical operations.* This is erroneous. In the Field Hospitals the Senior Medical Officer undertakes important operations, but it is also his duty to tell off those under him to perform operations in turn. Besides, the whole of the field units are leavened with reserve medical officers, most of whom have been employed in hospital work in Japan.

100. An amputation which I saw performed at one Field Hospital may be a useful warning on field service. This was an amputation of the arm on account of gangrene of the limb caused by an elastic tourniquet being left on too long. An accident of this kind is very apt to occur in the case of wounded men who wander back by themselves and spend, perhaps, many hours in finding the Dressing Station or Field Hospital.

101. With regard to the lighting of Field Hospitals, I found that the surgeons scarcely ever used the solid petroleum or Scharlach acetylene bicycle lamps, with which they were provided. As in the case of the Dressing Stations, they were content with the ordinary sperm candle. At the same time, when a Field Hospital commanding officer had an opportunity, he purchased for himself a better class of lamp, and I found No. 1 Hospital of the 3rd Division working with an excellent circular-burner petroleum lamp, with a billiard-room shade, which had been picked up at Liao-yang or Ying-kou.

102. The Field Hospitals do not carry about with them bed-pans or bed-urinals, except in very limited quantities. Each wounded man who is unable to walk is given an empty meat tin as a bed-urinal, which he keeps beside him, and ward commodes are improvised out of empty biscuit boxes. They answer the purpose sufficiently well, as they are lined with tin. One useful piece of ward equipment was the arrangement for feeding helpless patients. This was simply a sucking tube, by which a patient could drink milk or other fluid without raising his head. This simple arrangement was constantly used for giving patients stimulants, &c., while they lay on the operating table.

103. Roentgen ray apparatus do not form part of the Japanese field medical equipment. The surgeons said that they

* I mean that special field surgeons are said to be appointed for this work.—W.G.M.

got on very well without them, so far as the Field Hospital work was concerned. So far as I could judge, I do not think that a single case in the Field Hospitals would have been the worse for their absence, whereas many benefited by the increased amount of dressings, &c., which could be carried with a unit not encumbered with such apparatus.

Medical Units on the Lines of Communication.

104. The line of communication was, as already noted, short, namely from Yen-tai to Liao-yang, and subsequently from Shih-li-ho, a distance of 15 to 23 miles.

105. Stationary Field Hospitals were opened, before the battle had been decided, at Hsin-li-tun, Erh-tai-tzu, and Ku-chia-tzu. The Fourth Army had one at Yentai village, and subsequently the Second Army opened one at Liu-tang-kou, on the 17th October, not more than four miles from the Russian trenches.

106. These hospitals were formed by the unit known as the Reserve Medical Personnel (*Ei-sei-yobi-in*), of which there is one to each division. The unit is kept on the line of communication and ordered up as required. Each of these units is equal to about three Field Hospitals and may be employed in a variety of ways, notably in taking up positions in the field, as the firing line advances, and collecting the sick and wounded from the Field Hospitals to enable the latter to move on; and, also, in opening Line of Communication ("*Etappen*") Hospitals, as the line extends.

107. I visited the Stationary Field Hospital at Liu-tang-kou on the 21st October. It had practically taken over the whole village and had replaced No. 2 Field Hospital of the 6th Division there. In fact, the latter was packed up and cantoned in one of the neighbouring houses. The personnel of the hospital was one-third of the Divisional *Ei-sei-yobi-in* only. The other two sections were at Erh-tai-tzu and Hsin-li-tun. This personnel consisted of 4 medical officers, 1 apothecary, 13 N.C.O.'s and 40 privates of the medical service, and 1 intendance officer. The other sections were similar, except that an N.C.O. replaced the apothecary and the intendance officer.

The medical and surgical material was contained in three panniers, the first two being similar to the first two of a Field Hospital and the third a specially equipped pannier. These are sufficient to start work with, and supplies then come up, as required, from the Reserve Medical and Surgical Depôts and Line of Communication. The function of this hospital is not merely to relieve the Field Hospitals and enable them to move on, but also to keep and treat such cases as are likely to recover in a week or so and send them back to the ranks, and to take

temporary charge of any cases that are too serious to bear transport to the hospitals on the Line of Communication. All other cases, however, are evacuated as quickly as possible.

108. For this purpose a Sick and Wounded Transport Department unit was established near at hand. This Department or Committee, is called the *Kan-ja-Yuso-Bu* and consists of a combatant officer, three medical officers and a few men of the Medical Service. They have no sick transport material, except such as can be improvised out of local resources, but they have to make all the arrangements for this and take general charge of the patients during transport from one hospital to another. Each division has one such unit. It is responsible for establishing rest stations &c., along its line of evacuation.

109. The Reserve Medical and Surgical Supply Depôt is also a divisional unit. It is called the *Ei-sei-zai-ryo-yobi-sho.* A section of one of these was brought up to Lang-tzu-chieh on the 17th October from Liao-yang, and I visited it on the 21st October. Its personnel consisted of one Apothecary and two N.C.O.'s of the Medical Service, one N.C.O. of Intendance and one lieutenant and 50 drivers of the train. The normal equipment of the depôt is carried in 21 medical and surgical panniers, the first six of which are exactly similar to those of a Field Hospital. The six must always be kept filled in order to replace any Field Hospital, or rather Half Field Hospital, that may be left behind in a retreat. The remaining 15 panniers contain the reserve material for replenishing the Field Hospitals and Dressing Stations. The Depôt has 7 Japanese one-horse carts for the carriage of these stores; but it carries in addition eight tents in four carts, and 1,200 blankets and 300 sets of hospital bedding and clothing in 24 carts.

These three Line of Communication units, which are at the same time divisional units, are under the Line of Communication command and can be distributed where the commander thinks best. They come up into the field only on requisition from the command of the army in the field. Thus, the Supply Depôt only came to Lang-tzu-chieh temporarily to distribute material that had been requisitioned for by the P.M.O. of the Second Army, through the P.M.O. of the Line of Communication.

Working of the Geneva Convention.

110. A point that may be of some interest in connection with this and other battles, is the manner in which the Red Cross sign of neutrality was employed by the Japanese, and the measure of protection afforded by it. The latter point can be dismissed very briefly. The Red Cross was never used by the Japanese as a protection against fire, nor did they expect it to afford them protection, except when captured by the enemy.

111. Two sizes of flags are used, the smaller being 24 inches by 20 inches, and the larger 48 inches by 32 inches, with a cross formed of five 9-inch squares. The regimental dressing stations used the former, and the dressing stations and field hospitals the latter. They were almost invariably hoisted on short poles, about 6 feet long, and crossed with the national flag of the same dimensions. The position selected for hoisting the flags was usually the entrance to the house or shed where the unit was working, and, as this entrance was invariably in a village street, turned away from the firing line and concealed from it by the intervening house, it was impossible for the flags to be visible to the enemy.

112. Occasionally I saw the flags hoisted on one of the village trees, but it had become a habit also to hoist the national flag on one of these trees whenever a village was captured, in order to warn the artillery to cease firing on the village. At a distance the national flag, a large red spot on a white ground, was indistinguishable from the Geneva Convention flag, and this too would have interfered with any protection being afforded by the latter.

113. On one occasion I experienced a very hot artillery fire, when nominally under the so-called protection of the Red Cross flag. This occurred on the 13th October, when I happened to be with a dressing station of the 6th Division at Ta Chu-kuei-p'u. There was some artillery concealed in the village at the time, or rather its walls were used as a place of concealment and protection for the ammunition wagons, and these could be seen by the enemy, when they came to or left the village. A party from the Dressing Station proceeded to cross the open fields between the village and the village in front, Shu-lin-tzu, but they had scarcely got half way, when they were severely shelled and compelled to come back. The shell fire followed them right up to the Dressing Station, where they took shelter, and, for about two hours more, the Dressing Station itself and its vicinity were severely shelled. Fortunately no one was hit, but here was an instance of the uselessness of the Red Cross as a protection from fire, at any rate when displayed in the manner in which the Japanese displayed it. Even if it had been visible, it is doubtful whether the Russians would have refrained from firing, seeing that the village contained combatant troops, and that they might very well have suspected the Dressing Station party to have been reinforcements going from it to the next village.

114. In these modern battles, especially when the fighting is over a flat plain and the distance between the firing point and the place hit some miles, all idea of protecting the medical units by the display of Red Cross flags must, in my opinion, be abandoned. I am sure that this is the Japanese military view of the matter; and it seems unnecessary to consider the many

inventions and improvements suggested for making the flag more conspicuous.

115. The display of the Geneva Convention signs is, of course, essential for the protection of these units and their personnel, when a place is captured.

116. It may be noted that the Japanese adhere so closely to the letter of the Geneva Convention, which affords protection of neutrality only when the hospitals or ambulances (*i.e.*, Bearer Companies and Dressing Stations) contain sick and wounded, that the Red Cross flag is never hoisted over houses where these units are cantoned, or when, during a battle, they are packed up and waiting to move on. This refers to the flag only. The personnel of all medical units wear the Red Cross brassard at all times, whether they belong to the medical service or are attached to one of its units from combatant or other units.

Present Position of the Medical Units.

117. The above notes may give some idea of the present position of the field units at the end of the year. As regards the Bearer Battalions and Field Hospitals there has been no change, and their work at present is practically *nil.* Indeed at the end of December the patients under the charge of the medical units of the Second Army, including the units on the short line of communication to Liao-yang, were only 145 in number, namely, 32 wounded, 5 enteric, 1 dysentery, 54 beri-beri, and 53 other cases. This was the return for an Army of three divisions at least.

118. Between Liao-yang and the sea base, Dalny, there is now only one large Line of Communication Hospital open, namely, at Ta-shih-chiao, the junction for Ying-kou. At Liao-yang itself and at Dalny there are large Line of Communication Hospitals. The one at Dalny is the largest unit of all. It is worked in three sections, the first and third in public and private buildings in the Russian settlement, and the second in the Russian barracks about a mile out of the town. This hospital is capable of accommodating 7,000 patients at one time. It was opened on the 24th June. Further details of the hospital and its work will be submitted in a separate report. It may be noted, however, that all the infectious diseases, such as enteric fever and dysentery, are kept here until they recover None are sent on board ship.

119. There are also Sea Base Hospitals at Ta-lien-wan and and at Ying-kou, and a large Line of Communication Hospital at Wa-fang-tien. These are kept ready, although they are not used at present except for the reception of local sick. When the port of Ying-kou is again free from ice, the Hospital there will again become an active base hospital, and the Wa-fang-tien

Hospital, I am told, is kept ready in case it should be necessary at any future time to abandon the hospitals further north.

120. Transport of sick and wounded between the front and these bases is by train. There are, however, no hospital trains. The sick and wounded are conveyed in goods vans. Mattresses are placed on the floor of the vans, and the patients are well covered with blankets. In each van there is a specially made night stool, but otherwise there is no equipment. Each patient, however, carries a small charcoal hand or foot warmer, which keeps hot for 24 hours, the duration of the journey from Liao-yang to Dalny. At Ta-shih-chiao there is a large refreshment shed at the railway station, where the sick and wounded obtain good hot meals.

121. For the transport of patients from Dalny to Japan there are at present 17 hospital ships, carrying from 200 to 480 patients each. These are employed solely in hospital work between Dalny and the Japanese ports.* In addition to these, there are six large transports, which have a large permanent staff of medical officers and hospital orderlies on board, and which have operation rooms and dispensaries constructed for hospital purposes. The ships are the 6,000-ton ships of the *Nippon Yusen Kwaisha*, and, while they are engaged in ordinary military transport work on the voyage to Dalny, they are employed on the return journey in carrying sick and wounded. They carry from 800 to 1,000 patients each accommodated on the troop deck platforms as described in my report of 24th August 1904 on the fittings of the transport *Aki Maru*. Since the 25th June 1904 to the end of January last 122,610 sick and wounded have been sent back to Japan on these hospital ships and transports from Dalny. Considerable numbers, have, of course, been also sent back during the same period from Ta-lien-wan and Ying-kou.

Conclusion.

122. Although one is not yet justified in submitting what might be called lessons of the war, there are one or two points which already stand out prominently in connection with the Japanese military medical system. These may be briefly summarized as follows :—

(1) The extreme mobility of the field medical units, including the depôts for the supply of medical and surgical material.

(2) The extreme simplicity and uniformity of the dressings, and manner of dealing with the wounds.

(3) The continuous and rapid system of evacuation of hospitals of all classes to the bases in Japan.

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* *See* Appendix II., page 193.

(4) The method by which complete medical and surgical records are kept, even of those killed outright in the field, without unduly encroaching on the other professional work of the surgeons.

(5) The general sufficiency of the Japanese medical service for all that it is called upon to perform under the conditions of modern warfare and big battles, and the ease with which the machinery works.

123. Many causes combine to produce this result. They are of vital importance in dealing with questions of efficiency, but they may be reviewed more advantageously, when certain gaps in matters of information are filled in, and when they may be considered in the light of further experience. So far, however, the only defect that stands out in any marked contrast is a defect in the quality of material for the transport of sick and wounded. There is no defect in quantity, but the material consists generally of improvised stretchers, heavy springless country carts, goods vans, trucks, &c., without any special arrangements for minimizing jolting or vibration.

On the other hand, there is an entire absence of that sentiment, which, in Western nations, is apt to exaggerate these defects into so-called medical scandals. The Japanese soldier who is wounded, considers his sufferings as nothing compared with the hardships and dangers of his comrades who are left in the fighting line; and the general public appreciates this. The Army Staff recognise the defects, but so long as the ultimate result of the wound is not affected (and it is difficult to contend that it can be, when a suitable dressing is well applied and limbs, if necessary, immobilized), temporary suffering has to give way before the military exigencies, which do not permit the field units and line of communication being hampered with special forms of transport material. The fate of such wounds as wounds of the skull and abdomen, under these conditions of transport is, however, unsatisfactory; but, as I have noted above, the percentage of these that survive until the time comes for their removal from the Field Hospital is small. Those that do would be carried to the Stationary Hospital in a field stretcher as carefully as possible, or a Stationary Hospital would come up and take them over at the place where the Field Hospital was opened, and they would be attended there until they could be moved with less risk to their ultimate recovery.

APPENDIX No. I.

TABLE showing the NUMBER of WOUNDED admitted DAILY into the DRESSING STATIONS and FIELD HOSPITALS of the SECOND ARMY during the BATTLE of the SHA HO (OCTOBER 10th to 20th, 1904).

Name of Unit.	Oct. 10.	Oct. 11.	Oct. 12.	Oct. 13.	Oct. 14.	Oct. 15.	Oct. 16.	Oct. 17.	Oct. 18.	Oct. 19.	Oct. 20.	Total.
DRESSING STATIONS.												
3rd Division, No. 1 Company	20	178	498	—	509	136	80	140	109	—	—	1,670
„ No. 2 „	—	58	103	—	246	145	20	—	27	—	—	599
6th Division, No. 1 „	—	—	342	79	82	29	48	17	4	6	—	607
„ No. 2 „	18	78	72	37	318	204	204	20	19	8	4	1,082
4th Division, No. 1 „ / „ No. 2 „	—	167	214	—	430	51	54	53	5	10	5	989
Total received in Dressing Stations	38	481	1,229	116	1,585	565	406	230	164	24	9	4,947
FIELD HOSPITALS.												
3rd Division. No. I., 1st Half / „ 2nd Half	—	—	—	—	32	655	126	193	94	165	60	1,325
No. II., 1st Half	—	—	—	242	23	—	2	2	—	—	—	269
„ 2nd Half	—	—	—	—	399	73	10	84	20	319	82	987
No. III., 1st Half	—	—	364	—	1	—	—	—	—	—	—	365
„ 2nd Half	—	184	330	12	9	—	—	—	—	—	—	535
No. IV., 1st Half	—	—	—	—	—	—	—	296	370	—	70	736
„ 2nd Half	—	—	—	—	—	—	359	62	82	—	—	503

	Name of Unit.	Oct. 10.	Oct. 11.	Oct. 12.	Oct. 13.	Oct. 14.	Oct. 15.	Oct. 16.	Oct. 17.	Oct. 18.	Oct. 19.	Oct. 20.	Total.
6th Division.	No. I., 1st Half - - -	—	—	180	160	70	—	441	54	13	25	8	951
	„ 2nd Half - - - -												
	No. II., 1st Half - - -	—	—	—	—	36	448	9	—	—	—	—	493
	„ 2nd Half - - - -												
	No. III., 1st Half - - -	—	—	—	—	—	112	30	13	4	11	1	171
	„ 2nd Half - - - -												
	No. IV., 1st Half - - -	—	—	—	193	2	5	—	—	—	—	—	200
	„ 2nd Half - - -	21	105	65	2	—	—	—	—	—	—	—	193
4th Division.	No. I., 1st Half - - -	—	—	97	125	6	—	—	—	—	—	—	228
	„ 2nd Half - - -												
	No. II., 1st Half - - -	—	—	—	—		425	55	—	—	—	—	480
	„ 2nd Half - - -												
	No III., 1st Half - - -	—	—	—	—	—	—	39	82	15	21	5	162
	„ 2nd Half - - -												
	No. IV., 1st Half - - -	—	—	179	9	—	—	—	—	—	—	—	188
	„ 2nd Half - - -												
	Total received in Field Hospitals -	21	289	1,215	743	578	1,718	1,071	786	598	541	226	7,786

APPENDIX No. II.

List of Hospital Ships and Transports employed in conveying Sick and Wounded to Japan.

Hospital Ships.	No of Beds.
*Hakuai Maru	270
*Kosai Maru	270
Rohilla Maru	400
Rosetta Maru	400
Miyoshino Maru	480
Tairen Maru	210
Ko-un Maru	280
Yokohama Maru	280
Kohina Maru	320
Ugo Maru	200
Kabafuto Maru	250
Jingu Maru	320
Choisan Maru	200
Kono-ura Maru	200
To-e-i Maru	250
Kirin Maru	250
	4380

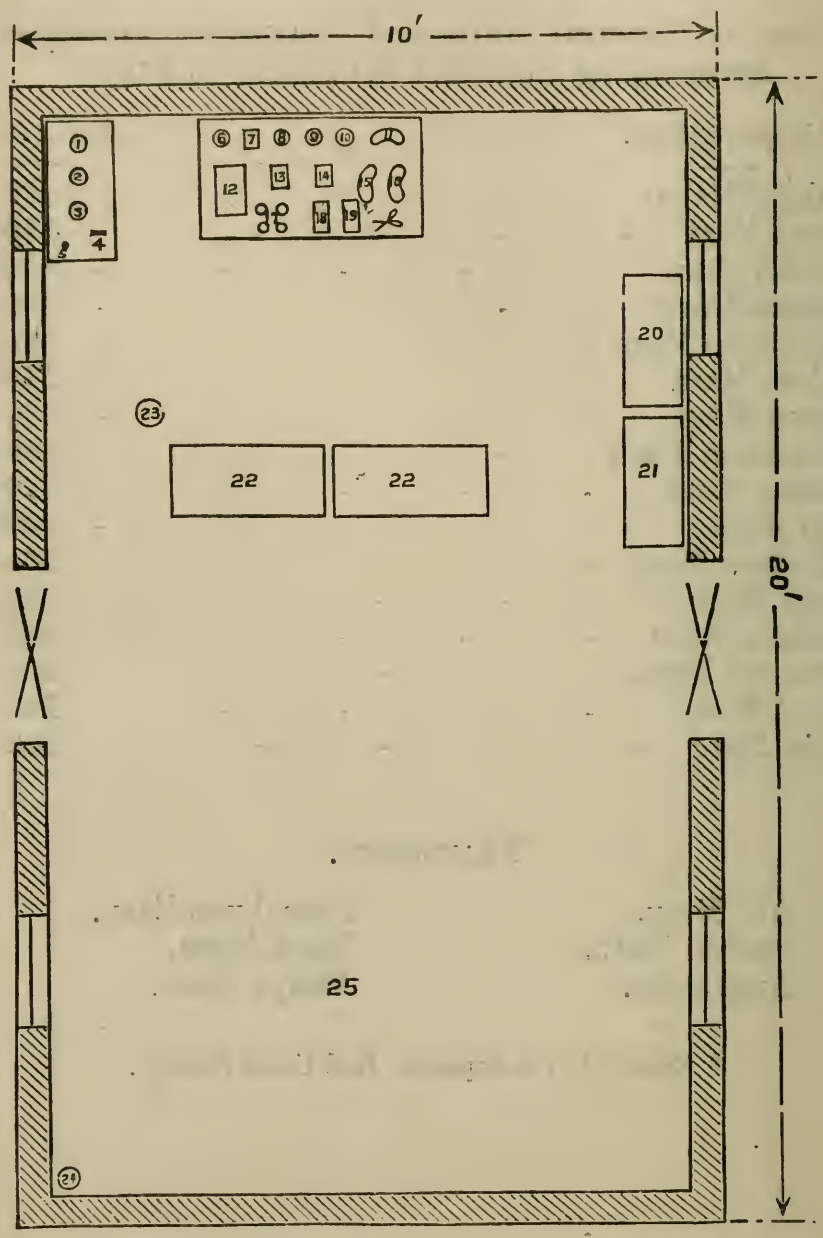
Transports.

Aki Maru.	Kamakura Maru.
Sanuki Maru.	Kaga Maru.
Awa Maru.	Tampa Maru.

* Belong to the Japanese Red Cross Society.

APPENDIX III.

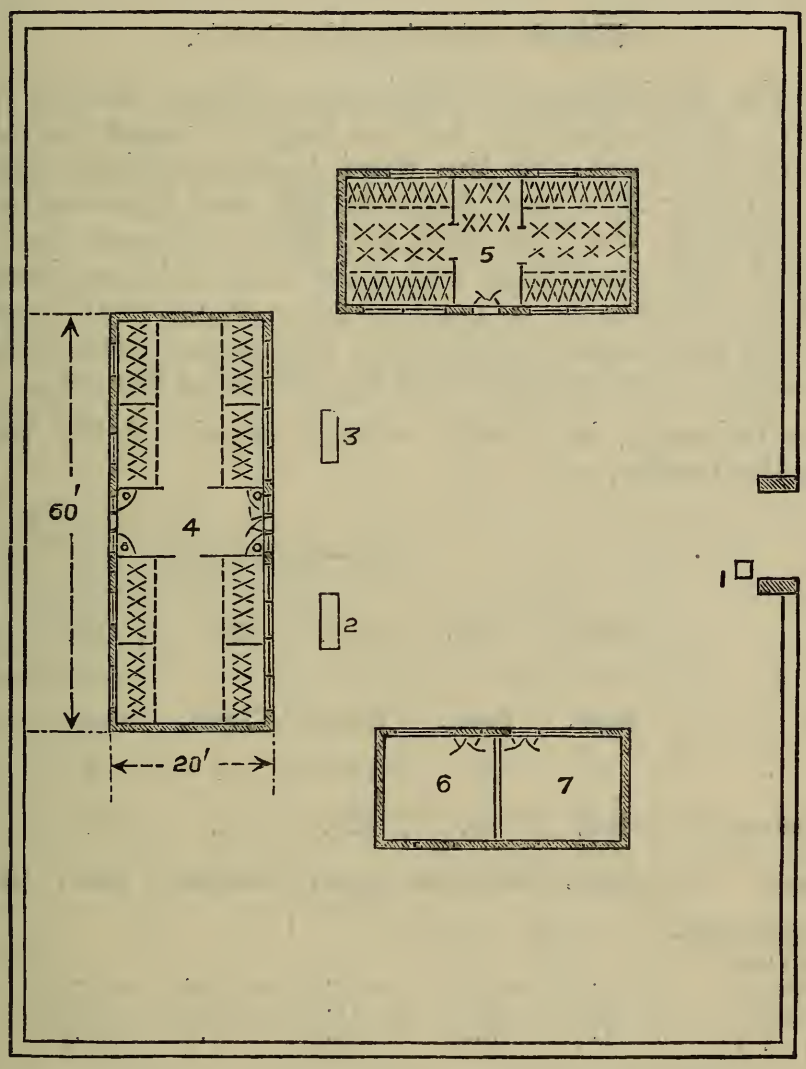
PLAN of GATEWAY ENTRANCE to TEMPLE at LA-MU-TUN, showing how it was arranged as a BATTALION DRESSING STATION, 16th October 1904.



1. Chinese basin with carbolic lotion.
2. „ „ sublimate „
3. „ „ sterilized water.
4. Nail brush.
5. Soap.
6. Lantern.
7. Surgeon's pocket-case of instruments.
8. Wooden cup.
9. Bottle of menthol brandy.
10. Bottle of water.
11. Kidney-shaped pus basin.
12. Bundle of cotton wool in oiled paper.
13. Gauze in a Chinese sweetmeat tin.
14. „ „ „ „
15. Pus basin, kidney shaped.
16. „ „ „
17. Four gauze roller bandages.
18. Triangular calico bandages and scissors.
19. Rubber plaster in tin.
20. Battalion med. and surg. pannier A.
21. „ „ „ „ „ B.
22. Two Chinese stools together, forming dressing or operation table.
23. Chinese basin for dirty dressings, swabs, &c.
24. A stretcher.
25. Space for wounded; floor covered with a piece of matting.

APPENDIX IV.

PLAN of TYPE of CHINESE VILLAGE HOUSE, showing how such was arranged as the DRESSING STATION of a company of the Bearer Battalion, 6th Division, at TA TUNG-SHAN-P'U, 11th October 1904.



1. Entrance gate and "Receiving Department."
2. Operation table in open air for "Severe Case" Department.
3. " " " "Light Case" "
4. Main building with "severe cases," after being dressed at (2), placed on the "*kangs*." The X denotes wounded soldier.
5. Principal out-house with the "light cases" (X), after being dressed at (3), placed on the "*kangs*" and floors.
6. Out-house building for "Apothecary's Department."
7. Out-house building for Personnel, or for the Chinese family owning the house.

The buildings are enclosed in a compound surrounded by a mud wall.

(6) The Effects of Cold during the Battle of Hei-kou-tai, 25th–29th January 1905.

NOTES of a LECTURE given by the PRINCIPAL MEDICAL OFFICER of the 5th Japanese Division, reported by Lieut.-Colonel W. G. MACPHERSON, M.B., C.M.G., Royal Army Medical Corps. Mukden, 2nd April 1905.

Weather during the Battle.

On the 23rd January there was a sudden change in the weather. The temperature fell to a very low point, the relative humidity increased, and the wind began to blow from the north. On the 26th snow began to fall, and the weather was at its worst on the 27th, 28th, and 29th. The air was then saturated with moisture, and this high relative humidity caused it to become a good conductor of heat from the body. To this fact, more than to the actual lowness of the temperature, is to be attributed the effects of the cold.

The following is a table of the records of the weather during the battle :—

—	Date—January 1905.					
	26th.	27th.	28th.	29th	30th.	31st.
Weather - -	Snow.	Snow.	Snow.	Cloudy.	Fine.	Fine
Cloud - -	10	10	10	7	0	—
Wind direction -	N.E.	N.	S.E.	N.	S.	
Wind force - -	Light.	Moderate.	Light.	Moderate.	Light.	Moderate.
Temperature (Fahrenheit) :—						
6 a.m. - -	8·6	− 4	− 2·2	−11·2	− 9·4	—
2 p.m. - -	17·6	15·8	14·	−11·3	−12·2	—
10 p.m. - -	1·4	10·4	− 2·2	1·	−12·2	—

Remarks.—From the 26th to 29th the air was saturated with moisture. On the 30th and 31st it was somewhat dry.

Local effects of the cold and snow on the body.

There were two kinds of local effects. The first was freezing of the extremities, and the second certain local effects on the eyes.

The local effects, other than the affections of the eye, were those of frost-bite. They all occurred between the 26th

and 29th, during the days of the fighting. A few cases occurred after the fighting ceased. The majority of the cases occurred on the 29th, the next greatest number on the 28th, and the next on the 27th. It was on these days that the fighting was most severe, and the weather at its worst. About 300 cases of frost-bite were admitted into hospital between the 26th and 29th. There were only two officers among them. There were 173 more cases, which did not go into hospital.

The 41st Regiment suffered most. The cases of frost-bite in it were as follows :—On the 27th, 18 ; on the 28th, 156 ; on the 29th, 169 ; on the 30th, 7 ; and on the 31st, 4. Many of these cases did not go into hospital.

Most of the cases of frost-bite were mild cases of the first or second degree ; that is to say, cases with simple redness and swelling, and cases with deep red or purple swelling and blistering. Cases of the third degree, *i.e.*, gangrene, were rare. 97 of the cases admitted to hospital were discharged cured within a week. Out of 113 cases observed in the Field Hospital at Ta-tai and Hsiao-tien-tzu by Dr. Inouye, the Assistant to the Principal Medical Officer of the 5th Division, most had a history of getting frost-bitten at night. Very few got affected during the day. The feet were affected more than the hands, and the hands more than other extremities. In fact, there was only one case of frost-bite, viz., of the ear, other than foot or hand. Of the foot cases, the great toe was affected most, then the little toe, and then the heel. Of the hand cases, on the contrary, the thumb was the least frequently affected. The middle and ring fingers were the fingers affected most, and then the index and little finger.

Omitting the case of frost-bite of the ear, the following is an analysis of the remaining 112 cases :—

Those affected during the day were 10 foot cases, of which 2 were left foot only and 8 both feet ; and 6 hand cases, of which 1 was left hand only and 5 both hands. The total "day" cases were 16. Of the night cases 69 were foot cases, of which 7 were left foot, 13 were right foot, and 49 both feet ; and 27 were hand cases, of which 2 were left hand, 8 right hand, and 17 both hands ; a total of 96 "night" cases. Of these cases, 47 were affected in the second degree and the rest in the first degree only. There were no cases of the third degree.

The predisposing causes were—

(1) Wet feet. The melting snow penetrated through the stitching of the welts of the boots, and one could see the line of wet along the socks. The officers seldom had wet feet as their boots were of a better quality. Some surgeons attributed the wet feet to perspiration, but this is an incorrect explanation.

(2) The leather of the boots became very hard and frozen, pinching the feet and interfering with the circulation.

(3) The fighting took place often during the night, and the men were obliged to lie on the snow in fixed positions. They were unable to move about in order to maintain circulation, and the gloves got wet in the snow.

(4) The men went to sleep unconsciously; they were worn out with fatigue, want of sleep, and want of food.

(5) The country was an open plain without cover and the enemy was close up to the men. This often prevented them from lighting camp fires.

The wounded suffered very little. Only 25 cases occurred among them. The total number of wounded for the Division was 1,292.

The experience of the Hei-kou-tai fighting led to certain measures being taken to prevent frost-bite during the Mukden battle, which took place a month later.

These measures were—

(1) The boots were well greased, especially along the welts.

(2) The men were given more than one pair of socks and gloves, so that they might have a change, should the socks or gloves become wet.

(3) Whenever there was a halt for a long time the men were made to take off their boots and put on Chinese felt or straw shoes.

(4) Each soldier was given an issue of sugar, which he carried in his pocket and which he was told to eat as he lay in the positions. This not only kept him awake, but it increased the bodily warmth by combustion. Dr. Inouye had great belief in this dietetic prophylactic measure.

Effects on the eye.

Snow blindness, fatigue of the eye and eyelids, and conjunctivitis did not occur. These conditions are usual results of exposure to reflected light from snow surfaces, and their absence is due to the fact that the days of snow were cloudy, and that the soldiers were provided with goggles of dark-coloured gauze cloth.

Eleven cases of night blindness occurred in the artillery regiment and a few cases amongst the infantry, but these are most probably due to the heavy work that had to be done at night in making gun positions, &c.

General effects of cold.

No cases of death, or apparent death, from extreme cold occurred. This good result must be attributed to the excellence of the clothing.

Effects of the cold on the wounded.

In warm weather it is customary to remove the clothing in order to dress a wound, even at the temporary dressing stations and in the firing line. On this occasion the clothing was never removed until the patient reached the field hospital. Instead a small piece of the clothing was cut away from over the wound, and the wound quickly dressed, and the patient at once taken to the field hospital.

Diseases attributed to the cold.

Rheumatic pains from cold have been extremely rare, but since the beginning of February, *i.e.*, after the battle was over, there was a mild outbreak of a catarrhal condition, like influenza. The symptoms were laryngitis, pharyngitis, gastric catarrh, neuralgia, and a temperature rising to 38° C. The cases remained with the regiment and recovered in a week.

Effects of the cold on food.

The chief effect of the cold on food was that the cooked rice, carried by the soldier in his small rice basket, froze solid and could not be eaten, until it thawed. This was not always capable of being effected. Some soldiers carried their rice basket under their waistcoats, in order to prevent the rice freezing, but this was inconvenient when they had to get into a firing position and had to be stopped. Some made a soup of the cooked rice by pouring water over it and heating it over a fire. But this took nearly 30 minutes to prepare, as it took a long time to thaw the rice. The result was that after the first day's experience the soldiers carried the rice uncooked, as they found that they could make a rice broth of the uncooked rice in 20 minutes instead of 30, as in the case of the frozen cooked rice. In consequence of this difficulty in keeping the rice ration from freezing, half the ration was replaced by biscuit. But this made the men very thirsty and, moreover, it took a much longer time to eat. The result was that even the strongest feeders did not eat all their ration and the men were consequently hungry. The water bottles, also, were not suitable for use in extreme cold as the water froze in them at once.

Effects of the cold on medical and surgical material.

Most of the drugs in solution froze. But the glycerines, alcoholic solutions, and the tinctures remained fluid.

The two most important drugs used in the firing line, namely, *Liquor Camphorae** and *Liquor Morphini** were not so affected as to make it impossible or difficult to use them. The former became of the consistency of condensed milk, but became fluid again with the warmth of the hand. The latter was not affected at all.

Esmarch's elastic tourniquet also remained unaffected, as it was not exposed to the cold in consequence of the manner in which it is carried by the men of the medical corps, namely, round the waist or over the shoulder (*en bandoulière*) under the coat.†

The measures that will be taken by the Japanese in the future, in order to minimise the effects of extreme cold during engagements, will be the adoption of a better quality of boot, and probably some changes in the rations.

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* *Liquor Camphorae* (Camphor 1 part, ether 4½ parts, olive oil 4 parts) is used for hypodermic injections in cases of collapse or shock; and is considered by the Japanese the most important drug of all in the firing line. *Liquor Morphini* is prepared of 5 parts water, 5 parts glycerine, and 0·2 parts morphin-hydrochlor. It remained unfrozen on account of the glycerine in its composition.

† Every non-commissioned officer and man of the Medical Service carries an Esmarch's elastic tourniquet in the field.

(7) The Effects of Cold during the Battle of Hei-kou-tai, 25th–29th January 1905.

NOTE by Captain R. T. TOKE, Assistant Military Attaché, Tokio, dated 16th March 1905.

A certain division despatched a surgeon to the scene of the above battle to investigate the effect of the cold on the Japanese troops.

The following are his observations :—

1. Casualties from the 26th to 30th January :—

—	Killed.	Wounded.	Missing.
Officers - - -	82	271	—
N.C.O.'s and men -	760	7,742	500

2. Great efforts were made to supply warm food from the rear, but a thorough system of distribution was extremely difficult, consequently the greater part of the men in the most advanced positions were obliged to eat biscuits and snow for nearly forty-eight hours. Charcoal was supplied, but it was only on the third day of the battle that it reached the most advanced parts of the fighting line, so that the men were without any means of warming themselves for nearly forty-eight hours.

3. There were about 300 men in one division, and 205 in another, who were admitted to hospital suffering from frost-bite alone. About one half of the wounded, however, were suffering more or less from frost-bite, but their cases were generally slight. Cases necessitating amputation of toes or fingers were few. The greatest number of cases occurred on the 27th and 28th, on which days a northerly wind was blowing with some force. The temperature was 16 degrees below zero on the 27th and 24 degrees below zero on the 28th, the majority of cases occurring between midnight and early morning on those days.

67 per cent. of the sufferers were frost-bitten in the toes, 28 per cent. had their fingers attacked.

No considerable difference was noticed between the men who wore shoes and those who wore boots, but those who wore loose boots suffered less than those who were wearing tight ones. Men who wore three or four pairs of thick woollen socks suffered far more than those who wore only one or two

pairs; this was probably owing to the tightness caused by wearing three pairs of socks. In the same way those men who wore two pairs of thick woollen gloves suffered more than those wearing only one pair. No inconvenience was experienced owing to the practice of wearing the gloves suspended by a string round the neck. Very few men used "Frost-bite Plasters," but those who did so spoke in favour of them.

4. The arrangements for first aid in the firing line were generally the same as under ordinary circumstances. Very few men were without bandages when carried back to the dressing stations.

There were a great number of cases in which blood had coagulated on the skin around the wounded portion, which caused frost-bite in a slight degree.

Great difficulty was experienced by the men in putting on first-aid bandages rapidly, owing to the thickness of the winter clothes.

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(8) The Battle of Mukden.—Medical Arrangements and Statistics.

REPORT by Lieut.-Colonel W. G. MACPHERSON, M.B., C.M.G., Royal Army Medical Corps, Manchuria, July 1905.

Plate.

Appendices.

This report refers to the operations of the Second Japanese Army only. No information has been received regarding the armies on its flanks, which are represented on the map accompanying this, by the 6th Division, and by the 9th and, afterwards, the 7th Divisions. These were the flanking divisions of the Fourth and Third Armies respectively. Little information has also been received regarding the reserve brigade, which, with the addition of some troops from the 4th Division, formed a detachment under Colonel Tomioka on the right of the Second Army. This brigade subsequently left the Second Army and came under the Fourth Army command. It had one field hospital only, but no information has been given regarding it. The detachment did little or no fighting while it was with the Second Army. It simply held the trenches in front of the Russian lines west of Ling-shen-pu on the Sha Ho.

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* Not reproduced.

Matters that came under my personal observation during the battle refer to the 5th Division, to which I was attached and from which any illustrations, such as those shown on the small plans (II. and III.),* indicating the positions of dressing stations under severe artillery fire, are drawn.

General Narrative.

After the battle of the Sha Ho in October 1904, the Second Japanese Army held a position throughout the winter in trenches that were on an average 200 to 300 yards distant from the Russian trenches. In one place, Ling-shen-pu (E. 3), the distance was less than 100 yards. The line so occupied extended from a point a mile or so east of Wu-chia-wa-tzu (E. F. 3), through La-mu-tun and Ling-shen-pu, to a line west of the Sha Ho, drawn through the villages Chang-liang-pu, Chin-yu-tzu, Wan-chia-yuan-tzu to Ta-ping-chuang, as is shown on the map to be occupied by Tomioka's detachment at the beginning of the battle. The cavalry, under General Akiyama, remained at that time on the left flank with its head-quarters at Li-ta-jen-tun, and the second line of troops was cantoned in the villages over the area south of the line of trenches as far as Yen-tai.

This was the position until the attack on Hei-kou-tai by Grippenberg between the 25th and 29th January 1905. The result of this attack was that two divisions, the 5th and the 8th, were moved to the left of the Second Army, and occupied the line shown on the map as being occupied by them at the commencement of the battle of Mukden. The original left of the Army was thus linked up with the Hun Ho. The 5th Division had been brought from the neighbourhood of Shi-li-ho, where it belonged to the Fourth Army, but was being held in reserve. The 8th Division had been protecting the line of communication west of Liao-yang.

When the battle of Mukden commenced, these divisions were added to the Second Army and other changes took place in the composition of the army. The 3rd Division, which occupied the trenches in the neighbourhood of Wu-chia-wa-tzu, was withdrawn to form a reserve division. The 6th Division extended into its lines and was placed under the Fourth Army command, the 4th Division was extended westwards to link up with the 5th Division, and the gap in the trenches formed by this movement was filled by the 8th Reserve Brigade, to which had been added three battalions of infantry and some artillery from the 4th Division, and which formed Tomioka's detachment.

The Second Army, therefore, consisted at the commencement of the battle, from right to left, of Tomioka's detachment, the 4th, 5th and 8th Divisions, and General Akiyama's cavalry.

Later on the 3rd Division rejoined the army in the area shown on the map, and Tomioka's detachment dropped out.

* Not reproduced.

The cavalry also were removed from the army after the first day and were attached to the Third Army.

The Head-Quarters of the army left Shi-li-ho, where it had remained since the battle of the Sha Ho, in the beginning of February, and stayed at Ta Tung-shan-pu till the last week in February, when it took up its quarters at Kou-tzu-yen.

The advance on Mukden commenced from these positions on the 1st March, and Mukden was entered on the 10th March. Some preliminary fighting, however, occurred during the last week of February. On the 26th the Japanese artillery opened fire in all directions and disturbed the Russian lines south of Chang-tan (C. 3), while at La-mu-tun, Chang-liang-pu, Liu-tiao-kou, and the line north of Hei-kou-tai, the Russians made counter-attacks during the succeeding days. After their action on the 26th February the Japanese did not, as a rule, reply to the Russian fire.

During the period of the battle proper, from the 1st to the 10th March, there were three main phases which, from the point of view of the medical arrangements, it is well to note. The first consisted of severe fighting, especially in front of the 8th and 5th Divisions on the 1st and 2nd March. During this phase the Russians were driven from their positions on the left of the Second Japanese Army, and were obliged to fall back on their second line of defence, west of Mukden, along the Hun Ho, and north of it from the unfinished railway embankment. The casualties during this period were excessive. The second phase lasted during the 3rd and 4th March, and consisted of a pursuit up to the Russian second line of defence. The casualties of this period were few. The third phase consisted of an attack on this line, which continued throughout the 5th, 6th, 7th, 8th and 9th March, and which led to the entry into Mukden on the 10th March without further fighting. This was also a period of severe fighting and excessive casualties. The areas over which the greatest number of casualties occurred were in the taking of the village south of Chang-tan by the 8th Division on the 1st and 2nd March; in the attack by the 5th Division on the Russian positions at Wang-chia-wo-peng (C. 3 South) and Li-chia-wo-peng (C. 3 South) on the same dates; in this division's attacks on Sha-to-tzu (E. 2 East) in the third phase of the battle; in the attack on Pei-tai-tzu (C. 3 South) by the 4th Division on the 2nd; in an attack by a regiment of this division, on the 7th and 8th, on Hsiao Kuei-hsing-pu (E. 3) near the Su-chia-tun railway station; and in a fierce encounter between the Russians and a brigade of the 3rd Division at Yu-hung-tun (E. 1/2) on the 6th and 7th March, during which the brigade was almost annihilated.

The various positions and movements from day to day are shown on the map, and any description of them further than this short narrative is unnecessary for the purpose of this report.

Weather.

The following are the minimum and maximum shade temperatures, Fahrenheit, during the operations, including the days immediately preceding and immediately after the battle :—

Date.	Minimum.	Maximum.
February 26th	20°	25°
" 27th	0	25°
" 28th	1°	25°
March 1st	0	35°
" 2nd	18°	45°
" 3rd	10°	32°
" 4th	8°	32°
" 5th	8°	28°
" 6th	7°	38°
" 7th	11°	42°
" 8th	13°	43°
" 9th	14°	53°
" 10th	20°	52°
" 11th	20°	50°
" 12th	21°	49°
" 13th	37°	47°
" 14th	11°	29°

During the whole period the weather was, as a rule, sunny, and the wind, although extremely cold, light and moderate. The 26th February and the 2nd and 9th March were, however, exceptional days. On the 26th there was a storm of snow accompanied with a blizzard, on the 2nd there was a heavy fall of snow and fog during the forenoon, and on the 9th there was a severe dust-storm all day, making it impossible to see more than 100 yards or so in front of one.

The rivers and pools throughout the area were frozen hard, and heavy transport could cross the Hun Ho on the ice until the time of the dust-storm on the 9th March, when the river suddenly thawed, and was flowing in an open stream on the morning of the 10th.

Physical Features of the Country.

The whole area over which the Second Army operated is a flat alluvial plain, with little or no undulations. It is studded with villages. In places, especially near the Hun Ho, there were hummocks of sand, apparently drift sand from the bed of the river, which is, as a rule, sandy in the neighbourhood of Mukden. The banks of the river along the course followed by the army are wide, with many extensive clumps of osiers.

The ground was frozen hard, and although much of the area is intersected by streams and has large tracts of marshy ground, they formed no obstacle, and the latter did not become apparent until after the thaw. There was no area of wood, except in the vicinity of the Northern Tombs near Mukden, but the villages and graveyards in the fields were well provided with

trees. In fact it was noticeable that very few of the trees had been cut down in the areas occupied by the Russians. In this respect the villages had a better appearance than those south of the Sha Ho, which had been denuded of their trees for firewood during the winter.

The houses in the villages were in fairly good condition, but many of them were without windows or doors. These had been used to make fires as the army advanced.

Water was obtained from village wells or by digging holes in the ice of the rivers and ponds. The water so obtained was boiled by the men in the best way they could in their water bottles over wood or *kaoliang* fires.

Protection of the Troops against Cold.

In a report, already submitted, on the effects of cold during the battle of Hei-kou-tai*, the measures taken to protect the troops against the weather during the battle of Mukden were indicated. The men had rations of sugar in their pockets, but otherwise no special additions to the ration were made. As they advanced, however, they found quantities of smoked or salted salmon, left by the Russians, as well as tins of meat and bread, all of which were added to the ration. The salmon especially was used as a supplement to the regular ration, and was of excellent quality.

The troops marched and fought very heavily clothed. For example, the men who were brought in wounded to the dressing stations were noted to have the following clothes on :—Cotton socks, drawers and vest, such as are worn in summer, with thick woollen socks, drawers and jersey over them ; the thick dark cloth winter uniform, trousers and tunic, with the summer khaki drill trousers and jacket over them, and the special winter goat-skin waistcoat and winter great-coat over all. A full pack was carried, with straw and Chinese felt shoes attached to the valise. A blanket and the blue cloth uniform great-coat were also attached to the pack.

As the men had to lie out in the open for many nights, especially during the third phase of the battle, the amount of warm clothing was not excessive, although the weight carried must have been very great.

Casualties.

During the preliminary period, from the 26th to the 28th February, there were only 13 wounded.

Between the 1st and 10th March the total casualties of the Second Army amounted to 22,727, of which number 5,908 are shown as killed, 16,288 as wounded, and 531 as missing.

The number of officers killed was 179, the number wounded 512, and the number missing 3. The equivalent numbers for the rank and file are 5,729, 15,776, and 528 respectively.

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* Pages 196, 198.

These figures give the following percentages to strength :—

Total Casualties.

Killed - - - - -	8·6	per cent.
Wounded - - -	23·6	„
Missing - - - -	0·8	„
Total - -	33	„

Officers.

Killed - - - -	9·6	per cent.
Wounded - - -	27·4	„
Total - - -	37	„

Rank and File.

Killed - -	8·6	per cent.
Wounded - - - -	23·6	„
Missing - - -	0·8	„
Total - - -	32·8	„

The proportion of killed to wounded is as 1 to 2·9, or, approximately, 1 to 3. This proportion holds good for both officers and men.

In previous battles the proportion of wounded was greater. Two factors seem to have reduced the proportion during the battle of Mukden—one, the excessive number of men killed in the fighting in the village of Yu-hung-tun, on the 7th March, where the combatants came to close quarters and fought to the death, and the other the factor of cold, which, it is believed, was the cause of men dying in the field before they could be brought into the dressing stations and field hospitals. That the wounded are far more liable to suffer from the effects of cold than the others is proved by the fact that out of 70 cases of frost-bite admitted into the field hospitals, practically all were amongst men who were wounded.

The following table shows the distribution of the wounded amongst the several divisions, and according to the nature of the weapon inflicting the injury :—

Division.	Rifle Fire and Machine Guns.	Artillery Fire.	Bayonets and Side-arms.	Other Causes.	Total.
3rd.	2,035	291	17	30	2,373
4th.	3,339	537	6	52	3,934
5th.	3,953	537	—	—	4,490
8th.	4,251	1,022	14	115	5,402
Total -	13,578	2,387	37	197	16,199

It will be noticed that the total is 89 less than the total, 16,288, given on page 207. This discrepancy is explained by the fact that the above figures were the admissions to the field hospitals only, whereas the total casualty figures were obtained from the consolidated return of the Surgeon-General of the Second Army, which probably included statistics of wounds that did not reach the field hospitals.

According to the table above, the wounds from rifle fire, including machine guns, were 83·8 per cent. of the total wounds, from artillery fire 14·7, from bayonets and side-arms 0·3, and from other causes 1·2 per cent.

These percentages refer, of course, only to those cases of wounded who survive long enough to reach the field hospitals.

Wounded from rifle fire survive the most, and wounded from bayonets and side-arms the least. At any rate, it is remarkable how few of the latter reach the field hospitals, although one constantly heard of fierce hand to hand encounters.

The wounds from other causes include wounds from grenades, burns, and injuries from falls, &c.

Medical Arrangements.

The table appended (Appendix V.) shows the number of wounded dealt with in the dressing stations of the bearer battalion and in the field hospitals of each division of the Second Army.

For dealing with these numbers the general arrangements were similar to those of the battles of Liao-yang and the Sha Ho, about which reports have already been submitted. That is to say, each infantry battalion or equivalent unit opened its own dressing station as a temporary dressing station when any fighting was going on, each division had main dressing stations formed by the two companies of its bearer battalion, and each division had four field hospitals, with the exception of the 8th Division, where there were only three. The field hospitals were distributed over the area according to the circumstances of the fighting, as shown on the map.

The work of these units was severe and at times unexpectedly great. Thus, on the 1st and 2nd of March, No. 2 Company of the 5th Division Bearer Battalion had over 1,100 wounded passing through its dressing station, and, quite unexpectedly, some 400 of these found their way into No. IV. Field Hospital at Kou-cheng-tzu, which was not intended for their reception, on the first day of the battle. The emergency was met by bringing up another field hospital to the same village on the following day. It was caused by the zone of evacuation from the dressing station in question to the field hospital at Hsiao-tien-tzu being under severe artillery fire, so that all the stretcher cases had to take a safer route that led them to Kou-cheng-tzu. The condition of affairs is illustrated by the plan appended. (Appendix II.)*

* Not reproduced.

As a rule, the temporary dressing stations of the infantry and other combatant units and the main dressing stations of the bearer battalions were opened in village houses, but on the 1st March, in the case of the 5th Division, both classes of dressing station were in the open air in ravines or trenches. In some cases the former class was in "dug-outs." The village houses were quite untenable at the time on account of the fire from a Russian heavy gun battery at Chang-chuang-tzu (C. 3). Thus the main dressing station of No. 2 Company, Bearer Battalion, opened in the bed of a river running along the south side of the village Liu-tiao-kou (C. 4). The river ran in a deep ravine, and no doubt this ravine gave the best protection. But the particular spot selected could not have been more dangerous. It was in the very midst of the Japanese artillery, and, in fact, somewhat in advance of the batteries. The main road into the village crossed a bridge over the ravine at the spot, and the ravine itself was crammed with the ammunition wagons and horses of the batteries, and amongst them the wounded lay and were dressed. The Russian batteries directed their fire almost continuously on the ravine at this point, evidently under the impression that batteries had been placed in it, under cover of the village in front. The batteries on the left of the line were never detected or fired upon. As may be imagined, the work of this dressing station was carried on under circumstances of much difficulty and danger. Fortunately, although some of the heavy gun shells burst on the bank of the ravine at the spot occupied by the dressing station, the only casualties that occurred were amongst the horses.

In the same division, No. 1 Company Dressing Station at San-chun-tzu (C. 4) received a comparatively small number of wounded during the day of the 1st March, although the fighting in front of it towards Wang-chia-wo-peng (C. 3) was most severe. The reason of this was that the zone of evacuation to the dressing station from the fighting line was constantly swept by rifle and machine gun fire, and the wounded had to be kept with the regimental units in ravines and trenches until dark.

A similar state of affairs occurred in connection with the attack of the 3rd Division on Yu-hung-tun (D. 2 N.) from Li-kuan-pu (E. 2 N.) on the 7th March. Both the villages, Yu-hung-tun and San-gen where the wounded fell, were partially occupied by or surrounded by the Russians, and it was impossible to get the wounded out of the villages to the dressing station at Li-kuan-pu. They were consequently collected into some of the houses occupied by the Japanese, and a dressing station improvised in which all the medical officers of the battalions present worked. The number thus collected before dark was so great that when the bearer battalion came up it was unable to remove all the wounded during the cover of darkness without aid. A company of infantry, therefore, that had been sent to Yu-hung-tun with a supply of ammunition, was ordered to come back with each man either carrying one of the wounded on his back or helping in

carrying a stretcher. In this way 1,029 wounded were taken back to Li-kuan-pu during the night.

On one occasion, namely, at Ta Yu-shu-pu (D. 2 E.), from the 6th to the 8th March, the dressing station of the 5th Division bearer battalion was merged into No. III. Field Hospital, the medical officers of the former dressing the wounded as they came in, while the medical officers of the latter recorded the cases. This is the only occasion in my experience in which a dressing station has been so merged. The circumstance seems to have arisen from the fact that the dressing station was originally opened in this village on the 5th March, when the troops were to attack Sha-to-tzu and when they were expected to hold a position east of the unfinished railway embankment. They were, however, driven back to the west of the embankment and the dressing station did not move forward as expected. In the meantime, No. III. Field Hospital had come to the village in anticipation of the dressing station moving on. Under the circumstances, while the attacking line remained without any appreciable advance until the 9th March, the wounded were brought direct to the field hospital and not through the dressing station.

The work of evacuating the wounded from the battalions to the main dressing stations was performed as usual by the stretcher squads of the divisional bearer battalions, but, as in previous battles, the majority of the wounded straggled back on foot.

In evacuating the main dressing stations to the field hospitals Chinese labour was used as much as possible. Even Chinese carts were employed. The pay of the coolies was 1·50 *yen** daily, or double what the coolies on the line of communication were getting.

According to the regulations, the bearer battalion should perform the double duty of evacuating from the battalions in the fighting line to the dressing stations, and from the latter to the field hospitals, but one of the lessons that has been learnt in this war is that a bearer battalion of two companies with 160 men and 40 stretchers each is unable to do more than evacuate the dressing stations. The battalion commander has therefore come to utilise local transport for evacuation to the field hospitals. Thus the regimental one-horse carts, returning empty for fresh supplies of ammunition, &c., would, in some cases, be used. In other cases, notably in connection with the 8th Division, some of the wounded were sent back to Hei-kou-tai on sledges on the ice; but the usual method was to employ Chinese coolies, Chinese carts, and improvised or regulation stretchers. But frequently the bulk of this duty of the bearer battalion was avoided altogether by field hospitals being moved up to the dressing station as the line advanced, thus saving all transport of severe cases from the dressing station to the field hospital.

The evacuation of field hospitals to stationary field hospitals or line of communication hospitals was carried out, as described

* 1 *yen* = 2*s*. 0½*d*.

in previous reports, by the sick and wounded transport service sections. In the battle of Mukden this duty seems to have been performed with remarkable rapidity. Thus, a "wounded" transport section had come up to Ku-cheng-tzu (C. 4) on the morning of the 2nd March, and was clearing out the wounded from No. IV. Hospital even during the heavy snowstorm. So rapid was the evacuation from this hospital that, although it had received over 1,000 wounded on the 1st and 2nd March, it was able to close on the 4th and move forward to the area of the third phase of the battle and open there at Tu-tai-tzu (D. 2), some 20 miles in advance, two days after leaving Ku-cheng-tzu.

The transport section engaged in this work had 50 Chinese carts equipped with blankets and quilts, and 50 Annam stretchers, similar in general construction and method of carrying to the Lushai dandy, in addition to ordinary and improvised stretchers. The wounded that were able to walk went on foot, and the hospital to which the evacuation was taking place was a stationary field hospital, afterwards a line of communication hospital at Lang-tung-kou, only three miles further back, which had been opened on the 26th February on the line of evacuation to Liao-yang, to which the wounded were eventually sent by road.

The general disposition and movements of the mobile medical units during the battle are shown on the map, and the units opened day by day in each division may be seen at a glance in the graphic charts appended. (Appendix I.).*

The transport material allowed to the field hospitals was on a very liberal scale, in consequence of the necessity of making preparations for severe cold. Thus, in addition to the regular field hospital transport of 22 one-horse carts, each field hospital had 21 Chinese carts loaded chiefly with blankets and warm quilts.

The reserve medical store depots were also pushed up, and there was no apparent deficiency of medical and surgical material.

It is not intended to give details here of the surgical work of the field hospitals, but its main features both in this and in previous battles were dry antiseptic or aseptic dressings, absence of operations of craniotomy and laparotomy, and the avoidance of amputations, or the removal of lodged missiles, except in cases of urgency.

The rate at which the wounded were dressed corresponded with what had been observed previously—namely, about eight for each medical officer in an hour. This included the work of a full record of the nature of the wound on each man's case sheet—a duty that was performed at dictation by a non-commissioned officer or by another medical officer while the case was being dressed.

One feature of the battle not noticed in previous operations was the long time taken to cremate and bury the dead. This is

* Not reproduced.

not, however, a duty of the medical service. It is mentioned to show how the Japanese avoid unnecessary hurry or trouble. The dead bodies became frozen at once, and there was therefore no urgency in the matter of burying or cremating. In fact, in some areas, numbers of bodies were seen where there had been no fighting, which must have remained there since the battle of Hei-kou-tai. It was noticed also that cremation had, in some cases, been carried out very imperfectly, much of the soft tissues being left untouched. In all cases the Russian dead were buried before the Japanese. The work was carried out by gangs of Chinese coolies.

Condition of the Russian Lines.

Many interesting facts were observed along the Russian line of retreat, from their positions in front of the 5th Division to Mukden, along the left bank of the Hun Ho as far as the unfinished railway, and in the Russian settlement in the vicinity of the Mukden railway station.

Apparently large numbers of the Russian troops on the area between the Hun Ho and the Sha Ho and near Mukden, instead of cantoning, as the Japanese did, in the Chinese villages, dug underground or semi-underground huts for the winter. There were many lines of these "dug-outs" arranged apparently for whole battalions. In some cases they were small, and the roof was so low-pitched that the accommodation was little better than that of a good-sized kennel. In other cases the huts were long and narrow and intended for a company or half company; but the usual form of hut was a somewhat small but comfortable hut, large enough for a squad or section. At one end there would be the door and at the other a window, and each hut was provided with a good stove. Considerable taste and ingenuity had apparently been used in constructing the "dug-outs," and some of them had artistic fences round them made of *kaoliang* stalks.

There were several Russian field hospitals along the line of retreat. At Chang-tan-pu (D. 3 N.) there was, for example, the 20th Field Hospital. It occupied five of the village houses. The Chinese windows had been blocked up, and small glazed windows inserted in their place. Also, the Chinese *kangs* had been removed and the bricks used for constructing stoves, on the Russian principle of construction, in the centre of the rooms, with chimneys leading through the roof or walls. The rooms used as wards had been papered and covered with pictures and decorative designs. They must have been fairly bright and comfortable. Apparently the houses must have been used as hospitals for a long time as some of the decorations were New Year and Christmas emblems.

A special bath-room had been constructed in connection with this field hospital, on the Russian system. The bath-room proper had the walls made of felt and Chinese matting, and the door was also padded so as to exclude the cold air from outside. The floor was bricked and covered with Chinese matting in strips, and there were benches round the room. It was approached

from outside through an ante-room, where there was also a bench for bathers to sit and cool themselves before going outside. An open brick stove, with a copper boiler, was apparently used for providing a hot, moist atmosphere. It was constructed in one corner of the bath-room, and two large Chinese earthenware jars had been placed on the floor alongside it, and were apparently kept filled with hot water from another boiler outside. There was a hole in the wall through which a pipe had been placed, with a funnel-like extremity outside near the boiler. The hot water was apparently poured down the funnel and led by the pipe to the jars inside the bath-room.

At Su-hu-pu, on the left bank of the Hun Ho, a mile or two up stream, there was another hospital of similar character. The class of house used was better, and a large, good operating room had been arranged in one of the houses. At Hun-ho-pu (F. 2), on the main road to Mukden from Liao-yang on the south of the Hun Ho, the remains of the 36th Field Hospital of the 55th Division were seen; also in village houses with the windows blocked up, the *kangs* removed, and glazed windows and brick stoves constructed in their stead. All these hospitals bore signs of having been rapidly evacuated during the retreat.

At Mukden, however, five hospitals remained with their complete staff. They were full of wounded men when the Japanese marched in on the evening of the 10th March. They were all in the neighbourhood of the railway station. Four of them belonged to Red Cross societies, or were of a semi-private nature under the general management of the Russian Red Cross Society's Delegate-General for Manchuria. The fifth hospital was the 43rd Military Field Hospital.

On our arrival, there were about 600 Russian and 260 Japanese wounded in these hospitals, all of them severe cases, which it was not considered advisable to remove hurriedly when Mukden was abandoned.

Of the four hospitals under the Red Cross Society, one had been equipped by the Czaritza, one by the Dowager-Empress Marie Feodorovna, and one by Countess Shuvalov, while the fourth was a small hospital with one Doecker hut belonging to a Russo-Dutch ambulance, similar to the Russo-Dutch ambulance that had been sent to the Transvaal during the South African war.

The two first of these hospitals occupied large barracks, similar in construction to those seen along the railway line at the various stations further south and at Port Arthur. They were arranged to contain about 500 patients each, in four rows of bed cots or stretchers. The wards looked bright and comfortable.

Countess Shuvalov's hospital consisted of two long tents or marquees, with 40 beds each in two rows, and a large tent constructed by Lefevre of Paris as an operating tent. The inside of the tents was lined with felt and Chinese matting, and the ground over which they had been pitched had been neatly paved with bricks, which were covered with strips of carpet.

The Russo-Dutch ambulance was tacked on to the 43rd Field Hospital. This hospital, which was constructed about 300 yards south of the railway station and close to the main line, was of a peculiar and interesting construction, and plans of it are appended.* These will explain the construction better than any description. The ward huts were two in number, and each could contain about 500 patients, lying on the earth platforms shown in the plans. These platforms were simply formed by digging trenches and leaving blocks of earth between. A pent roof was then pitched over the whole, made of wooden boards covered with earth, and the ward was then practically finished. I was informed that the reason for the adoption of this form of construction was the fact that there was a scarcity of wood for the construction of walls, and the device of using the ground got rid not only of this difficulty, but also of the difficulty of finding wood for the construction of bed platforms. The passages formed by the trenches were paved with bricks, and the interior was warmed by brick stoves. The construction of the roof was considered faulty, and fears were expressed that when the thaw came it would leak. This was exactly what happened, and when the hospital was subsequently taken over by the Japanese, the whole of the roof was reconstructed, and a roof of galvanised iron put on.

A hospital of exactly similar construction was seen afterwards at the Su-chia-tun railway station, between Mukden and the Sha Ho. The Japanese used it as a line of communication hospital after the battle.

The *personnel* of the Red Cross Society's Hospitals were under the direction of the Delegate-General of the Society for Manchuria, M. Goutchkov, a Moscow banker. M. Goutchkov had taken over the duties from M. Alexandrovski shortly before the operations leading to the capture of Mukden. He was assisted by three assistant delegates, and had under him 17 medical officers, 32 nursing sisters, and 60 male attendants.

Altogether the number of non-combatants captured at Mukden, including the staffs of the hospitals, is given as 70 officials of officer's rank, 657 of lower rank, 32 nursing sisters, and two priests. Of this number, 47 officers, 359 of other ranks, nine of the nursing sisters and the two priests, were delivered over at the Russian outposts on the 26th March, under Article III. of the Geneva Convention. The remainder were sent down the line at their own request, and were eventually handed over to their own consul at Chefoo, through the French Consul at Ying-kou.

The *personnel* of these hospitals lived in the barrack buildings or in "dug-outs," but a number also occupied Mongolian huts or "*kibitkas*." A large number of these huts had been brought to Mukden. They are circular in shape and domed, the framework of the walls being light telescopic wood frames opening and shutting like "lazy tongs." The dome was formed by sticks radiating from the centre of the roof to these side frames. A thick felt covered the frames and roof. The huts are easily

* Appendix IV.

erected, taken down, packed and carried, and require very little transport.

Many of the Russian wounded in the hospitals were men on whom craniotomy had been performed. The senior medical officer of the Czaritza's Hospital was Dr. Butz, who had studied in the Edinburgh School of Medicine. He informed me that the Russian surgeons regarded the performance of craniotomy early as of much importance. This confirms observations made in the Russian hospitals in Port Arthur, and contrasts somewhat with the Japanese practice. Laparotomies, on the other hand, were not attempted.

Several amputations had to be performed on account of suppuration, and also on account of frost-bite. There were many distressing cases of the latter, notably four men who lost both their feet and both their hands from frost-bite.

Dr. Butz also informed me that the Japanese rifle bullet did little damage, and that men used to ride into hospital with bullets through the lungs without any apparent distress. The Japanese shell fire, and especially the high explosive Shimose shells, on the other hand, caused severe injuries, especially during the latter days of the fighting.

These Russian hospitals were placed under Japanese administration after the occupation of Mukden, No. II. Field Hospital of the 5th Division taking over the hospitals in the barracks on the 13th March, and No. IV. of the 4th Division the 43rd Field Hospital and the Russo-Dutch ambulance on the same date. Countess Shuvalov's Hospital was at first under the nominal administration of No. II. Field Hospital, but it was afterwards closed and became the head-quarters of the sick and wounded transport service section of the 5th Division. The Russian establishments continued to carry on their work under the Japanese until sent back on the 26th March. During that period the utmost harmony prevailed amongst the two establishments.

When the railway line to Mukden was opened for traffic, the station became the head of the line of communication, and the hospitals were then taken over by line of communication hospital establishments. This event took place about the 23rd of April.

Many examples of the Russian sick and wounded transport material were seen along the line of retreat and at Mukden. The most interesting of these were the bogie trucks of the light field railways. These railways had been thrown out from the main line and its branches in every direction to the various Russian positions. For example, a line started at Ta Wang-chiang-pu (D. 3) from the railhead of a branch line from Su-chia-tun to that village, and extended to Chang-chuang-tzu, opposite Chang-tan. The latter part of this line had been laid on the ice of the Hun Ho, and was apparently used to carry ammunition to the guns that had been placed along the banks of the river at Chang-chuang-tzu. When the 5th Division arrived in pursuit of the Russians at Ta Wang-chiang-pu on the 3rd March, over 100 of the light railway bogie trucks were found there. Fifty of them were drawn up in two ambulance trains of 25 trucks

each. The floors and sides had been covered with Chinese matting, and it was evident that they had been employed in carrying the wounded away from the positions on the 1st of March and on the early morning of the 2nd. They were excellent conveyances for wounded. The draught was horse-draught, and the swingle-trees were attached to a system of springs that minimised all jolting. A large number of these trucks had to be abandoned at the ends of other lines of light field railways, and were captured by the Japanese.

It is to the use of these light railways that the rapidity with which the Russian wounded were evacuated from the positions must be attributed. Each truck measured 10½ feet by 5 feet, and could carry at least four wounded lying down.

None of the ambulance arrangements on the main line or its branches were seen. All the railway stock on these lines had been withdrawn before the arrival of the Japanese. The Delegate-General of the Red Cross Society, however, informed me that three kinds of hospital trains had been employed—(*a*) trains made up of Imperial carriages, luxurious, but capable of carrying a small number only; (*b*) ordinary hospital trains, plainly but suitably equipped; and (*c*) improvised hospital trains. The last of them left Mukden on the afternoon of the 9th March.

Many types of ambulance wagons and stretchers were seen. The best form of ambulance wagon was a light two-wheeled canvas-covered wagon, carrying four excellently-constructed cots for the carriage of four wounded lying down. It appears to have been of Swedish manufacture, and the cots bore the name of a firm, "Still, Stockholm."

Only one of these ambulance wagons was seen. It was eventually sent to Japan. The ambulance wagons of the regular military equipment were heavy four-wheeled wagons, with elaborate arrangements of springs. They were arranged to carry two lying-down cases only.

Among various articles of hygienic interest found along the Russian line of retreat, mention may be made of a large and well-organized field bakery, which was found at Ta Wang-chiang-pu on our arrival there on the 3rd March, and an establishment at Su-hu-pu that appeared to be an establishment for purifying water.

The former was in flames on our arrival at Ta Wang-chiang-pu, but its character could readily be understood. It was an establishment organised in four lines. The outer line consisted of 12 large brick-built duplicate ovens, *i.e.*, 24 ovens altogether. The next line was a line of 12 tents, one opposite each set of ovens. Each tent contained two wooden kneading troughs and a number of utensils connected with the kneading process. There was thus a kneading trough for each oven placed opposite it. The third line was a line of 18 tents, each tent covering a square, measuring 15 feet by 12 feet; they were intended for the bags of flour. The fourth line was a similar line of 18 tents; they

were intended for storing the baked loaves. One of them that had not caught fire was stacked with loaves of brown bread. The loaves were of a large size, somewhat oval in shape, and measured 14 inches long by 10 wide and 5 thick. The weight was about 10 lbs. The bread was very palatable.

According to the measurements of the stack of loaves and the size of the loaf, each tent in the last line must have been intended for the reception of 3,000 loaves approximately. In this way the bakery could store in the line of loaf tents about 54,000 loaves, which may be taken as the capacity of the establishment. It is understood that one of these 10-lb. loaves is a daily ration for four men, so that the bakery was capable of supplying rations for a force of over 200,000.

What was supposed to be a water purification establishment at Su-hu-pu consisted of:—(*a*) an installation of four large coppers, 32 inches in diameter, fixed on brick fireplaces, each of these boiler constructions measuring 42 inches wide by 45 high and 57 long; (*b*) an upright iron boiler, 42 inches high and 46 in diameter. It was marked "Patent No. 6473" and with the name of a firm in Kiev, F. E. Marr and M. V. Slootka, No. 434; (*c*) ten cylindrical metal tanks, each 4 feet long and 32 inches in diameter. Two rail-like rings were fixed round these cylinders, at the central portion, and 14 inches apart from one another. They were apparently intended as rollers for running the tanks along the ground; (*d*) a quantity of alum.

It is possible that the establishment was a soup kitchen and intended for the supply of the hospital in the village, but the presence of the alum implied that it had at any rate something to do with water purification. The installation was in the open air in the compound of a village house, in which a quantity of tins of the preserved meat ration had been stored. This store was on fire at the time. The tins in it bore dates from 1898 to 1903.

Amongst the material captured at Mukden and during the pursuit to the north of the city there were many of the Russian regimental travelling soup kitchens, which are so well-known from Russian manœuvre reports. But there was also one of special construction for hospital purposes. It was larger and heavier than the regimental pattern kitchen, and contained four instead of a single boiler. The boilers were, however, smaller and of different sizes. They were evidently intended for four different kinds of soups or diets, which could be kept ready and accompany mobile units. Were it not for the weight of the vehicle, the kitchen appeared a useful addition, especially in cold or wet weather, to the equipment of dressing stations or field hospitals.

To describe the many varieties of stretcher and articles of Russian hospital equipment seen during the pursuit would occupy too much space in this report. It may be sufficient to say that there appeared to be no lack of material, and that it was of the most modern description.

Working of the Geneva Convention.

The Geneva Convention did not seem to have much application, except in the case of captured hospitals and establishments, such as those at Mukden. Indeed, it is doubtful if the Articles of the Geneva Convention go any further than this. In the case of the captured hospitals, its provisions were most rigidly carried out both in the letter and in the spirit by Japanese and Russians alike. The Japanese wounded found in them were receiving the greatest care and attention from the medical staff and nursing sisters. The Japanese, on their side, interfered in no way with the work of the hospitals, so long as the Russian staff remained in them, and gave them every facility for carrying on their work. On the 26th March, as already noted, all who wished were delivered over at the outposts under Article III. of the Convention.

But during the actual fighting, tales were told of outrage to the wounded, none of which I am able to confirm from personal observation. Comments were made on the manner in which some of the Russian wounded were left on the field by the Japanese. Cases of this kind, which were seen, were cases of men with severe wounds of the brain in which the skull was shattered and the brain substance protruding; cases in which there was total unconsciousness, and in which death was more or less imminent. A peculiar custom amongst the Japanese must be mentioned in order to understand the reason of such cases being left on the field. It is considered a special honour to be killed outright in battle, and this honour is given to all wounded who are so hopelessly injured that they die a few hours afterwards, even if they have been received into the dressing station and treated there. Such cases are always returned as "killed," not as "death from wounds." It is therefore not considered inhuman to leave on the field a case so hopelessly injured that death is likely to occur within an hour or two. All the energy of the medical service and bearer battalion is directed towards bringing in the wounded who are likely to survive, before dealing with the hopelessly injured. In one place, three Russians were found on the field where they must have lain out wounded all night. They were not hopelessly wounded, but in this case an orderly of the Medical Service was near at hand, and was waiting the arrival of stretcher parties to bring them in.

The tales commonly told against the Russians were to the effect that they deliberately fired on stretcher parties and convoys of Chinese carts carrying wounded back. It is true that not only Chinese carts with wounded, but also stretcher squads, came under severe shell fire at times, and under circumstances that would give rise to the impression that the fire upon them was deliberate. But much of this can be explained by reference to Appendix III.*

* Not reproduced. It showed that the road from Hsiao Yu-shu-pu (D. 2) *viâ* Ta Yu-shu-pu and Tu-tai-tzu to Su-hu-pu, by which the wounded were sent back, passed behind the Japanese batteries which were under fire from Mo-chia-pu.

The road from Tu-tai-tzu to Tu Yu-shu-pu (D. 2 S.E.) from the 4th to the 9th March was traversed by a continuous stream of troops and transport going northwards, towards the front lines, and also by many parties of wounded going back to the hospital at Tsai-chia-pu, or to the stationary field hospital at Su-hu-pu. The Russian batteries used to sweep this road and its stream of traffic every morning about nine o'clock, sometimes when there were convoys of wounded on their way back. The circumstances were not such, however, as to indicate that their intention was other than to intimidate the traffic along this route, and delay as much as possible, the Japanese operations.

The foreign attachés with the 5th Division were informed that some Russians, during the dust-storm of the 9th March, got behind the Japanese advanced line and found a number of wounded at a temporary dressing station near the embankment west of Sha-to-tzu (E. 2) and bayoneted them there. This may have been the case, but I had no opportunity of confirming the statement.

Condition of the Chinese at Mukden.

On the arrival of the Japanese at Mukden, the city was found crowded with refugees. The Scotch Presbyterian Mission alone was housing and feeding 8,000 of them. They received grants of money and grain for the purpose from the Chinese Governor, and subsequently, too, from the Commander-in-Chief of the Japanese Manchurian Armies.

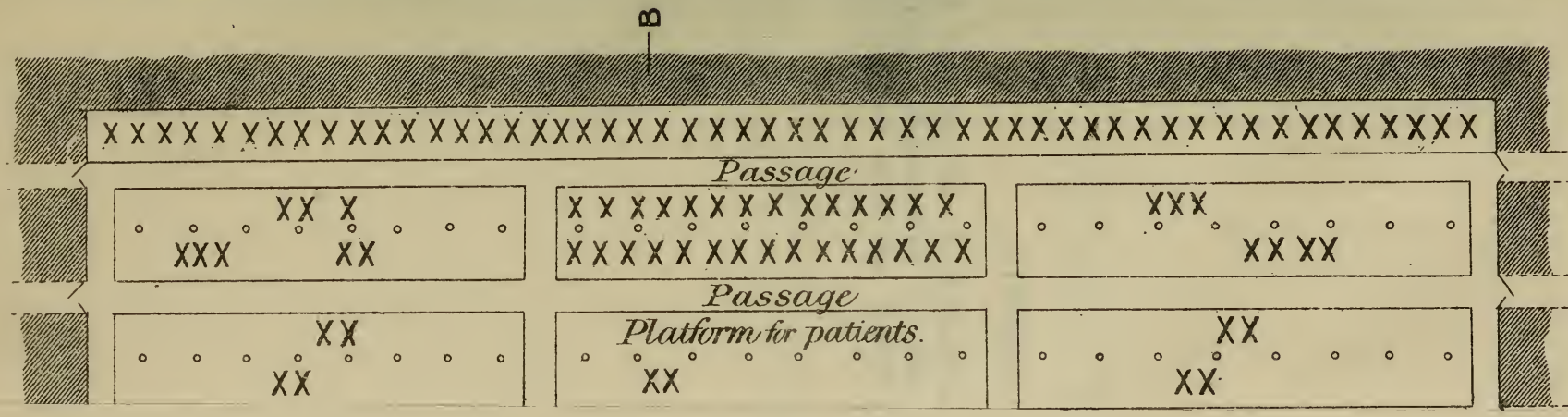
The overcrowding and destitution amongst these refugees had given rise to severe epidemics. Typhus fever, scarlet fever of a malignant type, measles, and small-pox were specially prevalent. There was little enteric fever, however. The mission doctors had also under their charge a number of Chinese men, women and children, who had been wounded. There had been much fighting along the walls of the city, to the south-east, where the mission premises were, and shrapnel and rifle bullets entered the compounds of the Chinese houses in this neighbourhood.

A number of serious injuries were also seen that had been caused by lads and children playing with hand-grenades that they had found, and the nature of which they did not understand. Many injuries also occurred from the handling of live shells, numbers of which could be seen all over the area of the operations.

face page 220.

Appendix IV.

Plan of Semi-underground Russian Field Hospital Ward as seen at Mukden.



(a)

Plan of floor, sh
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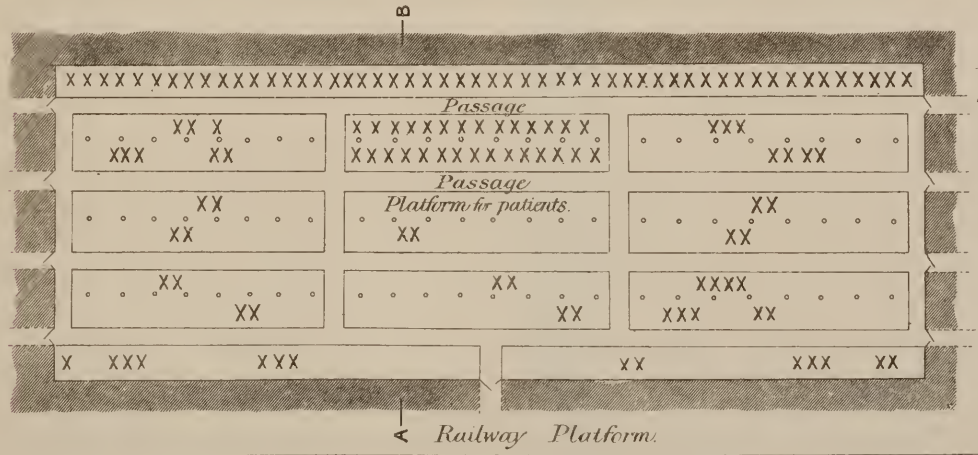
forms for the pati
to lie on.

X—Patients.

To face page 220.

Appendix IV.

Plan of Semi-underground Russian Field Hospital Ward as seen at Mukden.



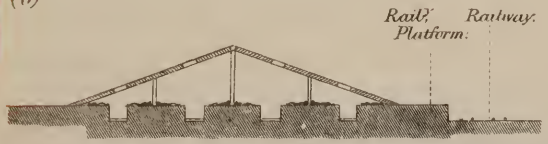
(a)

Plan of floor, shewing passages cut in the ground, and blocks of earth between, as platforms for the patients to lie on.

X—Patients.

Scale: 1-25 ft, approx.

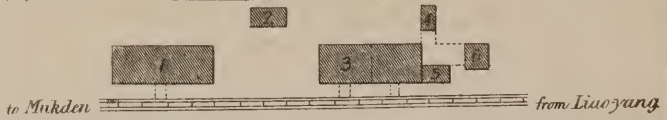
(b)



Section at A-B of (a), same scale.

(c)

Block Plan not drawn to scale.



1. Ward shewn in (a) & (b). 2. Operating rooms.
3. Similar Ward to 1, but divided, one half being under the Russo-Dutch Ambulance.
4. Doecker Hut of R-D. Amb. 5. Operating room. 6. Kitchen.

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APPENDIX V.

TABLE showing the ADMISSIONS to DRESSING STATIONS and FIELD HOSPITALS of the SECOND JAPANESE ARMY during and after the BATTLE of MUKDEN.

APPENDIX V.

TABLE showing the ADMISSIONS to DRESSING STATIONS during and after the

Division and Medical Units.	March				
	1st.	2nd.	3rd.	4th.	5th
4th Division. Dressing Station. No. 1 Company	175	346	97	356	165
4th Division. Dressing Station. No. 2 ,,		250	48	215	132
4th Division. Field Hospitals. I.	—	—	—	520	46
4th Division. Field Hospitals. II.	—	—	—	—	II.[1] 192
4th Division. Field Hospitals. III.	3	6	2	21	189
4th Division. Field Hospitals. IV.	—	360	224	140	—
Total Admissions to Field Hospitals	3	372	226	681	427
5th Division. Dressing Station. No. 1 Company	88	168	52	22	—
5th Division. Dressing Station. No. 2 ,,	806	388	144	35	55
5th Division. Field Hospitals. I.	—	—	226	I.[1] 79 I.[2] 24	19 1
5th Division. Field Hospitals. II.	—	430	72	1	—
5th Division. Field Hospitals. III.	315	259	3	—	450
5th Division. Field Hospitals. IV.	406	597	—	—	—
Total Admissions to Field Hospitals	721	1,286	301	104	470
8th Division. Dressing Station. No. 1 Company	213	217	72	92	482
8th Division. Dressing Station. No. 2 ,,	505	125	11	189	282
8th Division. Field Hospitals. I.	—	651	—	I.[2] 101	I.[1] 28 I.[2] 158
8th Division. Field Hospitals. II.	716	73	34	3	—
8th Division. Field Hospitals. III.	3	1	—	9	III.[1] 559
Total Admissions to Field Hospitals	719	725	34	113	745
3rd Division. Dressing Station. No. 1 Company	—	—	—	—	—
3rd Division. Dressing Station. No. 2 ,,	—	—	—	—	—
3rd Division. Field Hospitals. II.	—	—	—	—	—
3rd Division. Field Hospitals. IV.	—	—	—	—	—
Total Admissions to Field Hospitals	8	—	—	—	—
Grand Total of Admissions to Field Hospitals	1,443	2,383	561	898	1,642

Grand Total of wounded requiring evacuation

APPENDIX V.

and Field Hospitals of the Second Japanese Army Battle of Mukden.

March							
6th.	7th.	8th.	9th.	10th.	11th.	12th.	13th.
141	712	104	—	—	—	—	—
—							
—	—	—	—	—	—	393	3
229	54	2	—	—	—	—	—
	II.[2] 87	592					
366	245	296	61	2	27	—	—
—	—	185	—	—	—	—	468
595	386	1,025	1	2	27	393	471
—	—	—	329	62	—	—	—
259	—	—	92	23	—	—	—
1	—	—	—	—	—	—	—
—							
—	—	—	—	57	—	—	—
439	70	—	417	75	—	—	—
185	237	142	391	33	—	—	—
625	307	142	808	165	—	—	—
368	317	46	10	25	—	—	—
593	357	104	11	—	4	243	—
322	587	86	45	—	—	—	—
3							
—	162	67	2	2	—	105	1
193	604	11	—	—	—	—	698
518	1,353	164	47	2	—	105	709
83	22	1,029	—	29	—	—	—
—	—						
—	—	252	803	78	8	1	1
—	—	1,145	5	18	58	4	—
—	—	1,397	808	96	66	5	1
1,738	2,046	2,878	1,724	265	93	503	1,181

from the Second Army Field Hospitals, 17,255.

(9) Evacuation of Wounded after the Battle of Mukden.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, 21st January 1906.

Plate.

Diagrammatic plans showing the lines of evacuation.

Appendix.

Tables, showing the positions of the various medical units.

The accompanying diagrammatic plan and tables were obtained officially, in reply to questions that were submitted to the Head-Quarters Staff of the Second Army. There was much delay in obtaining them, and consequently they were not available for submission with the report on the medical arrangements of the battle of Mukden.

They are, however, of value as an addendum to that report, in showing the distribution of the mobile medical units, namely, the reserve medical personnel, the sick and wounded transport units, and the medical and surgical reserve depôts (all of which are mobilized as divisional units and placed under the Line of Communication Command) during and immediately after a great battle.

The villages named in the tables, with the exception of Ta Pa-chia-tzu, are shown on the plan, so far as their positions relative to one another are concerned. Their exact positions can be ascertained by reference to the general map of the battle.

All the field hospitals are not shown in the plan, as the positions occupied temporarily by many of them are the positions taken up subsequently by some of the stationary field hospitals.

Stationary field hospitals were opened, either by the complete reserve medical personnel of a division or by one or more of the three sections into which it is divided.

Similarly, the work of a sick and wounded transport unit, or of a medical and surgical reserve depôt, might be carried on

by the complete divisional unit or by one or other of its three sections acting at independent points along the line of evacuation or supply.

Evacuation along the line of railway was not carried out by the sick and wounded transport units, but by the Staff on the Line of Communication.

The transport material used consisted of field stretchers, Annam dandies or Chinese carts, and bearers of stretchers and dandies and drivers of carts were locally hired Chinese coolies and carters.

The plan explains other details of evacuation, and some notes on the subject are already embodied in the report on the medical arrangements during the battle.

APPENDIX.

The positions of the various medical units of the Second Japanese Army on the Line of Communication during and after the battle of Mukden, with the dates of opening and closing for the purpose of receiving and evacuating wounded and supplying medical and surgical material to the Field Army.

I.—*Stationary Field Hospitals.* (*Reserve Medical Personnel.*)

Position.	Date of Opening.	Date of Closing.
Liu-tang-kou	17th October*	9th March.
Hsiao-yen-t'ai	16th February†	8th ,,
Ku-ch'eng-tzu	4th March	8th ,,
Te-sheng-ying-tzu	8th ,,	10th ,,
San-chia-tzu	7th ,,	13th ,,
Su-ho-p'u	7th ,,	20th May.‡
Su-ma-p'u	3rd ,,	8th March.
Wai-chia-p'u	7th ,,	11th ,,
Shu-lin-tzu	9th ,,	29th ,,
Tsui-chia-p'u	10th ,,	8th May.‡

* Opened at time of battle of the Sha Ho, and remained open throughout the winter.

† Opened about one week before the commencement of the battle of Mukden.

‡ Date of closing is not quite certain.

II.—*Rest Stations.*

Positions.	Date of Opening.	Date of Closing.
Lang-tung-kou - - -	13th March - -	10th April.
Shu-lin-tzu - - -	29th „ - -	10th May.
Ta-ying-pan - - - -	16th February -	13th March.

III.—*Line of Communication Hospitals.*

Positions.	Date of Opening.	Date of Closing.
Lang-tung-kou - - -	24th February -	13th March.
Hsiao Kuei-hsing-p'u - - -	22nd March -	1st June.
Liao-yang - - - -	(Opened after the battle of Liao-yang, September 1904, and the head of the Line of Communication for other armies besides the Second Army).	

IV.—*Sick and Wounded Transport Units.*

4th Division	No. 1	section,	headquarters	at	Liu-tang-kou.
	„ 2	„	„	„	San-chia-tzu.
	„ 3	„	„	„	Shu-lin-tzu.
3rd Division	„ 1	„	„	„	Te-sheng-ying tzu.
	„ 2	„	„	„	Wai-chia-p'u.
	„ 3	„	„	„	Tsu-chia-p'u
*6th Division	„ 1	„	„	„	Hsiao Yen-t'ai.
	„ 2	„	„	„	Ku-cheng-tzu.
	„ 3	„	„	„	——
8th Division	„ 1	„	„	„	Su-ma-p'u.
	„ 2	„	„	„	Su-ho-p'u.

* The 6th Division was transferred to the Fourth Army, and the 5th Division joined the Second Army in its place. The sick and wounded transport units of these divisions, however, remained on the line of communication of their original armies.

To face page 226.

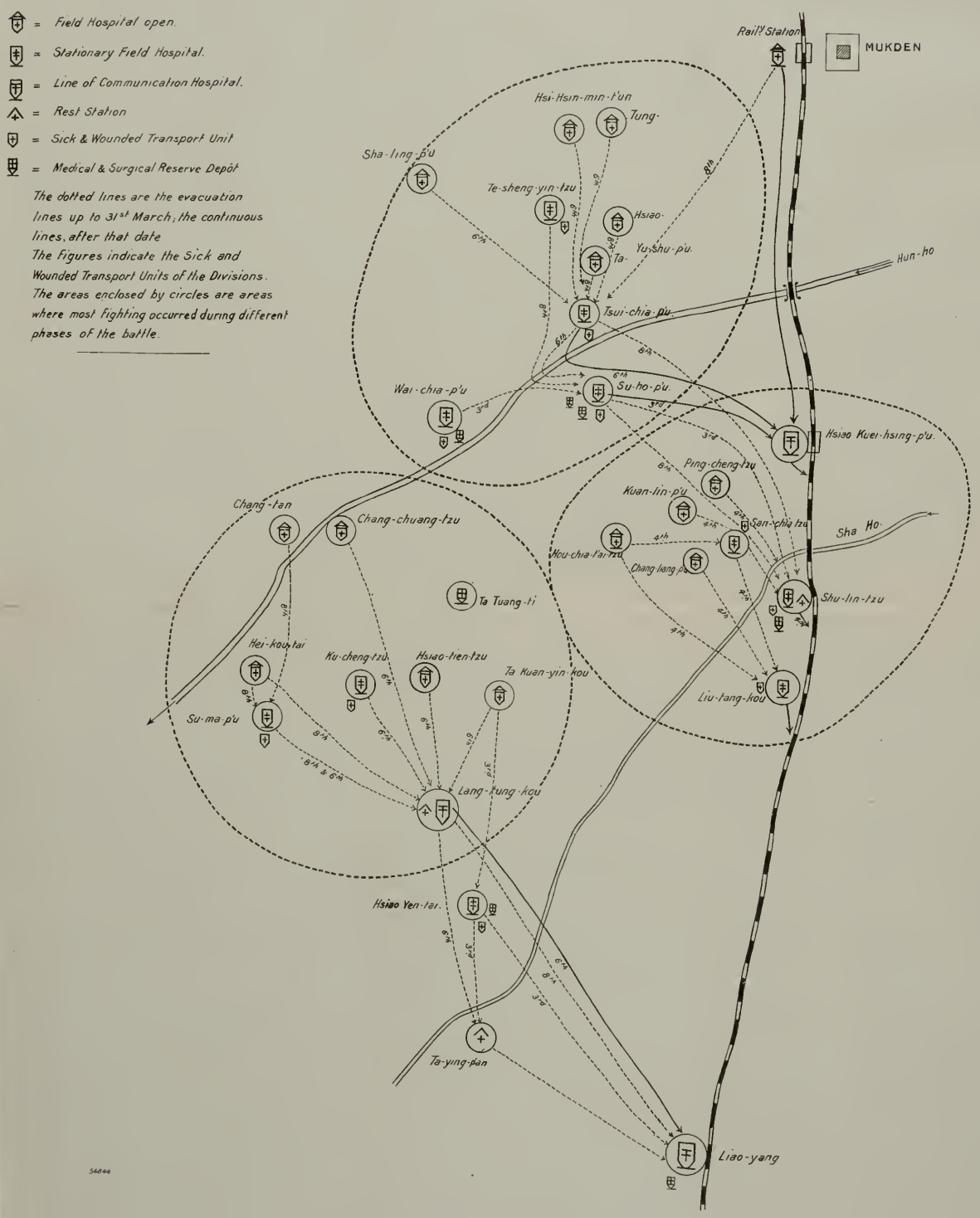
e Army during

PLATE

To face page 226.

DIAGRAMMATIC PLAN

shewing lines of Evacuation of the Wounded of the Second Japanese Army during and after the BATTLE OF MUKDEN



V.—*Medical and Surgical Reserve Depôts.*

3rd Division	No. 1 section	at Liao-yang.
	„ 2 section	„ „
	„ 3 section	„ „
4th Division	No. 1 section	„ Hou Pa-chia-tzu.
	„ 2 section	„ Su-ho-p'u.
	„ 3 section	„ „
*6th Division	No. 1 section	„ Ta Huang-ti.
	No. 2 section	„ Ta Huang-ti. / Shu-lin-tzu.
	No. 3 section	„ Shu-lin-tzu.
8th Division	No. 1 section	„ Hsiao Yen-tai.
	No. 2 section	„ Hsiao Yen-tai. / Wai-chia-p'u.
	No. 3 section	„ Su-ho-p'u.

* *See* note under IV. The Medical and Surgical Reserve Depôts of the 6th and 5th Divisions were not transferred when their divisions were transferred.

(10) The Medical Arrangements for the Evacuation of Sick and Wounded of the Second Japanese Army in the District round Chang-tu during the Summer of 1905.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, 19th February 1906.

Plates bound in text.

Plan, showing general scheme of Hospitals, Rest Stations, and Lines of Evacuation in district occupied by the Second Army.

1. Photograph. Carriage of patients.
2.* " " "
3. " " "
4. " Cantonment Hospital, exterior.
5.* " " " reception tent.
6. " " " interior.
7. " Country cart used for sick.
8. " " " " " "
9. " " " " " "
10. " " " " " "
11. " Convoy of Field Stretchers and Carts.
12. " Patients on Field Stretchers.
13. " Patients halted on way to Rest Station.
14. " Convoy of sick and wounded.

Battalion medical units opened battalion sick rooms and treated there the regulation three classes of patients, namely, (1) those that required admission into the sick room, (2) those that were required to attend daily for treatment, and (3) those that were reported sick for the first time and were marked medicine and duty. If patients of class (3) reported three days running, they had to be taken into class (2) or (1). If class (2) or (1) did not have a prospect of being fit for duty within a few days, or if acute symptoms occurred, they were sent to their cantonment hospital and shown as admissions to hospital, as distinct from admissions to the sick room.

One or more field hospitals opened as cantonment hospitals, into which all cases sent from the battalions were admitted for treatment, or for evacuation to the line of communication.

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* These have not been reproduced.

They had sections for the isolation and treatment of enteric fever and dysentery cases; and, as a rule, none of these cases were evacuated until they were convalescent. Other cases likely to recover within two or three weeks were kept in the hospitals and treated there. The rest were sent to collecting rest stations, opened by the sick and wounded transport department units, for evacuation to the line of communication and for further conveyance to the reserve hospitals in Japan.

Battalion bearers and bearer battalions carried the patients, who were unable to walk, to the sick rooms and field hospitals. The hospitals, which evacuated to collecting rest stations formed by the sick and wounded transport department units, had to make their own arrangements for conveying the patients there. As a rule they hired country carts, and sent the sick to the collecting rest station under the charge of a non-commissioned officer or orderly of the hospital staff. The distance was in some cases considerable, three to five or more miles.

Each division had one of its field hospitals open as a cantonment hospital, but half field hospitals were also opened as rest stations, where patients might be kept, for a day or two only, on their way from their battalions to the cantonment hospital or line of communication.

The sick and wounded transport department units continued the process of evacuation to the line of communication. North of the Liao Ho this was done by the unit belonging to the 6th Division, although, at the time, its division belonged to the Fourth Army on the right, *i.e.*, on the east of the railway line. A collecting rest station was pushed up into the district between Chang-t'u and the Liao Ho to the village Ch'ien-ssu-fang-t'ai. Another rest station was formed at Tzu-lin-tzu on the Ch'ing-shui Ho, about half way between the advanced rest station and the railway station of Kai-yuän.

At both these rest stations patients would be kept overnight or longer, if necessary, and convoys would be formed there for evacuation from the advanced rest station to the rest station at Tzu-lin-tzu, and from the latter to the railway station, whence the patients went by rail to Tieh-ling, where there was a large line of communication hospital.

The 4th, 3rd, and 5th Divisions and a reserve brigade had cantonment hospitals in the area north of the Liao Ho, but other divisions came into the area towards the autumn. The medical arrangements of these were not observed. They appeared to be in the district immediately to the west of the railway line and north of the Ch'ing-shui Ho.

The 8th Division occupied an area south of the Liao Ho, where it opened cantonment hospitals and rest stations, which evacuated to Kou-t'ai-tzu on the Liao Ho, where the sick and wounded transport unit of the 3rd Division had an advanced rest station. The same unit opened another rest station at Pa-li-t'un, between the Liao Ho and the railway station of

Hsin-t'ai-tzu, and near the latter. The patients were taken to the railway trains there, whence they were conveyed to the line of communication hospital at Mukden.

The patients both in sick rooms, cantonments hospitals, and rest stations were accommodated in Chinese village houses.

The transport material in use during the evacuation of the sick and wounded consisted of stretchers, both regulation pattern and improvised, the form of dandy known as the Annam stretcher by the Japanese, and Chinese country carts, some of which were fitted with straw mattresses and with covers.

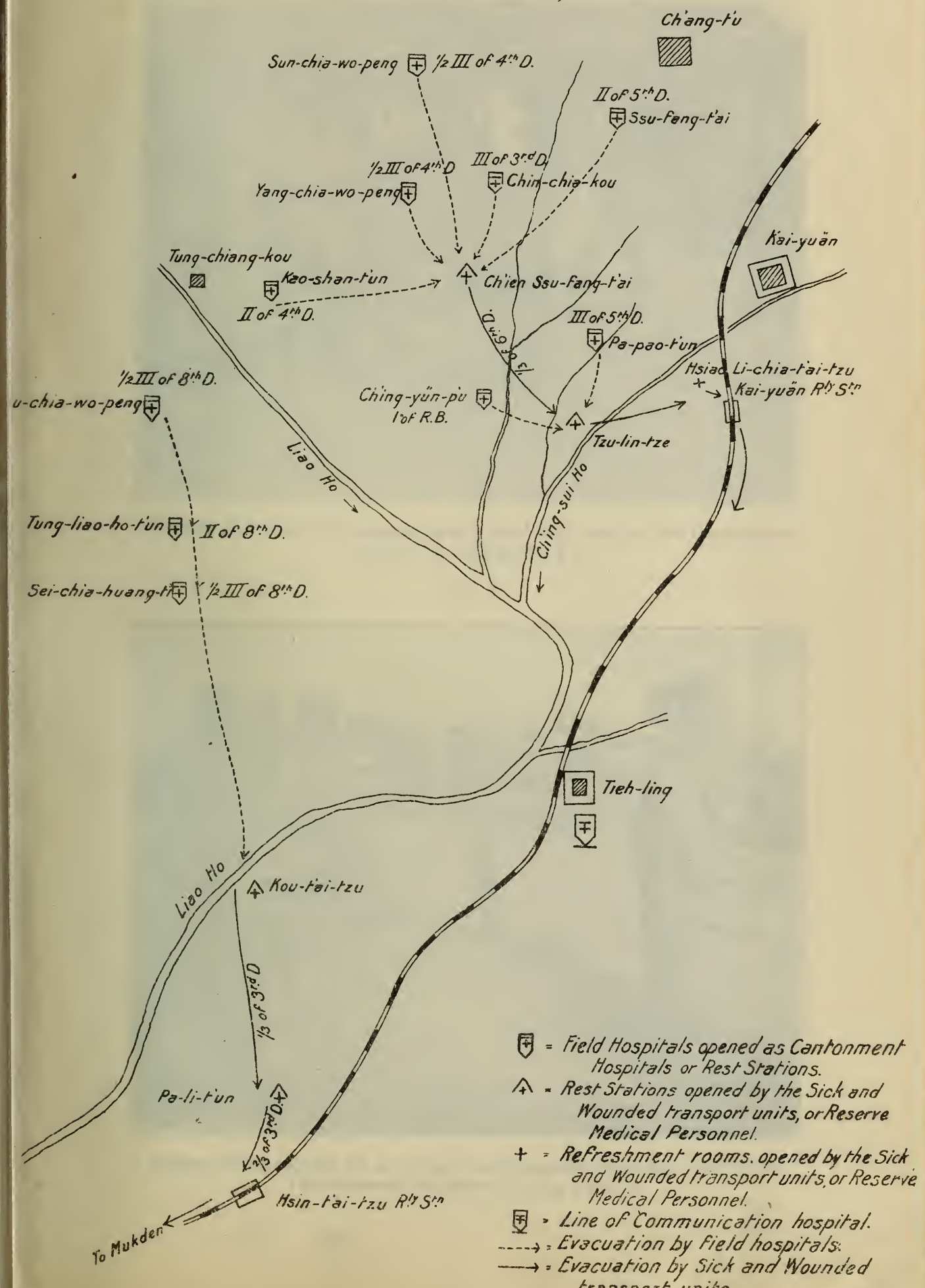
Occasionally patients were seen being carried pick-a-back to the cantonment hospital by a comrade. Many went there on foot.

Twelve photographs illustrating these arrangements and a plan of the various evacuation positions in the district are appended.

To face page 230.

PLAN SHEWING THE GENERAL SCHEME OF CANTONMENT HOSPITALS, REST STATIONS AND LINES OF EVACUATION IN THE DISTRICT OCCUPIED BY THE SECOND ARMY DURING THE SUMMER 1905.

(Scale about 6 miles to the inch.)



[*After page* 230.

Photographs to accompany notes on the medical arrangements in the district round Ch'ang-t'u.

No. 1.

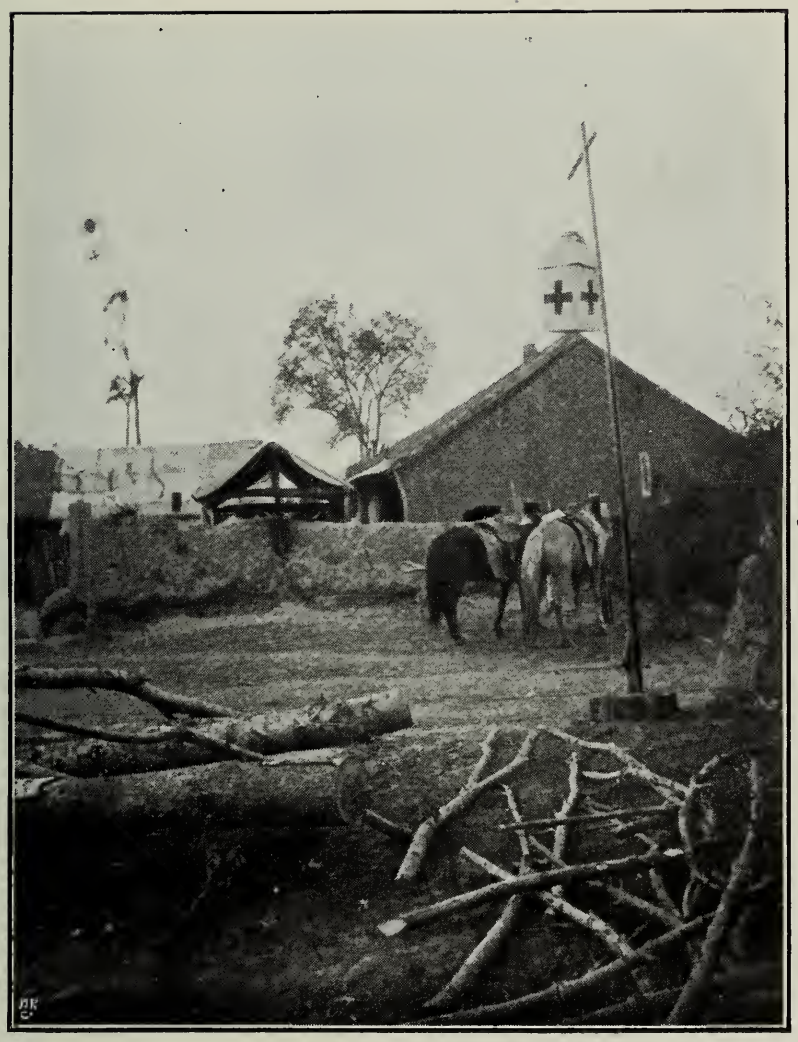
Patients on foot and pick-a-back going from their unit to the Cantonment Hospital at Ch'ing-yŭn-p'u.

No. 3.

Patient being carried in an improvised stretcher from his unit to the Cantonment Hospital at Ch'ing-yŭn-p'u.

[After page 230.

No. 4



Outside the Cantonment Hospital, Ch'ing-yŭn-p'u.

[*After page* 230.

No. 6.

Ward in the Cantonment Hospital at Kao-shan-t'un.

The patients are lying on the K'ang or brick platform, heated in winter by the flues from the fireplace.

The ward is one of the rooms of a Chinese house in the village.

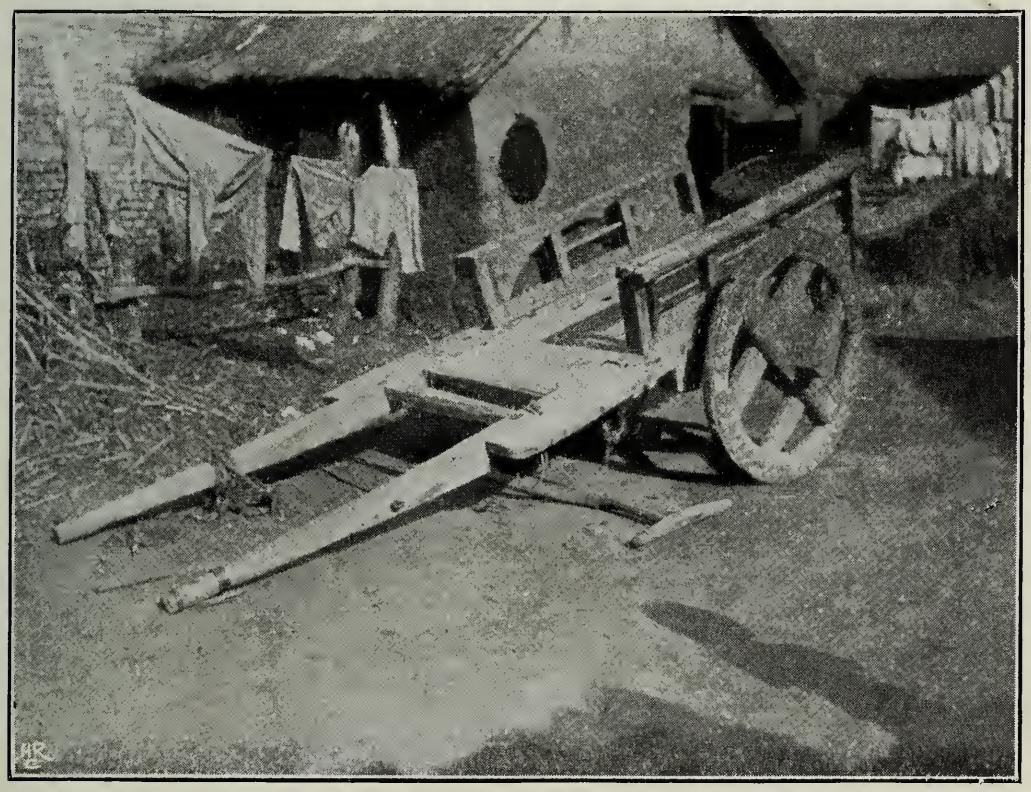
[*After page* 230.

No. 7.

Chinese cart used by the Cantonment Hospital (No. III. Field Hospital of 3rd Division) at Chin-chia-kou for the transport of sick and wounded to the collecting rest station at Ch'ien Ssu-fang-t'ai.

The cart was photographed on its way back to the hospital after handing over the patients at the latter village.

No. 8.



Showing the general character of the Chinese cart. Photograph 7 is the same cart with mattress and cover added.

[*After page* 230.

No. 9.

Same cart as 7 and 8, showing detachment of wheels from body.

No. 10.

Body of cart of photograph 9, showing the bearings of the axle.

These photographs are intended for the purpose of illustrating the absence of springs or other contrivance for the prevention of jolting.

[*After page* 230.

No. 11.

Convoy of Chinese carts and field stretchers, with covers, and Chinese coolies as stretcher bearers, drawn up in the street of Ch'ien Su-sfang-t'ai, waiting for patients from the rest station there.

No. 12.

Stretchers, of photograph 11, loaded, ready to move off to Tzu-lin-tzu.

[*After page* 230.

No. 13.

Patients on stretchers, halted on military road between Ku-ch'eng-p'u and Ch'ing-yŭn-p'u on their way to the Cantonment Hospital at Pa-pao-t'un; or rest station at T'zu-lin-tzu.

[*After page* 230.

No. 14.

Convoy of sick and wounded Japanese, showing carriage of lying down cases on improvised stretchers.
The Chinese bearers are hired locally.
(This photograph was received from Surgeon-General Fujita, principal medical officer of the 4th Army).

(11) The Collection of Wounded.

TRANSLATION of NOTES made by two Japanese Medical Officers; forwarded by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, Manchuria, June 1905.

The following notes were obtained for me unofficially from two battalion medical officers who have been through the battles of the Second Army. They are given, freely translated, in the form in which they were received.

A.—NOTES OF FIRST MEDICAL OFFICER.

(1) *Collection of Wounded in Open Ground.*

Past experience has shown that it is very difficult while fighting is going on, especially in the day-time, to carry wounded from the place where they fall, over open ground, on stretchers. Therefore it has been the custom to carry them by hand up to a point where the stretchers can begin to work. This point is usually about 100-110 yards behind the fighting line.

The first line of medical assistance (*postes de secours*) is placed as near to the fighting line as possible, and the point from which the stretchers begin to work is the best place to select for this.

It is a good plan to place these aid points in the rear of the two wings and not in the centre of the line. In fact, experience shows that the rear of the centre is the most dangerous place of all.

It is impossible to lay down any hard and fast rule as to the distance between the fighting line and the battalion dressing station. This must be left entirely to the judgment of the medical officer, the condition of the roads, and the nature of the country. The rule for guidance is to select a point in the rear of the fighting line. I was always able to establish my dressing station within 600–700 yards of the first line, except at the battle of Mukden, in the neighbourhood of Mi-chia-pu, where the ground was so flat that I could not get nearer than 850 yards. In consequence of this I had often to go out under heavy fire to the point where the stretchers started to give advice and

direct matters. Whenever this was done, the men seemed greatly relieved, and the presence of the medical officer amongst them had a good effect. The lesson that is to be learnt from this is that it is the duty of the medical officer to expose himself to risk as much as the combatant officer.

The time at which most casualties occurred was just when the battalion was preparing to make its final rush. In tactics, the point for this, theoretically, is 550 to 750 yards from the enemy's line, but in practice the distance varied according to circumstances. At this time the front of the battalion does not extend more than 440 yards. Fortunately, therefore, one dressing station in rear is sufficient.

Since, however, the South African tactics have been introduced, the line of attack has greatly extended and a company which formerly had a front of 100 yards now extends much further. A battalion has thus extended in the attack more than 1,000 yards. The distance, also, between the echelons in the fighting line has been increased; but, even with this increase, casualties occurred from shell fire during the advance and made it very difficult for the medical officers to collect all the wounded quickly.

Under such circumstances everything depends upon the judgment of the medical officer, who has charge of the duty of collecting the wounded, and on the soundness of his instructions and arrangements. It is necessary for him to enter the zone of fire himself, as the number of men of the medical service and stretcher bearers with the battalion is small. It is also very important that he should keep in touch with the fighting line. Accordingly, when a battalion is extended in South African formation, it is best to establish more than one point of first aid (*poste de secours*). By this means he will be able to keep in touch with the fighting line.

(2) *Collection of Wounded in Hilly Country.*

It is much easier to select a battalion dressing station in hilly country than in open country. Besides, the unit advances on a smaller front and preserves this small front at the point where the final rush commences.

On the other hand it is more difficult to carry the men to the rear, and this makes it necessary to bring the dressing station as near the front line as possible. In hill fighting the advancing line used to form up just below the ridge of hills and under cover of the ridge. Sometimes the battalion dressing station was able to come close up to this line, so that it was not necessary to form minor *postes de secours*. In my experience, however, this happened very seldom.

In hilly country it was found very difficult to carry stretchers. A battalion had frequently to separate into two isolated units, on account of the nature of the ground. It was necessary, under these conditions, to form more than one *poste de secours*.

(3) *Collection of Wounded during Night Attacks.*

Night attacks are always made with the object of bringing matters to a decision. They are always made in close formation. In such cases the medical officer is always told the particulars of the ground over which the attack is to be made, and he must then select beforehand the exact place where he will have his *poste de secours*, so that a better service of collecting wounded to it may be kept up and touch maintained with the fighting line.

As examples of night attack experiences, it may be mentioned that during the attack on Hung-pao Shan in the battle of the Sha Ho, I arranged the *poste de secours* beforehand, but my plans were all upset by the enemy taking us in the rear. In fact many casualties occurred in the *poste de secours* on that occasion.

At Ta-shih-chiao, when I had little experience, it took the whole night to collect 40 men. Now I simply laugh at my inexperience then. One reason why I failed to collect the wounded rapidly was that both my men and myself used to speak to one another and call out to one another during the night. This attracted the attention of the enemy, who concentrated their fire on the spot where voices were heard. Besides, I was foolish enough to use lights. Experience tells me that one must be very careful during night attacks in the use of lights at *postes de secours* or in the collection of wounded.

One point in favour of the medical arrangements of a battalion during night attacks is that the *postes de secours* can be converted into the battalion dressing station at a very early stage. In selecting the place for the *poste de secours* a place must be selected that is readily found in the dark.

It should be a spot near to the place where the battalion has arranged to concentrate for the final assault.

(4) *Collection of Wounded during Defensive Actions.*

I have had very little experience of these, but in one of the villages during the battle of Hei-kou-tai, where the battalion was attacked by a large force of the enemy, I found it very easy to arrange *postes de secours* because defensive works could be made. One must avoid on these occasions the top of any elevated position and the vicinity of isolated trees or buildings.

(5) *General Conclusions.*

(*a*) The time of year must be considered in selecting the place for a *poste de secours*, viz., a shady spot in summer, a protected spot in winter.

(*b*) The distance from the fighting line must be as short as possible, but this must be regulated by the condition of the fighting and of the enemy. It should always be possible to place it within 650 yards of the fighting line.

(*c*) One *poste de secours* is not sufficient for a battalion. There must be more on account of the greater extension of line under present attack formations.

(*d*) The selection of a suitable *poste de secours* is much easier in hilly than in open country.

(*e*) The removal of wounded is, on the contrary, more difficult in hilly than in open country, and takes a longer time. Besides, one cannot depend on obtaining local means of transport, such as country carts.

(*f*) In night attacks the *poste de secours* must be at a place easily found.

(*g*) The best place for a *poste de secours* during a night attack is close to the point at which the battalion concentrates for the assault.

(*h*) The selection of *postes de secours* during a defence is simple.

B.—Notes of Second Medical Officer.

It is almost impossible to conceal from the enemy the position of a battalion or other dressing station. It is also an extraordinary fact that the enemy appeared to concentrate their fire on these places, both rifle and and artillery fire; also, although this may seem incredible, they fired on the wounded when they were being carried back.

On this account we began to carry back our wounded during the night time only, when fighting in the open country.

We had not the same experience in fighting in the hills. On such occasions we found it easy to conceal our positions.

The medical service of the line of communication and of the field hospitals is regulated chiefly by the condition of the roads and the accommodation available in houses. The open country is, therefore, better for such services than the hills. In the armies operating in the hills several line of communication hospitals and rest stations had to be formed along the line of route.

One detached force had to carry its wounded by hand, with much expenditure of time and labour, in a place where local carts could not be used.

The conclusion that I make is that the medical service in the fighting line is simpler and easier in hilly than in open country, whereas the opposite is the case with regard to the medical service in the rear. In hilly country the hours taken to collect and evacuate the wounded are shorter as regards the service in the fighting line, but longer as regards the service in the rear. My general conclusion is that fighting in open country, notwithstanding the difficulties of the medical service in front, is more favourable to the wounded than fighting in hilly country.

These notes refer to experiences in a Division which fought with the Second Army as far as Ta-shih-chiao, with the Fourth

Army operating in hilly country during the Liao-yang and Sha Ho fighting, and again with the Second Army in the plains during the battles of Hei-kou-tai and Mukden. Apparently, the medical officer of the battalion, about which the first series of notes is made, arranged for first-aid stations (*postes de secours*) in addition to the battalion dressing station. In fact, he appears to have arranged four lines of assistance within the battalion—(1) a line of carriage by hand up to 100 yards behind the fighting line; (2) a line of carriage by the regimental stretcher bearers; (3) *postes de secours* within 650 yards from the fighting line; and (4) the battalion dressing station outside that zone.

The notes regarding night attacks are of considerable interest. It appears that the medical officers arrange beforehand to go to a certain point during the night near to the place from which the assault will be made, not necessarily following the movements of the battalion in doing so. The point is evidently selected before dark and pointed out to the men in daylight, if possible.

The remark regarding the necessity of avoiding the centre rear of an attacking line for the selection of the point to which the wounded are collected is important, as is also the remark regarding the necessity of doubling the number of such *postes*, when rapidity of collection is necessary to enable the medical officer to keep in touch with his battalion.

The remarks about the necessity of silence and of using no lights that can be seen by the enemy in connection with collecting the wounded during the night are also interesting and important.

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(12) Port Arthur: Medical Arrangements of the Third Japanese Army during the Siege.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B.
Royal Army Medical Corps, 24th April 1905.

Plates.

Appendix.

The following notes are compiled from information given to me by the principal medical officer of General Nogi's Army, by the principal medical officer of the Liao-tung garrison, whose head-quarters were at Dalny, and by the hospital authorities at the large base hospital at Dalny, and from personal observations made during an inspection of that hospital on 4th and 5th February 1905. The introductory narrative is taken from a lecture given to the military attachés of the northern Armies by one of General Nogi's staff officers outside Port Arthur, on the occasion of a visit to Port Arthur after the capitulation.

General Narrative.

The Army that besieged Port Arthur was formed after the battle of Nan Shan (27th May). It consisted at first of two divisions, the 1st and the 11th. On the 8th June 1904 it occupied the line of hills from An-tzu Shan to Tai-tzu Shan, west of Dalny.

On the 26th June the 11th Division attacked and took, after stubborn resistance and with a loss of some 200 men, the hills Wai-tou Shan and Chien Shan. The Russians tried to recapture the latter on the 3rd, 4th, and 5th July, but failed in the attempt, losing about 1,500 to a Japanese loss of about 600.

About the middle of July the besieging army was reinforced by the arrival of the 9th Division and other troops. On the 26th July it attacked the line Shuang-tai-kou, An-tzu Ling, and Ta-po Shan. The fighting lasted till the 28th July, and the army had about 3,000 casualties. After the engagement it advanced and occupied the railway station at Chang-lin-tzu, and the line to Ying-ko-shih and Tiao-yu-tao. The Russians held the hills Feng-huang Shan to Lang Shan, south of Chang-lin-tzu. The Japanese attacked and occupied these hills on the 30th July and the Russians then retired into their line of main defences.

The Japanese now occupied their besieging line from Hsiao-tung-kou on the right to Shui-shih-ying (Suishihin) in the centre, and Wu-chia-fang-tzu on the left, and waited the arrival of the siege artillery. The railway line was then open from Chang-lin-tzu.

A general bombardment commenced on the 19th August. This was followed by an attempt to take the fortress by assault. This took the form of a series of surprise attacks on the mornings of the 21st, 22nd and 23rd August. The assault failed in its main object, and the Japanese casualties amounted to 15,000 in round numbers.

Attempts to take the fortress by assault were then abandoned, and on the arrival of heavy siege guns the regular siege operations commenced on the 1st September.

On the 19th September the 203 Metre height was taken with a loss of 6,000 men, but was recaptured by the Russians three days later.

A general attack was made from the 26th October to the 2nd November, resulting in a loss of 15,000 men, and in a further advance of the besieging line.

A final general attack from the 26th November to the 6th December resulted in the occupation of the 203 Metre height for the second time. The casualties during this attack were 10,000.

Since then no general attack was made, but one fort after another of the Russian main defences was taken on the 28th December, 31st December, and 1st January, with comparatively small losses, and the fortress capitulated.

In round numbers the besieging Army lost 55,000 men during these operations, of whom 20,000 were killed and 35,000 wounded. The Russian killed were estimated at 12,000. No estimate was made of the number of their wounded.

General Sanitary Conditions.

The sanitary condition of the besieging army was always a matter of anxiety, because of the more or less stationary character of the army, and the consequent accumulation of *excreta* and other refuse in its immediate surroundings. Nearly all the soldiers in the first line lived in underground bombproof shelters, and there was great difficulty in keeping up a high standard of sanitation in and around these places. Water was scanty, and obtained chiefly from small springs, streams, and surface wells. Orders were issued to all units to see that only boiled water was drunk, and that fæcal matter was buried with lime and refuse burned. No special apparatus was provided for boiling or cremation, and the unit concerned had to make its own arrangements.

The general aspect of the country is rocky and barren, differing essentially from the alluvial, cultivated plains, studded with well-to-do villages, over which most of the fighting of the Manchurian armies in the north had taken place. The villages appeared poor and were comparatively few. Consequently they were not of much help in the establishment of field hospitals behind the besieging lines. At first the hospitals used tents, but the majority of the tents were destroyed by the fire of the enemy, and the hospitals had to retire to lines further back.

The chief prophylactic used by the army was the creosote pill. A box of these was issued monthly to each soldier, and he was ordered to take one three times daily with each meal. The use of these pills caused in time both gastric pain and diarrhœa, besides imparting an objectionable smell to the breath. On this account the principal medical officer was of opinion that a very careful study of the results of their use must be made after the war, in order to determine whether they are worth the expense of providing them. The cost, he stated, was very considerable. At present nothing has transpired with regard to their prophylactic value. The amount of epidemic disease has undoubtedly been very small, but official opinion is extremely reticent as to the cause of this, or as to how far the creosote pills may have contributed towards the result.

The chief disease was beri-beri. In the opinion of the principal medical officer it was due to rice. In the hot weather, both during transport and after issue to the men, the rice was with difficulty kept from fermenting. Surgeon-General Ochiai laid much stress on the importance of mixing the rice with wheat or barley, and from September onwards this was done throughout the army. Beri-beri diminished from that time, and he attributed this to the issue of barley with the rice. It is noted, however, that the disease became less prevalent generally as the weather became colder.

General Organization of the Medical Services.

As regards the positions of the various medical units, the battalion and main dressing stations were in the trenches or shelters in the vicinity, the field hospitals had no fixed positions, but moved about from time to time according to the condition of the fighting, while the stationary field hospitals remained throughout in the villages where they were originally opened. There were three field hospitals with the right and left divisions, and four with the central division. The stationary field hospitals were three in number, one for each division, that for the right division being at the village Shan-chien-p'u, for the central division at Tsao-chia-t'un, and for the left division at Lung-kou.* All these villages are situated behind the ranges of hills that covered the positions of the heavy siege guns. The establishment of the stationary field hospitals was formed of the reserve medical personnel of each division.

The divisional Sick and Wounded Transport Committees and the Reserve Medical and Surgical Store Depôts were stationed near the stationary field hospitals.

The sick and wounded were collected from the dressing stations, either direct or through the field hospitals, into the stationary field hospitals, and those not likely to recover within a short time were evacuated from these latter to a line of communication hospital at Chang-lin-tzu, and thence sent by rail to Dalny, where there was a large base hospital. From there they were sent to the reserve hospitals in Japan by hospital ships or transports, partially arranged for carrying sick and wounded.

Dalny Base Hospital.

The "Line of Communication" hospital, as it is called, at Dalny, was opened on the 24th June 1904. It was gradually expanded, and at the time I visited it, in the beginning of February 1905, it was the largest of the Japanese hospitals in Manchuria. It formed then three sections, namely, the Head-Quarter Section, No. I. Section, and No. II. Section. There was accommodation for 7,000 patients, and, if necessary, this could be expanded to 10,000.

The establishment consisted of 60 medical officers, 10 apothecaries, 85 non-commissioned officers of the medical service, and 296 sick attendants and others. This establishment included three relief sections (male) of the Japanese Red Cross Society, each consisting of two medical officers, one apothecary, two wardmasters, and 20 sick attendants, representing an establishment for the care of 100 patients. No female nurses were employed.

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* *See* Plate 6.

From the 25th June to 3rd February, 130,686 patients had been admitted into the hospital. Of these, 122,610 were sent to Japan, 2,915 died, and 2,174 were discharged cured. The admissions were, for wounds 55,671, for infectious diseases 2,541, for beri-beri 45,068, and for other diseases 27,406. Details of the admissions up to the end of December are given in the appended table.*

From this table it will be seen that a considerable number of the admissions came from the armies in the north after September. The principal base, however, for these armies was Liu-shu-t'un, on the opposite side of Ta-lien Bay.

(*a*) The Head-Quarter Section.

This section of the hospital occupied the main portion of the public and other buildings near the Dalny railway station. The site was on a cliff overlooking a branch of the bay, and was the chief residential part of the Russian town. The buildings occupied included the old Russian hospital, the cathedral, the Dalny Club Hotel, the Eastern Chinese Railway Company's offices, the quarters for railway officials and employés, and a street of villas.

The administrative offices, dispensary, kitchens, mortuary, bath-room, operating room, disinfecting rooms, and laboratories were in the Russian hospital buildings and adjoining villas, or in temporary structures in its grounds. The cathedral and Club Hotel were kept for sick and wounded officers, and the remaining buildings for N.C.O.'s and men, and for the hospital establishments. The section had altogether about 30 buildings.

The following details of some of the accessory buildings may be of interest :—

Kitchen.—This was in a large temporary shed and was well equipped for preparing, cooking, and distributing the diets. The apparatus for cooking consisted of 23 coppers in fixed fireplaces, and 6 field kitchen coppers. They were capable of cooking 2,000 diets at one time.

The diets were of four kinds: (1) Rice and wheat mixed and cooked dry; (2) Rice cooked dry; (3) Rice cooked as a thick soup or porridge; (4) Bread. All other foods are considered accessories to the rice diets or their equivalent in bread. In the mixed rice and wheat diet the proportion of wheat is three parts to four of rice.

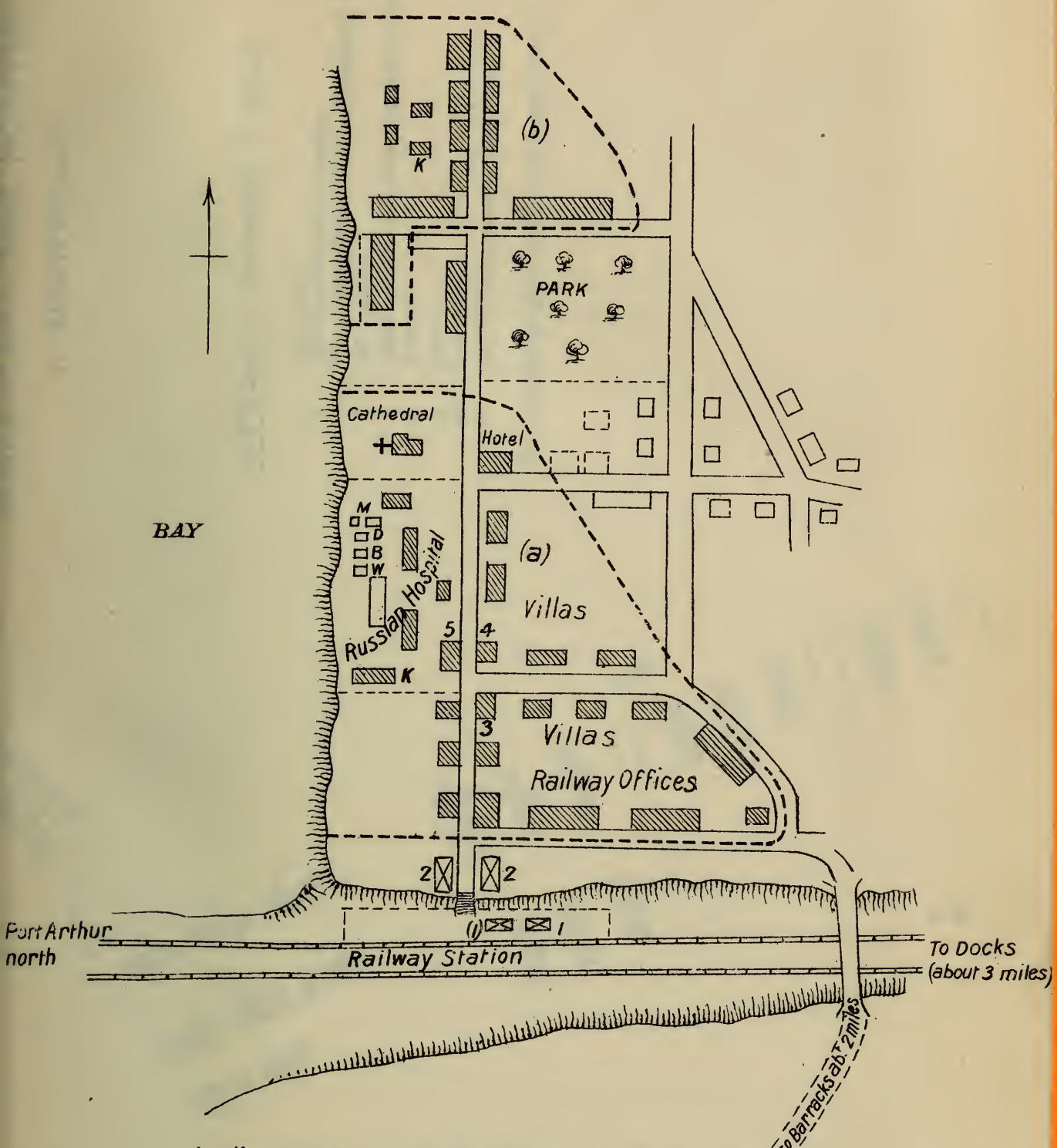
The diets were issued in three meals—morning, mid-day, and evening. The last was the principal meal, but, at each, two or three kinds of accessories were served. For example, the

* *See* Appendix, page 248.

To face page 240.

BLOCK PLAN OF BASE HOSPITAL AT DALNY.

DIAGRAMMATIC; NOT DRAWN TO SCALE



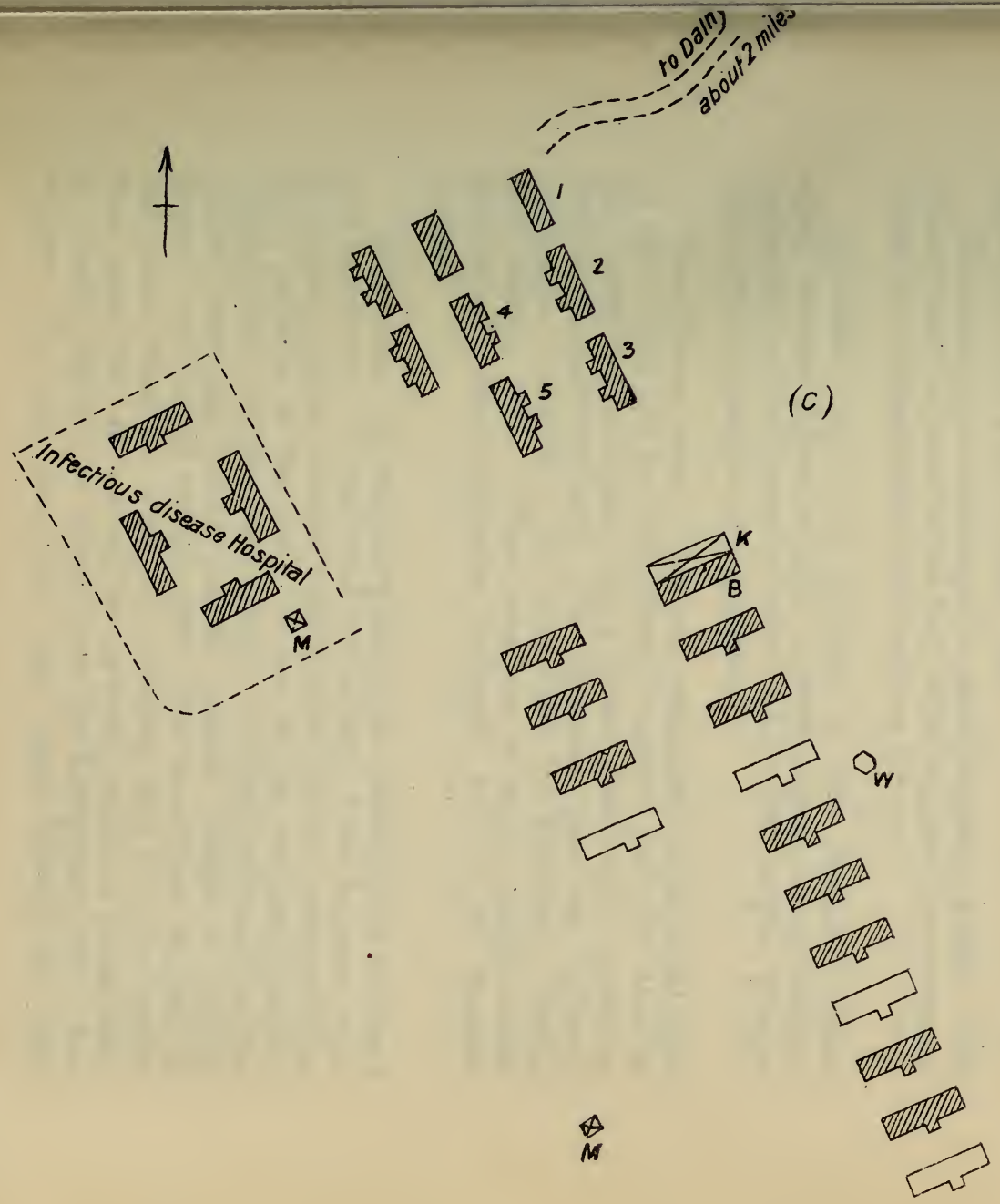
(a) Head-Quarter Section – Shaded blocks within thick dotted line next to railway.

3 - Laboratories
4 - S.M.O's quarters
5 - Dispensary
K - Kitchen
W - Washing place for dressings
B - Bathroom
D - Disinfecting room
M - Mortuary

(b) No. 1. Section; within thick dotted line north of park:– all the blocks are artisans' dwellings

Departure sheds. (1). on Railway platform
Arrival sheds (2) above Railway station

BLOCK PLAN OF BASE HOSPITAL AT DALNY. (Contd)



(c) No. II Section. Barracks S. of Railway

1	Officers
2	Wards for serious cases
3	Hut with operation room, dispensary & stores
4	Itch wards
5	Reading rooms (for patients about to be discharged
K	Kitchens
B	Baths
M	Mortuary
W	Well (80' deep sunk in Nov 1904.)

The unshaded Barrack blocks were in ruins

following are the diet accessories arranged for the 5th and 6th February:—

5th February:—

Morning meal—Fresh cabbage, *miso* (a sauce made of beans), and pickles.

Mid-day meal—Sardines and cabbage.

Evening meal—Pork, radish boiled in *miso*, ginger.

6th February:—

Morning meal—Beans, potatoes, and pickles.

Mid-day meal—Bean curd, lettuce boiled with eggs, *miso* sauce.

Evening meal—Beef, potatoes, lettuce, and giant radish.

These accessories vary for each day of the week. Tinned salmon and other fish are the commonest of them.

Cases of serious illness or wounds, unable to take the ordinary diets and accessories are fed on such extras as eggs, milk, rice broth, port wine, and rum.

The meals were distributed in meat tins made locally. The rice or "diet" is placed in the body of the tin, and the accessories in the two compartments of the tray on the top.

Operation room.—The mortuary of the Russian hospital, which was well lighted and had a good concrete floor, had been converted into an operation room with modern aseptic fittings. There was no Röntgen ray apparatus.

Disinfecting room.—This was constructed in the usual style of two rooms, one for the infected material and the other for the disinfected material, with a steam disinfecting apparatus fixed in the partition wall. The apparatus used was Vaillard's ("*Système Vaillard*") and was made by Flicoteaux, Borne, and Boutet, Paris. There was also a small upright steam disinfector. The equipment belonged to the old Russian hospital.

Bath-room.—A temporary shed with concrete floor was used as a bath-room. It was fitted with a bath of the Japanese type, *i.e.*, a large, square, wooden bath divided into two compartments by a partition in the hut. In one of the compartments the heating stove and flue were placed. The bath was used by the patients according to their national custom. Before the bath is entered, the body is rubbed with a wet towel and buckets of hot water from the bath are douched over it. The bather then enters the bath and sits in the water, which is hotter than is usually capable of being borne by Europeans, for a few minutes. He then comes out and soaps himself all over,

eventually douching the body again with buckets of hot water. When the soap is removed he again enters the bath and stays as long as he pleases, but there is no soaping or washing the body in it. That is all done outside the bath.

Mortuary.—There were two mortuaries, one for officers and the other for other ranks. They were both similarly constructed, but the former was considerably smaller than the latter. They were corrugated iron huts beautifully decorated in the interior with illuminated writings, flowers, altar, &c., the whole of this equipment being a gift from the principal Buddhist temple in Kyoto. A wooden screen separated the bier from the main part of the hut.

On the day of my visit, the mortuary contained the body of a non-commissioned officer who had been taken off a truck on the arrival of one of the trains, frozen to death. He had been travelling in charge of some goods on the truck. In this connection it may be mentioned that the hospital was at the time of my visit full of wounded who had come from the north after the battle of Hei-kou-tai on the Hun Ho, north-west of Liao-yang, which had taken place between the 25th and 29th of January. A considerable proportion of these cases (the Principal Medical Officer said about one half) were suffering from frost bite, some of them severely. Thus I saw cases in the hospital which required amputation of the affected limb on account of gangrene from frost bite.

Bacteriological laboratory.—This occupied a room in one of the villas adjoining the hospital, but the bacteriologist, Professor Suzuki, of the Army Medical College at Tokio, was in Japan at the time of my visit, and there was very little equipment in the laboratory.

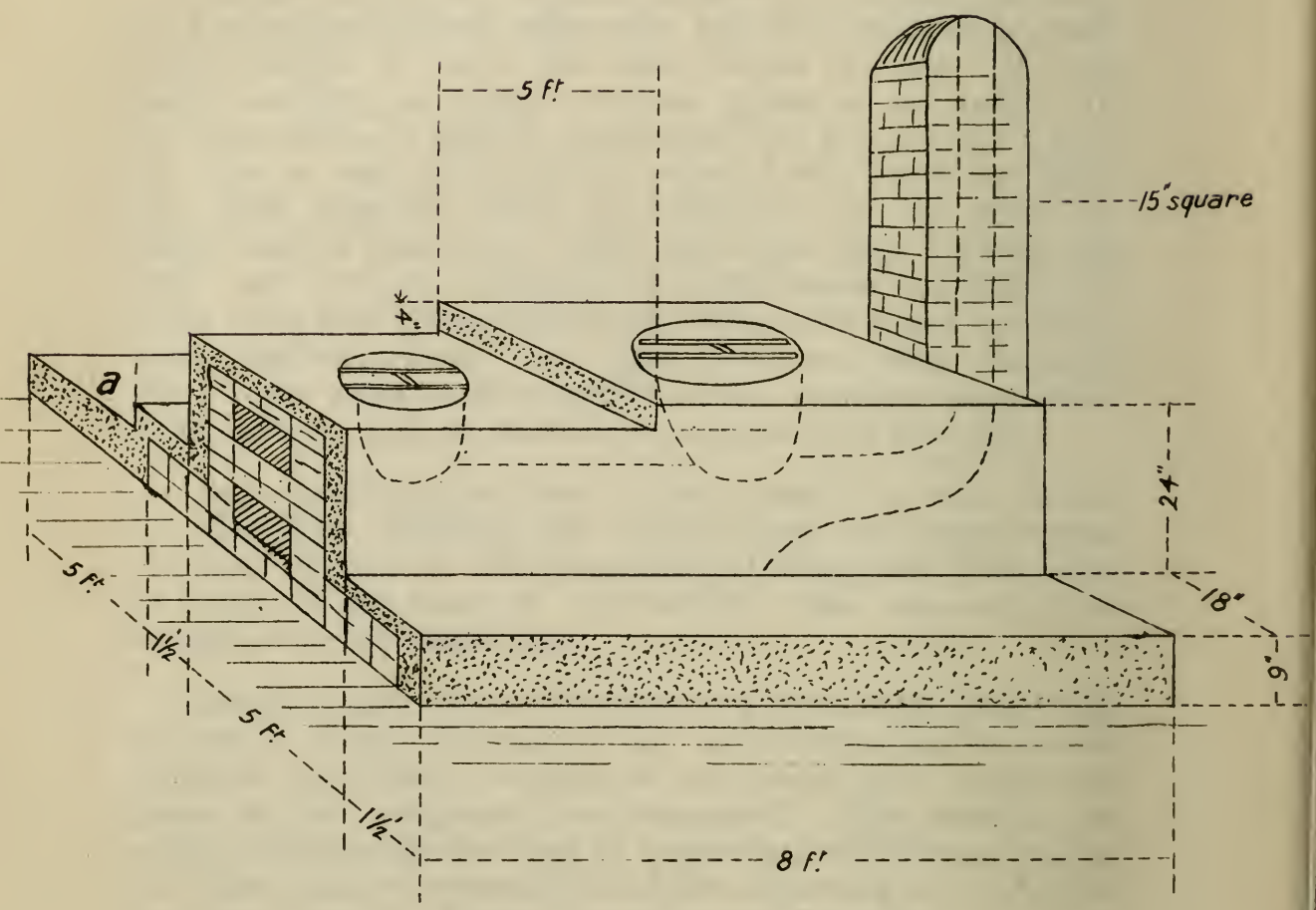
Chemical laboratory.—This was in a room in the same villa. It was in charge of one of the apothecaries, and was well equipped for detailed analysis of air, water, food, drugs, &c. Some of the equipment was improvised. For example, an empty kerosene tin was used in connection with the analysis of air, tubes being conveniently fixed for aspirating the air to be examined into it. It was a convenient apparatus on account of the ease with which its capacity can be measured.

Dispensary.—The old Russian hospital dispensary was used as the dispensary, and was admirably organized, with a waiting-room for persons waiting to have prescriptions dispensed, and lockers for each ward into which the prescriptions from the ward were placed by the ward orderly, and from which he eventually took away the medicines when they were made up. By this simple arrangement, the ward orderlies wasted no time hanging about the dispensary, but came back at a fixed time for the medicines.

To face page 243.

BASE HOSPITAL, DALNY.

SKETCH OF BOILING COPPERS FOR OLD DRESSING MATERIAL.



Diameter of small copper = 2 ft

" " large " = 2½ ft

Construction. Brick with 4" to 6" concrete on top

a = Platform for washing dressings

Arrangement for utilizing Dressings that had been used.—Much of the dressing material, such as bandages and gauze, was used over and over again by simply boiling, washing, and bleaching; and afterwards sterilizing before use. For this purpose an excellent boiling and washing place was constructed, in appearance not unlike the destructor designed for hospitals in South Africa by Colonel Rawson, R.E. The material was first thoroughly washed on the concrete platforms, then boiled in the coppers with soda, and afterwards bleached with chloride of lime.

Wards.—These varied according to the nature of the building occupied. The main ward building of the Russian hospital had been burnt down, but the Japanese were rebuilding it. Two large ward pavilions, however, remained. They had two wings, each wing forming a ward for about 30 patients. They had concrete floors, but the Japanese had built a flooring, or rather platform, of wood, over the concrete, about 18 inches high. There were no beds, but mattresses were placed on the platform and the patients lay on these with one blanket underneath them and three above. These, with a pillow, constituted the bedding, and there was no ward furniture of any kind. Two smaller pavilions belonging to the Russian hospital, one for cases of mental disease and the other for infectious disease amongst the officers, were also occupied.

The other buildings forming the Head-Quarter Section of the hospital had similar ward equipment, with the exception of the cathedral and the Club Hotel, which were used for officers' wards and which were furnished with bedsteads and bed-head tables. The cathedral had 8 beds in the main part of the interior, 2 beds in the altar, and 3, 5, and 6 beds in three accessory rooms. The building looks large and imposing from outside, but this was all the accommodation in the interior, which is comparatively small.

The Club Hotel was a small building. It had 14 beds in the saloon, and 1 to 6 in the bedrooms, of which there were about 12.

The railway offices and railway employés' quarters contained 30 or more rooms in each building, opening on to a corridor at the back. The rooms were of various sizes and accommodated from 6 to 13 patients each.

The allowance of space for each patient is calculated according to the size of the Japanese mat, which measures 6 feet by 3 feet. Three of these mats are allowed to two patients, one to lie upon and the third in between. Allowing a length of matting also between rows of patients and a regulation space of one foot from the matting to the wall, each patient gets 60 superficial feet of space. This may be taken as the normal amount of space allowed in the Japanese military hospitals. Cubic space is not reckoned.

(*b*) No. I. Section.

This section of the hospital was in the same part of the town as the Head-Quarter Section. It occupied a series of well-built artisans' dwellings, facing a public park and in an adjoining street. Three large two-storey blocks faced the park or other open space, eight smaller blocks formed the street, and two or three old single storey huts at the back were used as wards for Russian wounded. One of these older buildings had been converted into an operating room. Its floor and walls had been rendered smooth and impervious by concrete and cement, and good windows had been added to the rooms. The section kitchen was also in this part of the hospital area.

Each of the artisans' dwellings consisted of two rooms, a front and back room, opening one into the other. The entrance was through the front room, which opened on to a verandah running along the whole front of the block. Four to six patients were placed in each room, or ten in a single dwelling. One of the larger blocks had forty of these two-room dwellings and could accommodate 400 patients.

The total accommodation for the section was for 2,000.

(*c*) No. II. Section.

No. II. Section was formed in a group of barrack huts, situated on the slope of a hill about 2 miles south of the railway station.

The style of hut was similar to that of the Port Arthur infantry barrack huts, described in the notes, already submitted, of the hospitals there.* Their floors were of concrete, but the Japanese had constructed wooden platform floors in all the huts used for patients, similar to the platforms over the concrete floors of the wards in the old Russian hospital buildings of the Head-Quarter Section.

Some of the huts had been burnt down, but there were 10 good huts with normal accommodation for 140 patients each, four with accommodation for 110 each, and one hut for 80.

Some of the huts were used for the hospital accessories, bath-room, operating room, and kitchen, &c., which were arranged in most respects as in the Head-Quarter Section.

The hospital for infectious diseases formed part of this section, and occupied a group of four isolated huts. None of the cases admitted into it were sent back to Japan until complete recovery had taken place and they were free from infection. Small-pox cases, as well as dysentery and enteric fever cases, were treated here. At the time of my visit, one Russian and seven Japanese were in hospital suffering from small-pox. The total number admitted for this disease had been 11.

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* *See* page 249.

There had been one admission for anthrax, a veterinary surgeon who had become infected while making a post-mortem examination; he died three days after admission.

The bulk of the admissions had been for enteric fever and dysentery. I was unable to obtain the exact figures, and although the table appended shows apparently few, I gathered that before September many more cases had occurred, which should have been shown as admissions to this hospital. In fact the senior medical officer of the section spoke of the number of admissions for these two diseases being about 4,000, of which about 1,000 were cases of enteric fever. He also stated that the mortality for enteric fever was about 10 per cent., and for dysentery about 25 per cent. He attributed the latter high mortality to the fact that 90 per cent. of the dysentery cases were complicated with beri-beri, and also to the method of transport from the front. Although the journey by rail from the hospital at Chang-lin-tzu was comparatively short, the cases had severe relapses after it. The means of nursing such cases on the railway journey were inadequate, at any rate at first.

The total accommodation in No. II. Section was for 2,200 to 2,800. In one month, October, it received as many as 10,441 patients, and on one day, September 2nd, as many as 2,058.

A point with regard to the heating of the barrack huts may be of interest. The heating was by means of Russian stoves. The weather at the time of my visit was cold, and although the stoves had been kept constantly lighted, a thermometer in one of the wards marked a temperature of 32° F. only. The outside temperature was 20°.

Arrangements for the Arrival and Departure of Sick and Wounded at Dalny.

The railway station at Dalny is close to the Head-Quarter Section of the base hospital, and patients are conveyed there on arrival from Port Arthur and the north. But they are first taken to two large wooden sheds near the station, where they are separated into classes and thence distributed to various sections of the hospital. The classification for this distribution is: (A) Sick.—(*a*) Light cases; (*b*) Severe cases. (B) Wounded.—(*a*) Light cases; (*b*) Severe cases. (C) Mental cases. (D) Infectious cases.

The sheds were comfortably warmed by charcoal braziers in the floors, which were of earth. The stretchers, with lying-down cases, were placed across a series of benches, and, while classification was going on, warm soups and tea were distributed to the patients.

A similar set of sheds was constructed on the station platform for patients proceeding to the docks, about 3 miles further on, for embarkation.

Forty rickshaw litters, such as are described in the Report on the Medical Arrangements of the Japanese troops, China Field Force, 1900–01, were kept at the hospital Head-Quarter Section and used in connection with the conveyance of serious cases from and to the railway station sheds.

Evacuation to Japan.

In a report on the work of the medical service during and after the battle of the Sha Ho,* a note was made regarding the number and capacity of the hospital ships and transports engaged in conveying the sick and wounded from the bases in Ta-lien bay to Japan. These details need not be repeated here. Details of hospital ships have also been submitted, and there is little to add to them.

One or more of these vessels was always arriving at or departing from Dalny, and the flow of patients from the Dalny Base Hospital to the divisional reserve hospitals in Japan was constant. The base hospital was in fact only a stage of the journey home from the front, a fact which is best understood from the figures of the numbers sent back already given. The figures are equal to 93·8 per cent. of the total admissions, as compared with 1·6 per cent. discharged cured and 2·3 per cent. died.

The high percentage of those sent back to Japan and the small percentage of those sent back to their units are explained by the fact that patients likely to recover soon are not sent to Dalny at all, but are treated at the stationary field hospitals of their divisions, or at the hospitals at the head of the line of communication. Further, the best accommodation and equipment for more prolonged and special treatment are in the reserve hospitals in Japan. Practically all the beri-beri cases were sent to them, and these formed a large proportion of the cases that found their way to Dalny. The duration of the voyage from Dalny to the base in Japan is only three or four days, and the arrangement for sending such a large number home was the best under the circumstances.

Comparative Statistics.

The tables appended show a remarkably low incidence of disease in proportion to wounds. This is unusual in war, and the point has been commented upon by the Japanese. Some interesting comparisons were given to me at Dalny from a study of figures collected at the Dalny Base Hospital from the beginning of the war till the 20th October. These figures gave an admission rate for disease in proportion to wounds of 2·5 to 1. In the war with China the proportion was 56 to 1. This lowering of the disease proportion is mainly due to the

* *See* page 156.

Table showi

N.B.—Ron
Armies in Nor

Diseas

Wounds (received

APPENDIX.

Table showing the Admissions into the Base Hospital at Dalny (from 25th June to 31st December 1904).

N.B.—Roman figures = admissions from Army before Port Arthur and totals; Italics = admissions from Armies in North.

Disease.	Ranks.	25th June to 31st July.	August.	September.	October.	November.	December.	Total.	Grand Total.
Wounds (received in action)	Officers	64	377	133	79	181	205	1,039	1,637
	"	—	—	*137*	*363*	*86*	*12*	*598*	
	N.C.Os.	123	930	375	172	433	647	2,680	4,090
	"	—	—	*186*	*874*	*318*	*32*	*1,410*	
	Privates	1,376	9,989	4,810	1,905	4,147	6,836	29,063	45,836
	"	—	—	*2,565*	*10,222*	*3,631*	*335*	*16,773*	
	Others	3	8	9	3	—	2	25	41
	"	—	—	*3*	*8*	*4*	*1*	*16*	
	Total	1,566	11,304	8,218	13,626	8,820	8,070	51,604	51,604
Other injuries	Officers	5	—	1	1	4	2	13	20
	"	—	—	—	*1*	*2*	*4*	*7*	
	N.C.Os.	13	7	1	2	2	2	27	67
	"	—	—	*2*	*26*	*8*	*4*	*40*	
	Privates	220	140	196	171	64	74	867	1,903
	"	—	—	*10*	*415*	*302*	*309*	*1,036*	
	Others	7	4	4	13	7	11	46	74
	"	—	—	*1*	*5*	*17*	*5*	*28*	
	Total	245	151	217	834	406	411	2,064	2,064
Dysentery	Officers	3	5	3	3	—	—	14	14
	"	—	—	—	—	—	—	—	
	N.C.Os.	20	34	18	10	4	2	88	90
	"	—	—	—	*1*	*1*	—	*2*	
	Privates	22	578	259	297	127	9	1,499	1,520
	"	—	—	*3*	*5*	*12*	*1*	*21*	
	Others	30	3	10	43	5	2	93	95
	"	—	—	—	*1*	—	*1*	*2*	
	Total	282	620	293	360	149	15	1,719	1,719
Enteric fever	Officers	—	—	—	11	15	1	27	28
	"	—	—	—	—	*1*	—	*1*	
	N.C.Os.	—	—	—	13	16	6	35	37
	"	—	—	—	—	*2*	—	*2*	
	Privates	—	—	—	191	160	115	486	540
	"	—	—	—	*8*	*23*	*23*	*54*	
	Others	—	—	—	5	3	4	12	16
	"	—	—	—	*1*	*3*	—	*4*	
	Total	—	—	—	299	243	149	621	621
Beri-beri	Officers	2	29	67	36	20	16	170	414
	"	—	—	*7*	*90*	*92*	*35*	*244*	
	N.C.Os.	77	350	443	182	77	70	1,199	2,230
	"	—	—	*37*	*347*	*328*	*319*	*1,031*	
	Privates	1,618	6,400	5,527	2,082	1,142	889	17,658	34,179
	"	—	—	*586*	*6,098*	*5,027*	*4,840*	*16,521*	
	Others	283	485	273	267	277	411	1,996	2,355
	"	—	—	*10*	*97*	*110*	*142*	*359*	
	Total	1,980	7,264	6,950	9,199	7,073	6,712	39,178	39,178
Venereal diseases	Officers	—	—	—	—	—	—	—	2
	"	—	—	—	—	2	—	*2*	
	N.C.Os.	4	3	3	2	—	2	14	32
	"	—	—	—	*3*	*8*	*3*	*18*	
	Privates	88	48	71	73	59	78	417	1,095
	"	—	—	*12*	*214*	*279*	*173*	*678*	
	Others	7	5	6	6	4	7	35	56
	"	—	—	*1*	*10*	*4*	*6*	*21*	
	Total	99	56	93	310	356	271	1,185	1,185
Other diseases	Officers	15	26	33	51	46	40	211	521
	"	—	—	*9*	*83*	*106*	*112*	*310*	
	N.C.Os.	77	75	81	145	121	77	576	1,924
	"	—	—	*19*	*209*	*234*	*186*	*648*	
	Privates	1,184	1,173	1,155	1,967	1,269	879	7,627	16,577
	"	—	—	*449*	*2,946*	*3,787*	*2,368*	*8,950*	
	Others	65	56	83	134	129	192	659	949
	"	—	—	*8*	*72*	*108*	*162*	*290*	
	Total	1,341	1,330	1,837	5,607	5,200	3,956	19,271	19,271
	Grand Total	5,513	20,725	17,608	29,965	22,247	19,584	115,642	115,642

enormous number of casualties in the great battles that have been fought, and in the assaults on Port Arthur. In the war with China nothing in any way comparable to these occurred.

Another comparison made from the same set of figures is that of epidemic disease incidence. In the present war there has been only one case of epidemic disease (*i.e.*, enteric fever, dysentery, cholera, &c.) to 80 other cases of sickness. In the China War the proportion was 1 to 9. It must be noted, however, that beri-beri is not included in the epidemic diseases, and that this fact, along with the fact that so many cases of the disease occurred and are included in the "Other diseases," is a factor of some importance in causing the favourable comparison.

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(13) Port Arthur.—Condition of Hospitals and other Medical Establishments after the Capitulation.

NOTES on a VISIT by Lieut.-Colonel W. G. MACPHERSON, M.B., C.M.G., Royal Army Medical Corps, dated 11th April 1905.

Plates.

Map of Port Arthur showing positions of Russian hospitals - -		
Plans of some hospital wards - -	Figure 1	Bound in text.
Plans of barracks used as hospital -	,, 2	
Section of "Blindage" at No. XV. Hospital - - - -	,, 3	
Plan of No. XV. Hospital* - -	,, 4	
Improvised stretcher* - -	,, 5	
Improvised medical cart* - -	,, 6	

By the kindness of the Japanese Imperial Head-Quarters, I was permitted to visit Port Arthur in the latter half of January and to remain there for two weeks, detached from the Second Army to which I belonged, in order to study the condition of the Russian sick and wounded after the fortress had capitulated.

I arrived in Port Arthur on the 20th January and left it on the 3rd February. I stayed in Dalny, visiting the hospitals there, from the 3rd to the 6th February, and rejoined the Second Army, south of the Sha Ho, on the 7th February.

During my stay in Port Arthur, with the exception of the first two days, which were warm and sunny, the weather was bitterly cold and stormy, with heavy falls of snow and a blizzard blowing from the north. Few people moved about except on business, and the difficulty of finding the different hospitals was considerable. All were eventually visited and the sick and wounded in them seen.

General Conditions up to and after the Capitulation.

The number of troops, naval and military, forming the original garrison of Port Arthur, *i.e.*, at the commencement

* Not reproduced.

of the siege operations, is estimated at 60,000. This number has been calculated from the following details :—

Number of prisoners in health (at time of capitulation) - - - -	24,369
Number in hospitals (at time of capitulation)	16,538
Hospital establishments (at time of capitulation) - - - - - -	2,088
Killed in the field - - - -	12,000
Died in hospital (say) - - -	5,000

The last two items are only rough estimates, and probably the number of deaths in hospital are under-estimated.

There was a considerable civil population in addition to the troops, including merchants, women, children, and Chinese. No estimate has been made of these, nor could I obtain any definite information regarding their health conditions during the siege.

Until the Russians retired to their main line of defences on the 30th July, the health of the troops is said to have been extremely good. Supplies of all kinds could be obtained, and there was an open market in the fortress where fresh meat and vegetables could always be bought. On the 1st September the regular siege operations commenced, and from that date onward the garrison was shut off from fresh supplies from outside. The health of the garrison gradually became bad. Enteric fever and dysentery prevailed during September, October, and November. Scurvy first made its appearance towards the end of August, but the majority of the admissions to hospital for this disease occurred in November and December, the cases during the latter month being extremely severe.

Although enteric fever was epidemic during three months, apparently the extent of the epidemic was not great in comparison with other historical epidemics. Accurate statistics of admissions to hospital were not given to me, but I gathered that the number did not exceed 2,000.* This is equivalent to an admission rate of 3·3 per cent. of strength for the epidemic period. Our troops during the epidemic at Bloemfontein, in April and May 1900, had an admission rate of 3·5 per cent., the Prussian army investing Metz, September and October 1870, a rate of 5·3 per cent.; and the United States troops in camps in Florida and the South, May to September 1898, a rate of 10·4 certain, and 19·2 probable, enteric. Dysentery, so far as I could gather, was somewhat more prevalent than enteric fever, but there was no other prevalent disease beyond scurvy.

I am unable to give the exact number of admissions for scurvy during the siege. A large number never came into hospital, but it may be taken as a fact that considerably more than half the garrison were markedly affected with scorbutic symptoms. The officers, however, suffered very little in

* One of the Principal Medical Officers said that the number was about 1,700.—W. G. M.

comparison with the men. I did not see a case amongst them, at any rate in hospital. Nearly all the wounded in hospital as well as the other cases had scorbutic symptoms. A note on the actual state in the hospitals is made further on, and a table illustrating this is appended (Appendix III.).

The garrison capitulated on the 1st January 1905, and the Japanese troops entered on the 3rd January. Their Principal Medical Officer, Surgeon-General Ochiai, came in with them, although General Nogi and his staff remained in their original quarters at a small farm about 10 miles north of the fortress. He took up his quarters in the Military Club—a large, commodious building, situated at the entrance to the old town, and near the principal military hospital, the "Sovodni" Hospital.

From the 3rd to the 8th January Surgeon-General Ochiai's time was mainly occupied in arranging the transfer of the buildings, equipment, &c., of the various Russian field hospitals to the Japanese in accordance with Article 4 of the Geneva Convention. This was carried out by a committee of Russian and Japanese officers. The composition of this committee is appended (Appendix II.); in addition to the names in that list, Colonel Kurzevich, the military commandant of the Russian hospitals, was also appointed a member of the committee, but, as he did not appear at the first meeting, the Japanese struck his name off the list.

The transfer was completed on the 18th January, and Surgeon-General Ochiai then proceeded to hand over his charge to a Fortress Garrison Administration. He rejoined his Army Head-Quarters on the 22nd January, and a Surgeon-Major, Dr. Hoshino, became Senior Medical Officer of the garrison. He was under the authority of the Principal Medical Officer of the Liao-tung Garrison, whose head-quarters were in Dalny, and whose sphere of administration reached to Liao-yang.

During the time of my visit these various transfers had left the administration in a somewhat unsettled condition, and the Medical Department had not yet had time to collect much information on matters of medical interest in connection with the siege, but I was given a free pass to go where I liked and make what inquiries I liked. For this privilege I am indebted to Professor Ariga, the eminent authority on international law, who very kindly interested himself in the matter, and helped me in many other ways.

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General Statistics during January.

At the time of the capitulation, the Russian hospital establishments consisted of 2,088 individuals. Of these, 1,585 were military, 283 naval, and 220 members or employés of the Russian Red Cross Society. The numbers also include a number of voluntary nurses. The number of Medical Officers and Apothecaries of officer's rank was 96 military, including 5 medical students, 28 naval, and 13 Red Cross Society, or 137 in all. The numbers employed as nursing sisters were 95. These and other details of the distribution of the personnel at the time of the capitulation are given in Appendix I.

The staff of the hospital ship *Kazan*, originally that of the hospital ship *Mongolia*, which belonged to the Red Cross Society, and the crew of the latter are not included in the above figures.

The number of sick and wounded in the hospitals at the time of the capitulation was 16,538. Between the 3rd and 18th of January this number had been reduced to 14,419 by 1,436 recoveries and 683 deaths, 439 of the latter being due to scurvy, 164 to wounds, 52 to dysentery, and 28 to other diseases.

I obtained further statistics of the state of the hospitals on the 28th of January, four weeks after the capitulation. The details of these are appended,* and it will be seen that the number was still further reduced to 11,478 by that date, of which number 4,336 were cases of wounds, 23 of enteric fever, 220 of dysentry, 17 of other infectious diseases, 6,278 of scurvy, and 604 of other diseases. I have heard that the number of patients had been reduced to about 5,000 by the middle of February. While I was in Port Arthur the number of deaths was averaging about 40 daily, but latterly the condition of the wounded and scorbutic cases began to improve rapidly, and the rapid reduction in the numbers in hospital may be attributed to this.

The Hospitals in Port Arthur.

At the time of the capitulation, Surgeon-General Ochiai found the sick and wounded distributed amongst 37 different hospitals or convalescent homes. Twelve of the hospitals and 15 homes were occupied by the military authorities, 1 hospital and 7 homes by the naval authorities, and 2 hospitals by the Red Cross Society. There were three hospital

* Appendix III., page 276.

ships in the harbour, but none were occupied. He closed a number of the homes and concentrated the sick and wounded as much as possible in large buildings and barracks, so that when I arrived in Port Arthur I found them distributed amongst 19 hospitals and 1 hospital ship. In most of the cases a hospital included several buildings.

These hospitals had been numbered I. to XIX., and a Japanese medical officer had been put in charge of each, solely for the purpose of compiling returns and requisitions, and determining what patients were fit for discharge as prisoners of war, and submitting the necessary documents. The professional work of attending to the patients medically and surgically, of nursing them, of dieting, cooking, and general hospital duties, continued to be carried on by the Russian establishments in all the hospitals, except Nos. I., II., III., and IV., which had Japanese establishments only. The hospital ship also remained entirely in the hands of the Russian staff.

The hospitals were further grouped for general supervision and administrative purposes into four districts, each under a Japanese surgeon-major, who was responsible for collecting the requisitions and returns from the hospitals in his district, and exercising general control, issuing orders to and communicating superior orders to the Japanese staff under him, and so on. He was assisted by a clerical staff, and in touch with the Senior Medical Officer of the garrison. Each district had one of the four hospitals with a Japanese establishment, and patients fit for discharge were concentrated there previous to being handed over to the authorities for conveyance to Japan as prisoners of war.

The districts were designated by Surgeon-Major Hoshino, the Head-Quarter District, No. I. District, No. II. District, and No. III. District. He also re-arranged the numbering. &c., of the various hospital buildings, but, as his arrangement was confusing and complicated so far as purposes of description are concerned, I shall refer to the hospitals in the following notes by the descriptive numbers given to them by Surgeon-General Ochiai.

(a) *The Head-Quarter District Hospitals.*

This district is the portion of Port Arthur known as the Old Town. It contained Hospitals Nos. IV., XIV., XV., XVI.,* and a small Japanese isolation hospital.

No. IV. Hospital occupied a set of Russian infantry barrack huts on the east of the main road into Port Arthur from the north, and an artillery barrack hut on the opposite side of the road. The infantry huts were five in number, and of the type shown in Figure 2 A.† One of the huts was used for administrative purposes and as quarters for the staff. The

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* *See* map facing page 273. † *See* plate opposite page 279.

others had each four rooms as wards with 44 patients in each, arranged in rows of 11 cots, and allowing about 400 cubic feet to each bed. The artillery barrack hut was somewhat similar. The hospital was opened by the Japanese after the capitulation for their own sick and wounded, and for Russian convalescents of all classes. It was also used as an evacuation hospital for patients fit for discharge. The hospital was entirely Japanese. There were three medical officers to each hut in addition to the senior medical officer. Some of them were medical cadets, and two of the medical officers of the artillery hut, and the whole of the subordinate establishment there, were supplied by a male "relief section" of the Red Cross Society.

No. XIV. Hospital was the largest of the military hospitals. It occupied the whole of the Port Arthur Military Garrison Hospital, known as the "Sovodni" Hospital, situated on the east slope of the conspicuous hill that faces the entrance to the harbour, and lies between the railway and the old town. This hospital occupies a considerable extent of ground, and consists of 15 pavilions and 9 huts. One set of pavilions existed at the time of the war between China and Japan, and was originally a Chinese hospital under the charge of a French surgeon. Afterwards a new set of pavilions was erected by the Russians higher up the slope, and another new and imposing set was commenced and barely finished before the present war, on the slope facing the main road. The ground covered by these three sets of hospital buildings is now enclosed within a substantially built stone wall. The pavilions are solidly built, and the general arrangement and construction are modern in character. The older Russian pavilions form specially bright and comfortable wards, and have the finest site, but the new pavilions have the most imposing appearance. One of them contains a fine modern operating room and its accessories. There is also a Roentgen-ray room, but the apparatus was not satisfactory. It gave only a 4 to 6-inch spark. Electricity was generated from a dynamo in the room, driven by hand by means of a large fly-wheel. The name and maker of this dynamo was the "London Psycho," Starley Bros., London, St. Petersburg, and Coventry. There was no localization apparatus. One of the rooms in the older pavilions was constructed as a clinical laboratory, but the surgeons were too busy with other work to use it, and no one had been appointed specially for laboratory work. Both the old and new pavilions were scientifically heated, the former with a special kind of Russian stove, which was fed from the corridor outside the wards, and the latter by hot-water radiators. There was also a water-closet system with pedestal "flush-down" pans, connected by a drainage system to cess-pits, which were cleared by means of a pneumatic evacuator.

The staff of this hospital, when I visited it, was entirely Russian, viz., ten medical officers, some nursing sisters, and

about 40 ward attendants. The number of beds was about 1,200. The hospital was reserved for surgical cases during the siege. But there were a few cases of general disease, and the majority of the surgical cases had scurvy.

The hospital sustained a considerable amount of damage from artillery fire. According to the statements of the surgeons, as many as 299 shells burst in the grounds during the siege, and nine patients were killed. Bombproof shelters had been prepared for the patients as a last resort in the event of the fortress holding out. A glance at the map facing page 273 will show how liable shells aimed at the dockyards and ships would be to burst in the grounds.

No. XV. Hospital belonged to the Russian Red Cross Society. It is situated near the "Sovodni" Hospital, and was in process of construction when the war broke out. It owed its existence to General Balashov, an officer on the retired list, and the Delegate-General of the Russian Red Cross Society in Port Arthur. It was originally intended as a hospital for the training of nursing sisters, a work which is practically the monopoly of the Red Cross Society in Russia. Nursing sisters that are trained, or are being trained, form *communautés*, as they are called, each community being named after one or other of the saints; and in connection with each community there is, as a rule, a hospital. Such communities of the Red Cross Society are found in practically all important Russian towns. It was one of these that General Balashov sought to establish in Port Arthur, and he had, in fact, when war broke out, completed the nursing sisters' quarters, and the greater part of the hospital, dedicating the community to S. Mary Magdalene. He continued its construction during the siege. This *communauté de Marie*, as it was called, received paying patients into those wards of the hospital which were already finished before the siege commenced, but the hospital was afterwards, under Red Cross Society management, converted into a hospital for military patients only.

The building is an imposing structure of two stories, with an ornate façade. It consists of two wings, which meet at right angles to one another in a semicircular entrance hall, with the operating room above it. The construction is that of a hospital with a number of small private wards, for one, two, or more beds each. The wards all open on to terraces or balconies in front, and to a wide corridor behind. The original number of beds was fifty, each patient paying a charge of three roubles daily; but during the siege the one-bed wards were converted into six-bed wards, and each of the corridors formed wards of forty to fifty-beds each, in two rows. The accommodation was thus raised to 500 beds. There was also a large out-patient department connected with the hospital.

The construction of this hospital, which is still unfinished, is good, the construction of the operating room being specially

noteworthy. The floor of the latter was constructed of cement laid on a bed of bitumen over iron plates. Each plate was about two feet square, and rested on bricks placed with a space between each. Hot air generated in a stove in the entrance hall beneath was led into the space between the bricks, and heated the iron plates to an even temperature, by which it was claimed that the floor and room could be also kept at an even warmth. Four air inlets from the space beneath the plates were inserted through the floor, each with a cotton-wool air filter, and there were outlets in the walls below the ceilings. These inlets and outlets could be opened or closed at will. In the corridor, outside the operating room, there was a stove specially constructed for burning dressings and other refuse from the operating room. Adjoining the operating room and communicating with it by means of a hatch-window, there was a room for sterilizing dressing material, &c. This room had a shoot in the wall, down which old dressings were thrown to be carried into a stove outside, in the corridor.

The nursing sisters are quartered in a separate one-storey building, and other separate buildings are the kitchen, stores, mortuary, and a fine palm house.

There are two wells in the grounds, from one of which the hospital building is supplied with water by means of a force pump, driven by a donkey engine. A system of drainage was also being constructed, leading to a septic tank outside the grounds. The ward water-closet annexes were unfinished pending the completion of the drains.

When I visited this hospital the patients were all surgical cases, but many of them were scorbutic. The staff, all Russian, consisted of 5 surgeons, 5 medical students, 16 sisters (7 undergoing training), 1 "kitchen" sister, 1 apothecary, 2 ward-masters, and 26 orderlies. Dr. Rozanov, the senior surgeon, was the medical officer of the hospital before the war. The remainder of the medical staff, under Dr. Chaikovski, came from St. Petersburg on the outbreak of war, and had opened a Red Cross Society's hospital at the village of Shui-shih-ying, about four miles north of Port Arthur on the main road. When this village was captured by the Japanese, Dr. Chaikovski and his party became attached to Dr. Rozanov's hospital, and were working there at the time of my visit. I am indebted to Dr. Rozanov for permission to go through his surgical records with him and obtaining material, in this way, for the preparation of a series of statistical tables containing the analysis of 2,080 wounds admitted into his hospital during the siege. These tables will be submitted in a separate report.*

This hospital also was exposed to artillery and even rifle fire. General Balashov had to erect a series of wooden screens to protect the nursing sisters from the latter, as they

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* *See* page 281.

crossed the open ground between their quarters and the hospital. He had also made bombproof shelters, "blindages," for the accommodation of 250 patients, and was constructing more when the fortress capitulated. The nature of these blindages will be gathered from the appended plan.* General Balashov was loud in his complaints regarding the shelling of the hospital, but its situation was in the direct line of fire behind Erh-lung-shan Fort and adjoined the large supply depôt, on which the Japanese were directing their fire.

No. XVI. Hospital was in a large marine barrack building near the Dockyard. The building has a "broad arrow" shape, the two wings being two-storeyed and the central projection a large hall, which was used as a chapel. Each wing has two large barrack rooms on each floor, and between these rooms there are rooms for N.C.O.'s and well-arranged ablution rooms and latrines, the latter in an annexe, separated by a disconnecting passage from the main building. There are also large kit and drying rooms at the end of the wings opening on to the end staircase landings. The naval or marine barracks in Port Arthur differ entirely from the military barracks in style of construction. The latter are in the form of detached huts for 100 or 200 men each, four or eight huts forming a battalion barracks. The naval barracks, on the other hand, are large two or three-storey blocks with rooms for 100 or 200 men. A plan is appended of the type of room used as a ward by No. XVI. Hospital,† and this may be compared with the plan of the rooms in No. IV. Hospital, as illustrating this difference in construction.

During the siege this building was only partially used for hospital purposes, but after the capitulation all of the west wing and one half of the east wing were filled with Russian sailors suffering from scurvy and other diseases, and by about 150 convalescent cases of wounds. They were lying on trestle cots or on wooden platforms, called *narui*, such as are used in prisons and convict settlements in Russia. In each room there were about 100 patients in rows of 4, 5, or 6 rows. In one room I counted 6 rows of 27 beds each, or 162 beds, but this was an exceptional number. Even in this case the cubic space per bed was 450 cubic feet. The total number of patients in the hospital, at the time, was 468. The building could accommodate 1,000, if necessary, with a cubic space of 600 cubic feet per bed. It had a staff of 3 naval and 1 military medical officer, 1 volunteer female nurse, 7 ward-masters and 55 other attendants, of whom 33 were trained nursing orderlies.

In addition to the above hospitals of the Head-Quarter District, there were two detached sections of the "Sovodni" Hospital (No. XIV.). One was a room in the Engineer

* *See* Figure 3 facing page 280. † *See* Figure 2(c) facing page 279.

Barracks, which was situated on a slope north of General Balashov's hospital and near the infantry barracks occupied by No. IV. Hospital. The room contained 72 patients, mainly convalescents from scurvy and wounds. They lay on trestle cots closely packed together in four rows, with a cubic space of only 250 cubic feet each.

The other detached section was very different. It occupied a well-built building in the centre of the town, on a little eminence overlooking the dockyard. It had been constructed as a school for girls by the Grand Duke Constantine. A plan of the hospital arrangement of this building is appended.* It formed a bright, pleasant little hospital, and was used entirely for surgical cases. The grounds were prettily laid out as rose gardens. At the time of my visit there were 80 patients in it, 40 in each of the large school-rooms. The other rooms had been appropriately arranged for stores, kitchen, extra wards, operating room, and bandaging room. The wards seemed crowded—about 450 cubic feet per bed. The superintending schoolmistress had remained as a volunteer nurse, and there was a staff of 1 surgeon and 10 orderlies. The building must have been greatly exposed to artillery fire, but this does not seem to have interfered with its occupation as a hospital.

Some officers' quarters between General Balashov's hospital and the Engineer Barracks, mentioned above, were used as accessory wards for No. XV. Hospital.

(b) *No. I. District Hospitals.*

This district included the west end of the new town, some military barracks situated there, a large naval barrack block and naval hospital on the hill-side, west of the new town, and two sets of infantry barracks in an outlying valley leading to Pigeon Bay. The hospitals included in these were Nos. I., VII., IX., X., and XI.†

No. I. Hospital occupied the barracks on the west of the new town. Eight barrack huts were occupied. They were similar in most respects to the huts of No. IV. Hospital, already described. They had been opened as a hospital by a Japanese establishment after the capitulation. Each hut had about 100 sick or wounded, partly Russian and partly Japanese. It had both operating room and room for bandaging and minor dressings. At the time of my visit it contained 800 patients (269 wounded, 490 scurvy, and 41 other diseases). The *narui* type of sleeping accommodation was used, the patients lying in four rows in each room. The staff included eight Japanese military surgeons and two Red Cross surgeons. The latter were members of a male "relief section" of the Japanese Red Cross Society, which was doing duty in one of the huts. The remaining establishment belonged to the

* *See* Figure 1(D) facing page 278. † *See* map facing page 273.

Reserve medical personnel of one of the divisions of General Nogi's Army.

No. VII. Hospital occupied three large private buildings in the west end of the new town. They had been occupied throughout the siege by the Russian No. 6 Field Hospital. It had been much exposed to shell fire, and casualties had occurred amongst the patients, but it was not evacuated. The patients were in rooms of 6 to 10 beds each, and they had comfortable beds with clean cotton hospital clothing and sheets. Rooms had also been converted into excellent operating rooms and rooms for minor dressings. At the time of my visit there were 224 patients in the hospital, 203 being cases of wounds. There was a Russian staff of 5 surgeons, 4 nursing sisters, and 30 male attendants. This was one of the most interesting of the improvised hospitals, on account of its air of comfort, cleanliness, and good surgical work.

No. IX. and No. X. Hospitals were in adjoining infantry barracks, situated in the valley leading to Pigeon Bay. Each of these barracks consisted of eight barrack huts, of the type shown in the Appendix,* in addition to officers' quarters and quarters for married men. Some of the huts were unfinished. The barracks had been commenced just before the war. They afforded accommodation for about 2,000 patients, but some of the huts were very closely packed. Thus, in three at least of the huts, there were 200 patients, allowing only about 80 cubic feet to each.† They were all convalescents, more or less fit for discharge. The least crowded had 72 patients, or something under 300 cubic feet each. I did not get the exact figures representing the numbers in hospital on the day of my visit, but, a few days afterwards, the state was 521 wounded, 3 dysentery, 1 erysipelas, 1,029 scurvy, and 97 other diseases, or a total of 1,651. The majority of the patients were lying on *narui*, but one section had comfortable hospital beds. The staff of these hospitals was provided by two Russian Field Hospitals, No. 9 and No. 5, and by the staff of the Dalny Red Cross Society's Hospital. The field hospitals had originally occupied an hotel and large official buildings in the middle of the new town, and the Dalny Red Cross Society a building on a hill in the centre of the old town. They were forced to evacuate these buildings at the beginning of December in consequence of the Japanese artillery fire, and in this way came to occupy these outlying barracks.

The Dalny Hospital was originally the principal civil hospital in Dalny. It had been founded by the Russian Engineer, M. Sakharov, who was the Governor and builder of Dalny, and died of enteric fever in General Balashov's

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* *See* Figure 2(B) facing page 279.

† Rows of platforms were placed down the centres as well as the sides of the huts in order to accommodate this number.—W. G. M.

hospital during the siege. The hospital in Dalny was organized for 300 beds and in peace time had a staff of 3 medical officers, 3 female and 6 male nurses, in addition to other employés. Its establishment in No. X. Hospital in Port Arthur was 4 surgeons, 6 nursing sisters, and 50 male employés. It seemed to have taken with it some good ward equipment in the way of beds, bedding, bed-head tables, &c.

No. XI. Hospital was the principal hospital for the navy. It occupied the naval barracks, an enormous and attractive block on the hillside west of the new town, and also the naval hospital, which had been built on an adjoining piece of ground just before the war. The barrack block was a three-storey building with 12 large barrack rooms, measuring about 120 by 60 feet each. There were two such rooms on each floor on either side of a central staircase and entrance hall. Ten of the rooms had been taken over as wards, one as a room for convalescents and the twelfth as a room for the establishment. Each ward accommodated 100 patients, as shown in the plan of the wards in No. XVI. Hospital,* but they were in four rows of 25 cots each. The kind of cot varied. I saw, for example, the iron barrack-room cot with mattress, the trestle cot, *narui* platforms, and ship standard cots in use. The flooring of all the storeys was concrete, a feature of floor construction which is universal in all the Port Arthur barracks, naval and military.

The newly-built naval hospital, which formed a section of No. XI. hospital, was the best of the Port Arthur hospitals. It consists of four separate single-storey pavilions, a double-storey administrative block and medical officers' quarters, and a picturesque two-storey villa for the senior medical officer. There were also the usual accessory buildings. Each pavilion had one large ward for 60 patients in two rows, a small ward for 12 beds, attendants' room, medical officer's room, two single-bed special wards, ward kitchen, bathroom and latrine annexe.† In one of the pavilions, the smaller ward was constructed as an operating room, and there were also rooms for minor dressings and for Roentgen-ray work. The Roentgen-ray apparatus was supplied with electricity from an electric station in one of the neighbouring positions. The wards were heated by hot-water radiators fed from a central circulating engine and boiler. The ward equipment was excellent. The beds were white enamelled iron bed-cots with spring mattresses, and there were also white enamelled bed-head tables with metal shelves. The latrines were modern pedestal water-closets with "flush-out" pans. The normal number of beds, for which the hospital had been constructed, is 250, but during the siege as many as 500 were put into it. The senior medical officer's quarter was used as wards for officers.

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* *See* Figure 2(c). The rooms shown in this plan are similar to those of the barrack rooms in No. XI. Hospital.

† *See* Figure 1(*a*).

The number of patients in No. XI. Hospital, on one of the days on which I visited it, was 991, of which 568 were wounded, 17 enteric, 14 dysentery, 3 erysipelas, 334 scurvy, and 55 cases of other disease. They were wearing white quilted hospital gowns, presented to them by the Red Cross Society of Japan.

There was a staff of 20 naval surgeons, 5 doing general and administrative work and the others in charge of the wards and barrack rooms in the proportion of one to each barrack room and hospital pavilion. One medical officer acted as dentist, having made a speciality of dentistry. Many officers' wives acted as volunteer nurses, and there were also two or three trained nurses from the Red Cross Society. The principal ward work, however, was done by sick-bay men and orderlies.

(c) *No. II. District Hospitals.*

This district included the hospitals in the main and eastern part of the New Town, and on the Tiger's Tail Peninsula. They were hospitals Nos. II., XII., XIII., V., and VI.

No. II. Hospital occupied the hotel and official buildings that had been evacuated by the staffs of the field hospitals then occupying Nos. IX. and X. Hospitals of No. I. District. It had been opened after the capitulation by a Japanese medical staff provided by the reserve medical personnel of the 7th Division and two male "relief sections" of the Japanese Red Cross Society. At the time of my visit the buildings were comfortless, draughty, and cold, and had little or no suitable ward equipment. They had been badly damaged by shell fire, and there were large holes in the roofs and walls. There were no beds or cots, and the patients were lying on matting, mattresses, and blankets on the floors. Charcoal braziers, or improvised stoves, made out of the tin lining of packing cases, were used for heating the rooms. The hotel was a three-storey house in the main street. The official building was a finely built two-storey house, intended, I understood, for the Russian Head-Quarter Staff offices. The rooms were of various sizes, on an average 18 feet square (324 square feet), and there were from 15 to 20 patients in each. There was also a long one-storey building at the back of the staff offices and forming an annexe to it. It was evidently intended as a quarter for the employés of the Head-Quarter Staff offices, and was also being used for hospital purposes. On the day of my visit there were about 400 patients in this hospital. They were chiefly lighter cases of scurvy and wounds. I was told that since the hospital had opened at the beginning of the month (January), 1,000 patients had been admitted into it, and that there had been 12 deaths. At the time of my visit 22 of the patients were Japanese.

No. XII. Hospital occupied the Russian *Realschule*, in the middle of the new town, and two private houses in the vicinity. The school house was a long single-storey building. Thirteen of the class-rooms were used as wards, each having about twenty patients. Other rooms were converted into a good operating room and room for minor dressings. At the time of my visit there were 248 patients in the building, all of them surgical cases. One of the private houses belonging to this hospital was a bookseller's shop and dwellings above it. It contained 80 light cases of wounds or scurvy. The other private building was a block containing small dwellings or flats. It contained 180 convalescents. The establishment of this hospital was that of the Russian No. 7 Field Hospital—namely, 5 surgeons, 4 nursing sisters, and about 80 other employés. They had occupied the school building throughout the siege.

No. XIII. Hospital occupied a palatial edifice facing the harbour at the east entrance to the new town. It was a new building, constructed as an hotel, and had just been leased to a German, named Schultz, when the war broke out. The lessee had not completed furnishing, and the building had never been occupied or opened as an hotel. Its first occupation was as a hospital on the 31st June 1904, and it has been occupied as such ever since. The original number of beds was 210, but these were afterwards increased to 600. The establishment was that of a Russian field hospital—viz., 5 surgeons, 1 apothecary, 4 nursing sisters, 8 male nurses, and about 100 other employés. (I do not know if this represents the normal establishment, but it was more or less the establishment of those hospitals in Port Arthur, which were designated "Field Hospitals," a term which, I understand, is applied to a unit that is not necessarily a mobile unit.) One of the nursing sisters had been with the Russian Red Cross Society's ambulance in the Transvaal during the South African War, and had afterwards worked, so she said, in Newcastle, Natal.

At the time of my visit there were 376 patients in hospital. They were all severe surgical cases, and about 200 were scorbutic. They were distributed in 40 different rooms. Other rooms of the hotel had been converted into excellent operating and bandaging rooms. The building had been hit by shells several times, but had not been evacuated. The staff had apparently done excellent surgical work during the siege.

Nos. V. and VI. Hospitals were on the Tiger's Tail Peninsula, and were approached by steam launch from the dockyard. They were used entirely for cases of scurvy, enteric fever, and dysentery. No. V. occupied two large naval barrack blocks of three storeys each, situated in a narrow valley leading from the landing stage (*see* map). The construction of the rooms in these blocks was similar to that of the naval barrack blocks already described. The rooms were, however,

larger, one room being equal to two of the rooms in the other barracks. Each room contained five or six rows of 50 patients each. In one room I counted 285 patients in five rows of 57 each. They lay on the *narui* platforms, and were all more or less severe cases of scurvy. Over 4,000 cases had been admitted into this hospital since the end of August, when it opened. Between the date of opening and the end of November there were 505 deaths, chiefly from scurvy and dysentery. In December there were 600 deaths, a fact that indicates the severity of the former disease during that month.

At the time of my visit there were 1,100 cases in this hospital. The maximum number during the siege had been 1,300. The establishment consisted of 8 surgeons, 5 nursing sisters, 9 trained ward-masters, and a large number of other employés.

No. VI. Hospital was in a set of infantry barrack huts and an artillery barrack hut similar to those of No. IV. Hospital. These were situated near the isthmus of the peninsula, facing the barracks occupied by hospitals Nos. IX. and X. The barracks had been occupied as a hospital since the summer of 1904. It had been opened specially for the treatment of cases of dysentery and enteric fever. Four infantry huts and one artillery hut had been used as wards of the type shown in Figure 2(A). The maximum number in hospital at any time was 850. At the time of my visit, there were 530 in hospital. They were all cases of scurvy, but several had been convalescents from enteric fever and dysentery. The number of deaths in the hospital since the 1st July was 760. I was promised, but did not obtain, a statement of the numbers admitted. The establishment comprised 6 surgeons, 5 nursing sisters, 10 trained ward-masters, and 60 other employés. The general arrangement and equipment of this hospital appeared fairly comfortable and appropriate. The patients were in separate trestle cots, arranged in four rows of 9 or 10 cots each.

(d) *No. III. District Hospitals.*

No. III. District included hospitals situated in the valley, running eastwards from the dockyard to the heights on the east of Port Arthur, and on the low line of hills, running eastwards along the coast-line from Golden Hill, *i.e.*, the hill at the east entrance to the harbour. In the valley there is a varied assortment of infantry, artillery, and marine barracks, and at its head there are the original city and lock hospital buildings. These hospital buildings were occupied by No. VIII. Hospital, and the various barracks by Nos. III. and XIX. On the coast hills, immediately to the east of Golden Hill, there are a series of seaside villas, some of which were occupied as No. XVII. Hospital, and, further eastwards, there are huts

that had been originally constructed as the Garrison Venereal Diseases Hospital, and that was now No. XVIII. Hospital.*

The city and lock hospital forming No. VIII. Hospital, consisted of an old two-storey building and six modern one-storey pavilions. The former had been the lock hospital, and had three wards on each floor, the upper wards with surgical cases, 12 to 25 in each, and the lower with a similar number of medical cases. The upper floor also contained an operating room and a room for minor dressings.

The city hospital pavilions consisted of two surgical pavilions, two medical pavilions, a pavilion as quarter for medical officers, and a dispensary, stores, &c. One of the surgical pavilions had an excellently-constructed operating room as an annexe, and no two pavilions were exactly similar. One had two wings with ten wards of six beds each, another, one ward of twelve beds and two of five beds each, a third a single ward of thirty beds and the operating room, and the fourth had one half occupied as quarters, and the other half as a ward of twelve beds. These buildings had been constructed four years ago.

The establishment at the time of my visit was that of No. 8 Russian Field Hospital, which had occupied the hospital during the siege. It comprised originally four surgeons and 75 N.C.O.'s and men, but had been supplemented by three surgeons and four Red Cross Society's nursing sisters. An infantry barrack hut of the usual type had also been added to this hospital to increase accommodation.

At the time of my visit there were 481 patients in No. VIII. Hospital, including 210 convalescent wound cases in the barrack hut.

No. III. Hospital was a hospital with a Japanese establishment, similar to Nos. I. and IV., and occupying similar barracks.

No. XIX. occupied the remaining assortment of barrack huts in the vicinity of No. III. The huts consisted of various types of huts, and had an establishment of regimental surgeons and a field hospital establishment, that had formed a hospital in some of the barracks during the siege, called No. 9 Russian Hospital. The various barracks were crowded with sick and wounded of various regimental units, all more or less convalescents, from scurvy or wounds.

No. XVII. Hospital occupied seven of the seaside villas. It contained only sick and wounded from the *Amur*, *Bayan*, and *Sevastopol*, and the staff was one of the surgeons from each of these ships and some sick-bay men. The rooms in the villas were fitted up as wards with ship's fittings and wooden platforms, and resembled more the 'tween decks of a ship than the wards of a shore hospital. The patients were mainly convalescent patients.

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* *See* map facing page 273.

The old garrison venereal diseases hospital, forming No. XVIII. Hospital, consisted of six one-storey pavilions or huts, constructed with two wards of 22 beds each. Only five of the huts were used for patients, the sixth being occupied as a barrack for the establishment. There were also accessory buildings for medical officers' quarters, dispensary, and office. During the siege this hospital had been occupied by No. 5 Russian Reserve Hospital, with an establishment of 4 surgeons, 1 apothecary, 3 nursing sisters, and about 80 other employés. At the time of my visit there were 180 patients in the wards, of whom 28 were venereal cases, 78 cases of wounds, and the remainder chiefly scurvy cases. A plan of one of the huts is appended.* The normal accommodation is 210 beds. During the siege 400 were in hospital at one time, four instead of two rows of beds being placed in the wards. The cots were trestle barrack-room cots.

Hospital Ships.

Three hospital ships had been organized during the siege, and all were in the harbour at the time of my visit. None of them had been used during the last month of the siege, because they were in danger of being hit by Japanese shells. One of them had been hit and rested on its bottom, half submerged at high tide. This was the largest of the three vessels, the *Angara*. The other two were the *Kazan* and the *Mongolia*.

The *Angara*, formerly the *Moskva*, had been built on the Tyne in 1898 for the mail and passenger service between Odessa and Vladivostok. It was a large fast vessel of 12,050 tons displacement and 16,800 horse-power, with a speed of 20 knots. It had a 58-feet beam and was 470 feet long. As it was half under water and abandoned, I did not visit it, but I was told that there had been accommodation on board for 800 cots in one tier, and for 50 officers in separate cabins.

The *Mongolia* was also no longer used as a hospital ship. Compared with the other two, it was a small vessel, of 2,600 tons "gross" and 1,600 tons "registered" tonnage. It had been built in Trieste, and belonged to the Eastern Chinese Railway Steamship Extension Company, who had employed it in running between Port Arthur, Dalny, Shanghai, and Japan. It had been chartered as a hospital ship by the Russian Red Cross Society at the beginning of the war, the price being 500 roubles daily. A hospital staff had been specially sent from St. Petersburg, along with a certain amount of hospital equipment for 300 beds. The staff arrived on the 20th February and had the ship ready three weeks later. It accompanied the Russian fleet, as a hospital ship, when the fleet attempted to get away on the 10th August. General Balashov ordered the staff to abandon

* *See* Figure 1(B) and (C) facing page 278.

the vessel at the beginning of December. They eventually formed the staff of the *Kazan*, when that ship was reoccupied as a hospital ship after the capitulation.

The *Kazan*, which was the only ship occupied as a hospital ship at the time of my visit to Port Arthur, was a large vessel, built by Wigham, Richardson & Co., of Newcastle-on-Tyne, in 1900, for the Russian emigrant and trooping service between Odessa and the Far East. It had a displacement tonnage of 9,755 tons, a speed of 12½ knots with 4,000 horse-power, a length of 400 feet, and beam of 50 feet. The height between decks was 7¾ to 8¼ feet, and there were large central hatches measuring 25 feet by 14 feet and 14 feet by 10 feet, in addition to smaller side hatches. It had been constructed to carry 2,000 emigrants, and included, in its construction for the emigrant service, an excellent hospital, with dispensary and medical officer's office, in the poop and poop-deck, an Equifex steam disinfector (3 feet by 6 feet) on the boat deck, ablution rooms and bath-rooms on each emigrant or troop deck, and a bakery, capable of baking for 2,000 in 24 hours. The bakery was a specially compact apparatus, made by Werner, Pfleiderer, and Perkins, London. It measured about 4 feet by 4 feet by 10 feet, and consisted of duplicate baking ovens and stoves with hot-air circulating tubes. Forty-four of the Russian ration loaves, weighing about 12 lbs. each, could be baked in two hours, and the bakery on board not only supplied the ship, but also some of the hospitals on shore. All the arrangements were eminently fitted for the conversion of the ship into a hospital ship, and this was effected with little or no alterations. Both the main and lower decks were used as wards. The cots were similar to those placed on board the hospital ships *Princess of Wales* and *Maine* during the South African war. They were arranged in single tiers of one, two, or four cots, placed end to end, with a space of 5 feet or more between the rows. Each cot had a bed-head table of white enamelled wood, that had been made in the dockyard. The wards had also comfortable dining tables and deck chairs and seats. A portion of the main deck midships, on both the port and starboard sides, had been screened off and fitted as operating room and rooms for minor dressings. Arrangements had also been made for hoisting cases on board by means of platforms, on which one or two stretchers could be placed. Similar, but smaller, platforms were used for lowering the patients on their stretchers into the wards by way of the hatches. I was much impressed by the general appropriateness of an emigrant ship of this class for the purposes of a hospital ship in time of war. The *Kazan* was, indeed, the best hospital ship I have seen. It was large enough to accommodate 500 sick or wounded in one-tier cots, with ample space between the cots. At the time of my visit there were only 245 on board, but one of the lower deck wards was empty, and the others by no means fully occupied. The medical establishment consisted of 4 surgeons,

5 medical students, 6 nursing sisters, 2 Red Cross Society delegates, 1 apothecary, 21 male nurses, and 41 other employés. Five of the nursing sisters belonged to the *Communauté St. George*, one of the best known of the Red Cross Society's communities in St. Petersburg. The sixth sister was Princess Levin, the wife of the captain of the *Diana*, that had escaped to Saigon.

The *Kazan*, like the *Angara*, had come to Port Arthur, as one of the volunteer cruisers that had passed the Dardanelles. It was converted into a hospital ship in Port Arthur by the naval department. All three hospital ships had their hulls painted white with red crosses on the funnels; and, in the case of the *Angara* and *Kazan*, with a green band, 1½ metre wide; in the case of the *Mongolia*, with a similarly sized red band, below the rails or along the beading of the hull, in accordance with the articles of The Hague Convention, applying the terms of the Geneva Convention to hospital ships.* The position of the ships at the time of the capitulation is shown on the map facing page 273.

General Remarks.

(a) *Hospital Administration.*

The Russian administration of the various hospitals in the fortress during the siege appears to have been much divided, and there was little combined work or cohesion between the military, naval and Red Cross Society's administrative officers. Even these appear to have been divided amongst themselves.

The navy had two medical officers of administrative rank, in addition to the Principal Medical Officer of the Naval Hospital. One was Dr. Bunge, who was the Principal Medical Officer of the fleet, and the other Dr. Yastrebov, who was Principal Medical Officer of the marines on shore. They had apparently no authority over one another, and acted independently of one another on shore.

On the military side there was still greater division of authority, as there were three officers holding Principal Medical Officers' appointments—namely, Dr. Rebinin, who was Principal Medical Officer of the Army Corps, or "operating army," as it was called, which had been driven in after the battle of Nan Shan; Dr. Subbotin, who was Principal Medical Officer of the fortress troops; and Dr. Hubbenett, who appears to have been a chief consulting surgeon.

* * * * *

* A green band is adopted by hospital ships belonging to the naval or military authorities, a red band by those belonging to Red Cross societies.

There was, in addition, a military commandant of hospitals with a staff of his own, who dealt with all matters that were not strictly professional, and the medical element appears to have been much dissatisfied with the manner in which he exercised his authority. The three sections of the Red Cross Society, namely, the *Communauté de Marie*, the Dalny Red Cross Society, and the *Mongolia* staff, also appeared to work under no military authority other than that of General Balashov, the Red Cross Society's Delegate-General. All that was required of them was a return of the sick and wounded soldiers and sailors under their charge.

The result of all this divided authority in the hospitals during the siege was a defective organization and considerable friction, with great want of uniformity in the equipment and general condition of the various hospitals, some being over-supplied while others were in need of supplies.

(b) *Medical and Surgical Supplies.*

Much has appeared in the public press regarding the lack of medical and surgical supplies at the end of the siege. There was no deficiency of any supplies except that of material for dressings. The drugs were plentiful, and so too were the instruments, splints, and other surgical appliances. Medical comforts, such as wines and spirits, could also be obtained, although there was a lack of milk either fresh or tinned.

The deficiency in material for surgical dressings was made good by the purchase of dress material such as tarlatan and calico prints, and by making oakum dressings out of ships' ropes, the convalescent patients being employed in picking the ropes. Ordinary unbleached and non-absorbent cotton wool was also obtained in quantities from the Chinese, who use it for making quilted winter clothing. The tarlatan obtainable was generally black, but this was bleached to some extent by boiling in oxalic acid. It made excellent roller bandages. The other material was sterilized as dressings for application over the wounds. The oakum was liked best by the surgeons and gave the best results. There was no lack of ships' rope for its preparation. A certain amount, however, of the regular dressings supplied to military hospitals remained, and was kept for special cases. It is excellent material, and is not surpassed by the material of any other army that I know.

With regard to supplies of prophylactics against scurvy, I gathered that no such supplies existed. Certainly there never had been either in the army or navy any lemon or lime juice. Cranberry juice, or extract, seems to have been used to some extent, but there was apparently no provision made for its issue throughout the siege, and the supply was soon exhausted. It would not be going too far to say that

the lack of any provision to anticipate an outbreak of scurvy was one of the chief causes of the early capitulation of the fortress.

Citric acid was given after scurvy appeared, but this was more or less ineffective—an experience, which corresponds with our own experience of citric acid, as a prophylactic or therapeutic agent in scurvy.

(c) *Food Supplies.*

The diet of the soldier and sailor during the siege was 2 lbs. daily of black bread. Of this there was never any deficiency, and the bread was of excellent quality and well baked. There was also a soup made of compressed cabbage. The cabbage was of two kinds, fresh cabbage and *Sauer-kraut.* There also appears to have been a regular issue of this soup, and the bread and soup were practically the only regular issues. The issue of meat was made on five out of seven days only. The quantity issued was 100 grammes ($3\frac{1}{2}$ ozs.) per man on each of the five days. The issue was usually in the form of salt beef. But occasionally some freshly killed horseflesh or tinned meat would be issued. For some reason or other fish was not obtainable. The Chinese fishermen refused to go out, and the garrison appears to have done no fishing on its own account. Milk and butter ran short and were not obtainable by the troops. Up till August, as already mentioned, there was an open market where fresh vegetables and fruit could be purchased in abundance, but this was afterwards closed. There was abundance of wines and spirits, and the troops had an issue of *vodka* daily.

The prices of market articles, whenever anything of the kind could be obtained, were 700 roubles* for an ox, 300 for a pig, 50 for a goose, 15 for a fowl, one rouble for an egg, and about 70 kopecks for a pound of horseflesh.

I saw specimens of the bread, compressed cabbage, and salt beef, and found them good and palatable. The very marked and severe outbreak of scurvy was associated with (1) a marked deficiency in the meat diet; (2) an entire absence of such fresh vegetables as potatoes; (3) an absence of fruit; (4) an absence of prophylactics, such as lime juice.

In the hospitals the dietary was kept as nearly as possible to the regulation dietary. At 8 a.m. the patients got a meal of tea and bread; at 1.30 p.m., tea, meat, and soup; at 4 p.m., tea; and at 5.30 p.m., tea, soup, and bread. The dietary was of two, or rather three, kinds:—(1) Ordinary Diet, for patients requiring no special dietary; (2) Light Diet (*a*) for cases of debility, requiring more or less easily digested food; and (3) Light Diet (*b*) for acute cases of illness such as enteric fever and dysentery. The Ordinary Diet consisted of 18 ozs. of black and 6 ozs. of white bread, 6 ozs. of meat, bone free, and

* A rouble is a little more than 2*s*.

cabbage soup *ad libitum*. The medical officers had *carte blanche* to add 6 ozs. more meat, if thought necessary. The Light Diet (*a*) consisted of 18 ozs. white bread and 9 ozs. meat, minced, with a *bouillon* made without vegetables. The Light Diet (*b*) was ¼ tin of condensed milk, or one or two pints of fresh milk, as ordered, or their equivalent in condensed milk, and 18 ozs. of white bread. When the milk supply became exhausted *Hafer Mehl* was used instead.

After the capitulation, the Japanese authorities provided an extra meal, at 11 a.m., for all scorbutic cases. It consisted of a salad of cabbage, beans, potatoes, radishes, vinegar, and salad oil. They also provided extras, such as eggs, butter, milk, beer, claret, whisky, and oranges. Surgeon-General Ochiai himself told me of the difficulty he had in getting, quickly, enough fresh fruit. He had sent for supplies to North China, Shanghai, Formosa, and Japan.

(d) *Water Supply.*

Until the Japanese took the village of Shui-shih-ying and the forts south of the village in September, the water supply of Port Arthur was a pipe supply from springs in the hills. These springs had been impounded, one by one, at their source, and had been protected there from surface pollution by stone and cement covers. When these sources came into the hands of the Japanese, the fortress had to depend on wells in the town and on water from a condenser near the naval hospital. The well water was abundant, and, so far as I could gather, good. Those wells, which I saw, were well constructed, and the water, although near the surface, apparently came from strata leading from the surrounding hills. Water was distributed to the positions in water carts, similar in construction to our wooden barrel carts. The troops were ordered to boil the water before drinking it, but they disliked the taste of the boiled water, and apparently the supervision was not very strict. I did not hear of any special sterilizing apparatus having been used. It must be confessed that water-borne diseases did not become an important factor in determining the issue of the siege.

(e) *Material for Transport of Sick and Wounded.*

Among points of interest during the siege, mention may be made of the material available for the transport of sick and wounded from the various positions to the hospitals. A variety of material was used for this purpose. The Red Cross Society had a number of ambulance waggons of the Austrian or Lohner type, and a large omnibus. The local *droshki*, of the *voiturette* type, was also requisitioned for the hospital transport service. Over difficult ground hand stretchers were used, or the wounded were carried on the

backs of bearers, or by other improvised means. But what the Russians found most useful of all on the hill roads were wheeled litters, improvised by slinging a stretcher between two bicycles placed parallel to one another, and by placing the stretcher bodily on a frame with sides, fixed on rickshaw wheels. Forty of the latter were constructed in the dockyard under Dr. Bunge's superintendence. He also had constructed out of the bodies of rickshaws, on a plan suggested by a naval surgeon, Dr. Kefeli (?), about twenty hand carts for bringing dressings and medical comforts to the various positions. These hand carts were a great success, and were invaluable to the *postes de secours* in the positions. Details of the construction of both the litter frame and hand cart may be gathered from Figures 5 and 6.* Two bearers were required for the litter, only one for the comfort cart.

Questions connected with the Geneva Convention.

Many interesting questions connected with the working of the Geneva Convention, or with its application to hospital ships, have occurred in connection with the capitulation of Port Arthur. Those which came under my personal notice may be summarized as follows; (I am aware that there may have been many other questions, but I was not told of them, and had no opportunity of estimating their value):—

(1.) General Balashov complained bitterly of the Japanese firing on his and other hospitals. At one time during the siege he submitted a plan showing the positions of the hospitals in his part of the fortress, and asked that these positions might be respected. I was shown this map. It showed the large provision depôt near his hospital as a hospital position. There was no evidence of these buildings having been used as a hospital, and the Japanese authorities naturally doubted his good faith. It is true that many of the hospital buildings shown on this map were hit by artillery fire, but they were in the direct line, and in the vicinity of the dockyard and battleship moorings, which it was the primary object of the Japanese to destroy. Although, therefore, they did not willingly hit the hospitals, they could not guarantee that buildings in such a line of fire would not be hit. The distance from which they were firing was about six miles, and the object of their fire and the hospitals themselves were invisible, even from the observation posts.

In contrast with General Balashov's complaint, it may be mentioned that the second senior officer of the naval hospital, Dr. Nicolaevski, told me that he never felt so secure as in

* Not reproduced. Figure 5 shows a rickshaw frame with four strengthening traverses. Figure 6, a small body carrying medical comforts mounted on rickshaw axle and wheels.

his own hospital. He was sure that the Japanese knew its position exactly and were careful to avoid it. He considered their conduct in the matter absolutely correct.

(2) The buildings and equipment of all the military and naval hospitals were taken over by the Japanese as spoils of war, under Article 4 of the Geneva Convention.

(3) The buildings and equipment of the Red Cross Society's hospital, No. XV., were, on the other hand, respected as private property, *i.e.*, property belonging to a private society, and were left in the possession of General Balashov and the society. General Balashov made proposals for the sale of the building, &c. to the Japanese Red Cross Society. I do not know with what result, but immediately afterwards General Balashov demanded the right to be sent to the Russian outposts near Mukden under Article 3 of the Convention. * * *

(4) The hospital ships *Angara* and *Kazan* were regarded as prizes, because they had come out to Port Arthur as combatant cruisers. Moreover, it was stated that, after they had been converted into hospital ships, the crews acted alternately as crews of the ships and as combatants in the trenches.

(5) The *Mongolia*, on the other hand, which was chartered by the Red Cross Society at the beginning of the war, was set free and handed over to the agent while I was in Port Arthur. Unfortunately the agent could not move it, as the entrance to the harbour was blocked by sunk ships and mines, and he was in the awkward position of having the ship and crew on his hands without being able to make use of either.

(6) All the personnel of the Russian hospitals were obliged to remain in charge of their own sick and wounded, although it is laid down in Article 3 of the Convention that they may withdraw. This article has always been construed liberally, and the Japanese are well supported by precedents in retaining the establishments in question, even against their will, to look after their own sick and wounded. Besides, this was provided for in the terms of capitulation.

(7) All the sick and wounded were prisoners of war, but the question arose, under Article 6 of the Convention, as to what constituted inability to serve again. The Japanese authorities got out of this difficulty by applying to the wounded the rules, regarding incapacity to serve, which apply to their recruit levies. A list of the conditions which determine this is appended.*

(8) The medical officers and others, belonging to the Russian Army, are civil officials, although they wear a uniform resembling the military uniform. In consequence of the difficulty in distinguishing between civil and military

* Appendix IV., page 277.

officers as applying to the Russian Army, it was decided to regard them all as belligerents.

Matters of purely medical and surgical interest have not been introduced into this report, nor have I ventured to complicate it with notes relating to hospitals on the Japanese side during the siege and the organization and work of their base at Dalny. I have thought it better to reserve these notes for separate reports.

NOTE.—The position of the hospitals in map is only approximately correct, and the direction of the fire has been judged by the position of the shell holes in the buildings.

The plans of wards, &c., are prepared from notes made at the time of visiting the hospitals, and are submitted in order to give some idea of the class of accommodation for the sick and wounded during the siege, and not as accurate plans.

Appendices.

No. I. Personnel of Russian hospitals at the time of the capitulation.

No. II. List of the members of the "Medical Commission" for transferring hospitals, &c., from the Russians to the Japanese.

No. III. Table of sick and wounded in the hospitals on 28th January.

No. IV. Statement of the conditions causing incapacity for military service.

No. V. Figures 1, 2, and 3. Explanations.

PORT ARTHUR.

Positions of Hospitals at the time of & after the Capitulation, January, 1905.

W. G. Macpherson,
Lt Col. R.A.M.C.
Feby 1905.

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APPENDIX No. 1.

Personnel of Russian Hospitals in Port Arthur at the time of the Capitulation

A. Naval:—

Medical officers and apothecaries	28
Other officers	3
Nursing sisters	26
Priest	1
Ward-masters	8
Other ward attendants	146
Other employés	71
Total	283

B. Military:—

Medical officers and apothecaries	91
Medical cadets	5
Other officers	36
Nursing sisters	37
Volunteer lady nurses	69
Priests	8
Compounders	175
Other employés	1,164
Total	1,585

**C. Red Cross Society:—*

Medical officers and apothecaries	13
Nursing sisters (trained, 10; under training, 2; volunteers, 20)	32
Ward-masters	9
Other sick attendants	62
Other employés	104
Total	220

* In addition to these there was a Hospital Ship's staff of 44, belonging to the Red Cross Society.—W. G. M.

APPENDIX No. II.

List of Members of the "Medical Commission" at Port Arthur for the purpose of transferring Hospitals and Hospital Equipment from the Russians to the Japanese in accordance with Article 4 of the Geneva Convention.

Russian.

Dr. Bunge, P.M.O. of Russian Fleet.
Dr. Yastrebov, P.M.O. of the Naval Land Forces.
Dr. Subbotin, P.M.O. of the Fortress Garrison.
(These three are "State Councillors" and have the relative rank of Brigadier-General. The Military Director of the Russian Military Hospitals, Colonel (local, Major-General) Kurzevich was appointed, but did not attend the first meeting, and his name was then struck off.)

Japanese.

Surgeon-General Ochiai, P.M.O. of Third Army.
Surgeon-Major Tani.
Surgeon-Major Noguchi.
Surgeon-Lieut. Suzuki (Navy).
Surgeon-Captain Inouye.
Surgeon-Captain Omori.
Captain Katsuno (Staff).
Captain Nagamine (Intendance).
Apothecary Terata.
Mr. Hiyodo (Legal Adviser).

APPENDIX No. III.

Table showing the distribution of sick and wounded in the hospitals at Port Arthur on 28th January, 1905.

Hospital District and Number.	Wounded.	Infectious Diseases.			Scurvy.	Other Diseases.	Total.
		Enteric Fever.	Dysentery.	Others.			
Headquarters District.							
IV. - - -	43	—	—	—	389	72	504
XIV. - -	759	1	—	2	179	65	1,006
XV. - - -	269	—	1	—	51	4	325
XVI. - -	98	—	—	—	337	31	466
Isolation Hospital	—	—	1	4	—	—	5
Total Headquarters District.	1,169	1	2	6	956	172	2,306
No. 1 District.							
I. - - -	270	—	—	—	494	42	806
VII. - -	202	—	—	—	21	—	223
IX. - - } X. - - }	521	—	3	1	1,028	97	1,650
XI. - - -	568	17	14	3	334	55	991
Total No. 1 District.	1,561	17	17	4	1,877	194	3,670
No. 2 District.							
II. - - -	53	—	—	—	287	30	370
XII. - -	202	—	—	—	11	5	218
XIII. - - -	164	1	4	5	198	1	373
V. - - } VI. - - }	—	1	188	2	1,070	6	1,267
Total No. 2 District.	419	2	192	7	1,566	42	2,228
No. 3 District.							
III. - -	339	2	4	—	1,432	55	1,832
VIII. - -	319	—	5	—	107	76	507
XVII. - -	39	—	—	—	120	11	170
XVIII. - -	77	—	—	—	77	34	188
XIX. - -	158	1	—	—	143	20	332
Total No. 3 District.	932	3	9	—	1,879	196	3,019
Hospital Ship, *Kazan.*	255	—	—	—	—	—	255
Grand Total -	4,336	23	220	17	6,278	604	11,478

APPENDIX No. IV.

Statement of Conditions which the Japanese Authorities used as a guide in determining a man's incapacity for further service in connection with the application of Article 6, paragraph 3 of the Geneva Convention. (These are the conditions laid down in Japanese Compulsory Service Enactments as disqualifying a man for military service at any time.)

1. Incurable or intractable skin disease.
2. Affections of lips, teeth, or mouth interfering to any great extent with the performance of military duties.
3. Rickets.
4. Loss of ears or nose.
5. Dulness of intellect.
6. Dementia.
7. Loss of sight.
8. Loss of hearing.
9. Loss of speech.
10. Stricture of œsophagus.
11. Curvature of spine or deformity of pelvis.
12. Contraction of fingers, preventing grasp of hand.
13. Loss of thumb or first finger or any two other fingers.
14. Loss of great toe or of three or more toes.
15. Curvature or deformity of legs.
16. Tendency to dislocation of joints.
17. Club foot.
18. Epilepsy.
19. Aneurism.
20. Hernia.
21. Deformity or abnormality of joints.
22. Elephantiasis or leprosy.

To face page 278.

FIG. A.

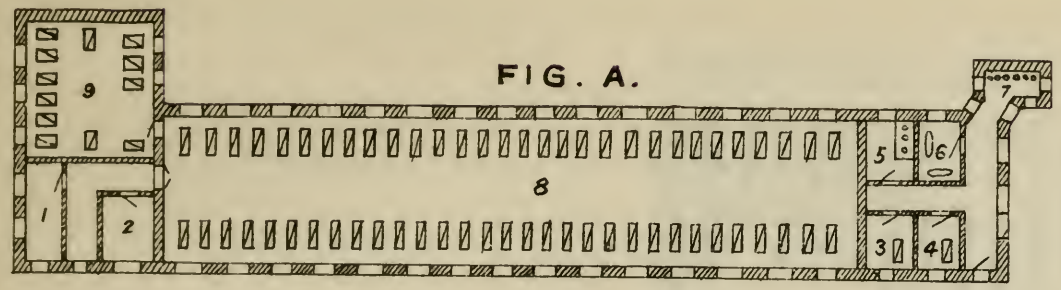


FIG. B.

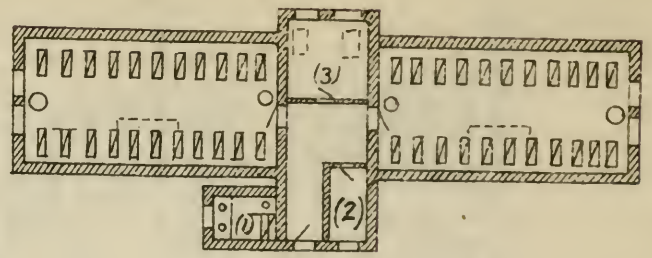


FIG. C.

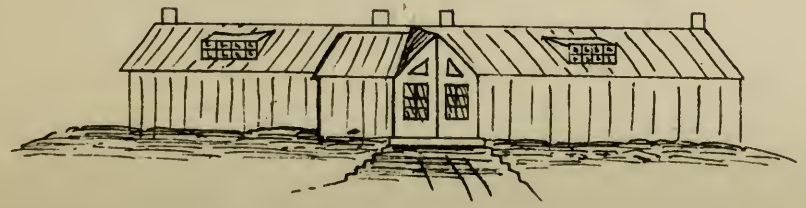
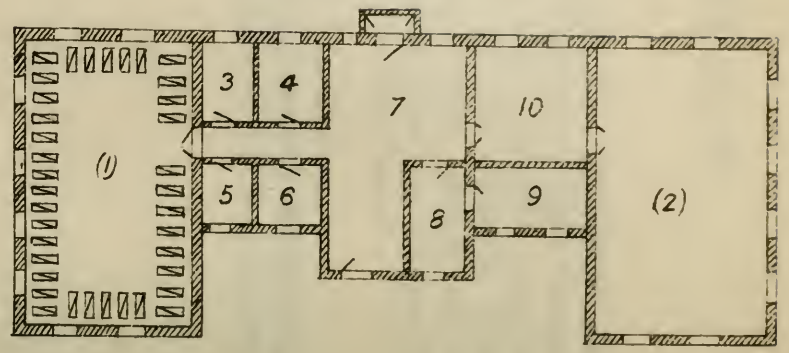


FIG. D.



Scale 1"=50' (approx)

Figure 1.

APPENDIX No. V.

Explanation of Figures 1, 2, *and* 3.

FIGURE 1.—PLANS of some HOSPITAL WARDS at PORT ARTHUR at the time of capitulation.

(*a*) A pavilion of the Naval Hospital (No. XI.). (1) M.O.'s room. (2) Attendants' room. (3) and (4) Special wards. (5) Ward kitchen. (6) Bath-room. (7) W.C.'s. (8) Ward with 60 beds. (9) Ward with 12 beds.

(*b*) A hospital hut of the Military Venereal Hospital. (Hospital No. XVIII.) (1) Annexe of two w.c. seats and urinal. (2) Ablution room. (3) Attendants' room. (In one of the huts this was an operating room. The circles in the wards represent stoves.)

(*c*) Front elevation of (*b*), showing lighting by dormer windows.

(*d*) Plan of Grand Duke Constantine's School, as converted into a hospital (Section of No. XIV. Hospital) :—(1) and (2) Large school rooms used as ward for 40 beds each. (Beds shown in (1)). (3) Stores. (4) Kitchen. (5) and (6) Nurses' or Attendants' rooms. (7) Hall. (8) Room for minor dressings. (9) Operating room. (10) Class-room used as ward.

FIGURE 2.—PLAN of BARRACKS as used for HOSPITAL WARDS in PORT ARTHUR at the time of capitulation.

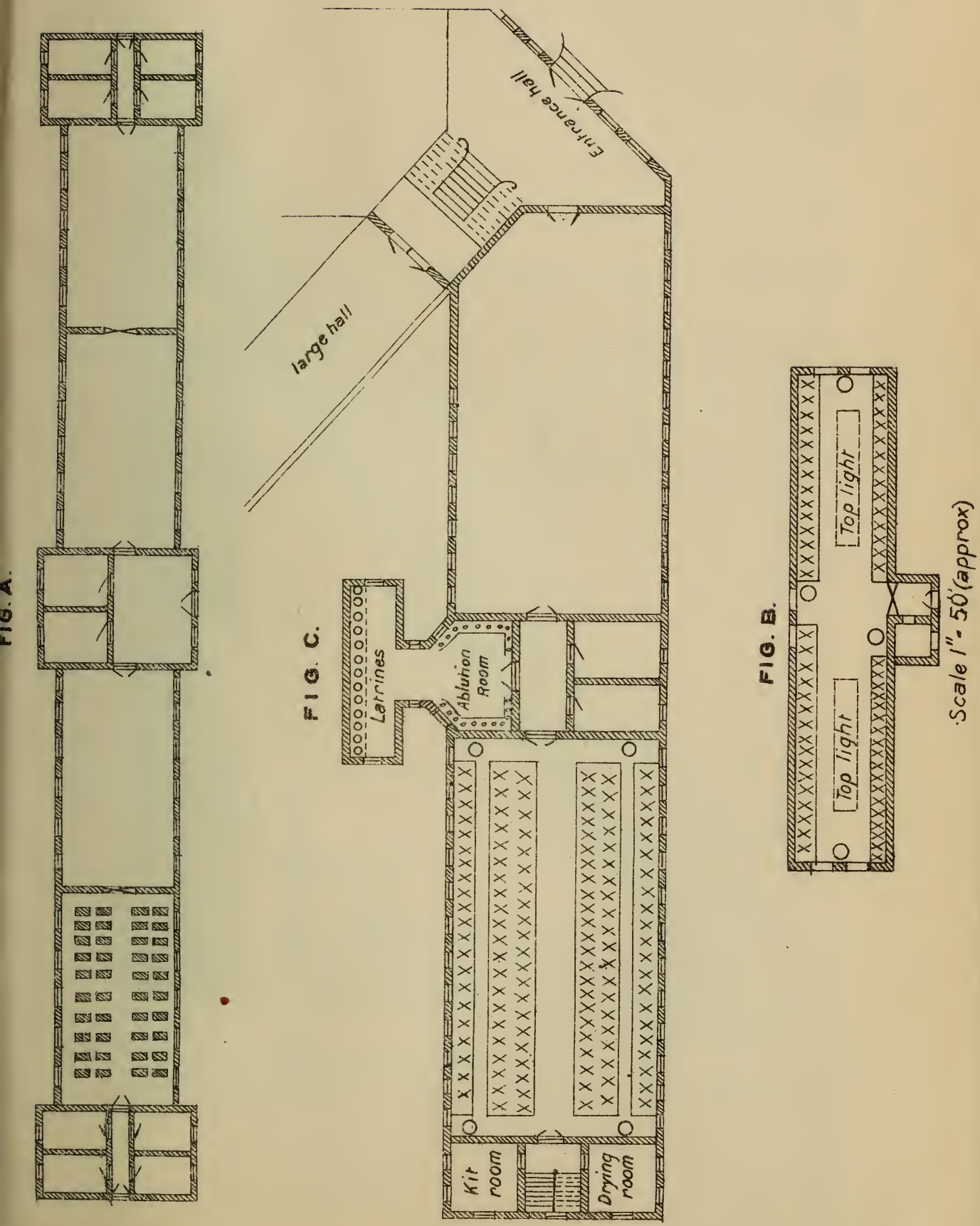
(*a*) Usual type of infantry barrack hut, showing arrangement of cots in one of the rooms. The small end and centre rooms were used as offices, special wards, attendants' room, ablution rooms, commode rooms, or as rooms for minor dressings and operating rooms.

(*b*) Type of barrack hut in the infantry barracks occupied by Nos. IX. and X. Hospitals. The patients lay crowded together on platforms (*narui*).

(*c*) Type of Naval or Marine Barrack, such as was occupied by No. XVI. Hospital, showing the arrangement of patients on platforms (*narui*) in six rows in one of the large barrack rooms.

To face page 279.

Figure 2.



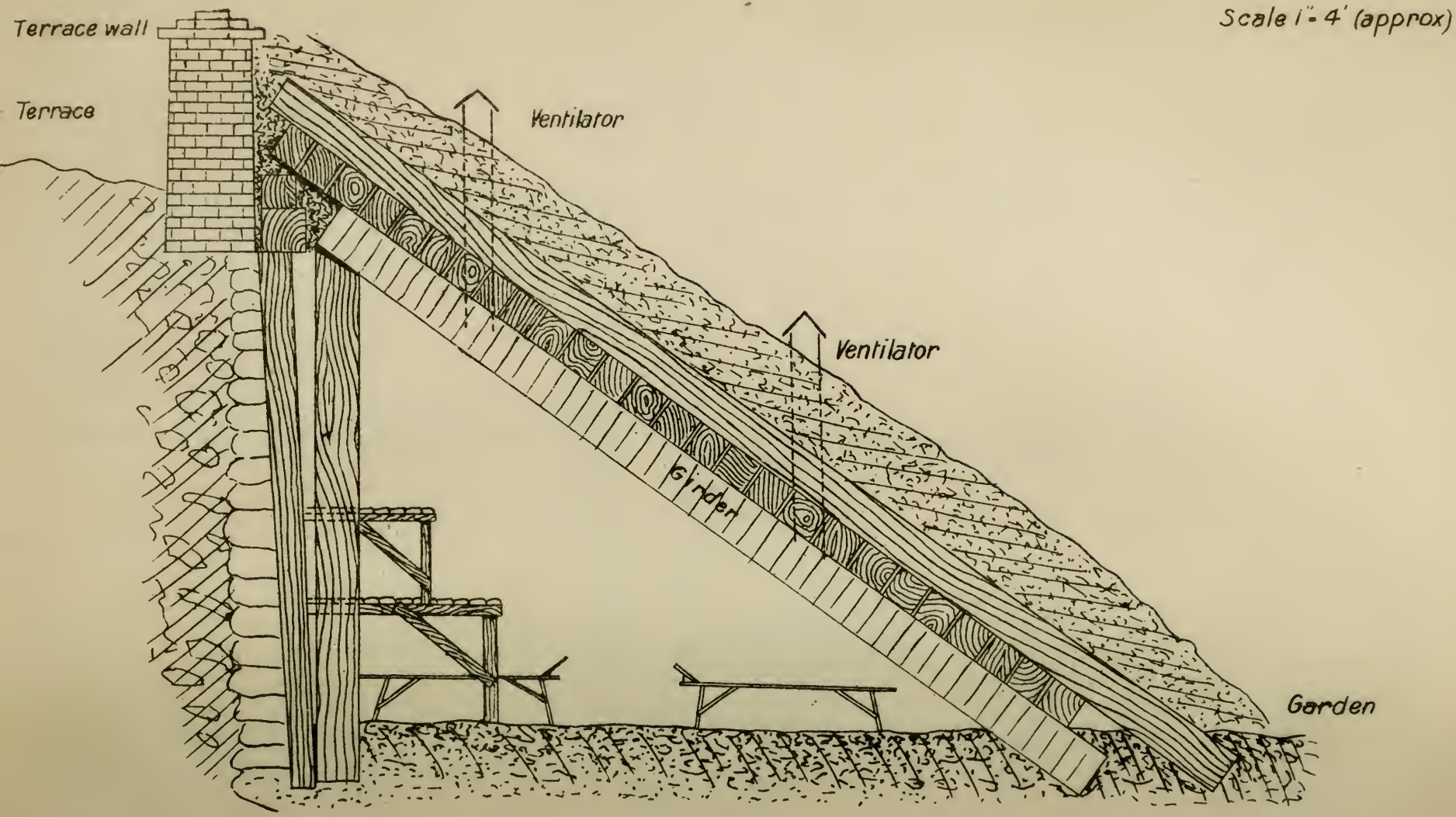

Scale 1" = 4' (approx)
Terrace wall
Terrace
Ventilator
Ventilator
Girder
Garden

FIGURE 3.—SECTION of "BLINDAGE" at No. XV. (Red Cross Society's) HOSPITAL at PORT ARTHUR.

(*a*) *Explanation.*—The girders were supported on upright beams. A layer of stout beams was laid across the girders; and another layer of beams across these; a thick layer of earth and stones was laid on top. Ventilators (wooden square shafts) were inserted at intervals.

The platforms in the interior were intended to take patients placed along the long axis of the "blindage." Two rows of hospital cots could be placed along the short axis. There were no windows, but the "blindage" was open at the ends, like a tunnel.

(14) Port Arthur:—The Russian Red Cross Society's Hospital: Statistical Analysis of 2,080 Wounds treated during the Siege.

REPORT by Lieut.-Colonel W. G. MACPHERSON, M.B., C.M.G., Royal Army Medical Corps, dated Manchuria, 15th May 1905.

Statistical Tables (at end of Report).

Distribution of patients according to month of admission into hospital and the number of wounds received - - - - - -	Table I.
Distribution of wounds according to month and the nature of the injury - - - -	„ II.
Distribution of wounds according to anatomical regions - - - - - -	„ III.
Surgical operations performed - - -	„ IV.
Out-patient department - - - -	„ V.

The following analysis and the accompanying tables are compiled from the records of the Russian Red Cross Society's Hospital at Port Arthur, and it is entirely due to the kindness of Dr. Rozanov, the Senior Medical Officer of the Hospital, that I am enabled to submit them Dr. Rozanov very kindly went through his records with me and permitted me to make a note of the figures, from which the analysis has been made and the tables compiled.

The statistics cover the period from the beginning of the war to the end of December 1904.

The number of wounded treated in the hospital during that time was 1,616, and the number of wounds 2,080: 1,379 of the patients had one wound only, 178 had two wounds, 31 three wounds, 13 four wounds, 6 five wounds and 3 fifteen wounds each. There were also single cases of patients with 8, 9, 12, 19, 27, and 40 wounds.

The figures give the following percentages:—

85·3	per cent.	with	1 wound.
11·0	„	„	2 wounds.
1·9	„	„	3 „
·8	„	„	4 „
·4	„	„	5 „
·6	„	„	8 or more wounds.

Table I shows the distribution of these figures according to months. The large number of multiple injuries in August was caused mainly by mines and hand grenades.

Distribution of the Wounds according to the Nature of the Missile.

Big guns firing high-explosive shells caused 743 of the wounds, shrapnel and missiles from field guns 291, rifle fire and machine guns 926, bayonet and side arms 13, mines and hand grenades 74, and fragments of wood, stone, &c., from wrecked blindages and shelters 33; the percentages from each of these causes being 35·8, 14·0, 44·4, 0·6, 3·6, and 1·6 respectively.

Table II gives the distribution of the figures according to months. The wounds shown as occurring during the first three months were all caused by shells fired from the Japanese ships outside Port Arthur.

Distribution of the Wounds according to the Part of the Body Injured and Nature of Injury.

Table III gives the detailed figures showing this according to the Russian system of classification.

The wounds from shells and rifle fire give the following percentages according to the part hit:—Head (region of skull), 10·2 per cent. of the wounds; back (region of the vertebral column), 4·0 per cent.; face, 10·0 per cent.; neck, 1·2 per cent.; thorax, 9·0 per cent; abdomen, 5·2 per cent.; pelvis, 6·7 per cent.; upper extremity (excluding joints), 20·6 per cent.; lower extremity (excluding joints), 20·0 per cent.; joints, 6·4 per cent. Percentages of the distribution of the injuries from bayonets and side arms and from other causes have not been calculated, as the numbers are too small to be of any interest or importance. The table shows all that is necessary with regard to them and they form together only 3·1 per cent. of the total wounds. 75 of the 2,080 wounds, or 3·6 per cent., were not classified according to the part hit in Dr. Rozanov's records.

Of the wounds classified in Table III (*i.e.*, 2,005 wounds), 259, or 12·9 per cent., were fatal.

Wounds of Head.—Of the 212 wounds of the head the mortality was 39·6 per cent. The bone and contents of the cranium were injured in 125 cases, and the mortality amongst these was 67·2 per cent. Where the scalp only was injured there was no mortality.

Wounds of the Back.—Eighty-two wounds of this region gave a mortality of 26·8 per cent 53 were wounds of the soft tissues only, without mortality. Of the 29 in which the vertebral column was injured, 75·8 per cent. were fatal.

Wounds of the Face.—Out of 208 wounds of the face, 48·6 per cent. were wounds of the soft tissues only, 25·0 per cent. were complicated with fracture of bone, 14·9 per cent. were wounds of the eye, and 11·5 per cent. wounds of the ear; 5·8 per cent. of the fracture cases and 3·2 per cent. of the eye cases were fatal, the total mortality in wounds of the face being 1·9 per cent.

Wounds of the Neck.—These gave a mortality of 41·7 per cent. in 24 cases. All the fatal wounds were wounds of the large vessels (9) or of the œsophagus (1). All of these wounds proved fatal. They formed 37·5 and 4·2 per cent. respectively of the total of wounds of the neck. There were 2 cases of wound of the larynx. The remaining cases, 12, were wounds of the soft tissues only.

Wounds of the Thorax.—The mortality amongst these injuries was 26·6 per cent. in 187 wounds. The lungs were injured in 94 cases, and 21, or 22·3 per cent., were fatal. Six wounds of the large vessels were all fatal. There were 3 wounds of the heart, one of which recovered. 19 cases of injury to the ribs had a mortality of 10·1 per cent. The remainder were wounds of the soft tissues, and none were fatal.

Wounds of the Abdomen.—There were 109 of these, with a mortality of 53·2 per cent. 23 of the wounds were wounds of the soft tissues only, without mortality. 77, or 70·6 per cent., were wounds of the stomach or intestines, and 49, or 65 per cent., of these were fatal. There were 9 cases of wounds of the liver, and all proved fatal.

Wounds of the Pelvis.—Eighty-six out of 140 cases, or 61·4 per cent., affected the soft tissues only, and none were fatal. In 23 cases where the bones were injured, there were 6 deaths, or 15 per cent. 10 wounds of the rectum gave a mortality of 80 per cent., six wounds of the bladder a mortality of 75·0 per cent., and three wounds of the large vessels a mortality of 33·3 per cent. None of the other wounds, viz., 5 of the penis and urethra, and 7 of the scrotum and testicle, were fatal.

Wounds of the Upper Extremities.—There were 429 wounds of the upper extremities, exclusive of injuries to joints. The mortality was 1·2 per cent. One out of 273 wounds of the soft tissues only proved fatal. These wounds formed 63·6 per cent. of the wounds of this region. 18, or 4·1 per cent., were injuries of the large vessels, none of them fatal, and 138 (32·3 per cent.) fractures of bone, with a mortality of 2·9 per cent. All the fatal wounds, involving fracture of bone, were wounds in which the humerus was fractured, namely, 4 out of 36. 26 of the fractures involved the bones of the forearm, and 76 the bones of the hand or fingers.

Wounds of the Lower Extremities.—There were 416 of these injuries, excluding injuries of joints. The mortality was 4·0 per cent. The soft tissues only were affected in 307, or 73·8

per cent. of the cases, and one of these proved fatal. Eight were wounds of the large vessels, or 0·2 per cent; 4 of these were fatal. The bones were fractured in 101 of the cases, or 24·2 per cent. 21 of these were fractures of the bones of the foot, 38 were fractures of the bones of the leg, and 42 were fractures of the femur. The mortality amongst the fracture cases was 11·8 per cent. All the deaths, 12 in number, occurred amongst the fractures of the femur, giving a mortality of 27·6 per cent. for these injuries.

Wounds of Joints.—There were 133 wounds of joints, including 10 of the wrist, 19 of the elbow, 14 of the shoulder, 16 of the tarsal, 10 of the ankle, 34 of the knee, and 6 of the hip joint. The articular ends of the bones were splintered in 6 of the wrist, 14 of the elbow, 12 of the shoulder, 13 of the tarsal, 16 of the knee, 9 of the ankle, and 5 of the hip cases, or 75 in all, heing 56·3 per cent. of the total joint wounds. In addition to these, 24 joint wounds are recorded as wounds of the joint in which the bullet lodged in the joint, but these injuries are not classified according to the particular joint injured. Only 6 of the joint wounds proved fatal, or 4·5 per cent. Two of the fatal cases were wounds of the knee joint with splintering of the bone, and the remaining four were wounds of the hip joint, also with splintering of the bone. The mortality, therefore, of these injuries was 12·5 per cent. in the case of the knee joint, and 90 per cent. in the case of the hip joint. The mortality for all wounds of the knee joint was 5·8, and of the hip joint 75·0 per cent.

Wounds from Side Arms.

Only one of the 13 wounds recorded died. It was a wound of the large vessels.

Wounds from other Causes.

These included 1 dislocation each of the ankle, patella, and humerus; 6 fractures of the ribs, 2 of the humerus, 2 of the femur, and 1 of the leg bones; and 38 contusions, 28 of which were from "blindage" injuries, 8 from "windage" of shells, and 2 from explosions of mines. Both of these last cases were fatal, but none of the others.

Surgical Operations.

The statistics of the surgical operations are shown in Table IV. The mortality was 8·5 per cent., *i.e.*, 51 deaths in 600 operations. Two of the deaths occurred amongst 24 operations for re-section of bones, namely, 1 from primary hæmorrhage in re-section of the femur out of 12 such operations, and 1 from empyema and abscess of the liver out of 5 operations for re-section of the ribs. There were 10 deaths in connection with amputations, namely, 9, or 47·0 per cent., in 19 amputations of the thigh, and 1 in 13 amputations of the leg. The

chief cause of death in these cases was primary hæmorrhage. There was 1 death in 261 operations for extraction of foreign bodies, namely, an operation for extraction of a bullet from the kidney. There was also a death in 158 operations for removal of splinters of bone.

One case of operation for re-section of the rectum proved fatal. 2 operations for cystotomy also proved fatal. They were for cases of severe injury to the pelvis and urinary passages.

Fourteen laparotomies were performed; 11 of the cases died, giving a mortality of 78 per cent.

Craniotomy was performed in 50 cases, with 21 deaths, or a mortality of 42 per cent. The deaths were mainly from hæmorrhage or meningitis.

One case, in which œsophagotomy was performed, lived for three weeks after the operation and then died of inanition. The operation was performed in consequence of a piece of shell being lodged in the œsophagus.

There was 1 death in 8 cases of ligature of arteries, namely, from hæmorrhage after ligature of the popliteal.

No other deaths occurred after operations.

Septic Infections.

Only 9 of the wounds, or 0·4 per cent., were complicated with septic infections. 4 were cases of erysipelas, 2 in May and June, and 2 in December. They all recovered. The remaining 5 cases, namely, 2 of tetanus, 1 of pyæmia, and 2 of gangrene occurred in August and all of them died. The wards, utensils, &c. were thoroughly disinfected after this occurrence and the hospital remained free from further cases until January 1905, after the fortress had capitulated, when 7 cases of pyæmia occurred in patients who had been sent from other hospitals. Four of them died.

Out-Patients.

Although the work of the out-patient department of the hospital does not come under the statistical analysis of the 2,080 wounds treated in the hospital, it may be of interest to add the Table appended, Table V, showing the numbers so treated. The figures shown under the months February to July (inclusive) represent cases of wounds and sickness amongst the civil population, the wounded being chiefly artisans employed in the dockyard and townspeople who were hit by shell fire during the naval battles. From August to December only soldiers were seen in the out-patient department. No statistics were kept of the nature of their injuries or diseases, but about half the number were cases of wounds.

Conclusion.

These statistics of wounds in one of the hospitals at Port Arthur during the siege may be taken as an example of the surgical results of the wounds treated in the besieged fortress.

It was not possible to obtain statistics of each or of any of the other hospitals, of which a report has already been submitted; but, so far as I was able to judge from my visits to them and from conversations with the medical officers, the general results of the treatment of the wounds in them were very similar to those of the Red Cross Society's hospital. Infective complications were certainly not a feature in the history of the cases, and the hospitals were all admirably equipped for the maintenance of a strict aseptic ritual. The chief difficulty with which the surgeons had to contend was the scorbutic complications, which prevented the union of bony tissue, delaying the recovery of cases of fracture, and which also rendered the performance of amputations and similar operations risky, on account of the danger of hæmorrhage, as well as unsatisfactory on account of tardy union of the flaps.

In other respects the wounds did not present any special peculiarities. Those which gave the most satisfactory results under modern methods of treatment were the injuries to the skull and brain, many remarkable cases recovering completely after early craniotomy, an operation which could always be satisfactorily performed in fixed hospitals, such as those of a besieged place. Laparotomies, on the other hand, were not favourably spoken of, the general impression being that cases were more likely to recover without than with operation. This opinion is to some extent borne out by the mortality statistics of the cases in which the stomach and intestines were injured and the mortality statistics of the laparotomy operations, as given in the analysis; contrasting in a marked manner with similar statistics for skull injuries and craniotomy operations.

As regards septic diseases, the general impression was that they were most frequent in wounds caused by the destruction of bomb-proof shelters, especially wounds caused by splinters of the beams that supported the earth covering, and I was told of some cases of malignant œdema, as well as of tetanus, that had occurred in connection with such wounds.

The wounds caused by hand grenades were difficult to treat satisfactorily. I saw many such cases. The wounds were usually multiple, and in some cases they were not only caused by strips of the metal case but by the explosive effects of the pyroxilin gas, which appears to have been the explosive agent. The Russian medical officers called these wounds "pyroxilin" wounds. The explosive effects were as a rule those of complete shattering of a limb, the part being completely carried away, or so damaged as to require amputation. The wounds caused by the strips of the casing were deep lacerated wounds, leaving a ragged, irregular, and often stellated cicatrix after healing, and frequently causing much disfigurement when the face, as was usual, was the site of the wounds. These wounds were also, at first, of a brilliant yellow colour, and the patients suffered an unusual amount of pain in the wound, a symptom that persisted long after the wound had begun to heal.

Table I.

Distribution of the Patients according to Month of Admission into Hospital and the Number of Wounds received.

Month, 1904.	Number of Patients admitted with											
	1	2	3	4	5	8	9	12	15	19	27	40 wounds.
February - March - April -	15	5	1	—	—	—	—	—	—	—	—	—
May - June -	113	28	5	—	—	—	—	—	—	—	—	—
July -	189	19	3	1	—	—	—	—	—	—	—	—
August -	422	71	2	4	2	1	—	1	1	1	1	1
September -	83	8	4	3	4	—	1	—	2	—	—	—
October -	142	15	10	3	—	—	—	—	—	—	—	—
November -	173	17	2	1	—	—	—	—	—	—	—	—
December -	242	15	4	1	—	—	—	—	—	—	—	—
Total -	1,379	178	31	13	6	1	1	1	3	1	1	1

Table II.

Distribution of the Wounds according to Month and the Nature of the Injury.

Month, 1904.	Number of Admissions with Wounds from						Total of Wounds.	Total of Individuals.
	Big Gun Shells.	Shrapnel and Field Gun Common Shells.	Rifle and Machine Gun Fire.	Bayonets and other Side Arms.	Mines and Hand Grenades.	Other Causes.		
February - March - April -	38	—	—	—	—	—	38	21
May - June -	12	68	104	—	—	—	184	146
July -	61	20	157	6	—	—	240	212
August -	294	71	314	5	8	23	717	507
September -	62	34	85	—	—	1	182	105
October -	79	41	72	1	19	3	214	170
November -	96	26	59	1	27	5	217	193
December -	101	31	135	—	20	1	288	262
Total -	743	291	926	13	74	33	2,080	1,616

Table III.

Distribution of the Wounds according to the Anatomical Regions.

(Deaths are indicated by the figures in italics.)

Nature of Wound. (Gunshot and Rifle.)		May, June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Wounds of Head.	Soft tissues -	1	14	31	6	13	9	13	87
	Cranium -	4(*3*)	10(*6*)	32(*18*)	12(*6*)	15(*9*)	18(*14*)	34(*28*)	125(*84*)
Wounds of Back.	Soft tissues -	2	12	33	2	—	—	4	53
	Spinal column -	2	—	13(*8*)	5(*5*)	2(*2*)	3(*3*)	4(*4*)	29(*22*)
Wounds of Face.	Soft tissues -	1	6	38	—	21	17	18	101
	Bone - -	6	4	10(*1*)	2	4	9(*1*)	17(*1*)	52(*3*)
	Eye - -	—	3	11	2(*1*)	4	7	4	31(*1*)
	Ear - -	1	—	8	—	8	4	3	24
Wounds of Neck.	Soft tissues -	2	—	6	2	—	—	2	12
	Large vessels -	1(*1*)	—	2(*2*)	2(*2*)	—	2(*2*)	2(*2*)	9(*9*)
	Larynx -	—	—	1	—	1	—	—	2
	Œsophagus -	—	—	—	—	—	1(*1*)	—	1(*1*)
Wounds of Thorax.	Soft tissues -	2	2	19	2	22	17	1	65
	Bone - -	3	1	6(*1*)	3	—	4	2(*1*)	19(*2*)
	Heart - -	1	—	—	—	—	—	2(*2*)	3(*2*)
	Lungs - -	12	18(*2*)	28(*7*)	14(*6*)	3	5(*3*)	14(*3*)	94(*21*)
	Large vessels -	1(*1*)	—	1(*1*)	—	—	2(*2*)	2(*2*)	6(*6*)
Wounds of Abdomen.	Soft tissues -	—	2	9	4	1	4	3	23
	Stomach and intestines.	16(*8*)	13(*7*)	17(*8*)	8(*5*)	8(*7*)	7(*6*)	8(*8*)	77(*49*)
	Liver - -	—	—	2(*2*)	1(*1*)	2(*2*)	2(*2*)	2(*2*)	9
Wounds of Pelvis.	Soft tissues -	7	3	46	9	6	7	9	86
	Bone -	3(*1*)	—	8(*1*)	2	4(*2*)	3(*2*)	3	23(*6*)
	Rectum - -	1(*1*)	—	5(*3*)	2(*2*)	1(*1*)	—	1(*1*)	10(*8*)
	Bladder - -	2	—	2(*2*)	1(*1*)	—	—	1(*1*)	6(*4*)
	Large vessels -	—	1	1(*1*)	1	—	—	—	3(*1*)
	Penis and urethra.	1	1	1	1	—	—	1	5
	Scrotum and Testicles.	—	1	2	1	1	1	1	7
Wounds of Upper Extremities.	Soft tissues -	16	31	92	21	41(*1*)	33	39	273(*1*)
	Large vessels -	1	—	9	2	1	3	2	18
	Fractures of—								
	Fingers -	4	4	9	1	5	4	11	38
	Hand - -	2	6	11	6	—	1	12	38
	Forearm -	1	2	9	3	1	6	4	26
	Humerus -	1	5	14	5(*1*)	5(*1*)	2(*1*)	4(*1*)	36(*4*)
Wounds of Lower Extremities.	Soft tissues -	26	59	106	31	25(*1*)	21	37	307(*1*)
	Large vessels	—	—	3(*1*)	4(*2*)	1(*1*)	—	—	8(*4*)
	Fractures of—								
	Foot	4	4	6	—	2	1	4	21
	Leg - -	2	5	17	1	6	3	4	38
	Femur -	4(*1*)	7	14(*2*)	4(*1*)	1(*1*)	9(*5*)	3(*2*)	42(*12*)

TABLE III.—*continued.*

	Nature of Wound. (Gunshot and Rifle.)	May, June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Wounds of Joints.	Wrist—								
	With splintering of bone.	—	1	2	—	—	—	3	6
	Without - -	1	1	2	—	—	—	—	4
	Elbow—								
	With splintering of bone.	—	—	9	4	—	—	1	14
	Without -	2	—	—	—	—	1	2	5
	Shoulder—								
	With splintering of bone.	1	1	6	2	—	—	2	12
	Without - -	—	—	—	—	2	—	—	2
	Foot—								
	With splintering of bone.	2	—	8	1	—	—	2	13
	Without - -	2	1	—	—	—	—	—	3
	Ankle—								
	With splintering of bone.	1	1	3(*1*)	—	1	2	1	9(*1*)
	Without - -	—	—	1	—	—	—	—	1
	Knee—								
	With splintering of bone.	1	2	6	4	—	—	3(*2*)	16(*2*)
	Without - -	2	5	6	2	1	1	1	18
	Hip—								
	With splintering of bone.	—	—	1	—	1(*1*)	1(*1*)	2(*2*)	5(*4*)
	Without - -	—	—	—	1	—	—	—	1
	Missile lodged -	1	4	13	6	—	—	—	24
Wounds by Side Arms.	Head—								
	Soft tissues -	—	2	—	—	—	—	—	2
	Face—								
	Soft tissues -	—	1	1	—	—	—	—	2
	Neck—								
	Large vessels -	—	3	—	—	—	—	—	3
	Upper Extremities—								
	Soft tissues -	—	—	4	—	—	—	—	4
	Large vessels -	—	—	—	—	1(*1*)	—	—	1(*1*)
	Lower Extremities—								
	Fracture (leg) -	—	—	—	—	—	1	—	1
Wounds from other Causes.	Dislocations—								
	Ankle - -	—	1	—	—	—	—	—	1
	Patella - -	—	—	—	1	—	—	—	1
	Humerus - -	—	—	—	—	—	—	1	1
	Fractures—								
	Humerus - -	1	—	1	—	—	—	—	2
	Leg - -	1	—	—	—	—	—	—	1
	Ribs - -	—	—	6	—	—	—	—	6
	Femur - -	—	—	2	—	—	—	—	2
	Contusions—								
	"Blindage" -	1	5	—	14	3	5	—	28
	"Windage" -	—	—	—	8	—	—	—	8
	Explosions -	—	—	—	—	1(*1*)	1(*1*)	—	2(*2*)

TABLE IV.

SURGICAL OPERATIONS performed in connection with WOUNDS treated in the RED CROSS SOCIETY'S HOSPITAL at PORT ARTHUR during the SIEGE.

(*Deaths after operation are indicated in italics.*)

Operation.	Feb., March, April.	May, June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Re-sections of Bones—								
Humerus	1	1	—	3	3(*1*)	3	—	1
Femur	—	—	1	2	1	—	—	—
Os calcaneum	—	—	—	1	—	—	—	—
Ribs	—	—	—	2(*1*)	—	—	1	2
Radius	—	—	—	—	—	1	—	—
Radius and ulna	—	—	—	—	—	—	1	—
Re-sections of Joints—								
Elbow	—	—	1	4	2	—	—	1
Knee	—	—	—	1	2	—	—	—
Shoulder	—	—	—	2	1	—	—	—
Tarso-metatarsal	—	—	—	—	—	1	—	—
Phalangeal	—	1	—	—	—	—	—	—
Amputations—								
Fingers	—	1	—	—	—	2	1	3
Thigh	—	1(*1*)	1	5(*2*)	2(*1*)	3	4(*3*)	3(*2*)
Foot	—	—	—	1	—	—	—	—
Leg	—	—	—	5	1	3(*1*)	—	4
Forearm	—	—	—	—	—	—	1	2
Upper arm	—	—	—	3	2	1	2	3
Extractions of—								
Missiles	11	23	52	70(*1*)	38	19	18	30
Bone fragments	4	15	18	48(*1*)	27	13	12	21
Operations of—								
Arthrotomy of knee joint.	—	1	—	—	—	—	—	—
Excision of rectum	—	—	—	1(*1*)	—	—	—	—
Fracture of patella	—	—	—	—	1	—	—	—
Cystotomy	—	1(*1*)	—	1(*1*)	—	—	—	—
Castration	—	—	—	—	1	—	—	—
Laparotomy	—	2(*1*)	3(*2*)	2(*1*)	2(*2*)	3(*3*)	2(*2*)	—
Craniotomy	—	2(*1*)	3(*2*)	15(*6*)	6(*1*)	7(*4*)	8(*4*)	9(*3*)
Œsophagotomy	—	—	—	—	—	—	1(*1*)	—
Tracheotomy	—	—	—	1	—	—	—	—
Iridectomy	2	—	—	—	—	1	—	—
Ligature of arteries	—	1	—	3(*1*)	1	1	—	2
Enucleation of eye	—	—	—	—	—	1	1	1
Dislocation of shoulder operation.	—	—	—	—	—	—	—	1
Total	18	49(*4*)	79(*4*)	170(*15*)	90(*5*)	59(*8*)	52(*10*)	83(*5*)

NOTE.—Total operations, 600; Deaths after operations, 51.

Table V.

Statistics of the Out-patient Department of the Red Cross Society's Hospital at Port Arthur during the Siege.

Month, 1904.	Gastro-enteritis.	Wounds.	Enteric.	Dysentery.	Other Diseases.	Total.
February - -	—	211	3	—	441	655
March - -	11	—	—	12	419	442
April - - -	1	235	—	8	260	504
May - -	67	490	—	8	324	889
June - - -	30	116	—	25	687	858
July - -	44	200	—	60	408	712
August - -	?	?	?	?	?	1,297
September -	?	?	?	?	?	1,115
October - -	?	?	?	?	?	1,235
November - -	?	?	?	?	?	1,242
December -	?	?	?	?	?	1,072
Total - -	?	?	?	?	?	10,021

(15) Port Arthur.—Notes on the Clinical Symptoms of Scurvy Cases seen after the Capitulation; their Treatment by Russians and Japanese; and points of resemblance between them and Cases of Beri-Beri.

REPORT by Lieut-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, dated Manchuria, 18th May 1905.

At the time of the capitulation of Port Arthur (1st January 1905) there were about 8,000 cases of scurvy in the hospitals, exclusive of a very large percentage of scorbutic complications in an almost similar number of patients admitted for wounds. Between the date of the capitulation and the 18th January 439 of the scurvy cases died, and about an equal number had recovered and had been discharged from hospital. On the 29th January the number of cases in the hospitals had been still further reduced to 6,278, exclusive of the cases amongst 4,336 wounded remaining in hospital on that date. The following notes are made from jottings in the various hospitals during the period between the 20th January and the 1st February.

Clinical Symptoms.

The commonest symptoms were congestion and tumefaction of the gums and palate, œdematous swellings of the body generally or of one or more limbs only, hard brawny swelling of the calf of the leg, with pain and contraction of the gastrocnemius, anæmia, and ecchymotic discoloration of the body generally, or of one or more limbs only. But in addition to these, there were numerous less frequent but important symptoms, and sometimes the latter existed without the more prominent symptoms being present. I propose to give an account of these as I saw them, taking the more prominent symptoms first, but grouping the others as far as possible under them, according to their association with them.

Condition of the Gums and Soft Palate.

In well-marked cases with gum symptoms, the condition was that of great tumefaction and congestion both of the gums and the soft palate. The teeth in these cases were completely

concealed by the hypertrophied mass of mucous tissue, the cavity of the mouth was almost completely filled by it, and the appearance of the cheeks, as if swollen over the maxillæ with gumboils, was very characteristic. In exaggerated cases the incisors and molars would be equally covered by the mucous membrane, but most of the cases, in which the characteristic swelling of the cheek was observed, had apparently perfectly healthy gums along the line of the incisors, while the molar region was completely covered with the hypertrophied mass. The colour of the mass was not always blue, or even bluish. It was most frequently a reddish purple. The swelling was usually irregular in shape, as if some of the glandular elements were more congested than others, or as if intervening strands of connective tissue bound them down. The general appearance was that of a mulberry mass. Although, as a rule, the swelling was bilateral, some marked cases were seen in which one side only was affected, causing a typical gumboil-swelling appearance on one side of the face.

Milder and convalescent cases showed only small patches of granular-like swelling. In one case ecchymosis of the gum was seen; and in some of the convalescent cases the only gum symptoms were small flat healing ulcers in the molar region. Many severe cases of scurvy, however, were seen in which the gum symptoms had entirely disappeared, or had only existed in a mild form.

Looseness of the teeth was not often observed, but I saw one well-marked case.

In connection with the gum and palate symptoms some rarer symptoms were observed. One of the commonest of these was pain and swelling of the maxillæ, affecting sometimes the maxillary joints, and apparently due to a periostitis or scorbutic hæmorrhage between the periosteum and bone. The pain in these cases is great, and this pain in the jaw was not uncommon, even when a definite periosteal swelling was not present.

Epistaxis and bleeding from the gums were not frequently observed. The swelling of the mucous membrane was indeed more hard and brawny than soft and spongy; and the appearance was not that of a swelling from which constant bleeding would occur.

In one case the swelling appeared to have affected the parotid, but only one such case was seen or heard of.

Œdema.

Œdematous swelling was common. In the majority of cases, one or more limbs only would be affected; in a few cases the whole body. The legs were affected most, and in a series of cases (123), taken as they came in one of the wards, the left leg was affected with the same frequency as the right, and both legs were affected simultaneously also with the same frequency.

Sometimes the face alone would show prominent œdematous symptoms, and this was generally associated with excessive tumefaction of the gums. Such a condition was regarded as an unfavourable sign, death occurring two or three days after its appearance. The thigh was the next most frequently affected with œdema, sometimes being swollen to double its normal size. In cases in which the œdema was more general, the serous cavities showed presence of effusions. Frequently these more general swellings would be confined to the lower part of the abdomen and lower extremities. One such case had the scrotum and penis swollen so as to resemble a case of elephantiasis, and, in addition to considerable ascites, it showed extensive œdema of the abdominal walls and thighs. Three similar cases had been observed in the same ward. In another case, in which there was general œdema with ascites, the swelling was most marked in the hands and wrists.

In the more localized cases of œdema, it was noted that the flexor surfaces were more affected than the extensors. There was one peculiar case, in which the œdema was circumscribed, as if a tight band had been tied round the limb. This was a case of œdema of the right knee, the œdematous area extending from the middle of the upper third of the tibia to the junction between the lower and middle third of the thigh.

Œdema of the lungs was an almost invariable symptom in the more serious of the cases, which showed symptoms of subcutaneous œdema; as was also dropsical effusion into the peritoneal, pleural and pericardial cavities. The most frequent of these was a form of what became known as "scorbutic pleuritis." It was accompanied with pain and a feeling of constriction in the thorax, and with the usual symptoms of effusion. In cases where the cavity was tapped a bloody serum was invariably found. (The ascitic fluid was also hæmorrhagic in character.) In one of the hospitals the opinion had been formed that scorbutic pleurisy occurred in nearly every case of scurvy.

Albuminuria was never observed in one of the hospitals (namely, the hospital that treated most of the severe cases), in cases of œdema and ascitis; but in another hospital I was shown two cases, in which there was albuminuria, one with well-marked scorbutic gums and pulmonary œdema.

Hard Swelling and Contraction of Muscles.

More common perhaps than subcutaneous œdematous conditions was the form of swelling known as "dry" swelling. This was almost invariably confined to the gastrocnemii, but sometimes affected the lower end of the biceps just above the elbow, the site of the affection in the upper extremity being in this respect remarkably similar to that in the lower extremity. This form of swelling was, in most cases, of a hard flat brawny

board-like character, and was painful. It was accompanied with general harshness of the skin and constituted the chief symptom in the form of scurvy known as "dry" as distinct from the "moist" form, the chief characteristic of which was the œdematous swellings. As in the case of the œdematous swellings, the hard dry swelling was sometimes circumscribed. In these cases it was globular in form and occupied the centre of the gastrocnemius or the lower end of the belly of the biceps, the site of the swelling being the junction between the muscle and tendon of insertion. The left leg appeared to be more commonly affected than the right, and it was not uncommon to find one leg perfectly free from the affection when the other was completely crippled. Sometimes, however, both legs would be the site of this form of swelling simultaneously, the patients in these cases being helplessly crippled.

All these cases had hæmorrhagic manifestations in the form of extensive ecchymoses, contrasting in this respect with the œdematous forms, which had petechiæ instead of ecchymoses. The ecchymoses were sometimes general, all over the body, but more frequently they were confined to the extremities, and especially to the flexor surfaces. Their size varied considerably, from large patches discoloring the whole limb evenly to isolated patches of all shapes and sizes. In some cases one limb only would display signs of ecchymoses, and cases were seen in which all appearance of ecchymoses had disappeared, leaving only a hard brawny-looking skin. It may be said, generally, that the common site for the ecchymoses was the leg, affected with brawny swelling of the gastrocnemius.

An invariable result of this dry swelling was painful contraction of the gastrocnemius and stiffening of the knee joint, amounting in most cases to false ankylosis. In some cases the contraction resulted in an exaggerated flexion of the limb, but in the majority the flexion was usually not more than to an angle of 130 degrees. The limb, however, in these cases, was crippled and the patient could walk with crutches only. As the cases progressed towards recovery, the method of progression without crutches became very characteristic, the weight of the body resting on the ball of the toes, with the heel retracted and not touching the ground.

It was stated in one hospital that this stiffness of the knee preceded the condition of swelling, and one case was seen in which the history bore this out. Contraction of the muscles of the hip and ankle joint was never observed, and the only other joint affected, and that rarely, was the elbow joint.

Long after the hard swelling had been reduced, the stiffness of the joint continued and was then associated with tightness and contraction of the tendons in the popliteal space and with atrophy of the muscular fibre. The limb in these cases became, literally, skin and bone in appearance. This helplessly crippled

condition was that of a large number of the scurvy cases in the Port Arthur hospitals at the end of January, many of them showing no other symptom than this sequel along with a certain amount of anæmia. The gums in many of these cases had entirely recovered.

Periostitis and scorbutic ulcers were sometimes associated with this condition of the legs. The former complication affected the tibia only, if one excepts the periostitis of the maxilla, to which reference has already been made, and also a certain condition of the periosteum, noted below in connection with surgical operations. The clinical cases of periostitis were not very common. They, however, caused perhaps more pain to the patient than any of the other complications, and cases were seen in the wards crying out with the suffering caused by periostitis.

Scorbutic ulcers were also not commonly seen in the wards. The few that were, were ulcers over the front of the tibia or dorsum of the foot, and the site of the former corresponded very much with the site of periostitic inflammation. The ulcers presented no peculiar features, except one in which the granulations bled freely and the pus was thus mixed with blood.

Anæmia.

Practically all the cases at one time or another suffered from anæmia. Several of the cases, however, had become hæmic by the end of January, even with the gum symptoms well-marked. The cases that displayed the most profound anæmia were the œdematous cases, and the pathological condition was said to be one of hydræmia rather than of true anæmia by those who had made more scientific clinical studies of the cases. Although, as just stated, some of the cases had become hæmic by the end of January, some 90 per cent. of the cases noted in the hospitals showed profound anæmia, thus indicating the practically universal presence of this symptom at one time or another amongst the scurvy cases in Port Arthur.

Ecchymoses.

Most of the facts connected with this symptom have already been noted. If the cases in which petechiæ only occurred are included, subcutaneous hæmorrhages were also a practically invariable symptom of scurvy. Some well-marked cases were seen in which the conjunctivæ and eyelids were the site of ecchymoses. The majority of these occurred after fits of coughing.

It was not apparently usual for the ecchymotic patches to break down and form ulcers, but there was a severe form of suppurative inflammation of the cornea that may have had its origin in connection with ecchymoses of the conjunctivæ. In

one form of this complication the ecchymosis appeared to follow pain in the eye and to come on gradually. Six cases of a suppurative keratitis were observed in one hospital, the effects being to cause blindness. A similar case was seen in another of the hospitals.

Complications.

In addition to the complications noted under the above headings, the most important complication was a form of diarrhœa, which the Russian medical officers called "Colitis Scorbutica." This was an extremely intractable form of watery diarrhœa. The discharge was profuse, sometimes, but not always, mixed with blood and never with slime. The number of stools in one case observed was 20 daily. The chief feature of these cases of diarrhœa is their intractability. In one hospital the medical officers said that the diarrhœa was associated with diphtheritic-like ulcers of the intestine, but in another hospital I was shown a preparation of the large intestine of one of the cases, in which there was an irregular mulberry-like thickening of the mucous membrane, the size of a hen's egg, and circumscribed. It was very similar, in fact, to the kind of swelling seen in the gums and soft palate.

Dysentery was not a complication of the scurvy cases in Port Arthur. On the contrary, patients, that were admitted originally for dysentery and afterwards contracted scurvy, recovered from the former disease, while the symptoms of the latter continued. Thus, out of 25 cases which had been admitted to hospital on account of dysentery and which were observed by me, ten had completely recovered while continuing to suffer from scurvy.

Enlargement of the liver was seen in one of the cases, but it does not appear to be commonly associated with scurvy.

The Japanese medical officers, who had charge of some of the cases, observed enlargement of the spleen, but the Russian medical officers do not appear to have observed this.

Meningitis and encephalitis occurred in some of the cases; they ended fatally. Two of these cases were seen at the end of January in one of the hospitals. They were unconscious, and had inequality of the pupils, stertorous breathing, and paralytic symptoms.

Two cases were seen in which there were paralysis of the rectum and incontinence of urine; and one case, in which there was hemiplegia, without other symptoms of central nerve affections.

Cystitis was seen in three cases, associated with retention of urine, and haematuria in one case. These may have been due to intercurrent affections.

In order to differentiate between some of these scorbutic cases and beri-beri, several of the cases were examined to

determine the presence or otherwise of anæsthetic points and the conditions of the reflexes. The results were uncertain and varied. In some there was some apparent anæsthesia, which was probably more subjective than real, and, in the case of the reflexes, some were normal, some exaggerated, and some diminished. It was, however, difficult to determine the latter on account of the stiffness of one or other of the knee joints.

Orchitis was noted as a complication in one of the cases, which I saw.

Otitis was present in two of the cases and deafness in one These complications were probably intercurrent, especially as such cases were common amongst the men who were in the forts and liable to suffer from the effects of the explosions of big shells and guns.

One of the commonest subjective complaints was that of cold. This sensation of cold was very marked. The patients, who were able to remain out of bed, would be seen crouching close to the stoves, even when the temperature of the wards was comparatively warm. The symptom was well-marked and always attracted the attention of the medical officers.

In most of the cases, so far as I could gather, there was a slight rise of temperature for the first two weeks after admission. In the temperature records examined, the highest point reached was 103° F. (39·8° C.). The difference between morning and evening temperature was slight.

The mode of onset appears to have been gradual. As a rule the first symptom complained of was the pain in the calves of the leg. There was, however, a series of cases amongst the crews of the *Pallada* and *Bayan*, which I was informed were the first to occur in the fortress. These cases arose after the ships had been docked, and the medical officers attributed their origin to the filthy, insanitary condition of the dockyard latrines They stated that the first symptoms were gastritis and intestinal catarrh.

Autopsies.

Post-mortem examinations were made in very few of the cases. In one hospital, however, a record was kept of the immediate cause of death in all. This was the Red Cross Society's hospital, into which as a rule only surgical cases were admitted. The number of deaths from scurvy in this hospital was 22. Of this number 6 died with "pleuritis hæmorrhagica," 4 with "encaphilitis hæmorrhagica," 4 with "meningitis hæmorrhagica," 3 with "hæmorrhagic effusion into the pericardium," 1 with "hæmorrhagic effusion into the knee joint," and 4 with no definite pathological condition of the internal organs, except ecchymoses and hydræmia. In all cases the blood was thin, watery, and of a pale colour and did not coagulate.

There was one class of cases, notably the "dry" form of scurvy, which died suddenly and without any evidence of internal complication. These were cases which were sufficiently recovered to be able to walk about, or which had never been so severe as to need confinement to bed. In these cases death would occur suddenly from syncope. The patient, after getting up, would suddenly and unexpectedly fall down dead after walking a few paces from his cot. In consequence of the frequency of such occurrences, the "dry" form of scurvy was regarded as the most dangerous form, and prognosis in these cases was not favourable, although the general appearance of the patients was better than in the œdematous form with its excessive pallor, and symptoms of œdema of the lungs, pleurisy, and ascitis.

Effect of Scurvy on Wounds.

Some interesting facts were observed in connection with this subject. In wounds that had long since been healed the cicatrices were a deep purple colour. In some a large area of the skin around would also be discoloured. The condition might best be described as purpura of cicatrices. As an example a case may be cited in which there were eleven cicatrices of wounds in the right leg and thigh, all of them almost black from hæmorrhagic effusion. The patient had received the wounds at Nan Shan from shrapnel, as far back as the 26th May 1904.

The healing of wounds was delayed. In some cases healing would not take place at all. Thus a case, in which the glands of the neck had been removed by operation on the 16th July 1904, displayed scorbutic symptoms on the 10th August, and on the 22nd January 1905 the operation wounds were still unhealed. A wound of the head and shoulder obtained in October was also unhealed on this date.

Fractures would not unite properly, and callus would be converted into a form of fibrous union, in marked contrast to the non-scorbutic cases, in which bony union occurred very rapidly. In some cases fractures that had apparently united gave way.

Wounds sustained by men suffering from scurvy generally displayed a large area of ecchymosis round the wound. Thus, in one case, where there was only a simple graze of the eyebrow, the whole of the eyelids and vicinity of the eye was ecchymosed.

Granulating surfaces bled easily, and such conditions healed with difficulty.

The question of operation was much complicated by the presence of scorbutic conditions. Thus in one hospital the surgeons found it almost hopeless to perform amputations with anything like satisfactory results, as the flaps would not unite,

and the danger from hæmorrhage was great. In another, the operations for resection of joints, &c., in order to save a limb, were abandoned in favour of amputation, as the latter gave better results, so far as recovery after operation was concerned. In the principal military hospital the operation of craniotomy had successful results in 60 per cent. of the cases, before scurvy appeared. Afterwards the recoveries were said to have fallen to about 30 per cent.

It was noted that in amputations the periosteum was quite loose, detached from the bone, and could be turned back over the bone, or drawn away from it, like the finger of a glove.

Treatment.

There was no uniform method of treatment in the various hospitals. Some preferred one form of remedy, some another. But all treated the cases generally, as best they could, by generous diet, fresh meat, milk, fruit, wines and spirits. This general treatment was only possible in its entirety after the capitulation. Cranberry juice and citric acid were given to the patients during the siege. The former, however, appears to have become exhausted, but there was abundance of the latter. There was no lime or lemon juice.

As general blood tonics, the favourite remedy was Fowler's solution and Blaud's pills.

The condition of the gums was treated by touching them with solid nitrate of silver. The Japanese, however, rejected this form of treatment, and used instead tincture of iodine. This caused considerable pain at first, but the gums rapidly improved. In some hospitals ordinary astringents were used for the gums.

As internal remedies for checking hæmorrhages, the extracts of ergot and hydrastis canadensis were used in one of the hospitals.

Camphor was the remedy most relied upon in cases of cardiac failure, œdema of the lungs and other conditions, where cardiac stimulants were indicated.

One medical officer spoke highly of the successful results of hypodermic injections of arseniate (cacodylate ?) of sodium, another of the equally good effects of salicylate of soda.

Digitalis and strophanthus were used with success in the treatment of œdemas in some of the hospitals, but in others they were not regarded with favour. Digitalis was, however, the best remedy for such cases in the hands of the Japanese, and one case was seen under their charge which had ascites with œdema of the penis, scrotum and lower extremities, and which had lost these symptoms after three days' treatment with digitalis.

In the Naval Hospital and in the Red Cross Society's hospital there was a small supply of Poehl's essence of spermin,

which was said by those who used it to have had excellent or, as they expressed it, marvellous effects. The dose found most useful was two hypodermic injections daily, with 25 to 30 drops three or four times daily by the mouth.

The painful local conditions of the legs in cases of dry swelling and contraction of the gastrocnemius were treated by the Russians by wet compresses. A compress in much favour at one hospital was a warm compress of solution of acetate of aluminium. Massage was also employed, an ointment containing five parts of tincture of opium, 10 of oleum terebinthinæ, and 30 of vaseline being used. The Japanese objected strongly to the system of treatment of these cases by means of wet compresses, and used massage only.

The general impression, however, with regard to treatment among both Japanese and Russian medical officers was that cases did well without any medicinal treatment whenever they were given a generous diet of fresh meat, fruit, vegetables, and wine or beer, and that when these were not forthcoming medicinal treatment was of little use.

Resemblance of the Cases to Beri-Beri.

One of the first things that struck one after seeing a large number of cases of beri-beri amongst the Japanese troops during the preceding months was the marked resemblance, at first sight, between them and the cases of scurvy at Port Arthur.

Both diseases have the two distinct varieties, the "dry" and the "moist," and in both the former is considered the graver, because of the sudden and fatal syncope that is apt to occur, when the patient gets up and walks. Further, the distinction between the varieties in both diseases depends on an œdematous condition of the body generally or of the limbs, especially of the lower extremities, or the reverse.

The chief and most constant symptoms in both diseases are pain and swelling in the gastrocnemii and anæmia. In beri-beri, exactly as in scurvy, the former condition leads to atrophy and contraction of the muscles, with stiffness of the knee. In both diseases the leg symptoms are the first which attract the notice of the patient, and, in fact, there is little to distinguish the muscular symptoms of the one disease from those of the other, in the dry varieties.

The same may be said of the œdematous varieties. Thus in beri-beri the legs are most frequently attacked with œdema. This too is the case in scurvy. In beri-beri the œdema may be circumscribed, or it may spread to the trunk, genitals, face, arms, and serous cavities. So too in these cases of scurvy. The lungs, pericardial, pleural, and peritoneal cavities are all invaded, and occasionally the joints. No differentiation in this respect could be made between the two diseases.

In beri-beri the temperature is said to rise to 39° or 40° C. for a week or so, but the temperature symptoms are not constant. The same may be said of scurvy.

The subjective sensation of cold is a marked symptom in both diseases.

Further, the macroscopic post-mortem appearances closely resemble one another. In both diseases the blood is thin and watery and does not coagulate; the lungs are œdematous, and there are hæmorrhages in the serous cavities, and hæmorrhagic erosions and swelling of the mucous membrane of the intestine.

When questions of differential diagnosis come to be considered, one can depend only on a few symptoms to establish this. The early paralytic symptoms of beri-beri are absent in the cases of scurvy. Thus a flaccid state of the joints and drop wrist are not seen in the latter. On the other hand, many of the beri-beri cases acquire the peculiar contraction and stiffness of the knee which is so characteristic of most cases of scurvy, and when this occurs the peculiar beri-beri gait, namely, a straggling of the legs and a planting of the feet on the ground as if they were stuck in clay, is changed to the more characteristic scurvy gait, where only the balls of the toes touch the ground.

The condition of the gums and the existence of ecchymoses are usually considered sufficient to establish a diagnosis of scurvy. This would certainly be sufficient in the majority of the cases, but I have seen cases of beri-beri with distinct swelling and sponginess of the gums, and cases of scurvy in which gum symptoms and ecchymoses were slight or had disappeared before the case was seen, or may not have appeared.

The differential diagnosis by means of anæsthetic symptoms and reflexes is also, I think, uncertain in most cases, although they are more marked and more constant in the cases of beri-beri.

Beri-beri is a disease of summer and autumn more than of winter, although it did not completely disappear even during the extreme cold of the Manchurian winter. Scurvy on the other hand was said by the Russian medical officers to be a disease of winter and not of summer, but this is probably only a coincidence, or due to the fact, that conditions under which scurvy appears are more common in a Russian winter than in summer.

A fact of some importance in diagnosis is that scurvy cases invariably improve rapidly and the disease disappears when good generous diet and fresh meat are given, whereas the beri-beri cases do not seem to recover so quickly under similar conditions.

Conclusion.

I am aware that the above notes lack modern scientific precision. Nothing of the kind is claimed for them. They were

made without access to books or other means of guidance such as are essential in treating a subject of the kind according to modern clinical methods. Besides the time at my disposal in Port Arthur was limited. At the same time they are notes of facts which were observed under conditions that are, perhaps, unique in the present generation, and the mere enumeration of the facts may serve to present a picture of a disease which has long ceased to exist* in our army and navy, but which is on that account all the more likely to be forgotten.

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* This refers to European rather than to non-European troops of our army; for there was a severe outbreak of scurvy a few years ago amongst the troops of the Central African Rifles in Somaliland. There was also scurvy amongst the Indian troops in Somaliland.—W. G. M.

(16) Japanese Casualties, 1904–1905.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps. 24th January 1906.

Appendices.

The accompanying tables have been obtained through the courtesy of the Director-General of the Japanese Army Medical Service.

They are the only tables that can be considered sufficiently reliable, up to the present time, for the purposes of drawing conclusions or making comparisons.

They are not complete enough to enable a comparison to be made of wounds caused by different missiles or of diseases caused by specific organisms; but deductions, somewhat different from those that have been drawn from less complete data, may be made.

Wounds in Action.

According to Table 2 the total number of officers and men admitted into the hospitals in the field for wounds in action amounts to 146,813; but 6,860 more are shown in Table 1 as being wounded in action, who apparently did not go into hospital.

The total number of wounded, therefore, may be regarded as 153,673, of whom about 4·4 per cent. remained with their units.

Of the 146,813 admitted to hospital, 15,018 are shown in Table 2 as having recovered in the field and 8,304 as having died, while 112,661 appear in Table 3 as having been sent home from the front. This leaves 10,830 unaccounted for. Probably the majority were still in hospitals in Manchuria, Korea, and Saghalien at the time the tables were compiled.

The above figures give the following percentages of the number admitted to hospital for wounds in action :—

Recovered in the field - -	10·2 per cent.
Died in the field - - -	5·6 „
Sent home - - - -	76·8 „
Unaccounted for - - - -	7·4 „

Of the 112,661 shown as sent home from the front—

52,138 or 46·3 per cent. recovered.
11,360 or 10·1 per cent. were invalided as unfit for further service.
965 or 0·8 per cent. died.
38,427 or 34·1 per cent. were discharged to miscellaneous forms of sick furlough.
9,771 or 8·7 per cent. were still in hospital.

Killed.

The number of all ranks shown in Table 1 as killed in action amounts to 43,219. These, added to the number of wounded and missing in the same table, give a total casualty list of 201,973.

The percentage of killed is therefore 21·4 of the total casualties in action, as compared with 76·1 per cent. wounded and 2·5 per cent. returned as "missing."

The proportion of killed to wounded is as 1 to 3·55 for all ranks, as 1 to 3·20 for officers only, and as 1 to 3·57 for rank and file only.

Diseases.

The number of all ranks admitted on account of disease, according to Table 2, amounts to 221,136. Of this number—

25,080 or 11·3 per cent. recovered in the field.
12,811 or 5·8 per cent. died in the field.
168,926 or 76·4 per cent. were sent to Japan.
14,319 or 6·5 per cent. are not accounted for in the tables.

Of the 168,926 shown in Table 3 as having been sent home from the front—

85,472 or 50·6 per cent. recovered.
4,124 or 2·4 per cent. were invalided as unfit for further service.
2,636 or 1·6 per cent. died.
60,527 or 35·8 per cent. were discharged to miscellaneous forms of sick furlough.
16,167 or 9·6 per cent. were still in hospital.

Infectious Diseases.

The admissions classified under the head of infectious diseases are admissions for enteric fever, dysentery, small-pox, cholera, plague, typhus fever, diphtheria, and scarlet fever.

A few cases of small-pox are known to have occurred, and probably, too, there were a few cases of typhus fever; but plague, cholera, diphtheria, and scarlet fever were unknown, according to information obtained at various periods.

The admissions for "infectious disease," therefore, may be regarded practically as representing the admissions for enteric fever and dysentery; and the small number of cases of small-pox and typhus fever may be ignored in determining ratios.

In Table 2, 17,866 admissions are shown under this head. Of this number—

2,044 or 11·4 per cent. recovered in the field.
5,961 or 33·4 per cent. died in the field.
2,156 or 12·1 per cent. are shown as sent home to Japan.
7,705 or 43·1 per cent. are not accounted for in the tables.

352 or 16·3 per cent. of those sent home to Japan appear in Table 3 as having died in Japan.

Comparisons.

The data for estimating the strength of the Japanese forces in the field are very uncertain, but if a rough estimate is made from the number and composition of the various armies and divisions, then the mean strength for the whole period of the war would probably work out at 250,000 approximately. Even should the numbers have risen to 500,000 or more previous to the declaration of peace, it must be remembered that in the earlier months of the campaign one Army only was in the field, and that the number of Armies did not materially increase from the subsequent number of four until the campaign had continued for close on twelve months. On these considerations, a mean strength of 250,000 is taken for working out comparisons. If the number is too high, then the comparisons are in favour of the Japanese, and if too low, in favour of British ratios.

With this mean strength, then, the admissions for disease work out at 884·5 per 1,000 for eighteen months (March 1904 to August 1905 inclusive), or a ratio of 589·6 per 1,000 per annum.

The ratio of deaths for disease, including deaths in Japan, calculated in the same manner, is 61·8 per 1,000 for the eighteen-month period, or 41·2 per 1,000 per annum.

The ratio of admissions for infectious diseases (practically, that is to say, for enteric fever or dysentery) is 71·4 per 1,000 for eighteen months, or 47·6 per 1,000 per annum. The death

rate for these diseases, including deaths in Japan, is 25·2 per 1,000 for eighteen months, or 16·8 per 1,000 annual ratio.

The admission rates for wounds in action, calculated on the same mean strength, are 587·2 per 1,000 and 391·6 per 1,000 for the eighteen months and annual period respectively.

If the number of men dying from wounds after admission to hospital is added to the number of men killed in action, the death rate for wounds amounts to 206 per 1,000 for the eighteen months, or 137·3 per 1,000 per annum.

The ratio of cases admitted for wounds in action to cases admitted for disease is as 1 to 1·5. The deaths from wounds, including killed, are in the proportion of 1 to 0·3 deaths from disease; that is to say, for every three to four men killed or dying of wounds, one man died of disease during the campaign.

For comparing these results with the results of the South African war, the following table may be found useful:—

Table, comparing the wound and disease statistics of the Japanese forces in the Russo-Japanese war with those of the British forces in the South African war.

Nature of Comparison.	Japanese forces, Manchuria (1904–5. Period of 18 months.)	British forces, South Africa (1899–1902. Period of 31 months.)
Admissions for wounds. Annual ratio per 1,000 mean strength.	391·6	34·2
Deaths from wounds, including killed, do. -	137·3	14·4
Admissions for disease, do. - - -	589·6	727·0
Deaths from disease, do. - - - -	41·2	24·4
Admissions for enteric fever and dysentery, do. -	47·6	138·7*
Deaths from enteric fever and dysentery, do. -	16·8	16·5
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 fever 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

Note.—The mean strength for 18 months of the Russo-Japanese war is taken at 250,000, and for 31 months of the Boer war at 209,404 (including officers). The admission and death ratios are reduced to a twelve-month period for purposes of comparison.

* Officers excluded.

Remarks on the Table of Comparisons.

The table does not bring out evidence of any marked immunity from disease amongst the Japanese field forces as compared with the British forces in South Africa. The admission rate for disease is considerably, but not very strikingly, lower, while the death rate is markedly higher. For the class of disease, regarded as preventible, namely, enteric fever and dysentery, the Japanese admission rate was distinctly lower (about one-third lower), but the death rate was a fraction higher than that of the British forces in South Africa for these diseases. The comparisons are not absolutely accurate, because in the Japanese heading a few deaths from other diseases may have been included under the heading from which the figures are taken, although this is doubtful. In any case, the number of such deaths would not have been so great as to reduce the death rate to a figure more than a fraction below that of the death rate amongst the British forces.

The case mortality from disease, and especially from infectious disease—that is to say, the percentage of deaths amongst patients in hospital—was much higher amongst the Japanese than amongst the British. This confirms the information obtained in Dalny, in February 1905 regarding the patients from the Japanese Army besieging Port Arthur. (*See* Report on the medical arrangements of the Third Japanese Army during the siege.)*

An explanation of some of these apparently anomalous conditions may be found in the fact that, in South Africa, it was customary to return as enteric fever the large and non-fatal class of cases usually returned under the heading of simple continued fever. The Japanese had not this class of case to deal with—at any rate, to the same extent; and did not return cases as cases of enteric fever or dysentery until they were satisfied with regard to their specific cause. This procedure had the effect of lowering the admission rate, and raising the case mortality. The death ratio to mean strength, however, would not be affected, and this must therefore be regarded as the best comparative test. In this respect, the ratios of both Japanese and British are practically identical as regards this class of case.

With regard to wounds, on the other hand, the Japanese results compare favourably with the British, their case mortality in the field being exactly one-half that of the British. There are many factors, which might be mentioned, as likely to have influenced these results. Some of the more important may be mentioned :—

(1) The Japanese returned, as "killed," cases that were hopeless and died within a few hours of coming under treatment.

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* Report 12 in this volume, page 245.

(2) They avoided operative interference as much as possible in the mobile units.

(3) They evacuated with great rapidity to fixed hospitals and to Japan, where the hospital treatment was perfect of its kind. Witness the fact that only 0·8 per cent. died in the hospitals in Japan.

(4) The Japanese soldier and the Japanese surgeon are scrupulously clean.

(5) The Japanese method of dressing wounds is extremely simple, and irritant lotions and wet dressings are avoided.

(6) The Japanese had a special unit engaged solely in the duty of evacuating the sick and wounded from the field.

But against these favourable conditions must be mentioned the fact that the transport material was of the roughest description.

In the report on the medical arrangements during the battle of the Sha Ho,* a note is made on this point. The low mortality from wounds confirms the remarks made there with regard to the influence of transport material on the fate of wounds.

The proportion of killed to wounded is almost identical in both comparisons. For the British figures the middle of three sets has been taken. The Army Medical Department's statistical figures give a ratio of 1 to 3·1. The figures obtained from the Casualty Department give 1 to 3·6 (the ratio that is almost the same as the Japanese ratio); while Surgeon-General Stevenson, in his work on "Wounds in War" (page 481), gives 1 to 3·9. The difference in these ratios depends on a difference in the "wounded" figures, not in those of "killed."

As a general conclusion, it may be stated that an examination of the figures shows that the very marked difference between the Japanese and British, in the proportion of admissions and deaths on account of wounds to admissions and deaths on account of disease, is due to the nature of the engagements in which the Japanese forces took part, and to the excessive number of wounds rather than to any special difference in the numbers of admissions and deaths from disease.

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* Report 5 in this volume, page 190.

TABLE 1.

List of Japanese Casualties in the War of 1904–5.

Date.	Places.	Bodies of Troops.	Killed.		Wounded.		Missing.		Total Losses.		
			Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Grand Total.
April 26th to May 1st.	Near Chin-lien-cheng (Ya-lu).	First Army - -	5	198	33	775	—	10	38	983	1,021
May 16th	Shih-san-li-tai - -	1st Division -	—	8	7	131	—	—	7	139	146
May 25th, 26th	Chin-chou and Nan Shan -	Second Army - -	31	652	124	3,803	—	3	155	4,458	4,613
May 30th to June 2nd	Near Lung-wang-miao -	Part of 5th Division and 1st Cavalry Brigade.	1	26	4	53	—	—	5	79	84
June 8th	Near Hsiu-yen - -	Part of 10th Division and part of Guards Division.	—	4	2	31	—	—	2	35	37

List of Japanese Casualties in the War of 1904–5—*continued.*

Date.	Places.	Bodies of Troops.	Killed.		Wounded.		Missing.		Total Losses.		
			Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Grand Total.
June 14th and 15th.	Near Te-li-ssu - -	Second Army - -	8	198	45	938	—	1	53	1,137	1,190
June 26th and 27th.	Near Fen-shui Ling - -	10th Division and part of Guards Division.	3	19	3	168	—	—	6	187	193
June 26th	Port Arthur - -	11th Division - -	—	25	4	129	—	—	4	154	158
July 3rd to 5th.	Port Arthur - - -	11th Division -	1	30	8	169	—	—	9	199	208
July 4th	Near Mo-tien Ling -	Part of 2nd Division	—	18	2	38	—	—	2	56	58
July 5th to 9th.	Near Kai-ping - -	Second Army - -	—	22	6	137	—	—	6	159	165
July 17th	Near Mo-tien Ling (in (defence).	2nd Division -	4	68	15	270	—	—	19	338	357
July 18th and 19th.	Near Chiao-tou - -	12th Division - -	1	68	17	428	—	—	18	496	514
July 23rd to 25th.	Near Ta-shih-chiao -	Second Army -	10	149	46	903	—	1	56	1,053	1,109
July 26th to 31st.	Port Arthur - -	Third Army - -	24	664	115	3,267	—	—	139	3,931	4,070

July 31st to August 1st.	Yang-tzu-ling and Yü-shu-lin-tzu.	First Army - -	8	149	36	778	—	—	44	927	971
July 31st to August 1st.	Near To-mu-cheng - -	Fourth Army - -	9	186	24	617	—	—	33	803	836
July 29th to August 1st.	Near Hai-cheng - -	Second Army -	—	4	3	41	—	—	3	45	48
August 7th to 9th.	Port Arthur (Ta and Hsiao Ku Shan).	11th Division - -	11	254	50	971	—	—	61	1,225	1,286
August 13th to 15th.	Port Arthur - -	Third Army -	14	252	42	895	—	—	56	1,147	1,203
August 19th to 24th.	Port Arthur - - -	Third Army - -	165	4,779	378	10,313	—	—	543	15,092	15,635
August 26th to Sept. 4th.	Liao-yang - - -	First Army - -	52	1,053	194	4,850	1	18	247	5,921	6,168
		Second Army - -	105	2,668	255	7,430	—	87	360	10,185	10,545
		Fourth Army -	57	1,281	193	5,371	—	—	250	6,652	6,902
		Total, Liao-yang	214	5,002	642	17,651	1	105	857	22,758	23,615
Sept. 19th to 22nd.	Port Arthur - - -	Third Army -	51	1,332	131	3,828	—	—	182	5,160	5,342
October 7th to 20th.	Sha Ho - - -	First Army - -	66	1,414	244	5,943	—	3	310	7,360	7,670
		Second Army -	46	1,003	206	5,934	4	299	256	7,236	7,492
		Fourth Army - -	52	895	149	3,594	5	443	206	4,932	5,138
		Total, Sha Ho -	164	3,312	599	15,471	9	745	772	19,528	20,300

List of Japanese Casualties in the War of 1904–5—*continued.*

Date.	Places.	Bodies of Troops.	Killed.		Wounded.		Missing.		Total Losses.		
			Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Grand Total.
October 26th to 31st.	Port Arthur - - -	Third Army - -	27	495	89	2,652	8	464	124	3,611	3,735
Nov. 26th to Dec. 6th.	Port Arthur - -	Third Army -	171	3,679	431	11,059	12	1,140	614	15,878	16,492
Dec. 17th	Near Kao-ting Shan, Port Arthur.	Part of 7th Division	—	22	1	79	—	—	1	101	102
Dec. 18th	East Chi-kuan Shan, North Fort.	Third Army -	1	122	20	703	—	14	21	839	860
Dec. 26th	Near Hou Yang-shu-kou, Port Arthur.	Part of 7th Division	—	27	2	120	—	—	2	147	149
Dec. 28th to 29th.	Erh-lung Shan - - -	9th Division - -	6	231	26	876	—	48	32	1,155	1,187
Dec. 31st	Sung-shu-Shan - -	Part of 1st Division -	—	44	2	149	—	—	2	193	195

Dec. 28th to Jan. 2nd.	Near Wang-tai - -	Third Army - -	6	163	17	624	—	14	23	801	824
Jan. 1st	Near Hou Shan-yang-tai -	Part of 7th Division	—	31	5	98	—	—	5	129	134
Jan. 25th to 29th.	Hei-kou-tai - -	8th Division -	48	1,193	110	3,731	2	88	160	5,012	5,172
		8th Brigade of 2nd Reserve.	15	271	56	1,540	—	9	71	1,820	1,891
		2nd Division - -	—	12	7	118	—	6	7	136	143
		5th Division -	15	206	51	1,389	2	32	68	1,627	1,695
		Total, Hei-kou-tai	78	1,682	224	6,778	4	135	306	8,595	8,901
Feb. 18th to March 12th.	Mukden - - -	First Army - -	75	1,885	299	8,599	2	45	376	10,529	10,905
		Second Army - -	179	5,729	511	15,779	3	525	693	22,033	22,726
		Third Army -	143	3,629	471	12,915	5	1,068	619	17,612	18,231
		Fourth Army - -	102	2,707	327	9,770	3	305	432	12,782	13,214
		Ya-lu Army -	50	1,118	157	4,506	—	107	207	5,731	5,938
		Total, Mukden -	549	15,068	1,765	51,569	13	2,050	2,327	68,687	71,014

List of Japanese Casualties in the War of 1904–5—*continued.*

Date.	Places.	Bodies of Troops.	Killed.		Wounded.		Missing.		Total Losses.		
			Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Officers.	N.C.O.'s and Men.	Grand Total.
June 16th	Liao-yang-wo peng - -	7th Division -	—	50	7	183	—	1	7	234	241
Losses from Patrol Collisions and other similar skirmishes.	Manchurian Force - -	First Army - -	17	265	57	1,400	3	89	77	1,754	1,831
		Second Army -	24	483	94	2,332	2	136	120	2,951	3,071
		Third Army - -	29	1,354	184	6,104	—	47	213	7,505	7,718
		Fourth Army -	9	193	10	1,255	—	—	19	1,448	1,467
		Ya-lu Army - -	9	177	15	368	—	24	24	569	593
	Korea - - -	Troops Stationed -	1	32	6	121	1	1	8	154	162
	Karafuto (Saghalien) -	Army in Occupation	6	25	16	91	—	—	22	116	138
		Total, Patrol casualties -	95	2,529	382	11,671	6	297	483	14,497	14,980
	Grand Total - - -		1,657	41,562	5,307	148,366	53	5,028	7,017	194,956	201,973

Remarks.—(1) Warrant Officers are included under the heading of Officers.
(2) The table is prepared from sources available up to June 30th, 1905, in the case of the Manchurian Force, and up to the day of the actual Armistice in the case of Korean and Karafuto Armies.

TABLE 2.

Admissions to Hospitals in the Field from the Commencement of Hostilities in 1904 *to the* 31*st August* 1905.

Classification.	Wounded in Action.			Other Injuries.			Infectious Diseases.			Other Diseases.			Total.		
	Fresh Admissions.	Recovered.	Died.	Fresh Admissions.	Recovered.	Died.	Fresh Admissions.	Recovered.	Died.	Fresh Admissions.	Recovered.	Died.	Fresh Admissions.	Recovered.	Died.
First Army - -	22,192	2,891	991	3,640	1,123	33	3,313	545	848	44,519	5,933	957	73,664	10,492	2,829
Second Army - - -	40,156	3,290	1,896	2,544	505	23	3,657	383	985	33,588	3,015	700	79,945	7,193	3,604
Third Army - -	51,200	2,302	3,187	4,283	742	82	3,661	436	1,426	43,268	3,138	1,814	102,412	6,618	6,509
Fourth Army - - -	22,527	2,310	1,124	2,671	646	23	2,523	321	872	24,087	3,488	740	51,808	6,765	2,759
Eighth Division - -	5,228	11	45	333	6	—	—	—	—	489	29	4	6,050	46	49
Ya-lu Army - - -	4,654	551	368	815	204	8	1,379	40	350	15,965	2,054	708	22,813	2,849	1,434
Liao-tung Line of Communications.	575	3,559	669	1,413	608	38	2,649	116	1,295	29,327	2,540	1,553	33,964	6,823	3,555
Port Arthur - -	—	—	—	27	9	6	10	—	3	205	100	3	242	109	12
Korean Army - - -	181	100	18	656	294	23	673	203	181	9,708	2,687	356	11,218	3,284	578
Karafuto Army - -	100	4	6	74	10	1	1	—	1	2,114	79	15	2,289	93	23
Grand Total - -	146,813	15,018	8,304	16,456	4,147	237	17,866	2,044	5,961	203,270	23,063	6,850	384,405	44,272	21,352

REMARKS.—The figures are subject to more or less alteration, according to the results of the further investigations which are proceeding.

TABLE 3.

Disposal of Patients sent Home from the Front.

Classification.	Officers and Officials of equivalent Rank.			Warrant Officers.			N.C.O.'s and Men.			Others.			Total.
	Wounded in Action.	Infectious Disease.	Others.	Wounded in Action.	Infectious Disease.	Others.	Wounded in Action.	Infectious Disease.	Others.	Wounded in Action.	Infectious Disease.	Others.	
Recovered - -	1,097	—	930	287	1	227	50,690	460	73,327	64	50	10,477	137,610
Discharged from service.	3	—	10	2	—	1	11,355	—	4,113	—	—	—	15,484
Died - -	26	1	18	3	—	3	935	311	2,125	1	40	138	3,601
Miscellaneous - -	1,089	9	841	346	3	167	36,941	1,095	57,207	51	133	1,072	98,954
Remaining in hospital	137	1	178	27	—	51	9,604	42	14,790	3	10	1,095	25,938
Total - -	2,352	11	1,977	665	4	449	109,525	1,908	151,562	119	233	12,782	281,587

REMARKS.—(1) The figures are derived from the investigations for the period extending from the commencement of hostilities in 1904 to 31st August 1905, inclusive.

(2) The term "Miscellaneous" includes those who were discharged from hospital to receive medical attendance at home, and other reasons, such as transfer to convalescent homes, sick furlough, &c.

TABLE 4.

Causes of Invaliding in Aggregate Total of Patients discharged from Military Service.

Description.	Classes.	Patients sent Home from the Front.				Patients at Home.			Grand Total.
		Wounded in Action.	Wounded in other Ways.	Sick.	Total.	Wounded.	Sick.	Total.	
1. Became blind in both eyes	Warrant officers	—	—	—	—	—	—	—	—
	N.C.O.'s and men	52	—	1	53	—	—	—	53
2. Became deaf in both ears	W.O.'s	—	—	—	—	—	—	—	—
	N.C.O.'s and men	28	—	1	29	—	—	—	29
3. Lost one or more limbs	W.O.'s	4	—	—	4	—	—	—	4
	N.C.O.'s and men	1,014	72	1	1,087	2	—	2	1,089
4. Had two or more limbs disabled	W.O.'s	—	—	—	—	—	—	—	—
	N.C.O.'s and men	30	2	1	33	—	—	—	33
5. Deformed or disabled in other manner than the above; requiring constant attendance (*i.e.*, fall under Headings I. and II. of Art. IX. of Army Pension Law)	W.O.'s	1	—	1	2	—	2	2	4
	N.C.O.'s and men	131	13	28	172	2	3	5	177
6. Same as above; requiring occasional attendance (*i.e.*, fall under Headings III. and IV. of the same Article)	W.O.'s	3	—	8	11	1	2	3	14
	N.C.O.'s and men	598	40	88	726	3	14	17	743
Total	W.O.'s	8	—	9	17	1	4	5	22
	N.C.O.'s and men	1,853	127	120	2,100	7	17	24	2,124

Causes of Invaliding in Aggregate Total of Patients discharged from Military Service—*continued.*

Description.	Classes.	Patients sent Home from the Front.				Patients at Home.			Grand Total.
		Wounded in Action.	Wounded in other ways.	Sick.	Total.	Wounded.	Sick.	Total.	
7. Deformed or disabled; requiring no attendance (*i.e.*, fall under Headings V. and VI. of the same Article) - - - -	W.O.'s - -	4	—	9	13	2	1	3	16
	N.C.O.'s and men	6,114	238	439	6,791	57	50	107	6,898
8. Entitled to gratuitous money only once, in accordance with Art. XIV. of the aforesaid law - - - - -	W.O.'s - -	—	—	—	—	—	—	—	—
	N.C.O.'s and men	8,381	478	224	9,083	195	13	208	9,291
Total - - - -	W.O.'s - -	4	—	9	13	2	1	3	16
	N.C.O.'s and men	14,495	716	663	15,874	252	63	315	16,189
9. Discharged owing to illness or wound other than the above - - - - -	W.O.'s - -	—	1	1	2	—	7	7	9
	N.C.O.'s and men	—	91	1,690	1,781	250	7,449	7,699	9,480
Grand Total - - -	W.O.'s - -	12	1	19	32	3	12	15	47
	N.C.O.'s and men	16,348	934	2,473	19,755	509	7,529	8,038	27,793

NOTE.—In the above table civil or other employés of equivalent rank are apparently included under Warrant Officers.

(17) Japanese Civil Hospital for Treatment of Chinese Inhabitants.

REPORT by Lieut.-General C. J. BURNETT, C.B., Head-Quarters Third Army, 6th August 1905.

In continuation of my report on the duties of a Japanese Civil Governor,* I now have the honour to state that I have visited the civil hospital, established for the treatment of the Chinese inhabitants by the Japanese free of all cost. I was fortunate enough to find the medical officer in charge there, and he kindly gave me the following details:—

The inhabitants use the hospital freely, and the average daily attendance is from 75 to 100. There have been more at times. No one is allowed to remain and be treated in the hospital except prostitutes who are suffering from venereal diseases. These women come up to the hospital, at present, every five days for inspection, and any found diseased, or under suspicion, are kept in a hospital close at hand for treatment and observation. They are not allowed out until cured and free from any suspicion.

In the case of any other infectious disease the patient can, if he has a decent house, be treated in it, after such house has been thoroughly disinfected. If his house cannot be made sanitary he is sent to an infectious hospital, about 300 yards outside the city, and treated there until he is cured or dies. There have not been many cases of infectious disease. A few cases of typhoid and some dysentery have been all the serious cases treated.

Operations are performed in the hospital, and for this purpose one room is set apart and fitted with an operating bed, much like an iron camp bedstead, only higher and with movable head and foot. All the medical men when in hospital wear white coats, and the whole place was scrupulously clean. For medicine bottles, all the beer and other bottles used by the various messes have been collected, thoroughly cleaned and purified, and handed over to the hospital.

I also saw the disinfecting utensils, which are very simple, but at the same time very efficacious. They consist of wooden buckets, tin pannikins with a strong long tin handle, and a sprinkler made of tin, the bottom of which holds the liquid and is in the shape of a kettle without any spout. A handle is fitted to the side of this, and a straight nozzle projects from the top about one foot in length, with a watering pot rose at the end. Two buckets, one pannikin, one sprinkler, with four or five strong brooms, form a complete set of disinfecting utensils.

* *See* Russo-Japanese War, Reports of Officers attached to the Japanese Forces in the field, Vol. II.

The disinfectants used are—

(i.) Bichloride of mercury, 1 to 1,000.
(ii.) Carbolic acid, 1 to 20 or 30.
(iii.) Common lime.

In disinfecting a house all furniture is removed, disinfected, and put in the sun. The walls are thoroughly disinfected, as also ceiling and floor. All articles of clothing which are dirty and not of much value are burnt. Valuables are disinfected by steam.

Nos. (i.), (ii.) are imported from Japan, No. (iii.) is procured locally. Brooms, pannikins, and sprinkler are made locally also.

The sanitary state of this town leaves little to be desired, which is more than I can say for some places I have seen outside of this army command.

The weed for killing flies appear to answer well, but we are going to try it.*

* In a previous report Lieut.-General Burnett mentioned the use of a weed which, boiled and mixed with a little food, was said to kill the flies which settled on it.

(18) Japanese Hospital Ships at Ujina.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps. Tokio, 5th June 1904.

Plate.

Rough plan of hospital ward arrangements on the "Hakuai Maru" - - -

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The sea-transport of sick and wounded of the Japanese Armies in the field is forming an important line in the medical arrangements of the present war. So far, three classes of ships have been fitted out for the purpose—(1) those belonging to the Naval Department, (2) those belonging to the Military Department, (3) those belonging to the Red Cross Society. The names of the ships belonging to these are—

Naval - - - -	*Saikyo Maru.* *Kobi Maru.*
Military - - - -	*Yokohama Maru.* *Rosetta Maru.*
Red Cross Society - -	*Hakuai Maru.* *Kosai Maru.*

All these vessels are under 3,000 tons gross register and, with the exception of the Red Cross Society's ships, are about 20 years old. They are all intended to carry from 200 to 300 or more sick and wounded, and are therefore of the nature of transports, and can scarcely be regarded as hospital ships in the sense of provision of proper accommodation for the prolonged treatment and nursing of serious cases of wounds or disease.

They are protected by the Hague Convention, which applied to hospital ships the protection given by the Geneva Convention to military hospitals on shore. In accordance with the articles of that convention, the ships are painted white with a red cross on the funnel and a broad green band along the moulding.* In the case, however, of the Red Cross Society's ships, the band is red instead of green, as distinguishing between ships belonging to or chartered by the Government and those belonging to or chartered by a private society. The personnel, both ship's crew and hospital staff, wear the red cross brassard, which is stamped, numbered and delivered to them along with an authorization card by the military or naval authorities only.

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* This band is 5 feet wide.

All the vessels named belonged to the *Nippon Yusen Kwaisha*, and are chartered in much the same manner as transports are chartered by our Government. The special arrangements between the shipping company and the Red Cross Society have already been reported.*

The naval ships were ready during the first month of the war, and have been engaged in conveying the sick and wounded from the fleet to the naval bases at Sasebo and Kure. The *Yokohama Maru* was fitted out at Ujina, the port of Hiroshima, the military base, in the middle of May, and has so far completed one voyage only. The *Rosetta Maru, i.e.*, the old P. & O. ship *Rosetta*, is only now being fitted out, also at Ujina, and has not yet begun to make voyages. The *Hakuai Maru* was ready at Yokohama on the 6th February, in time to take over the Russian wounded at the sinking of the *Koreetz* and *Varyag*, and has since made twelve voyages from Ujina and back. The *Kosai Maru* left Yokohama for Chemulpo on the 22nd February on her first voyage, and has since made about ten trips between the seat of war and Ujina.

When I visited Hiroshima and neighbourhood, 27th to 29th May, all these ships with the exception of the *Kobi Maru* were at the base, the *Saikyo Maru* being at Kure and the others at Ujina. I inspected two of them, the *Hakuai Maru* and the *Yokohama Maru*, and submit now the notes made at the time. I have purposely omitted full details in order to avoid making the report wearisome, and have limited my notes to those details which involve special points in connection with the fittings, material, and personnel of these hospital ships.

(A) Hakuai Maru.

Accommodation for Sick.—There are the following classes of cots for sick :—

(1) First-class Passenger Cabins.—These are on the starboard and port sides of the after-part of the main deck, and differ in no respect from the ordinary first-class cabins of the ship when it is in use as a passenger ship; but there is this special feature, that there is direct communication between the pairs of cabins. The upper berths are not at present in use, so that each cabin carries two sick or wounded officers. There is, thus, accommodation for 28, capable of expansion to 42 by using the upper berths; but two of the cabins are at present used by the staff.

(2) Swinging Cots.—These are placed in the after-part of the saloon, round which are the first-class passenger cabins. The number is eight. They are intended for serious cases amongst the officers.

* Report on the Red Cross Society of Japan, published in the Journal of the Royal Army Medical Corps, April 1906.

(3) Serious Case Wards.—Four cabins in the port alley-way amidships have been made into two wards for three or four serious cases each. The cots are the ordinary cabin cots without upper berths.

(4) Main Ward.—This occupies the main deck forward of the engines. The cots are of the type fitted on our emigrant ships for third-class passengers, and are of the pattern supplied, I think, by Messrs. Hall and Sons, Birmingham, *i.e.*, galvanized iron cots supported on stanchions, which also carry the head, foot, and side rails. These cots are in blocks of 16 and 20, in two tiers. The individual cots in these blocks are not separated from one another except by the side rails, and the blocks themselves are only between 1 and 2 feet apart. The number of patients so accommodated is 130.

(5) Contagious Diseases Ward.—This is in the compartment forward of the main ward, and is separated from it by the watertight bulkhead. The ward is intended for cases of typhoid, dysentery, &c. The cots are similar to those in the main ward, but in blocks of 6, instead of 16.

(6) Lower Deck Ward.—This ward occupies the port side only of the compartment of the lower deck, beneath the main ward. The starboard side of the compartment is separated from it by a fore and aft bulkhead to give accommodation for the male sick attendants. The cots are improvised wooden cots in blocks of eight, four lower and four upper, with one or two four and two-berth blocks, the number of berths being 42.

Ward Annexes.—The first-class cabins have baths and w.c.s in the after-part of the saloon. The main and lower deck wards have no special annexes, the latrines and bathrooms being on deck. Special baths and w.c.s are provided for the contagious diseases ward on the starboard side of the same compartment. There are no commode rooms nor special places for cleansing and disinfecting bed-pans, &c. There are also no special places for dining or recreation between decks, except for the officers, who dine in the portion of the saloon not occupied by the swinging cots and who have a comfortable recreation saloon with piano on the upper deck.

Operation Room, &c.—The dispensary, operation room, instrument room, Roentgen ray room are in converted cabins on the port alley-way, aft of the main ward. They are fitted up as completely as similar installations in a hospital on shore. They are placed between the serious case and the main wards.

There is a large sterilizer in the operating room, made by Green of Chicago, for sterilizing dressings. The steam is introduced direct into the sterilizer from the ship's boilers.

Disinfector.—There is a large steam disinfector on the starboard side of the upper deck, enclosed in an iron deck house, divided into two compartments, one for foul and one for disinfected articles. The deck house measures about 20 feet by 10 feet, and the apparatus is capable of disinfecting five rolls

of bedding at a time. Steam is obtained direct from the ship's boilers.

Laundry.—There is a laundry on the lower deck, occupying part of the bunker space. It is fitted with electro-motor washing machines, such as were fitted on the *Princess of Wales* and *Maine* during the South African war, and there is also a drying room.

Kitchens.—The galley for the sick is on the upper deck. There is no special provision for conveying the food to the sick. The officers' kitchen is on the main deck amidships aft of the engines.

Ventilation, Warming, &c.—There are no special means of ventilation, and the provision of downcast and upcast shafts is very defective. The main and lower deck wards depend on ventilation through the main hatch, with windsails when necessary. There is no attempt at ventilating wards, annexes, &c., by propulsion fans, extraction fans, or other means by which ventilation is ensured independently of weather conditions. There are a few small electric punkahs, but these in no way act in connection with ventilation.

Warming is amply provided for by steam pipes running through the ship.

Accommodation for Staff.—The details of the hospital staff have already been reported. I did not find any modification made in it. The medical officers, manager, apothecary and clerk are accommodated in cabins in the port and starboard alley-ways. The 20 nursing sisters are in one compartment in the lower deck, below the saloon, bulkheaded off by a fore and aft bulkhead on the port side from the medical stores, refrigerator, &c., which are on the starboard side of the same compartment. The two superintending sisters are in a cabin built close to the nursing sisters' compartment. The berths are galvanized iron berths in two tiers, similar to those in the main ward. The male sick attendants are similarly accommodated, along with the superintendents, on the starboard side of the lower deck ward, as already noted.

There is no separate provision made for latrine and bath-room accommodation for the female and male staff.

Hospital Bedding, Clothing, &c.—These are the regulation equipment of hospitals on shore, viz., straw mattress, blankets, pillows and sheets, white counterpane, and as clothing, white shirt, white *kimono* and *obi* (*i.e.*, gown and waist belt).

Loading and Unloading.—The ship has large cargo or baggage ports on the main deck, by which patients can be conveyed on stretchers through the alley-ways to the wards on the main deck. More serious cases can, if necessary, be hoisted on board, in cots exactly similar to those used at Southampton for slinging serious cases from the ships to the wharf. There

are no lifts from the lower or main deck wards for raising the patients on deck through the hatches. There are also no special means for conveying the patients from the ship to the shore, except in small launches and sampans.

Water Supply.—The water supplied for drinking is condensed on board.

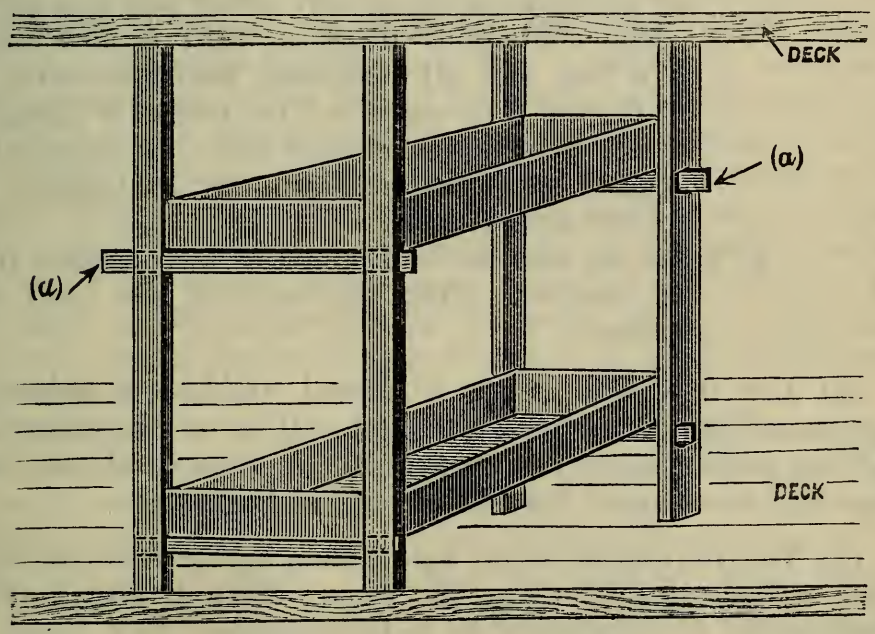
(B) Yokohama Maru.

The *Yokohama Maru* is very similar in equipment to the *Hakuai Maru*, but there are the following points of difference :—

(1) The first-class cabins are as in the *Hakuai Maru*, but the saloon, off which they open, is converted into a ward fully occupied by cots, in two tiers.

(2) The cots throughout, except those in the cabins, which are the usual cabin cots, are improvised wooden cots of plain deal. They are arranged in blocks of one upper and one lower berth each, but the blocks are closely packed together, being only some 6 inches or so apart, except where a passage along the deck is required.

The lower berth is only two or three inches from the deck, and the upper berth is rested on cross bars which can be withdrawn and the berth removed, thus converting the arrangement into that of single berths only, when required.



The above rough sketch may help to give some idea of the arrangement.

The supports marked (*a*) of the upper cots can be slipped out of the wooden stanchions, and the upper cot removed altogether.

(3) More of the deck space has been converted into wards than on the *Hakuai Maru*, the several wards being as follows:—

(*a*) Officers' Ward. The first-class cabins already noted.

(*b*) Main deck wards:—

1. The saloon.
2. The main deck compartment forward of the engines.
3. The compartment forward of this, which is occupied by two four-berth cabins for contagious disease among officers, and by commode room, disinfectant sink, bathroom and w.c.s for the contagious wards.

(*c*) Lower deck wards:—

1. The starboard side of the lower deck, below the saloon ward, is used as a ward; the port side being partitioned off, as in the *Hakuai Maru*, for the accommodation of the nursing sisters.
2. The compartment below the main deck ward forward has the port side partitioned off from the male attendants' quarters, and converted into a ward.
3. The compartment below the contagious diseases compartment of the main deck is used as a contagious diseases ward.

   The berths in these lower deck wards are of the same pattern as in the main deck, but they are in blocks of eight, four below and four above.

   The contagious diseases ward is also divided by a fore and aft bulkhead into two wards, one for enteric fever cases and the other for dysentery, which, along with enteric fever, is regarded for hospital purposes, in Japan, as contagious, and isolated accordingly.
4. There are also on the lower deck two padded rooms for lunatics. They are built off the main ward forward.

(4) The operation room is placed amidships before the engines and is lighted by a top light. It is on the main deck. There is no Roentgen ray apparatus. A cabin in the adjoining alley-way is set apart for instruments and dressings.

(5) The ventilation is no better than on the *Hakuai Maru*; warming arrangements are the same; there is also a similar arrangement of disinfector in a two-chamber deck house, but there is no laundry.

(6) The bedcots have a small bracket for cups, medicines, &c., attached to the side rail. (The cots of the *Hakuai Maru* have no cot table of any kind.) The bedding, clothing, &c., are the same in both ships.

(7) The hospital staff is the same as on the Red Cross Society's ship, and is supplied by the Red Cross Society; but an Army Medical Officer is in charge.

(8) The number of sick which the ship is arranged to carry is 318. The tonnage is 2,300. The deck space for open air exercise and recreation on both ships is excellent and free from encumbrances.

(9) There are no condensers or refrigerating chambers. Drinking water is boiled, and food, &c., are kept in a large ice-chest.

Remarks.

As the other ships belonging to the Red Cross Society and the Military Department are fitted in the same manner as these two ships, the following remarks may be taken to apply generally to the Japanese hospital ships.

What strikes one first is the fact that a large trained hospital staff, suited for the prolonged nursing and treatment of sick and wounded, with perfectly fitted operating rooms, Roentgen ray rooms, laundry, disinfecting establishment, &c., should be maintained on board these comparatively small vessels, which, with the exception of the cabin berths and swinging cots, have no cots in any way suitable for nursing and otherwise treating serious or helpless cases of wounds or disease. In fact, as regards surgical equipment and personnel, the ships are equal to those of the best hospital ships that have been fitted out in any country; but as regards ward accommodation, ventilation, cots, ward annexes, utensils, &c., they are not equal, in any respect, to the hospital ships which have been equipped in connection with our own campaigns during the last twenty or more years.

The ships are, however, well suited for the transport of sick and wounded during a short transit of two or three days in a manner better than is possible on ships fitted as ordinary transports; and, when the top cots are removed and only a limited number of the lower berths used, more detailed nursing and treatment would be possible in the event of the ships being required to make longer voyages or to carry on work as stationary hospital ships.

The Japanese military medical authorities clearly recognise this. The omission of a Roentgen ray room and laundry from the military ships was done purposely, because it was found that these establishments on the Red Cross Society's ships are practically never used. In fact, the electric power is not sufficient to work the laundry machinery, while other electric requirements are being supplied.

In a word, we have nothing to learn from these ships in connection with the care of the sick and wounded during transport by sea, except perhaps in the very complete arrangements for disinfecting bedding, &c., by steam in a deck house on the upper deck. Our practice is to dispense with this altogether

and throw infected articles overboard, but this might at any time, should an epidemic occur, leave our ships during a voyage without sufficient bedding and clothing, and is, in the long run, uneconomical.

A rough sketch plan of the *Hakuai Maru* is appended. It is only approximately correct, as it is chiefly done from memory, but it indicates fairly accurately the general arrangement of the ship and the ward accommodation.

Reference to Surgeon-General Sir Wm. Taylor's report* on the Japanese medical arrangements during the war with China in 1904–5 shows that the ward accommodation on the hospital ships then in use was very much the same as that of these ships. No report on the Japanese hospital ships was submitted in the volume of reports† on the medical arrangements of the allied contingents during the Boxer troubles.

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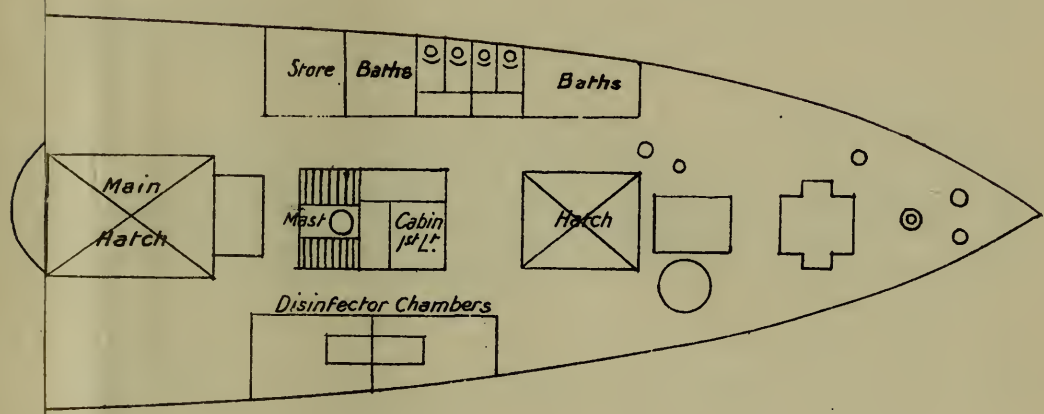
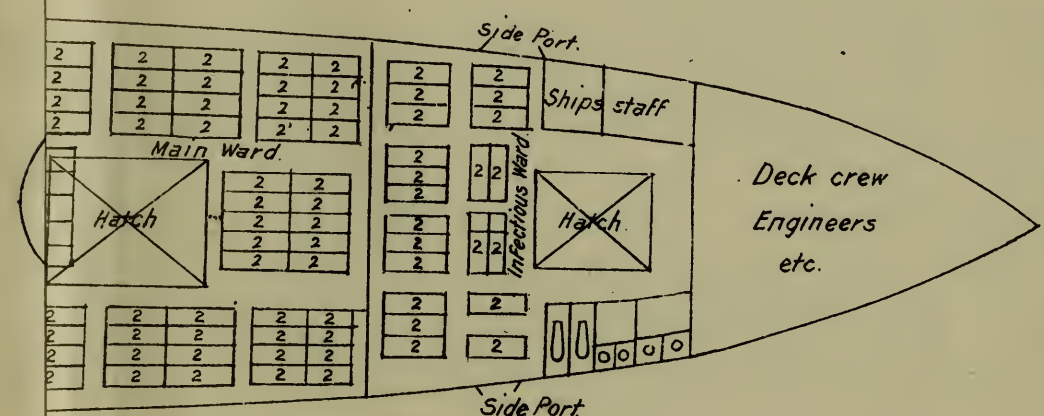
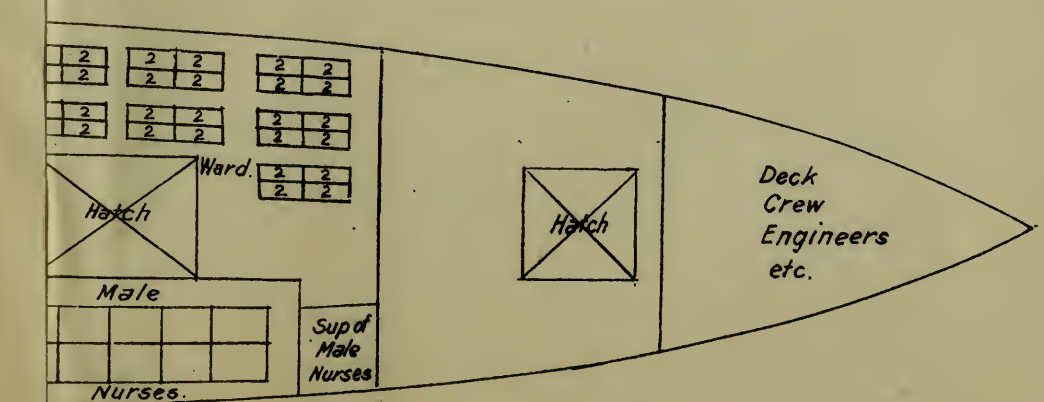
* W.O., No. 4828/1/98 of 22nd September 1894.
† W.O., No. A 669(4) in reply to 376 I. C. of 21st June 1901.

ETC.

18.7.


Store
Baths
Baths
Main Hatch
Mast
Cabin 1st Lt.
Hatch
Disinfector Chambers


Side Port.
Ships staff
Main Ward.
Hatch
Infectious Ward.
Hatch
Deck crew
Engineers
etc.
Side Port.

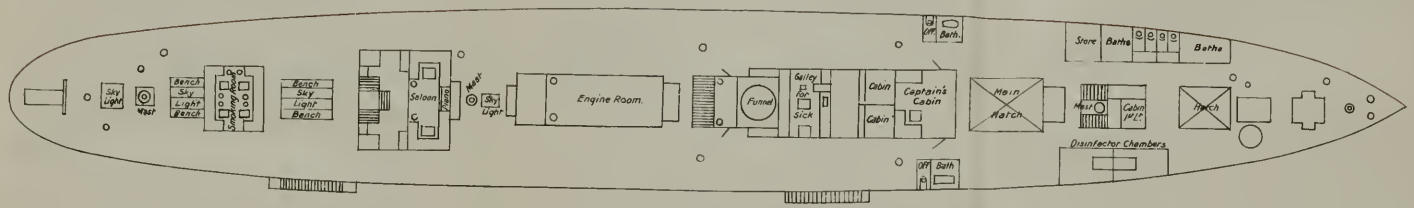

Ward.
Hatch
Male
Nurses.
Sup of Male Nurses
Hatch
Deck
Crew
Engineers
etc.

ROUGH PLAN OF HOSPITAL WARD ARRANGEMENTS, ETC.

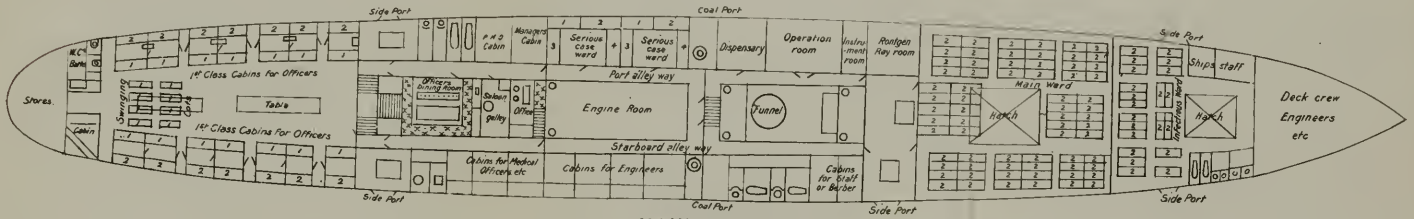
— ON THE —

HAKUAI MARU.

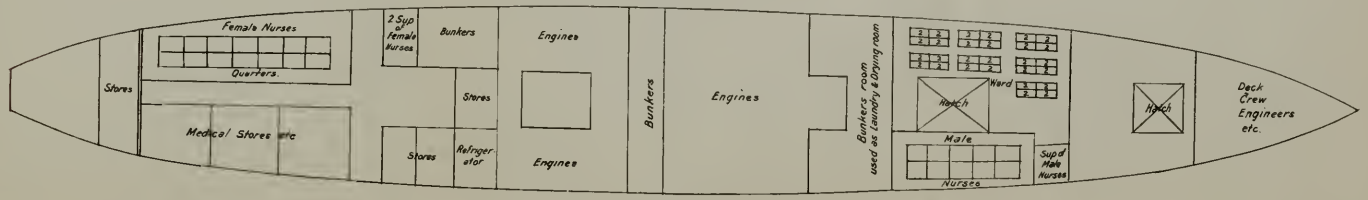
(Gross Tonnage 2774. Length 312'. Breadth 39 2', Depth 18 7'



UPPER DECK



MAIN DECK



LOWER DECK

(19) The Reserve Hospitals in Japan.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, May 1906.

Appendices.

Plates.

Hiroshima showing the relative positions of sections of the reserve hospital - - -	Map 7.	
Sections of the reserve hospital, Hiroshima, showing grouping of huts -	Figure 1	Bound in text.
Shibuya section of the reserve hospital, Tokio - - - -	„ 2	

Photographs.

Military Reserve Hospital, Shibuya, Tokio - -	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

The Reserve Hospitals in Japan.

During the Russo-Japanese War, the large military hospitals at the head-quarter stations of the territorial divisions became reserve hospitals for the reception, treatment, and final disposal of the sick and wounded returning from the field.

The military hospitals concerned are, as a rule, hospitals of 300 or 400 beds in well-constructed, more or less permanent, buildings, with all necessary accessories for hospital work of the highest character Each of them had to receive the sick

and wounded of its own division in the field, but the hospitals of the 5th Division at Hiroshima, of the 4th Division at Osaka, and of the 12th Division at Kokura, being close to Ujina, Osaka or Kobe, and Moji, the ports of disembarkation, had also to provide accommodation for patients belonging to other divisions who were, on disembarkation, too ill to continue the journey by rail to their own divisional reserve hospitals.

Some of the reserve hospitals had consequently to provide more accommodation than others; but all had to expand to at least ten times their normal peace dimensions of 300 or 400 beds.

Generally speaking, it may be said that not one of the 12 divisional reserve hospitals had, at the end of the campaign, less than 3,000 beds, and some had as many as 10,000 and 15,000.

This extraordinary expansion was effected, not by taking up existing buildings, but by the erection of new wooden pavilion huts on any suitable open site in the locality, each site, with its group of huts, becoming a numbered section of the reserve hospital. The permanent military hospital was invariably the head-quarters section, and all the sub-sections were administered from it; while to it all returns from them were sent.

The size of the sections depended on the extent of the site. Thus some were comparatively small sections of 300 or 400 beds, others large sections of 1,000 or more beds. As a rule, each section formed a complete hospital in itself, with kitchens, operation rooms, bathrooms, laboratory, and all necessary accessory buildings.

The appended plan of Hiroshima and the distribution of the sections of the reserve hospital in it illustrate these points, and also the arrangements by which sick and wounded were conveyed from hospital ships by water or road to the various sections. The arrangements at Osaka (*see* plan on page 339) were very similar.

The type of hut used was a solidly constructed pavilion, containing a large ward of 48 or 50 beds, a bath and latrine annexe at one end, in some types disconnected by a short corridor, in others entered direct from the ward, and, at the other end, the main entrance with medical officer's room, nurse's room, ward kitchen, and small special case ward on either side of the entrance. When the site permitted, the type of hut was a double hut, with the entrance and its accessory rooms in the centre, and 50-bed wards in either wing. Huts for officers, senior non-commissioned officers, and serious cases had not large wards, but were partitioned off into a series of small wards for one or more beds.

The lighting of the wards was by large sliding panel windows on both sides, with fanlights above each window. The huts were raised from the ground on stone, brick, or wooden plinths, and they were connected with one another by covered

corridors. The dimensions of a single ward hut was about 150 feet long, 30 feet wide, and 12 to 14 feet high.

The accompanying photographs illustrate the type of hut, and the plans of the Hiroshima and Tokio reserve hospital sections illustrate the manner of grouping the huts together in sections.

The slop and bath water was run into underground drains in some cases, in others into surface drains of stone, brick, concrete, wood, or earth, according to circumstances. The contents of latrines were received into receptacles and removed by farm coolies for agricultural purposes, or cremated in incinerators erected in the hospital grounds.

The cost of erecting one of the single ward huts was 2,000 yen (about 200*l.*) at Hiroshima, and 400 men could erect it in a single day. There appeared to be no lack of men or material for the purpose. In fact all the arrangements for the expansion of the local military hospitals into large reserve hospitals in war seem to have been carried out rapidly in accordance with previously prepared plans in the possession of the head-quarters staff of each division. In Tokio, for example, huts for 1,000 beds were ready in one month (June 1904), and the same rate of expansion continued all over the country. It may be estimated that when war was declared there were some 5,000 beds in the permanent military hospitals, and that at least 60,000 additional beds were provided by expansion during the progress of the campaign, representing over 1,000 ward huts, of which some 200 or 300 were got ready within the first four months.

The total number of sick and wounded sent back from Manchuria to the reserve hospitals was 281,587, according to the statistical tables already submitted (Table 3, page 317). This number represents more than 75 per cent. of the admissions into the hospitals in the field for wounds, sickness, or other injuries.

According to a later announcement of the Director-General of the Army Medical Service, made at the annual meeting of the Medical Society of Japan on the 7th April 1906, 97,850 sick were also admitted from local garrisons in Japan and Formosa, and 77,805 from amongst Russian prisoners. The latter number would include sick and wounded who fell into the hands of the Japanese at Port Arthur, Mukden, and elsewhere, and it is presumed that all who survived were transferred to the hospitals in Japan.

It will be gathered from these figures that by far the largest share of the work of treating and finally disposing of the sick and wounded during the campaign was done at the reserve hospitals in Japan.

Details of the work in all of them were not obtained, but those at Tokio, Osaka, and Hiroshima were visited as types of

the more important reserve hospitals, although the extent and importance of the surgical work, for example, may have been just as great in others.

The personnel for all the reserve hospitals was arranged as follows:—The command of the hospital was held by a senior medical officer of lieut.-colonel's or colonel's rank, and that of each section by a major or lieut.-colonel. Surgical and medical divisions were also under the charge of regular medical officers or officers of the regular reserve. Their rank was that of major or captain, and, as a rule, they were selected as officers with special expert knowledge in medicine and surgery.

Other professional medical or surgical duties were carried out by reserve medical officers, medical officers of relief (nursing) sections of the Red Cross Society, or volunteer civil surgeons practising in the locality.* The proportion was 1 medical officer to 50 patients in the more serious cases, or 1 in 100 in the lighter case wards.

Each hospital had also its staff of pharmacist officers, compounders, and instrument repairers; intendance officers and non-commissioned officers for pay and supply duties; clerical staff of non-commissioned officers of the regular Army Medical Service or its reserve, supplemented by specially employed civil clerks; non-commissioned officers of the Army Medical Service or reserve as wardmasters; and a nursing staff of the peace establishments of civil nursing orderlies or of relief sections of the Red Cross Society.

The proportion of wardmasters was 1 for every 50 beds; and of nurses 1 for every 5 patients (or 1 for every 2 serious cases, or 1 for every 10 light cases). A nursing or relief section of the Red Cross Society, as noted in previous reports, is composed of a staff for the treatment and care of 100 patients in accordance with these scales, namely, two medical officers, two senior nurses (as wardmasters or sisters-in-charge), and 20 nurses (male or female).

As the war progressed, the relief sections of the Red Cross Society were gradually brought in to the reserve hospitals to replace the civil nursing orderlies, as these were pushed up to the line of communication hospitals, and also take over the beds in the sections of the reserve hospitals as they expanded. The female nursing sections were invariably used in the serious case

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* The number of Medical Officers and members of the Medical Service engaged in treating the sick and wounded during the campaign is given as 10,175, made up of the following details:—

Personnel of Army Medical Service and its reserve - - - - -	4,517 (*a*)
Personnel of Relief (nursing) sections of the Red Cross Society - - - - -	5,470
Civil doctors temporarily employed - -	188

(*a*) This number apparently excludes stretcher bearers and officers and men not actually employed in the ward work of hospitals.

wards and in the operation and bandaging rooms; male sections in the lighter case wards. In all cases their work was confined to treatment and nursing, and no members of these sections were permitted to take over duties of administration or command even of the individual huts in which they were employed.

As regards details of the work and construction of reserve hospitals, the following notes, which were made during visits paid to the reserve hospitals at Tokio, Osaka, and Hiroshima, after peace was declared, in November 1905, may be of interest:—

The Reserve Hospital, Tokio.

The Tokio reserve hospital consisted of the following sections:—

(*a*) Head-Quarters section at the garrison hospital, situated between the War Office and the British Embassy, in a somewhat confined site. Many new permanent wards and accessory buildings, such as a fine operation-room, were in course of construction towards the end of the campaign. It had originally about 500 beds in a two-storied officer's ward, a surgical division of five one-storey pavilions, including venereal and eye and ear wards; a medical division of seven old wooden pavilions, which are gradually being replaced by new brick buildings; and an isolation pavilion. There were also separate blocks for administration; dispensary and pharmacist's laboratory; operations; kitchen, &c.

(*b*) Toyama section, near the main barracks of the 1st Division. This was an expansion of the hospital in wooden huts to over 4,000 beds.

(*c*) Shibuya section. This was also an expansion by the erection of wooden huts in the grounds around the permanent hospital of the Red Cross Society. The number of beds provided by the expansion was also over 4,000.

(*d*) Shikawa section.

(*e*) Hiro section.

(*f*) A German hospital section. This was a small hospital opened in the house of a German merchant by a detachment sent out by the German Red Cross Society. They were placed under the administrative control of the Tokio reserve hospital, and made a section of the hospital.

(*g*) Setagaya section.

(*h*) Fukuromusa section.

In addition to these eight sections, two convalescent homes were affiliated to the reserve hospital and placed under it for

administrative purposes—one at Yugawa, and the other at the mineral and hot springs of Atami, a favourite Japanese watering place and health resort. Patients were sent there for the mineral baths, and placed in buildings acquired for them or billeted amongst the residents, some of whom offered their houses as convalescent homes.

The total number of beds available month by month in the Tokio reserve hospital is shown in the following table:—

Month.		Total Beds.
1904.	March	580
„	April	1,100
„	May	1,100
„	June	2,800
„	July	2,800
„	August	4,400
„	September	9,000
„	October	11,900
„	November	12,900
„	December	12,900
1905.	January	13,200
„	February	13,200
„	March	13,300
„	April	15,000
„	May	15,000
„	June	15,000
„	July	15,000
„	August	15,000

In November the number of cases in hospital had fallen considerably, and whole groups of huts were empty. On the 6th of November the numbers in the various sections of the hospital were as follows:—

Section.	Officers.	N.C.O.'s and Men.
Head-Quarters	11	373
Toyama	—	1,436
Shibuya	116	1,627
Shikawa	—	309
Hiro	—	579
German Hospital	—	—
Setagaya	—	40
Fukuromusa	—	6
Yugawara	25	384
Atami	9	87
Totals	161	4,841

On that date the personnel had been greatly reduced. Only one nursing section (female) of the Red Cross Society, for example, was being employed in the Head-quarters section, the

general nursing duties being in the hands of the n.c.o.'s of the regular Army Medical Service and the civil male nurses usually employed in peace.

The following table gives the general statistics of the work done in the hospital:—

TABLE of ADMISSIONS, &c., to the RESERVE HOSPITAL, TOKIO.

Month.	Highest number in Hospital on any one day.		Fresh Admissions from the Field Army.	Discharged from Hospital.		Transferred to other Reserve Hospitals.	Died.	Invalided as unfit for further Service.
	In Tokio sections.	Outside Tokio.		Recovered.	Convalescent.			
1904.								
March -	280	—	—	200	83	—	2	86
April -	490	—	—	200	160	—	23	150
May -	900	—	380	300	250	—	5	110
June -	2,000	300	1,600	350	360	—	5	110
July -	2,200	400	800	490	200	—	5	70
August -	5,000	1,900	3,700	790	200	—	23	50
September	12,200	4,400	8,700	1,200	600	—	26	70
October -	13,500	5,300	6,500	4,500	2,600	25	33	90
November	12,000	3,100	4,900	3,600	3,200	20	36	130
December	12,300	1,300	7,300	2,500	1,600	300	29	110
1905.								
January -	12,700	1,400	4,700	2,000	3,200	160	26	250
February	11,300	1,100	7,000	1,400	2,900	1,900	24	450
March -	11,500	1,100	8,000	2,800	3,800	1,300	35	760
April -	13,200	1,100	10,000	2,900	5,000	1,300	34	700
May -	11,900	1,700	2,300	1,400	3,900	940	39	660
June -	7,600	1,100	2,900	1,300	1,900	460	34	540
July -	7,900	890	1,900	800	1,600	300	38	540
August -	7,100	1,300	2,900	1,300	1,000	430	30	840
Totals -			73,880	28,030	33,553	8,135	447	5,716

It will be estimated from this table, that out of 73,880 admissions from the field army, 37·9 per cent. were discharged as cured, 0·6 per cent. died, and 7·7 per cent. were invalided as unfit for further service. The small proportion of deaths is, in a measure, due to the fact that the more grave cases of wounds and sickness belonging to the Tokio divisions would have been retained at the ports of embarkation (Hiroshima or Osaka) until they were fit to travel or had died there.

Details of the different classes of disease were not obtained for the whole period. The number of days under treatment for certain groups, for the period 3rd March to 31st December 1904, was—internal diseases 32, infectious diseases 25, beri-beri 39, wounds in action 48, other injuries 43.

Amongst the plans appended there is a plan of the Shibuya section of this hospital. A fine recreation room was presented

to this section by a benevolent donor. Photographs are submitted of this and other parts of the section.

The section had five departments, namely—

I. Surgical.

II. Medical.

III. Admission and discharge, *i.e.*, new cases were received into and distributed to the other departments from this department; and all cases of invaliding, examinations for pensions, and documents relating to them were dealt with here.

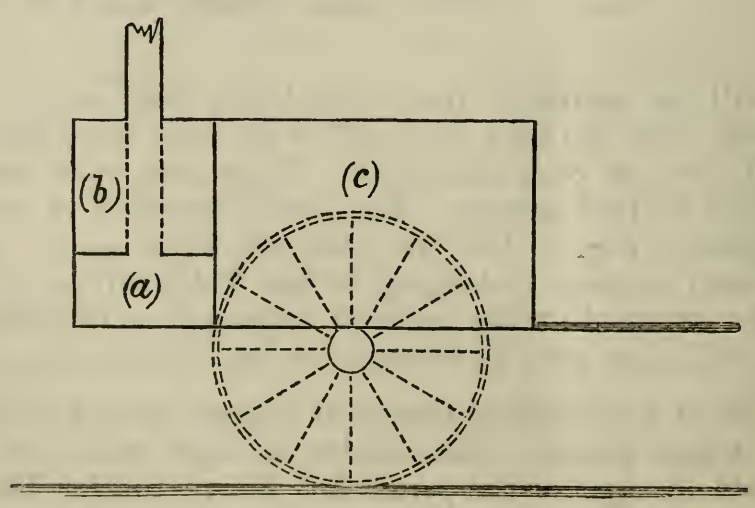
IV. Infectious diseases.

V. Officers. The permanent Red Cross hospital building and some adjoining military huts were reserved for officers.

On the 7th November 1905, the numbers in this section were 100 officers and 1,800 N.C.O.'s and men. The nurses were chiefly civil hospital orderlies; only 3 female relief sections of the Red Cross Society were being employed, all in the serious case wards and operation and bandaging rooms.

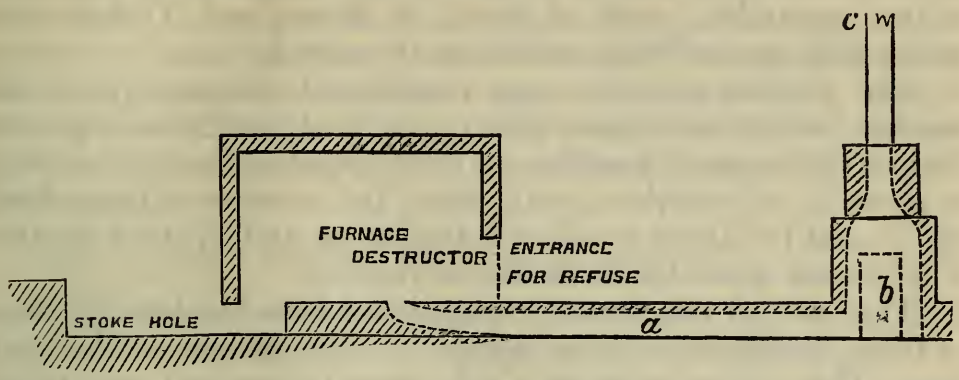
There were some special sanitary features in this hospital worth noting—

(1) All the milk used was sterilized. For this purpose a shed was erected where the bottles were washed. When filled they were placed in a portable wagon steamer of a simple construction, thus—



(*a*) Fire.
(*b*) Water boiler.
(*c*) Chamber, into which steam escapes from (*b*), and in which the milk bottles are sterilized.

(2) A large destructor was erected in the grounds on the following principle of construction:—



The refuse was tilted into the furnace and the entrance hermetically closed. The fumes thus escape by an underground funnel (*a*) to a secondary furnace (*b*), where organic matter in the fumes was further destroyed by heat before escaping into the air by the chimney (*c*). The whole base of this establishment was constructed of concrete; and it was inside an open shed covered with corrugated iron.

(3) The slop and bath water was removed in underground drains. The drains from the infectious diseases blocks emptied into a tank close to an engine room, where dynamos for electric lighting of the hospital, &c., were worked. The waste steam from the boilers was conducted into the foul water tank, and was thus used for sterilizing the water before the effluent was allowed to pass into ordinary surface or other channels.

The Reserve Hospital at Osaka.

This reserve hospital consisted of the following sections:—

(*a*) Head-Quarters. The original garrison hospital near the castle, of 11 ward huts, for about 400 beds; an administrative block and 14 accessory buildings.

(*b*) Tennoji section. About 75 newly erected huts near the old industrial exhibition ground.

(*c*) Abeno section. About 46 huts in addition to the large exhibition building. This exhibition and the building remaining permanently on the site is to Japan very much what the Crystal Palace is to England. These sections (*b*) and (*c*) adjoin one another and have together about 5,000 beds.

(*d*) An infectious diseases section, near (*b*) and (*c*), of 500 beds in 11 ward huts, with one administration block and six other huts.

(*e*) Tenkajaya section. A large section of 3,000 beds in 62 huts.

(*f*) Bamba section. About 1,000 beds in 20 ward huts with six other huts.

(*g*) Momoyama section. Similar to Bamba section.

The total number of beds was about 11,000.

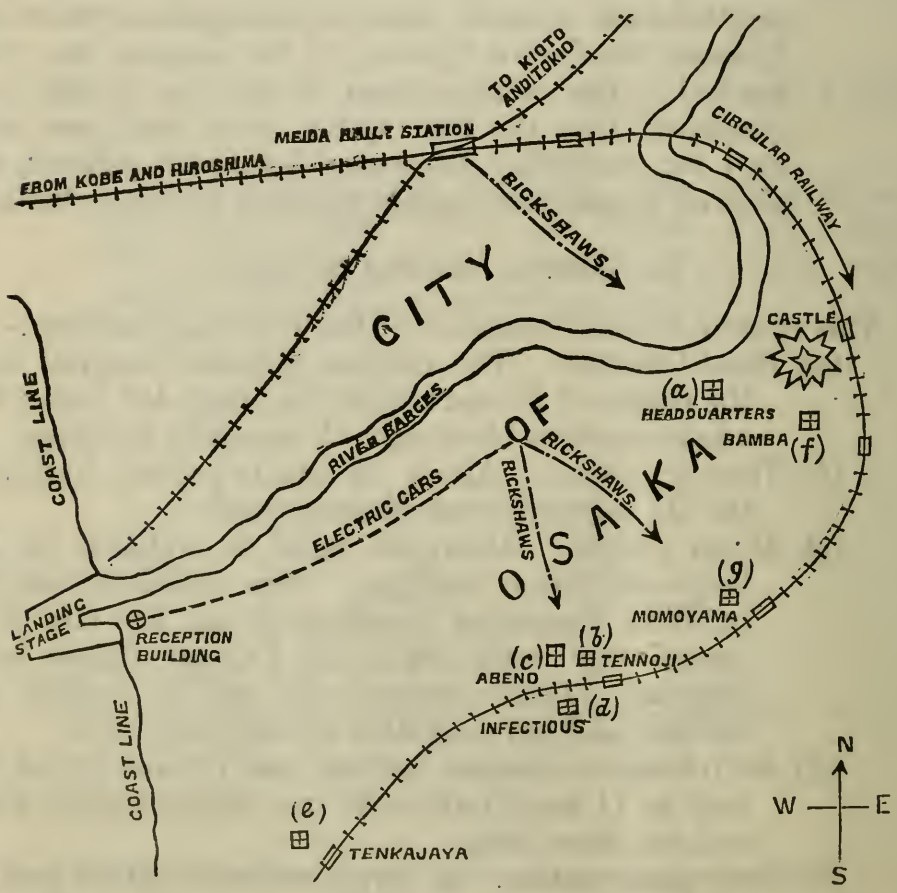
In addition to the sections, there was a set of reception huts at the landing stage; and convalescent depots at Nakayama in the mountains north of Kobe, at Arima and Yoshino also in the hills, and at Wakanohula on the seaside.

The various sections are a considerable distance from one another, with the exception of (*b*), (*c*) and (*d*), which are together. Section (*f*) is near the castle and Head-Quarters Section; but (*g*) is about a mile further south along the circular railway line (*b*), (*c*), and (*d*) about a mile still further on, and (*e*) about another mile distant down the same line of railway.

They are all two, three or more miles from the landing stage or from the Meida railway station, *i.e.*, the station on the main line. The serious cases, as a rule, came by sea and were taken up the river to the Head-Quarters Section, the only section on the river. The others, most of whom came by train from Hiroshima, went to their sections by the local circular railway, by electric tramcars, or in rickshaws.

The accompanying diagrammatic plan shows the relative positions of the sections and the means of access to them.

Osaka Reserve Hospital.



Diagrammatic plan showing the relative positions of the sections of the reserve hospital and the means of conveying sick and wounded to them. (Not drawn to scale.)

At one time 150 medical officers were on duty at the Osaka reserve hospital, and 14 female relief sections of the Red

Cross Society (two in each section of the hospital) were employed. On the 12th November 1905 all the sections had been closed except the Head-Quarters, Tennoji, Momoyama, and infectious diseases sections; and of the convalescent depôts, that at Nakayama only remained open. The number of medical officers was reduced to 50, and only three Red Cross Society's relief sections were employed (two at Head-quarters, and one in Tennoji).

Special points noted at this hospital were—

(1) Placards were attached outside each hut to indicate the number of patients in it requiring to be carried, to be helped, or able to look after themselves in case of fire. These were wooden placards about 8 inches long and 1½ inches wide. A red placard had chalked on it daily the number that would have to be carried, a green placard the number requiring help, and a black placard the number able to look after themselves.

(2) Electric power for Roentgen ray apparatus was generated by a dynamo worked by steam in the Head-Quarters Section, from which it was distributed to other sections.

(3) All old dressings were washed and sterilized in the Head-Quarters Section, and re-issued. Scarcely any new material was required under this arrangement after December 1904.

(4) Plague was prevalent in the city, and mats in tanks of carbolic acid, into which every one entering had to dip their feet or boots, were placed at the entrance to each section.

The following table shows the extent of the work done in this hospital during the campaign:—

TABLE of ADMISSIONS into the OSAKA RESERVE HOSPITAL from the 7th May 1904 to end of October 1905.

Distribution.	From Field Army.	From Local Garrison.
Total admissions - - -	51,356	4,783
Recovered - - - -	20,217	2,919
Died - - - - -	422	90
Invalided - - - -	1,113	442
Discharged as convalescents - -	4,347	754
Transferred to other hospitals -	23,826	187
Disease changed - - -	104	50
Remaining in hospital at end of October 1905 - - -	1,327	541

In addition to these, about 20,000 light cases belonging to other divisions were landed at Osaka, and sent direct to their own divisional reserve hospitals. The large number of transfers to other hospitals also indicates the number of cases belonging to other divisions temporarily treated at Osaka until fit to continue their journey.

The above figures give a mortality amongst admissions from the field army of ·8 per cent., and a recovery rate of 39·6 per cent.

Amongst the admissions were 25 cases of enteric fever with 14 deaths, 17,726 of beri-beri with 219 deaths, and 74 of dysentery with 4 deaths.

The Reserve Hospital at Hiroshima.

The reserve hospital at Hiroshima consisted of the following sections, with ordinary and emergent accommodation as shown :—

Name of Section.	Ordinary Accommodation.	Emergent Accommodation.
(*a*) Head-Quarters Section - -	290	355
(*b*) Motomachi - - -	1,280	1,514
(*c*) Koshomachi - - -	580	680
(*d*) Sendamachi - - -	488	560
(*e*) Eba - - - -	1,315	1,515
(*f*) Hakushima - - -	1,290	1,513
(*g*) Minami - - - -	3,444	4,101
(*h*) Takaya - - - -	1,872	2,262
Total beds - - -	10,559	12,500

The Head-Quarters Section was for severe cases only, both medical and surgical, but mainly for the latter. Practically all the important operations were performed in it; the only other sections in which operations were performed being Takaya, Motomachi, and a small hospital not mentioned in the list of sections. It had two fine operating-rooms, and a magnificently equipped establishment for Roentgen ray work, with ortho-diagraph, a Schomberg compression tube for abdominal skiagrams, electrolytic interrupters, and coil capable of giving a 23-inch spark. There was also a complete equipment for electro-therapeutics. The officer in charge of the surgical work and chief-operating surgeon was Surgeon-Captain Tanaka, who was the Japanese medical attaché with our army during the South African war.

The Motomachi and Koshomachi Sections were for surgical cases of the 5th Division, the latter being for light cases only. The Takaya Section was intended for surgical cases from other

divisions, but lately only medical cases have been admitted to it.

The Sendamachi Section was kept for beri-beri cases of the 5th Division; the Eba Section for infectious diseases; the Hakushima Section for medical cases amongst officers from all divisions, amongst other ranks from the 5th Division only; and for cases of lunacy.

The remaining section, Minami, was for sickness amongst men from other divisions. It was the largest section, and eventually half of it was partitioned off and handed over as a clothing or equipment depôt, leaving 1,200 beds available in ordinary or 1,400 in emergent circumstances.

The maximum number of patients in hospital at any one time was 11,000. The number of medical officers employed at the time of maximum was 180, of whom 30 belonged to relief sections of the Red Cross Society. The maximum number of these relief sections employed was 15.

On the 15th November 1905, the Head-Quarters, Koshomachi, Sendamachi, and one half of the Minami Sections only were open.

The statistics of the admissions and deaths from the field Armies, month by month, are shown in the table* on the following page.

One or two points of interest and importance may be gathered from the figures :—

(1) There was continuous wastage during the whole period from beri-beri. The total number of cases of beri-beri admitted in the field is given elsewhere as 97,572,† and as many as 62,867 of these appear to have found their way to Hiroshima; the wastage showing but little decline during the second year of the war. This latter fact contradicts some statements that have been made, to the effect that a great improvement in the health of the army in respect to this disease occurred during the second summer. There is an improvement it is true, but it is not so marked as to emphasize any great sanitary change in the army.

(2) Out of some 9,722 cases of enteric fever admitted in the field, only 1,160, and out of 7,642 cases of dysentery only 1,646, reached this reserve hospital. This is due partly to the fact that a very large percentage of the admissions in the field died in the field (about 33 per cent.); and partly to the fact that none of

* A note has since appeared in one of the Japanese newspapers to the effect that the total number of sick and wounded treated in the hospital at Hiroshima during the war was 216,673; and that the actual number in hospital at the end of March 1906 was only 1,002.

† A lecture by Baron Takaki at St. Thomas' Hospital, May 11th, 1906.

ADMISSIONS and DEATHS amongst SICK and WOUNDED of the FIELD ARMIES in the RESERVE HOSPITAL at HIROSHIMA.

Months.	Beri-beri.		Enteric Fever.		Dysentery.		Wounds in Action.		Other Diseases or Injuries.		Totals.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1904—March	—	—	—	—	—	—	—	—	6	1	6	1
April	25	—	1	1	7	—	4	1	335	5	372	7
May	92	—	5	1	70	1	497	—	810	10	1,474	12
June	187	1	9	1	101	1	2,846	4	910	13	4,053	20
July	1,264	8	19	1	185	2	1,081	7	1,779	7	4,328	25
August	5,011	120	30	2	192	10	3,755	20	2,924	28	11,912	180
Sept.	7,862	228	70	6	300	14	9,536	63	2,919	25	20,687	336
October	6,255	132	88	19	175	24	5,928	69	3,261	33	15,707	277
Nov.	5,393	97	286	35	256	29	6,870	78	4,884	46	17,689	285
Dec.	3,249	49	202	32	101	27	7,699	62	3,405	35	14,656	205
1905—Jan.	2,838	20	66	12	24	8	1,495	48	2,744	32	7,167	120
Feb.	3,853	29	22	2	26	2	5,875	24	5,233	31	15,009	88
March	1,998	24	13	5	5	1	10,211	35	2,633	21	14,860	86
April	2,587	7	32	3	5	1	6,094	52	2,938	33	11,656	96
May	2,397	9	35	4	13	1	343	18	2,835	22	5,623	54
June	2,917	9	47	3	11	—	276	15	3,745	26	6,996	53
July	3,109	15	21	2	9	2	224	5	3,400	26	6,763	50
August	5,310	17	35	8	35	2	158	8	4,370	31	9,911	66
Sept.	5,279	24	55	13	39	10	187	2	5,670	40	11,230	89
Oct.	3,241	28	124	16	92	11	30	2	6,817	33	10,304	90
Totals -	62,867	817	1,160	166	1,646	146	63,109	513	61,621	498	190,403	2,140

these cases were sent to Japan until they were convalescent.*

(3) The death rate amongst the admissions for wounds in action, namely, ·8 per cent., is exceptionally small. While allowing for the aseptic nature of small calibre bullet wounds and their more or less humane character, one must give the Japanese surgeon credit for this excellent result. His equipment, his methods, and his training are exceptionally favourable for the production of a result such as this. The following statistics of surgical operations performed at the Head-Quarters Section of the hospital may be quoted :—

1,272 cases were operated upon, 1,049 being for gunshot injuries, 109 for frost-bite, and 114 for other injuries or diseases. The operations consisted of 102 incisions with no deaths, 120 extractions of bullets, &c., with 1 death, 141 operations for traumatic aneurisms and injuries to blood vessel with 11 deaths, 25 operations on nerves with no deaths, 425 operations on bone with 29 deaths, 138 operations on joints with 14 deaths, 28 operations on the brain with 11 deaths, 1 tracheotomy and 34 operations for empyema with no deaths, 15 operations on the abdomen with 4 deaths, and 11 on the urino-genital regions with 1 death. The total is 71 deaths subsequent to 1,272 operations.

(4) The small number of deaths from all causes in proportion to admissions from all causes, namely, 1·1 per cent., is also exceptionally small.

General Medical and Surgical Notes.

At Tokio, Osaka, and Hiroshima reserve hospitals some special notes were made that have some professional interest in connection with the campaign. Briefly, these notes may be summed up as follows :—

(1) Some severe cases of frost-bite remained in the reserve hospitals in November 1905. They were cases in which the extremities of all four limbs had been lost, and they had occurred amongst wounded men during the battle of Mukden on the 3rd March.

(2) Aneurisms, following bullet wounds, were very common. The general impression was that the best treatment consisted in excision of the sac.

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* In Table 3 of Report 16 on Japanese casualties, page 317, the number of cases of infectious diseases sent home from the front, nearly all of which were cases of enteric fever and dysentery, is given as 2,156, whereas the numbers admitted to Hiroshima reserve hospital alone amount to 2,806. It is possible that the discrepancy is due to the fact that the convalescents may have been sent back under a different heading, *e.g.* debility, and have been restored to the infectious disease heading in the Hiroshima returns.

(3) Neuralgia was also common as a sequel of wounds. It was chiefly due to thickening of the nerve, in which case the nerve had to have the thickened or nodular portion excised or set free.

Occasionally the neuralgia was found to be caused by small pieces of bullet being lodged in the nerve.

(4) In case of injuries to the brain, when complete recovery had apparently taken place, it occasionally happened that epilepsy, or cerebral abscess and meningitis, suddenly set in some time afterwards.

(5) Amputations were extremely rare. In this respect the Japanese practice differed to a considerable extent from the Russian, as seen in the Russian hospitals at Port Arthur and Mukden.

(6) A common method of treating fractures, especially at the Osaka hospital, under Surgeon-Captain Saigo, was by pegging. Nickel-plated iron pegs were used. This method was found more satisfactory than wiring.

One remarkable case, of which a skiagram was shown, was a case of re-section of the tibia, in which 6 inches of the shaft of the bone had been removed. Surgeon-Captain Saigo had inserted a steel pin, about ½ inch in diameter, into the ends of the bone; and this pin took the place of the excised shaft in the solution of continuity. Periosteum was growing all round the pin, the external wound was perfectly healed, and the patient was able to go about.

(7) Laparotomies were not common operations, but occasionally operations had to be performed for fœcal fistulæ resulting from wounds.

(8) A simple dressing was used of birdlime and collodion in the Osaka hospital for simple bullet wounds. This was found to be an excellent dressing material in place of sticking plaister or bandages for securing small dressings.

(9) Suppuration was very common in wounds coming from the Army besieging Port Arthur; much more so than in those from other field Armies.

(10) There was no evidence that entozoa were specially contracted in Manchuria, simply because they are so common in Japan itself that it was impossible to say, when cases occurred, whether they had been contracted in Manchuria or Japan.

(11) At Hiroshima, Surgeon-Major Kokubo had charge of the beri-beri cases, and had a special laboratory for the study of this disease at the Sendamachi Section. The discovery of special microbes and the employment of a serum treatment in beri-beri were common matters of discussion amongst the medical officers throughout

To face page 345.

Figure 1.
(a) (b) (c)

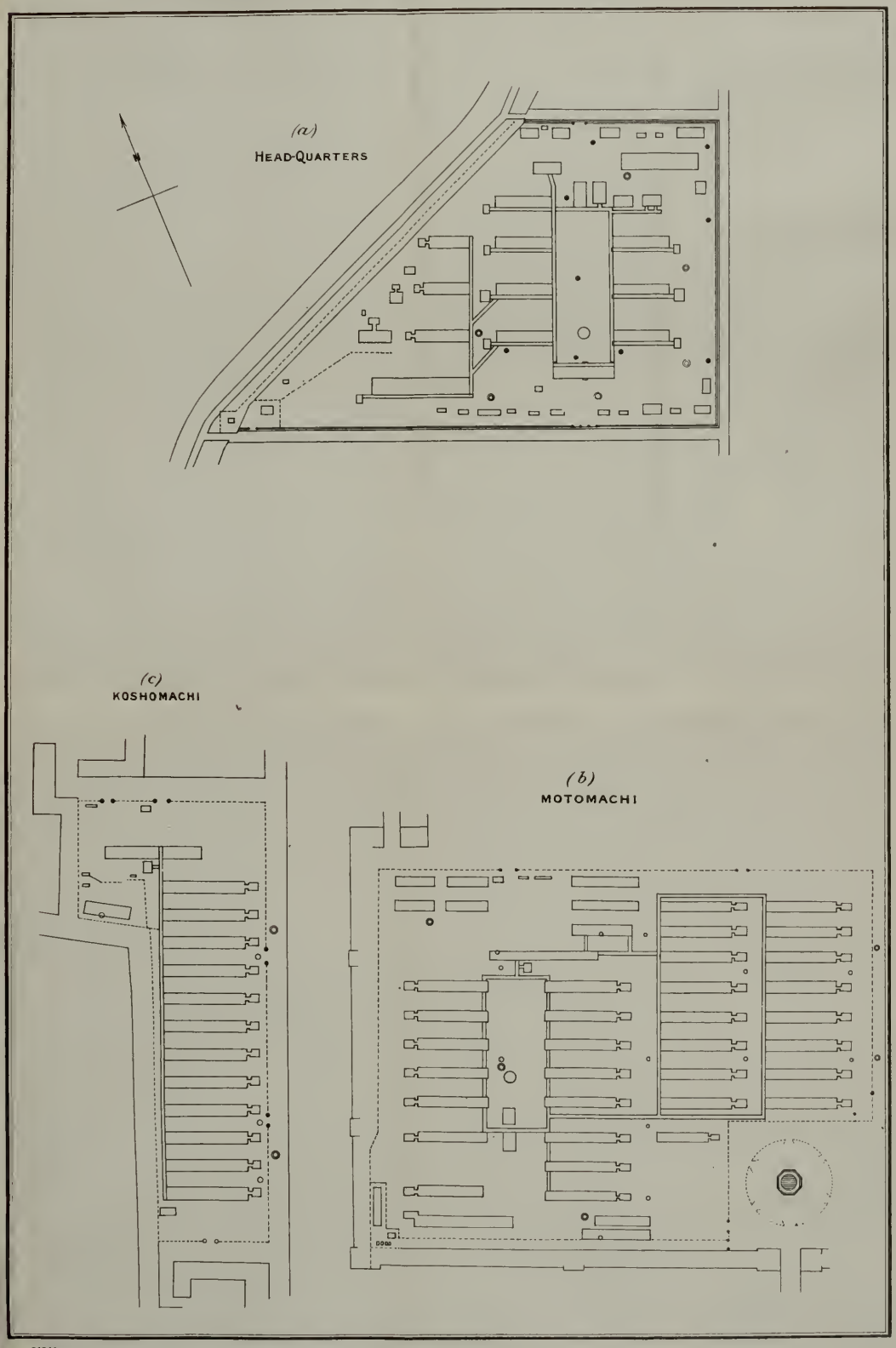
PLAI SECTIONS.

To face page 345.

HIROSHIMA RESERVE HOSPITAL.

Figure 1. (a) (b) (c)

PLANS OF HEAD-QUARTERS, MOTOMACHI AND KOSHOMACHI SECTIONS.



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AL.—

IA SECTIONS.

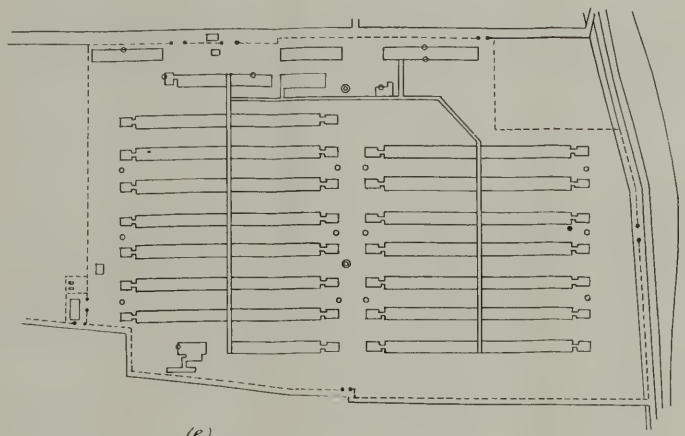
Figure 1.
(d) (e) (f).

To face page 345.

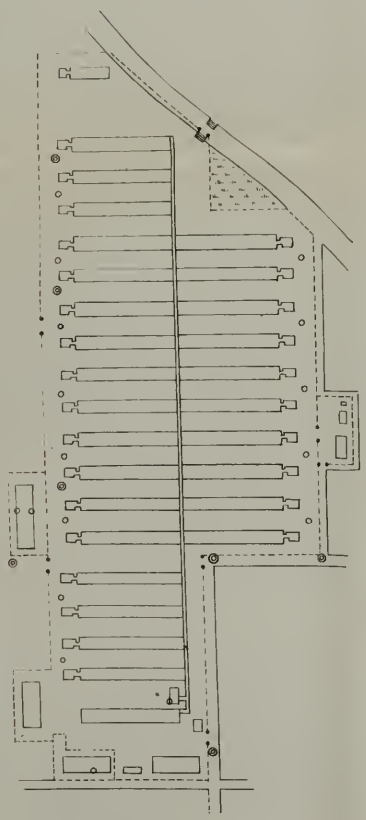
HIROSHIMA RESERVE HOSPITAL.

PLANS OF SENDAMACHI, EBA AND HAKUSHIMA SECTIONS.

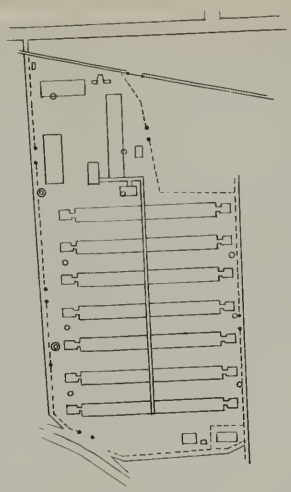
Figure 1. (d) (e) (f)



(e)
EBA



(f)
HAKUSHIMA.



(d)
SENDAMACHI.

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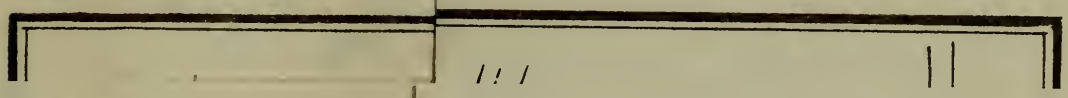
Figure 1.
(g) (h)



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HIROSHIMA RESERVE HOSPITAL.

PLANS OF MINAMI AND TAKAYA SECTIONS.

Figure 1. (g) (h)

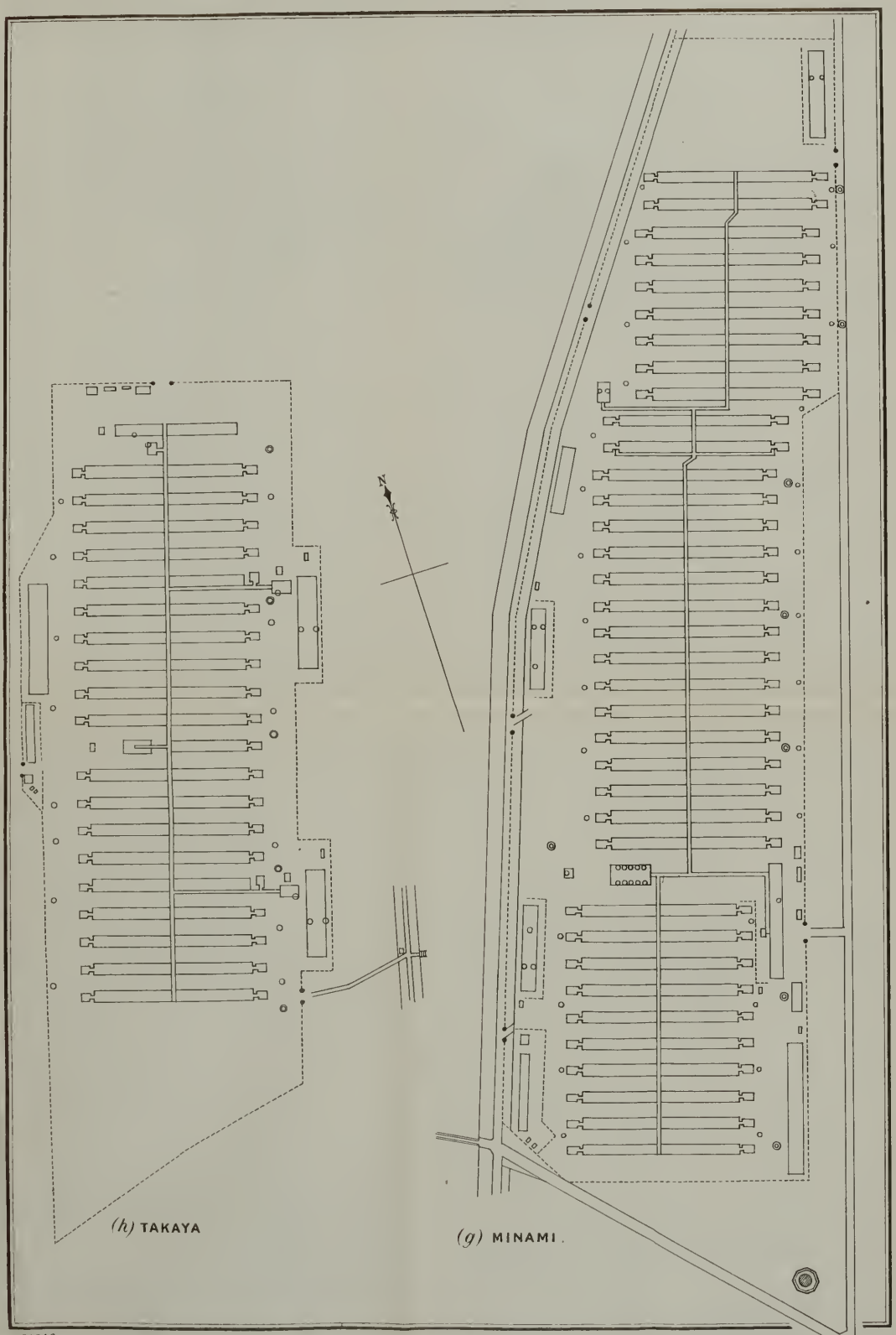

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Figure 2.

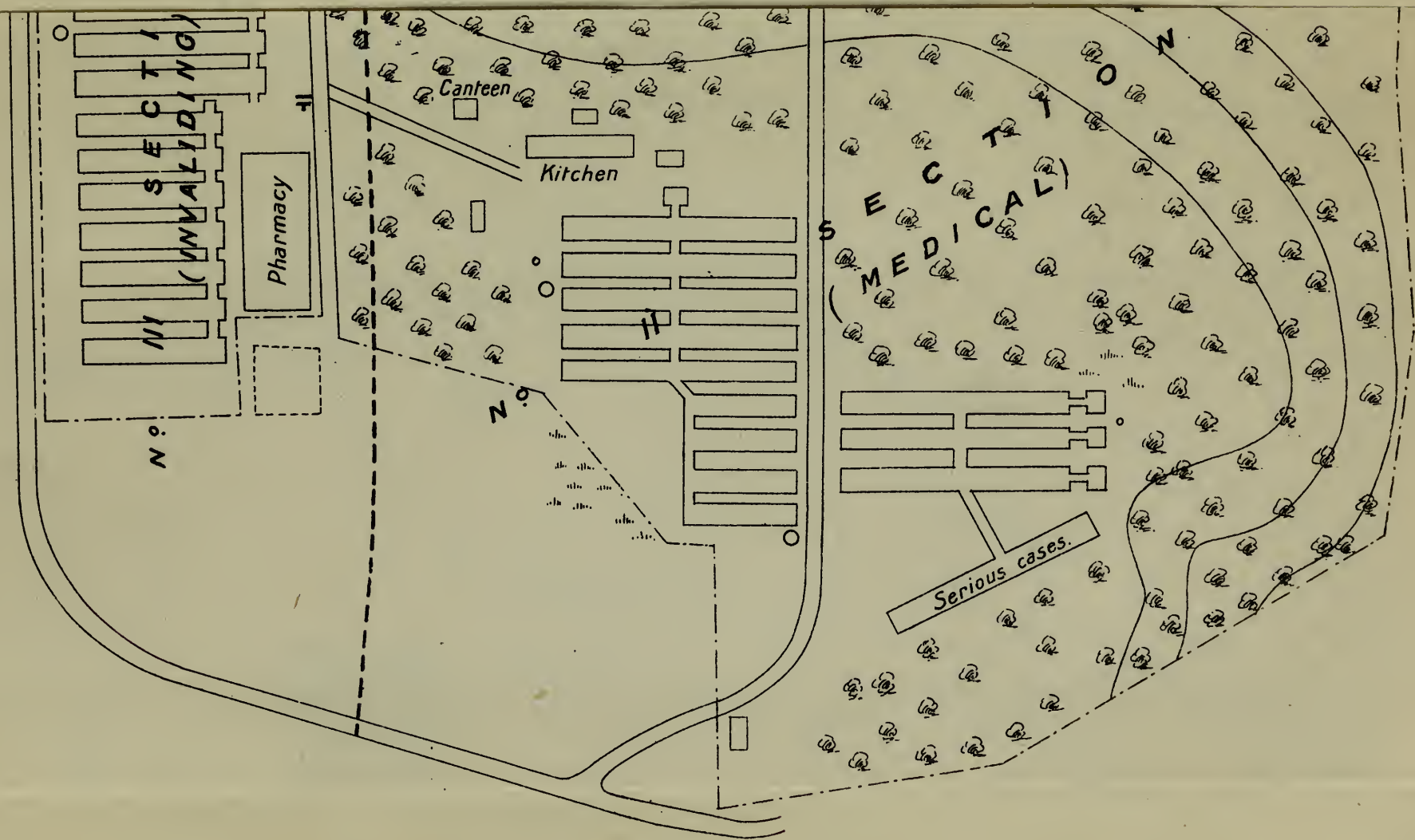
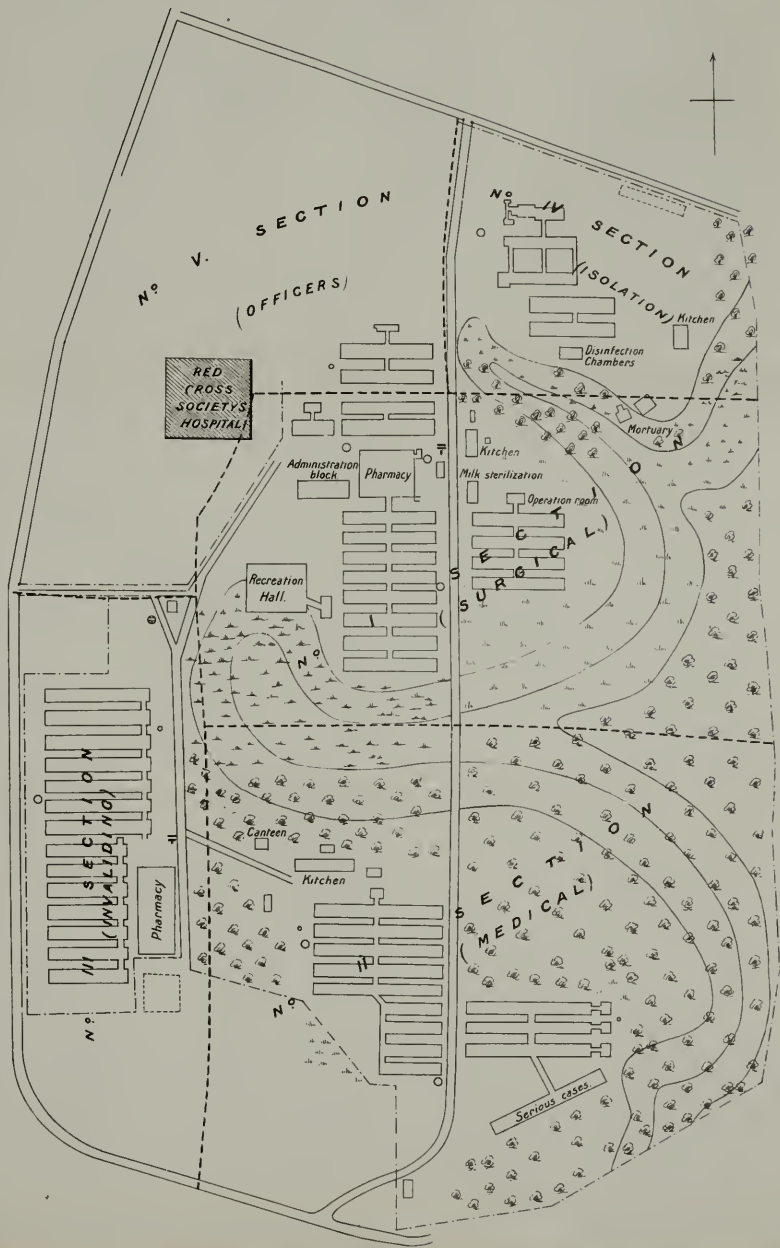

SECTION
(INVALIDING)
Pharmacy
Canteen
Kitchen
No. 1
No. 2
SECTION
(MEDICAL)
Serious cases.

Figure 2.

SHIBUYA SECTION OF RESERVE HOSPITAL, TOKIO.



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(1)

Military Reserve Hospital, Shibuya, Tokio.

View of Huts, as constructed during the War with China, in 1894–95.

The arrangement of four huts together without any disconnection, and the method of lighting the wards of such huts, are peculiar in hospital construction, though economical in space.

(2)

Military Reserve Hospital, Shibuya, Tokio.

a b *a b* *c*

(2)

View of Huts in course of Construction (July 1904).

The following points are shown :—

(1) The construction of roof—
  (*a*) With thatch as innermost layer ;
  (*b*) Frame work ;
  (*c*) Iron sheeting;
    (The outer thatch on the iron sheeting has not been put on yet.)

(2) The construction of the bathroom and latrine annexe, without disconnecting corridor.

(3) The proximity of huts to one another.

[*To face page* 345.

(3)

Military Reserve Hospital, Shibuya, Tokio.

View of Hut in course of Construction (July 1904).

The following points are shown:—

(1) Roofing with iron sheeting, over which thatch is placed. This sheeting is intended as preventive of fire.
(2) Proximity of huts to one another. The distance is only equal to the height from the ground to the eaves.
(3) The lighting and ventilation of latrine and bath annexe by louvres—placed vertically.

(4)

Military Reserve Hospital, Shibuya, Tokio.

Black mud plaster.

Pit where mud plaster is prepared.

Outer boarding.

View of Gable End of Ward Hut in course of Construction (July 1904).

The photograph shows the following points:—

(1) Layer of black mud plaster. This is laid on over lathe work, between the inner and outer boarding.
(2) Framework for boarding.
(3) Outer boarding.

The figures are those of two patients and workmen.

[*To face page* 345.

(5)

Military Reserve Hospital, Shibuya, Tokio.

View of Framework of Corridor in course of Construction (July 1904).

[*To face page* 345.

(6)

Military Reserve Hospital, Shibuya, Tokio.

General View of recently completed and occupied Huts (July 1904).

The naked figure is one of the labourers employed in constructing huts.

The figures in white are patients.

(7)

Military Reserve Hospital, Shibuya, Tokio.

View of one Wing of Wooden Hut from the Side (July 1904).

The following points are shown :—

(1) Ventilation of space beneath floors by large gratings.
(2) General style of window with Japanese sliding or removable sashes, enabling the whole side of the ward to be opened up.
(3) The glazing of the windows, with painted glass.
(4) The upper pivotting windows for ventilation.
(5) Thatching of roof.
(6) General construction of outer wall.

[*To face page* 345.

(8)

Military Reserve Hospital, Shibuya, Tokio.

View of two Adjacent Huts (July 1904).

The photograph shows:—

(1) The length of the huts.
(2) The central connecting corridor.
(3) The small space between huts.

Other points are shown in better detail in other photographs. The figures are patients.

Military Reserve Hospital, Shibuya, Tokio.

LATRINE FOR CONVALESCENTS AND ATTENDANTS (JULY 1904).

(10)

Military Reserve Hospital, Shibuya, Tokio.

STRAW MATTRESSES AND PILLOWS, SUCH AS ARE USED IN THE MILITARY HOSPITALS.

These mattresses and pillows are being made in various localities in Tokio, on requisition by the Medical Department of the Army, for the Reserve Hospitals.

Military Reserve Hospital, Shibuya, Tokio.

INTERIOR OF A WARD.

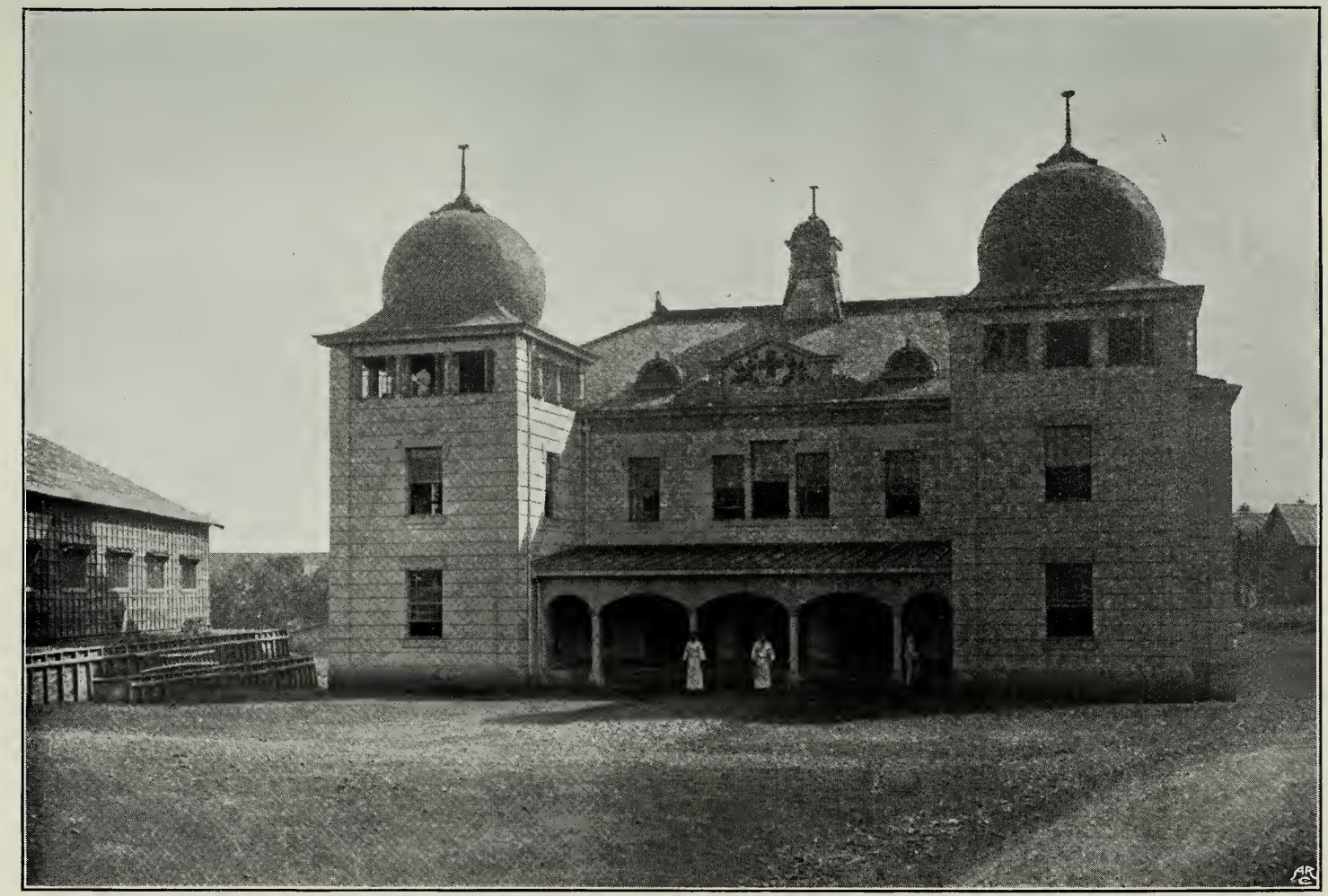
[*To face page* 345.

Military Reserve Hospital, Shibuya, Tokio.

ROOM FOR DRESSINGS.

[To face page 345

Military Reserve Hospital, Shibuya, Tokio.



Recreation Room.

[*To face page* 345.

Military Reserve Hospital, Shibuya, Tokio.

Interior of Recreation Room.

[To face page 345.

the army both in the field and in Japan, some regarding Kokubo's work unfavourably, others keeping an open mind.

In any case, there can be no question regarding that officer's enthusiasm, hard work, and scientific methods. He had a fine laboratory at the Sendamachi Section, with four assistants. In it he made examinations of blood and excreta, cultures of the susposed specific organisms, preparations of therapeutic sera, and careful tests of their anti-toxin values, with control tests on animals.

The basis of his work is the discovery of two micro-organisms invariably associated with beri-beri. One is a small, short, thick bacillus found in the excreta, and developing substances with an alkaline reaction in culture. The other is a diplococcus, found in the blood, and developing substances with an acid reaction.

A therapeutic serum is prepared by inoculation of mixed cultures of these micro-organisms into horses, 15 inoculations being given at intervals of four days.

In the treatment of cases, a dose of 0·8 to 8·0 grammes is given. In acute cases the injection is given every four hours; in chronic cases, every fifth or seventh day. The treatment is continued until the general symptoms are good. This result occurs in four or five days, according to Surgeon-Major Kokubo, in the acute cases, but is not so easily obtained in the chronic cases, one week to one month elapsing before any alteration in symptoms are noticed in the latter.

Surgeon-Major Kokubo was able to demonstrate all these points clearly by sphygmographic tracings; electrical reaction charts, temperature charts, diagrams showing areas of anæsthesia, &c., in cases under serum treatment as compared with control cases not under treatment.

The dose of the therapeutic serum is put up in glass tubes, corked and waxed, in the laboratory in the Sendamachi Section, the strength being carefully tested by control experiments on animals inoculated with mixed cultures of the bacillus and diplococcus. For this purpose mice and rabbits are employed. Guinea-pigs are with difficulty poisoned by the toxin, although dogs and horses can be destroyed by strong doses.

No doubt full accounts of Kokubo's work will appear in the German scientific journals, as he studied bacteriology for three years with Esmarch in Göttingen, and led me to understand that he proposed publishing articles in the *Centralblatt für Bacteriologie.*

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(20) Russian Wounded Prisoners at Matsuyama.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps. Tokio, 5th June 1904.

I visited Matsuyama on the 29th May. It is on the island of Shikoku, which forms the southern boundary of the Inland Sea, and is about five hours journey by steamer from Ujina, the port of Hiroshima, including a short journey by rail from the port of Mitsu.

I was permitted to see all the Russian wounded prisoners there, and examined several of them. They had all been wounded in the operations on the Ya-lu on or about the 1st of May. They were accommodated in the following hospitals :—

(1) The Garrison Hospital, a well constructed and admirably equipped hospital on a beautiful site on the northern slope of the Matsuyama, *i.e.*, "Pine Hill." The accommodation in this hospital is for 70 patients, in two pavilions, divided into wards of six to eight beds each, and having an excellently constructed and equipped operating room.

(2) An improvised hospital in a small Buddhist temple in the town. The main hall formed one large ward, and a small side room was also utilized as a ward. This hospital had very little equipment beyond the means of performing minor dressings and operations.

(3) An improvised hospital in another and larger Buddhist temple in the town, viz., Dai Rinji. The main hall formed one large ward, as in the smaller temple, but the priests' quarters were converted into two wards for more serious cases, and a smaller hall at the back of the main hall was also used as a ward. This hospital was a little better equipped than the smaller temple, that is to say, there was a special place in the priests' quarters equipped as an operating room for dressings and minor operations.

In the Garrison Hospital only one of the two pavilions was kept for the Russians. The other pavilion was used for the sick of the garrison. The number of Russian wounded in this hospital was 35, of whom 5 were officers in a ward by themselves. The patients were all seriously wounded, with the exception of the officers, of whom only one was confined to bed.

It is only the serious cases requiring special attention and operative treatment that are placed in the Garrison Hospital, and when any case in the improvised hospitals develops serious symptoms or has to be operated on he is removed to this hospital.

The nursing staff in charge of the ward is a half Relief Section of the Red Cross Society.* The medical officers are army medical officers of the regular service or reserve. The senior is the Professor of Surgery at the Army Medical School, who has only recently returned from Berlin to take up his appointment. His surgical work is admirable, equal to the best European operative work. He showed me one perfect dissection of the popliteal artery and vein with the surrounding sac, which he had removed the day before for the treatment of a traumatic aneurism. The Japanese authorities are, therefore, giving the Russian wounded the best surgical treatment that can be had. There was a Russian medical officer in the hospital who had been captured at the Ya-lu, but he was not employed in the treatment of the cases. He appeared to me to be in bad health and not up to much work.

The patients were in small wards of eight beds each, or to speak more correctly of eight mattresses, for the patients were lying on mattresses placed on the floor in all but the officers' ward and one other. The mattresses are straw mattresses and comfortable. The bedsteads in the officers' and one of the wards are improvised wooden bedsteads of a rough and ready make. All the patients, including the officers, were clothed in comfortable Japanese hospital clothing, which consists of a white cotton shirt, white *kimono* and *obi*, as are shown in the photographs published in the volume of Reports on the Medical Arrangements of the Allied Contingents during the Boxer Troubles in 1900–01.

The number of patients in the smaller of the improvised hospitals was 83. The small ward was occupied by non-commissioned officers. The floor of the wards was covered with Japanese matting, and the patients were lying on straw mattresses placed in six rows of ten mattresses each in the larger ward, the remaining 23 being in the smaller ward. The staff of this hospital consisted of the second half of the Relief Section of the Red Cross employed at the Garrison Hospital, with a Red Cross Society's surgeon and manager in charge. The patients are clothed in the regulation hospital clothing. None of the cases were serious, and all were able to be up and walking about.

The number of patients in the Dai Rinji temple was 172. The general arrangement of mattresses, &c., was exactly the same as in the smaller improvised hospital. The staff consisted of a complete "Relief Section" of the Red Cross Society, with the two medical officers and manager in charge.

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* *See* Report on the Red Cross Society, printed in *The Journal of the Royal Army Medical Corps*, April 1906.

Both these improvised hospitals have been provided and equipped by the Red Cross Society, but they are attached to the Garrison Hospital for supervision, and as already stated, whenever any of the cases in them becomes serious, he is removed to the Garrison Hospital. A certain number of non-commissioned officers of the Army Medical Service are permanently attached to the improvised hospitals for clerical and other official military work.

A retired army medical officer, Surgeon-General Kikuchi, who is one of the famous civil surgeons in Japan and the director of a large private hospital in Osaka, has just been sent to Matsuyama as a consulting surgeon. He had not, however, arrived when I paid my visit to the hospitals.

There is another hospital in Matsuyama for Russian wounded, but it is in no way under the control of the army medical authorities, and is at present occupied by twelve Russian sailors from the *Koreetz* and *Varyag*. The hospital is a permanent hospital of 24 beds, belonging to the local branch of the Red Cross Society. It is situated on the south slope of the Matsuyama, and is entirely run by Red Cross medical officers, managers, and nurses.

The whole of these establishments are under military and police surveillance. A military guard is kept at each of the military hospitals, and a police guard at the hospital with the naval wounded.

All the patients were kept very clean, comfortably clothed, and appeared to be on excellent terms with their guards and attendants. The Red Cross Society had a Japanese at each of the improvised hospitals who spoke Russian and acted as interpreter. A Russian prisoner, who spoke German, acted as interpreter between the wounded at the Garrison Hospital and the surgeon in charge. The medical officer of the Red Cross hospital for naval patients himself spoke Russian.

Nature of the Wounds.

The total number of military wounded that have been under treatment up to the date of my visit is 380. Of these 88 have been discharged as cured, 2 only have died, and the remainder were then in hospital.

So far as I was able to gather from the surgeon-in-charge, all these cases came from the fighting on the Ya-lu on 1st May, and he could not refer me to one wound from artillery fire, although he said that one or two of the cases may have been caused by shrapnel.

Amongst the serious cases in the Garrison Hospital the following were shown me:—

(1) A wound of the lungs, with exit of the bullet through the trachea. The case was doing well under expectant treatment, and no operation was necessary.

(2) A wound of the abdomen, penetrating, with apparently a considerable amount of chronic peritoneal inflammation localized in the lower half of the abdomen. The treatment in this case was also expectant, but an early operation was contemplated.

(3) An aneurism (traumatic) of the right subclavian. This case had been operated on, but gangrene of the limb set in, and the arm was amputated at the shoulder the day before my visit. The case was then doing well.

(4) Traumatic aneurism of the popliteal (arterio-venous). In this case the bullet had apparently passed from the outer aspect of the right knee, superior to the condyle of the femur, obliquely downwards and inwards, to escape at the inferior angle of the popliteal space. There was a well-defined arterio-venous aneurism in the popliteal space.

(5) A similar case of aneurism which had been operated on by resection of the artery and vein along with the surrounding sac. The wound of both artery and vein was a clean puncture, the margins being a little ragged with lymph. The punctures were about $\frac{1}{8}$th inch in diameter. The sac was comparatively small.

(6) A case of traumatic aneurism of the femoral, at present waiting operation.

(7) Several cases of gunshot fractures of the femur and humerus, about ten in all. None of the cases had bad symptoms, and the only amputation case was the one referred to above for gangrene.

(8) A wound of the thorax, followed by empyema, which had been operated on the day before by resection of ribs.

(9) One case only of penetrating wound of the skull, which had just been admitted from one of the improvised hospitals on account of symptoms of hemiplegia having commenced. It was waiting operation.

In the improvised hospitals the wounds were all of a more or less simple character, and had mostly healed or only required minor dressings. I was shown one or two interesting cases.

One case was that of a man who had eight different wounds, all of which had completely healed. The man was wounded on the morning of the 1st May. He was first attended to in the evening by Japanese medical officers.

Another case had been wounded by a bullet that had entered in the left temporal region and had passed through the middle ear, making its exit through the left mastoid process. This wound was discharging pus through the external meatus, and an operation was contemplated.

The cases in the naval hospital (the local Red Cross hospital) were entirely different. They had been in the hospital since

February, and the wounds had practically healed. They were the result of shell fire and explosions, and five amputations had been performed in the hospital.

The two deaths in the military hospital were due, the one to a penetrating wound of the abdomen, followed by peritonitis; the other to a complicated wound of the pelvis, involving the bladder and intestines. I notice, however, that another death has since occurred.

Remarks.

The following are the points which struck me most in connection with the wounds from the Japanese fire in the battle on the Ya-lu on May 1st:—

1. The absence of wounds from artillery fire.

2. The large number of cases of traumatic aneurism, resulting from clean, perforating wounds of the larger arteries and veins. The surgeon-in-charge of the Garrison Hospital told me that he had ten cases. The aneurisms had all developed gradually after the wounds of entrance and exit had completely healed. The proportion of these aneurisms is higher, he thinks, than in previous wars, and this confirms the facts already noticed that traumatic aneurism is more frequent in wounds by small calibre, high velocity bullets, than in wounds by other missiles.

3. The absence of septic conditions. This is due to the treatment. Suppuration had occurred in several cases, but this had been checked by operations for the removal of foreign bodies that had been carried into the tissues at the time of the injury. Thus amongst the specimens extracted was a large piece of jungle grass.

4. The impossibility of distinguishing between the wound of entrance and of exit. Both formed small healthy circular cicatrices about $\frac{1}{4}$-inch in diameter. There were no instances externally of explosive effects, but I was informed that the destruction of tissue in the soft parts was sometimes great owing to supposed explosive action.

5. The fact that penetrating wounds of the thorax and skull were, as a rule, being classed amongst the milder cases, and not treated as serious unless secondary complications occurred.

6. The comparatively small number of lodged bullets and fragments that had been extracted. About eight specimens had been extracted. One was a complete bullet, 6·50 millimetres (·256 inches) diameter, with hard nickel mantle and lead core. Another was a similar bullet bent by impact with some harder body, and the remaining pieces were twisted and broken fragments of mantle and lead core.

7. The general principle of surgical treatment. This was almost entirely expectant, that is to say, no operation was undertaken to remove foreign bodies such as bullets, &c., unless there were symptoms of sepsis, or, in the case of injury to vital organs, unless the symptoms, such as those of intracranial pressure, called for interference. As the surgeon in charge had just returned from studying under Professor Bergmann and other renowned surgeons in Germany, I formed the conclusion that the expectant treatment is the treatment advocated in case of gunshot injuries by them. This, I understand, has also been advocated in connection with gunshot injuries of the thorax and abdomen as the result of experiences in the South African war. As a rule, all the treatment required for the bullet wounds was to cover them with iodoform gauze, kept in place with strips of rubber plaister. At any rate, this was the practice of Surgeon-Major Nakayama, the surgeon-in-charge, and he told me that in non-suppurating cases no other treatment was needed. The external wounds nearly always healed completely before the secondary symptoms of injury to vital parts appeared.

It may be of interest to mention that the above notes are of injuries made by the Japanese 6·50 millimetres (·256 inches) rifle.

(21) Transport of Sick and Wounded, Medical and Surgical Material, and Sanitation.

MISCELLANEOUS NOTES by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps; Tokio, 29th June 1904.

Appendix.

Field Regulations for the Sanitation of Feng-huang-cheng.

TRANSPORT OF SICK AND WOUNDED.

Railway Trains.

A large number of sick and wounded is being transferred from the Base Hospital at Hiroshima to the military hospitals of the territorial divisions to which they belong. Trains are arriving with them almost weekly in Tokio, and although I have made formal application to be present on the platform when they arrive permission has not yet been granted me. On one occasion the Transport Officer took me on to the platform, when I was at the station amongst the outside crowd, but another officer came up and explained that I could not be permitted to be present. The incident merely shows how extremely difficult it is at present to see any of the military arrangements, even when these are connected with the sick and wounded. There is nothing personal in the difficulties that are raised. They are merely the outcome of the Japanese military discipline, under which no officer is permitted to disclose anything without a direct order to do so. The medical service is as punctilious in this respect as the combatant branches of the Japanese Army.

I was able, however, to make the following observations. The sick and wounded are not transferred from Hiroshima until they are sufficiently convalescent to admit of their travelling by ordinary trains. The train is made up of three or four 2nd and the same number of 3rd-class carriages. The former have an interior construction well adapted for the conveyance of lying-down cases. They are, in fact, similar in almost every respect, to the 1st-class carriages on the Japanese railways, and there seems little need to construct special ambulance cars so long as cars of this construction are available.

The 3rd-class cars are not suitable for lying-down cases, but if necessary, boards are placed between the seats for lying-down cases. In a train made up of eight carriages, partly 2nd and partly 3rd class, about 200 sick and wounded are conveyed. This was the number which I saw arrive at Tokio on one occasion from Hiroshima.

The journey from Hiroshima to Tokio takes at present about two days and one night, and the invalids receive food and treatment *en route* at rest stations. No special arrangements are made on the trains for their treatment. The journey is made, however, in stages. The first night is spent in Osaka, about 12 hours' journey from Hiroshima. The invalids are received there under special arrangements of the Railway Transport Service, have their dressings changed if necessary, and are housed for the night by being billeted in inns and houses in the neighbourhood of the railway station. The next stage is Tokio, where similar arrangements are made for the accommodation of those invalids who are proceeding further. Thus, large parties are passing through at present to the military hospital at Sendai in the north, and they are being billeted in houses near the Shimbashi railway station in Tokio. A house in the neighbourhood is hired as an office for the Railway Transport Staff and as a reception room for those of the invalids who require their dressings to be attended to. Stretcher parties, ambulance rickshaws, and ordinary rickshaws are in attendance at the railway station to receive the patients and carry them to their billets or to the hospital in Tokio. The unloading of the trains is carried out very methodically. All the serious cases are taken out first and carried away on stretchers. Then the ambulance rickshaws are loaded, next the ordinary rickshaws, and lastly all those who are able to walk are paraded on the platform and marched to their billets. No section is unloaded until the previous section has been cleared from the platform. The arrangements are not carried out by medical officers, although one is in attendance. They are apparently in the hands and under the direction of the officers of the Railway Corps, which has no equivalent in our Army. The subordinates who direct the stretcher detachments and rickshaw men are N.C.O.'s of the Army Medical Service.

The invalids travel in hospital clothing and each has one blanket which he takes with him to his billet.

Transport Columns of the Red Cross Society.

In my report of the Red Cross Society of Japan* it was stated that the society had organized three transport columns for carrying sick and wounded in countries where the roads are not suitable for wheeled transport. The first of these columns has now been called out for training at the request of the army

* This is printed in the *The Journal of the Royal Army Medical Corps* for April 1906.

medical authorities and expects to be sent shortly to Manchuria. I was given an opportunity of watching their training by the Red Cross Society's officials. The strength of the column is three chief and 120 ordinary stretcher bearers, under a commandant, with one medical officer and 12 trained sick attendants. There are, however, 150 stretcher bearers under training for this column, the balance being trained as a reserve. The commandant is a retired officer of Gendarmerie, the medical officer a retired army medical officer, and the men old soldiers who have completed their reserve service.

The training is very efficient. It takes place daily at different places, sometimes out in the country, at others on the canals and rivers, where the methods of arranging, loading, and unloading barges, &c., are practised, and generally in the grounds of a school near the headquarters of the Red Cross Society which has been hired for the purpose of training in ordinary stretcher bearer drill.

This drill is almost an exact copy of our stretcher drill with four bearers to each stretcher. The chief difference is that the bearers are not taught to break step, and the slings are not adjusted long enough to give the bearers the full length of the arm in carrying the stretcher. This is apparently done on purpose to maintain greater steadiness of the stretcher, but the strain on the arm must be very considerable.

The stretcher in use for training in stretcher drill is the army stretcher already described by Major McCulloch in the Report of the Medical Arrangements of the Allied Contingents in North China. The bearers are also trained in simple bandaging with the triangular and roller bandage, and were very efficient in this, although their normal employment will be to carry sick and wounded along roads on the line of communication where no suitable arrangements are made for serious cases.

The most important lesson, however, which may be learnt from the training of this transport column is the training in the manufacture of improvised stretchers, litters, &c., out of the material in common use amongst the people of the country where the column is likely to be employed. For this purpose a study has been made of the material commonly found in towns and villages in Korea, China, Formosa, and Manchuria, such as the kind of matting, the straw, the ropes, the clothing, the wood suitable for stretcher poles, &c., the nature and size of the door and window shutters, the household furniture, the lids of travelling trunks, and so on.

Models of sixty different forms of improvised stretchers and litters, made by members of the column out of specimens of the common materials of the countries mentioned, were exhibited. I also saw nine stretcher squads prepare nine different forms of stretcher and litter out of bamboo poles, pieces of stick for cross bars, legs and head rests, and straw sacking and ropes in common use in Japan for the cot, &c. These were all prepared

in ten minutes. At first sight they looked flimsy, but I had myself carried some distance on one of them and found it not only strong but also very comfortable, as if the body of the stretcher were placed on easy springs.

The following list of material, which has been studied and made use of in improvising stretchers and litters, may be interesting :—

Straw sacks in which the country people keep their bedding.
Sugar sacks.
Canvas sacks.
Horse blankets.
Mosquito nets.
Matting.
Chinese trousers and coats.
Soldiers' knapsacks.
Boards of biscuit boxes, &c.
Chinese doors.
Boards used in connection with the silk cocoons.
Chinese trunks.
Japanese tables.
Drawers from chests of drawers, &c.
Baskets of all kinds.
Tops of rice boilers.
Different kinds of shrubs, such as vines.

All the materials enumerated above are adapted for the cots of the stretcher or litter. The poles are almost invariably bamboos, of which there seems to be no lack in Japan and neighbouring countries. The rope of the country is used for binding the various pieces together and giving strength and elasticity to the body of the stretcher.

The above note should be of special importance to India, where the study of the material found in native villages and the means of rapidly converting them into improvised litters would be of value in connection with the training of the recently organized Bearer Companies in that country. I can only add that the bearers of the Red Cross Transport Column, thanks to their training, were most expert "handy" men in using materials of the kind enumerated. A good clasp knife and saw were the only things carried with each squad of four for the purpose, and each member of the squad had his allotted share in the preparation of the litter or stretcher. Thus, while one man cut the bamboo poles to a proper length, another was notching and cutting the cross bars, a third twisting and cutting the ropes, and a fourth preparing the sacking, &c., for the body of the litter.

I would repeat the lesson taught by what I saw :—

(1) The study of common materials in peace.
(2) Making practical use of them in the training of the men, not in one or two exercises, but as a daily work.

Supply of Medical and Surgical Materials.

Major McCulloch has already enumerated the chief articles of medical and surgical equipment of the Japanese army. I tried to obtain information as to the method of supply, but the information was very meagre. I was shown, however, the central depôt of the Army Medical Service in Tokio, and got in touch with the firm that is supplying most of the surgical instruments, &c. All the materials are obtained from private manufacturers, as in our system of supply, and I could not find any large stores for the maintenance of a reserve of materials in peace. Large quantities of packing cases of deal, marked with a red cross and measuring 2 feet by 1 foot by 1 foot, are being made in small shops throughout Tokio, and sent to the A.M.S. Depôt, where the medical and surgical materials are packed and forwarded to the Field Depôts. Bandages are being rolled and first field dressings prepared by the Ladies' Committee of the Red Cross Society, by school girls and others, according to requisitions made on them from time to time by the Army Medical Authorities.

At the Central Depôt, where I was shown specimens of most of the field material, I only saw one or two improvements or additions since the Boxer troubles in 1900–01. The following were specially noted :—

Field Sterilizer for Instruments and Dressings.—This is an enlargement of the sterilizer described by Major McCulloch. The component parts nest into one another, the boxes for the dressings and instruments nesting into the brazier, which is adapted for any kind of fuel such as wood, coal, or charcoal. The whole apparatus is carried in a deal box painted black and marked with the Red Cross. It measures about 2 feet by 1 foot by 1 foot, and the apparatus and box together weigh about 20 lbs. I hope to be able to obtain one of these sterilizers, but at present there are none in the shops except what are ordered by the Army authorities. It is a good practical apparatus, and is constructed according to the German (?) model of Oberstabsarzt Heyse.

Field Stretchers.—This is similar to the stretcher described by Major McCulloch, except in the construction of the traverse. In the old stretcher the traverse and stretcher had no legs, and the traverse could only be fitted to a pole of a fixed diameter. The new traverse, which is the invention of Pharmacist-Major Hata, has folding legs riveted on to the clips attaching the traverse to the poles ; the clips can be fastened to different sizes of poles by means of winged screws ; and the cross bars are in two pieces, which screw into one another when the stretcher is fixed. Each set of traverses can be detached at will from the stretcher, and replaced when broken by spare traverses. The principle is, in fact, very similar to the system of the detachable traverse of a stretcher-dandy which was submitted to the

authorities in India about sixteen years ago, and which is described in the Manual of Ambulance Transport. The weight of a pair of traverses is 7 lbs. They are made of steel, and are painted with galvanized paint. The total weight of the stretcher is 12 lbs.

Each stretcher is provided with a light canvas cover. A semicircular hoop, fixed into slots in the canvas of the stretcher at the head end and strapped to the traverse, supports the head end of the cover. The foot end is simply tied to the foot end of the poles with tapes.

First Field Dressing.—The First Field Dressing is very simple and costs very little. It consists of three small compresses of gauze wrapped in a piece of paper, one safety pin, and a small triangular bandage. These are wrapped in a khaki drill cover loosely stitched, and the package is carried in the left-hand skirt of the coat.

Field Disinfecting Apparatus.—The apparatus that is being constructed for the field is designed by the Principal Pharmacist of the Central Depôt, and is similar in construction to modern steam apparatus with double jacket and pressure gauge. It is fixed on a wheeled carriage. One feature of the apparatus is that it is supplied with an arrangement by which the temperature of the interior of a bundle is recorded by the ringing of an electric bell. A single-cell battery is used for the current and the circuit is completed at a temperature of 100 degs. to 98 degs C. by the expansion of a piece of metal placed inside the bundle. The metal is known as Rose's metal, consisting of lead (30 parts), steel (19), and bismuth (31). The time during which the interior of the bundle is exposed to a temperature of 98 degs. to 100 degs. C. can be correctly watched by means of this electric bell.

Surgical Instruments.—The surgeon's pocket case has been altered so as to occupy less space.

The new case is a little longer, but otherwise similar in size to our pocket case, but the old case, which measures only 6½ by 3½ by 1 inch, and can be easily carried in the pocket or wallet, has a very useful selection of instruments, and is in my opinion the best pocket case I have seen. It can be purchased in Tokio for 16 *yen* or 32*s*. The smaller case costs 9 *yen* or 18*s*. The instruments are aseptic in construction, and are beautifully finished and plated. The difference in price between the Japanese-made instruments and ours is very marked, our pocket case, which is equivalent to the smaller Japanese case, costing 72*s*. 6*d*.

I have made some inquiries about the quality of the Japanese-made instruments, and the opinion in all the hospitals in Tokio is the same, namely, that the cutting instruments are not reliable, but that all the others are equal to the best European-made instruments.

I venture to draw special attention to this supply of surgical instruments and apparatus in Japan, because, in an emergency, apparatus for the fitting out of operating rooms, &c., could be obtained at a very much smaller cost, and much more quickly, from Japan than from England, for such stations as those in North and South China. This is specially the case with regard to operating-room aseptic furniture, of which I found a great need in North China, where dust is blown about everywhere. Such furniture could be obtained from Japan in a month or so, while it would have taken several months to obtain it from England by ordinary requisition.

Field Sanitation and Epidemiology.

Although I have not yet been permitted to proceed to the area of active operations, certain facts have come to my notice that may be of interest. To begin with, not only the Army Medical authorities but also the civil sanitary authorities, such as the Professor of Hygiene at the University at Tokio, are very reticent about the sanitary measures in the field, and I have not been able to obtain any direct information from them on the subject.

As regards water-borne disease, Miss McCaul, who has just returned from a rapid journey to Feng-huang-cheng, informs me that very strict measures are being taken to prevent the men drinking anything but boiled water. The details of this and the efficacy of the measures must be left for more direct observation.

In addition to boiling water, experiments are being tried in Tokio to sterilize water by chemical means. Professor Kitasato, with whom I have conversed on the subject, advocates the addition to the water of slaked lime in the proportion of 1 of lime to 1,000 of water, allowing it to act for ten minutes, and afterwards adding phosphate of soda, which completely removes the taste of the lime. He states that the lime in this proportion destroys enteric, cholera, and dysentery germs. (It may be noted that the dysentery bacillus of Shiga is regarded as the specific cause of the epidemic dysentery of Japan and of armies in the field.)

A local druggist, Ishiji, has brought forward a powder which he calls a secret powder for the purification of water. This powder has been tested by Kitasato and other authorities, and the former tells me that it causes an immediate precipitate, leaving the clarified water free of germs, but that the deposit contains living organisms, although the number is considerably reduced. The powder, he tells me, is composed of alum, permanganate of potash, and lime. It is, therefore, very similar to Lepeyrere's powder, which was described in the Report on the International Conference of Hygiene in 1898. There is,

therefore, nothing specially new to record with regard to measures for purifying water in the field.

As regards epidemic diseases, from what I can gather, very little disease has broken out so far. Some alarm seems to have been caused amongst people accustomed to the English nomenclature by hearing that typhus had broken out at the front. It may be as well to note that the Japanese, who are used to German teaching in medicine, use the term typhus, as the Germans do, as short for "typhus abdominalis" or "typhoid."

The only epidemic of which I obtained any real information was an epidemic of anthrax amongst the horses. The military authorities had just given Professor Kitasato orders to prepare at once sufficient material for the prophylactic inoculation of 120,000 horses. The material prepared is living cultures of anthrax bacillus in bouillon. Two inoculations are made, the first being ·5 gramme of a 24-day culture and the second, after ten days, a similar amount of a 12-day culture, both cultures being free from spore formation. The material is being despatched in hermetically sealed tubes containing material for ten inoculations each.

Anti-tetanus material is also being prepared for the army, and anti-dysenteric serum is being used in the treatment of dysentery. I have not personally seen the details of this treatment yet.

No prophylactic inoculations are being practised in the army with regard to enteric fever. Professor Kitasato has advised them, but the Army Medical authorities refuse to allow them until they are better satisfied as to the results of Wright's prophylactic treatment.

Isolation is practised not only in the case of enteric fever, but also in the case of dysentery. The diseases which the Japanese schedule as infectious and contagious are cholera, enteric, dysentery, diphtheria, plague, small-pox, spotted typhus, and scarlet fever, and all these are rigidly isolated.

I append a free translation of the sanitary regulations for improving the sanitary condition of Feng-huang-cheng, the Head-Quarters of the First Army. I am indebted to Miss McCaul for them. She obtained them at the front, and has very kindly handed them to me, along with two photographs showing the field arrangements for boiling water and for filling water bottles, to which reference has already been made.

There is much in connection with these sanitary arrangements, such as the composition of the sanitary board and the efficiency of its control, about which Miss McCaul was unable to inform me, but the information so far confirms what had been reported in one of the newspapers several months ago, to the effect that the Japanese were making special arrangements for the prevention of epidemics in the field.

Geneva Convention.

Up till now three instances connected with the working of the Geneva Convention have been reported, and I have had opportunities of discussing two of them with legal advisers on questions of International Law. One instance is the case of a train containing combatants escaping under cover of the Red Cross flag. Another instance is the common complaint of belligerents deliberately firing on a medical unit displaying the Red Cross flag.

The third instance connected with questions of the Geneva Convention is entirely new in the history of the working of the Convention. It is the case of the Russians applying to be allowed to send their hospital ship *Mongolia* out of Port Arthur with sick and wounded to some neutral port such as Chefoo or Shanghai. The application was made before the blockade was complete, but did not come forward for decision until the blockade was declared. The situation, therefore, at present is that of a besieged town desiring to send out some of their number by sea to a neutral port. So far as I can gather the Russian application has not been granted.

Addendum on Transport of Sick and Wounded.

In my previous Reports the number and names of the hospital ships were given. Since then large numbers of sick and wounded have also been brought back to the base at Hiroshima by the ordinary transports. The Japanese are, in fact, following the course adopted by us during the South African war.

Appendix.

The Field Regulations for the Sanitation of Feng-huang-cheng.

The following regulations were issued by the Head Sanitary Board on May 26th, 1904 :—

I. The Committee of the Head-Quarters will meet in council with the Sanitary Board of the three Army Divisions.

II. The town of Feng-huang-cheng will be divided into three districts; in each there will be a sanitary establishment under one officer, who will be responsible for the thorough cleaning of the district allotted to his establishment.

III. The members of the Sanitary Board shall visit the districts and decide the plan of sanitary work and what materials are necessary for carrying out the work.

IV. Rules for general cleaning of the town shall be as follows:—

(*a*) The roads shall be repaired, and according to the situation, open or closed gutters shall be constructed.

(*b*) This work shall be completed by the engineers and by Chinese coolies.

(*c*) The waste water of barracks shall be connected with the gutters.

V. Latrines shall be constructed in proportion to the number of inhabitants in each house, and men engaged for the purpose shall keep them clean.

Latrines shall be constructed for the houses of Chinese residents, and also, at convenient places, in the streets.

Refuse shall be burned by the sanitary establishments at convenient places and non-combustible matter shall be taken to places assigned for its deposit.

Stables owned by natives of the town shall be repaired and thoroughly cleaned.

VI. Stones or bricks should be used to form copings for wells, so as to prevent surface water draining into the wells, and for the same purpose, boards or tiles should be placed on the surface around the wells.

VII. Eatables that are sold by Chinese or Japanese must be examined, and any foodstuffs not passed by the authorities must not be sold.

All articles exposed for sale must be kept, by coverings, from flies.

VIII. Encouragement shall be given to Chinese and Japanese to open public bath houses.

Barbers shall be kept under sanitary control.

Endeavours shall be made to prevent the Japanese from living in dirty native houses.

IX. The members of the Army Medical Service shall supervise the carrying out of these regulations, and the natives shall be informed regarding them through the Chinese Government Officials (*Tao-tai*).

Implements needed for carrying out the work shall be obtained from the military stores. Materials shall be purchased locally by the officer in charge of each sanitary establishment, and the amount recovered from the Army Paymasters.

X. The above work shall commence on the 28th May 1904.

XI. Slaughter-houses shall be built, and neither Japanese nor Chinese shall be permitted to slaughter animals except in the places assigned for the purpose.

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(22) Japanese Medical and Surgical Supplies.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, dated 23rd February 1906.

Plates.

Appendices.

The general system of supply of medical and surgical material has already been noted in the report on the Japanese Field Medical Regulations.* The following notes deal with the subject in greater detail, many of the facts having been obtained just before I left Japan, during visits to the Central Medical and Surgical Depôt of the War Office at Tokio, which for the purpose of this report may be called shortly the "Central Depôt."

SOURCES OF SUPPLIES.

Medical and surgical material is obtained from several sources, which may be enumerated as follows:—

(1) Purchase from private firms in Japan.
(2) Purchase from foreign firms in Japan or abroad.
(3) Manufacture of special articles in the Central Depôt.

* Report No. (1) of this volume.

(4) Manufacture by the people in their homes.
(5) Articles prepared by the apothecaries of the various hospitals in the hospital pharmacies.
(6) Material prepared by various volunteer associations and schools throughout the country.
(7) Improvised use of local resources in the field.
(8) Local purchases in the field.

All the articles so obtained,* with the exception of those prepared in the hospital pharmacies and used in the hospital concerned, and those improvised in the field or purchased locally in the field, are forwarded to the Central Depôt, and are packed there for conveyance to the field army.

The packages, the sizes and weights of which are appended, are forwarded to the port of embarkation, where they are warehoused prior to shipment. They are received into a warehouse at the port of disembarkation prior to being sent to the General Supply Depôt in the Field, which has a section for medical and surgical supplies. They are distributed from this section (*a*) to the Medical and Surgical Reserve Depôt Units, and (*b*) to the Line of Communication hospitals and other medical units in the Line of Communication service, according to requisition.

Material is distributed from the Medical and Surgical Reserve Depôts to the mobile field medical units, *i.e.*, Field Hospitals, and Bearer Battalions, according to requisition.

The infantry and other field units have their battalion medical and surgical panniers replenished from the Field Hospitals or Bearer Battalions of their divisions. As a rule, these are replenished once a month.

In this general system of supply, administrative medical officers, assisted by the apothecaries with the various units, endeavour to anticipate events. Being kept fully informed, as according to regulations they must, of the nature and probable results of the military operations, they are able to have supplies brought up in advance, as near to the mobile field units as possible; and endeavour to have this done during the periods of least pressure on the lines of supplies for other purposes. It was the custom in the field to take advantage of every opportunity for getting supplies up to the Medical and Surgical Reserve Depôts; and these depôts would detach sections to take material to points of distribution close to the Field and Stationary Field Hospitals before, during, and immediately after the big battles.

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* Articles are purchased by the Central Depôt Staff, on the authority of the Minister for War, who receives requisitions from the Director-General of the Army Medical Service. The requisitions from the field are forwarded to the latter, but he also anticipates probable requirements.

The nature of the articles obtained from the different sources enumerated above, so far as could be gathered, is as follows:—

(1) *Purchase from Private Firms.*

Drugs were obtained from two large manufacturing chemists, one in Tokio, the other, the Nippon Sei Yaku Kwaisha, in Osaka. The former was at one time a government factory for supply of medicines to the public services, but it was afterwards converted into a private company, whose products, it is said, are inspected from time to time by the Professor of Pharmacy at the University of Tokio. The Osaka factory also belongs to a private company.

Surgical instruments and appliances are obtained from several manufacturing firms, of which there is a considerable number in Tokio, Osaka, and Kioto. With the exception of the cutting instruments, the articles appear to be as well and as strongly made as any manufactured in Europe; and the prices are, in many instances, considerably less.*

Only a proportion of the surgical dressings was obtained from private manufacturers, chiefly absorbent cotton wool. The method of obtaining gauze, ordinary wool, and bandages will be found under the headings below.

(2) *Purchase from Foreign Firms.*

The articles purchased from foreign firms, that is to say, imported as manufactured products from foreign countries, were not numerous.

Amongst drugs, creosote was the chief foreign importation. This product is not manufactured, apparently, in Japan, although on several occasions complaints were heard of the expense incurred in purchasing it from foreign firms.

Amongst surgical material the chief manufactured imports are rubber and gum elastic catheters. For some reason or other, probably climatic, these are not manufactured in Japan.

Some special appliances, such as microscopes, electric coils, and Roentgen-ray apparatus, articles for laboratory use, and so on, supplied to reserve hospitals in Japan, appear to have been obtained from foreign countries; but many important appliances are now being manufactured in Japan itself, and the number of such that come from abroad is gradually becoming less.

(3) *Manufacture of Special Articles in the Central Depôt.*

The Central Depôt has organised a manufacturing department, which appears to be gradually growing and becoming more important. During the war, however, the articles

* An illustrated price list, with translation of prices into English, is being prepared for the use of the Army Medical Department.

manufactured there were comparatively few in respect to variety, and consisted of the tabloids and soloids, the hypodermic injections, the pills and ointments used in the field, and contained in the field panniers.

The impregnation of dressing material with corrosive sublimate and the preparation of many of the first field dressings were also carried out at the Central Depôt. It may be noted here that only the dressing material of the first field dressing and of the regimental units and bearer battalion panniers is as a rule impregnated with an antiseptic (corrosive sublimate), although a certain quantity of the Field Hospital dressing material is also so impregnated. All impregnated dressings are coloured pink with anilin scarlet, which is found more suitable than fuchsin or other colouring materials. The latter are said to precipitate the antiseptic, and also to lose colour.

A list of the various articles prepared in the Central Depôt, with the quantities supplied during the war, is appended. Specimens of each have already been handed in to the branch of the Medical Department of the War Office that deals with medical and surgical supplies.

In the preparation of these articles the bases, such as the alkaloids, salts, &c., were obtained in the usual manner from private or foreign firms. It was only the process of making them into tabloids, pills, &c., that was carried on at the Central Depôt.

The work is under the supervision of the Senior Apothecary who is in charge of the Depôt. He has twelve other apothecaries, who have officers' rank, under him, and an establishment of eighty subordinate personnel, of whom forty are women, for the skilled labour required in making the preparations.*

Pill and tabloid machines are used, capable of turning out more than 2,500,000 pills and 10,000 tabloids daily. The creosote pills were used as a prophylactic, and were issued in tin boxes of ninety pills each. Each soldier received one of these boxes monthly, and he was obliged to take one pill three times daily.

The hypodermic injection material is issued in hermetically sealed glass capsules, each capsule containing one injection. Most of the work of preparing and filling the capsules is done by the women, and the apothecaries of the Depôt have designed special appliances for doing this rapidly and aseptically.

(4) *Manufacture by the People in their Homes.*

During the war the price of surgical material, such as gauze, was raised to an exorbitant figure by the private manufacturers, and, in consequence of this, the Minister for War communicated

* About 135 others are employed in the Central Depôt in connection with the work of packing and forwarding of supplies, office work and charge of articles, purchase and examination of articles, and so on.

with the Minister for Agriculture and Commerce, and obtained his co-operation in getting gauze manufactured by the people in their homes. The crude cotton from which the gauze is woven is imported from China and India, and there was no lack of this material throughout the country. The Minister for Agriculture and Commerce wrote to the prefects of the various provinces, and, through them, the people were appealed to to make gauze in their own homes by means of hand looms. The articles, when finished, were purchased by the Government direct from the people all over the country at economic rates. Unlimited supplies were obtained in this way, and forwarded through the provincial authorities to the Central Depôt. The quality was not very uniform, but it was sufficiently satisfactory for the purpose. The gauze, as it came in, was sent to various bleaching establishments in Tokio to be bleached, and was afterwards sterilized or impregnated with corrosive sublimate, and made into suitable packages at the Central Depôt.

It may be mentioned that, before appeal was made to the people, the cloth manufacturers were asked to make gauze, but refused to undertake the contract on account of the large orders that had to be executed in connection with the clothing of the troops.

(5) *Articles prepared by the Apothecaries of the various Hospitals in the Hospital Pharmacies.*

Pharmaceutical preparations of vegetable products, such as tinctures, decoctions, infusions, essences, and so on, were made by the military apothecaries in the military (reserve) hospitals in Japan, and on the lines of communication in the field. Some interesting work was done in the latter, where investigations were made into the pharmacological properties of various plants growing in Manchuria. In some cases pharmaceutical preparations were made from these, and issued for use by the medical officers. In fact, the work of the apothecaries was distinctly interesting and admirable. We have nothing like it in our own army, although there is some approach to it in continental armies, more especially those of France, Russia and Spain, where the apothecary is as much a scientific as a pharmaceutical chemist, and probably a graduate in pharmacy of a University.

The Reserve Hospitals in Japan were supplied with such preparations almost entirely from their own pharmacies, and some sent supplies, prepared there, to the Central Depôt in Tokio for the supply of the Field Army.

(6) *Material prepared by various Volunteer Associations and Schools throughout the Country.*

Most, if not all, of the roller and triangular bandages issued during the war, were prepared by the local branches of the Ladies Volunteer Nursing Association, which is affiliated to the Red Cross Society, and by pupils of the various high schools for

girls. All this work was voluntary, and cost the Government nothing. Orders were issued by the Director-General of the Army Medical Service to each group that undertook the work, stating the number of bandages required from each from time to time, and the dates on which they had to reach the Central Depôt. In this way the labour was well distributed, and the various groups could be relied upon to send in their allotted quantities by the date fixed.

A proportion of the First Field Dressings was also obtained in this way; but the chief supply was that of roller and triangular bandages, prepared in accordance with War Office patterns.

(7) *Improvised use of Local Resources in the Field.*

The chief use of local resources in this respect was in connection with the preparation of splints. Thus an admirable series of splints was made out of *kaoliang* stalks, and one Field Hospital (No. IV. of the 5th Division), much of the work of which I observed personally during the battle of Mukden, practically used no other kind of splint. The medical officer in charge of this hospital found the regulation long splints and other wooden splints too narrow and difficult to keep in position, and preferred the splints which his own establishment was able to make out of *kaoliang* stalks to any of the splints supplied to the hospital panniers.* A photograph of these *kaoliang* splints is appended.

Much of the Russian dressing material, such as paper, wool, and tow or oakum, fell into the hands of the Japanese, and was used in their hospitals to supplement their own supplies.

(8) *Local Purchases in the Field.*

The instances of this that came to notice were not numerous, and such purchases were mainly confined to purchases of ordinary cotton wool, large quantities of which are used by the inhabitants of Manchuria for quilting their winter clothing.

Packing and carrying Medical and Surgical Material.

Each officer and man carried a first field dressing in a pocket inside the left skirt of his tunic. (*See* Appendix VII.)

Each bearer squad of the bearer battalion and each junior medical non-commissioned officer (*kango-shu*) carried a surgical

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* The splints carried in the panniers of a Field Hospital are:—
30 Volkmann splints (long splints),
30 pieces, 5″ × 14″, of copper wire netting,
6 back splints for leg and foot,
in addition to the short wooden arm or Gooch splint material carried in the valises of the N.C.O.'s and men of the Medical Service.

haversack, and each senior non-commissioned officer a field surgical companion, with all units, medical or otherwise.*

The valises of the non-commissioned officers and men of the medical service have a compartment at the top, which carries five small pieces of wooden splint material; and each non-commissioned officer with the fighting unit carried an Esmarch's rubber tube tourniquet *en bandoulière* or round his waist.

The field units, bearer battalions, Field Hospitals, Reserve Medical Personnel, Medical and Surgical Reserve Depôts, in fact all mobile medical units, carried material packed in panniers, the number and contents of which have already been submitted as an Appendix to the Report on the Field Medical Regulations.†

The panniers of the Reserve Medical Personnel and Medical and Surgical Reserve Depôts were found very far from sufficient for the carriage of all the material required, and most of the material carried by these units was carried in ordinary packing cases, each case containing a supply of one kind of article only. Thus there would be cases containing only bandages, or cotton wool, or gauze, or creosote pills, and so on.

These packing cases were the cases in which articles were packed in the Central Depôt in Tokio for conveyance to the field. They were ordinary deal cases, with a red cross painted on the outside. Four sizes were used, large, medium, and small, and a special tin-lined case (small) for creosote pills. The sizes were sufficiently light and convenient for easy handling by one person.

The dimensions and weights of the various panniers and packing cases are appended. Five special cases (wooden)‡ have been added to the field equipment for laboratory material, and experiments are being made with the intention of replacing the leather-covered wickerwork panniers of Field Hospitals with wooden boxes of the same dimensions, painted a khaki colour.

The field sterilizers were carried in separate wooden boxes. Special articles, such as bacteriological cabinets, were also carried in separate boxes.

The infantry battalion panniers and the panniers of other non-medical units are made of wood, and are similar to the officers' field boxes for carrying kit.

Two of these panniers, along with the four stretchers of an infantry battalion, are carried on one pack pony, and go with the first line of regimental transport, *i.e.*, they follow immediately in the rear of their battalion.

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* The contents of these are noted in the Appendix to the Report on the Field Medical Regulations (Report No. 1).

† Report No. 1.

‡ These cases are—

A and B for laboratory apparatus
C for re-agents.
D for re-agents and flasks, &c
E for tools.

Miscellaneous Notes on Special Articles forwarded from the Central Depôt.

The quantities of surgical dressings issued from the Central Depôt during the war were as follows :—

Gauze bandages - -	2,650,000	
Triangular bandages -	1,000,000	
Gauze, sterilized -	1,500,000	(pieces of about 3½ ozs. each).
„ sublimated -	1,400,000	„ „
„ absorbent - -	1,500,000	„ „
Cotton wool, absorbent -	62,000,000	(about 136,400 lbs.).
First field dressings -	600,900	

The requisitions for gauze and triangular or roller bandages declined as the war progressed. This was due to the economical use of the material, many hospitals washing, re-sterilizing, and using over again the old dressings. This was one of the special features of the large line of communication and reserve hospitals. A description and plan of the arrangements for this purpose at the large hospital at Dalny, which received most of the wounded from the Third Army during the siege of Port Arthur, were submitted in the report of the medical arrangements of that army* as an example of this economical use of dressing material. As a further example, it may be mentioned that at the Osaka Reserve Hospital no requisitions for fresh material were submitted after December 1904 in consequence of this practice of using old dressings.

Disinfectants formed part of the supplies issued from the Central Depôt. The disinfectants that have been issued consist of quicklime, carbolic acid, cresol and creolin, formalin, and a Japanese patent "disinfector" composed of cresol, camphor oil, resin, soap, and water, and prepared by Professor Shimoya, Professor of Pharmacy at the University of Tokio.

The quicklime was issued in petroleum tins, hermetically sealed. Afterwards, lime quarries were found in Manchuria, and special labourers were sent from Japan to work them and prepare the quicklime locally for issue to the troops.

Sprays for sprinkling formalin were issued from the Central Depôt. They were made in Tokio at a cost of 10 *yen* (21*s.*) each. The type is known as the Yonesawa sprinkler. It can be carried on the shoulder, and has, as a special feature, a bulb-shaped nozzle instead of a rose. The disinfectant is pumped through a small hole in the centre of the nozzle and spreads more effectively than in the old-fashioned rose nozzle. A second nozzle is used for a wider spray. It has a central hole, as in the first nozzle, but the disinfectant is directed against the side of a narrow slit in the nozzle, the wider distribution being caused by impact against this slit.

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* Report No. 12, page 236, *see* diagram to face page 243.

Steam disinfecting apparatus were also issued by the Central Depôt. There were two kinds, the portable, on a wheeled carriage, and the fixed. They were made in Japan. Sixty of the portable and 20 of the fixed type were issued. Very few, however, were seen in Manchuria, even on the Lines of Communication; but all the hospital ships were supplied with an apparatus of the fixed type.

The sterilizers for sterilizing instruments and dressings in the field were made by private manufacturers, according to designs prepared and submitted to them by the military medical authorities. They are modifications of the sterilizer of Oberstabsarzt Heyse. A description is appended.

Some of the divisions in the field had special articles of equipment with their medical units, which, apparently, were not provided through the Central Depôt, but out of funds at the disposal of the divisions themselves.

For example, the 5th Division had a small portable Roentgen-ray apparatus with No. III. Field Hospital; and the 4th Division had microscopes and bacteriological cabinets with all its Field Hospitals. Descriptions of these are appended. Early in the campaign the Medical Officer in charge of No. I. Field Hospital of the 5th Division had improvised a bacteriological equipment for himself; and, no doubt, there were many other instances of such special equipment in the field.

Apparently considerable latitude is allowed in divisions for the purchase of articles required in the divisional hospitals, such as the Reserve Hospitals in Japan. For example, the Senior Medical Officer of the Reserve Hospital in Osaka told me that he had power to purchase drugs, dressings, instruments, and appliances at his own discretion up to 100*l.* at a time, without higher approving authority. Some of the special equipment of the field units of the divisions was apparently obtained in this way. In fact, the Roentgen-ray apparatus of No. III. Field Hospital of the 5th Division was one that had been so obtained by the division at the time of the Boxer Expedition, and held since on charge at the Military Hospital in Hiroshima.

Other articles of special equipment, not noted above or in the Appendices of the Report on the Japanese Field Medical Regulations, are appended to this report.

No mention has been made of hospital furniture or ward utensils. Practically nothing of the kind existed. Many beds were obtained from the Russian hospitals, barracks, and officials' houses along the railway line, and these were used in some of the hospitals.

Bed pans were supplied from the Central Depôt or made locally out of the tin-lined biscuit boxes.

The only bed urinals used were empty meat or other tins.

The bedding consisted of blankets and mattress, and pillow-cases, which form part of the field hospital equipment, and which were stuffed locally with straw.

Photograph of splints made out of *Kaoliang* stalks, and used during and after the battle of Mukden by the Surgeons of No. 4 Field Hospital of the 5th Division, in preference to the regulation splints.

[*To face page* 371.

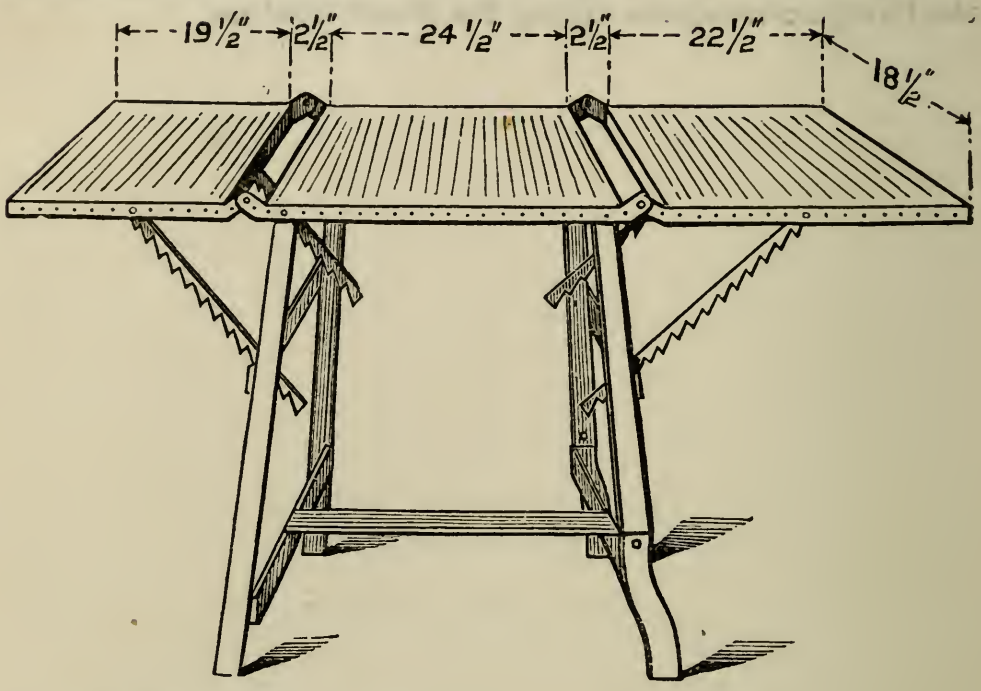
Mosquito netting was in universal use to cover beds or windows.

Operation-room furniture consisted of the irrigators carried in the panniers, the Chinese chests or cupboards in the houses occupied, the field operation tables (*see* Appendix), and an unlimited supply of Chinese earthenware basins, obtained locally.

Other articles required for ward use were also obtained locally or improvised; such, for example, as charcoal braziers for warming the wards in winter.

In conclusion, it may be mentioned that details of many instructive articles of medical and surgical equipment carried in the field have been purposely omitted, as they have already been published in the report on the medical arrangements of the foreign contingents during the Boxer troubles.

Portable Operation Table for Dressing Stations and Field Hospitals.



Construction.—Galvanized iron.

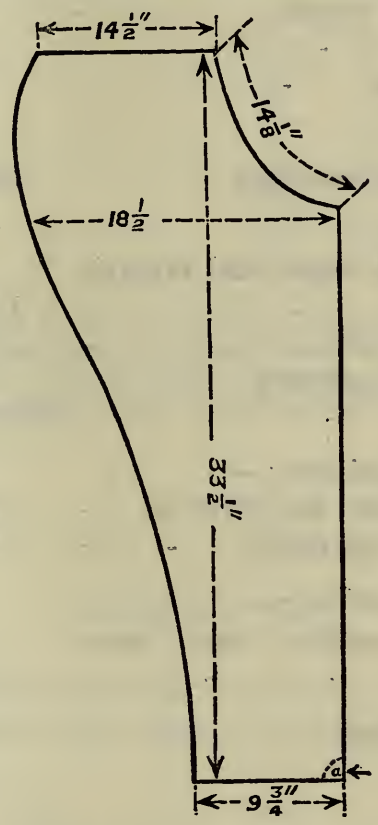
Height.—32 inches.

Weight not noted, but it folds into a light package, and when fixed, is steady and firm.

Plaster of Paris Splint

(for fractures of thigh or leg).

Designed by Dr. Yamagami during the Chinese War and used in the Field in Manchuria.



The above forms a bag of calico, shaped as in the figure, with an opening at the bottom right-hand corner (*a*). The bag is filled with plaster of Paris, and moistened on the outside with water. It is then shaped round the limb and allowed to harden. Holes may be cut when wanted for dressing wounds.

Appendix I.

List of Articles prepared in the Central Medical and Surgical Supply Depôt, Tokio, with the Quantities issued during the War.

Article.	Quantity issued.
A. *Tabloids :—*	
Salicylate of soda	6,000,000 tabloids.
Calomel	2,500,000 „
Antifebrin	1,800,000 „
Santonin	3,700,000 „
Dover's powder	1,200,000 „
Athropine	20,000 „
Morphine (tartarate)	3,700,000 „
Bismuth and opium	500,000 „
Cocaine	800,000 „
Apomorphine	14,000 „
B. *Soloids :—*	
Perchloride of mercury	3,700,000 soloids.
C. *Pills :—*	
Quinine (with sugar and tartaric acid)	1,100,000 pills.
Quinine and iron	500,000 „
Salicylate of mercury	5,000 „
Creosote	660,000,000 „
D. *Hypodermic injections :—*	
Camphor, ether, and olive oil	700,000 capsules.
Morphine, in glycerine	100,000 „
E. *Ointment for frostbite :—*	
Camphor, vaseline, and bees-wax	190,000 lbs.
F. *First field dressings*	600,000 packages.

Appendix II.

Dimensions and approximate Weights, when full, of the various Panniers and Packing Cases for Medical and Surgical Material.

Package.	Dimensions. Length.	Width.	Depth.	Approximate Weight.
	Ins.	Ins.	Ins.	Lbs.
Infantry panniers (2) (larger size) -	27 ×	14 ×	14	50
„ „ „ (smaller size) -	27 ×	13 ×	11	35
Bearer Battalion panniers (16) - -	27 ×	$13\frac{1}{2}$ ×	$16\frac{1}{2}$	90
Field Hospital panniers (12) - - -	$29\frac{1}{4}$ ×	15 ×	$21\frac{1}{4}$	110
Laboratory boxes :—				
A and B - - - -	$29\frac{1}{4}$ ×	$21\frac{1}{2}$ ×	$14\frac{1}{2}$	135
C - - - - -	$28\frac{1}{2}$ ×	17 ×	$11\frac{1}{4}$	70
D - - - -	22 ×	16 ×	8	35
E - - - -	$27\frac{1}{2}$ ×	$11\frac{1}{2}$ ×	$11\frac{1}{2}$	180
Sterilizer box - - - -	21 ×	11 ×	$12\frac{1}{2}$	30
Packing cases, large - - -	28 ×	$16\frac{1}{2}$ ×	15	108
„ „ medium - - -	$23\frac{1}{2}$ ×	$15\frac{1}{4}$ ×	$12\frac{1}{2}$	72
„ „ small - - -	$21\frac{1}{2}$ ×	$14\frac{1}{4}$ ×	9	54
„ „ special - - -	28 ×	$10\frac{1}{2}$ ×	$9\frac{1}{2}$	54

Note.—The panniers of the Reserve Medical Personnel Units and Medical and Surgical Reserve Depôts are similar to the Field Hospital panniers; those of the sick and wounded transport units and non-medical field units are similar to the infantry panniers. There are no cavalry bags or special panniers for mounted troops.

Appendix III.

Microscope.—Contents of Case,—(13 ins. × 8 ins. × 7 ins.).

1 microscope by Leitz, Berlin, with Abbe's substage condenser.

1 drawer with slide.

4 oculars, I., II., III., IV.

4 objectives, 2, 4, 7, and $\frac{1}{12}$ in. oil immersion.

Re-agents.—Contents of Case,—(9 ins. × 7 ins. × 7 ins.).

In racks for three rows of glass stoppered bottles, four in each row.

Fuchsin, methylene blue, gentian violet, alcohol, acetic acid, Canada balsam, terebene oil, glycerine, spirit lamp, empty bottles.

In drawer.—Pincette, forceps, 3 pipettes, 2 glass rods with platinum wire, canula, 2 dissection needles, 1 cover-glass holder,

2 watch glasses, 1 evaporating dish, 1 box blue litmus paper, 1 box filter paper, 1 box red litmus paper, 3 boxes cover-glasses, 3 beakers nested.

Microscope and reagent case are packed in a deal box measuring 26 ins. × 14 ins. × 9 ins. The combinations of oculars and objectives give sixteen different magnifying powers, varying from 35 to 1,500 diameters.

Appendix IV.

Component Parts of the Portable Field Sterilizer.

(1) Iron fire box. Suitable for any fuel such as coal, wood, charcoal, straw, &c. Oblong in shape, top open, bottom a grating.

(2) Oblong nickel-plated vessel, fitting on top of (1) and used for boiling the water.

(3) Wire gauze basket for instruments, to fit into (2).

(4) Lid for (2).

(5) Large oblong nickel-plated vessel, fitting on top of (2). Perforated bottom.

(6) Wire gauze basket for dressings, &c., to fit into (5).

(7) Lid for inside rim of (5).

(8) Lid for outside rim of (5).

(9) Measure, nickel-plated, for measuring the quantities of biborate of soda, which is added to the water in (2).

(10) Five canvas bags for the sterilized dressings.

(11) Two hooks, nicked-plated, for lifting (3) and (6) out of (2) and (5).

In packing, (9), (10), (11) are placed in (3).

(3) nests into (2).
(2) „ „ (1).
(1) „ „ (6).
(6) „ „ (5).

(4), (7), (8) are placed on (2), (5) inside, (5) outside rim.

The articles so nested pack inside a wooden box, 21 ins. × 11 ins. × 12½ ins., painted dark green and marked with a red cross on a white ground.

The sterilizer is carried with the Bearer Battalion, Field Hospitals, and other field medical units, as a separate package.

Appendix V.

Water Analysis Case (13 ins. × 8 ins. × 8 ins.).

Contents.

(*a*) *In bottles in racks*:—

Nessler's solution,
Nitric acid,
Oxalic acid,
Nitrate of silver,
Sulphuric acid,
Barium chloride,
Chromic acid,
Permanganate of potash,
Distilled water,
Empty bottles.

(*b*) *In tray*:—

Evaporating dishes,
3 nests of test tubes,
2 graduated pipettes.
Litmus papers,
Crucible holders,
Test-tube cleaning brush.

Field Hospitals, Reserve Medical Personnel and Line of Communication Medical Units are supplied with this case. The medical service with combatant and other non-medical units does not possess one.

Appendix VI.

Surgeon's Pocket Case.

(Nickel-plated case, in leather cover. The instruments are on a movable rack of caoutchouc. The body and lid can be used for sterilizing solutions.)

——	Old Case.	New Case.
Scissors, straight	1	1
„ curved on flat	1	—
Forceps	2	1
Scalpels (1 probe-pointed, 1 curved blade)	4	2
Probe	1	1
Volkmann's spoon	1	—
Razor	1	—
Needle-holder	1	—
Catheter (male and female)	1	—
Aneurism needle and director	1	—
Artery forceps	2	2
Needles / Sublimate silk	1 box	1 box.

The old pattern case is used in hospitals, &c., and forms part of the equipment carried in the panniers. The new case is carried by medical officers.

Appendix VII.

Japanese First Field Dressing.

Contents.

3 pieces of sublimated gauze folded in paper.
1 safety pin.
1 triangular bandage.

The contents are wrapped in a piece of khaki drill, which is stitched. The package measures 2½ inches wide, 4 inches long, and about 1 inch thick.

It is carried in a pocket inside the left skirt of the tunic, as in the British Army.

Appendix VIII.

Pouch with Carpenter's Tools (for Field Medical Units).

Contents.

Large pincers,
Hammer,
Saw,
Hatchet,
Brad-awl,
Spanner,
Nails.

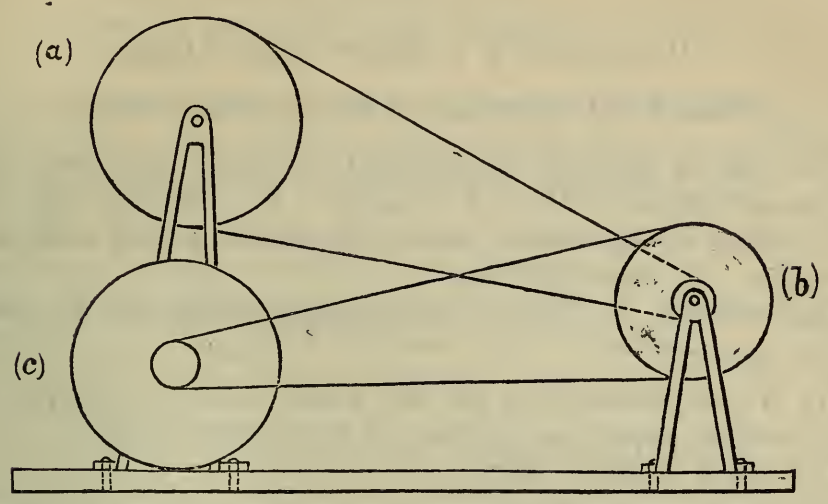
The pouch is made of stout canvas.

Appendix IX.

Description of a Portable Roentgen-Ray Apparatus (with No. III. Field Hospital of 5th Division).

Dynamo.—A small dynamo, driven by fly-wheel with handle. The fly-wheel is 19½ inches in diameter. It is connected with the nave of a smaller wheel, 13 inches in diameter, by a leather belt. The latter is connected with the nave of the dynamo, also by a leather belt

The following diagram shows the arrangement :—



(*a*) Fly wheel with driving handle.
(*b*) Intermediate wheel.
(*c*) Dynamo.

The above takes to pieces for packing.

The rheophores are connected direct with the coil.

The coil is 14 inches long and 7 inches in diameter. The makers are Schiemer and Herrscher. It has a hammer interrupter.

Four tubes are carried, for 4-inch and 6-inch sparks.

The voltage obtained is 25, and the ampères 6. One man can work the dynamo for 1 to 2 minutes at most without being relieved.

A fairly steady 4-inch spark could be obtained in Manchuria, where the atmosphere is dry. In Japan, where there is a moist atmosphere, the results were not satisfactory.

The apparatus packs into four deal cases as follows :—

(1) Dynamo, in case 20 ins. × 15 ins. × 15 ins.
(2) Fly-wheels, in case 22 ins. × 22 ins. × 8 ins.
(3) Coil, &c., in case 32 ins. × 19 ins. × 16½ ins.
(4) Tubes, in case 16 ins. × 18 ins. × 13 ins.

The total weight is about 200 lbs., and the cases may be carried on one pack-horse or in one 1-horse general service cart.

The apparatus was only used about five times in the field, namely, once at Hai-cheng, twice at Liao-yang, once at Hei-kou-tai, and once at Hsiao-tien-tzu (battle of Mukden), when the field hospital was opened at these places.

Appendix X.

Description of a Bacteriological Case.

(With Field Hospitals of the Fourth Division.)

The case is specialy constructed of wood, japanned on the outside and bound with nickel plates. It measures 18½ inches by 11 inches by 8½ inches; and is carried in a solid leather case. It weighs, full, about 20 lbs.

The interior is divided into compartments for the various articles, namely:—

(1) A compartment in the lid, which holds a folding bottle rack, blotting paper, and a piece of waterproof cloth.

The lid is 2 inches deep.

(2) Two trays on the upper part of the body of the box.

These trays are hinged to the back; and the part of the body beneath is exposed by swinging them back.

Each tray measures 2½ inches deep, 8 inches wide, and 9 inches long.

The contents of the trays are as follow:—

A. Left-hand tray:—

1 box with rubber caps,
6 stoppered bottles for staining reagents,
6 stoppered bottles for staining solutions,
1 spirit lamp,
1 magnifying glass, with three lenses,
Cover glasses,
Vaseline,
2 crystal cups,
Empty bottles,
Tin with methylated spirit.

B. Right-hand tray:—

2 wide-mouth bottles.
Slides.
9 Ellenmeyer flasks.
Platinum wire.

The trays are divided into compartments for each article.

(3) *Body of case* divided into compartments for:—

3 bottles for methylated spirit,
1 box containg 12 pipettes, of 1 cubic centimetre capacity, and 1 glass rod,
1 nickel box, containing 4 Petri dishes, 4 dropper bottles for cedar oil and Canada balsam,
A wooden box containg 2 scalpels,
2 spatulae, 2 pincettes, 2 catch forceps, 1 puncture needle, 2 scissors, 1 paint brush, 2 preparation needles,

A wooden box with racks for cover-glasses,
1 wire rack for tubes,
1 set of small scales and weights,
Funnels.

The body of the box is 8 inches wide, 3½ inches deep, and 18 inches long. The measurements of the trays correspond, so that when they are closed together they cover the body.

(4) *The back of the box* forms a compartment that lies behind the body and trays, the latter being hinged to it.

This compartment is 3 inches wide and 6½ inches deep; its length being the length of the case, viz., 18 inches.

It is divided into two equal spaces, each of which holds 14 test tubes in a rack.

In addition to this special case, a long box or basket is carried containing Ellenmeyer flasks, tropœolin, Liebig's extract, peptone, packets of gelatine and agar-agar, and an instrument for holding mice or other small animals.

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(23) Tables of Expenditure of Medical and Surgical Material of the Second Army.

Forwarded with NOTES by Lieut.-Colonel W. G. MACPHERSON C.M.G., M.B., Royal Army Medical Corps, Manchuria, July 1905.

The tables include the issues to regimental units, bearer battalions, field hospitals, and reserve personnel or stationary field hospitals. They do not include hospitals on the lines of communication.

The figures have been obtained, by the permission of the Principal Medical Officer of the Army, from the report submitted to him for the period in question.

The following points may be specially noted :—

1. The uniformity and simplicity of the surgical material used. The paper dressings are apparently material found amongst the Russian supplies.

2. The use of silk ligature material only.

3. The regular issue of creosote pills for prophylactic purposes.

4. The general use of drugs and preparations included in the British pharmacopeia.

5. The comparatively large expenditure of camphor preparations. These have been used mainly for two purposes—for the treatment of collapse in battle, and for the treatment of incipient frost-bite in the winter months.

6. The use of brandy and menthol brandy as the chief stimulants.

7. The issues of red wine were for the treatment specially of cases of beri-beri, and the digitalis was also used for this purpose.

8. The expenditure of calomel, sulphate of magnesia, and bismuth was specially in connection with cases of intestinal catarrh and dysentery.

9. The economical expenditure of surgical material is remarkable, when one considers that the period includes the days immediately succeeding the battle of Nan Shan, and the battles of Te-li-ssu, Ta-shih-chiao, Liao-yang, and the Sha Ho. Material once used is saved, if possible, washed, boiled, and sterilized, and then used again As regards surgical appliances, such as splints, much use is made of improvised splints, such as splints made of *kaoliang* stalks, which resemble rattan cane splints.

Another cause of the apparently small expenditure on surgical material is that the wounded are removed as rapidly as possible to the line of communication hospitals and to Japan.

Table showing the Amounts of the Principal Articles of Medical and Surgical Material supplied to the Second Japanese Army from June to December 1904.

Article.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total for 7 Months.
Bandages:								
Triangular - - No.	2,815	1,440	1,734	3,490	6,695	3,725	2,875	22,774
Roller - - „	13,990	8,500	12,046	25,458	16,980	9,990	7,320	94,284
Starch - - - „	134	100	—	—	—	—	—	234
Cotton cloth - - grms.	6,073	878	574	814	857	479	275	9,950
Sublimate gauze - „	685,400	368,800	116,700	328,210	456,200	94,800	77,600	2,127,710
Absorbent gauze - „	348,500	167,500	88,900	344,900	285,600	58,200	26,900	1,320,500
Absorbent wool - - „	304,500	361,800	152,900	133,650	190,100	131,100	25,940	1,299,990
Cotton wool - - „	92,000	173,200	46,500	339,700	287,000	184,000	34,500	1,156,900
Paper dressings (absorbent paper) - pieces	—	—	—	—	20,000	40,000	—	60,000
1st Field Dressings - „	65	150	80	1,748	—	—	1,104	3,147
Sublimate bags (for burnt straw dressings) - - - „	1,200	—	—	—	—	—	—	1,200
Silk ligatures (sublimate) - - - grms.	1,450	468	511	2,280	248	125	65	5,147
Drainage tube:								
Large - - - feet	28	10	20	29	11	10	33	141
Medium - - „	16	—	—	8	86	50	48	208
Small - - - „	33	—	6	13	30	10	5	97
Gooch splints - - pieces	1,595	759	200	1,336	2,390	560	135	6,975
Thin wooden splints - „	1,500	950	—	20	400	—	—	2,870
Pasteboard splints - „	710	625	5	14	150	20	45	1,569
Carbolic acid - - grms.	293,740	263,750	100,200	154,400	140,300	74,700	35,800	1,062,890
Sublimate Soloids - - No.	21,050	25,450	4,325	6,950	7,905	6,500	—	73,180
Perchloride of Mercury with Chloride of Sodium - - - grms.	106,950	33,750	21,170	15,750	1,350	1,350	—	180,320
Iodoform - - - „	28,228	11,330	4,055	4,498	3,320	3,886	1,158	56,475
Boric acid - - „	74,350	44,350	48,850	41,200	82,550	42,750	39,750	373,800
Boric ointment - - „	154,625	104,175	29,175	43,200	65,100	36,000	44,100	476,375
Vaseline - - - „	65,700	92,250	8,550	9,450	19,800	12,410	8,100	216,260
Plaster of Paris - - „	270,500	670,500	409,050	161,350	472,500	103,500	54,000	2,141,400
Collodium - - - „	19,775	20,786	1,800	1,350	2,250	—	450	46,411
Rubber plaster - - sq. in.	45,480	65,280	3,510	64	3,000	360	—	117,694
Gum plaster - - „	109,310	97,860	46,480	103,036	140,250	61,280	22,940	581,156
Resin plaster - - grains	2,250	900	1,800	450	1,350	900	450	8,100
Paraffin paper - - pieces	2,500	1,500	770	1,700	100	600	40	7,210
Oil paper - - - „	1,043	716	1,071	977	2,029	1,138	910	7,884
Linen - - - grms.	61,000	41,500	2,000	30,500	83,000	5,000	3,000	226,000
Ice bags - - - pieces	53	142	102	330	440	255	50	1,372

Table of Medical and Surgical Supplies of Second Japanese Army—cont.

Article.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total for 7 Months.
Safety pins - - - No.	750	—	790	980	4,190	1,830	845	9,385
Nail brush - - - „	37	10	37	16	29	20	2	151
Skin brush - - - „	18	5	26	9	28	—	7	93
Soap - - - pieces	108	110	140	83	—	113	119	673
Sponge - - - „	20	—	10	—	—	30	13	73
Paraffin, solid, for lamp grms.	1,800	72,450	1,940	—	900	—	1,800	78,890
Wick - - - metres	5	5	—	—	—	—	—	10
Chloroform - - grms.	68,270	90,900	16,200	22,950	9,000	900	1,350	209,570
Cocaine tabloids - - No.	6,350	7,910	5,780	2,070	2,490	500	620	25,720
Camphor oil (for hypodermic injections) - grms.	21,990	9,770	5,480	13,200	16,200	9,200	4,100	79,940
Creosote pills - boxes of 100	24,430	51,301	34,911	46,953	69,320	24,796	10,170	261,881
Starch powder - - grms.	10,500	18,900	34,470	9,650	30,600	26,570	1,350	132,040
Permanganate of Potash „	550	450	550	—	1,016	—	—	2,566
Potash, Chlorate - „	70,775	13,050	22,350	25,850	72,005	39,600	43,200	286,830
Tannic Acid - - „	54,400	5,535	2,600	4,275	3,825	3,600	4,050	78,285
Hydrochloric Acid (dil.) „	9,000	45,475	40,500	36,200	24,300	8,650	5,400	169,525
Tartaric Acid - - „	9,900	10,600	13,200	10,100	2,985	900	900	48,585
Bismuth Subnit. - „	91,250	233,300	141,275	117,050	131,400	48,600	31,050	793,925
Soda, Bicarbonate - „	31,600	70,025	95,340	113,350	77,850	55,000	40,950	484,115
Gastric powder (Rhubarb and Gentian) - „	111,700	173,750	315,575	132,020	326,300	175,925	51,150	1,287,020
Opium powder - - „	753	1,129	1,063	1,305	780	595	117·5	5742·5
Opium, Tincture - „	450	1,550	900	—	—	450	—	3,350
Antifebrin - - - „	5,565	1,890	3,891	1,646	17,399	12,337	9,551	52,279
Antipyrin - - „	150	600	1,645	4,840	12,686	7,618	2,482	30,021
Salicylate of Soda - „	15,850	12,300	57,600	33,905	71,080	62,600	90,900	344,235
Quinine Sulphate - - pills (0·1 grm.)	46,950	52,600	60,400	58,568	86,100	41,800	47,000	393,418
Quinine Hydrochlorate grms.	—	300	—	—	—	—	—	300
Dover's powder - - „	18,550	24,350	82,935	36,290	53,790	33,700	34,550	284,165
Ipecacuanha powder - „	1,884	230	228	200	1,506	2,216	1,912	8,176
Digitalis leaves - - „	234	284	1,256	—	3,826	3,375	1,425	10,400
Apomorphine - - tabloids	—	75	35	—	140	10	20	280
Aq. Laurocerasi - grms.	6,750	7,200	13,950	70,100	45,350	29,950	21,600	194,900
Chloral Hydrate - - „	25,304	9,596	1,963	2,306	1,770	570	252	41,761
Potass. Bromide - „	3,600	1,550	675	12,405	11,250	3,600	450	33,530
Potass. Iodide - - „	2,410	2,415	2,700	4,915	7,412	1,650	1,646	23,148
Potass. Nitrate - - „	450	2,475	900	4,050	5,400	1,800	2,700	17,775
Santonin - - - tabloids	3,090	4,710	2,040	6,900	7,100	3,600	3,500	30,940
Morphine - - „	31,530	20,705	10,455	13,610	11,099	5,400	4,150	96,949
Argent. Nitrate - - grms.	646	158	213	282	2,231	114	789	4,433
Zinc, Sulphate - - „	2,740	404	6,310	3,445	3,450	1,786	1,438	19,573
Argent. and Potass. Nitrate - - - „	70	552	2,970	56	134	84	262	4,128

Table of Medical and Surgical Supplies of Second Japanese Army—cont.

Article.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total for 7 Months.
Atropine - - tabloids	10	75	35	575	—	60	120	875
Zinc, Oxide - - - grms.	3,155	1,800	2,350	1,350	2,255	450	1,650	13,010
Tinct. of Iodine - ,,	7,245	10,150	11,725	2,600	19,550	14,400	13,500	79,170
Sp. Camphor - - ,,	6,300	8,100	7,200	20,475	26,750	112,500	9,070	190,395
Aq. Camphor. c. Ether - ,,	21,990	9,770	5,480	13,200	18,200	9,200	4,100	81,940
Camphor - - - ,,	20,180	19,921	9,775	9,280	9,954	2,784	19,008	90,902
Brandy - - - ,,	57,800	60,200	48,750	23,100	73,300	78,600	51,100	392,850
Menthol and Brandy - ,,	233,770	330,725	132,475	56,625	52,650	19,600	10,350	836,195
Menthol - - - ,,	554	693	326	254	1,351	86	140	3,404
Glycerine - - ,,	14,400	11,700	7,200	14,850	34,650	20,250	16,200	119,250
Olive Oil - - - ,,	66,428	25,610	9,940	3,600	22,950	12,600	8,550	149,678
Balsam of Peru - - ,,	450	2,250	1,175	1,800	450	—	900	7,025
Magnesia Sulph. - - ,,	142,100	580,967	417,300	636,800	615,090	320,850	395,300	3,113,407
Ol. Ricini - - - ,,	7,200	36,900	31,950	20,250	21,600	6,750	1,800	126,450
Calomel - - - ,,	42,000	24,612	30,527	17,338	16,165	2,931	3,054	136,627
Mustard powder - ,,	1,975	4,000	1,875	1,595	1,575	—	900	11,920
Sod. Chloride - - ,,	24,300	20,025	5,850	9,000	6,750	—	4,500	70,425
Sod. Carbonate - - ,,	900	2,000	1,050	1,350	675	900	—	5,975
Distilled Water - - ,,	24,550	38,500	37,609	54,825	102,900	7,150	33,700	299,225
Red Wine - - - ,,	441,700	556,600	288,800	425,500	903,000	275,800	120,400	3,012,800
Alcohol - - - ,,	320,870	317,150	104,850	107,740	115,200	65,700	95,870	1,127,380
Condensed milk - - tins	3,809	5,044	2,320	4,445	8,184	3,496	947	28,245
Sugar (white) - - grms.	35,250	19,800	9,000	18,000	17,200	18,000	50,850	168,100

(24) The Sanitary Instructions issued to the Japanese Army on Mobilization.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B. Royal Army Medical Corps, 29th November 1905.

Appendices.

A. Instructions issued by the Principal Medical Officer of the Field Forces.

B. Instructions issued by the Principal Medical Officer of the 1st Division.

On several occasions, both in Tokio and in the field, application was made for copies of the Sanitary Instructions, if any, issued on the outbreak of hostilities. The application was invariably refused on the ground that the Instructions were secret, or bound up with other matter that was secret. After peace was declared, copies of the Instructions issued by the Director-General of the Medical Service, acting as Principal Medical Officer of the Field Forces, and by the Principal Medical Officer of the 1st Division, afterwards Principal Medical Officer of the Second Army, were given to me on the day of my leaving the Army for Japan. The accompanying papers, marked "A" and "B," are translations of these Instructions, rendered somewhat freely from literal translations made by the Interpreter to the Military Attaché at the British Embassy, Tokio.

It may be said generally that there was evidence in the field that the Instructions were more or less strictly carried out; but this was not so apparent in the earlier stages of the campaign as later, especially after the battle of Mukden, when there was considerable anxiety regarding the health of the troops.

With regard to water, the rule as to boiling was practically always attended to, so far as could be observed. The "boiled-water stations," however, were not conspicuous until the summer

of 1905. They existed, undoubtedly, but not so conspicuously as laid down in paragraph 5 of Instructions "A."

The Instructions regarding clarification of water were not observed in practice with the Second Army, which invariably obtained its supplies from wells containing water that was fairly clear; but during the summer of 1905 the Ishiji filter, of which a description has already been submitted,* came into use generally both with units and at water stations. It took the place of alum clarification and asbestos canvas bucket filters.

At the kitchens, however, the flannel or cloth filters were frequently used, the cloth being tied round the rims of the rice cooking vessels and the water poured in through it.

As regards paragraph 6, *saké* was issued regularly to the troops in the trenches during the winter, so that the instruction relative to spirituous liquors does not seem to have been applicable in this case.

The provisions of paragraph 8 regarding variety of food were well carried out so far as one had an opportunity of judging.

Translations of the "Memorandum" referred to in paragraph 12, and of the Regulations referred to in paragraph 19, have already been submitted.†

With regard to paragraph 18, little appears to have been done during the summer of 1904, but during the summer of 1905 the Chinese houses in which the troops were quartered were made as fly-proof as possible by covering the windows with mosquito netting, of which a very large supply must have been sent into the field. The large Chinese chests, found in the houses, were also cleaned and used as fly-proof cupboards for food.

During both summers each soldier carried on his pack a mosquito-net head-cover, which he used as a protection against either flies or mosquitoes.

With regard to the reference in paragraph 10 to regimental canteens, it may be mentioned that each regiment has a canteen in peace time, but during this campaign each battalion had its canteen, where *saké* and beer, in some cases wines, could be purchased, as well as a variety of Japanese articles of food and delicacies, paper, soap, tooth-powder, &c. The canteens were run by civilian merchants, who were allowed to get their goods brought over from Japan free in the Government transports, but whose prices were regulated by the military authorities.

The Instructions marked "B" show how a divisional principal medical officer amplifies the Instructions of the Principal Medical Officer of the Field Forces and enters into details. They also indicate that each division arranges for its own supplies, at any rate with regard to the articles mentioned in the Instructions.

The large quantity of water mentioned in paragraph 1, as being required daily by a company, is explained by the fact that the company numbers about 220, the number of baggage

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* *See* page 359. † *See* Reports (25) and (26), pages 395 and 403.

animals apportioned to it being about six. The amount works out at about a gallon per head for the men, which included the water used for cooking, and about four gallons for the horses.

APPENDIX A.

Sanitary Instructions issued by the Principal Medical Officer of the Japanese Field Forces on the outbreak of Hostilities.

1. Dysentery, enteric fever, and other epidemic diseases which attack men through water are very prevalent. Therefore you must see that the drinking water is boiled before being used.

If practicable, steps will be taken to have boiled water kept in suitable vessels along the line of march for supplying troops as required.

2. Special placards will be placed at wells supplying drinking water, and sentries will be placed over these wells according to circumstances.

3. Should any case of illness occur which it is suspected has been caused by water from a poisoned well, as, for example, a well into which the enemy may have thrown poison, the well will be sealed up and the water analysed. It is also advantageous, in such a case, to cause the water to be swallowed by small animals, to see whether there are poisonous effects.

4. When it is necessary to use water from a small river or stream, places should be selected where no foul matter enters, and the stream dammed there, so as to accumulate water above the dam for drinking purposes. Horses will be watered below the dam, and washing, &c., will also be carried out below the dam. Placards will be put up to distinguish the different places. In drawing water from rivers, stages or similar contrivances will be constructed to enable water to be drawn from mid-stream. Water must not be drawn from near the banks.

5. To clarify muddy water, casks with the bottoms perforated with small holes will be filled with layers of pebbles, sand, animal charcoal (bone ash), and animal hair or felt, and the water allowed to filter up through the cask. Another method is to fill jars, casks, &c., with the water and add alum, previously dissolved, in the proportion of about 16 grains to the gallon of water (1 *mommé* to every 2 *tō*).

6. Boiled water for drinking purposes will be kept in covered vessels in a conspicuous place at every stage along the Lines of Communication, and drinking cups will be provided.

7. When there is any risk of the troops suffering from frost-bite or sunstroke, the drinking of spirituous liquors will be prohibited. Tea and coffee may be drunk at all times.

8. Care must be taken to see that only cooked food is eaten. When dysentery, cholera, &c., are prevalent, the eating of fruit will be prohibited, as it is apt to cause diarrhœa.

9. Want of variety in food must be avoided as much as possible, and fresh food must be given.

10. The only way to prevent the cooked rice from freezing in very cold weather is to keep the mess tins covered with thick felt.

To prevent the cooked rice from decomposing in hot weather, it is advisable to acidulate it by the addition of 35 grammes (1·23 oz.) of acetic acid to each bushel of rice.

11. Troops must be prohibited from buying articles of food and drink in the towns. Such articles as may be required should be supplied by the regimental field canteens.

12. The troops must be prevented from eating or drinking in excess before embarking on board ship, and no articles of food or drink are to be taken on board without permission.

13. As regards the prevention of sore feet, care will be taken to see that the rules relating to this in the "Health Memoranda for the use of Soldiers in the Field"* are strictly attended to.

14. The hottest months in Korea and Manchuria are July and August, and the coldest January and February. Special care must be taken to prevent sunstroke or frost-bite during these months.

15. In order to prevent frost-bite, or death from cold, care will be taken to see that the troops are supplied with a sufficient quantity of food and clothing, and that they get sound sleep at night. Further, the drinking of spirituous liquors will be prohibited, care will be taken to prevent the inside of the boots becoming wet, wet or torn socks will be changed, and the body and limbs kept in motion.

In pitching camps in snow, the snow will be removed and heaped round the space cleared. The tents will be pitched within the enclosures so formed. Men who sleep on the snow are liable to suffer from frost-bite, or to die from cold.

16. For the prevention of sunstroke care will be taken to see that the general rules of health are observed, that water is supplied in ample quantities, that drinking of spirituous liquors is prohibited, and that, if circumstances permit, the weight carried by the soldier is reduced, marching during the heat of the day avoided, and the ranks opened out. The clothing over the chest should be loosened and open, rests allowed whenever suitable

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* *See* Report (26), page 403.

places are reached, halts made immediately the men are exhausted and many are falling out, and the men never kept standing in the ranks, for long periods, at places of assembly, awaiting orders, &c. A loose curtain* will be attached to the cap during the march.

17. The climate of Manchuria and Korea is liable to sudden changes of temperature, from intense heat during the day to cold at night. Every soldier will, therefore, wear a cholera belt at all times during the summer.

Wet clothes will be changed as soon as possible, and underclothing washed as often as possible. Great-coats, when worn during rain or snow, will be dried quickly whenever the men reach their quarters.

18. In selecting halting places, see that thorough investigations are first made into the prevalence, or otherwise, of infectious disease in the locality. Suspected places must be avoided as far as possible.

As very few of the houses in Korea are suitable for cantoning troops, arrangements will be made in advance for the possible necessity of quartering troops in camps under canvas, or in hutments. In selecting sites for such camps, elevated, dry and clean ground will be chosen with easy access to water.

19. Many cases of malarial fever occur in China and Korea, and care must therefore be taken at the commencement of summer to protect the troops from mosquitoes as far as possible. Flies also abound in these countries, and, as they are suspected of being the medium for the conveyance of the germs of infectious disease, proper steps must be taken to prevent their access to articles of food or drink. The men must also be made to carry with them insect powder as a protection against bugs, &c.

20. With regard to the prevention of epidemics and disinfection, the Regulations providing for this will be followed, and proper and adequate measures will be taken to carry out their provisions and achieve their object according to actual requirements of the moment. The troops must be made to realise the fact that epidemics will not spread widely but will cease altogether if proper measures are carried out strictly and thoroughly from the moment the disease first makes its appearance.

21. As there is no chance of obtaining medical and surgical supplies locally, a sufficient quantity of these supplies must be provided for and spare equipment and articles taken into the field. For example, bamboos and wooden poles are not likely to be procurable for stretchers.

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* About 9 inches by 9 inches, made of drill, with two longitudinal slits, dividing it into three equal portions. It is hooked on to the back of the cap.

APPENDIX B.

Sanitary Instructions issued by the Principal Medical Officer of the 1st Division on Mobilisation.

1. The following materials should be provided for clarifying and sterilising water :—

(a) *Clarification.*

Alum.—It is recommended that each company should carry 60 lbs. of alum for clarifying water (cost about 4½ *yen*). This is sufficient for 10 days, taking the quantity of water required by a company daily, including drinking water for horses, to be about 260 gallons (6 *koku* 5 *tō*). It will be found convenient for each company to carry the alum in 15 rectangular tins containing 4 lbs. (500 *mommé*) each. These company tins of alum had best be carried all together with the battalion baggage.

Cloth Filters.—When water has been clarified by alum it is advisable to filter it through cloth filters. The number of these must be equal to the number of sets of cooking utensils carried by the unit. They are manufactured by Genjiru Uesugi, 3 Roppongi-Machi, Azabu-Ku, Tokio, and are constructed as follows :—

Five or six sheets of flannel are placed one over the other, and the upper and lower surfaces of the whole covered with hemp cloth. Hemp ropes are run along the longer margins to bind the filter round the rim of the vessel into which the water is to be filtered (cost about 8½ *yen* each).

Portable Filters.—If circumstances permit, it would be better for each soldier to carry a portable filter, or even for every five soldiers to have one between them. The "Portable Filter" is manufactured by Saburo Mizukami, 29 Kami-roku-ban-cho, Koji-machi-Ku, Tokio, and is constructed and used as follows :—

A canvas watering bag is provided with two false bottoms of wire gauze, and has a piece of tubing with stop cock let in at the bottom. The lower false bottom is fixed, the upper is movable and rests on a rim placed about one-third of the depth of the bag from the bottom.

Eighty grammes (2·8 oz.) of asbestos wrapped in a piece of calico, completes the filter.

To use the filter, the upper piece of wire gauze is removed, and the bag filled one-third full with water. The asbestos is then inserted and stirred up with the water. The upper piece of wire gauze is then replaced and the canvas bag filled full. The water can then be run out filtered through the tubing, and the bag filled over again. The asbestos should be squeezed dry after use, and occasionally cleaned and boiled. The cost of the set of filtering appliances is 45 *sen* (about 1*s.*) a set.

(b) *Sterilization.*

Chloride of Lime.—This is used for destroying germs in water suspected of containing the germs of infectious disease. It is recommended that the amount carried should be 3 lbs. (360 *mommé*) per company, at a cost of about 44 *sen* (about 11*d.*). This is the quantity required for the same period and the same quantity of water as that noted in connection with the supply of alum. It must be carried in closely sealed tins.

In using it, mix with a small quantity of water and pour the mixture into the whole of the water to be disinfected. Then stir well, and afterwards allow the water to remain still for over one hour.

2. For preventing putrification in rice, acetic acid will be carried. It is recommended that 17½ lbs. (1 *kwam* 120 *mommé*), costing 2·736 *yen* (about 6*s.*), be carried per company. This is sufficient for 30 days, and will be used in the proportion of 35 *grammes* (3 oz.) to one bushel (2 *tō*) of rice.

3. Cloth covers for mess tins and water bottles are recommended. The covers should be made of thick cloth or similar material, but as they are not likely to be required at present, they must be sent up later on.

4. Cholera belts should be made of a good quality of flannel.

5. Insect powder is recommended to be carried in convenient quantities by each company. The powder of the *Chrysanthemum Roseum* (*Web et Mohr*) is recommended.

6. The ointment for the prevention of frost-bite (*Seki-sho-nan-ko*) is composed of camphor, white wax, and vaseline. A paste of white wax and linseed oil may be used instead (?). It is recommended that each man should carry on his person about

50 *grammes* (1·76 oz.) of the ointment. The cost is about 7 *sen* per man, or 15·51 *yen* (about 1*l.* 11*s.*) per company. In consequence of the present climatic conditions, it will be better to have the supply of ointment sent up later on.

7. For detecting infectious disease, it is advisable that each field hospital should carry a microscope and some reagents.

8. Vessels, such as casks, barrels, &c., for storing cold water, and spare lengths of bamboo and poles for stretchers, should be kept handy, as these articles are not likely to be obtained locally in the field.

9. Medical units will find it advisable to requisition for and keep ready a sufficient number of vehicles to meet any contingency that may arise.

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(25) Regulations for Prevention of Epidemic Disease in the Japanese Army: (1) General Regulations; (2) Detailed Instructions.

REPORT by Lieut.-Colonel W. G. MACPHERSON, M.B., C.M.G., Royal Army Medical Corps, Manchuria, 20th May 1905.

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(1) *General Regulations regarding the Prevention of Epidemic (Infectious) Disease in the Army.*

(*Preliminary Note.*—These regulations were first issued in 1889. They were revised in 1897 and again in 1900. They consist of seventeen paragraphs of which the following is a translation or resumé. Copies must be in the possession of each medical unit in the field, including the Sick and Wounded Transport Department, the Reserve Medical and Surgical Store Depôts, and the Hospital Trains and Hospital Ships. The number of copies in the possession of each unit is stated in the preliminary note of the Detailed Instructions that follow.)

Paragraphs:—

1. This paragraph states the application of the regulations to military service.

2. Officers and all others concerned are responsible for notifying to their superior officers the presence of infectious disease in the locality where they happen to be stationed.

3. On the occurrence of any infectious disease in a unit or locality, the officer commanding will report the fact to the G.O.C. of his division, who will then consult with his P.M.O. as to the steps which should be taken to prevent its spread. In the event of the disease spreading, he will report the facts to the Minister of War.

4. If an outbreak of infectious disease is anticipated or already exists in the locality or in camps, the officer commanding the station will appoint a committee,* who will undertake the whole matter of preventing its spread.

5. The medical officers in charge of regimental units must make full reports to their commanding officers on all matters connected with the existence of infectious disease amongst the inhabitants of the locality. The commanding officer must then consult with the civil governor of the district, or, if the locality

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* *See* paragraph 10 of Detailed Instructions.

is a municipal district, with the mayor of the town, regarding the measures to be taken to protect the troops.

6. The medical officer of a unit must send returns to the P.M.O. of his division of any cases of infectious disease occurring in his unit.

7. When recruits or reserves join a unit from an infected village, or come through an infected village on their way to join a unit, or if infectious disease is present in the unit at the time they are about to join it, the G.O.C. of the division must apply to the Minister of War for instructions.

8. The medical officer of a unit must examine all recruits or reserves on their arrival, and any who show signs of sickness of any kind must be isolated, under observation, for a few days.

9. Should the medical officer of a unit consider it necessary to isolate men who are apparently in good health, he must refer the matter to his commanding officer, who will report the facts. to the G.O.C. (*See* paragraph 16 of Detailed Instructions.) The latter, after consultation with his P.M.O., will apply to the War Office for instructions.

10. If the senior medical officer of a military hospital desires to open a special section for the treatment of infectious diseases, he will apply to the G.O.C. of the division, who, after consultation with his P.M.O., will refer the matter to the War Office for instructions.

11. If there is a civil infectious diseases hospital in the locality, the G.O.C. of the division has the right to apply to the civil governor or mayor of the town, as the case may be, for the use of one half of it for the troops in the event of an outbreak of disease amongst them; and, similarly, if there is a military infectious diseases hospital, the governor or mayor has the right to apply for the use of one half of it for the civil population in the event of an outbreak of disease among them. Both sides must enter into a contract to bear their own expenses.

12. A non-commissioned officer must be appointed to prevent soldiers entering any area that is put out of bounds on account of infectious disease. Healthy men, who may be isolated as a precautionary measure, may not enter such areas, and the clothing of such men must in any case be disinfected.

13. A special place must be set apart for burning or burying infectious discharges. If this place is outside the military area, the civil authorities must be consulted with regard to its selection.

14. Non-commissioned officers and civil employés, who are permitted to reside out of barracks, must keep away from their duties until the commanding officer gives them permission to return, should any infectious disease occur in the place where they reside, or amongst their families. In the event of such occurring, their clothing, &c. will be disinfected as laid down in regulations.

15. In the case of units who are quartered at a distance from the head-quarters of the division, the commanding officer will use his own discretion, pending the result of the application to the War Office under paragraphs 9 and 10.

16. These regulations are applicable, if necessary, to other diseases than the eight diseases scheduled as infectious diseases.

(*Note.*—The eight scheduled infectious diseases are Cholera, Smallpox, Plague, Scarlet Fever, Diphtheria, Enteric Fever, Typhus Fever and Dysentery.)

17. These regulations are also applicable to Hokkaido, Formosa and other dependencies. In these places the officer commanding in chief will act as the G.O.C. of a division, and the civil governor as the Minister of War for the purpose of paragraphs 9 and 10.

(2) *Detailed Instructions for the Prevention of Epidemic (Infectious) Disease in the Army.*

(*Preliminary Note.*—These instructions were first issued in 1889. They were revised in 1897. They consist of 27 paragraphs with sub-paragraphs. Copies must be in the possession of all the medical units in the field. Bearer Battalions, Field Hospitals, Hospital Trains, and Hospital Ships must have two copies each, the Reserve Personnel three copies, and the other units one copy each. A copy must also be kept in each P.M.O.'s office, except in the office of the P.M.O. of a division in the field, where the copy is kept in the office of the chief adjutant. Copies are also kept with each unit commander.)

The paragraphs are to the following effect :—

1. This paragraph applies the instructions to barracks and areas occupied by troops.

2. Whenever a case of infectious disease occurs amongst the troops of a unit, the medical officer of the unit must report the fact to the officer commanding and take immediate steps to deal with it.

3. The P.M.O. of a division, when he is consulted under paragraph 3 of the General Regulations, will consider the best measures for carrying out disinfection according to a uniform method and standard, in consultation with the other medical officers in the garrison of the head-quarters of the division. In the case of a unit that is quartered at a distance from the head-quarter station, the senior medical officer there will report all the steps he takes to the P.M.O. of the division.

4. The existence of infectious disease in any unit must be notified to all other units, by the P.M.O. to the units head-quarter station, and by the senior medical officer of the station in other localities.

5. When smallpox occurs in a unit, the soldiers of the unit will be vaccinated and everything possible done to cleanse and

disinfect the place where it occurred. Special latrines are to be constructed, and no one outside the unit allowed to enter the barracks affected.

6. During the course of an epidemic amongst the troops, the P.M.O. of the division must report periodically to the civil authority of the locality the number of cases, deaths, and recoveries. In like manner, when an epidemic occurs amongst the civil population, the P.M.O. will obtain, on demand, information as to the number of cases and the localities where they occur. In stations at a distance from head-quarters, these duties will be carried out by the senior medical officer of the station, or the officer commanding a unit.

7. The report required in the foregoing paragraph will be submitted daily or weekly according to the extent of the epidemic.

8. The P.M.O. of a division will submit duplicate reports to the Army Medical Department of the War Office.

9. When an outbreak of infectious disease in any unit has ceased, the senior medical officer of the unit will submit a full report to the P.M.O. of the division, noting the statistics of the outbreak and the measures taken to prevent its spread, &c. The P.M.O. of the division will submit a similar report to the War Office, embodying the facts connected with all the units affected.

10. The committee that will be formed in accordance with the requirements of paragraph 4 of the General Regulations will consist of the following as a minimum:—

(*a*) Two senior medical officers.
(*b*) One regimental officer.
(*c*) One intendance officer may be added.

11. The site of an infectious diseases hospital must be as far away as possible from rivers or sources of water supply, but conveniently placed for transport and supplies. The P.M.O. should consult with the civil governor or mayor of a town before deciding on a site.

12. In establishing an infectious diseases hospital, the following four classes of wards must be provided:—

(*a*) for suspected cases,
(*b*) for light cases,
(*c*) for severe cases,
(*d*) for convalescents.

There must also be accommodation for the following:—

Office, dispensary, sick attendants' room, disinfecting room, bath room, mortuary, and kitchen.

In the event of a civil hospital being used or of the number of cases being few, a certain amount of discretion is allowed in modifying the above accommodation.

13. No one may enter an infectious diseases hospital without the permission of the senior medical officer. Relatives may visit patients at fixed times, and under the instructions of the medical officer.

14. Medical officers and sick attendants placed in charge of cases of infectious disease will remain in charge of them throughout the whole period of the epidemic.

15. Special clothing will be provided for them.

16. Healthy persons isolated under the provisions of paragraph 9 of the General Regulations will remain isolated for at least six days, counting from the time when they left the train, room, ship, or other infected place. This period may be increased at the discretion of the medical officer.

17. The following rules will be adhered to in cleansing localities where infectious diseases have occurred:—

(*a*) The premises will be disinfected, then cleaned and swept, and all dust, &c. burned.
(*b*) All drains and gutters will be thoroughly cleaned out, and, if necessary, filled in, and fresh ones made.
(*c*) Latrines and pools will be disinfected and cleaned.
(*d*) All refuse will be collected into a place specially set apart for the purpose.
(*e*) Wells will be cleaned out.
(*f*) Fresh latrines will be provided if necessary.

18. The following are the authorized methods of disinfection:—

(*a*) Burning.
(*b*) Disinfection by steam.
(*c*) Disinfection by boiling.
(*d*) Disinfection by chemical agents.

19. The following will be disinfected by burning:—

(*a*) Corpses.
(*b*) Clothing worn during illness.
(*c*) Bedding, linen and cheap articles that cannot be disinfected by other means.
(*d*) All discharges.

20. The following articles may be disinfected by steam:—

(*a*) Clothing, bedding, hangings curtains, cushions, &c.
(*b*) China, glass, pottery, and wooden and metal articles.

21. In disinfecting by steam the following precautions must be observed:—

(*a*) Leather goods, lacquered work, paintings, furs, tortoise-shell and horn goods must not be disinfected by steam or by boiling.

(*b*) Clothing must be examined to see that it contains no explosives before being disinfected.

(*c*) Articles disinfected by steam must remain 30 minutes in the apparatus, at a temperature of 100° C.

22. Disinfection by boiling will be by exposure to a temperature of 100° C. for 30 minutes. The following articles may be disinfected by this method :—

(*a*) Food utensils, drinking utensils, coins, surgical instruments, clothing, pillow-cases, &c.

(*b*) All other articles such as are not damaged by boiling.

23. The following chemical disinfectants are authorized :—

(*a*) Carbolic acid, 20 per cent. solution, with 1 per cent. hydrochloric acid added.

(*b*) Mercuric chloride, 1 in 1,000 solution.

(*c*) Chloride of lime, 20 per cent. solution (?).

(*d*) Caustic lime, 10 per cent. solution (?).

24. These agents will be used as follows :—

(*a*) They will be used hot.

(*b*) When used with discharges they must be well mixed with the discharges.

(*c*) Carbolic acid will be used for washing articles in the room and for instruments.

(*d*) When the hands and body are washed with carbolic acid they should afterwards be washed with plain water.

(*e*) When carbolic acid is used for instruments or clothing, the solution must be used without the addition of hydrochloric acid. The articles must be left in the solution for 12 hours and then rinsed out in clean water.

(*f*) Mercuric chloride solution may be used for the hands, doors, glass, or wooden articles. It must not be used for coins or other metallic article, or for discharges. Pillow-cases, food, or drinking utensils or any article likely to cause food or drink to be affected by the agent should not be disinfected by mercuric chloride.

(*g*) Chloride of lime and caustic lime may be used for disinfecting discharges, drains, gutters, latrines, the surface of the soil, and the basement of, or ground under houses.

In disinfecting discharges the proportion used should be $\frac{1}{50}$th of the bulk of the discharge in the case of chloride of lime, and $\frac{1}{25}$th in the case of caustic lime; and the agents must be thoroughly mixed with the discharge.

For latrines and gutters the proportion used should be the same, in proportion to their contents.

In disinfecting soil the lime will be sprinkled over the surface.

25. The following must invariably be disinfected in connection with cases of infectious diseases:—

(*a*) *The Patient.*—The finger nails will be cut and the fingers disinfected with mercuric chloride solution. The whole body will be washed with warm mercuric chloride solution, and then a hot bath will be given and the body soaped all over. Warm cloths may be used instead of the bath for soaping the body. After the bath, clean clothing will be put on.

(*b*) *Corpses.*—The body and clothing will be sprinkled all over with mercuric chloride solution or carbolic solution, and then covered with a sheet steeped in one or other of these solutions.

(*c*) *Sick Attendants* and others in contact with the patients. Their finger nails and hands will be disinfected every time they come in contact with the patient. If necessary, their clothing will also be disinfected and a bath taken. The clothing must be completely changed if they go outside or mix with other people.

(*d*) Any vehicle used in the conveyance of a patient must be disinfected each time it is used. Mercuric chloride or carbolic acid solutions will be employed for this purpose.

(*e*) *Latrines, Baths, Washing-places, Drains, and Gutters.* Bed-pans and urinals must always contain some chloride of lime or caustic lime and the discharges mixed with them. They may be cleansed with mercuric chloride or carbolic acid solutions.

Baths will be disinfected by filling them with $\frac{1}{1000}$ mercuric chloride solution and allowing it to drain out slowly.

Chloride of lime or caustic lime will be used on refuse heaps and the heap burnt if necessary.

Lime will also be used in drains or other channels.

(*f*) *Clothing, Bedding, and other Articles from the Sick Room.*—These will be dealt with under paragraph 19. Articles noted under paragraph 21 may be washed with soap and cleansed with carbolic acid. Articles not capable of being disinfected, without damage, by the processes mentioned, may be exposed to the sun.

(*g*) *The Room occupied by the Patient.*—Every portion must be thoroughly washed with mercuric chloride or carbolic acid solution, and afterwards dried with hot sand and well aired.

(*h*) *Railway Carriages.*—These will be treated in the same way as rooms. The discharges of patients in a train will be disposed of according to discretion. Train latrines will be disinfected with carbolic acid.

(*i*) *Ships* will be disinfected in the same way as rooms and trains, or by using steam from the engines. The water compartments will be disinfected by filling them with $\frac{1}{200}$ solution of chloride of lime for 12 hours and then thoroughly cleansing them.

26. All corpses must be burned if possible.

27. Cremation will be carried out in the local crematorium. Should there be no crematorium, the officer commanding the unit will consult the civil authorities, and they will do the best they can to carry out cremation.

(26) Japanese Field Service Health Memoranda.

PAMPHLET issued to Japanese Soldiers on Mobilization, translated and forwarded by Lieut.-Colonel W. G. MACPHERSON M.B., C.M.G., Royal Army Medical Corps, dated Manchuria, April 1905.

Health Memoranda for the Use of Soldiers in Time of War.

Introduction.

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, and secondly, that for which the soldier himself is responsible, and each must help the other.

These memoranda 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.

Contents.

I.—*Instructions regarding the Care of the Body.*

(1) Even trivial complaints, such as whitlow, boils, toothache, &c., reduce the fighting power of an army. These occur most frequently from the soldier being too lazy to cleanse himself. He must, therefore, be careful to cleanse every part of his body, even in the field.

(2) As hot baths cannot always be taken during war, the soldier must keep himself clean by rubbing the dirt off his body by means of a wet towel, especially from the armpits, inside of the thighs and private parts.

(3) The hair must be kept closely cut and the head frequently washed in order to prevent lice and dandriff.

(4) The mouth must be washed out every morning, and the teeth cleaned with a tooth brush and tooth powder, in order to prevent decay of the teeth.

(5) The hands are especially liable to become dirty, and whitlows, &c., are very apt to occur. Also the germs of disease are apt to enter the body from the dirt on the hands through cuts, or by fingering food, &c., when the hands are dirty. It is necessary, therefore, to wash the hands frequently with soap and water.

(6) The feet, like the hands, are very apt to be dirty. Sweat condenses within the boots, decomposes and smells badly and causes inflammation and blistering. The feet must, therefore, be cleaned whenever quarters are reached for the night. Mounted men must, for the same reasons, clean the inside of the thighs and the seat in order to prevent blistering from the saddle.

(7) Dirt under the nails 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 nail is apt to occur.

(8) During cold weather, cracks and chilblains occur on the hands and feet, and they are very apt to be the means by which disease enters the body. The ointment that is issued for the purpose must therefore be rubbed over them after the hands and feet have been washed.

II.—*Instructions regarding Clothing.*

(1) The chief purpose of clothing is to prevent cold; but if too much clothing is worn, sweating occurs, and this is bad. The soldier should therefore wear, during work, that amount of clothing only which will neither cause sweating nor the sensation of cold. In the case, however, of the soldier resting for any length of time, or being on sentry or outpost duty he must wear much more clothing.

(2) The principal article of clothing for preventing cold is the overcoat. It must, therefore, be very carefully looked after, as it is also the only article that the soldier may have for covering himself when he is sleeping; and, if it gets wet in rain or snow, it must be dried as quickly as possible whenever quarters are reached.

(3) Shirts, drawers, and socks must be washed thoroughly. It is not enough to keep the body only free from dirt, as the

underclothing accumulates dirt from the body and the wearing of clean underclothing in itself keeps the body clean.

(4) Tears in the drawers must be mended with an even stitch. Otherwise the stitching is apt to cause blistering, especially in the case of mounted men.

(5) The wearing of a flannel belt for the prevention of chill in the bowels is compulsory.

(6) Socks must be changed frequently. Wet socks and socks that have holes in them and are worn out, cause blisters and frost-bite. If the socks are too worn out to mend and the weather too cold to go without them, then any cloth or flannel material that the soldier may have with him should be torn into bandages and wound round the feet.

(7) The boots must be kept soft. Blisters occur not only from badly-fitting boots but also from hardness of the leather. The boots are kept soft by rubbing grease into the leather.

(8) In order to soften the leather of the military boot the boot should be first soaked in water or brushed with a wet brush. When the leather has become soft from absorbed water, it should be dried with a cloth and afterwards smeared with grease and then placed in the sun or near a fire.

(9) The military boot is to the infantryman what the horse is to the cavalryman. It must therefore be kept as carefully as the horse.

(10) When boots are out of repair, the feet are apt to get injured. Great care must therefore be taken to keep the boots in repair, and prevent damage to them. For example, if wet boots are placed before a fire, they will be damaged. To dry boots without damage, put dried straw or some woollen material inside them, and then hold them before the fire, but at some distance from it.

(11) When boots get worn out during winter, and a second pair is not obtainable, twist dried grass, or straw that has been threshed, round the uppers, then tie a piece of cloth round this and wear a sandal with the boot. Raw silk, if procurable, is the best material of all to wind round the uppers.

III.—*Instructions regarding Food and Drink.*

(1) Food is the source of bodily strength. In war the body is specially in need of strength. Therefore more food must be taken. The results of taking more food are threefold: the soldier marches better, he can stand cold better, and he resists disease better. On the other hand, excess in eating and drinking must be avoided.

(2) When the body is fatigued or hot after exercise, it is better to wait a little before eating.

(3) Articles of food that smell or taste badly should not be eaten.

(4) Ripe fruit is useful for quenching thirst, out it should always be peeled or skinned. Unripe fruit is apt to cause diarrhœa, especially when dysentery or cholera are prevalent.

(5) Uncooked food and unboiled water frequently contain the germs of disease and must be avoided.

(6) 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.

(7) Water from old wells, marshes and surface ponds must never be used, even although boiled, except in time of emergency.

(8) Never consume any food or drink left behind by the enemy.

(9) Drinking tea, coffee or similar fluids and the smoking of tobacco are refreshing and useful when fatigued.

(10) Drinking alcohol in moderation is useful in restoring from fatigue and in giving a sense of well-being, but excess of alcohol must be avoided.

(11) Alcohol must be avoided in case of frost-bite, numbness, or sunstroke, accompanied with fever.

IV.—*Instructions regarding Marching.*

(1) On the day before commencing a march, boots and socks must be examined, and the body cleansed by wiping it with a wet cloth. Food and drink in moderation and as much sleep as possible should be taken. Frost-bite and sunstroke are apt to be caused by want of sleep.

(2) Before marching, sew on buttons and tapes that require to be sewn on. The fingers may be too cold for this to be done, when the march has commenced.

(3) Before the march commences, fill the water bottle with water that has been boiled, or with tea.

(4) The pace must be kept as even as possible during the march and a stooping position must be avoided. On going up hill or marching against a wind, neither speak nor smoke.

(5) Do not leave the ranks, except for necessary purposes, because you will have to run to catch up your file, and even this short run adds to the fatigue of the march.

(6) It is bad to drink whenever you feel thirsty, as the more you drink the more thirsty you become. The soldier must therefore restrain himself from acquiring this habit.

(7) If a large quantity of water is taken at one draught when the body is over-heated, bad effects, even death, are apt to occur. Instead of drinking a large quantity at once, first moisten the lips and mouth, and then drink small quantities at a time.

(8) Swallowing pieces of ice or snow during a march is bad and only creates greater thirst.

(9) During a halt, button the collar of the coat but do not remove the cap so as to let the sun strike direct on the head. Adopt as easy a position as possible.

(10) Do not lie down on damp ground when the body is heated, but select some dry ground or collect straw, hay or branches of trees and lie on these.

(11) On halting for the day, the first thing to do is to examine the feet and toes. If any redness is apparent anywhere, go at once to the surgeon and get some ointment to rub on the part or some foot powder* to sprinkle over it.

(12) Stockings must be examined and flattened out if they are wrinkled, when the halt is made. It is a good plan to put the left foot stocking on the right foot and *vice versâ*. If they are saturated with perspiration, put on a clean pair.

(13) Wipe the face, neck, feet and hands with a wet cloth, wrung dry. This will help to remove fatigue after the march.

(14) If it is impossible to get drinking water during the march, salted plums may be sucked, not eaten. If you have no salted plums, then it is a good plan to chew stalks of grass or the leaves of non-poisonous plants. These will relieve thirst temporarily.

V.—*Instructions regarding Quarters.*

Section 1.—*Houses.*

(1) The houses in China and Korea have oven beds (*kang* or *ondoru*). If the charcoal *hibachi* (brazier) is placed inside such houses according to the custom in Japan, there is danger of losing one's life by charcoal gas poisoning.

(2) If the *kang* or *ondoru* is out of order and cannot be lighted, an *hibachi* may be used, but when this is done a part of the window must be kept open day and night.

(3) In China and Korea there are innumerable flies, which settle on the food and contaminate it. Care must therefore be taken to protect the food from flies. Bugs are also to be found everywhere in China and Korea. They prevent sleep and their bites cause inflammation and disease of the skin. You must therefore get insect powder from the surgeon, or take your own measures for protecting yourself.

(4) There are no latrines or urinals in China and Korea. The soldier in occupying houses must therefore make a trench and fill it in with earth after using it, in order to prevent flies from settling on the excreta.

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* This foot powder consists of 87 per cent. mica powder, 3 per cent. salicylic acid, and 10 per cent. starch powder.—W.G.M.

Section 2.—Tents and Bivouacs.

(1) In fine weather, even during the night, leave two sides of the tent open, in order to allow a constant current of air to pass through the tent.

(2) Straw, hay and branches of trees, used as bedding, should be taken outside and dried in the sun frequently.

(3) When the *tentes abri* are used, the open method of combining them should be employed in summer, and the closed method in winter. In either case, the spare sheets will be spread on the ground as protection against damp or wrapped round the legs as a protection against cold.

(4) In winter the feet are the first part of the body that will be affected by cold while bivouacking. Therefore more than one pair of stockings should be worn, straw or straw rope wound round the boots, and the feet drawn up under the great-coat, before going to sleep.

(5) When bivouacking in snow, the snow should be cleared from the ground and heaped up so as to make a shelter from the wind. The entrance to the enclosed space must be on the side away from the wind.

(6) Latrine and urinal trenches must be made as noted in connection with houses.

VI.—*Instructions for preventing Diseases during the March.*

The principal diseases caused by marching are sore feet, frost-bite and sunstroke. Sore feet have already been dealt with, and this chapter will therefore refer to frost-bite and sunstroke only.

Section 1.—Frost-bite.

(1) The fingers, toes, ears and nose are the parts of the body usually attacked by frost-bite, as the circulation of the blood is slowest there. These parts should therefore be smeared before marching with the ointment* issued, as a protection against frost-bite (*Tosho-ko*).

(2) Frost-bite and numbness occur most frequently when there is lack of food and sleep. Therefore eat and sleep well, as much as time and circumstances permit.

(3) Drinking alcohol gives temporary warmth, but its after-effects are to lower the temperature of the body. Therefore alcohol should be avoided, if one is going to be exposed to cold.

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* This ointment contains camphor, petroleum oil, and simple ointment.—W.G.M.

(4) Frost-bite and numbness may be prevented by movement, because the circulation is thereby increased. Therefore, even on sentry duty, keep moving about, and do not stand still.

(5) Rubbing is also a means of preventing frost-bite, and whenever the ears, nose, fingers or toes begin to feel frozen which is the first sign of frost-bite, begin to rub.

(6) The most useful protection is the wearing of hoods gloves and stockings. Therefore mend holes in these at once.

(7) Frost-bite is certain to be caused by touching metal with the ungloved or wet hand.

(8) The toes are the most readily attacked, because of the wetness of stockings from perspiration, even when marching on dry ground. When marching across rivers or over snow, care must be taken to have the stockings changed at the halt. A well-known general said that the secret of success in fighting was in the feet. Therefore take great care of them.

(9) The end of the penis* is also easily attacked by frost-bite, and care must therefore be taken to adjust the dress after micturition.

(10) The first symptom of frost-bite is cold in the part, then pain, then loss of sensation. These are the signs of an attack of frost-bite. When any of them are present, it is bad to warm the part before the fire. Rub it instead with a cloth steeped in water and wrung dry. After the part has been rubbed well, dry it well and smear it with the frost-bite ointment. If the symptoms continue, the part will become swollen and change colour. If this occurs, it is dangerous, and the soldier must report at once to the surgeon.

(11) If your file comrade (*Sen-yu*) falls down unconscious, affected by cold, the following steps must be taken while waiting the arrival of the surgeon. Warm wraps must not be put over him, and he must be kept away from the fire. Carry him into a room or place without a fire, remove the clothes, and rub hard with a cloth soaked in water or snow, and wrung dry. When the limbs are soft (? warm), put him into water and gradually warm it till it is hot by the addition of hot water. If there are no vessels for this or no hot water, perform artificial respiration. After he has been treated with the cold water gradually heated, take him into a room without a fire, place him on a bed and perform artificial respiration. When consciousness has returned, give him some warm tea, and then place him in a warm bed and let him remain quiet.

(12) Snow blindness is apt to occur on the march. To avoid this the soldier should not look down while marching, and he should wear smoked glass goggles or veils.

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* During the war with China many cases of frost-bite with loss of the penis occurred —W. G. M.

(13) The hands should not be kept in the pockets when ice is being crossed, but should be free to save a fall in case of slipping.

Section 2.—Sunstroke.

(1) Sunstroke is caused by the sun's rays, and is one of the most serious accidents during a march in hot weather.

(2) The persons most readily affected are the inexperienced in marching, the physically weak, convalescents from sickness, those who are suffering from fatigue, those who have had little sleep, those who have had insufficient food, those who are suffering from thirst, those who drink too much alcohol, and those who indulge too much in sexual intercourse.

(3) To avoid sunstroke, one must therefore look after one's own health and lead a temperate life. Water bottles should be kept filled in case of thirst, food should be taken in moderation, and one must sleep as much as possible. The unit commander is responsible that the march takes place when the sun is least powerful, and that a halt is made at mid-day. He is also responsible for increasing the distance between units, reducing the weight carried, and seeing that the chest is kept free from tight clothing and open to the air.

(4) The first symptoms of sunstroke are as follows:—Excessive perspiration with the sweat streaming from the forehead into the eyes and down the front of the chest, sense of heat in the head, rapid breathing and palpitation, a feeling of constriction in the chest, sense of numbness in the arms and legs, and giddiness. When these symptoms occur the soldier must leave the ranks, go into the shade, open his clothing, drink some cold water, put cold water on his head, and wipe his chest with a cloth dipped in cold water. He will then quickly recover.

(5) If, however, he continues marching with these symptoms, the sweating will suddenly cease, the skin will become dry, the heart's action will become feeble, and he will fall down unconscious. Death will take place in all probability if medical treatment is delayed.

(6) Under such circumstances the following measures will be taken while waiting the arrival of the surgeon. Carry the patient into a shady place where there is a good breeze and take off his coat and trousers, and unbutton his shirt. Place him in an easy position with the head raised, and prevent the men from crowding round him. Pour cold water over the head and chest, and, if possible, over the whole body, or wrap him in wet clothes and keep the clothes wet by pouring cold water over them. If the respiration is difficult, perform artificial respiration.

While this is being performed keep fanning him. Keep the limbs constantly rubbed. When consciousness is restored, let him drink plenty of cold water.

VII.—*Instructions for prevention of Infectious Diseases.*

(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 that killed by the enemy. All the staff officers take special measures to prevent infectious disease 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 or 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 underclothing 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) Smallpox 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. Rats and flies carry the disease germ. Therefore keep them away from food, &c.

(6) Malarial 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 from using washing basins and towels in common. This practice must therefore be avoided when such diseases prevail. But when it is impossible to have separate basins, &c., rinse out the basin several times before using it. Anyone who touches his eye with the discharge of gonorrhœa will probably lose his sight.

Note.—The above is a free translation of a small pamphlet of 39 pages, which each soldier must carry. The company officers are supposed to read it to the men frequently. At present many of the men have lost their pamphlet, but all the non-commissioned officers possess copies.

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(27) Japanese Rules for the Prevention of Cholera and Plague amongst Soldiers.

TRANSLATION of a Japanese Military Pamphlet, forwarded by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, June 1905.

NOTE.—This pamphlet was issued to the troops in the field in May 1905. It was published in that month by the War Office. It consists of 21 pages and is a small-sized pamphlet 3½ by 5 inches. The following is a free translation of its contents. Medical officers of units, company and section commanders are instructed to lecture to their men on these paragraphs periodically.

Translation.

Introduction.

Cholera and plague are the most dangerous of the infectious diseases which are liable to occur in the future in the home territory and in the field. It is on this account that special rules are now issued with regard to them. With regard to the other infectious diseases all concerned will be guided by the pamphlet already in their hands, entitled "Health Memoranda for the use of Soldiers in the Field."*

Rules for the Prevention of Cholera.

1. Cholera is an infectious disease. It is caused by a germ which enters the body by the mouth and attacks the intestine. It is the most fatal of all the infectious diseases.

2. The most severe and rapid type commences on the first day of exposure to infection, or two or three days afterwards. The first symptoms are vomiting, followed by diarrhœa. The stools lose their natural colour and look like rice-water. Micturition frequently ceases then altogether; the body becomes collapsed, and death ensues.

There is one kind of cholera that has the symptoms of simple diarrhœa only. There is no other change in the body; but this mild type is just as much cholera as the severe type.

There is also another type, in which the diarrhœa is of a simple character, but the patient feels slack and tired.

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* Page 403.

There is also a state of cholera in which the patient is convalescent, but continues to pass cholera germs in his stools.

In all these types and conditions the cholera germs are just as dangerous as in the severe type. The disease is spread by men suffering from these milder types. They do not know that they have cholera nor do their comrades know, and they mix freely with one another.

When cholera is prevalent the latrines must be carefully watched to see whether any of these mild types of cholera are prevalent amongst the men.

3. The cholera germs are found in the stools, urine and vomited matter. They infect others by means of the clothing, utensils, water, milk, and other articles of food and drink.

The smallest particle of matter containing cholera germs, attached to clothing or utensils or mixed with articles of food and drink, will give the germs an opportunity of developing very rapidly, if once they enter the body.

4. Any one suffering from cholera, whether of the mild or severe type, must be isolated. He must not be removed from isolation either when he is suffering from the disease or when he is convalescing.

No one is to be permitted to come in contact with cholera patients except the attendants.

5. All places fouled by vomit or other discharge must be carefully disinfected.

6. All discharges from the body, and articles which have come in contact with them, must be destroyed by burning or disinfected with strong disinfectants.

7. Discharges, &c., even although they are thoroughly disinfected, must not be thrown out in the neighbourhood of wells, streams, or water channels. The same rule applies to the water used in washing bedding, clothing and utensils connected with a case of cholera.

8. Articles in the room occupied by a cholera patient, before he is isolated, and other articles that have come in contact with him, must be isolated and thoroughly disinfected, before they are handed over to the patient's friends or other persons.

9. Attendants or others who come in contact with cholera patients, may mix with other people after they have disinfected their hands and clothing.

10. Attendants and others are prohibited from smoking, eating, or drinking in cholera wards.

11. The most dangerous channel by which cholera is spread is *water*, and cholera is most easily spread by this channel. During cholera epidemics, all water must be regarded as suspicious. Nothing but boiled water must be used. Boiling destroys and renders harmless any cholera germs that may be in the water.

When water cannot be boiled and when only muddy water is obtainable, it will be filtered through an *Ishiji* filter and afterwards treated by some germ-destroying method.

12. Cholera germs are liable to infect people, if they are present in water that is used for washing clothes, utensils, teeth, &c., or for general ablution, and for sprinkling on the floor or ground to lay the dust.

Only pure water must therefore be used, as far as possible, for these purposes. All water used for brushing the teeth must be boiled or passed through an *Ishiji* filter.

13. No article of food or drink, sold or made in a house where cholera has occurred, or in any of the adjoining houses, must be used.

All articles of food or drink must be cooked or boiled, when cholera is prevalent.

14. Flies are the chief intermediaries in spreading cholera. They must be attacked in a hundred and one different ways and their propagation prevented.

Stables, kitchens, latrines and refuse pits must be kept clean. Lime must be sprinkled over refuse heaps and in latrines. All refuse and dirty water must be removed from the vicinity of quarters as much as possible.

It is of special importance to keep flies from articles of food and drink; and all utensils, which come in contact with the mouth, in eating or drinking, must be kept covered.

15. A disordered stomach and intestine are specially liable to be attacked with cholera. Excess in eating and drinking must, therefore, be avoided.

The food on which the cholera germ develops most readily is dried cuttle fish, taken with water or *saké*.

Diarrhœa is apt to occur when the abdomen is exposed to chill. An abdominal belt, *hara-maki*, must therefore be worn.

Some people imagine that when cholera is prevalent it is a good thing to take the medicines sold in the street as preventives, and to drink strong spirits. The exact opposite is true, for these disorder the stomach and intestine and render them more liable to attack.

16. The habit of eating ice frequently sets up gastric and intestinal disturbance. The cholera germ may also be preserved in the ice that is swallowed.

17. Unripe fruit also causes gastric and intestinal disturbance; but ripe fruit will do no harm, if carefully peeled.

18. In localities where cholera is prevalent, places where people crowd together must be avoided.

19. When vomiting or diarrhœa occurs, the doctor must be consulted without a moment's delay.

Do not be afraid of the disease, but exercise ordinary care to avoid it. One of the very worst habits that a soldier can have is to be careless about disease or to conceal disease. As regards the individual, the habit may lead to a disease being fatal, while, on a large scale, it may lead to the destruction of a whole army.

Rules for the Prevention of Plague.

1. Plague is also a form of infectious disease and is caused by the plague germ.

2. The symptoms commence two or three days after exposure to infection. The first symptoms are fever with a heavy feeling generally and giddiness. In severe cases death occurs on the third or fifth day after these symptoms commence.

3. There are two common forms of plague, first, a form in which there is swelling of the glands, and, second, a form in which there is inflammation of the lungs. A rare form of plague is one in which there are skin eruptions.

4. The glandular, or bubonic form of plague, attacks the outside of the body. Internally there are usually no symptoms, but there are local swellings in the groin, in the armpits and in the neck. Sometimes swellings occur in deep glands, which cannot be felt from the surface.

The form of plague with skin eruptions shows an eruption of blisters, with severe pain in the localities where they occur. These blisters remain for a short time only.

5. The form of plague with inflammation of the lungs is the most fatal form. The first symptoms occur two or three days after exposure to infection. These symptoms are cold and shivering, fever, giddiness, followed by pains in the chest and a feeling of constriction in the sides, with cough and with expectoration mixed with blood.

6. Bubonic plague and the skin eruption form of plague are contracted by infection entering the body by cuts, scratches, grazes, insect bites, chilblains or fissures and blisters on the feet.

7. Plague with inflammation of the lungs is contracted by infection entering by the nostrils or mouth.

8. Persons suffering from plague are very liable to infect others. Insects go from plague patients and settle on or bite other persons. In lung cases the expectoration and the breath of the patient are full of plague germs. Further, unless the body of a person dying from plague is dealt with properly, it is impossible to tell by what channels the disease will be spread.

9. Persons suffering from plague must be isolated.

10. Anything that comes in contact with a plague patient and all discharges from him must be burned or disinfected with strong disinfectants.

11. The chief intermediaries in the dissemination of plague are animals of the rat tribe. Rats are attacked very readily and plague spreads rapidly amongst them. Rats, suffering from plague, leave their holes and enter houses where they spread the disease by the discharges from their bodies, eventually dying inside the houses.

The two intermediaries by which plague is spread are, therefore, men and rats. One plague-stricken rat is alone sufficient to cause all the people in the neighbourhood to be infected. Care must be taken not to handle carelessly any dead rat.

12. Dead or living rats should not be seized by the hand, but by tongs or chopsticks. When they are carried to the medical officer for examination, they must be wrapped in a cloth steeped in a disinfectant, and after the examination has been made they must be burned.

13. If plague germs are found in any rat, the whole of the area where it was found must be disinfected without delay, and methods for destroying rats and preventing them entering houses must be taken into consideration.

For the destruction of rats the best measures are to trap them or poison them.

To prevent rats entering houses the following measures are the best :—

> Close the rat runs with wire netting or with bricks. Cover the ceiling, walls and foundations with wire netting. Erect a barrier of metal sheets round the house, sunk to a depth of three feet in the ground and standing six and a half feet high. Houses are fairly safe where these measures are employed.

14. As far as possible, means must be taken for the destruction of mosquitoes, flies, bugs, fleas, lice, &c.

15. Avoid food on which flies have settled. If this cannot be done, cook the food over again.

Throw away articles of food or drink which are fouled by any discharges from rats.

16. It is very difficult to define the area over which rats may have spread plague. It is best to disinfect as large a circle as possible, taking the place where a plague-stricken rat has been found as the centre.

When plague is prevalent, no one must be allowed to go about barefoot either inside the house or outside.

The boots must even be disinfected in plague-infected areas.

Trivial cuts, &c., on the hands and feet must be carefully treated and disinfected when plague is prevalent.

17. Plague is commonly found in dark and damp houses and seldom in well-lighted, sunny and dry houses. As many windows, therefore, as possible should be opened up, and the foundations of the house made dry. The best way of doing this is to sprinkle the soil under the house with lime.

18. When plague is prevalent, the men and their quarters must be constantly inspected. The disease should be discovered in its earliest stages. Any one who has the slightest feeling of pain in the neck, armpits, or groin must consult the medical officer at once. Cases of plague which are discovered in the early stages have the best chance of recovery.

Addendum.

The bodies of persons dying of cholera, plague or any other infectious disease must be wrapped in sheets steeped in carbolic acid solution, and the clothing in sheets steeped in solution of perchloride of mercury, before being sent away to be cremated.

(28) Disposal of Dead.

TRANSLATION of REGULATIONS by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, dated Tokio, July 24th, 1904.

NOTE.—The following is a translation, made with the aid of a Japanese interpreter, of the Regulations, recently issued, concerning the disposal of the dead in the field.

It may be of interest to note that, in accordance with Buddhist rites, all corpses may be and, as a rule, are cremated in ordinary civil life; but not so in accordance with the Shinto religion, which enjoins burial. In the field, however, all corpses of Japanese are cremated, on sanitary grounds, irrespective of the religion of the deceased; but, in order not to offend the religious scruples of the enemy, the Japanese do not cremate the corpses of Russians, except in the case of infectious disease.

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

Translation.

REGULATIONS FOR CLEARING THE FIELD AFTER AN ENGAGEMENT, AND FOR BURYING THOSE WHO HAVE BEEN KILLED OR DIED OF DISEASE.

(Published by the Minister of War, 30th May 1904.)

1. Immediately after an engagement, each unit should organize a detachment for clearing the field, for searching for sick, wounded and killed, as well as for equipment, &c. left by them on the field.

The officer commanding will appoint a special detachment to carry out this duty.

2. The sick and wounded shall be dealt with according to the Field Regulations of the Army Medical Service, and the killed shall be honoured and respected according to their rank, whether they belong to the Imperial Army or to the enemy.

3. As minute an examination as possible shall be made from the pocket book, marks on uniform, identification tally, &c., as to the full name, rank, position, relatives, and regiment of any one found dead.

4. Corpses of those belonging to the Imperial Army shall be cremated, while those of the enemy shall be interred, except when contagious and infectious diseases are prevalent, when all corpses, even those belonging to the enemy, shall be cremated.

5. No burial shall be made until death has been definitely assured.

6. The clearing detachment shall collect separately the corpses of both armies, either in one place or in several places, and mats or matting shall be spread over them. Even when corpses cannot be collected together, steps must be taken to cover them.

7. When the necessary steps mentioned in clause 6 have been taken, the corpses shall be separated into those belonging to the Imperial Army and those belonging to the enemy, as soon as possible, and cremated or interred accordingly.

8. As regards the selection of ground for interment, the following provisions should be noted, especially (1) and (2):—

(1) The ground must be some distance from any road, town, village, or garrison.

(2) The ground must be at a distance from sources of springs, streams, wells, or other sources of drinking-water.

(3) The ground must be on high land or gentle slopes, and the soil must be loose and more or less dry.

9. Corpses of those belonging to the Imperial Army should be cremated separately, and the bones and the larynx sent home. When circumstances prevent this being done, only the hair shall be sent home and the bones shall be buried temporarily on the field.

When circumstances prevent separate cremation, the non-commissioned officers and privates shall be cremated together, and the hair only sent home.

10. The bones and hair sent home shall be buried in the cemetery at home according to clause 6 of the regulations for the burial of soldiers.

On application, the bones and hair may be given to the relatives of the deceased to bury.

Remains buried temporarily in the field must be taken home eventually and re-buried in the cemetery at home.

11. In the case of corpses buried under the provisions of clause 9, the following should be noted:—

(1) Bones of officers, warrant officers, and senior non-commissioned officers should be given separate burial.

(2) The bones of other ranks should also be buried separately, but, when circumstances do not permit, they may be buried together.

(3) In any case the bones of senior non-commissioned officers and warrant officers must be given separate burial.

12. In the case of interment of corpses belonging to the enemy the following should be noted:—

(1) The corpses of officers, warrant officers, and senior non-commissioned officers, should be buried separately.

(2) Corpses of other ranks should also be buried separately, or in numbers of less than 50 together.

(3) The graves should be one metre (39 inches) deep.

(4) The bottoms of the graves should be covered with branches of trees or straw, upon which the corpses shall be placed, and a layer of lime, charcoal, ashes, or slag, shall be placed over the corpses, and all necessary sanitary precautions taken.

(5) The earth removed in digging the graves shall be replaced over the graves so as to make a small mound.

13. Corpses belonging to the Imperial Army, that are buried, shall be buried according to the same instructions as in the previous clause, some of the hair from each corpse being preserved.

14. When corpses belonging to the enemy are cremated, the bones shall be buried under the instructions contained in clause 11.

15. The graves of the dead of the Imperial Army shall be kept separate from those of the enemy, and proper marks shall be erected over both.

16. In every case of burial the proper funeral rites shall be observed, and the Shinto or Buddhist priests, chaplains or priests of any other religion shall take part.

17. When the corpses of inhabitants of the country are found on the field, they shall be buried as laid down for the enemy, but, should they be claimed by relatives, they shall be handed over if possible.

18. The personal effects of the dead of the Imperial Army shall be packed with the bones and hair, addressed with the full name, rank, and regiment of the deceased, and the package forwarded to the divisional headquarters where the deceased was mobilised, or to the office where the organisation of his corps took place.

19. The name, age, nationality, position, rank, and regiment of the dead of the enemy shall, if known, be entered on a list, and the list shall be sent by the divisional headquarters, or by the officer left in command, to the "Prisoners' Information Bureau" at Tokio. Personal effects, with the exception of arms, horses, and maps, shall be packed, and the package addressed with the full name and rank of the deceased, and forwarded to the above-named office.

20. Effects belonging to dead inhabitants of the locality shall be handed in to the local officials by the head-quarters of

the troops, in order to be returned to the relatives of the deceased.

21. Arms, provisions, horses, maps, and other articles left on the field without an owner, shall be dealt with by the headquarters of troops of the district. All other articles, except those belonging to the Imperial Army, shall be regarded as trophies.

22. The manner of the burial rites, the disposal of articles belonging to the dead, according to clause 18, the description and number of the articles, shall be reported by the headquarters of the district troops to the General Officer Commanding.

23. Dead horses shall either be buried or burned; and, in burying, the provisions of (3) and (4) of clause 12 shall be noted, and special medical precautions taken.

24. These Regulations shall apply to the treatment of dead and their effects, in all places in the area of operations, even though not on the actual field of battle.

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(29) Japanese Cremation in the Field.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, Liao-yang, 8th September 1904.

A copy of the regulations on the subject of the disposal of the dead in the Japanese army during active operations has been submitted already. I have now had an opportunity of seeing these regulations put into practice, and a note of the details, as actually observed, may be useful.

After the action leading to the occupation of Liao-yang on the 4th September, the corpses of those killed were cremated by companies, *i.e.*, each officer commanding a company had to arrange for the cremation of his own dead. The corpses were collected together and a funeral pyre erected. The wood and other fuel was obtained from the neighbourhood, and the pyre erected on the level ground at a convenient spot near the place where the killed were collected.

When the pyre was prepared kerosene oil was poured over it, the quantity used being three tins of Russian refined oil for a pyre containing 12 corpses. The pyre was lighted, after a religious ceremony by a Buddhist priest, in the presence of the officer commanding the company. After it was fairly alight both these officers left, but a subaltern and a small party of soldiers remained until the cremation process was completed.

The time taken to cremate the pyre was 12 hours in unfavourable weather. I was told that the usual time is 10 hours. After the pyre had been consumed I found the corpses completely calcined. The teeth and the larynx, or what represented it, were then removed for transmission to Japan in accordance with the regulations, and the ashes buried in separate graves on the spot. A wooden post was placed over each grave with the name, &c., of the deceased written on it.

The process, from beginning to end, was decorous and partook essentially of a religious rite, as well as being of much sanitary value.

The kerosene oil is obtained by requisition, as required. It will be observed that the quantity used for 12 corpses was three tins or 15 gallons.

A large number of bodies had to be buried without cremation, after the actions leading to the occupation of Liao-yang because of the absence of sufficient fuel and the impossibility of dealing with the large number of killed by this process. In some cases, where cremation was attempted without sufficient fuel, half-burnt corpses were observed. Burying was in some cases

insufficiently deep, consisting occasionally of throwing a mound of earth over the body instead of digging a trench for it.

Both cremation and burying were carried out without removing the clothing.

I was informed that many bodies were also buried after the Nan Shan fight, on account of the difficulty in obtaining sufficient fuel for cremation.

Note.—15*th January* 1906.

The method noted in this memorandum is not invariably employed. Rough and ready methods have frequently been observed subsequently. Thus, the bodies of those who died during the winter on the Sha Ho were cremated by simply placing them on bonfires of millet straw, and brushwood or branches of trees.

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(30) Japanese Sanitary Regulations after the Battle of Mukden.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps. Manchuria, 14th May 1905.

Plates.

Japanese portable water boiler - -	In text.
Section of water boiler - - -	

After the battle of Mukden a certain number of the troops that took part in the fighting were cantonned in the suburbs of the city and in villages in the vicinity. Epidemic disease was then very prevalent amongst the Chinese population, especially typhus fever, scarlet fever, and measles. Smallpox and enteric fever were also present. The epidemics broke out in the first instance, so far as is known, amongst the Chinese refugees, of whom there were many thousands, 8,000 for instance, being cared for by the missionaries of the Scotch Presbyterian Mission, one of whom was himself attacked with typhus fever.

When these facts were ascertained by the Japanese medical authorities, an unusual amount of activity in connection with sanitation became apparent, and stringent orders were issued, in divisional orders, to all concerned.

Although I was not permitted to see a copy of these orders, I was given a resumé of them. They were published on the 13th April, and were headed "Divisional Orders for the Prevention of Disease." The following is the resumé of the orders:—

(1) Soldiers must boil water before drinking it. Any soldier who neglects to do so will be made a prisoner, and no excuse listened to. The means for boiling water must always be kept ready by the soldier himself.

(2) Stations will be formed at various places where boiled water may be obtained.

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

(4) Latrines will be constructed along the lines of march—
(*a*) for soldiers and Japanese;
(*b*) for Chinese.

(5) The battalion medical officers will inquire into the state of health of all Chinese residing in the village occupied by their unit, or in adjoining villages that are not occupied by other units. A weekly inspection will be made for this purpose.

(6) When a case of smallpox, measles, enteric fever, dysentery, or typhus fever is discovered in any of the Chinese houses, the patient will be kept in the house; but the house will be isolated, and one of the battalion medical officers will himself take medical charge of the case and prevent the patient leaving the house until he has recovered and is free from infection.

(7) All articles of food sold by the Chinese, in the area where the battalion is quartered, will be inspected by the battalion medical officers, and the sale of such articles will be generally supervised by them. They will see that they are—
(*a*) fresh;
(*b*) free from parasites;
(*c*) protected by covers from dust and flies.

(8) All dry refuse in the area, or any neighbouring area unoccupied by other units, will be buried or burned by the unit concerned.

(9) Wells must be coped up, as a protection from surface pollution.

(10) A bucket will be specially kept at each well for drawing water; it will be used for this purpose only, and no other buckets must be used for drawing water.

(11) Dirty pools in or near the villages must be filled in by the regimental units.

These orders, it will be observed, throw the whole responsibility of maintaining cleanliness in the areas occupied, of boiling water, protecting wells, &c., and even of dealing with infectious diseases amongst the inhabitants of the areas, on the regimental units.

As regards the manner in which these orders have been carried out, there is nothing very special to record.

Units have not been provided with any special apparatus for boiling water. When the water is boiled in bulk, as, for example, at the food distribution station, the ordinary cooking cauldron, or a Russian soup wagon, is used; but, individually, the soldier boils water for himself in his water bottle, which is made of metal and is not covered with felt or other material.

Recently, however, there has been an experimental issue of a water boiler (fixed on the regulation type of cart used by the Japanese transport service, *i.e.*, a light one-horse cart) to each regiment. (*See* Plates, pages 429–30.) The boiler is the same as that in use in the hospitals in Japan in peace time, and has been simply fixed on to the bars of the cart by means of strong corner plates. Plate 1 will serve to show the general construction without further description. The section drawing is made from rough measurements, and the rivetting of plates, &c, may not be correct from an engineering point of view. But the general principle of construction appears to be that of an inner jacket, shaped like an inverted cauldron, with a circular hole for the chimney and another for the stoke-hole, rivetted on to an outer cylindrical jacket, so as to form a reservoir for the water between the two jackets, and leave a large central space for the fire. Any kind of fuel can be used, except the inflammable oils and their like. Ordinary dry sticks and logs were being used in the boiler which I examined.

The capacity of the space between the jackets is said to be 13 to 15·5 gallons. My own estimate from the measurements also gives a capacity of from 14 to 15 gallons. It takes 45 minutes to boil the water when the boiler is first filled. Subsequent fillings take only 20 minutes, *i.e.*, if the reservoir is filled before the boiler cools.

A square wooden tank, equal in capacity to the boiler, is said to be fixed on the back of the cart, but as yet I have not seen this tank, and was told that it was not issued with the boiler from which the photographs and drawings were made.

A brass tap for drawing off the boiled water is shown on Plate 1. There is no water gauge, and it is difficult to understand how the reservoir is to be kept free from furring, or cleaned. Unless it is always kept filled or the fire allowed to go out before the water is drawn off, it will also be difficult to avoid damage to the inner jacket.

As regards the formation of water stations, I have as yet only seen one or two. The arrangements showed no special organisation.

As regards wells, all that has been done is to fix a square wooden box-like coping on the mouth of the well. It stands about 18 to 24 inches above the surface level. In some cases an area of 9 to 12 feet round the well has been loosely paved with the bricks used in building houses. They are taken usually from the walls of the village temple. A surface channel is also usually cut from this area to a large square soak-pit, dug in the soil at a distance of some 100 feet or so from the well. This pit is intended to receive the water that is spilled around the well and also the water used in washing rice, a process that takes place generally at the mouth of the well.

There is practically no other source of water for the troops except these village wells. In any case, I have seen no other source made use of. The wells are all surface wells, varying in depth from 3 or 4 feet to 20 or 30 feet. They are not constructed with any kind of impervious steining, but the upper part has usually some brick or stonework.

The battalion medical officers have no chemical or other analysis cases in their equipment, but they generally have with them re-agents for testing qualitatively the presence of chlorine, organic ammonia, and oxidizable matter. With these they determine roughly whether well water should be labelled "unfit for drinking" or not. It should be mentioned that all these village wells are sunk in the village streets or in patches of cultivated ground, and it is difficult to imagine any of them giving good qualitative analysis results. I have seen very few, however, labelled "unfit."

The wells are open and have no covers. Water is invariably drawn by means of rope and bucket, and the order regarding the use of one special bucket only, with a view to preventing buckets that have been standing on dirty soil being dipped into the well, has not, so far as I have observed, been carried out; at any rate, not with that attention to detail that would bring about the desired result.

As regards latrines, the effect of the order has been the digging of small trench latrines and urine pits in the soil, at suitable places, and providing these with some form of screen. In some case the trenches and surrounding surface have been sprinkled with lime.

I have made several applications to be allowed to accompany a battalion medical officer when he is making his inspections, with a view to seeing in what manner the other sanitary matters referred to in the orders are carried out, but permission was always delayed, until at last the vicinity of Mukden was vacated by the troops in question and the opportunity was lost.

In addition to these sanitary regulations, special regulations were issued with regard to the prevention of venereal disease. Mukden was apparently not put out of bounds, but soldiers had to be in possession of passes to enter the city, and there were sentries at all the gates.

Public prostitution was regulated from the 14th April, about five weeks after the city was occupied by the Japanese.

The regulations were to the following effect:—

(1) Each prostitute will be registered, and will be given a book, on the front page of which will be her photograph, and on the other pages the dates and results of the medical examination.

(2) The medical examination of each prostitute will take place on a fixed day each week.

(3) The examination will consist of an inspection of the external genitals, the internal genitals, the skin, the lips and mouth, and, if necessary, the secretions and discharges will be examined microscopically.

(4) The diseases to be determined are syphilis, soft chancre, and gonorrhœa.

(5) In order to insure thoroughness of the examination, no more than six to eight prostitutes will be examined in one hour, or thirty-six to forty in a day, by one medical officer.

(6) The number of medical officers will be increased whenever the number of prostitutes exceeds the number that can be dealt with by two medical officers working each day of the week. The minimum number of medical officers engaged in the work will be two.

(7) A house will be taken over and equipped as a hospital, into which all diseased prostitutes will be taken for treatment.

(8) Any prostitute who neglects to attend at the appointed time for examination will have her book taken away.

These regulations were in full force, and were working well during the month in which they were issued. An excellent lock hospital and examination room were organized. Two trained female nurses were appointed from Japan, and one of them arrived before the end of April. They were appointed because of the difficulty in obtaining Chinese women competent to perform the duties.

Houses were opened for the prostitutes within the inner city, and fifty women applied for registration when they were opened. Notices were posted in the courtyards of the houses warning the soldiers to examine the prostitutes' books, and see that they were marked free from disease at the last inspection.

The whole of these arrangements were carried out by the military authorities, and the sanitary inspection of the city of Mukden generally was placed under the medical officer attached to the staff of the Commander-in-Chief, who had taken up his residence in the inner city.

In concluding these notes, it may be mentioned that the regulations, &c., of which they are intended to give some account, are simply a development of the regulations issued to each soldier individually in the small pamphlet *Jin Chu Eisei* Kokorei,* of which a translation has already been submitted, the organization for the preservation of the health of the troops in the Japanese Army being essentially individual and regimental.

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* *See* page 403.

[To face p. 429.

APPENDIX.

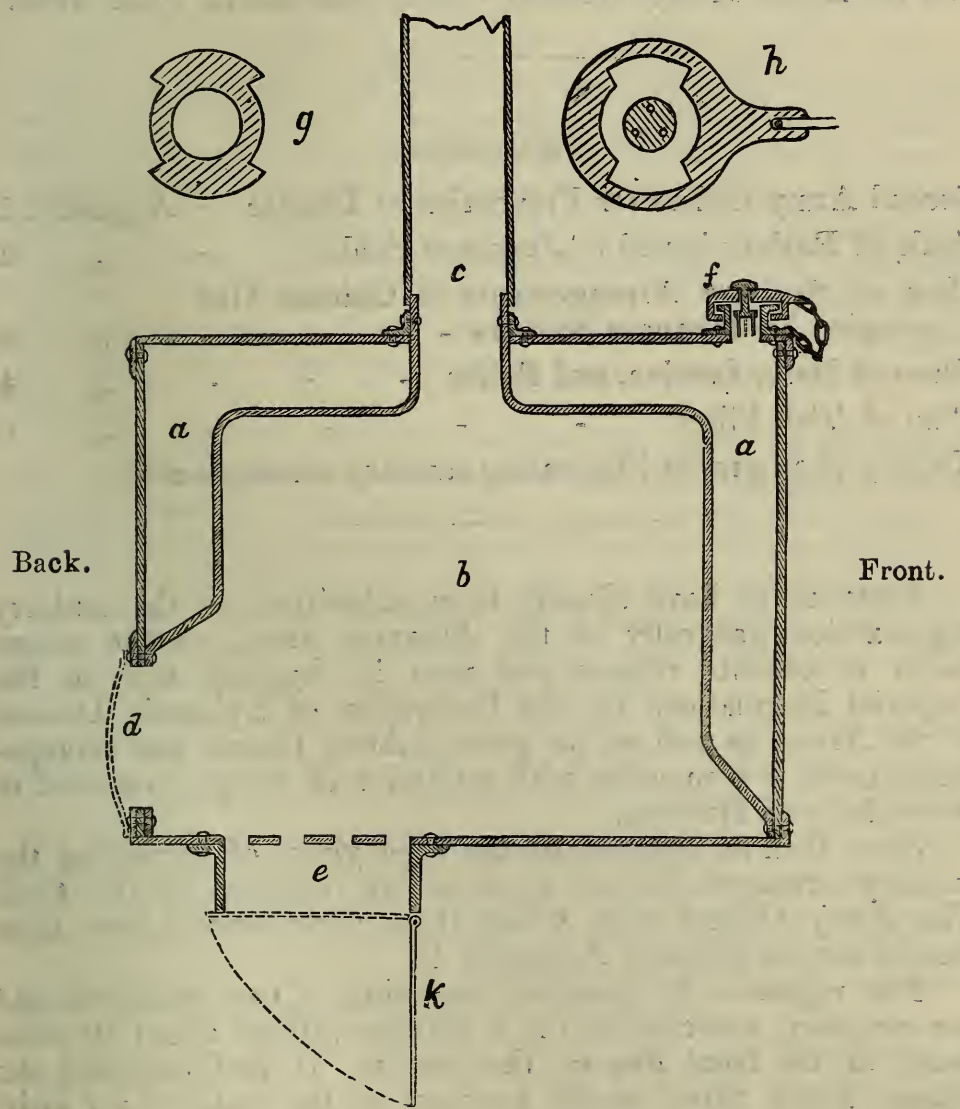
Plate 1.

Japanese Water Boiler on Cart.

Section of Water Boiler (through middle line from back to front).

Measurements.

Outside diameter	26 ins.	
Height of sides	21 ,,	
Height of chimney	30 ,,	Diameter 4 ins.
Diameter of stoke-hole	6 ,,	
Base of ash aperture	16 ,,	
Width of ash aperture at centre	8 ,,	
Diameter of filling aperture	1½ ,,	
Width of water reservoir	2½ ,,	
Capacity	15 gallons.	



a = Water reservoir.
b = Fire-hole.
c = Chimney.
d = Stoke-hole. Door hinges at one side and is circular.
e = Ash grating and box.
k = Shutter to form bottom of ash-box or valve. This shutter and ash grating aperture are semi-lunar in plan, the hinge forming the base.
f = Aperture for filling, with steam valve cap in position.
g = Plan of upper surface of aperture for filling.
h = Plan of under surface of cap for (*g*).

(31) Japanese Sanitary Arrangements in the Field.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, Manchuria, June 1905.

Appendices.

Some notes have already been submitted on the sanitary organization generally of the Japanese army, on the means taken to educate officers and men in hygiene, and on the Imperial Regulations for the Prevention of Epidemic Disease in the Army, as well as on general Army Orders and arrangements made in connection with sanitation of troops quartered in the vicinity of Mukden.

Since then an opportunity has been given of inspecting the sanitary arrangements in a particular regiment in the field. The Army Orders upon which these arrangements have been carried out are given in Appendix 1.

The regiment in question, consisting of two battalions and one company, was cantoned in a Chinese village about 10 miles south of the front line of the enemy. It had occupied the village about three weeks previous to the date of my visit, which was made during the first week of June 1905.

The village was of considerable size and was intersected by two or three nullahs, which were utilized by the Japanese as the outfall of their surface drains.

The regiment had the reputation of being the healthiest, or at any rate one of the healthiest, in the army in the field. It had taken part in the Chinese War and in the Boxer Expedition, and was thus regarded as a regiment that had much experience

in looking after the health of its men. Its commander told me that it showed better health statistics in the field than in garrison at home. It had been 14 months in the field, and during that time there were only 5 cases of enteric fever, 10 of dysentery, and 20 of Beri-beri in one of its battalions. The details of the other battalions were not given to me.

So much for the general conditions. The detailed sanitary points of interest may be best given under different headings, as follows :—

Selection of Villages for Troops or Sites for Camps.

When a division or brigade or other composite body of troops is ordered to advance on any line, there is no special selection of quarters or sites, so long as the advance is made in fighting formation or under fire. When the advance is, however, simply strategical, each brigade selects the villages of the area to which it is assigned. For this purpose the adjutant of the brigade commander goes on ahead, accompanied by the adjutant of one or both regiments of the brigade, and selects the villages for each regiment. He is not accompanied by a medical officer in doing this. Sites for camps are selected on the same principle.

The regiments are then ordered to march to the villages selected, and when this is done the regimental adjutant, accompanied sometimes, but not always, by a medical officer, goes on ahead and selects the areas for each battalion of the regiment.

The battalions then march in and occupy the houses, without any special medical selection being made at the time, unless epidemic disease is detected in the village, in which case houses, where such disease occurs, are not occupied.

Immediately afterwards a cantonment battalion committee is formed for carrying out and enforcing sanitary regulations. This committee has the senior medical officer of the battalion as president, and one officer from each company as members. They can requisition labour from the battalion as required, and their duties generally are to see that the houses and village are cleansed, surface channels made, wells protected, latrines and urinals constructed, and all matters connected with sanitation laid down in orders or regulations carried out.

Apparently all the houses, good or bad, were occupied in the village inspected. It is only when infectious disease is discovered in a house that it is vacated or left unoccupied by troops. No house, for example, would be rejected as unfit for occupation because it was in a tumble-down condition, or the interior or surroundings dirty and insanitary. As a matter of fact, a rule of that kind would lead to the rejection of most of the Chinese village houses. The Japanese rule is to cleanse and repair after occupation, not before. In other words, the medical opinion is not so much regarded at this stage of the advance of an army, except, as stated, when epidemic disease is present.

Selection of Water Supplies.

The selection of sources of water supply is also at first without any expert sanitary control. Invariably, the troops use the Chinese village wells, which have been in existence from time immemorial. All these wells are constructed on the same principle. They are surface wells, with open mouths, without coping, without any impermeable steining, and with no means of drawing water except by hand rope and bucket. Each inhabitant takes his own bucket and rope to the well, and it is, therefore, impossible to say what the nature of the pollution of the water may be.

When the Japanese troops march into the village, nothing is done at first, but the medical officer may possibly have made a rough selection of the wells that are to be kept for drinking water, if he accompanied the regimental adjutant on the latter's inspection of the village ahead of the troops. The selection is then made from a rough physical analysis. I watched a medical officer making his inspection once in a village to which a battalion had been assigned. The medical officer rode round the village with the adjutant and an orderly. When they came to a well, one of the Chinese villagers was ordered to draw some water in a bucket and bring it to the medical officer. The latter, without dismounting, looked at the water to see whether it was clear and then tasted it once or twice. No other examination was made. I was informed that this was the method of selecting wells in the first instance, *i.e.*, when troops first arrive, and that the regiment to which the present note refers had the wells examined, at first, by this method only.

After the wells for drinking water have been selected, a placard is put up to the effect that no washing is to take place at the well, and a sentry is posted at each to see that neither Chinese nor Japanese transgress this rule and also that no foul matter is thrown out near the well.

Other wells not selected for drinking water are left alone. No sentries are placed over them and the inhabitants can treat them as they like.

Collection of Water Supplies.

There were no arrangements for collecting water and conveying it to the different quarters, &c. The water would be drawn by Chinese buckets, belonging to the villagers. The troops did not carry with them any special bucket for collecting or carrying water, except the canvas bucket, which is carried with each horse, for watering the animals. They had no water-carts or any substitutes for them. The water was drawn from the well by hand and by means of rope and bucket. Each village hut, where troops were, would send its own bucket to the well.

Storing and Distributing Water.

In each house there was an earthenware jar, which was kept filled with water. There was no special vessel for water that had been purified by boiling or otherwise, nor for distributing such water to the troops.

However, in accordance with Army Order No. 6, appended, a boiled water distribution station was formed along the route troops would take in marching into or out of the village. This station was formed and kept up by the unit quartered in the adjoining huts. The one which I specially noted consisted of a Chinese fireplace and cauldron in one of the temples, such as is shown in the drawing appended (Appendix 4, Fig. 3).

Water was boiled here and benches placed in the yard for soldiers to sit on and rest. The boiled water was filled into 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 everywhere in Japan. The tea was supplied by the intendance officer of the battalion, whose duty it was to maintain this water station. There were two similar stations in the village in question, placed at the main entrances to the village or in the principal square. Many similar stations have been established in accordance with the orders on the subject, and they are all very much of the same character. No special apparatus is used for boiling the water, and the arrangements are of an improvised nature.

Purification of Water.

No means of purifying wells by chemical processes have been employed, but wells selected as "drinking water" wells are emptied and the mud in the bottom cleared out. Fresh sand to a depth of 2 or 3 feet is then placed in the bottom of the well, if sand is procurable. If not, the mud only is cleared out. This was the method of cleaning wells in the village in question, but whether it is done generally or not is doubtful. I have never seen it done in the numerous villages in which I have myself been living, nor in any that I have passed through. The wells, however, are invariably protected by a square wooden coping made of old packing cases, and surface channels dug round them to keep the vicinity of the well from becoming sloppy. Occasionally, but not always, a wooden lid is attached to the coping. The coping is not always placed so as to prevent surface washings from entering the well. Sometimes these square wooden copings may be seen simply resting on the uneven surface round the mouth of a well, with the result that in many places there were open holes and slits between the edge of the well and the bottom of the coping. But, as a rule, the copings are more accurately fitted to the mouth of the well.

The water, after it is drawn, must be boiled before it is used for drinking. There was no special boiling apparatus, such as has been described in a report already submitted, with the regiment in question.* The boiling was done in the Chinese cooking places in the village houses. As a rule, each squad, *i.e.*, 16 to 20 men, were given a hut, irrespective of the size of the hut, and they used simply the Chinese arrangements and utensils found in the hut for the purpose of boiling water. The fuel was supplied by the battalion intendance officer, but apparently no fixed quantity is laid down. It is issued as required, and is obtained locally, so far as is possible.

Water is seldom drunk by the men in any other form than tea, made in the Japanese fashion. The quantity of tea issued to each man is small, but it is used over and over again, so that, although he is said to be drinking tea, he is practically drinking only hot water. There is apparently no supervision with a view to determining whether the water actually boils or not.

Muddy water is clarified by alum, or by passing it through six layers of thick flannel material. But, the day before my inspection of the regimental sanitary arrangements, *Ishiji* filters had arrived, and I saw one of them fixed for use (Appendix 5).

Last year a report was submitted on this filter, and, so far as is remembered, it was stated that it was being tried experimentally by Professor Kitasato in the Government Hygienic Laboratories in Tokio. It was one of these filters which I now saw for the first time in the field. It is only now that it has been issued to the army to which I am attached. The filter issued is of large size, capable of filtering 44 gallons, *i.e.*, $\frac{8}{9}$ths of a quart for each man in the company, in 13 minutes. As already described, the filter is made of canvas, conical shaped, with one or two outlet sleeves let in about midway between the apex and middle of the cone. These sleeves act as outlets for the filtered water, and each contains a metal cylinder filled with granulated charcoal and a sponge (*see* Appendix 5). The water is mixed first with the *Ishiji* powder, a specimen of which was forwarded last year for analysis, but of which I have heard nothing further.† The composition of this powder is kept a secret by the inventor of the filter, but it seemed to be a mixture of permanganate of potash, aluminate of iron and lime. According to Kitasato, it acted as a precipitant, and in so doing carried with it practically all micro-organisms.

But since the apparatus was seen in Tokio, a second powder is used in it, and is added to the water, after the water has been thoroughly mixed with the first powder. This second powder is carried in a glass bottle (the first is in a tin), and smells of chlorine. It is probably hypochlorite of lime or some compound containing free chlorine.

There is no question as to the value of this apparatus for clarifying water quickly and effectually. The canvas cone is hung up from a beam, the apex downwards, and the ends of the

* *See* Report (30), pages 426 and 429. † *See* page 487.

sleeves and the apex tied up to prevent water escaping. The canvas is then filled with water, and specified measures of the powders added and mixed with the water. The water then draws off clear through the sleeves, first, of course, passing through the charcoal cylinders and sponges. The precipitate that sinks to the lower third of the cone can eventually be washed out through the aperture in the apex.

A small leaflet of instructions accompanies the filter. It apparently states that this method of purification is not to be considered entirely satisfactory in time of epidemics, and that the clarified water must subsequently be boiled. As yet however, I have not been permitted to obtain one of these pamphlets.

No other means of purifying water is in use in the Army to which I am attached, and it will be noted that the *Ishiji* filter has only now been obtained, after the army had been 14 months in the field. Up till this time, the only purification of water relied upon was that of boiling. The apparatus for boiling was invariably improvised. As a rule, it was simply boiled over a camp fire in the soldier's water-bottle or mess tin.

I was surprised to find that the special water-boiler to which I referred in a previous report, and of which drawings were submitted, was not in use. I had been told that these boilers had been issued to each regiment, but in this particular regiment it had never been heard of.

When I inquired whether alum or any other chemical had been in use, I was told that alum was carried, but that it was seldom if ever used. I could discover nothing with regard to the use of hypochlorite of lime, which I had been told had been issued to each regiment in the field. It had at any rate never been used in the regiment in question.

It ought to have been mentioned in connection with the subject of selection of water, that, although the first selection is purely physical, the battalion medical officers, after they have settled down into quarters, analyse the water qualitatively as far as lies in their power, but they have no special equipment for this purpose. Any analysis of the kind rests entirely with themselves. They are not, in other words, held responsible for such analysis. If they think it necessary to have a more detailed analysis of the water, they apply to have this done by one of the medical officers of the divisional field hospitals. These hospitals have practically nothing to do when there is no fighting, and medical officers of the hospitals are then appointed to examine the wells of the various villages where the units of the division are quartered. The field hospitals are equipped with a fairly satisfactory case for chemical analysis, the details of which will be submitted more appropriately in the details of medical equipment in the field. But the chief point which I have noted in this connection is that the determination of good or bad water is not carried out according to any recognised modern scientific method, at any rate for some days or even weeks after a village has been occupied, and never at all when an army is advancing against the enemy.

Selection of Soil.

So far as I can gather at present, there is absolutely no hygienic or scientific consideration of this question in the Japanese army. I might also add that the Russian army appears also to have regarded this as impracticable in war, because I have seen their camps pitched in swamps, that is to say, in places which, in wet weather, are swamps.

The Japanese, latterly, have endeavoured to drain the villages which they occupy. Their method of drainage consists in cutting earth channels down the streets towards any kind of outfall, such as a river, ravine, or low-lying pond. In the village in question, as will be seen from the drawing appended (Appendix 3), the earth channels were led, as direct as possible, into the ravine or nullah running through the village. These channels are, however, cut without any definite supervision, and although they are of much use temporarily in draining quagmires in the streets, they soon get blocked and are of no further use until they are again cleared out.

Latrines.

Each squad forms its own latrine within the precincts of the hut which it occupies. The latrine consists of a pit, about 3 feet square and 8 feet deep. A couple of deal boards are placed across the top of the pit, parallel to one another. The men stand on these, and the general plan of such a latrine may be gathered from the drawing appended (Appendix 4, Fig. 2), without further description.

The latrine pit is filled in gradually with earth and ashes. It is partially surrounded with a screen of *kaoliang* stalks.

Urinals.

Each hut has also to prepare a place as a urinal. It is usually a simple pit in the soil, surrounded with a screen of *kaoliang* stalks.

I have never seen any disinfectants used in these villages in the front, either for latrines or urinals. When lime is procurable in the locality, the intendance officer is empowered to purchase any quantity required for such places, but this has only been done in the case of units quartered near towns or where there were stores of material of this kind.

Disposal of Refuse.

According to orders, refuse should be burned. As a rule this order is not carried out, because there is no kind of transport for the removal of the refuse to any place where it can be cremated in bulk. The usual arrangement is to collect it in a pit in the grounds of the hut. I have seen many such pits with a placard saying "Here all refuse must be deposited."

Protection against Insects.

Mosquito head-nets are issued to the men during the summer or fly season. But no insect powder is issued. Men must purchase such powder for themselves. Gauze netting is also used to cover the windows of the Chinese houses and prevent the ingress of flies.

Ablution.

In every one of the village houses I found a hot-water bath erected. The bath was improvised out of Chinese earthenware jars, placed on a fireplace built according to the Chinese fashion. A plan showing this is appended (Appendix 4, Fig. 1).

As a rule, each man has a hot bath every second day. In this respect the Japanese soldier endeavours to carry out the customs of his own home, where every man, no matter how poor he is, indulges in hot baths at all times. The fuel for baths is supplied by the battalion intendance officer. When there is any scarcity of fuel, the men make a cooking place and bath place in combination, or forage themselves for fuel, using sometimes the doors, window frames, and furniture of the village houses.

Kitchens.

Each battalion carries a complete set of field kitchen equipment in the proportion of two sets for each company. In other words, the set cooks for 100 men at a time. In the Chinese village cantonments these sets are not used at all. Each squad uses, instead, the Chinese cooking place which is found in every house, and which is used for heating the *kang* or oven bed as well as for cooking.

The general arrangement of these is shown in the drawings appended. (Appendix 4, Fig. 3.)

Rations.

The scale of rations is appended (Appendix 2). No change is made in summer or winter, but if any additions, such as pork, or chicken, or fish, can be obtained in the locality, they are added to the ration. In these respects the men are, as a rule, allowed to forage for themselves. There is no issue of lime-juice or similar prophylactic.

Miscellaneous Sanitary Arrangements.

There are probably many points which have not been touched on under the above headings. In fact, it is very difficult to discover any definite prevailing organization in the Japanese for carrying out sanitary principles. The sanitary conceptions of war and of individual life appear to be more those that can be instilled into the minds of every individual of a unit, rather than those which require an expert body to carry out.

At the same time I do not think, from what I gather, that the medical officers of the army are satisfied. They regard, or at any rate some of them regard, our proposal to have a special body of men to deal, for example, with the selection, purification, and distribution of water, as strictly sound. On the other hand, the commanding officers, who are inclined to agree with this view, say that everything is possible where there is no financial objection; but that questions of finance must regulate such matters very largely in Japan. They have also a very good record to bring forward in regard to the absence of preventable disease, so far as the war has gone at present, without such an organization.

Personally, I am of opinion that much of this exceptionally good result is due to the fact that the boiling of water is instilled into the men's minds perpetually, as well as other sanitary lessons.

I have already submitted a translation of a pamphlet issued to every soldier and read to him and explained at least twice in every month.* Another pamphlet has just been issued on the subject of plague and cholera, and a translation of it is forwarded at the same time as this report is forwarded.†

As regards the sanitary works carried out by the sanitary committee of a battalion, I do not see anything in them which satisfies the requirements of prevention of disease, according to any scientific standard, although they are, no doubt, useful in many ways, in leading to the cleansing of villages.

The main lesson to be learnt is that the battalions do their own sanitary work, that they are supplied with no special apparatus to enable them to do so more efficiently or accurately, but that they are thoroughly trained in "personal hygiene."

They are left very much to their own resources. In fact, a division is left to take its own methods of sanitation by the army commander, a regiment by the division commander, a battalion by the regimental commander, and company officers by their battalion commanders. The general ideas only are given by the higher commands.

The medical officers are never anything more than advisory officers and instructors in sanitary matters. Sanitary orders are always issued by the combatant commander. Medical officers have told me that this is the only way in which they can get their recommendations obeyed properly. Some have gone so far as to say that they find it better to make the company officers or even the non-commissioned officers lecture to the men on sanitary matters, in their place, as the men obey better the lessons taught by their own unit commanders.

As regards punishments for disobedience in carrying out sanitary regulations, such as the drinking of water that has not been boiled, I am informed that such punishments are mild, and generally take the form of a parade of the culprit's company and a lecture to the culprit in its presence.

On inquiring how the swallowing of creosote pills was carried out day by day, I was informed that the non-commissioned

* Report 26, page 403. † Report 27, page 413.

officer of each squad was responsible for seeing each man take his pill after each meal. At first the men did not like this, but they are now accustomed to take the pill. The medical officers of the battalions in question consider that the use of the creosote pill has been of much value in averting disease.

The pills are supplied by the medical department. They are issued to the men monthly, the supplies being obtained from the Field Medical and Surgical Reserve Depôt. This depôt also supplies any disinfectants that may be required in the field, with the exception of such as may be obtained locally by a battalion on purchase by its intendance officer.

Another point that may be worth mentioning in connection with battalion sanitary arrangements is, that, from time to time, comforts of various kinds are sent up by the Government, purchased out of funds voluntarily subscribed for the purpose by the public.

The public were clearly given to understand that an indiscriminate inflow of gifts and comforts for troops in the field would lead to endless trouble, and might also lead to the gifts never reaching the men. They were advised, instead, to subscribe the equivalent value of the gifts in the form of money, and a department was formed at the War Office and at the Admiralty to utilize such funds for the benefit of the soldiers and sailors. In this way each man in the field has an issue from time to time of a "comfort package" containing such things as tooth brushes, tooth powder, insect powder, towels, &c., which he does not receive as a regular issue from Government.

The drawings in the appendices must be regarded merely as diagrammatic, for the purpose of illustrating the description of the sanitary arrangements. The plan, for example, of the village hut may apply to a few only. There are all kinds and sizes, but each is arranged on the same principle, of an entrance hall and rooms containing platforms, or oven beds, on which the men sit and sleep. A point, which is of considerable sanitary importance, is the fact that the men always remove their boots or shoes before getting on to the *kang*. This is due to the Japanese custom of never entering a house, or rather of stepping on matting or carpet, &c. with the boots on. It is a most sanitary custom, so far as the maintenance of cleanliness inside a quarter is concerned.

The village hut shown in the plan is one of the smaller huts. Similar or larger huts would be found on the adjoining pieces of ground, but the size of the hut would not depend on additional rooms, but merely on additional size of rooms, arranged as shown in the plan.

As regards the diagrammatic plan of the ablution arrangement, the principle shown in it was carried out in a variety of ways. A common arrangement was to dig the flue hole through the mud wall of the house yard, so as to have the chimney separated from the bath by the wall.

The construction of the village huts, almost universally, is of brick, with windows covered with paper instead of glass, floors of

mud or rough brick pavement, roofs of *kaoliang* thatch and pent, the interior open to the rafters, and the inside walls plastered with mud. The *kangs* are built of brick, and are plastered with mud both on the top and on the sides. A piece of matting covers the top. All the windows open, and the frames can be removed with ease. The rooms are not only bright, as a rule, but airy and well ventilated.

The chief sanitary defect of these Chinese huts lies in the amount of old furniture and accumulated dust in, around, and underneath them, and in the dirtiness of the ceiling rafters, &c. Similar dirt and dust fill the numerous cracks and corners in the walls and *kangs*, and these, as well as the woodwork and matting, are full of bugs, fleas, cockroaches, and other insects.

The Japanese enter the huts while they are in this dirty state. It is only afterwards that they begin to clean them out.

APPENDIX 1.

Army Orders issued to the Second Japanese Army for the Prevention of Disease during the Summer. (Issued May 1905.)

(1.) *Maintenance of Cleanliness in Quarters and their Vicinity.*

It is the duty of each unit to clean the quarters in which it resides.

It is also the duty of a unit to clean any neighbouring village that is not occupied by another unit.

The following measures will be taken for cleaning villages:—

(*a*) All refuse will be burned or buried.

(*b*) Surface channels will be made for dirty water.

(*c*) Wells will be protected, so as to prevent dust and dirty water getting into them.

(*d*) Latrines will be made for the men of the unit and also for men passing through the village. The latter must be constructed in two sections, one for Japanese and the other for Chinese.

(2.) *Regulations for Food and Drink.*

Each unit must arrange one or more places in its village where the soldier can always get boiled water to drink, so that the rule, by which the soldier is absolutely forbidden to drink anything but boiled water, may be carried out.

All articles of food must be cooked.

Chinese are prohibited from selling food direct to soldiers in the villages. But in places where the Chinese cannot be prevented from keeping shops where articles of food are sold, they must be made to keep the articles covered over so that they are not contaminated by dust and flies.

(3.) *Clothing and care of the Body.*

Shirts, socks, and other underclothing must be washed as often as possible.

An abdominal sash or binder (*hara-maki*) must be worn always.

The upper clothing and blankets must be hung up in the sun frequently.

The body will be kept clean by baths and by rubbing. The hands and feet specially must be kept clean, and they will be washed with soap.

(4.) *Health Inspections of the Chinese.*

As the Chinese are constantly coming to and leaving villages, health inspections must be constantly repeated.

The method of inspection must not be too strict, otherwise the Chinese may become frightened and not appear for inspection.

When a Chinaman is found suffering from infectious disease, a battalion medical officer must treat the case.

(5.) *Lectures to Soldiers on Hygiene.*

When a unit is stationed for any length of time in any one place, the medical officers will give lectures to the men at least twice monthly. The lectures will be on the lines of the Soldiers' Health Memoranda for the Prevention of Disease in the Field.

In addition to the rules in this pamphlet, the soldier must be told that he is to avoid eating food sold by the Chinese. He must also be told to avoid the risk of venereal disease, because the venereal diseases amongst the Chinese are extremely dangerous. Besides, a soldier disgraces himself by getting venereal disease.

(6.) *Boiled-water Stations.*

Soldiers on the march must be prohibited from drinking water that has not been boiled. For this purpose, units will establish, in their village, places where troops passing through may obtain boiled water.

These places must be indicated by a placard.

A boiled-water place must, especially, be established at the food distribution depôt.

APPENDIX 2.

Scale of Rations issued to the Japanese Soldier.

(N.B.—There is no difference between summer and winter rations.)

A. *Daily Issue.*

Article.	Quantity.
Rice (uncooked)	1 quart (about 2 lbs. by weight).
Tinned meat, or fish (salmon)	$\frac{1}{3}$ lb.
Dried vegetables	$\frac{1}{4}$ lb.
Pickles	2 ozs.
Sauce (*soyo*)	1 oz.
*Miso**	1 oz.
Salt	$\frac{1}{2}$ oz.
Sugar	$\frac{1}{2}$ oz.
Tea	$\frac{1}{7}$ oz.

B. *Periodic Issue* (once or twice weekly).

Saké (Japanese spirit)	$\frac{1}{5}$ litre (·35 pint).
Fresh meat	1 lb. with bone.
Cigarettes	20 (*i.e.*, two packets of 10 cigarettes each).

C. *Irregular Issues* (at indefinite times).

Japanese cake	$\frac{1}{2}$ lb.
Fresh fruit	Two or three oranges, peaches, apples, &c. at a time.

Remarks.—The rice ration is usually two-thirds rice and one-third barley. This mixture is supposed to be a preventive against beri-beri. The pickles are either pickled plums or mixed vegetables.

* *Miso* is a bean meal made into sauce.

[*After page* 443.

No. 1.

Troops making surface drain in village street, Tang-hsiang-kung-tai. The unit medical officer and a company officer are superintending the work.

No. 2.

A Chinese village house, Ku-cheng-tzu, cleaned and drained by Japanese troops. The foreign attachés inspecting the sanitary arrangements are shown in the photograph.

[*After page* 443.

No. 3.

Interior of Chinese house at Chang-tu Fu, occupied by Japanese troops, showing the men's mess-tins, covered with clean white cloth. The tins are filled with boiled water kept for drinking purposes.

No. 4.

Interior of Chinese house, Chang-tu Fu, converted into a barrack room for Japanese troops.

[*After page* 443.

No. 5.

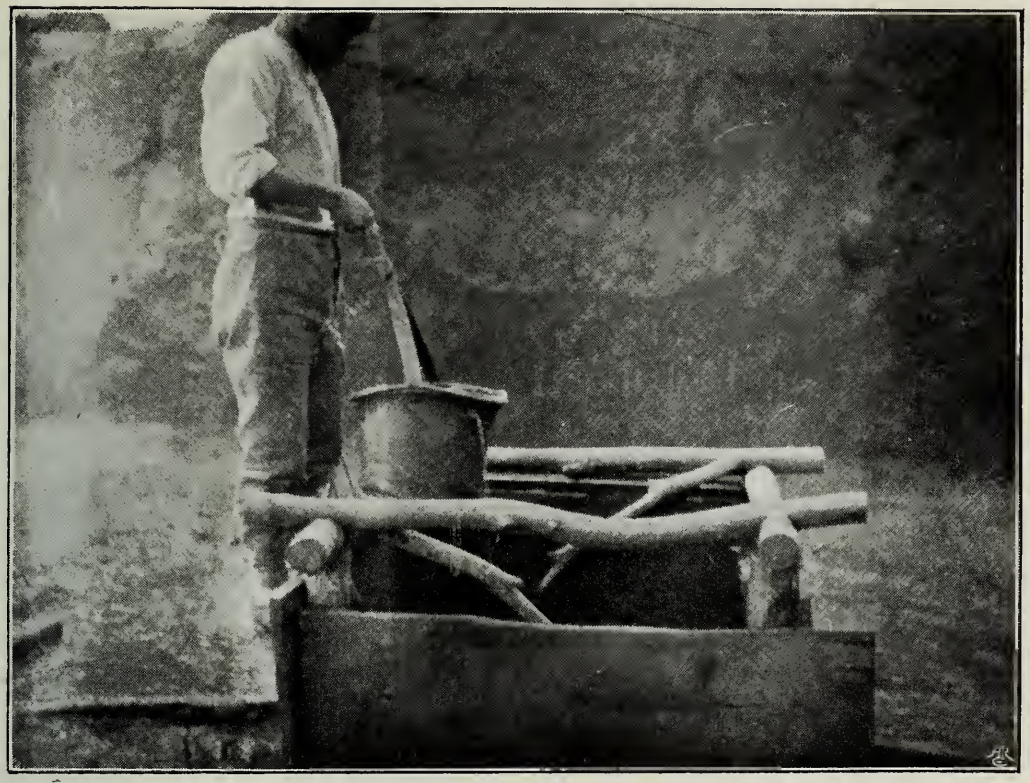
Typical scenery of the area occupied by Japanese troops, 2nd Army, during the summer of 1905, in the neighbourhood of Chang-tu Fu.

No. 6.

Village well, Ching-yun-p'u, guarded by sentry in order to prevent washing of clothes or rice in the neighbourhood of the well. A wooden coping and lid have been placed at the mouth by the Japanese troops.

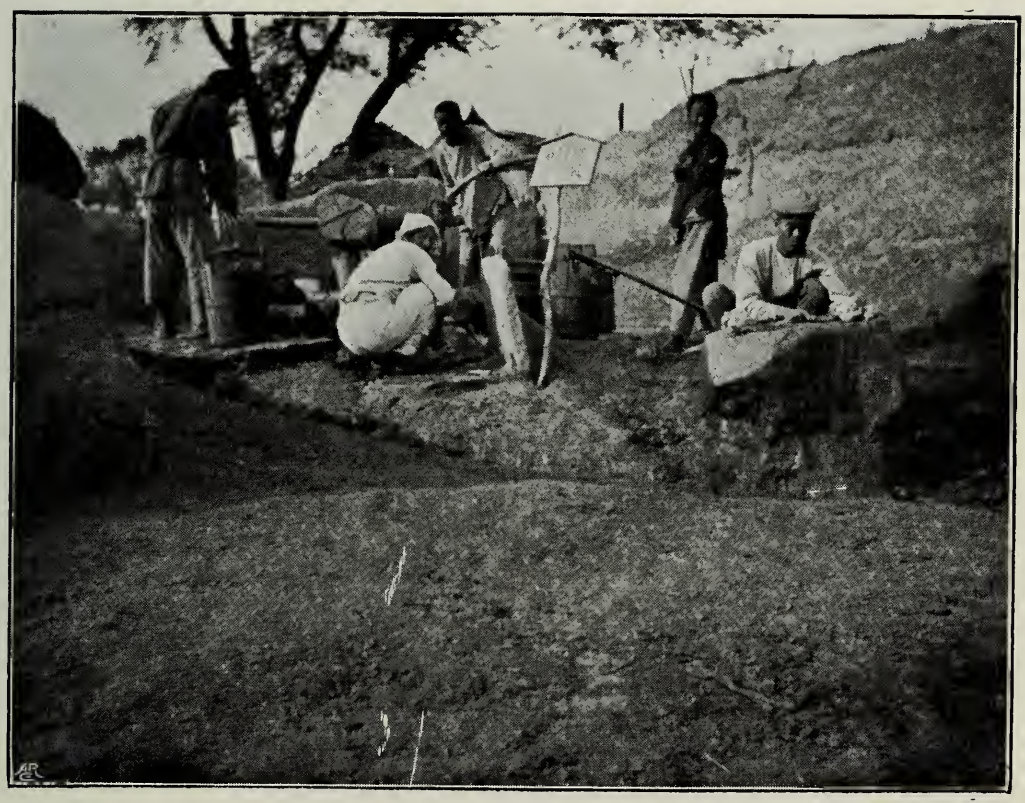
[*After page* 443.

No. 7.



Japanese soldier drawing water in military canvas bucket from village well, Tang-hsiang-kung-tai. The wooden coping was placed over the mouth of the well by the Japanese.

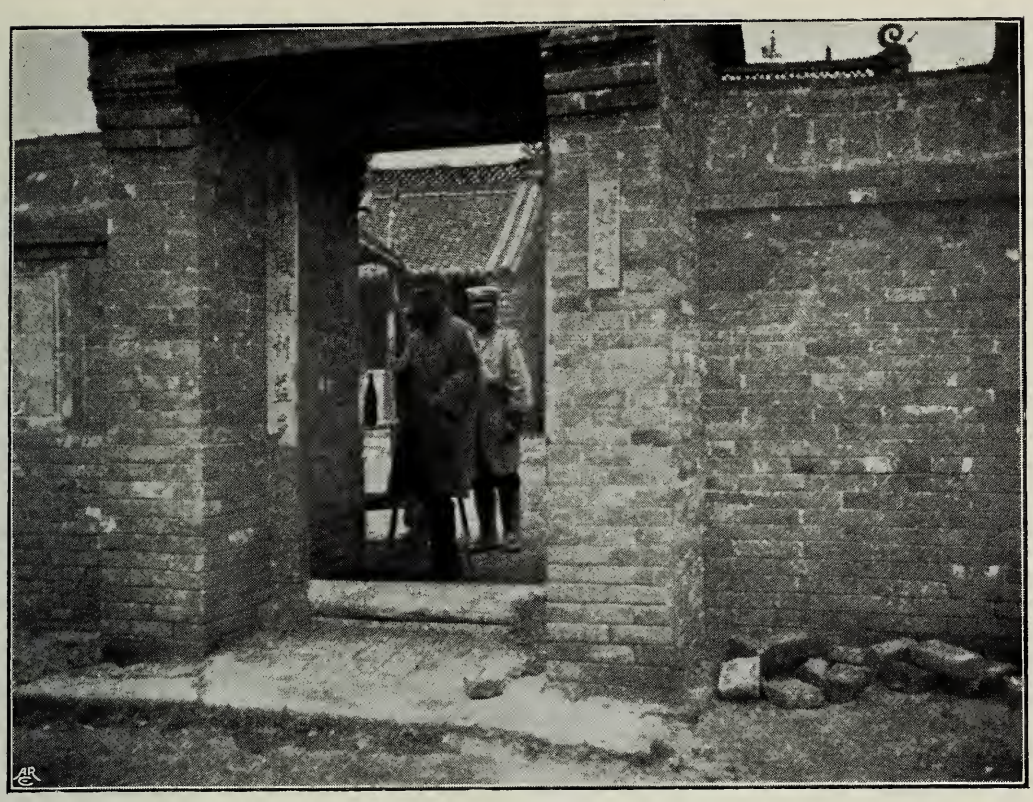
No. 8.



Soldiers washing clothes near mouth of village well, Ching-yun-p'u. There is no sentry over the well, and the water is not intended for drinking purposes.

[*After page* 443.

No. 9.



Outside of a drinking water station, established at village temple, Ku-cheng-tzu. The placard states, "Here boiled water may be obtained from 8 a.m. till 8 p.m." The bottle shown in the photograph is a bottle of boiled water.

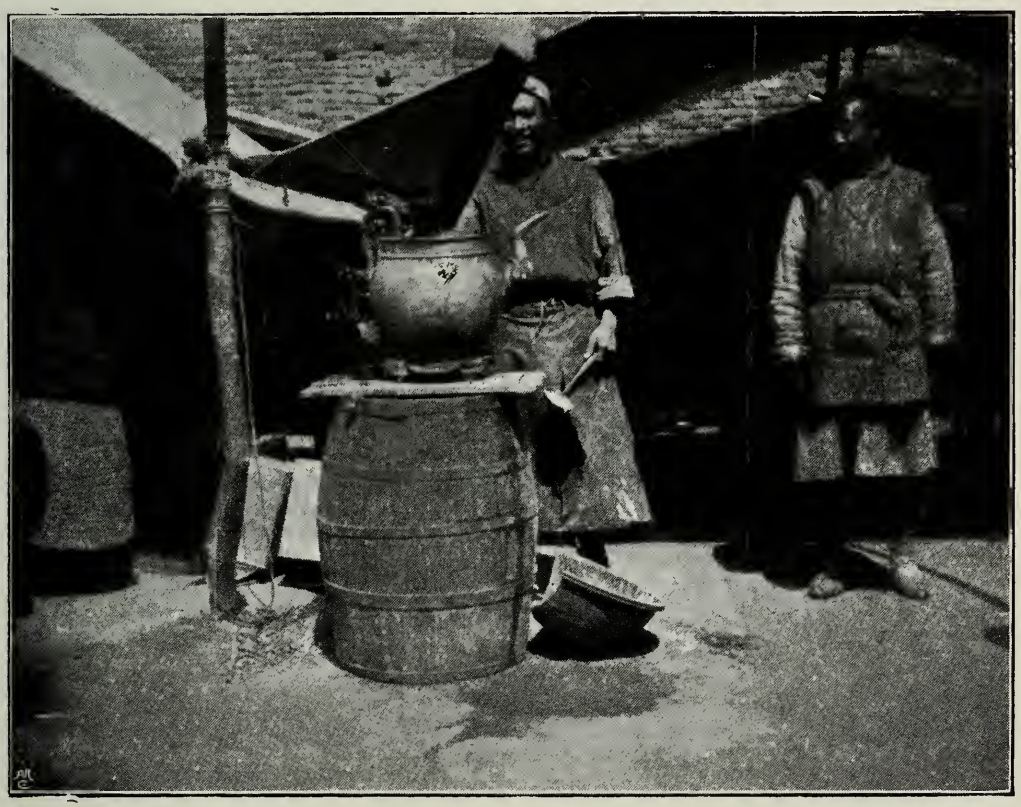
No. 10.

Inside drinking water station at temple, Ku-cheng-tzu, showing the Chinese cooking place where the water is boiled; a Japanese military water bucket for storing unboiled water, and bottles filled with boiled water.

No. 11. [*After page* 443.

Captured Russian kitchen waggon, used by the Japanese at one of their water stations. A Chinese boy is filling a Japanese soldier's water bottle with boiled water from the waggon.

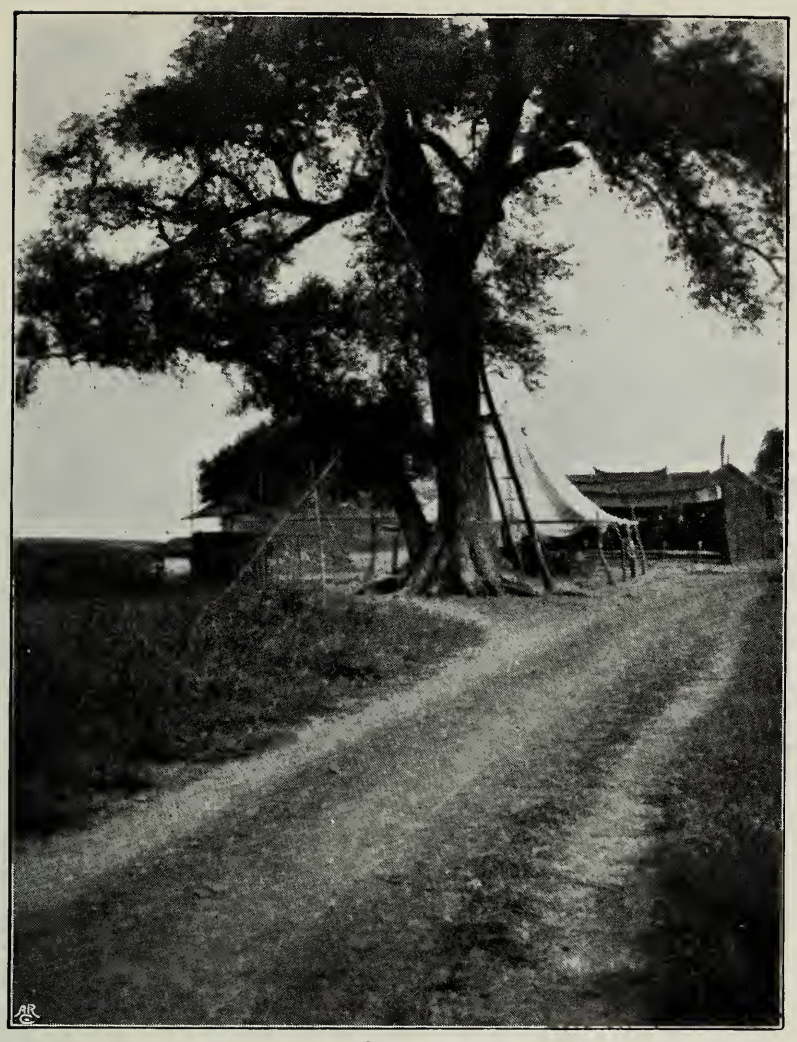
No. 12.



Chinese kettle, used generally at tea shops in China. The water is boiled by charcoal lighted inside the funnel, which is inserted into the kettle. The photograph was taken in a street in Mukden.

[*After page* 443.

No. 13.



A typical Japanese water station, during the summer of 1905. It is in the village of Tang-hsiang-kung-tai and shows tripod for the Ishiji filter (*see* "Report on filters," page 497), boiling place screened off, rest tent, and, in the background, an improvised theatre for entertainments.

No. 14.

Station for boiling water at Tang-hsiang-kung-tai, during summer of 1905, showing field kitchen and rice cauldron for boiling the water, with the Ishiji filter for clarifying the water beyond.

[*After page* 443.

No. 15.

A boiled water station on the line of march in the Liao-tung peninsula, summer of 1904. The Chinese earthenware jar was kept filled with barley water.

No. 16.

Soldiers washing clothes and filling water bottles at mouth of an unguarded well, inside town of Hai-cheng, summer of 1904.

No. 18.

An officer's bathroom, Ku-cheng-tzu, summer of 1905. The bath is the open earthenware jar. The inverted jar, with the hole knocked out of the bottom, is the chimney of the flue from the fireplace, which is made in the ground under and around the bath. A screen is made partly by the mud wall of a village compound and partly by Chinese matting and *kaoliang* stalks.

No. 17.

Auxiliary soldiers filling water bottles direct from a well on the line of march to Hai-cheng, summer of 1904.

[*After page* 443.

[*After page* 443.

No. 19.

General view of a soldiers' bath made out of Chinese earthenware vessels, showing stoke-hole, fire-hole, bath and chimney (the inverted vessel). A mill-stone slab is placed beside the bath for the bather to stand on, a scoop made out of a gourd is shown on the left of the bath, and on the right there is a channel cut in the ground for carrying off the slops. The bather soaps himself while standing on the slab, and washes off the soap before sitting in the bath. (*See* plate below, No. 20.)

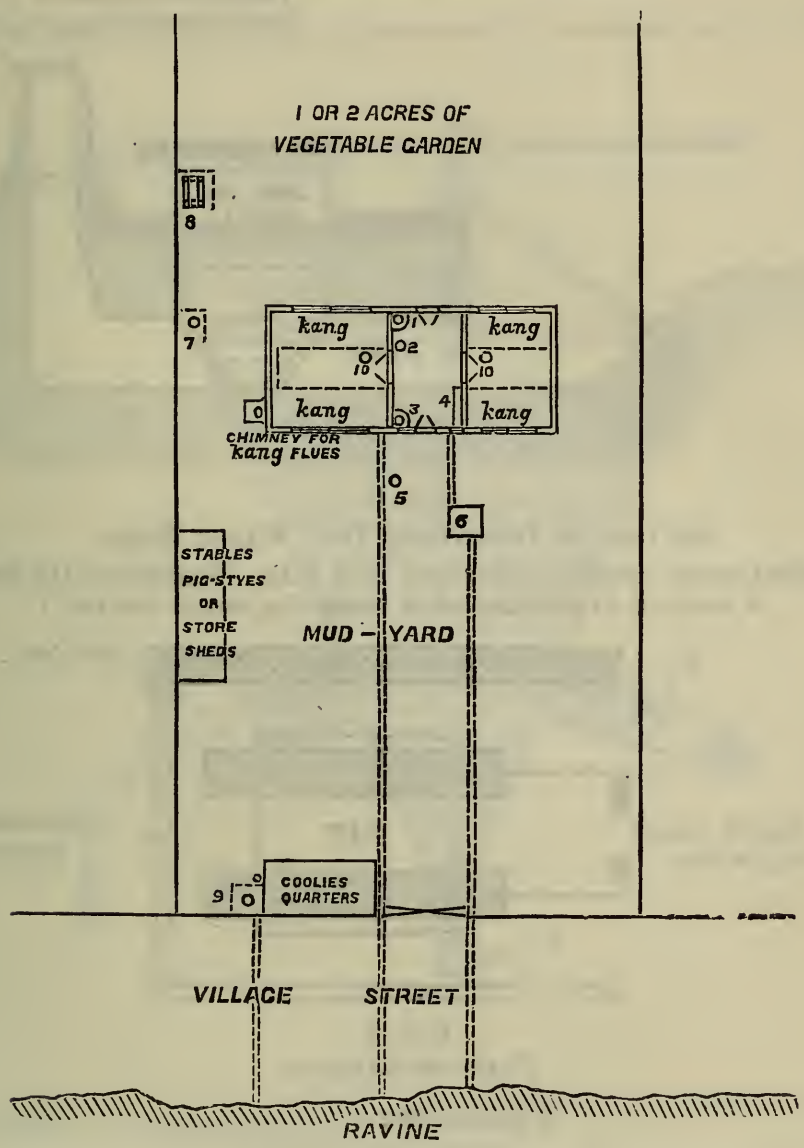
No. 20.

Japanese soldiers bathing in improvised bath, Ching-yun-p'u, summer of 1905.

APPENDIX 3.

Plan of Sanitary Arrangements of a Chinese Village Hut, as occupied by Japanese Soldiers.

(*Scale*, 1 *inch* = 20 *feet approx.*)



Explanation.

The hut is occupied by one squad, or 16 men. They sleep on the *kangs*, or bed platforms.

(1) Chinese fireplace, for heating the *kangs* in winter, with cauldron for cooking. This is used by the soldiers for boiling drinking water.

(2) Chinese jar for storing unboiled water.

(3) Same as (1), used by the soldiers for cooking their food.

(4) Chinese cupboard, used by the soldiers for keeping their food and eating utensils.

(5) Earthenware basin of water, used for washing hands after coming from latrine or urinal.

(6) Soak pit for slops.

(7) Hole in soil, as urinal.

(8) Pit in soil as latrine.

(9) Earthenware jar, on improvised fireplace, used as bath.

(10) Earthenware jars, used as spitoons.

= = = = = Surface channels cut in the soil.

APPENDIX 4.

Plans of Bath, Latrine, and Boiler, as used by Japanese Soldiers in Chinese Village Hut.

(*Scale*, 1 *inch* = 4 *feet approx.*)

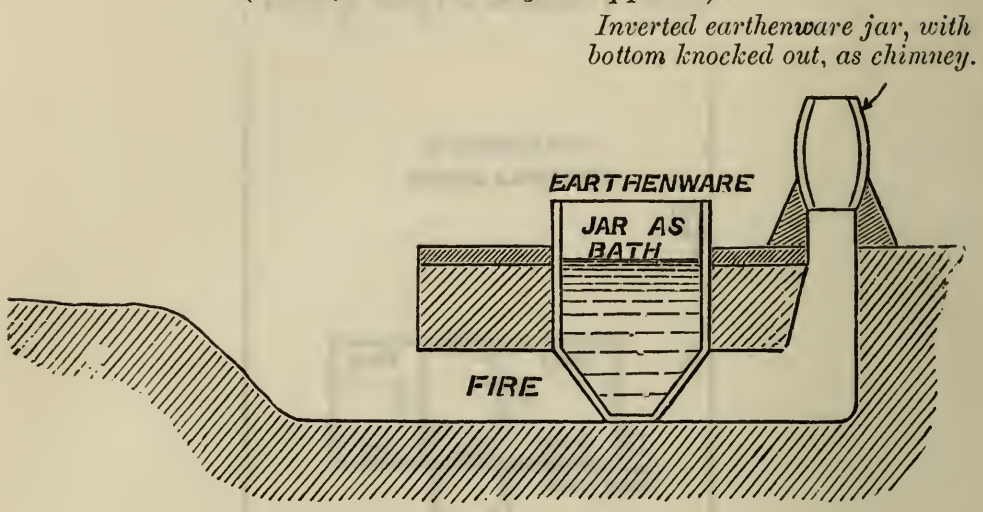


Fig. 1.

Section of Improvised Hot Water Bath.

(A bamboo screen usually surrounds this bath. Sometimes the fireplace is made of bricks instead of being dug out of the soil.)

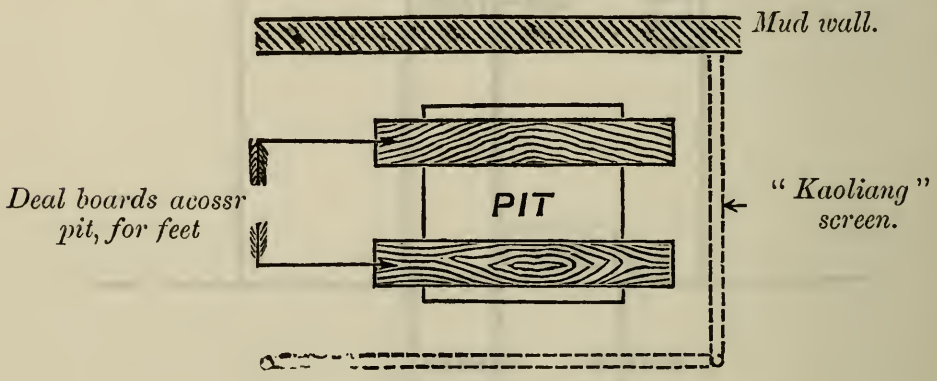


Fig. 2.

Plan of Latrine.

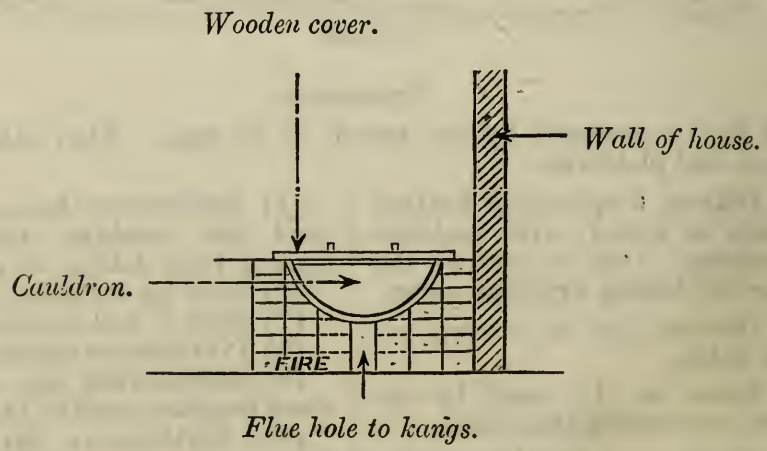


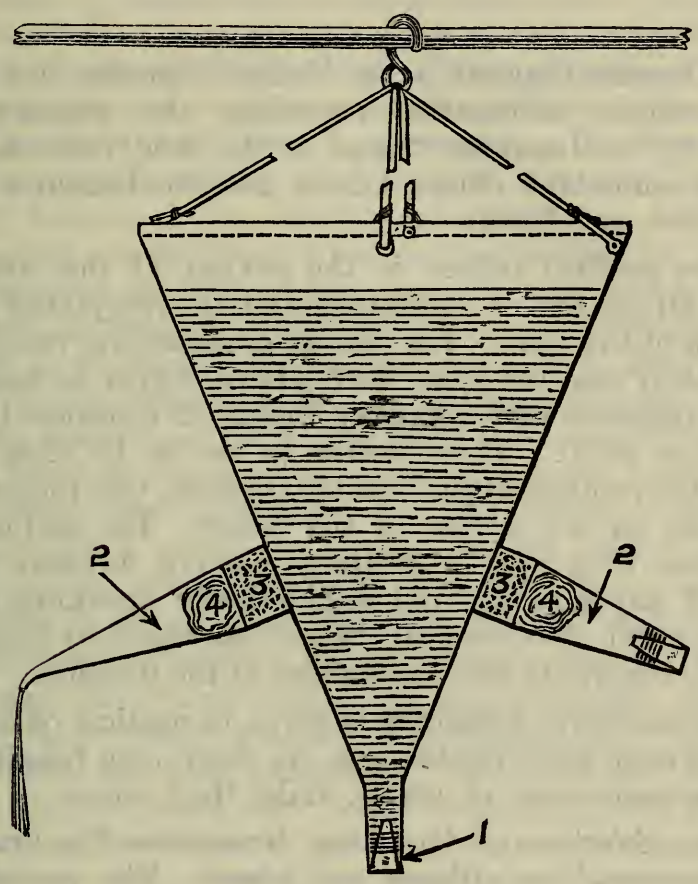
Fig. 3.

Section of Chinese Fireplace and Cauldron used for Boiling Water and Cooking.

APPENDIX 5.

Plan of Ishiji's Filter, issued to Japanese Troops in the Field.

(*Not drawn to scale, but, approximately, one inch = one foot.*)



Description.

The filter is shown hanging from a beam, with the apex (1) tied up.

2, 2 = sleeves let into the sides, containing

3, 3 = metal perforated cylindrical boxes of granulated charcoal, and

4, 4 = sponges.

One of the sleeves is shown tied up.

Both sleeves are slipped on over an inset, containing the charcoal box, so that both box and sponge are easily removed for cleansing.

The precipitating powders are mixed with the water in the body of the filter.

Both body and sleeves are made of waterproof canvas.

A metal ring, shown by dotted line, with joints for folding, is let into the rim, by which the filter is suspended.

(32) Sanitary Arrangements in the Japanese Army.

REPORT by Lieut.-General C. J. BURNETT, C.B. Head-Quarters Third Army; 19th May 1905.

The Director-General Army Medical Service, having asked me for certain information regarding the sanitary system followed by the Japanese troops in the field, from the point of view of a combatant officer, I have now the honour to reply to his questions as follows:—

1. The medical officer is the adviser of the commanding officer in all matters of sanitation, and in everything regarding the health of the men. The officers commanding companies, &c. see that their men act upon such advice, which is usually published in battalion and company orders if considered specially necessary so to do. There seems to me to be close intimacy between the combatant and medical officers, the former placing great value on the advice of the latter. The medical officers realise that they are, in sanitary matters, advisers only, and friction of any sort or kind is, practically speaking, unknown. If it does occur the medical officer can report to his divisional chief, who reports to the commander of the division.

2. No executive authority is given to medical officers except over their own subordinates, and in their own hospitals. The bearer companies are, of course, under their orders.

3.—(a) *Selection of Camping Grounds.*—The army is now always quartered in villages and towns. The procedure as to the selection of quarters is as follows: The general line to be occupied by an army corps is fixed by Army Head-Quarters. Then the army corps commander assigns positions to the various divisions of his corps, division commanders to brigades, and brigade commanders to regiments, and so on. The adjutant of a regiment, as staff officer to the regimental commander, fixes the battalion quarters, which are eventually told off to companies by company commanders. The first and primary object is tactical, and, if tactics and sanitation clash, sanitation goes to the wall for the immediate moment, but no time is lost in taking sanitary precautions and in improving the sanitary surroundings of all places occupied by any body of troops, however large or however small. The work of digging and clearing is done by hired Chinese labour. I may cite here an instance of such care. During the battle of Mukden a portion of the Third Army found itself hung up in a village in which all the water was very bad. Its drinking water was carried a distance of

one mile and a quarter from an adjacent village. The troops which have the worst quarters in one cantonment get the best in the next. Battalion, unit, and company commanders see that the medical officers' recommendations are attended to.

(b) *Providing Water Supplies and safeguarding them from contamination.*—A medical officer always accompanies the advanced guard. He at once examines all the wells roughly, and pronounces as to their fitness or otherwise for drinking purposes, but, in any case, the water is always boiled before use. This the men do themselves in their mess tins. The medical officer is responsible for posting notices on all the wells as to quality, and informing all concerned. Samples of water are sent back to divisional head-quarters by the medical officer, where they are carefully analysed if necessary. No latrine* or urinal is permitted within 20 yards of any well or house occupied by troops. I am credibly informed that, besides the notices, sentries are placed on wells unfit for drinking, and an officer has assured me that he saw a sentry on a well for a part of a day, but, personally, I have never yet seen a sentry on any well. This may be due to the fact that up to the present I have only been in villages with the army corps head-quarters, and now the water is so good that there is no need for sentries. Moreover, here the water is all boiled and issued to the troops by the commissariat department. My own opinion is that those responsible trust a great deal to the common sense of the men themselves, and to the careful instruction they have received in such 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, which I know was not good water, some of them tried to fill their water-bottles, and would have done so had not their company officers prevented them. 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 these duties is gauged by carefully kept statistics.

(c) *Methods in use for Purifying Drinking Water.*—Boiling is the sole means, up to date. A new apparatus for the purification of water has been invented by a Japanese medical officer, and is about to be issued to every unit. I will watch for it and report. I cannot do better than quote the following, to show how the Japanese soldier observes generally sanitary rules. 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

* These latrines are *emptied* here by Chinese when half full. They are 1 yard deep, about 1½ feet wide, and as long as required.—C. J. B.

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 an *etappen* station, where he knew he would find boiled water, and there filled them and returned. At all *etappen* stations boiled water is kept on hand ready for immediate use.

(d) *Other Measures for Preventing Disease.*—Nothing which care and foresight can devise to minimize danger from climatic or other causes is left unconsidered by the Japanese. Suitable and seasonable clothing is issued. Thus, on or about 15th April, when warm clothing was withdrawn from the troops, an excellent light khaki dust-coat was issued. *Kummerbunds* of flannel are worn. Pills for prevention of dysentery, cholera, and enteric fever are given to the men in small boxes to be taken, one after each meal, during dysentery season. Vaccination is enforced in any district in which smallpox is prevalent. Barley is mixed with men's rice ration as a preventative against beri-beri. Glasses are issued to every man as a protection to the eyes during dust-storms. Cleanliness in clothing and person is strictly attended to. Teeth are carefully looked after. A soldier's hand-book is issued, which contains, amongst other things, rules and guidance for the preservation of health in the field.* Strict supervision is exercised for the prevention of all sorts of venereal diseases, and all the houses where loose women reside are carefully watched by the military police. The inhabitants are made to keep the town or village clean if it is occupied by soldiers. Barrels for boiling water on the march are being introduced. This is copied from the Russians. In order that men's feet may get hard and men accustomed to marching, all reinforcements are sent by road from the port opposite Dalny. This puts men into good condition, and when they join their units they are fit for the hard work before them. Lines of communication are kept wonderfully clean, and, in a 40 mile ride to join this army, though I passed over ground which had been the scene of very heavy fighting, I only saw one dead animal, and that was a dog. Most of the Japanese soldiers are inveterate cigarette smokers, but, as the tobacco is not strong, it does them no harm, and I often wonder whether it has any appreciable effect in warding off disease.

4. The whole responsibility for disciplinary control as regards the carrying out of orders by the troops relating to the prevention of disease, and the preservation of health, rests in the hands of officers commanding battalions, units, &c., acting on the advice and in consultation with their medical officers. If men break rules they are reported to their commanding officers by company officers. Some commanding officers punish on such occasions, some do not. As I have previously stated, much reliance is placed on the men themselves and their sound

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* Report 26, page 403.

and thorough teaching in peace time. In the case of the pills, issued in small boxes to the men, for the prevention of dysentery, cholera and enteric fever, which, even the medical authorities admit, have an atrocious odour, and which the men are supposed to take three times a day, it seems to be taken for granted that the men will obey orders and take them, which, as a rule, they do. If a company commander has reason to believe some of his men are not doing so, he tells off a trusty private to find out, and let him know what is really going on. The effectiveness of disciplinary control is judged by results, that is, if a battalion shows by statistics more than a proper proportion of sickness, as compared with other battalions in the brigade, circumstances being similar, I fancy that commander would have to give very good reasons for such excess sickness. The same applies to a company in a battalion, very strict and careful statistics are kept under this head.

5. All combatant officers, from the highest to the lowest, attach the greatest importance to the enforcement of sanitary measures as a means of contributing to the fighting efficiency of those under their command. I cannot emphasise this better than by quoting the opinion of General Nogi. The P.M.O. of this Army told me a few days back, that, for the past year, there had been only five cases of typhoid fever in the whole of the Third Army. During one of the many conversations it has been my good fortune to enjoy with General Nogi, I mentioned this to him, and said that, although we had excellent sanitary rules and regulations for the guidance of troops in the field, yet we had never succeeded in doing away with heavy casualties due to their non-observance. He replied that during the Japanese-Chinese war they themselves had suffered most severely in consequence of the ignorance or neglect of the men to recognize the necessity of strictly observing the sanitary rules issued for their guidance, more particularly amongst the younger soldiers who came up to fill up gaps caused by war. The authorities so took this to heart that, directly after the war, improved rules and regulations were drawn up, and all soldiers were thoroughly instructed in peace time as to their purport, and the necessity of their strict observance, and what neglect of them meant to their country, army, and comrades. This teaching has been so thorough and effective that the result sums up—practical immunity from all diseases which have hitherto followed the footsteps of all big armies in the field. Good as were the results last year, General Nogi told me he hoped for even better in the year to come, because the older soldiers would take the younger ones in hand and insist on their paying strict attention to rules which had worked so well in their own case.

6. The general and individual opinion seems to be that boiling the water before drinking and looking carefully after the water supply demands the greatest attention. This of course must include selection of sites for latrines, filling them in

periodically, general cleanliness, and the taking of preventatives issued. But, all said and done, it is to the constant use of boiled water for drinking purposes that reliance is placed for the prevention of disease. For further particulars on this head see remarks under paragraph 3, clause (d). On this subject of supervision I may perhaps be allowed to offer my own remarks, based on personal observation and conversations with Japanese officers of all ranks. I ask myself, is this immunity from disease secured solely by close and constant supervision? The only answer I can find is that it cannot be so, inasmuch as, all things being equal, supervision, however close, can but secure a certain percentage of reduction in the number of deaths and sickness. It will not, and cannot, bring about practical immunity. What then is the cause? I make bold to say that the efficiency of the Japanese army remains unimpaired in this connection for the following reasons:—

(i.) They learnt their lesson in the Chinese-Japanese war.

(ii.) They profited by this 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.

(iii.) These rules and regulations have, for the past 10 years, been so inculcated into the minds of all concerned that they have become household words with them.

(iv.) The individual soldier has 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.

(v.) The extraordinary eagerness of every soldier to be of use to his country, and a corresponding determination on his part not to allow any indulgence or neglect of rules to impair his fighting efficiency.

(vi.) The care taken by the older soldiers, indeed by the mass of the men, to keep the few waverers in the right way.

When you once get this feeling into the ranks of an army, combined with sound proper teaching in peace time, you do not need that close and constant supervision on which we place so much reliance.

7. After having written the above I thought it would be better, before sending it off, to verify the statements made; Surgeon-Inspector Major-General Ochiai, M.D., of the Third Army, gave up a whole morning to hearing it translated in my presence, which is another of the many acts of kindness that I have received at the hands of Japanese officers. He also gave me a copy of the soldier's "Sanitary Book in the Field," together

with a pamphlet describing the apparatus alluded to in paragraph 3, subhead (c), which I enclose with this report.* The Major-General told me that medical officers lectured the men once a week on all subjects regarding the preservation of their health whilst in the field. When I said that water was sent back by the medical officer with the advanced guard, for analysis, if necessary, I made a statement which is misleading. No water is ever sent back, but if a division halts for any time in one place, the waters of the various wells, or other sources of water supply, are carefully analysed should any doubt exist as to their purity, paragraph 3, subhead (b). As regards the danger attending the drinking of impure water, and the rapidity with which water can become contaminated, Major-General Ochiai told me the following:—

There was, before Port Arthur, an advanced post of about 300 men, whose drinking water came from a small well they themselves had made in the valley below their post. The post was in such close proximity to the enemy that fires were out of the question, and boiling the water impossible. This water was good enough unboiled until, one day in August, a heavy storm of rain came on which flooded the well and no doubt filled it with impurities. The men drank the water as usual, and next morning they were nearly all down with dysentery. With reference to loose women: if the Japanese stay any time in a town, all the women are examined daily by a medical officer. Those diseased are sent to hospital and attended by Japanese medical officers. They do not attempt to stop the trade of the sound women, but keep close supervision over them, as I have already pointed out.

* For translation of this pamphlet, *see* Report 39, page 487.

(33) Further Remarks on Sanitary Regulations in the Field.

REPORT by Lieut.-General C. J. BURNETT, C B., Head-Quarters Third Japanese Army, 1st July 1905.

In continuation of my memo. of 24th May, containing answers to queries by the Director-General, Army Medical Service,* I have now the honour to offer the following further remarks, made after a week's journey to the front:—

Everywhere I went I was immensely struck by the cordial relations which existed between the combatant and medical officers. Remarking on this one day to General Baron Oshima, he said: "Yes; and whereas formerly the soldiers looked upon "the medical officers simply as men who gave them medicine "when they were ill, all ranks now realised the fact that they "were men who, if their advice was followed, helped to keep "them in health, and that consequently great attention was "paid to what they said."

The men were all put up in villages and comfortably and well housed. I visited many of these and found them all very clean and tidy. No overcrowding. The unit commander was responsible for the supervision of all sanitary details, and the senior officers, from general downwards, took the greatest interest in seeing that nothing was neglected for the comfort and preservation of the health of those under their command.

Water was, as I before said, always boiled, and I noticed that in almost all cases the water was taken from the receptacle by a long-handled tin pannikin, and no man put his own drinking cup into the water. This pannikin was in the bucket with the water, and with it soldiers drew and filled their own cups. This, no doubt, is an excellent plan; but I have seen cases in which this regulation was not complied with—I must admit they were few. Drawing of pannikin is attached.† I

* *Vide* Report 32.

† Not reproduced. The drawing represents a tin can with an improvised wooden handle.

did not see any attempt to keep dust out of water; but, on the other hand, this is practically the rainy season, and there is therefore not much dust about. Still, in a hospital I visited I noticed that they were very particular in this respect, and covered every open receptacle with a clean linen cloth. As regards cleaning water, I saw a thing I have never seen before when going up the Liao River in a junk. The river is simply a mixture of yellow mud and water, with the mud predominating, I should say. The sailors drew a bucket of this stuff out of the river, and threw into the bucket a handful of crushed haricot beans, when the mud began to settle at once, leaving perfectly clear water on the top. The men who did this were Chinese, not Japanese.

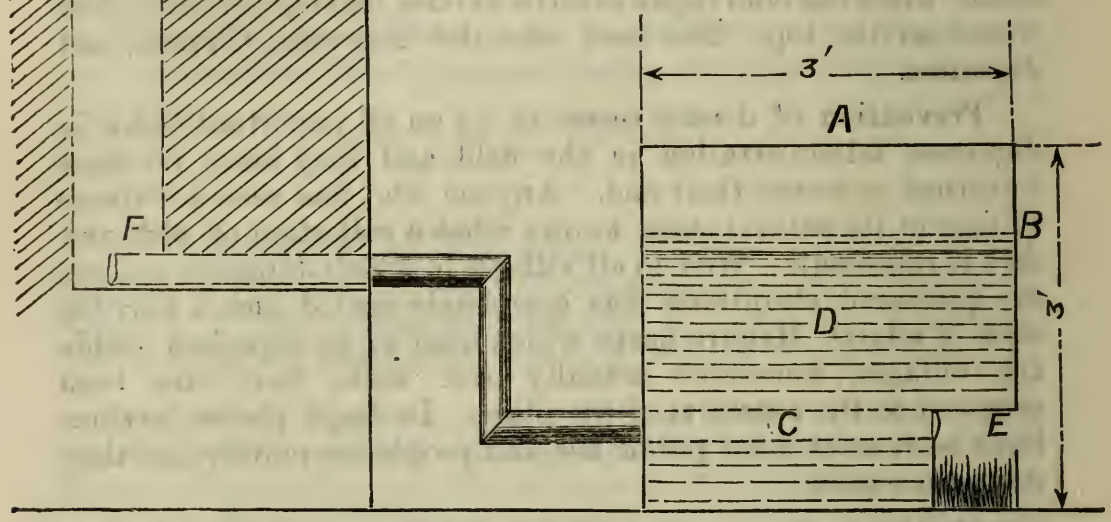
Prevention of disease seems to be an all important factor in Japanese administration in the field, and they leave no stone unturned to secure their end. Anyone who has seen a Chinese village in its natural state knows what a collection of filth and dirt it represents. Well, in all villages in which Japanese soldiers are quartered, cleanliness has completely ousted such a horrible state of affairs. Manure heaps which used to be deposited inside the villages, sometimes actually over wells, have now been removed to the outskirts of the place. In large places latrines have been erected for public use, and people are punished if they do not use them.

At the commencement of the hot season all dogs had to be registered, if not they were killed. Some 200 were so killed in this place alone and their skins sold, the money received for them being given away in charity. The registered dogs wear a wooded ticket round their necks, tied on with string. All roads have to be put in order, and, as they generally churn up into thick black mud during rainy weather, the Japanese have carted any quantity of sand into the place to put down. In all villages where this is possible the roads are now very good, comparatively speaking. Drains have to be seen to, and the Chinese houses themselves have been thoroughly cleaned out before occupation by officers or men. Every Chinaman is responsible that the road opposite his own premises is in proper order and drains correct. Much attention is given to varying the diet of the men, and great importance is attached to this by both combatant and medical officers, no one being stronger on this head than General Nogi himself.

Vegetables are freely issued, and one sees cartloads of them being sent daily to places where they are not procurable locally. Bodily cleanliness is considered essential to health, and all sorts of expedients are resorted to for extemporizing bathing places. The Japanese soldier is naturally very cleanly, and does not care about anyone who neglects the cleanliness of his person. I attach a rough sketch of the baths I saw in my travels.

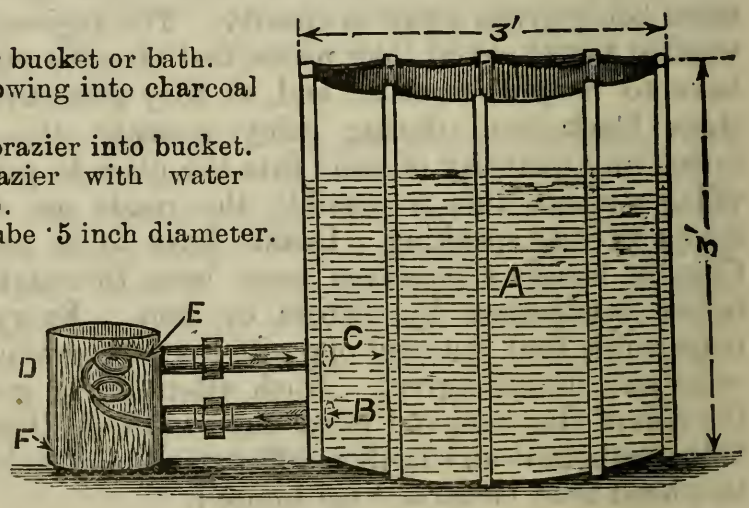
Improvised Bath.

A. Wooden box, 3 feet by 3 feet by 3 feet 6 inches.
B. Wooden seat, 9 inches broad.
C. 3-inch stove piping, conducting smoke to chimney F, in wall of house.
D. Water.
E. Tin-lined fireplace for charcoal.



Canvas Camp Bath.

A. Canvas water bucket or bath.
B. Cold water flowing into charcoal brazier.
C. Steam from brazier into bucket.
D. Charcoal brazier with water jacket (F).
E. Spiral iron tube ·5 inch diameter.



The cold water passes from A through the connecting hose B into the water jacket of the brazier D, where it is converted into steam, and returns into the bath through C.

It takes about 50 minutes to thoroughly heat all the water in the bath.

Flat stone slabs are placed outside, together with a wooden bucket, which is filled with hot water from the bath. Cold water is added to the bath when necessary. Washing is done from the bucket outside the bath, which contains sufficient water for six or eight persons.

Head nets of gauze (collapsible) are issued to all men to keep off mosquitoes and flies, and very necessary they are. Employment for both mind and body is insisted on. Men are constantly at work. The younger soldiers are trained in piquet and outpost work, in making entrenchments, &c., whilst the older men make and improve roads, or other work is found for them of a profitable nature.

Games of all sorts are encouraged, and as much distraction as possible from the routine of a sedentary life is found. Theatrical performances are got up, and the soldiers are kept busy and amused in every possible way. I noticed that, when not employed, the men remained almost entirely in their quarters, never leaving them except when on duty. Boots are taken off whenever opportunity offers, and the Japanese slipper put on.

The most remarkable thing is the way every man seems determined to keep in health. Mentioning this matter to General Oshima, he said: "I have commanded my division for "seven years. Every day of this seven years I have dinned "into my men's heads the necessity of observing the rules laid "down for the preservation of their health in the field, until I "was almost ashamed of such frequent and constant repetition. "However, I see now the good fruit of it all; as, since we have "taken the field, I have not had to say a word, because the "men know what to do and do it."

Again, he said: "The men know that they are fighting for "the independence of their country, and that therefore they "must do all they can to preserve their health in order that "they may be of use."

Another distinguished officer has more than once remarked to me: "The people in Japan do not like sick soldiers, and they "do not get the best of receptions if they leave the front in "consequence of disease."

This, as I pointed out in my former report, is the true secret of the immunity from sickness of the Japanese army. The men have been taught what to do in peace time, and such is their love for their country that they are determined, one and all, to follow the principles laid down in such teaching so that they may be fit, when called upon, to die if necessary in her service.

No amount of supervision could produce such results, there being less sickness in the field than in quarters.

(34) Japanese Military Quarantine Stations.

TRANSLATION of the Regulations for the establishment of a Special Quarantine Department, (Imperial Ordinance No. 184), forwarded by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, Tokio, 14th July 1904. (From the Official Gazette of 1st July 1904.)

Art. 1. The Special Army Quarantine Department is under the orders of the Minister of War, and charged with the Quarantine examination of those vessels under the army which ply between Japan and the seat of war, and of the men, horses and articles on board them.

Art. 2. The Special Army Quarantine Department consists of the main office and quarantine stations. The main office is situated in Tokio. The position, opening and closing of quarantine stations will be decided by the Minister of War according to the requirements of existing circumstances. The Minister of War is authorized to establish out-stations of the main office according to requirements.

Art. 3. The Special Army Quarantine Department will be constituted of the following :—

Main Office :—

Chief.
Sub-Chief.
Staff.

Quarantine Stations :—

Chief.
Staff.

These functionaries are appointed from among officers and civilians of the higher ranks, belonging to the army. In addition, N.C.O.s, subordinate officials and specialists will be appointed, the subordinate officials to be of *Han-nin** rank.

Art. 4. The Chief of the main office is subordinate to the Minister of War and is charged with the general management of the affairs of the Quarantine Department.

Art. 5. The Sub Chief assists the Chief and is in charge of the office.

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* The four ranks of civil officials in the Army are (1) *Shin-nin*, (2) *Choku-nin*, (3) *So-nin*, (4) *Han-nin*.

Art. 6. The Staff are charged with the duties allotted to them under the Commander-in-Chief.

Art. 7. Officers and officials in charge of quarantine stations are subordinate to the Chief of the main office and manage the affairs of their own stations.

Art. 8. The staff of a quarantine station is charged with the duties allotted to them under the orders of the officer or official in charge of the station.

Art. 9. N.C.O.s and civilians of the *Han-nin* rank perform their duties under the direction of their superiors.

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(35) Japanese Military Quarantine Stations.

TRANSLATION of the Instructions for the Examination of Troops returning from the Field, at Quarantine Stations; forwarded by Lieut.-Colonel C. V. HUME, D.S.O., Military Attaché, Tokio, November 23rd, 1905.

I.—GENERAL INSTRUCTION BY THE DIRECTOR OF THE QUARANTINE EXAMINATION DEPARTMENT. (From the "Nichi-Nichi" newspaper of 8th November 1905.)

Lieut.-General Ishimoto, Director of the Quarantine Examination Department, has recently issued the following instructions and at the same time published a guide to the place of disinfection of each quarantine station.

"Considering the statistics of past campaigns, numerous instances will be found in which an outbreak of epidemic disease not only destroyed the lives of many thousands of officers and men, but also weakened the strength of the country at large by its devastating power, although the country was the victor in the campaign.

It is now one and a half years since our country despatched troops to Korea and Manchuria, yet we have had the good fortune to escape from the outbreak of any contagious or infectious diseases.

This is partly attributable to the great care taken by individuals for their own health, and partly to the improved sanitary arrangements in the field. At the present moment, when the troops are returning from the front, it would truly be a deplorable circumstance if they brought back any epidemic disease with them, thereby not only sacrificing in vain the lives of those who had returned from the war crowned with success, but also the disaster would spread from them to their units, from their units to their homes, and from their homes to their villages and towns, and, lastly to the country itself. This was then the reason why the Department of Special Military Quarantine Examination was established by Imperial Ordinance No. 184, for the purpose of checking the inroad and spreading of camp epidemics, thus preventing any future disaster which might befall the troops or the public.

Consequently all officers, men, and civilians arriving at any quarantine station on their way back from the front must bear in mind the object aimed at, and subject themselves to quarantine

examination and disinfection in accordance with the instructions laid down in the "Guide to Places of Disinfection in Quarantine Stations of the Department of the Special Military Quarantine Examination," endeavouring on the one hand to ensure the safety of their own persons and on the other hand prevent their countrymen falling victims to camp epidemics.

(Signed) S. ISHIMOTO, Lieut.-General,
Director of Department of Special Military Quarantine Examination.

September 1905."

II.—GUIDE TO PLACES OF DISINFECTION IN SPECIAL MILITARY QUARANTINE STATIONS.

A.—*Before entrance.*

This guide is intended to give information concerning quarantine examination and disinfection, and the matters to be attended to in connection with it, for the use of those to be examined and disinfected in Special Military Quarantine Stations.

Consequently unit commanders or commanders of transports or inspecting officers will, before landing, make all those about to undergo disinfection thoroughly understand the principles laid down, so as to prevent confusion.

(*a*) When a military transport arrives at a port where there is a Special Military Quarantine Examination Station, the commander of the transport (or inspecting officer) will, before the ship drops anchor, make everybody on board assemble according to the following classification, call the roll, and await the arrival of the quarantine authorities:—

(1) Officers and those ranking as such on the quarter-deck.
(2) Non-commissioned officers and below on the upper deck fore and aft.
(3) Crew on the main decks fore and aft.

The above posts may be varied by commanders of transports according to the interior arrangements of the ships concerned.

(*b*) While the examination is proceeding, everybody will fall in quietly at their appointed places, which must not be quitted until permission is given by the quarantine authorities.

(*c*) Articles belonging to soldiers to be disinfected will be classified into three categories, these articles being taken ashore by the men according to the instructions given by the quarantine authorities.

1. *Clothing.*—Blankets, great-coats and other woollen fabrics, bags carried on the back, haversacks, hemp and cotton goods, paper, glass wares, earthenware articles which are to be subjected to disinfection by steam are to be packed in blankets or portable tents. It is strictly probibited to include powder, matches, or other explosive articles amongst the clothing.

2. *Sundry Articles.*—Skins, furs, lacquer-ware and other painted articles, rubber goods, articles fastened by glue or paste, ivories, tortoise-shell goods, horn articles, wooden articles (especially glued ones), mineral goods, which are to be subjected to disinfection by means of chemicals, are to be packed in valises or bags carried on the back.

3. *Valuables.*—Identification cards, money, purses, tobacco pouches, small books, watches, charms, rings, and other articles of value are to be disinfected by means of chemicals.

B.—*After entrance.*

The names of all the different rooms in the disinfecting place are posted up on the doors and each room has an official in charge with a staff of soldier servants. Should anybody undergoing examination have anything to be attended to, he will call out the name of his room, when the servants attached will attend.

Inspection Room.—The number of men to be disinfected at one time is 120 (60 in the case of Dairi and Wadamisaki stations). They will enter the room in due order under the guidance of officers or non-commissioned officers in the case of troops, or of senior officials in the case of civilians.

On entering the room, rifles and cartridge pouches will be placed on the arm-rack carts in proper order, revolvers will also be placed in these carts.

In the room, the men will receive a metal ring, four wooden tickets, a net bag, and a bamboo basket, all bearing the same number; disposing of them in the following manner:—

(*a*) The ring will at once be placed on the finger and not removed until leaving the place of disinfection.

(*b*) With regard to the wooden tickets, one will be attached to the bundle of clothing, another to the sundry articles before enumerated, which will be placed in the bamboo basket, the third will be attached to the net bag containing the valuables, while the fourth will be taken to the bath-room.

When the above procedure is over, the official in charge will give the word "Forward," when the men will move into the "Deposit Office," carrying the things with them.

Deposit Office.—There are two Deposit Offices, one for valuables and the other for common articles, consequently the men will deposit their things separately at each office.

Waiting Room.—When in the room the men will quietly await the signal for the bath, which is given by means of a bell when preparations are complete.

Bath Room. — On entering the room, the men will receive Japanese towels and hemp bags at the "Towel Office,"

they will then proceed to the place set apart for undressing, where they will put their clothes in the hemp bags and attach the remaining wooden ticket to the bag. They will then enter the bath.

The bath lasts about 15 minutes, and at a given signal the men will get out of the bath, receive a bath dress, and when clothed, proceed to the "Resting Room."

Resting Room.—The men will wait here until the disinfection of their clothing is completed, which will be notified by ringing a bell. They will then proceed to the "Dressing Room."

Dressing Room.—Here the men will receive their clothing as identified according to the numbers, dress and proceed to the "Delivery Office," leaving behind the hemp bags and bath dresses.

Delivery Office.—The men will receive their valuables at the "Valuables Delivery Office," and the other things at the "Common Articles Delivery Office." They will then proceed to the "Equipping Place."

Equipping Place.—Here the men will be properly equipped and await orders to retire.

On leaving the place, the four tickets will be brought together and passed through the ring and returned to the officials in charge; together with the net bags and bamboo baskets.

(36) Japanese Military Quarantine Station at Nino-shima.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps. 15th January 1906.

Plates (bound in text).

Appendix.

Military quarantine stations are special institutions that have been established by the Japanese for the purpose of disinfecting all articles returning from the army in the field, including the clothing and equipment worn or carried by the soldier on his arrival in Japan. Nothing is exempt, officer and man are treated alike, and their arms, accoutrements, kit, personal effects, papers, and baggage generally have to be disinfected. In other words, everyone returning to Japan from the field has to pass through a quarantine station before he or his belongings are allowed to land.

Three military quarantine stations have been established: one in the Bakan Straits off Moji and Shimonoseki, another at Wadi off Kobe, only recently opened, and the third, which is also the oldest and most important, on Nino-shima, an island off Ujina, the port of Hiroshima.

It is with this last that the present report deals. I visited it on the 16th November 1905, and the information contained in the following notes was obtained then.

The island on which the quarantine station is established is a prominent feature in the landscape and lies about twenty minutes by steam launch to the south of Ujina. The name signifies the "similar island," or the island that resembles in shape Fuji-yama, the famous sacred mountain of Japan. It consists of a single conical-shaped peak that rises precipitously from the sea. There is consequently very little level space for buildings such as would be required for a quarantine station of any size; but two more or less flat areas at the eastern base have been prepared for the purpose, one about 19 acres in extent and the other about 18 acres.

The larger area was used as a quarantine station during the Chinese war and the Boxer troubles. A description of the establishment as it existed during the former period has been given by Surgeon-General Sir Wm. Taylor, who was attached to the Japanese army during that war. The buildings erected then were retained until the commencement of the war with Russia, when they were demolished and an entirely new set of buildings constructed.

The quarantine station as it exists now consists of two sets of disinfecting establishments, two sets of barracks for troops in quarantine, and one quarantine hospital.

One set of disinfecting establishments, one set of barracks for troops in quarantine, and the entire quarantine hospital are on the larger of the two areas noted above, and the other disinfecting establishment and set of barracks for troops on the smaller area, which is three-quarters of a mile distant. The former is described as No. I. Section of the quarantine station, and the latter as No. II. Section, the one being established in 1904 and the other early in 1905.

A description of No. I. Section, with some modifications in No. II. Section, which will be noted further on, will explain the nature of the station as a whole.

No. I. Section consists of—

(1) the disinfecting department;
(2) the huts for troops in quarantine;
(3) the quarantine hospital.

All the buildings in the section are single-storeyed and of the nature of wooden sheds and wooden barrack or hospital huts, similar to those erected in connection with the expansion of hospital accommodation in the Reserve Hospitals.

Plate 1* appended shows the general arrangement of the section and the buildings in the various divisions.

The disinfecting department is capable of dealing with 5,000 men and their kits daily, with continuous night and day work; the huts for troops in quarantine are intended for 6,000 men; and the hospital for 1,000 patients.

See Figure 1.

The disinfecting department contains details of much interest and importance, and merits a somewhat full description of its arrangement and working.

It contains for disinfection purposes—

(*a*) A complete establishment of personnel and equipment for the medical examination of ships on arrival and for disinfecting them when necessary.

(*b*) A set of steam disinfecting chambers for disinfecting all articles not liable to damage by this method of disinfection.

(*c*) A special set of chambers for disinfecting by formalin articles liable to damage by superheated steam.

(*d*) Formalin sprinklers for disinfecting the rifles, pouch belts, and side arms.

(*e*) Hot-water baths for officers and men.

(*f*) Destructors for burning useless articles and rubbish.

When troops arrive off the station they pass through the disinfecting department according to the following procedure:—

The transport is signalled from the signalling station, and on anchoring is at once boarded by the medical inspection staff. If infectious disease exists on board, the troops are placed in the quarantine barracks (if the disease is one for which such action is necessary), and the patients are removed to the quarantine hospital. The transport is then disinfected by the staff kept ready for this duty.

Should no infectious disease exist, the troops are landed by companies, taking with them their arms, accoutrements, great-coats, blankets, and packs. Baggage and private luggage, military stores, &c. are landed at the same time, and taken to warehouses erected for their reception. The men on landing are divided into groups of 120 each; and a group of this size, along with their kits and accoutrements, &c., pass through the processes of disinfection simultaneously.

The group first of all give up their rifles, pouch belts, and side arms at the point where they enter the buildings.* The rifles are placed on racks, and the side arms and pouch belts are hung on hooks in tramway trollies specially constructed for the purpose. Each trolley takes 30 sets, so that four trollies are in waiting for the group of 120 men at the point of entrance. The trollies when loaded are run into an open shed or space on the far side of the formalin disinfecting shed,* and the rifles, &c. are there sprinkled with a 0·5 per cent. solution in water of formic aldehyde, without being removed from their racks or hooks.

The men pass into a large entrance hall, where they are given a finger ring each, and small net bags for valuables. The

* *See* Figure 2.

ring is numbered and has four wooden labels, bearing the same number, attached to it by twine. The rings are numbered from 1 to 120. The group is also divided here into sub-groups of 60 men each; and, on the orders being given to proceed to the waiting rooms for the baths, they leave the entrance hall and give up the bags with their valuables, bundles containing articles of kit not likely to be damaged by steam disinfection, and bundles containing leather goods, such as the valise, boots, mess-tins with straps, &c., in the corridor outside the hall. To the bag with valuables, and to each of the two sets of bundles wooden labels from the ring are attached.

The valuables and bundles for steam disinfection are placed on trollies specially constructed to run into and pass through the steam disinfecting chambers, and the valise, leather goods, &c., which are usually tied up loosely in the blanket, are placed in another set of trollies, which run to the formalin disinfecting chambers.

When this is accomplished, the men proceed to the waiting rooms previous to entering the baths. They have given up everything except their body clothing, and they have also, it will be noted, used up three of the four wooden labels attached to their finger rings.

There are two waiting rooms, each taking a sub-group of 60 men. Officers proceed to a small officers' waiting room.

When the baths are ready a bell rings and the men leave their waiting rooms, receiving on their way to the baths a towel and clothes bag. The corridor and platform outside the baths are used as places for undressing. The men put their clothes into their clothes bags and attach the last of the wooden labels to them. The bags with clothes are thrown into steam disinfection trollies, which run up alongside the "undressing platforms." The men then enter the baths, which are supplied with hot water, both salt and fresh. The time allowed in the baths is fifteen minutes, bathing being conducted according to Japanese custom—that is to say, several men get into a bath together.

When the men have finished bathing they dry themselves on the platform on the side opposite that from which they entered the baths; and here they are given *kimono* or bath-gowns to wear until their clothes are returned.

Dressed in the *kimono*, they pass into comfortable waiting rooms, warmed with charcoal braziers and with excellent matting on the floors for the men to sit on. They wait here for five or ten minutes until their clothes have passed through the steam disinfecting chambers, and are given tea, cigarettes, and cakes while waiting.

In the meantime the trollies, into which the clothes were thrown, have been run into the steam disinfecting chambers where they are exposed to disinfection by superheated steam for about twenty minutes. On completion of the process the

trollies are run out on the disinfected side of the chambers into a neighbouring shed, where they are again drawn up alongside platforms.

The men then pass from their resting rooms into this shed, receive their clothes back on the platforms, and there dress themselves.

They then proceed along corridors to the *disinfected side* of the formalin chambers, receiving on their way the bags with their money and valuables, and the bundles from the steam disinfecting chambers.

On the disinfected side of the formalin chambers they find their bundles with their valises, leather goods, &c., which have also passed through the disinfecting processes in the meantime.

(The formalin disinfection processes are described in detail in the Appendix.*)

They then receive their rifles, side arms, and pouch belts from the trollies on which they were placed at the entrance to the buildings, and which have been disinfected by formalin sprinklers.

The wooden labels attached to the clothes bags, valuables bags, steam disinfection bundles, and formalin disinfection bundles are removed as the various packages are received back, and tied on to the finger rings again.

The men have now completed their course of disinfection. They return the finger rings and labels (the bath-gowns, towels, clothes' bags, and money bags are returned at the dressing platforms and at the place where valuables are handed back), and, putting on their accoutrements and full equipment, are marched direct to the landing stage for re-embarkation, or to huts, where they remain in quarters until they are required to re-embark.

The general organization of the disinfecting department is intended to enable a group of 120 men with their kits, &c. to pass through the buildings in half-an-hour. A company of infantry—about 240 men—take, therefore, about one hour to pass through, a battalion four hours, and so on. Officers go through the same processes simultaneously with the men, but have separate bath and waiting rooms.

With regard to the details of disinfection, the formalin process, as already noted, is fully described in the Appendix.*

As carried out at Nino-shima, the process is new and is the invention of the medical officer in charge of the station. In No. I. Section of the station it is carried out in four identical chambers, each capable of disinfecting the bundles of a subgroup of 60 men.

The steam disinfecting chambers in this section are also four in number. They are of a type similar to the Geneste and Herrscher (Equifex) chambers, oval in transverse section, of which the long diameter is about 6 feet and the short about 5 feet in dimension. The length is between 7 and 8 feet.

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* *See* **Appendix, page 471.**

Each chamber takes two trollies, measuring about 4½ feet wide and 3½ feet long. The chambers are arranged in pairs, the chambers in each pair being marked A and B. A takes the great-coat bundles and B the clothes bag bundles of a sub-group of 60 men. The chambers are made by a firm in Osaka (Messrs. Kawasaki).

The steam for the steam and formalin chambers, for heating the bath water, and for working the dynamos for the electric lighting of the station, is generated in six large boilers, made by Schaeffer and Hadenburg, Manchester, London, and Glasgow. They sustain a pressure of 60 to 90 lbs. The amount of coal used in the furnaces is about 15,000 lbs. in 24 hours.

These boilers are installed in a large engine-room building, partitioned off at one end for the dynamos and electric light installation. The steam is conveyed in main pipes to the formalin and steam disinfecting departments, and also to four square water tanks, each with a capacity of about 1,500 gallons, that are placed between the two sets of baths. The water for the baths is heated by steam being turned on to the tanks.

The general organization and arrangement of the disinfecting departments of No. I. Section, as described above, will be understood better by reference to Plate 2* appended. It will be noted that in addition to the various rooms described, there are warehouses for the reception of baggage and other stores waiting disinfection, and also for their reception after disinfection. These are articles which are landed from the transports and not carried on shore by the soldier. They include all kinds of military stores, officers' baggage, papers, &c. Rubbish and useless articles are burnt at an isolated spot about 200 or 300 yards beyond the warehouse for the reception of articles waiting disinfection. As a rule the baggage and military stores are disinfected during the night, and the men's kits during the day.

The articles required for disinfecting ships are kept ready in a store room close to the baggage landing-stage. They include all the modern appliances, such as those required for destroying rats by sulphurous acid fumes, and for disinfecting water tanks by steam. There are also formalin sprinklers and sets of rubber boots, waterproof overcoats, and drill clothing for the men employed in carrying out the processes.

A complete system of tramway lines for the trollies runs through the establishment, as shown in Plate 2.*

Other buildings connected with the disinfecting department of No. I. Section are shown on Plate 1,† and need no further description.

The barracks for troops in quarantine are also sufficiently described by this plan. They contain accommodation for 6,000 men, but at present three of the huts are set apart for men waiting to re-embark after they have left the disinfecting

* *See* Figure 2. † *See* Figure 1.

department, and four others for soldiers employed in connection with the section. As yet the quarantine barracks have not been required for quarantining troops from any of the transports.

The quarantine hospital in No. I. Section consists of three main divisions, one containing wards for convalescents, another wards for acute cases, and the third wards for plague cases only. The last is specially isolated, and is subdivided into convalescent and acute case wards.

The hospital administration hut and officers' and non-commissioned officers' quarters are placed between the acute case and convalescent divisions, and a kitchen and store rooms for all three divisions at the far end of the acute case division. The general arrangement is sufficiently shown on the plan (Fig. 1).

In connection with the hospital there are a mortuary, two incinerators for excreta and refuse, and a crematorium for corpses. The incinerators are similar in construction to the incinerator designed for hospitals in Natal by Colonel Rawson, Royal Engineers. The crematorium is quite simple in character, and contains three pairs of cremating chambers. The chambers are simple brick chambers with flues; iron trays containing the corpses slide into the chambers, and incineration is effected by wood or coal fires burning inside the chambers under the trays. Two hours are said to be sufficient for the incineration of a corpse.

Connected with the disinfecting department, but also available for use in connection with the hospital, there is an excellent laboratory for clinical and experimental investigation. The efficiency of the disinfecting processes is carefully tested there.

The disinfecting department of No. II. Section of the Nino-shima quarantine station is shown in Plates 3 and 4.* The processes of disinfection are the same as described above in connection with No. I. Section; but there are only two steam and two formalin disinfecting chambers. The formalin chambers are simpler in construction than those in No. I. Section, and permit of the trollies containing articles for disinfection being run into them and out on the other side after disinfection. The system of tramway lines, consequently, runs through these chambers, as shown on Plate 6, which may be compared with Plate 5,† for explanation of the difference between the formalin chambers of No. I. and II. Sections. Special trollies, similar in many respects to those constructed for the arms and accoutrements, are used in connection with the formalin chambers of No. II. Section. Valises, mess-tins, boots, &c. are placed on racks in or hung on the trollies instead of being tied up in the blankets, and the articles are thus disinfected without being removed from the trollies.

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* *See* Figures 3 and 4. † *See* Figure 5 (*b*) and (*c*).

The steam disinfecting chambers of No. II. Section are similar to those of No. I. Section.

The baths are considerably better. In No. I. Section they are wooden tanks placed on the floor, while in No. II. Section they consist of one long granite trench, measuring about 5 feet wide, 2½ feet deep, and 36 feet long, constructed down the centre of the bath rooms. The floor of the bath rooms is also paved with granite.

As in No. I. Section, the bath rooms of No. II. Section consist of two rooms for 60 men at a time, one for general officers, and one for other officers. But there is in the latter section an additional bath room for the non-commissioned officers. The granite bath trench runs down the centre of all these rooms, and is simply partitioned off into compartments for men, non-commissioned officers, officers, and general officers, the dimensions given above as regards length being those of a compartment for 60 men. The width and depth are the same throughout the various compartments.

Sea water only is used in these baths. It is laid on hot or cold, the hot-water pipes being painted red, and the cold green.

In the engine room of No. II. Section there are only two boilers, but they are more powerful than those of No. I. Section, taking a pressure of 120 to 140 lbs. each. The makers are Geipel and Lange, Westminster, London. 7,000 lbs. of coal daily are used for these boilers.

There is some difficulty in supplying fresh water for the boilers and for other purposes at the station. As much as possible is collected into reservoirs on the peak, but a large quantity has to be conveyed daily in boats from the mainland.

For further details of No. II. Section, Plate 3,* may be consulted. The section is capable of disinfecting 3,000 men and their kits daily, and of quartering about 6,000 in quarantine huts.

The establishment of personnel for the two sections of the Nino-shima quarantine station consists of the following:—

(1) A Commandant (Colonel Ishimaru, of the Gendarmerie).

(2) An Assistant Commandant (a captain of infantry, who was invalided from the field, but who is now "fit to serve at home"). He supervises the personnel of No. II. Section, and troops landed there.

(3) A Senior Medical Officer in charge of the disinfection departments (Surgeon-Major Tsuzuki, an enthusiastic bacteriologist and formerly a student at Marburg University).

4) A Principal Medical Officer for the quarantine hospital (Surgeon Lieut.-Colonel Ohata.)

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* *See* Figure 3.

(5) Thirty medical officers for duty in the disinfecting departments, visiting ships on arrival, inspecting troops on board, and supervising the disinfection processes on board ships and on shore. Twenty-four of them are attached to No. I. Section, where the whole of the ship inspection staff remains. The remaining six belong to No. II. Section.

(6) Twenty medical officers for duty in the quarantine hospital.

(7) About 500 soldiers for duty in the various stores, working disinfecting chambers, and for all other skilled or unskilled labour in the sections outside the hospital. They are men belonging to the 1st or 2nd Reserve, who are unfit for field service but fit for service at home, or men belonging to the class of Recruit Reserves (*Hoju*). All these men are *Yu-sotsu* or "auxiliary soldiers," *i.e.*, men enlisted for auxiliary services, such as transport, intendance, servants, &c., and not for fighting.

(8) About 250 men of the medical service for hospital duties.

(It may be noted here that Surgeon-Major Tsuzuki has a laboratory establishment of two medical officers and five non-commissioned officers, but that any medical officer of the hospital or disinfecting staff can work in it if he likes.)

Since the station was opened, up to the time of my visit, about 240,000 officers and men passed through it previous to landing on the mainland. No troops had to be landed on account of quarantine, and only two cases of small-pox and some exceptional cases of enteric fever have been admitted into the hospital. As a rule, cases of enteric fever and dysentery are not placed in the quarantine hospital, but only such cases as plague, cholera, yellow fever, small-pox, scarlet fever, typhus, measles, and diphtheria.

Troops are placed in quarantine only on account of plague (ten days), and cholera or yellow fever (five days). Ships are disinfected at the quarantine station on the occurrence of any of the above-mentioned diseases, with the exception of enteric fever and dysentery, for which general ship disinfection is not carried out by the quarantine station staff.

APPENDIX.

Details of the Method in use at the Military Quarantine Station, Nino-shima, for disinfecting by Formalin.

Special formalin disinfecting chambers have been constructed, four in No. I. Section and two in No. II. Section. Plates 5 and 6* show the manner in which they are respectively arranged.

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* *See* Figure 5 (*b*) and (*c*).

The chambers in No. I. Section are constructed as follows, each chamber being identical :—

The walls are formed of an outer layer of ordinary pine boards, an inner layer of American *papier-mâché* (a kind of felt which is gas-proof), and a space between, filled in with rice straw. The thickness of the wall so constructed is 6 inches.

The roof is flat, and its construction is identical with that of the walls.

The floor is also similar in construction, but deal boards are placed at intervals across it with a space of from 1 to 1½ inches between them and the *papier-mâché* layer.

The inside measurements of the chamber are 18 feet in length, 12 feet in width, and 7 feet in height.

There are no apertures in the roof or in the end walls.

The side walls have each a door and two windows. The doors are in the centre and are 4 feet wide. They are constructed in the same way as the walls and fit tight, so as to be gas-proof when closed. The windows are glazed. They are placed high up on either side of the door, 42 inches in horizontal and 26 inches in perpendicular measurement. They are also gas-proof.

The doors are inserted for introducing bundles to be disinfected and for removing them on the other side after disinfection. The windows admit sufficient light into the chamber to enable the men who are handling the bundles to see what they are about.

On the side wall of the *infected side* there are apertures for steam and formalin pipes, and also for steam and ammonia pipes. They are placed above the windows respectively. There is also an aperture in this wall, near the door, for a thermometer, by which the temperature in the interior can be read after the doors are closed.

There is also an aperture on the *infected side*, connecting the space between the boarded floor and the *papier-mâché* floor with the outside of the building, in which the chambers are placed, by means of a pipe that passes under the corridor on which the chambers open.

There are no apertures except the windows and doors on the *disinfected side.*

The only fittings in the interior are some racks for bundles and a line of steam pipes, by which the chambers are kept as warm as possible continuously, with a view to reducing the time necessary for raising the temperature in the interior to that required during the process of disinfection.

The outside fittings consist of two branch steam pipes on the *infected side*, one fixed into the formalin aperture and the other into the ammonia aperture. (The main pipe, from which they lead, runs overhead, in the corridor, parallel to the line of chambers.) Nickel plated conical-shaped reservoirs are fixed on the wall above each of these apertures, one for formalin and

the other for Liquor Ammonii.* Their capacity is about three gallons each, this being the amount of formalin (15,000 to 20,000 grammes) used during one process of disinfection in each chamber.

It may be stated here that the Liquor Ammonii is used merely for the purpose of neutralizing the acrid effects of the formalin after disinfection is completed. The quantity used is equal to about half the quantity of formalin.

A tramway for trollies, 24½ inches wide, outside measurement, runs along the corridor on both the *infected* and *disinfected side.* It is connected with the general system of tramways in the disinfecting department.

In No. II. Section the construction of the chambers is similar, but the two chambers are separate from one another and have panel doors at either end, which open by being swung upwards by rope and pulley attached to an overhead beam. There is only one window to these chambers. It is of the same dimensions as the windows in the chambers of No. I. Section, and is fixed in the inner side wall. There are also only one reservoir and one steam pipe. They are first used for formalin and steam, during the process of disinfection; and when the formalin is exhausted, the reservoir is then filled with Liquor Ammonii and used for the introduction of ammonia and steam into the chamber.

The size of the chambers in No. II. Section is 14 feet in length, 10 feet in width, and 6 feet in height. Two parallel lines of tramway pass through each chamber, and on each line three trollies can be ranged up inside the chamber, when it is closed for the disinfection process. The articles for disinfection remain on the trollies during the process. Thus six trolley-loads can be disinfected in one chamber at a time.

The general arrangement of the tramway lines in these chambers is shown on Plate 6.†

The following is the process of disinfection :—

(1) The air pipe connecting the floor space with the outside is opened after the chambers have been filled with the articles to be disinfected and the doors closed.

(2) The steam is then turned on (in the chambers of No. I. Section, on the formalin reservoir side only). It is kept playing into the chamber till the temperature inside, as shown on the thermometer, reaches 60° C. This takes about fifteen to twenty minutes.

(3) The air pipe is then closed.

(4) The formalin is now turned on, and is allowed to pass into the chamber along with the steam. After two minutes it is shut off.

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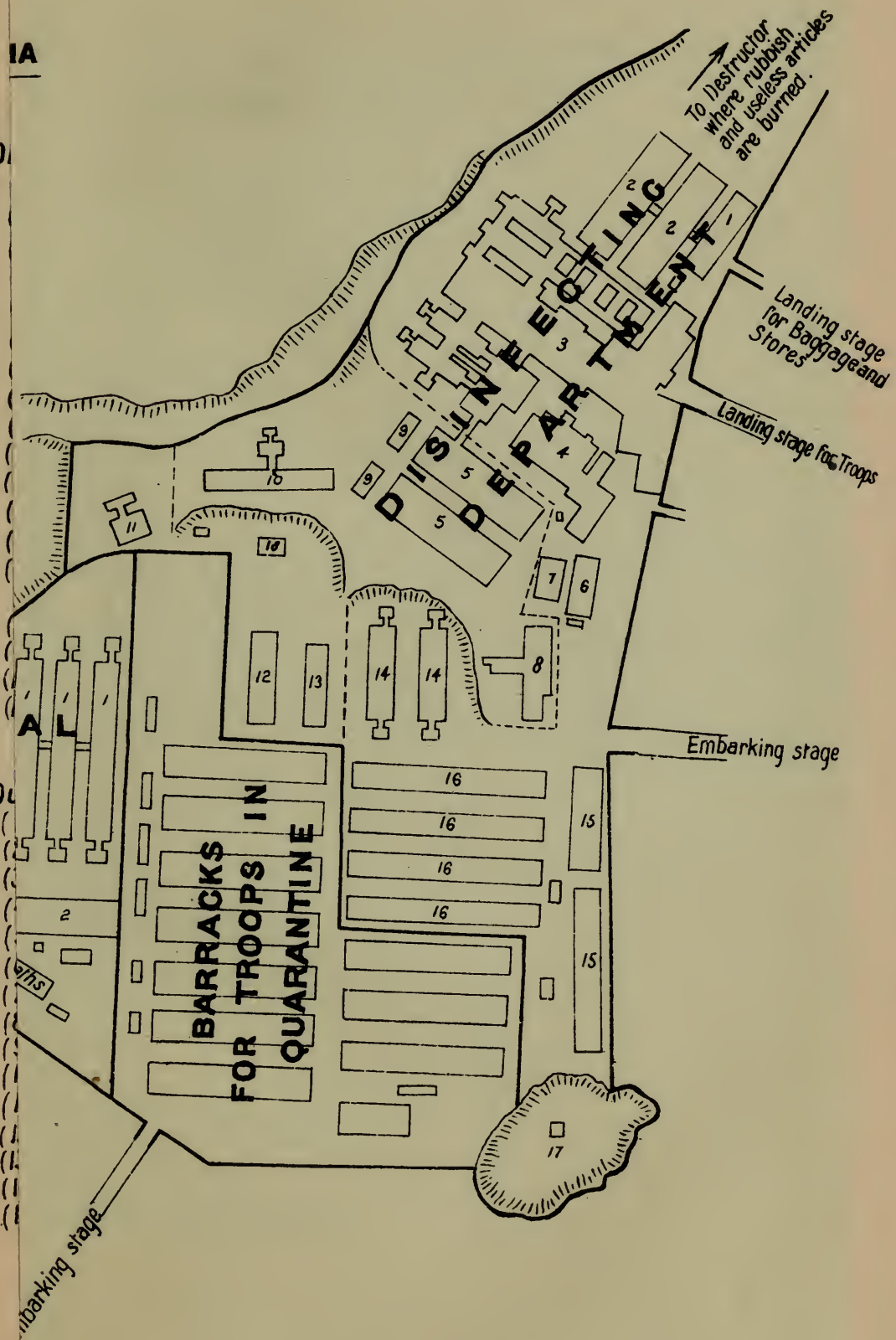
* *See* Figure 5 (*a*). † *See* Figure 5 (*c*).

Figure 1.


To Destructor where rubbish and useless articles are burned.
Landing stage for Baggage and Stores
Landing stage for Troops
Embarking stage
Embarking stage
DISINFECTING DEPARTMENT
BARRACKS FOR TROOPS IN QUARANTINE
1
2
3
4
5
6
7
8
9
10
11
12
13
14
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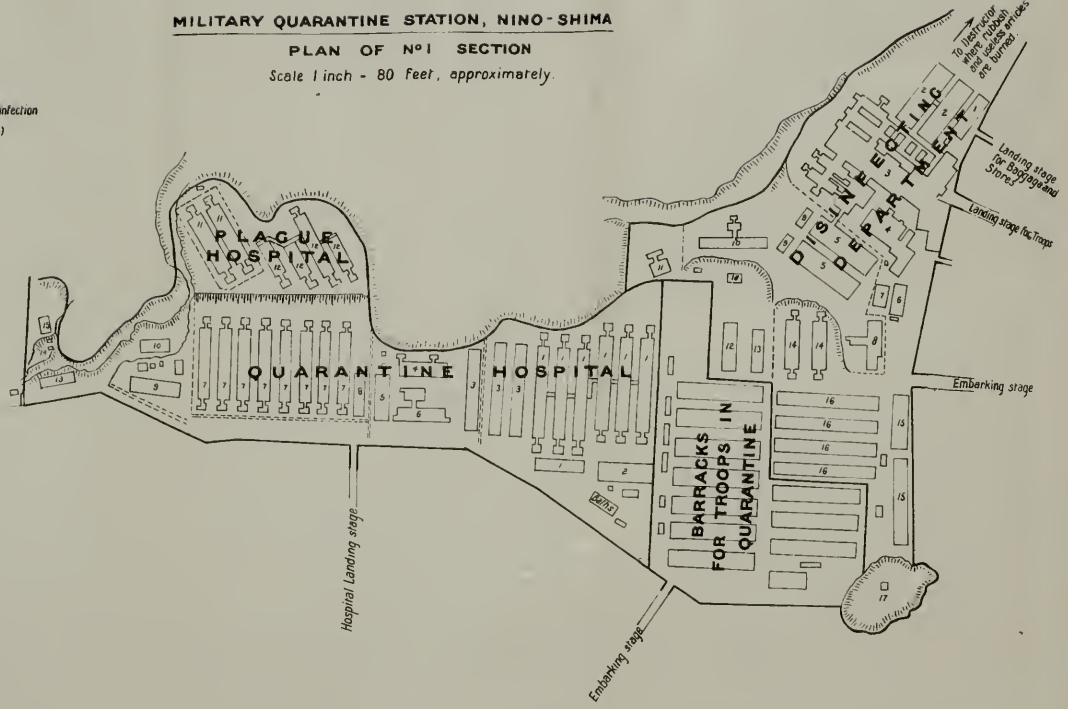
To face page 473.

Figure 1.

MILITARY QUARANTINE STATION, NINO-SHIMA

PLAN OF No I SECTION

Scale 1 inch - 80 feet, approximately.



EXPLANATION OF BUILDINGS NUMBERED.

DISINFECTING DEPARTMENT.

(1) Stores for disinfecting ships.
(2) Warehouses for baggage and stores received for disinfection
(3) Disinfection and bath buildings (see large scale plan.)
(4) Engine and Electric Installation Building.
(5) Warehouses for disinfected baggage and stores
(6) Store Room.
(7) Employes' Bath Room.
(8) Administration Offices
(9) Canteens
(10) Medical Officers' Quarters and Officers' Mess
(11) Laboratory.
(12) Store Rooms.
(13) Post Office.
(14) Med. Officers and other Quarters for Officers in quarantine.
(15) Senior N.C.O.s' Quarters.
(16) Soldier Employes Quarters
(17) Signalling Station.
(18) Medical Inspection Room for Employés reporting sick.

QUARANTINE HOSPITAL.

(1) Wards for Convalescents.
(2) Kitchen.
(3) Hospital Orderlies' quarters
(4) Medical Officers Quarters.
(5) Senior N.C.O.s' Quarters
(6) Administration Offices
(7) Wards for acute cases
(8) Stores.
(9) Kitchens
(10) Stores.
(11) Plague Wards, acute cases.
(12) Plague Wards, Convalescent cases.
(13) Mortuary
(14) Refuse Destructors.
(15) Crematorium for dead bodies.

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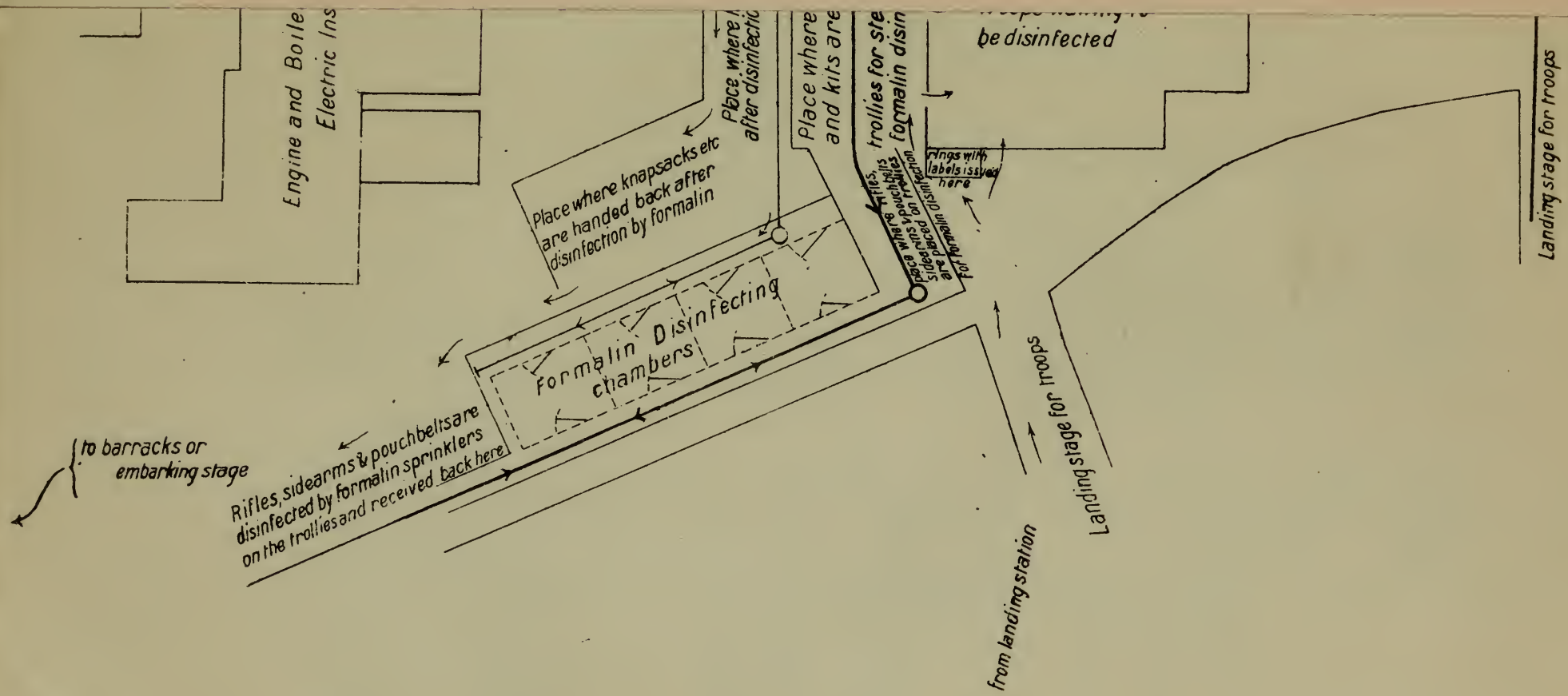
Figure 2.



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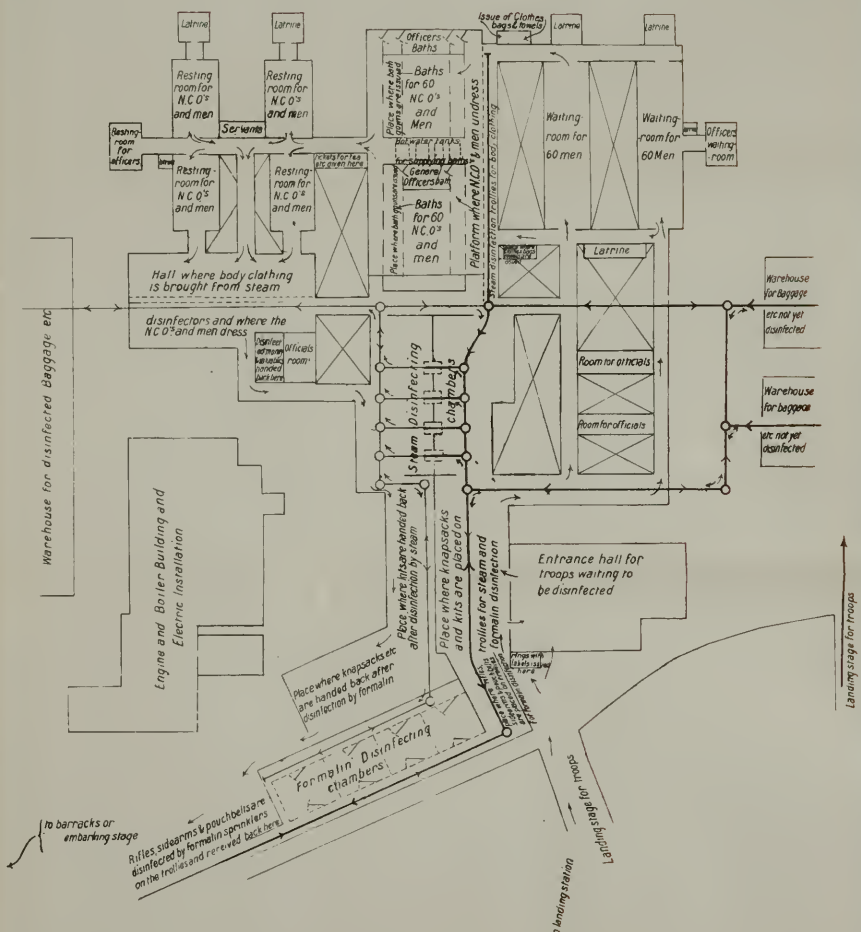
MILITARY QUARANTINE STATION.

NINO-SHIMA.

PLAN OF DISINFECTING DEPT

OF No I SECTION.

Scale 1 inch = 20 feet approximately



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To fa

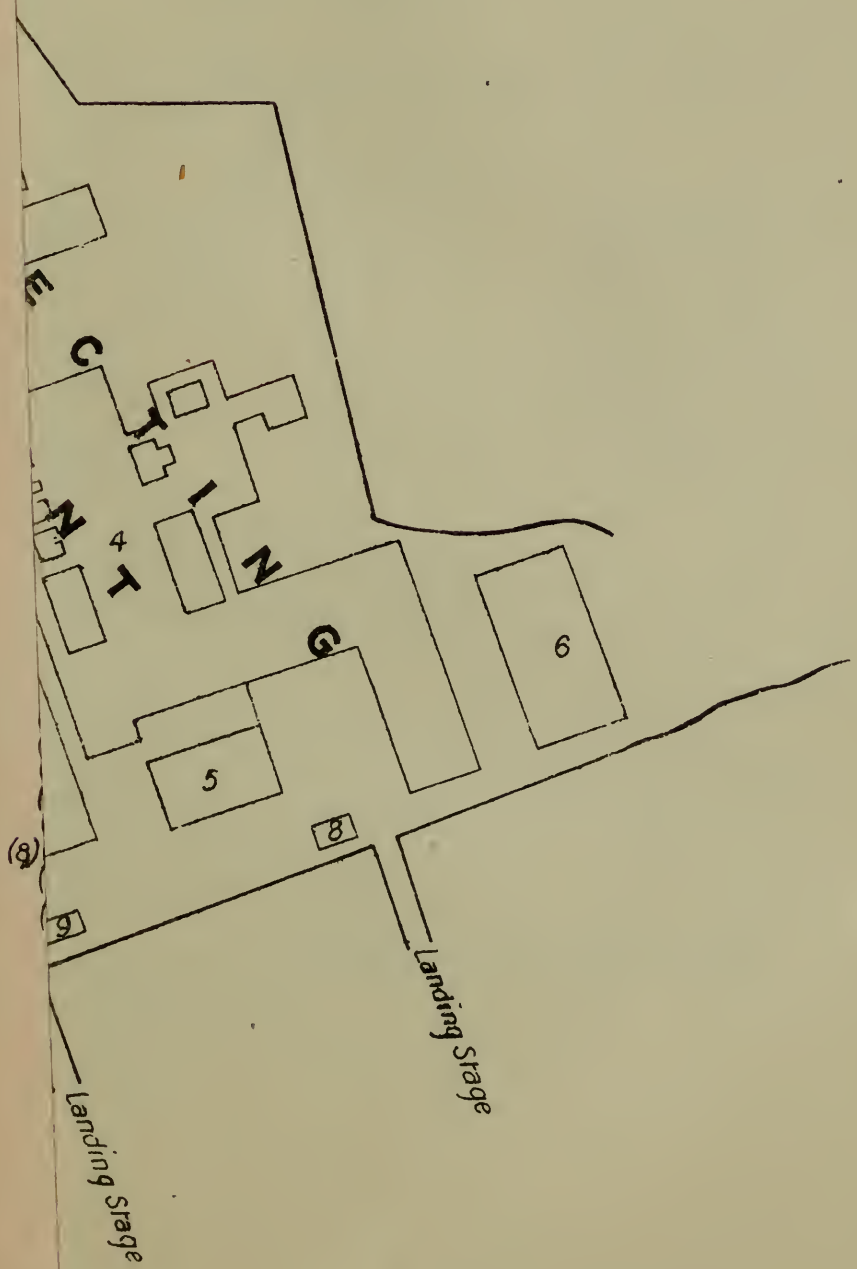
Figure 3.

MILITARY QUARANTINE STATION.

NINO-SHIMA.

PLAN OF No. II SECTION.

Scale 1 inch = 20 feet approximately



MILITARY QUARANTINE STATION.

NINO SHIMA.

PLAN OF No. II SECTION.

Scale 1 inch = 20 feet approximately

Explanation of buildings, numbered

DISINFECTING DEPARTMENT.

(1) Soldier employes' quarters
(2) Kitchens
(3) Baths for officials
(4) Disinfection & bath buildings (see large scale plan)
(5) Engine and boiler house
(6) Warehouse for baggage and stores received for disinfection
(7) Warehouse for disinfected baggage and stores
(8) (9) Guard house
(10) Medical Officers quarters
(11) Senior N.C.O.'s quarters

BARRACKS FOR TROOPS IN QUARANTINE.

(1) Officers quarters
(2) Kitchens
(3) Mens quarters
(4) Baths

54-84 6

Figure 4.

TARY QUARANTINE STATION,
NINO-SHIMA.
N OF DISINFECTING DEPART.
No. II SECTION.

(Scale 1 inch-20 ft approximately)

e where finger rings with wooden labels are issued
where clothes' bags and towels are issued
where bath gowns are issued
Route taken by the men
Route taken by trollies to disinfecting chambers
Route taken by trollies from disinfecting chambers
Route of empty trollies only
rollies also return along the fine or thick lines as shown
rows.

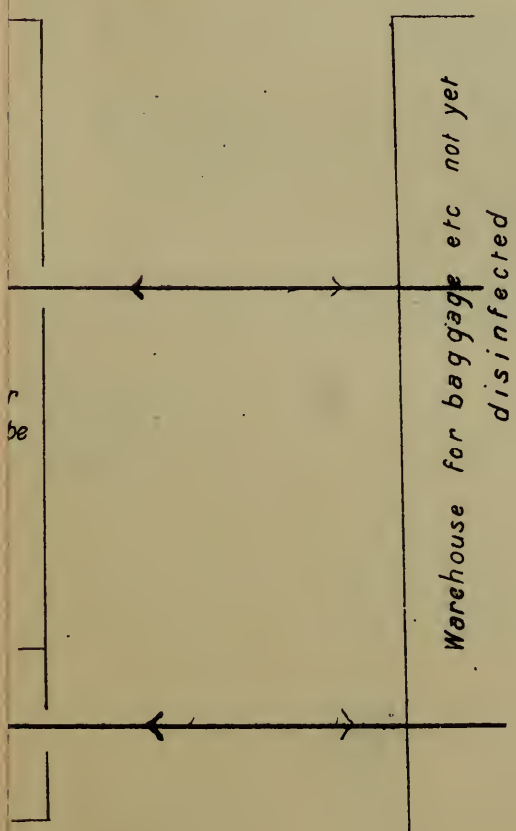
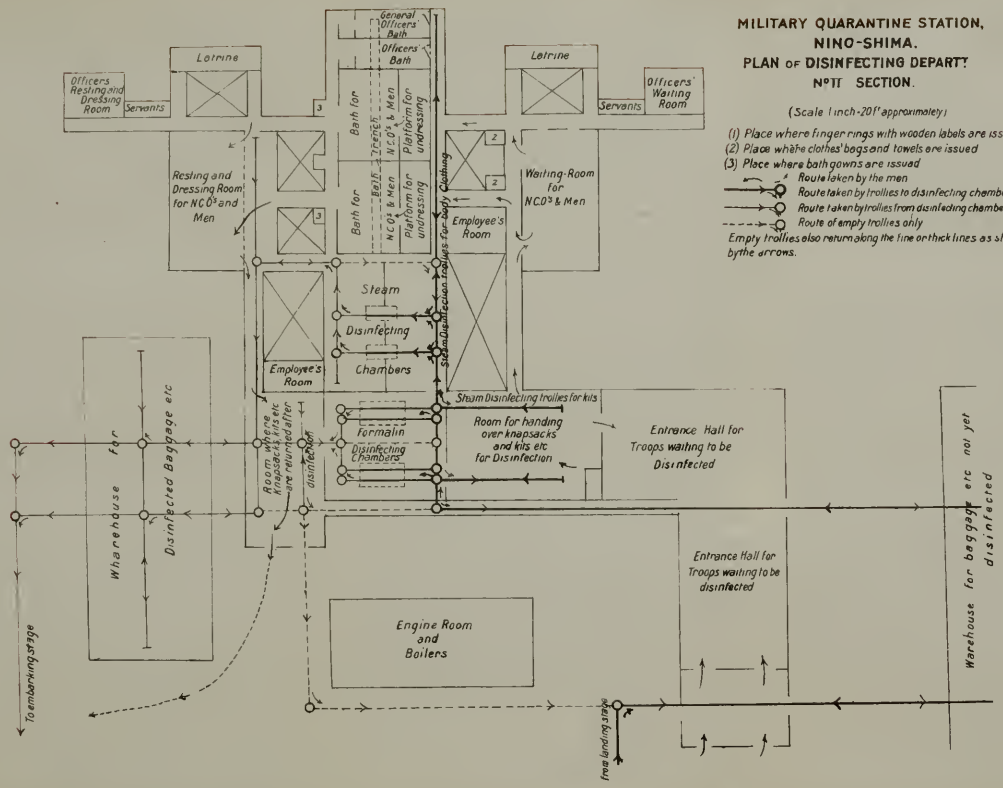


Figure 4.


MILITARY QUARANTINE STATION,
NINO-SHIMA.
PLAN OF DISINFECTING DEPARTT.
No II SECTION.
(Scale 1 inch=20 ft approximately)
(1) Place where finger rings with wooden labels are issued
(2) Place where clothes' bags and towels are issued
(3) Place where bath gowns are issued
Route taken by the men
Route taken by trollies to disinfecting chambers
Route taken by trollies from disinfecting chambers
Route of empty trollies only
Empty trollies also return along the fine or thick lines as shown by the arrows.
Latrine
Officers' Resting and Dressing Room
Servants
General Officers' Bath
Officers' Bath
Bath for French N.C.O.s & Men
Platform for undressing
Bath for Bath N.C.O.s & Men
Platform for undressing
Resting and Dressing Room for N.C.O.s and Men
Waiting-Room for N.C.O.s & Men
Employee's Room
Steam Disinfection trollies for body clothing
Steam
Disinfecting
Chambers
Employee's Room
Steam Disinfecting trollies for kits
Room for handing over knapsacks and kits etc for Disinfection
Formalin
Disinfecting Chambers
Room where Knapsacks, kits etc are returned after disinfection
Wharehouse for Disinfected Baggage etc
Entrance Hall for Troops waiting to be Disinfected
Entrance Hall for Troops waiting to be disinfected
Engine Room and Boilers
Warehouse for baggage etc not yet disinfected
To embarking stage
from landing stage
54866

To t

To fo

Figure 5.

(c)

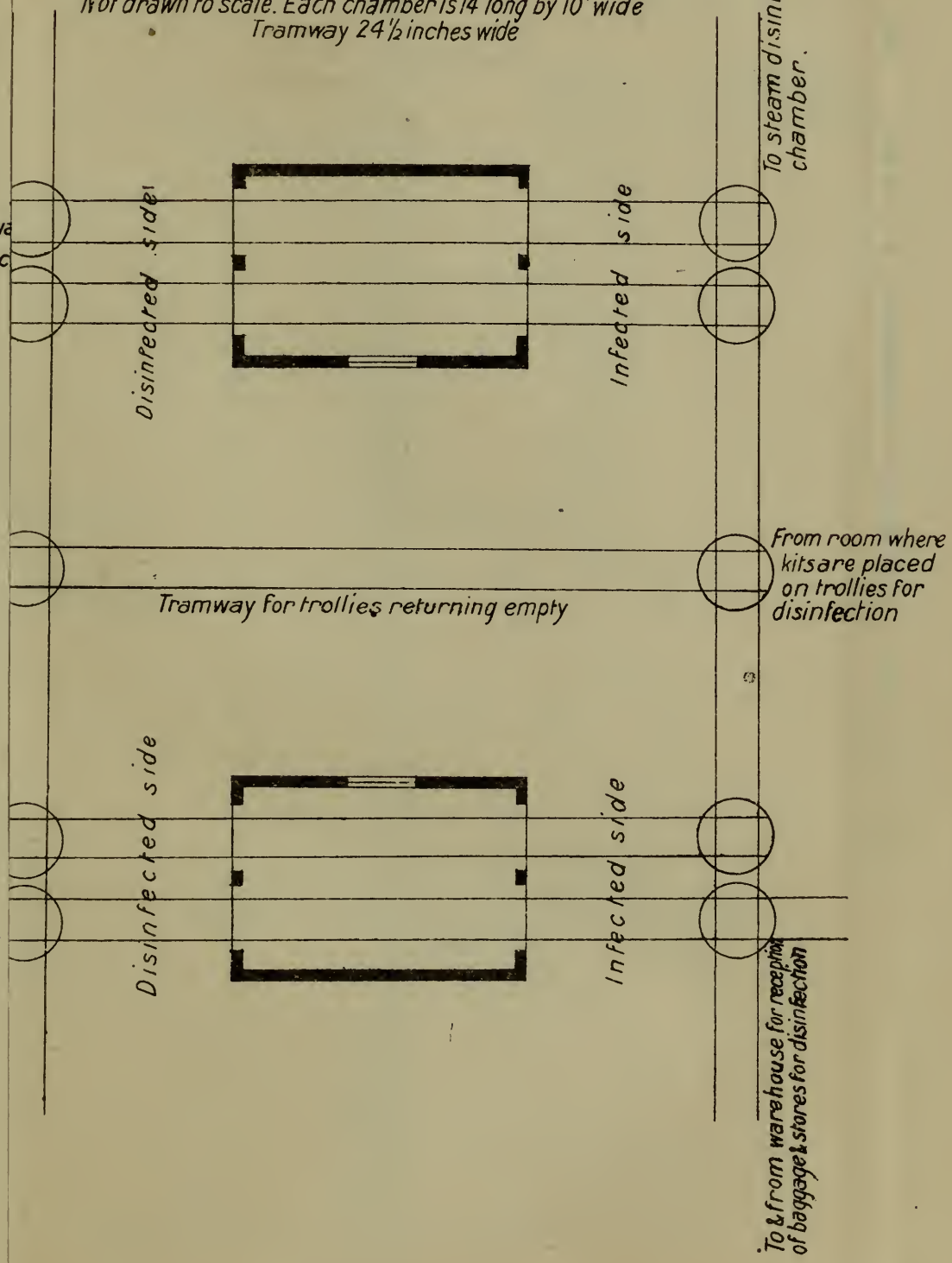
MILITARY QUARANTINE STATION.

NINOSHIMA.

FORMALIN DISINFECTING CHAMBERS.

No II SECTION

Not drawn to scale. Each chamber is 14' long by 10' wide
Tramway 24½ inches wide



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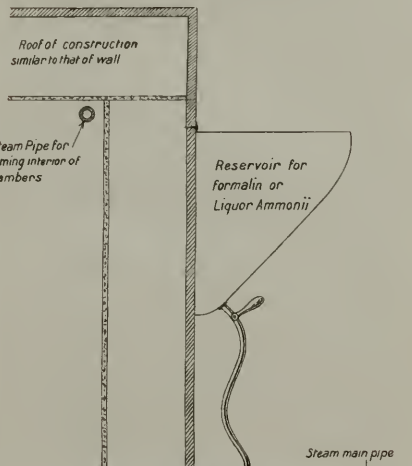
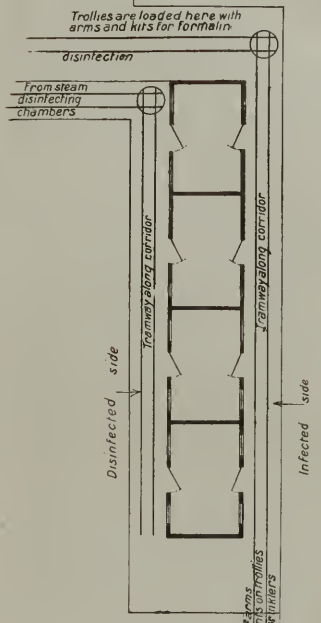
(a)

PLAN OF FORMALIN RESERVOIR
STEAM PIPE AND CONSTRUCTION OF WALL OF
FORMALIN DISINFECTING CHAMBERS.



(b)

FORMALIN DISINFECTING CHAMBERS
Nº I SECTION

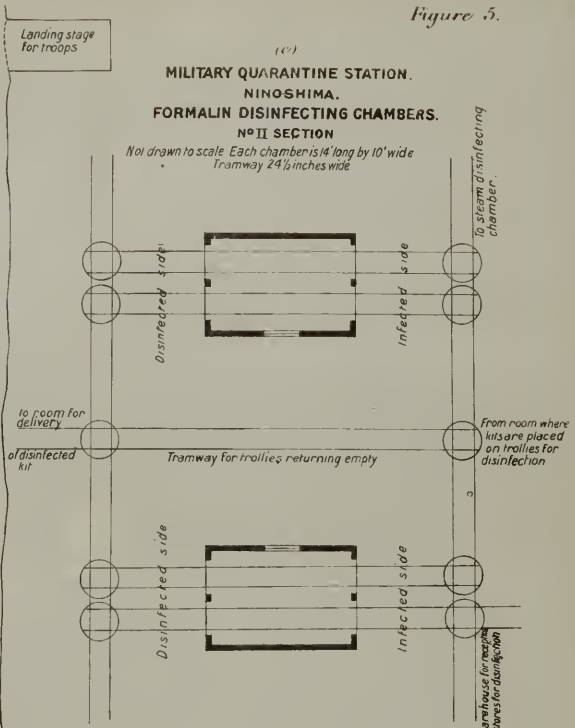


(Not drawn to scale Each chamber is 18' long & 12' wide)
Tramway 24½ inches wide Side corridors 6' wide

(c)

MILITARY QUARANTINE STATION.
NINOSHIMA.
FORMALIN DISINFECTING CHAMBERS.
Nº II SECTION

Not drawn to scale Each chamber is 14' long by 10' wide
Tramway 24½ inches wide



(5) The steam is allowed to continue playing into the chamber until the thermometer reaches 70° C. It is then shut off.

(6) The chamber is kept closed for fifteen to twenty minutes longer, and at the end of that time the Liquor Ammonii is turned on, along with steam, for one or two minutes.

(7) The door on the *disinfected side* is now opened, and the articles are removed.

It will be noted that this process of disinfection is a combination of steam, raising the interior to a temperature of 70° C., and formalin. The temperature is not allowed to go higher, in order to avoid damage to leather and other goods.

Surgeon-Major Tzusuki claims for the process great rapidity of disinfection as compared with the usual methods of disinfecting by means of formalin; namely, about half an hour as compared with seven hours. He also states that by this method the disinfecting agent is active not merely on the surface of the articles, boxes, bundles, &c., as in the usual method, but that it also penetrates into the interior of all packages. Boxes containing papers or other articles are not even opened during the process. The chief factor in effecting this result is the air pipe connected with the floor space, by means of which, and by the introduction of steam under pressure, a current is produced that acts in the same way as in steam disinfecting chambers.

I may state that I examined valises, boots, leather straps, and articles usually damaged by disinfection in steam disinfecting chambers, after they had come out of the formalin disinfecting chambers, and could not detect any injury to the fabric.

Dr. Tzusuki's process, therefore, seems a valuable process and worthy of being tried in connection with the disinfection of such articles.

(37) Notes on the use of Disinfectants with the Japanese Army in the Field.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps. Manchuria, 7th August 1905.

One Photograph.

Regulations with regard to methods of disinfection and the use of disinfectants with the Japanese army in the field have been recently revised. Copies of them have not been given to me, but the officer who drew them up has explained their purport.

Disinfection is applied to

(1) Chinese houses.
(2) Surface soil.

The former are disinfected, as a routine course, whenever they are occupied as quarters. The latter is only disinfected when a case of infectious disease occurs in the vicinity.

The interior of a Chinese house consists usually of mud floors, mud walls, and mud-plastered *kangs* or sleeping platforms. The roof is usually an open rafter roof with *kaoliang* straw placed across the rafters. There is generally a considerable number of large wooden chests in each room, the number varying according to the size of the room and wealth of the owner. They take the place of cupboards, &c. Remaining furniture may consist of a few Chinese tables and chairs. This description applies mainly to the Manchurian village house in which the troops are cantoned.

In disinfecting these houses, the furniture is removed. Any of the chests that the soldiers want kept in the rooms, as cupboards for food, utensils, &c., are emptied and scrubbed with perchloride of mercury solution, 1 in 1000. All fixed woodwork in the room is similarly treated. Such woodwork consists of door and window frames, rafters, and a wooden combing along the edge of the *kangs*.

The mud walls and floors are washed all over with a brush steeped in carbolic acid solution, 1 in 20. The surface of mud so treated is then scraped, and the room is now considered disinfected.

The windows are paper windows, and the soldiers themselves may buy clean rolls of paper in their battalion field canteens for a small sum, and re-paper, not only the windows, but also the walls.

[*After page* 475.

An improvised method of disinfecting the blankets of enteric fever patients in a field hospital at Pa-pao-t'un, summer of 1906. A *saké* cask is placed over a Chinese cooking vessel. The vessel is filled with water and the bottom of the cask is perforated. When the water boils, the steam rises into the cask, in which are the articles to be disinfected. A heavy stone is placed over the lid of the cask and blanket underneath, in order to maintain pressure, and other possible places where steam might escape are caulked.

Disinfection of surface soil is by means of slaked lime. Twenty per cent. of oxide of lime in water is used for this purpose, and the mixture is sprinkled over every portion of the surface.

No other disinfectants are used in the Field Army. All are supplied to the field units, who carry out the disinfection themselves, by the Medical and Surgical Reserve Depôts of each division.

Carbolic acid is supplied in bottles, just as in Europe.

Perchloride of mercury is supplied in two forms, namely, in the form of soloids, and in the form of a mixture of the agent with chloride of sodium. It is invariably coloured with an aniline dye of a pink or red colour.

It is proposed to use chloride of potash, instead of chloride of soda, as the auxiliary solvent, because it is not so deliquescent. Chloride of ammonia, which is used in England, is not used by the Japanese, because it evaporates and is also deliquescent.

Experiments have been made with the aniline dyes used to colour the mercuric solutions. Most of them are found to have a precipitating effect or to lose colour in time, but aniline scarlet has not these drawbacks, and it is now proposed to use it instead of fuchsin.

The oxide of lime* used in preparing the slaked lime is supplied in tins or drums of about four gallons capacity (10 *sho*), and, as already stated, this is supplied by the Medical and Surgical Reserve Depôt, which, in its turn, is supplied from the central store in Tokio, under the Medical Department of the War Office. Most of the material is obtained from two large chemical factories, one at Tokio and the other at Osaka. They belong to private companies, but are under the supervision of government officials, that at Tokio, for example, being under the supervision of the professor of chemistry at Tokio University. It is presumed that these factories are under contract to supply the army, and that the government officials are appointed to guarantee the quality of the supplies.

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* Latterly no lime has been sent from Japan, as lime quarries have been made use of in Manchuria for supplying slaked lime for disinfectant purposes.

(38) Creosote as a Prophylactic in the Japanese Army.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps. Manchuria, 24th August 1905.

Tables.

Results of Experiments - - Tables I. to V.

The employment of creosote as a prophylactic against diseases, whose etiology is the presence of specific pathogenic organisms in the digestive track, is due to the investigations of Professor Okada, the Professor of Hygiene at the Army Medical School, Tokio.

Professor Okada had long ago noted that the *Bacillus Coli*, after surviving a weak solution of creosote, gradually became capable of surviving stronger solutions. In this way he estimated that the *Bacillus Coli* survived exposure to a strength of the drug that would be inimical to other micro-organisms that were exposed to the same strength for the first time. His experiments in the laboratory also showed that the *Bacillus Coli* was itself inimical to other micro-organisms introduced into the digestive track.

It was on the theory formed by such experiments that the use of pills of creosote was ordered throughout the Japanese army, when it took the field in 1904. Since then, Professor Okada and his assistant, Dr. Totsuka, have continued their experiments, taking advantage of the use of the pills by men in the field, and have published some of the results in an article in this year's January number of the "Journal of the Army Medical Officers' Association" ("*Gun-i-gak-kai-Sashi*").

The following were the points which the authors of the article endeavoured to determine:—

(1.) The amount of the resistance of the *Bacillus Coli* to creosote, after inhabiting the intestinal track of a healthy man taking creosote daily.

(2.) The length of time any increased resistance lasts, after the man ceases to take creosote.

(3.) The extent of increase or decrease of the resistance of such *Bacillus Coli* to pathogenic bacilli, whose resistance to creosote in nutritive media is definitely ascertained.

(4.) The effect of introducing pathogenic bacilli into the digestive track of animals, which have been given creosote daily.

The following experiments were made to determine these points :—

A. Four healthy soldiers, I., II., III., IV., were treated as follows :—

Case I. Took 0·3 gramme of creosote daily, in three pills of 0·1 gramme each, for one week.

Case II.—Took the same as I. for one month.

Case III.—Took 0·303 gramme of carbonate of creosote in three pills of 0·101 gramme daily for one month.

Case IV.—Took the same as III., with some *Magnesium Ustum*, the quantity of which is not mentioned, for one month.

B. Guinea-pigs and rabbits were given 0·05 to 0·1 gramme of creosote daily, according to weight. The Creosote was made into an emulsion with broth, and diluted with water so that each dose contained 0·1 gramme of creosote or lesser dose according to weight. This was introduced into the animal's stomach. The doses were continued for 10 days to one month in the case of different animals.

The results of these doses were tested as follows :—

(*a*) Three platinum loopfuls were taken from the fæces of each of the men and thoroughly mixed with 300 cubic centimetres of bouillon. One platinum loopful was then taken from this mixture and introduced into bouillon containing creosote in the strength of 1 in 2,000 to 1 in 500. Each of these creosote bouillons, seeded with a small quantity of excreta from the individual taking creosote pills, was then incubated for 48 hours, and the development or otherwise of *Bacillus Coli* in the bouillon noted.

(*b*) *Bacillus Coli* was isolated from the fæces of the individuals taking the creosote pills and introduced into bouillon. A loopful of this bouillon and a similar loopful of pure culture of *Bacillus Typhosus* were simultaneously introduced into freshly prepared bouillon, and after incubation for 24 hours seeded on to agar plates. The number of colonies of *Bacillus Coli* and *Bacillus Typhosus* that afterwards developed was then noted.

In the case of animals, *cholera vibrio* was introduced into the stomach of the guinea-pigs and into the aural veins of the rabbits.

The results of the experiments on animals are not published. The experiments on the four men are shown in the tables appended. They serve to throw some light on the first three points, which it was the authors' object to investigate. They were carried on during two months and 18 days.

The general results are as follows:—

(1.) The resistance of *Bacillus Coli* to creosote gradually increases during one week's taking of creosote pills, and it retains the amount of acquired resistance for about five days after the pills cease to be taken. The acquired resistance then gradually diminishes until, at the end of three weeks after the pills cease to be taken, it is completely lost.

In the same case the resistance of the *Bacillus Coli* to *Bacillus Typhosus* increases in conformity with its resistance to creosote and reaches its highest point at the end of the week. Six days after the pills are stopped the resistance is less and continues gradually to decrease, until at the end of 50 days it has entirely disappeared.

(2.) In the case of the man taking creosote for one month, the resistance of the *Bacillus Coli* to creosote increases during the first week and continues to increase still more up to three weeks. After the pills are stopped, the resistance declines gradually from the third day and is altogether lost after 40 days.

The resistance to *Bacillus Typhosus* remains active for 20 days after the pills have been stopped.

(3.) In the case of carbonate of creosote taken for one month, the resistance to creosote increases gradually from the first week up to 30 days. After the pills are stopped, the resistance rapidly diminishes and is lost after three weeks.

The resistance to *Bacillus Typhosus* is marked after the pills have been taken for 30 days. After they are stopped the resistance lasts for 18 days and then gradually disappears.

(4.) In the case of carbonate of creosote taken with *Magnesium Ustum* for one month, the resistance is not marked.

The general conclusion of the authors is (*a*) that carbonate of creosote (creostal) which no doubt has been tried, as it has the reputation of being less disagreeable to take and less disturbing to the digestion, is less efficacious than creosote, and (*b*) that the acquired resistance lasts for a period after the pills of creosote have been stopped, that is somewhat shorter than the period during which they were taken.

With regard to the actual practice of taking these pills daily in the field, there is no doubt that it is more or less rigidly carried out by the soldiers. Each officer and man receives a tin box, circular in shape, measuring $2\frac{3}{4}$ inches in diameter and $\frac{1}{2}$ inch deep, containing 90 pills, once a month. Each pill contains 0·1 gramme of creosote, or $1\frac{1}{2}$ grs. The soldier takes a pill with each meal, and the squad non-commissioned officer sees that this is done. Men are now in the field who have been taking their three pills daily for nearly a year and a half. Those with whom I have spoken assure me that they have felt no disagreeable results, and, on the contrary, feel extremely well. In one division there were complaints at first of pain and diarrhœa being caused in some of the men for the first few days, but these symptoms rapidly passed away and did not return.

The question will naturally be asked how far there is evidence that the use of these pills has prevented enteric fever or other disease in the field. On this point it is difficult to arrive at a true conclusion. On the one hand, there is the fact that the cases of enteric fever have been comparatively few. Although no estimate of incidence per cent. of strength is possible, on account of the absolute secrecy maintained regarding strength of the armies in the field, the amount of enteric fever in the Second Army must fall between 0·5 and 1·0 per cent. admissions to strength for one year, namely, from the landing in Manchuria in May 1904 to May 1905. This, of course, is a small percentage of incidence for a campaign, and will be attributed, in some measure, no doubt, to the use of these pills.

On the other hand, the following facts have to be taken into consideration :—

(1.) Manchuria is not a country in which enteric fever is endemic.

(2.) The Russian troops, who apparently took no such prophylactic, have not suffered more than the Japanese from enteric fever, if one can judge by the statements made by their own medical officers and by the information received from the medical missionaries of the Scotch Presbyterian Mission in Manchuria, who were on intimate terms with the Russian medical and other officers. The percentage of enteric incidence was estimated by the Russian medical officers, with whom I had an opportunity of speaking, at about 0·5 per cent. of strength.

(3.) The climate can be compared more or less to that of Central Europe, with, perhaps, a severer winter and a hotter summer. In European campaigns, in such a climate, the incidence of enteric fever has not been great, as compared with campaigns in latitudes nearer the tropics or in the tropics.

(4.) Manchuria is richly cultivated, and, during the short summer, decomposing refuse is rapidly brought under the influence of crops.

(5.) Amongst the fairly large group of foreign attachés, their servants and Japanese grooms, transport soldiers and other followers, who must number throughout the armies as many as the members of a company of infantry, *i.e.*, 200 individuals, no cases of enteric fever have, to my knowledge, occurred. Yet they have lived under sanitary conditions that have generally been inferior to that of other troops in the field, and have not taken creosote.

(6.) The practice of drinking only water that is boiled is universal, both amongst the troops and the class mentioned in the preceding paragraph. The influence of this prophylactic must, therefore, be considered.

In view of these facts, it seems advisable to put forward as much as possible of the information that has been obtained regarding the use of creosote, with the object of suggesting laboratory experiments on the lines of those of Professor Okada, or on other lines that may offer confirmation, or the reverse, of the theory on which the use of creosote has been based; and also with the object of suggesting experiments on the use of the prophylactic amongst troops quartered in areas in which enteric fever is endemic, or in an area where it may happen to be epidemic.

Table I.

RESULTS of EXPERIMENTS of CASE I., *i.e.*, Creosote Pills of 0·1 gramme each taken three times daily for one week, and the growth of *Bacillus Coli* from the Fæces tested in varying strengths of Creosote Bouillon.

Days of Experiment.	Growth in Creosote Bouillon of Strengths					Remarks.
	1 in 500.	1 in 700.	1 in 1,000.	1 in 1,500.	1 in 2,000.	
1	0	0	?	+	+	Creosote stopped on 7th day. Age of soldier, 33.
2	0	0	0	+	+	
3	0	0	0	+	+	
4	0	0	+	+	+	
5	0	0	+	+	+	
6	0	+	+	+	Not tested.	
7	?	+	+	+		
8	0	+	+	+		
9	0	+	+	+		
10	0	?	+	+		
11	0	+	+	+		
12	0	+	+	+		
13	0	?	+	+		
14	0	?	?	+		
15	0	0	?	+		
16	0	0	+	+		
17	0	0	+	+		
18	0	0	?	+		
19	0	0	+	+		
20	0	0	+	+		
21	0	0	+	+		
22	0	0	?	+		
55	0	0	?	+		

Table II.

RESULTS of EXPERIMENTS of CASE II., *i.e.*, Creosote Pills taken three times daily (0·1 gramme each) for one month, and the growth of *Bacillus Coli* from the Fæces tested in varying strengths of Creosote Bouillon.

Days of Experiment.	Growth in Creosote Bouillon of Strengths					Remarks.
	1 in 500.	1 in 700.	1 in 1,000.	1 in 1,500.	1 in 2,000.	
2	0	0	0	+	+	Age of soldier, 22.
4	0	0	0	+	+	
5	0	0	+	+	+	
6	0	?	+	+		
7	0	?	+	+		
8	?	+	+	+		
9	0	+	+	+		
11	0	+	+	+		
12	0	?	+	+		
13	0	+	+	+		
14	0	+	+	+		
16	?	+	+	+		
17	0	0	+	+		
18	0	?	+	+		
19	0	?	+	+		
20	0	+	+	+		
21	0	+	+	+		
24	0	+	+	+		
25	?	+	+	+		
26	0	+	+	+		
27	?	+	+	+		
28	+	+	+	+		
29	0	+	+	+		
31	0	+	+	+	- -	Creosote stopped.
32	+	+	+	+		
33	?	+	+	+		
35	0	+	+	+		
36	0	+	+	+		
38	?	+	+	+		
40	0	+	+	+		
41	0	+	+	+	Not tested.	
42	0	?	+	+		
43	0	?	+	+		
44	0	+	+	+		
45	0	+	+	+		
46	0	+	+	+		
47	0	+	+	+		
49	0	+	+	+		
50	0	+	+	+		
52	0	+	+	+		
54	0	+	+	+		
55	0	+	+	+		
57	0	+	+	+		
58	0	?	+	+		
60	0	0	+	+		
61	0	0	+	+		
63	0	0	+	+		
64	0	0	+	+		
65	0	0	+	+		
67	0	?	+	+		
68	0	0	+	+		
70	0	0	+	+		
71	0	0	+	+		
73	0	0	+	+		
74	0	0	?	+		
76	0	0	?	+		
77	0	0	?	+		
78	0	0	0	+		

Table III.

RESULTS of EXPERIMENTS of CASE III., *i.e.*, Carbonate of Creosote Pills, 0·101 gramme each, taken three times daily for one month, and the growth of *Bacillus Coli* from the Fæces tested in varying strengths of Creosote Bouillon.

Days of Experiment.	Growth in Creosote Bouillon of Strengths					Remarks.
	1 in 500.	1 in 700.	1 in 1,000.	1 in 1,500.	1 in 2,000.	
1	0	0	+	+	+	Age of soldier, 26.
2	0	0	+	+	+	
3	0	0	0	+	+	
4	0	0	+	+	+	
6	0	0	+	+	Not tested.	
7	0	?	+	+		
8	0	?	+	+		
9	0	?	+	+		
10	0	0	+	+		
11	0	?	+	+		
12	0	0	+	+		
13	0	0	+	+		
14	0	0	+	+		
15	0	0	+	+		
16	0	0	+	+		
17	0	+	+	+		
18	0	0	+	+		
19	0	0	+	+		
20	0	0	+	+		
21	0	0	+	+		
23	0	0	+	+		
24	0	?	+	+		
25	0	0	+	+		
26	0	0	+	+		
27	0	0	+	+		
28	0	+	+	+		
29	0	+	+	+		
30	?	+	+	+		
31	0	+	+	+		Creosote stopped.
33	0	?	+	+		
34	0	0	0	+		
35	0	0	0	+		
36	0	0	?	+		
37	0	0	?	+		
39	0	0	+	+		
41	0	0	+	+		
42	0	0	+	+		
43	0	0	+	+		
44	0	0	0	+		
45	0	0	?	+		
47	0	0	+	+		
48	0	0	+	+		
51	0	0	+	+		
52	0	0	+	+		
53	0	0	+	+		
55	0	0	0	+		
56	0	0	0	+		
57	0	0	0	+		
58	0	0	0	+		
59	0	0	0	+		

Table IV.

RESULTS of EXPERIMENTS of CASE IV., *i.e.*, Carbonate of Creosote and *Magnesium Ustum*, taken three times daily for one month (the Carbonate of Creosote in pills of 0·101 gramme each), and the growth of *Bacillus Coli* from the Fæces tested in varying strengths of Creosote Bouillon.

Days of Experiment.	Growth in Creosote Bouillon of Strengths					Remarks.
	1 in 500.	1 in 700.	1 in 1,000.	1 in 1,500.	1 in 2,000.	
1	0	0	+	+	+	Age of soldier, 37.
2	0	?	+	+	+	
3	0	0	+	+	+	
4	0	?	+	+	+	
5	0	?	+	+	Not tested.	
6	0	?	+	+		
7	0	?	+	+		
10	0	0	+	+		
12	0	?	+	+		
14	0	0	+	+		
19	0	0	+	+		
20	Not tested.					
21	0	+	+	+		
22	0	+	+	+		
24	0	?	+	+		
26	0	+	+	+		
28	0	+	+	+		
29	0	+	+	+		
30	0	+	+	+		Creosote stopped.
31	0	0	+	+		
32	0	0	+	+		
33	0	0	+	+		
35	0	0	+	+		
36	0	0	+	+		
37	0	0	?	+		
38	0	0	+	+		
40	0	0	?	+		
42	0	0	+	+		
43	0	0	0	+		
45	0	0	+	+		
47	0	0	+	+		
49	0	0	+	+		
50	0	0	+	+		
53	0	0	+	+		
55	0	0	0	+		
56	0	0	0	+		
59	0	0	0	?		

Table V.

RESULTS of EXPERIMENTS of the Comparative Number of Colonies of *Bacillus Coli* from the Men taking Creosote, and of *Bacillus Typhosus*, incubated together in Bouillon and seeded on Agar Plates.

Case from which Bacillus Coli was taken.	Day of Experiment on which Bacillus Coli was taken from Fæces.	Number of Colonies on Agar Plates, in the different Experiments.							
		a.		*b.*		*c.*		*d.*	
		B. Coli.	B. Typh.	B. Coli.	B. Typh.	B. Coli.	B. Typh.	B. Coli.	B. Typh.
Case I. (*i.e.*, case taking creosote daily for one week).	7th day of taking	100	Nil	100	Nil	—	—	—	—
	6th day after stopping.	150	5	100	20	—	—	—	—
	15th day after stopping.	100	55	100	4	—	—	—	—
	50th day after stopping.	Enteric bac. only. Numerous.		Enteric bac. only. Numerous.		Enteric bac. only. Numerous.		—	—
Case II. (*i.e.*, case taking creosote daily for one month).	12th day of taking	200	1	240	1	100	1	—	—
	7th day after stopping.	100	Nil	100	Nil	100	Nil	100	Nil
	20th day after stopping.	100	Nil	100	1	100	2	—	—
	30th day after stopping.	100	Nil	100	Nil	—	—	—	—
Case III. (*i.e.*, case taking creosote carbonate for one month).	12th day of taking	100	Nil	100	130	100	100	—	—
	30th „ „	100	1	100	3	100	3	—	—
	18th day after stopping.	100	3	100	3	100	Nil	—	—
	30th day after stopping.	100	Innumerable.	100	16	100	15	100	3
Case IV. (*i.e.*, case taking creosote carbonate and magnesium for one month).	12th day of taking	100	6	100	19	—	—	—	—
	30th „ „	100	8	100	18	100	Nil	—	—
	17th day after stopping.	100	12	100	12	100	Innumerable.	—	—
	30th day after stopping.	100	Innumerable.	100	10	100	10	—	—

(39) Japanese Filters.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, 26th January 1906.

Appendices.

Plate in text.

Further Note on the Ishiji Filter.

The general construction of this filter has already been described,* and a specimen of one of the powders used sent to the War Office. Information has now been obtained with regard to the composition of the powders, which have been regarded as a secret of the patentee.

There are two powders, one supplied in tins and the other in glass bottles. The former is a mixture of aluminium sulphate, aluminium silicate, and permanganate of potash. The latter is a mixture of aluminium silicate and hydrochloric acid. The exact proportion of each agent in the powders has not been disclosed, nor have the exact methods of using them been disclosed, although information on these points has been promised.

It is claimed by the experiments of Professors Kitasato and Okada that the filter removes or destroys the pathogenic organisms of cholera, dysentery, and enteric fever, although many non-pathogenic organisms remain in the filtered water.

It may be mentioned that the filter is only used when the men are unable to sterilize the water by boiling, and that a Berkefeld field service filter is† now being sent to the Army for experimental trial in the field.

* *See* pages 435 and 446.

† I have since ascertained in Tokio that no Berkefeld filters were issued, as experiments with them in Japan led to the belief that they would not be serviceable in the field.—W. G. M.

Official Details of the Ishiji Filter, and Directions for Use.

There are two ways of using the filter :—

(*A*) *Simple filtration.*—Filter muddy water after adding the colouring precipitant until the water turns red. For only slightly muddy water, filter without using the composition. The filtrate must not be used for drinking purposes unless it is boiled.

(*B*) *Filtration with destruction of micro-organisms.*—Filter after adding both the colouring precipitant powder and the discolouring germicide powder. The filtrate is suitable for drinking purposes without boiling.

"B" process is to be adopted only when the existing circumstances at the front preclude the possibility of boiling.

Directions for Use.

1. Previously to the use of the filter, see that the sponge in the filter sleeve fills the opening well. Suspend the filter in a suitable place; tie up the two filter sleeves, and the discharge hole at the bottom; fill it with the water to be filtered, and after letting it stand for several minutes (about 10 minutes) after the powders have been added, untie the side openings and let the filtrate out into any suitable vessel. It is advisable to return gently that portion of the filtrate which comes out first and refilter it, as it may contain more or less muddy matter.

2. Do not refill the filter until the water in it is completely filtered off.

3. Every time the filter is used, clear out the precipitated matter by untying the discharge hole at the lower end, and cleanse frequently the charcoal and sponge, together with the cylinders in which they are placed.

REPORT by Surgeon-Major TOTSUKA of the Japanese Army on Bacteriological Experiments with the Improved Ishiji Filter made at the Army Medical School, Tokio.

The old patterns of Ishiji sterilizing filter were subjected twice to experiment at the Medical School, but on each occasion they proved unsuccessful in various respects. After further consideration, Professor Okada made suggestions to Mr. Ishiji for the purpose of effecting improvements upon the former systems and achieving the main object, namely, that of destroying specific micro-organisms. Several preliminary experiments were made, and Mr. Ishiji, who is a pharmaceutical chemist in Tokio, followed the suggestions with assiduity, and tried many different kinds of compositions until eventually a satisfactory basis for effecting the necessary improvements was established. During

the absence of Professor Okada on official duty, I took sole charge of the experiments, and with the assistance of Messrs. Yazawa and Utsumi, have been enabled to obtain such results as make the system of filtration sure and efficacious. The following is a brief statement of the experiments :—

I.—*Process of Filtration.*

The process consists of three stages: (1) Precipitation, (2) Destruction of micro-organisms, and (3) Filtration. The process is, however, simple in practice, and is as follows :—

(1) "A" composition (*i.e.*, the colouring precipitant) is put slowly into the water to be filtered, which is then stirred (or shaken).

(2) When the water presents a distinctly red colour, "B" composition (the discolouring germicide) is at once added while stirring or shaking, and the red colour then disappears.

(3) After letting the water stand for 10 minutes, it is allowed to pass through the filter in the waterproof canvas, which is conical in shape, and arranged so that the residue (precipitate) falls to the bottom, or apex of the inverted cone, while the water that has been treated passes through the filtering apparatus, fixed on the sleeves attached to the sides of the cone.

Both "A" and "B" compositions are powders. Flocculent masses are observed to form immediately after they are added to the water; this being specially the case with foul water from ditches, or water containing mud. The proportion of both compositions to that of water need not be determined at the time when they are used. The criterion as to quantity is the colouration or discolouration of the water, as the case may be. This is one of the points that recommends them for use in the field. If, however, the colouration cannot be observed well, as for example at night, or owing to the nature of the vessels containing the water to be filtered, the quantity required may be taken as 2·0 grammes of "A" composition, and 1·3 grammes of "B" composition, for each litre of water. (*Vide* Table of quantity used under "Compositions, and their quantities" mentioned after.)

II.—*Experiments to Test the Efficacy of the Process.*

Experiments were conducted as follows :—

The micro-organisms, taken from pure slope cultures on Agar-agar, were added to a fixed quantity of water taken from the waterworks in Tokio, and from one of the dirty moats.

A platinum loopful of the micro-organisms from the Agar-agar cultures was added to meat bouillon as a control test; and 0·5 cc. and 1 cc. of the filtrate and precipi-

tate were also added to bouillon after the water had been treated with "A" and "B" powders. The bouillon was incubated for 48 hours and then examined. In addition 100 cc. of the filtrate was made neutral, and 10 cc. of a 10 per cent. aqueous solution of peptone was added, and incubated for 24 hours. Cultures were then made of loopfuls from this mixture and examined after 24 hours' incubation.

Table I. of Results of Experiments.

Micro-organism.	Source of Water.	Clear or Muddy.	Quantities of Water used.	Quantities of Germs added.	Quantities of "A" Composition added.	Quantities of "B" Composition added.	Time taken in Filtration.	Physical character of Filtrate.	Growths after Incubation.*			
									Original Water.	Filtrate.	Precipitate.	Filtrate with Peptone.
					Grm.	Grm.	Minutes.					
Bacillus Coli (from dog).	Water from waterworks (1)	Clear	500 cc.	1 loopful	1·45	0·80	10	Clear	+	—	—	—
	" " " (2)	"	" "	"	1·60	0·68	"	"	+	—	—	—
	" " " (3)	"	" "	"	1·80	0·80	"	"	+	—	—	—
	" " moat (1)	Muddy	" "	"	1·92	0·45	"	"	+	—	—	—
	" " " (2)	"	" "	"	1·90	0·93	"	"	+	—	—	—
	" " " (3)	"	" "	"	1·82	0·75	"	"	+	—	—	—
	" " " (4)	"	" "	"	1·48	0·58	"	"	+	—	—	—
	" " " (5)	"	" "	"	1·55	0·63	"	"	+	—	—	—
Bacillus Dysenterici (Shiga's).	" " waterworks (1)	Clear	" "	"	1·35	0·73	"	"	+	—	-	—
	" " " (2)	"	" "	"	1·33	0·93	"	"	+	—	—	—
	" " moat (1)	Muddy	" "	"	1·81	0·88	"	"	+	—	—	—
	" " " (2)	"	" "	"	1·83	0·95	"	"	+	—	—	—
Bacillus Enterici.	" " waterworks (1)	Clear	" "	"	1·52	0·65	"	"	+	—	—	—
	" " " (2)	"	" "	"	1·57	0·72	"	"	+	—	—	—
	" " moat (1)	Muddy	" "	"	2·00	0·93	"	"	+	—	—	—
	" " " (2)	"	" "	"	1·75	0·73	"	"	+	—	—	—
Spirillum Cholerae.	" " " (1)	"	" "	"	1·80	0·71	"	"	+	—	—	—
	" " " (2)	"	" "	"	1·26	0·58	"	"	+	—	—	—

* (+) indicates development of germs, and (—) their absence.

We experienced from the above experiments that the degree in which "A" composition colours water does not become more marked after a certain limit in quantity, namely, about 1·0 grm. to 500 cc. of water. Consequently we conducted further experiments with 1·0 grm. of "A" composition. They gave the same satisfactory results, as can be seen from the following Table (II.)

Table II. of Results of Experiments.

Micro-organism.	Source of Water.	Clear or Muddy.	Quantities of Water used.	Quantities of Germs added.	Quantities of "A" Composition added.	Quantities of "B" Composition added.	Time taken in Filtration.	Physical character of Filtrate.	Growths after Incubation.			
									Original Water.	Filtrate.	Precipitate.	Filtrate the Peptone.
					Grm.	Grm.	Minutes.					
Bacillus Coli (from dog).	Water from waterworks (1)	Clear	500 cc.	1 loopful	1·0	0·60	10	Clear	+	—	—	—
	,, ,, ,, (2)	,,	,, ,,	,,	,,	0·58	,,	,,	+	—	—	—
	,, ,, ,, (3)	,,	,, ,,	,,	,,	0·68	,,	,,	+	—	—	—
	,, ,, moat (1)	Muddy	,, ,,	,,	,,	0·45	,,	,,	+	—	—	—
	,, ,, ,, (2)	,,	,, ,,	,,	,,	0·62	,,	,,	+	—	—	—
	,, ,, ,, (3)	,,	,, ,,	,,	,,	0·43	,,	,,	+	—	—	—
Bacillus Dysenterici (Shiga's).	,, ,, waterworks (1)	Clear	,, ,,	,,	,,	0·85	,,	,,	+	—	—	—
	,, ,, ,, (2)	,,	,, ,,	,,	,,	0·71	,,	,,	+	—	—	—
	,, ,, moat (1)	Muddy	,, ,,	,,	,,	0·75	,,	,,	+	—	—	—
	,, ,, ,, (2)	,,	,, ,,	,,	,,	0·70	,,	,,	+	—	—	—
Bacillus Enterici.	,, ,, waterworks (1)	Clear	,, ,,	,,	,,	0·68	,,	,,	+	—	—	—
	,, ,, ,, (2)	,,	,, ,,	,,	,,	0·75	,,	,,	+	—	—	—
	,, ,, moat (1)	Muddy	,, ,,	,,	,,	0·77	,,	,,	+	—	—	—
	,, ,, ,, (2)	,,	,, ,,	,,	,,	0·55	,,	,,	+	—	—	—

The chief object of using "B" composition this time was not to discolour the water but to destroy germs. Equally good results were obtained by experimenting with the most economical quantities of "B" composition, and without completely discolouring the water. This is shown by the following Table (III.).

Table III. of Results of Experiments.

Micro-organism.	Source of Water.	Clear or Muddy.	Quantities of Water used.	Quantities of Germs added.	Quantities of "A" Composition added.	Quantities of "B" Composition added.	Time taken in Filtration.	Physical character of Filtrate.	Growths after Incubation.			
									Original Water.	Filtrate.	Precipitate.	Filtrate with Peptone.
					Grm.	Grm.	Minutes.					
Bacillus Coli.	Water from moat - -	Muddy	500 cc.	1 loopful	1·0	0·33	10	Colourless, clear	+	—	—	—
	" " - -	"	" "	"	"	0·40	"	"	+	—	—	—
Bacillus Enterici.	" " - -	"	" "	"	"	0·15	"	"	+	—	—	—
	" " - -	"	" "	"	"	0·28	"	"	+	—	—	—
Bacillus Dysenterci.	" " - -	"	" "	"	"	0·35	"	"	+	—	—	—
	" " - -	"	" "	"	"	0·38	"	"	+	—	—	—

III.—*Quantity of the Powders used.*

The quantity in grammes of "A" and "B" powders used in our experiments and mentioned in the foregoing tables was as follows, per litre of water:—

Series of Experiments.	"A" Composition.			"B" Composition.		
	Max.	Min.	Average.	Max.	Min.	Average.
1st - -	3·84	2·52	3·3	1·9	0·9	1·5
2nd - -	—	-	2·0	1·7	0·86	1·3
3rd - -	—	—	2·0	0·8	0·3	0·6

IV.—*Odour and Taste of the Filtrate.*

When "A" and "B" Powders are added in the maximum quantities as shown in the above Tables, to clear water, and the water filtered, the filtrate has a bitter and astringent taste, similar to that of a very dilute solution of alum. When one adds the powders to moat water a more or less bad odour will be observed, but the filtrate is not disagreeable to drink. In the field, when men are thirsty they will probably ignore such odour and taste.

V.—*Conclusions.*

The advantages of this system of water purification are—

(i) The process is simple.
(ii) Muddy water is clarified.
(iii) Germs of disease are destroyed.

The only disadvantage is that the powders used dissolve somewhat in the water and pass out in solution with the filtrate, and that the odour of muddy water cannot be thoroughly removed. Nevertheless, we are confident that the advantages more than counterbalance the disadvantages, and therefore are induced to consider this improved Ishiji filtering process as suitable for practical use in the field.

(Signed) K. TOTSUKA,
Surgeon-Major of the Army.

To Y. Saigo,
Commandant of the Army
Medical School.

APPENDIX 1.

Directions for adding the Colouring Precipitant and the Discolouring Germicide.

(a) Colouring Precipitant.

In simple filtration, usually add six fills of the accompanying spoon to a filter full of water, and gently stir until it turns distinctly red. After the precipitate settles, untie the knot on one or both of the filter sleeves, and clear filtered water will be obtained.

If the water to be filtered is very muddy the quantity of the composition should be increased until a distinctly red colour appears.

(b) Discolouring Germicide.

Add three spoonfuls of this composition to the water turned red by the colouring precipitant; the proper quantity to be used being just such as will remove the colour. Gradually add more if there remains any red colour, until the colour entirely disappears.

It may be taken for granted that pure water, free from germs, is obtained by untying the knot on one or both of the filter sleeves, ten minutes after the red colour has disappeared.

APPENDIX 2.

Details of the Filters.

Volume of Water in each sized Filter and Time taken in Filtration.

Size of Filter.	Contains	Filtered in	Filtration per Hour.
Large - -	About 40 gallons	13 minutes -	About 184 gallons.
Medium - -	,, 24 ,,	13 ,, -	,, 112 ,,
Small - -	,, 6 ,,	15 ,, -	,, 24 ,,
Pocket filter -	,, $2\frac{1}{2}$ pints	5 ,, -	—

Dimensions and Weight of the different sizes of Filters.

Size.	Diameter at Mouth.	Can be Folded	Depth.	Weight.
Large - -	About 3 feet	Double -	About $3\frac{1}{2}$ feet	About 10 lbs.
Medium -	„ $2\frac{1}{2}$ „	„ -	„ $2\frac{3}{4}$ „	„ $8\frac{1}{4}$ „
Small - -	„ $1\frac{1}{2}$ „	„ -	„ $1\frac{3}{4}$ „	„ 4 „

Prices.

	£	s.	d.	
Large filters (double filtrate opening)	1	6	0	(approximately).
Medium „ „ „ -	1	0	0	„
Small „ (single filtrate opening)	0	8	0	„
Pocket „ „ „ -	0	1	5	„
Colouring precipitant powder—				
10 lb., with 10 grm. spoon - -	0	6	5	„
1 lb., „ „ -	0	0	9	„
$\frac{1}{2}$ lb., „ „ - -	0	0	5	„
Discolouring germicide powder—				
1 lb. - - - about	0	0	9	
$\frac{1}{2}$ lb. - - - „	0	0	5	
Spare charcoal filter—				
Large and medium, each - „	0	0	8	
Small, each - - „	0	0	5	
Spare sponge, each - - „	0	0	8	

[To face p. 497.

The Ishiji Filter in use.

The above shows the Ishiji Filter in use at a water station in the village of Tang-hsiang-kung-t'ai, Manchuria, during the summer of 1905.

The sleeves containing sponge and charcoal filtering media are hanging on one of the tripod poles. The arms on which the sleeves fit when in use are seen on the sides of the canvas filter.

The bottom of the filter is shown open for the purpose of cleaning out the precipitated mud, &c. The bucket is not part of the filter. It is the ordinary water bucket of a set of cooking utensils.

(40) Methods of Warming adopted by the Japanese in Manchuria during the Winter 1904–5; with description of Charcoal Burning and Briquette Making in the Field.

REPORT by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, 6th February 1906.

Appendices.

A.—Sketch of Field Stove.
B.—Section of Cylindrical Kiln for Charcoal Burning.
C.—Plan of Dug-out.

Three photographs.

All the Chinese village houses, occupied by the Japanese troops during the winter, in the area south of the Sha Ho, had *kangs* or oven beds, on which the men slept or sat, Japanese fashion.

These *kangs* are heated from Chinese fireplaces, constructed either in an adjoining room or in the corner of the room containing the *kang*. The fuel used was dry or green wood, such as doors, window frames and furniture, or the stalks and roots of the high millet (*kaoliang*). The quantity of such fuel was not sufficient to permit of the *kangs* being kept constantly heated. Not infrequently, too, the brick, tiles, or mud coverings over the flues, that run horizontally through the *kang*, leaked, and it was then impossible to light the fires without smoking everyone out of the room. The hot air, that passes along the flues and warms the *kang*, is not sufficient to warm the air in the interior of the room, but only the surface of the *kang* itself.

Kangs were, therefore, not always reliable, and the use of braziers became universal; while, later on, a special form of field warming stove was issued.

The braziers were of all kinds and sizes:—Shallow saucer-like holes in the mud floor, Chinese earthenware basins, square wooden boxes lined with tin from biscuit boxes and made by men of the unit, large square brick-built braziers, chiefly in the wards of hospitals that had been opened in Russian barrack buildings—all these forms of brazier might be seen in use.

The field stove was of simple construction. The details are given in Appendix A. 900 of these stoves were sent up to the Second Army at the end of December 1904.

The fuel used in the braziers and stoves consisted of charcoal and coal briquettes, quantities of which were manufactured locally by the divisions concerned, under arrangements made by their chief intendance officers.

Thus, in the 6th Division, a number of charcoal kilns was constructed on the north bank of the Shih-li Ho, near the village of Yen-te-niu-lu. A grove of trees was in the vicinity, and the trunks and larger branches were cut into blocks, the largest of which were about 2 feet long and 6 inches in diameter and weighed about 25 to 30 lbs. The kiln is formed by digging a cylindrical pit in the bank of the river, about 3 feet deep and 6 feet in diameter. An entrance hole is formed by cutting away part of the front of the pit, where the bank slopes, and building it up with bricks, leaving an aperture, about 1½ foot square in size. A flue is also built up of bricks on the opposite side of the pit. (*See* section plan, Appendix B.)

The pit is then filled with the blocks of wood, placed upright, the larger blocks being in the centre and the smaller heaped up so as to form a dome-shaped stack, which rises about 2½ feet above the pit. The pit is then covered over with a thick layer of mud, plastered over the stack of wood, a circular vent hole about 2 or 3 inches in diameter being left on either side of the dome.

The stack of wood in the pit is now set on fire, thin branches, cut in 3 or 4 feet lengths and thrust through the entrance aperture, being used for the purpose. The fire is kept going for three days and if, after that time, white smoke is issuing from the vent holes, the entrance and vent holes are sealed up with bricks and mud. A small aperture, 3 inches by 4 inches, is however left at the lower part of the entrance hole. The kiln is then kept closed for two days, when the entrance hole is opened up and the blocks of wood, which should now be converted into charcoal, removed.

Chinese coolie boys were employed to clear the charcoal out of the kilns. They had to enter the kiln by the entrance hole and bale out the blocks. This was often a dangerous duty, as there was the risk not only of suffocation by charcoal fumes, but also of getting badly burned by still actively burning wood. At first the charcoal fumes prevented the boys staying in the kilns more than one minute at a time, but when they got accustomed to the work they would remain in for three or four minutes.

The 6th Division had an installation of twenty-five kilns, constructed as shown in Appendix B., or of larger size and oval in shape. The dimensions of the latter were 10 feet in the major axis and 5 feet in the minor axis. The other dimensions were the same as those of the cylindrical kiln.

The installation was under the charge of an enlisted soldier, who had special knowledge of charcoal burning. The establishment of Chinese coolies was obtained locally.

The quantity of wood that the cylindrical kilns take at a time is about 600 lbs. With good and suitable wood about one third of the weight is recovered as charcoal, but the wood obtainable locally (willow and poplar) returned only about one fifth of the original weight.

The charcoal was filled into sacks made of empty rice or grain bags, and was issued to the units of the Division at the ration distribution depôt. Thirty of these sacks were seen filled from one kiln alone.

The installation of twenty-five kilns was not sufficient for the requirements of more than one-half of the division, two-thirds of which were living at the time in trenches and dug-outs. The deficiency in fuel was consequently made up by manufacturing coal briquettes, arrangements for which were also made by the divisional intendance officers.

A spot was selected on the bank of the Liu-tang-kou river close to the railway, and Chinese briquette makers were imported from Tientsin and Peking, where briquette making seems to be a special trade. They were housed in comfortable dug-outs, constructed by themselves, in the river bank.

The Tientsin method of preparing briquettes, as practised by them, is as follows :—

A gang of four men work together. The coal is sifted through a sieve, and the dust is heaped up in a circle, leaving a saucer-like hollow in the centre. Earth, containing clay, and water are mixed in this hollow into a fairly fluid mud, equal in quantity to about one-half of the coal dust. The coal dust is then mixed into a paste with the mud. This briquette paste is now spread out on the ground to form a square of about 6 feet side and 2 inches thick. Fresh coal dust is sprinkled over the surface and stamped in by the feet. The surface is finally flattened out with the backs of spades, and then cut into a series of small squares, 1½ to 2 inches in size, with the edge of the spade.

Two of the gang now take shallow baskets with open-work bottoms, and place them on the top of inverted earthenware pots, like a medium-sized flower-pot in shape and size. The other two workers shovel the briquette paste in small quantities at a time into the baskets, while the first two keep giving the baskets a rotatory motion on the top of the pot as a pivot, until the small squares into which the paste has been cut are rolled into balls. The balls are then laid out in rows to dry in the sun. They are filled into sacks, and issued in the same way as the charcoal.

Two other methods of briquette-making were practised. In both, the briquette paste was prepared by puddling the coal dust and mud in a large earthenware jar, such as is commonly used in Chinese houses. In one of the methods this paste was rolled by hand into balls, about 2½ to 3 inches in diameter. In the other method it was placed in wooden moulds, 6 inches by

4 inches by $2\frac{1}{2}$ inches, and converted into bricks of corresponding size.

The method of making the briquettes in moulds gave the largest weight of fuel in the shortest time. In the Tientsin method, that first described, the gang of four men took one hour to make the 6 foot square of paste into 1,700 to 2,000 balls. In the mould method four sackfuls of briquettes could be made in the same time as one sackful of briquettes made by the other methods.

The number of Chinese employed by the 6th Division Intendance Department for briquette making was 20. The pay was 80 *sen* (about 1*s.* 7*d.*) per man daily. They manufactured about 50 sackfuls of briquettes, each sackful weighing about 84 lbs., in a day.

Much trouble was experienced in drying the briquettes, as they froze hard, even when there was a bright sun. A drying room was consequently constructed. It consisted simply of a dug-out in the bank of the river with door and chimney. A fire was lighted in one corner, and the briquettes were spread out on batten platforms in the interior.

It cannot be said that the briquettes gave much satisfaction. There seemed to be too much clay in them and not enough coal. They gave out little heat, and the charcoal was consequently much more in demand.

Many of the dug-outs occupied by officers and men were constructed with *kangs* cut in the earth, as shown in the plans (Appendix C). Some of the dug-outs were comfortably warmed by this method of construction, more especially when the flues were connected with a fireplace made in an adjoining dug-out, so that the smoke from the fire did not get into the room. They were also made warmer and more attractive by having the earth walls lined with cleaned *kaoliang* stalks and the floor covered with *kaoliang* matting, of which abundance could be procured.

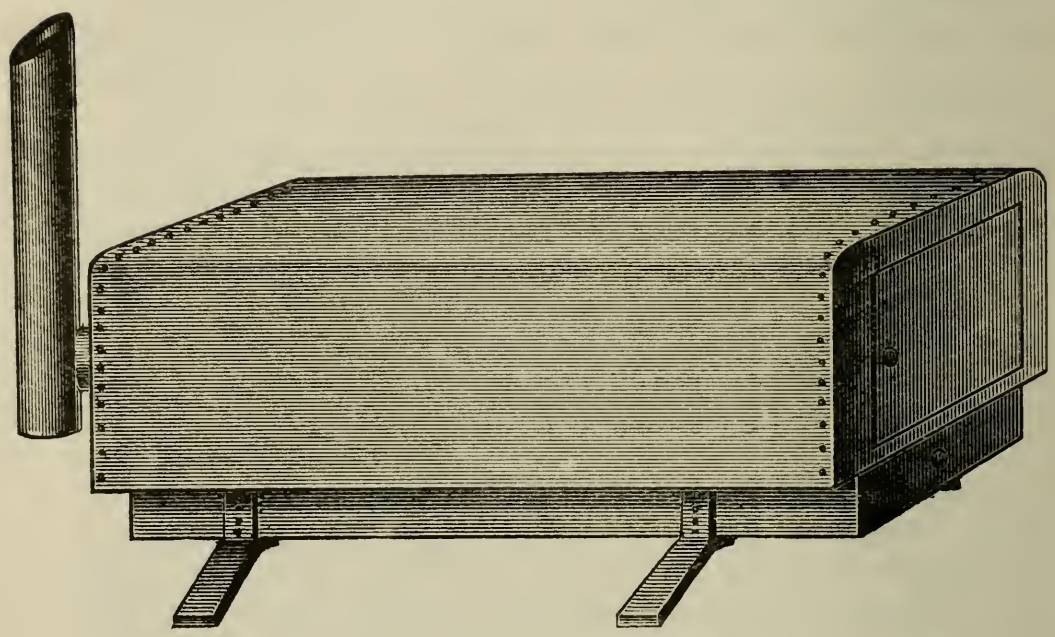
The charcoal brazier, however, as already stated, was the universal and favourite method of heating all forms of quarters during the winter. They were even taken into and used in the open field during the battle of Mukden.

A kind of pocket warmer, called *kairo*, was also used, but does not appear to have been a Government issue. These *kairos* are in common use in Japan, and consist of cloth-covered tin or aluminium cases, into which cylinders of prepared charcoal are placed and lighted. They were issued apparently to convoys of sick and wounded during railway journeys. At any rate one such convoy was seen, each man of which carried a semi-cylindrical case, made apparently out of old meat or biscuit tins ten inches long and two inches in diameter. A charcoal cylinder of corresponding size kept the tin heated for twenty-four hours, the duration of the railway journey to Dalny.

It may be mentioned, in conclusion, that certain precautions had to be taken in using charcoal in the interior of the Chinese houses, in order to avoid symptoms of suffocation from carbonic oxide. Apart from the necessity of admitting fresh air, it was always dangerous to introduce the brazier into the room until all the charcoal had been lighted into an even red glow. It was by no means unusual to have symptoms of headache, giddiness, and faintness from charcoal that was not properly alight. The field stove was always satisfactory, as it had flues connected with the outside air. Besides, it gave out a considerable amount of warmth to the inside air.

APPENDIX A.

Sketch of Field Stove, used by the Japanese for Warming purposes in Winter Quarters in Manchuria.



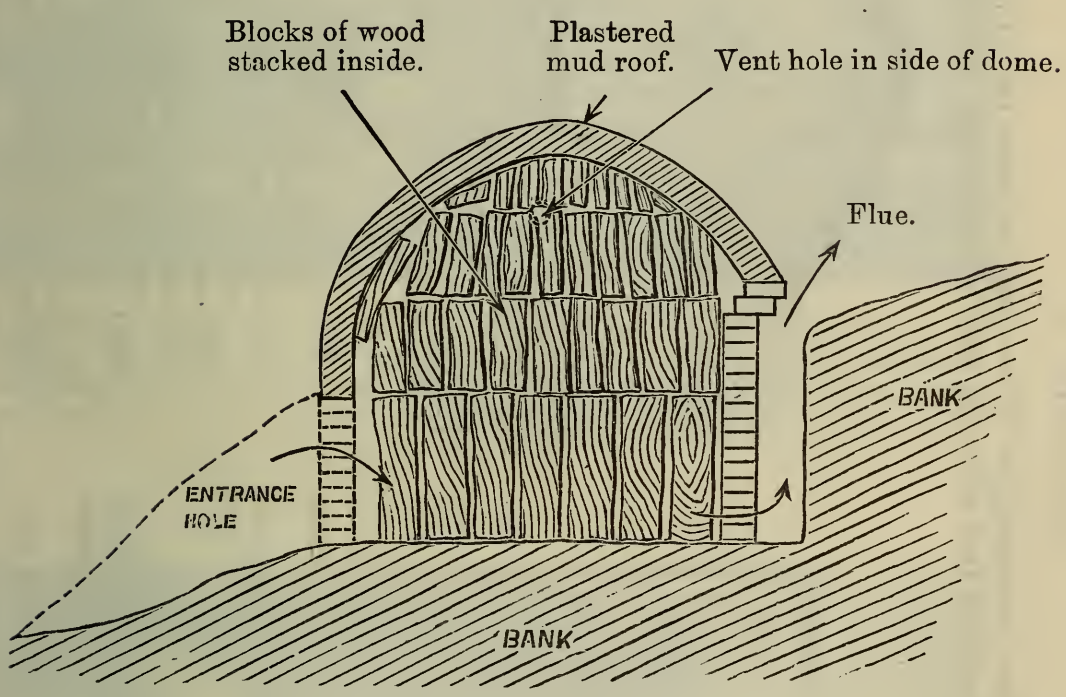
Construction.—Welted iron. Floor made of seven iron grating bars placed longitudinally, with closed ash box underneath. Stoke-hole door at one end and hole for flue at the other end.

Dimensions.—Length 32 inches, depth 12 inches, width 12 inches. *Ash box* same length, 3 inches deep and 9 inches wide. The chimney flue is in sections, which can be packed, along with fire-irons (tongs, shovel, poker), inside the body of the stove.

Fuel.—Charcoal, briquettes, or wood.

APPENDIX B.

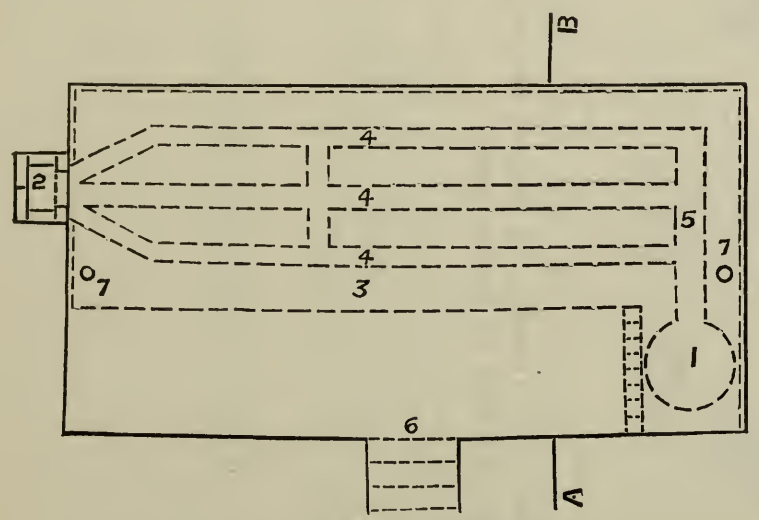
Section (Front to Back) of Cylindrical Kiln for Charcoal Burning, as used by the Japanese in the Field.



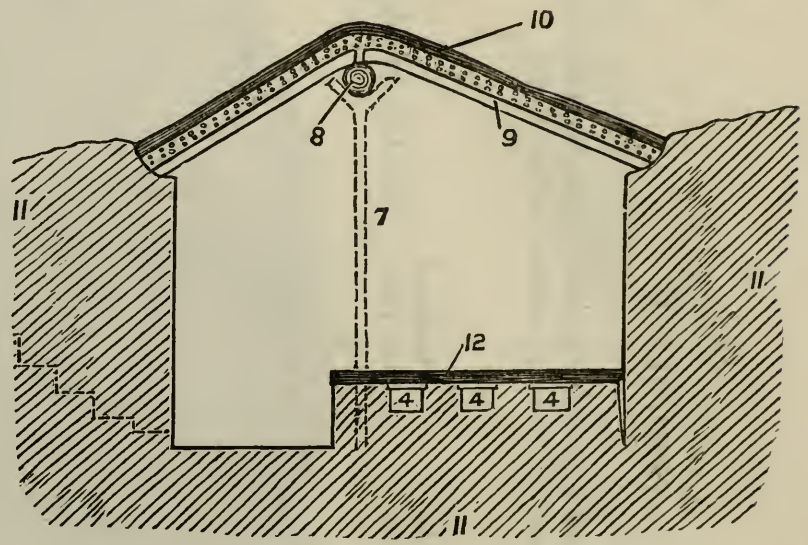
Dimensions.—3 feet high at sides, $5\frac{1}{2}$ feet at centre of dome, 6 feet diameter. Entrance hole $1\frac{1}{2}$ feet square.

APPENDIX C.

Plan of "Dug-out," with the floor arranged, for Warming purposes, as a Chinese "Kang."
(Dimensions of Dug-out--20 feet long, 10 feet wide, 5½ feet high at sides, and 8½ feet at ridge pole.)



(a) *Plan of Floor.*



(b) *Cross Section at AB.*

(1) Circular fireplace 2 feet diameter. Chinese cooking cauldron fits on top.
(2) Chimney, 1 foot by 1½ feet, cut in ground, bricked, and topped with earthenware jar with the bottom knocked out.
(3) Platform cut from the ground, 7 feet wide.
(4) Flues cut in the platform ground and connecting (1) with (2). Each flue is 6 inches wide, and about 8 inches deep. Covered with tile or brick, and made smoke-tight with plastered mud.
(5) Main flue from (1), the same as (4), but 10 inches wide.
(6) Entrance door, approached by steps cut down to it in the ground.
(7) Forked trunk of tree fixed on either end of (8) as uprights for roof.
(8) Trunk of tree, as ridge pole.
(9) Branches or smaller tree trunks as cross beams, seven on either side.
(10) Layer of kaoliang stalks and earth, as thatch. Can be made any thickness.
(11) Ground out of which hut is dug.
(12) Layer of kaoliang stalks as matting for platform.

NOTE.—A trench is cut all round the platform to keep it dry. It is very narrow.

[*After page* 505.

No. 1.

Wrestling amongst troops in the field during the summer of 1905, Tang-hsiang-kung-t'ai. Troops stationed in neighbouring villages would challenge one another to wrestling matches. Similar matches went on during the winter; the competitors being stripped naked even in extreme cold.

No. 2.

Soldiers drawn up for gymnastic exercises, Tang-hsiang-kung-t'ai, summer of 1905. A horizontal bar was made of a tent pole fixed between two trees. A climbing platform is shown on the left of the photograph.

[*After page* 505.

No. 3.

Kit and pack of the Japanese Infantry soldier during the battles of Hei-kou-t'ai and Mukden. Chinese straw boots and peasants' shoes are shown added to the ordinary pack. (Photograph by Colonel Tulloch, C.B., Indian Army).

(41) Daily Life of a Japanese Infantry Soldier in Time of War.

REPORT by Lieut.-General C. J. BURNETT, C.B., Head-Quarters Third Army, 14th July 1905.

As I have now visited all the divisions of the Third Army and seen the men in quarters and at ordinary routine work, it may perhaps prove of interest if I give an account of the daily life of a Japanese infantry soldier not in actual contact with the enemy. The life of the artilleryman or cavalryman is precisely the same, except that he has stables and the exercising of his horse. The Japanese soldier, at this season of the year, rises at 5 a.m. and has his first meal at 6 a.m. At 7 a.m. he is on parade, which keeps him employed for three hours, all told. He then returns to his quarters and does what he likes until 12 noon, when he takes his second meal. If it is considered necessary, he has another two hours' parade in the afternoon, but, from all I saw, this is only done in the case of young soldiers or others requiring special instruction. Lectures sometimes take the place of afternoon parade. The hours of afternoon parade are fixed by the battalion commanders, some working from 3 p.m. to 5 p.m., and others from 4 p.m. to 6 p.m. according to weather. At 6 p.m. or 6.30 p.m. the final meal of the day is eaten, and the men go to bed about 9.30 p.m.

All soldiers who are considered thoroughly efficient only go to parade once a week, and when off duty spend their time as they like. The men wake themselves in the morning and go to the place appointed for parade independently, just as a British workman goes to his work. I have seen buglers frequently in the field, but I have never yet heard a bugle sounded in quarters. When in their billets the men spend their time in sleeping, writing, smoking cigarettes, drinking tea, and washing their clothing, &c. They hardly ever leave their billets except when duty calls, and do not roam about the towns or villages in the way British soldiers do. On fine days all bedding and clothing is carefully put out to air, and in many cases the men have constructed large clothes-horses for this purpose. The men bathe in the evening, and guards are mounted in the evening also, about 7 p.m. at this season of the year. Games, theatricals, and other amusements are constantly indulged in. In one division I visited, I witnessed an excellent afternoon's sports, commencing with a very creditable gymnastic display on extemporized apparatus, followed by races of sorts and a display

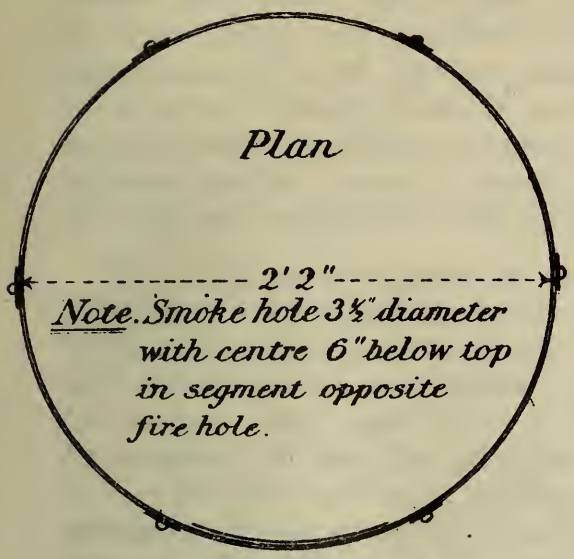
of hand-grenade tactics, winding up with wrestling, which latter amusement is indulged in frequently in the cool of the evenings. In another division an excellent theatrical performance was given. The plot and action of all the plays turned upon men's duty to their country, emphasizing the fact that everything, including life, must be given up, if required, for it and the Emperor.

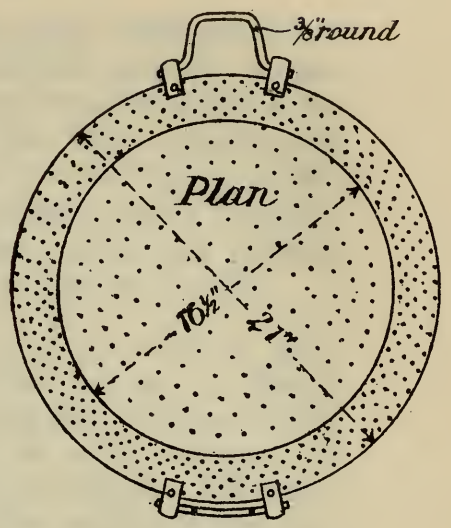
I saw only a very few tents pitched for the accommodation of troops; this is only done when there is not room in the houses for the garrison told off to any village. It shows, however, that the Japanese do not approve of overcrowding, even in the field. The tents I saw were white bell tents. Notwithstanding the order that no latrines are to be constructed within 20 yards of any place occupied by troops, in all the houses which held Japanese soldiers, latrines, without exception, were dug just in rear, or close by such houses for the use of the men. This goes to show that the authorities prefer to run some risk rather than inconvenience the men by having latrines too far off from their quarters, with the additional chance of their not using them at all. The latrines are usually oblong in shape, some are rectangular, being approximately 39 inches long, 39 inches deep, and about 20 inches wide. Usually they are emptied by Chinese, who use the excrement for manure, but if not, the orderly men left in from parade clean them out and bury the stuff in a place told off by proper authority. I have never seen any disinfectant used by the troops, except occasionally at a line of communication station, but in the hospitals I have visited it was always done. The only disinfectant is lime, procured locally. I have not seen many sentries on wells, but there was always a notice saying whether the water was drinkable or not. Most hospitals had sentries over the wells in use by them, if such wells were on a highway or in any public place. This sentry was always one of the Red Cross men.

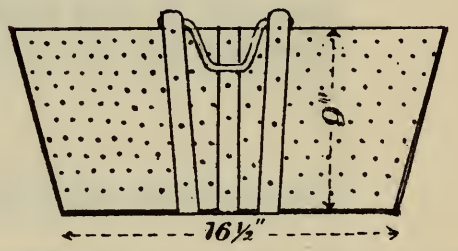
The food of the Japanese soldier, as I have already pointed out, is good, plentiful, and varied, and both tea and tobacco being weak, the men's nerves are not affected by their excessive use. Men in actual contact with the enemy and on the outposts are allowed more food that those in rear, as the Japanese consider that, men having hard, continuous, and anxious work require more nourishment than those who have a fairly easy time of it. It is the custom to relieve the outposts about once in 10 days.

In addition to the food ration, the men get every three days a pint of *saké* between four, and every week or so 20 cigarettes per man are issued as a gift from His Majesty the Emperor, as well as cakes and sweets, from the same source. Men who do not care for sweets exchange them for *saké* with their comrades who prefer sweets to wine. Rice, of course, forms the staple article of food in the Japanese dietary. This is supplemented by fish, vegetables, meat, pickles and

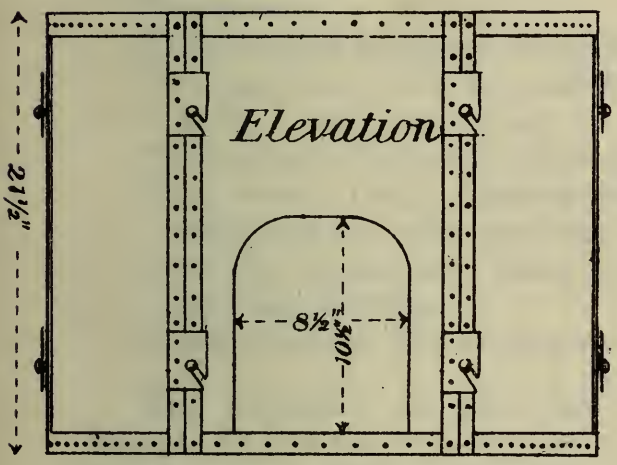
Japanese Cooking Outfit.



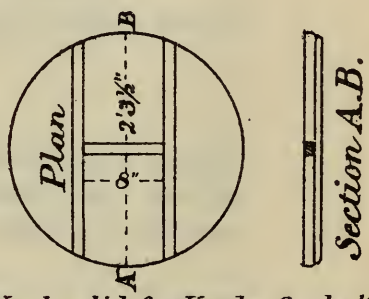




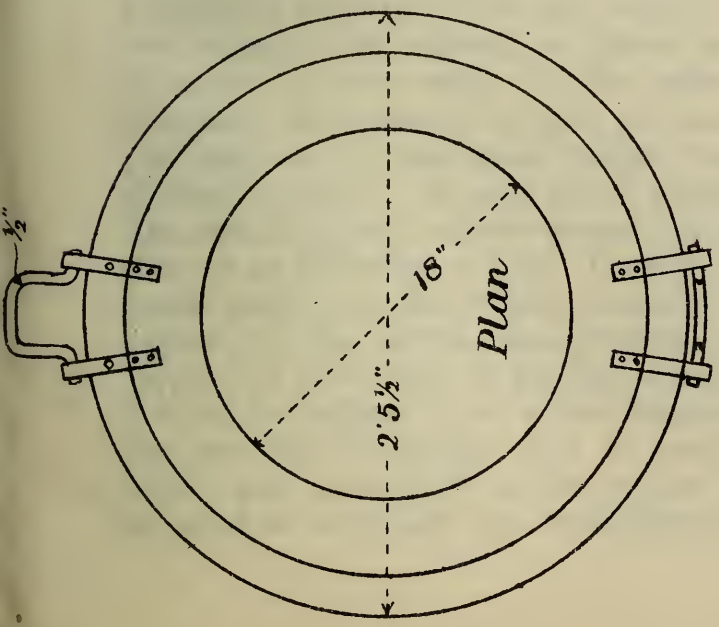
Tinned Sheet Iron Colander ~ Scale 1/12

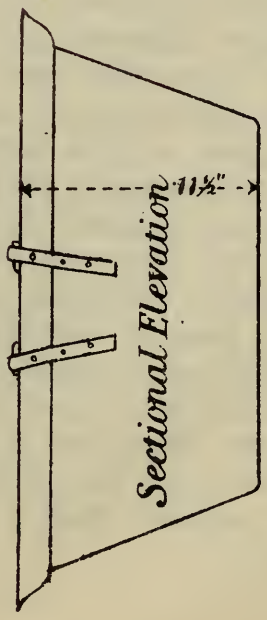


Sheet Iron Stove ~ Scale 1/12



Wooden lid for Kettle ~ Scale 1/10





Cast Iron Kettle ~ Scale 1/12

sauces of sorts. The Japanese have a very large assortment of canned and dried fish, which are of excellent quality, some of them being very palatable. The same remark applies to vegetables, but now that any amount of the fresh article can be procured locally there is no necessity to use tinned stuff. Meat is issued, sometimes canned and sometimes fresh, but the Japanese soldier is not a great meat-eater. He much prefers rice, fish, and vegetables, with pickles and sauces as a relish.

The cooking arrangements are very simple, as will be seen on reference to attached sketch kindly done for me by Major Kuhn, of the United States Army. There are two of these stoves with three boilers and three colanders to each company of 240 men, so that each stove is supposed to cook for 120 men. As a matter of fact, the colander only holds sufficient rice for 40 or 50 men at each boiling, so that three boilings are necessary if the company is at full strength and all the men present. The whole of the cooking utensils for one company are carried on one cart, namely:—

Two stoves.
Three boilers (wrapped in netting).
Two large zinc buckets (used to distribute rice when cooked and for washing rice in).
Three small zinc buckets (for carrying water).
One basket (with bamboo bottom and canvas sides, for receiving rice after washing; this is seldom used).
One bag (containing three wooden spoons and other small cooking utensils).
Three colanders (for boiling rice in).

The colanders fit into the boilers, and the three small buckets fit into the two large ones. Wood for immediate use is, I fancy, also carried on this cart. Water for drinking purposes is also boiled in the boilers.

The following is the procedure followed in boiling rice. The boiler is filled with water, and put on to the stove, where it is brought to the boil. The rice, which in the meantime has been well washed and cleaned, is placed in the colander, which is immersed in the water in the boiler and left there for 12 minutes. The colander is then taken out, the rice strained and put into one of the spare boilers, covered with a cloth, and allowed to steam. If more rice is wanted the process is repeated. The men all take it in turns to cook, but as the cooking is so simple there is no difficulty in this. I notice that all guards have their meals cooked at the kitchen nearest to their posts. From the highest to the lowest, the greatest attention is paid to the feeding of the men. A general who has 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. In the present instance, with a railway and river to assist transport, all the carts of the country available, and communications never threatened, the task of feeding the men well has been considerably diminished, but I am perfectly certain that, in the face of an active, energetic, and capable enemy, these difficulties would have been enormously increased, and the men would not have lived in the luxury they now enjoy. The Japanese thoroughly realise that prevention is better than cure, and as an instance of this, the other day, when sitting on the banks of the Liao river, watching the engineers constructing a bridge, an officer gave me a cup of tea (he called it), made from roasted barley, which his men drank as a preventative against beri-beri. It was a very palatable beverage.

At this time of year khaki clothing is worn, being of much the same cut as our own. Cotton shirts and cotton socks are worn in hot weather, with no jersey or drawers. Two cotton shirts and two pairs of socks form the kit of each soldier, and thus constant washing is necessary. Every soldier has a long piece of flannel issued to him for use as a *kamarband*, and they are generally worn in some form or another. In winter, flannel shirts and woollen socks are worn with jersey and drawers. These latter, I am told, are very thin. The same number of socks and shirts are issued in winter as in summer, but these are supplemented by gifts from societies in Japan.

The discipline in the Japanese Army is on much the same lines as in our own, that is to say, they are very strict on duty, and in all matters of duty; but, when off parade, there is a spirit of *camaraderie* and kindly feeling between all ranks, from the Field Marshal down to the private soldier, which ensures mutual affection, respect, and confidence. The officers, assisted by the non-commissioned officers, get up all the amusements for the men and superintend their proper working. As regards crime, none is apparent to the outside observer, but I have asked for some statistics on this head, which I hope will be furnished to me later on. All I can say is that, since I joined the Japanese army, I have not seen a single drunken man. I have seen men who undoubtedly had been drinking, but these could be counted on the fingers of two hands.

When working on roads, entrenchments, &c., the hours of work and the reliefs are fixed by the officer commanding the men. The only large infantry working party that I have seen employed worked from 8 a.m. until 4 p.m., with a 40 minutes interval for dinner. The reliefs worked for 30 minutes and had a respite for 30 minutes. This struck me as an excellent arrangement, as the full value was got out of every man, and no ill-effects could accrue from over-exertion.

* * * * *

The motto of the Japanese Army is, "Every man is capable of becoming a good soldier. If he is not, it is because he does not gives his mind to it."

From all the information I have been able to gather, the health of this army is perfectly wonderful, and it is extraordinary what a number of officers and men who were wounded at Port Arthur and Mukden have rejoined the ranks.

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(42) Supplies and Rations: Notes on the Japanese System.

REPORT by Lieut.-Colonel C. V. HUME, D.S.O., Royal Artillery.
Tokio, 29th June 1905.

1. Supplies are sent to Manchuria by the Ration Department at Tokio, which is under the Minister for War. They are all packed in boxes, bags or bales of such a size as to be transportable by pack-ponies, or conveniently packed on the little Japanese transport carts. Biscuits are the only things I have seen packed in tin-lined boxes; tinned provisions are packed in plain deal boxes; rice, barley and other grains are carried in bags made of stout straw-matting, containing each 2 *to*, or just about a bushel. A bag of rice weighs 66 lbs., and a bag of barley 45 lbs.

2. When supply depôts are first formed, platforms for stacking supplies are prepared by pegging out squares and laying a loose flooring of good big stones on each. A shallow trench is then dug along each side of the square. The boxes, bags, &c., are piled in pyramids, those of grain and other perishable articles being covered with tent-cloth. When the depôt becomes a permanent one, sheds are erected. The sheds I have seen have a galvanized iron roof on wooden uprights and the sides are formed of the local *kaoliang* matting.

3. A soldier's ration is about equal to the daily food of the middle-class Japanese. The well-to-do farmer recruit is accustomed to a more bulky daily allowance of food, and when he first joins he feels hungry and unfilled. His stomach, however, soon contracts to an accommodating capacity. A man of 6 feet or over gets a double ration. I believe there were three such men in the army when war broke out. In peace time the summer and winter ration are the same, but both in peace and on service a soldier gets an extra "meal" if he has to do four hours' or more work at night. An ordinary day's ration is divided into three "meals."

4. No alcohol nor tobacco is issued as a ration in peace time, but a man may purchase up to 2 *go* of *saké* (three-fifths of a pint) *per diem* at the regimental canteen. On special occasions a ration of *saké* is issued, exchangeable for sweetmeats by teetotalers. On service a ration of *saké* is issued occasionally, also on national holidays. Cigarettes sent by "Soldiers' Aid Societies" are also issued on occasions. Cigarettes can be

purchased by the men from the small canteens, or shops, which follow the army. There are generally one or two of these shops in every village where the head-quarters of an Army, Division, brigade or even regiment are installed during a halt. The larger ones provide some European stores, while at all of them may be purchased Japanese pipes and tobacco, cigarettes, matches, *saké*, small tins of Japanese pickles, tooth-brushes and powder, soap, writing materials, paper, candles, odds and ends of underclothing, toothpicks, and other little luxuries dear to the hearts of the Japanese.

5. Rice is not a good ration at all times. In hot weather it quickly goes sour and in winter it freezes solid. The Japanese medical authorities are still in the dark as to the *fons et origo* of beri-beri, but that a rice diet has some connection with it is now pretty well established. The admixture of one-third barley with the rice has had an excellent effect in reducing beri-beri both in the army and navy. A small purple bean is sometimes boiled up with the rice, making it, to my taste, very stodgy. In hot weather the men are very fond of making their rice up into *nigri meshi* as it then keeps fresh much longer. The process is simple, and consists in squeezing the boiled rice into dumplings the size of a cricket ball and roasting them among the ashes. One of these dumplings, with a salted plum concealed in the centre, keeps sweet a long time. I much preferred them to the plain rice, and often carried them last summer during the battle of Liao-yang During the very cold weather, every endeavour was made to give men in the trenches and in close proximity to the enemy at least one meal of hot rice *per diem*, but biscuits were their mainstay, and the men have got to like them pretty well, though at first they did not relish the strange food.

6. The dried rice of the iron-ration (*dō-myōji* or *hōshii*) is very good. I had to use it on many occasions last summer, and the specimens I sent home in the spring were some I had been carrying about with me for months. To prepare it, tie up the mouth of the bag by means of the string attached to it, dip the bag into cold water and then drop it into a mess-tin or other pot full of boiling water. In 8 or 10 minutes the rice will be found to have swelled and filled the bag. It is then ready to eat. A bag contains one meal. Three bags go to a day's ration of rice, the iron-ration being completed by the addition of one of the little tins of beef, holding about one-third of a pound, specimens of which I sent home with the rice.

7. The foreign attachés were, as a rule, fed on fresh meat and European stores, but when detached with the Guard last summer, we received our rations from the divisional head-quarters and sometimes ate strange things. Our daily food consisted of rice, fresh or preserved vegetables and meat or fish,

generally preserved, occasionally fresh (on one occasion it was curried horse). The Japanese tinned beef is good and sweet, but uninteresting owing to the want of fat, which the Japanese do not care for. The tinned salmon is soft and pulpy, and the best I tasted was a tin of salmon preserved in *soy*, which was given me by some sailors at Port Arthur. The Russian tinned meat, some tins of which I picked up during the Mukden pursuit, was the best of its kind I have ever come across. Among the various kinds of preserved foods to be found with the Japanese Army, I may mention the following :—

Salted plums.
Dried salsify.
Dried slices of lotus stalks.
Dried slices of *daikon*, a large and somewhat evil-smelling white radish.
Several kinds of dried sea-weed.
Condensed *soy* in tins.
Fish of several kinds, salted and smoked.
Dried *bonito*, in solid chunks the size and shape of a banana; this is scraped over the rice.

These were all very good and palatable, but somewhat unsatisfying, and after a longish course of them and rice only, biscuits and tinned beef were very welcome.

8. Some bad stores have appeared at the front, but not very many. At one time the rice was full of small white stones and it was found that this had been done by Korean coolies who had abstracted rice from the bags they were carrying and had filled up again with stones. After the battle of the Sha Ho, Marshal Oyama distributed all damaged rice to the Chinese, who much appreciated the gift.

9. There is no regular mode of requisitioning supplies in Manchuria. The headman of a village is always sent for and told what is required and the price to be paid. The price is generally liberal and the headman gladly undertakes the business, as payments are made through him, and a good deal of the money sticks to his palms. The Japanese have to pay good prices in Manchuria, as the Chinese are adepts at combining and putting up prices.

(43) Japanese Clothing.

REPORT by Lieut.-Colonel C. V. HUME, D.S.O., Royal Artillery. Tokio, 15th June 1905.

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1. "Clothing" consists of clothes, boots, spurs, curry-combs and brushes. All other articles of kit come under the heading "Arms." "Arms" are divided into (1) "Arms," which include arms, ammunition, carts and harness; and (2) "War Material," which includes all other articles of Ordnance supply.

2. The supply of clothing in the field is carried out entirely by divisions. The system is as follows:—

(1) The cloth, other than that purchased, is made at the Senju factory near Tokio.

(2) All cloth is stored at the depôt at Fukagawa, near Tokio.

(3) From Fukugawa, the cloth is sent in bulk to the head-quarters of divisions all over Japan.

(4) Divisions arrange for the making up of the clothing by contract. Everybody seems to be given a chance, and all over Tokio tailors can be seen at work in their little shops making up their respective lots. During war time, as a labour of love, the wives of the officers and men of the division take over a proportion of the underclothing and make it up under the superintendence of the wife of the G.O.C. or senior officer of the division.

(5) The division in the field indents on the depôt-battalion for the required clothing and the latter sends it to the army base depôt at the port of Ujina.

(6) From Ujina the clothing is shipped to Dalny, whence it is sent by rail to the most convenient "Despatch Magazine." These despatch magazines are established on the railway, and at them clothing and other supplies are stored till they can be despatched to the troops in the field. They are under the control of Manchurian head-quarters and are established at Dalny, Liao-yang, and Mukden, probably now also at Tieh-ling.

(7) At the despatch magazine the L. of C. of the army concerned takes the clothing over and delivers it at the head-quarters of the division it is consigned to.

(8) On the arrival of the clothing at the head-quarters of the division the intendance notifies regiments and other units of its arrival, and the latter send for it.

(9) No clothing is sent from Japan in anticipation of wants.

3. Should the chief intendant of a division find that it is possible to purchase locally materials for special clothing, such as warm coats for sentries, &c., he reports the fact to the War Minister, who, if he thinks it desirable, orders the division to purchase and make up in the field. The chief intendant then purchases the material and collects the tailors of the division at head-quarters to make it up. There are from 30 to 50 tailors in the ranks of each regiment.

4. In peace time the soldier gets two pairs of boots (shoes) *per annum,* and on service four pairs. The men are getting through about six pairs at present, the extra ones being indented for by divisions on their head-quarters in Japan. Repairs in the field are done by the bootmakers of regiments. The Japanese boots and shoes are, or rather were, cheap, shapeless, and over-roomy. They are now improving, anyhow in appearance and stoutness. I am not certain, but I think the government price at the beginning of the war was about 2 *yen** a pair, or even less. Up to the battle of Liao-yang, shoes and gaiters were universally worn by dismounted men. The shoes soon got loose and the gaiters ragged, and the majority of the men took to tying on their shoes with a bit of stout string (under the sole, then crossed over the instep, and then tied round the ankle). This kept the shoe close to the foot. Even when boots were introduced, after the battle of the Sha Ho, they were treated in the same way by the men. Boots and putties are finding great favour in the eyes of the Japanese, and though the troops in Tokio still stick to the shoes and gaiters, boots and putties are being issued in large quantities in the field. If not already the service kit, they will probably become so in the future.

5. Winter clothing is supplied to divisions as described in para 2. When winter is over, the division collects its warm clothing and hands it over to L. of C., which convey it to a despatch magazine, whence it is sent back to Japan. At Ujina it is all disinfected, and then sent on to divisional head-quarters, where it is cleaned, repaired and stored.

6. The winter clothing is excellent, and it is largely due to its good quality that the men have been practically immune from the effects of cold. A box containing a complete winter outfit has been sent home, and as we were each given an outfit in the winter, the following remarks on some of the articles, the result of my own experience, may be of use. I think the lowest night temperature we had was about 14 degrees below zero (Fahrenheit). There was very little snow and plenty of sun. On still days it was quite warm in the sun, but when the north

* A *yen* 2*s.* 0½*d.*

wind blew, which it often did, ever so little, the cold was intense even in the sun.

(1) The blanket overcoat is an excellent garment, loose and comfortable. Any amount of clothes and accoutrements can be worn underneath it. The hook fastenings answer admirably. The small keepers on the shoulders are for the tapes of the mitts, to prevent the latter falling off. The only weak point about the coat is that the skirts are not heavy enough to protect the knees when riding in a Manchurian north wind. I think the Japanese recognized this, for they served out to mounted corps a number of sheepskin "pull-overs" to cover the thigh and knee. In some divisions the overcoats were of a khaki colour, like the one sent home; in others they were grey or light brown, and made up actually of blankets, the red stripes to be found in most blankets appearing somewhere on the coat.

(2) The blanket hood is excellent in every way.

(3) The felt mitts I found indispensable. Dogskin gloves lined with rabbitskin were, I found, useless by themselves when riding on cold days, but five minutes in a felt mitt made a numbed hand warm again. So I always hung the mitts round my neck, for use when required.

(4) The woollen sweater is an excellent one, and I always wore it.

(5) The knitted drawers I did not venture on as I had some softer ones of my own, but the men could not have done without them.

(6) The knitted gloves are good, but require the assistance of the mitts, as mentioned above.

(7) I did not try the knitted socks very high, but I found them comfortable both riding and walking, in spite of their having no heels.

(8) The toe-caps I did not use, as my lace boots were not roomy enough and the least pressure produces numbed feet.

(9) The Balaclava cap is too thin. The men wore them all day and all night, but later on in the winter they were served out in addition with sheep or goat-skin ear-covers which were turned up over the cap when not required.

(10) The sheepskin waistcoat was, I consider, the greatest source of protection against the cold. It is worn over the jacket.

(11) The cloth boots were made in Japan. They are very comfortable and men and officers wore them, mounted and dismounted, till they wore them out. Having a large foot, I found Japanese sizes a bit too small. The first desideratum in a cold weather boot is room, and the

second is—more room. The Russian felt boots seemed excellent as far as warmth was concerned but, judging by the vast number I saw scattered along the roads leading north, after the battle of Mukden, they are not good foot-gear for rapid movements.

(12) I did not try the straw boots.

(13) The roomy, solid-hide Chinese shoes were popular with both Japanese and Russians.

7. Khaki was taken into wear by the troops last summer on or about the 1st June. The material was thin cotton drill. The jacket was a plain one, and so skimpy and short that the bottom edge was often hidden by the waist belt. Neither were the trousers and pants roomy enough. Khaki cap-covers, showing the band of the cap, were also worn. The value of the colour was well appreciated, and when, in the autumn, blue clothing was taken back into wear, many officers procured warm khaki serge of British pattern, while the rest of them and the men enlarged their khaki clothes by letting in pieces of drill, and wore them over their blue. The general effect was quaint as the pieces let in by the men varied in hue from white to dark brown. Later on, in the winter, the blanket overcoat provided the required khaki colouring. When the weather got milder again in March last, the blanket coat was discarded. To hide the blue every man was then served out with a loose khaki drill "dust-coat," reaching to the knees. This was put on over the blue, and the belts, packs, &c., put on over the khaki. This was the kit the troops were in when I left the front last month, and it seemed a very practical one. They will now be in khaki again.

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(44) Meteorological Tables.

METEOROLOGICAL RECORDS made in Manchuria by Lieut.-Colonel W. G. MACPHERSON, C.M.G., M.B., Royal Army Medical Corps, from the 28th July 1904 to 15th September 1905. Report dated Manchuria, September 16th, 1905.

Appendix.

Monthly Summary Table.
Tables of Daily Observations.

Two photographs.

The attached Tables are compiled from personal observations kept daily during the period 28th July 1904 to 15th September 1905, while in the field with the Second Japanese Army. The monthly Summary Table is for the completed months only, *i.e.*, from 1st August 1904 to 31st August 1905. The records are scarcely of a kind that will enable comparisons to be made with other localities during the same periods, or with other years. They are made without corrections, and are of value only as affording data by which some estimate may be made of the climate in Manchuria during the period of the operations in the localities where the forces were most concentrated in front of the enemy. They also form data for estimating seasonal and diurnal variations.

Atmospheric Pressure.

The observations were made with a pocket aneroid, such as is used by mountaineers. It had always given reliable results, and the records are a fair index of the daily and seasonal variations. None of the observations were in mountainous districts. In fact all may be said to have been taken in the plain of the Liao Ho and its tributaries. The constant high pressure during the dry winter months and the equally constant low pressure of the rainy summer months are the most noticeable features. This is due, of course, to temperature, as well as to humidity.

Temperature.

The records were made with a self-registering maximum and minimum thermometer, with the exception of the records from the 2nd August 1904 to the 6th November 1904, when, owing to the self-registering thermometer having got broken, the minimum and maximum were read from the dry bulb of a wet and dry bulb thermometer at sunrise and during the hottest time in the afternoon. These readings are, of course, only approximate readings for maximum and minimum. There was no appreciable index difference between this thermometer and the self-registering thermometer subsequently used. The readings were shade readings, the thermometer being hung as a rule about 5 feet from the ground on the north wall of a hut or out-building, where radiation and reflection were avoided as much as possible

Humidity.

Wet and dry bulb readings were made during the earlier periods, but were abandoned on account of the difficulty of keeping the wet bulb covering free from clogging, and the breakage of the water receptacle, and eventually of the themometer itself. It would also have been useless during the winter months.*

Rain and Snow.

The Tables show merely the number of days on which rain and snow fell. To some extent the duration of the fall is shown, and also whether the fall was heavy or slight. As a rule the rain was never very heavy, but it was frequently continuous, and occasionally drizzling in character. The heaviest fall in 24 hours probably did not amount at any time to more than 2 inches. (In Dr. Miyakawa's† rain-gauge records the maximum fall in one day is 1·9 inches, but some days of rain are omitted in his observation periods.) Rain very rarely accompanied north winds. The rainy days were almost invariably days of calm or southernly winds.

Snow, on the other hand, generally came with a north wind. It was seldom very heavy or continuous.

Wind.

As a rule, the wind was throughout light or moderate. It was only on rare occasions that it could be described as a gale or half a gale. The most windy period was March and April at Mukden, and during the earlier part of May, a period that was characterised by frequent dust-storms or dusty days.

Southernly winds were the most prevalent. They were invariably warm winds, and, in winter, had a marked influence

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* For further remarks on Humidity, *see* Note at end.

† *See* Note at end.

on the temperature records. In winter the northernly winds were bitingly cold, and a sudden change of wind to the north shortly after sunrise was sufficient to lower the temperature steadily, so much so that the maximum for the day would be the temperature at or about sunrise. This occurred, for example, on the 10th December, when the temperature recorded on the minimum thermometer, was 20 degrees as read in the morning, while there was a steady fall afterwards, the highest record during the remainder of the 24 hours being 15 degrees. A similar sudden change of temperature, with a steady fall during the day, occurred on the 15th of the same month, when the maximum, 32 degrees, was noted at 10 a.m. In the height of summer the influence of the north wind in lowering temperature was not marked. In fact it was often a hot wind then.

East or west winds were of rare occurrence. This was probably due to the physical configuration of the area in which the observations were taken, as the Liao Ho plain may be regarded as a wide valley running north and south, bounded on either side by more or less high ranges of mountains. Occasionally, especially in late summer, an easterly wind from the direction where the ranges were highest would blow into the plain for a short time towards sunset.

The number of days of calm is remarkable, especially during the winter months, when for many successive days there was not a "breath of air." The Summary Table shows many days in which wind direction was doubtful. These were either days on which the wind was changeable or days for which the records were doubtful. As a rule, the latter may be regarded as days of calm, because days on which the wind was distinctly appreciable were invariably noted.

Cloud and Sunshine.

The amount of sunshine is remarkably great. The column in the Summary Table of days of much sunshine represents days in which there was constant sunshine from sunrise to sunset, while the column of sunshine and cloud may be taken to mean days in which 50 per cent. of the hours between sunrise and sunset were sunny. Allowing this value of sunshine to these days, the recorded 396 days in the columns of cloud and sunshine of the Summary Table gives sunshine during more than 64 per cent. of the hours of the day for the whole period. In winter, especially in February, the percentage was much higher. In fact in February 25 out of the 28 days were days of continuous sunshine.

Weather Phenomena.

Dust-storms were not frequent, but on three occasions at least they were severe, and continued during most of the day. These occasions were the 9th March and the 12th and 29th May

1905. Dusty days were, however, invariably associated with north or south winds during the winter, and especially during the period in spring or earlier summer before the crops had come up. The crops, which covered practically the whole area in summer, were a complete protection against dust-storms.

Thunderstorms were comparatively rare also. They occurred most frequently during June, July and August 1905. They were never severe.

A weather phenomenon which may be mentioned is that during all the great battles of the period heavy rain fell on one or more days, except during the battle of Mukden, when there was a heavy fall of snow instead. This phenomenon never occurred on the first day of battle, but generally after one or more days of preliminary artillery fire.

Climate Generally.

The seasons of winter and summer are well marked, but the transition from extreme heat to extreme cold and from extreme cold to extreme heat is remarkably rapid. In other words, there is no gradual change through a spring season from winter to summer, or through an autumn season from summer to winter.

The rainy season, if it may be called a rainy season, for there are as many dry as wet days in it, lasted in 1905, in the district west of Kai-yuan where the observations were made, from the middle of May to the end of August. But rain or snow occurred in every month of the period.

The heat was often oppressive and at times muggy, but the nights were never so hot as to interfere with sleep. On the other hand, the extreme dryness and cold of winter seemed to do so to a considerable extent. Practically all the European attachés, not only with the Second Army but also with the other Armies, seemed to suffer from insomnia during this period. In fact, unbroken sleep seldom lasted for more than three hours. This was a very well-marked feature of the effects of climate, and was a subject of much remark amongst the attachés. It was apparently due, to a great extent, to work thrown on the renal functions by the action of the cold on the surface of the body. Even when a fair amount of covering was used, it was not always possible to avoid exposure of insufficiently covered parts, such as the shoulders, arms and face, to these effects.

In other respects the climate during the winter months is extremely salubrious and bracing.

The sun's rays were invariably pleasant in winter and never so fierce in summer as to induce one to avoid them.

The most important features of all, however, from a health point of view, are those already mentioned, namely, the excessive amount of sunshine, and the reduction in the number and severity of dust-storms from the extensive cultivation. These two features are perhaps more characteristic of Manchuria than of most other

[*To face page* 521.

Instruments for meteorological observations erected in village of Ching-yun-p'u, summer of 1905, at the head of the line of communication of the 2nd Army. The pole for the anemometer was made and used at Liao-yang, and had been carried about from place to place as the army advanced.

Laboratory building at the head of the line of communication of 2nd Army, Ching-yun-p'u, summer of 1905. It is erected in the garden of the house used by the Principal Medical Officer of the line of communication, and was equipped for chemical and bacteriological work.

places. The sunshine, especially in winter, is associated with blue skies and a more or less dustless atmosphere.

(*Note on Humidity, etc.*—Some Japanese Medical Officers, who also kept records, had Saussure hair hygrometers for use in winter. The most complete series of observations was made by a pharmacist officer, Dr. Miyakawa, attached to the staff of the Principal Medical Officer of the Line of Communication. He had a self-registering hair hygrometer as well as a wet and dry bulb thermometer. He had some extremely low records, as, for example, 28·8 per cent. relative humidity on 11th July 1904, but his averages, for groups of days that varied from a fortnight to a month, showed a maximum of 78 per cent. relative humidity for the period 7th to 20th July 1904, and a minimum of 59·2 per cent. for the period 1st to 31st December 1904.

It may be mentioned that this officer carried about with him from place to place not only this self-registering hair hygrometer and wet and dry bulb thermometers, but Casella's maximum and minimum thermometers, a rain gauge, a wind vane, and self-registering anemometer and barometer. He also carried a Stevenson's screen for the thermometers, and a pole, that was 9 inches in diameter and 28 feet high, for the wind observation instruments. His records have been placed at my disposal, but as they very rarely cover complete months, and are only for broken periods, according to the facilities he had for erecting his pole, screen, and rain gauge, the records of wind force, rainfall, and relative humidity are not suitable for introduction into a table of monthly summaries.)

APPENDIX.

Meteorological Observations in Manchuria.

Summary of Daily Observations from Wa-fang-tien, Lat. 39° 26′ N., Long. 122° 5′ E., to Ch'ang-t'u-fu, Lat. 42° 43′ N., Long. 123° 51′ E.—1st August 1904 to 31st August 1905.

Month.	Temperature °F. in Shade.							Number of Days of Rain or Snow.		Number of Days of Wind.						Number of Days of Cloud or Sunshine.				Weather Phenomena.		Remarks.
	Average Temperature.	Mean of Minima.	Mean of Maxima.	Highest Maximum.	Lowest Minimum.	Average Diurnal Variation.	Greatest Diurnal Variation.	Rain.	Snow.	N., N.W., N.E.	S., S.W., S.E.	E.	W.	Calm.	Doubtful.	Much Sunshine.	Much Cloud.	Sunshine and Cloud.	Records Doubtful.	Dust-storms or Dust.	Thunder-storms.	
1904. August -	76·4	70·5	82·3	94	62	11·8	22	15	—	3	6	—	—	7	15	8	12	8	3	1	3	1st to 8th, on march, Wa-fang-tien to Hai-ch'eng. 8th to 26th, at Hai-cheng. 26th to 31st, in field towards Liao-yang.
September	68·4	60·6	76·2	90	41	15·6	27	8	—	1	7	—	1	5	16	17	6	2	5	2	3	1st to 6th, in field south of Liao-yang. 6th to 30th, at Liao-yang.
October -	47·9	40·4	55·5	78	24	15·1	24	4	—	7	5	—	—	18	1	19	2	7	3	2	2	Maximum time for 12th, 14th, and 22nd, not recorded. Mean of maxima is for 29 days only; and other averages are modified accordingly. 1st to 10th, Liao-yang. 10th to 16th, area of operations south of Sha-ho. 16th to 31st, near Sha-ho Railway Station.
November	32·7	22·7	42·8	63	9	20·1	35	2	3	7	9	—	—	9	5	17	6	2	5	2	—	Near Sha-ho Railway Station, whole month.
December	16·6	6·8	26·4	50	− 7	19·6	34	2	2	8	6	—	—	15	2	22	3	1	5	3	—	Maxima of 8th and minima of 9th, not recorded. Means and averages are for 30 days accordingly. 1st to 15th, near Sha-ho Railway Station. 15th to 31st, at Shi-li-ho.
1905. January -	23·4	12·1	34·8	51	−10	22·7	38	1	3	6	11	—	1	13	—	20	2	5	4	3	—	At Shi-li-ho, whole month.
February	14·0	1·0	27·0	43	−14	26·0	38	Nil	2	6	2	—	—	19	1	25	1	1	1	1	—	1st to 26th, at Shi-li-ho. 26th to 28th, in area of operations west of Hun-ho.
March -	34·2	22·0	46·5	66	0	24·5	39	2	3	9	9	—	2	10	1	13	5	4	9	6	—	26th to 10th, area of operations along Hun-ho to Mukden.
April -	46·0	36·7	55·3	71	26	18·6	30	6	3	6	13	—	—	11	—	11	6	9	4	5	—	At Mukden.
May -	61·3	50·7	71·9	88	40	21·2	38	12	—	12	12	—	1	5	1	7	10	7	7	8	—	1st to 10th, at Mukden. 11th to 12th, at T'ieh-ling. 12th to 31st, near Willow Palisade, west of Kai-yuan.
June -	73·4	62·1	84·8	93	41	22·7	31	13	—	8	13	2	—	5	2	14	4	7	5	2	6	Near Willow Palisade, west of Kai-yuan, whole month.
July -	77·6	68·5	86·8	97	60	18·3	30	16	—	4	14	—	—	9	4	10	10	7	4	2	4	Ditto ditto.
August -	76·1	65·2	87·0	93	57	22·2	29	8	—	5	13	—	—	13	—	19	3	9	—	—	4	Ditto ditto except 4th to 6th, at Ch'ang-t'u-fu.

July (1904).

(The first observation was taken at a farmhouse between Chin-chou and Nan Shan, on the isthmus between Ta-lien and Chin-chou Bays, and is practically a sea-level observation. The remaining observations were made at various stages along the march to Wa-fang-tien.)

Date. 1904.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	Min.	Max.			
July 1st							
2nd							
3rd							
4th							
5th							
6th							
7th							
8th							
9th							
10th							
11th							
12th							
13th							
14th							
15th							
16th							
17th							
18th							
19th							
20th							
21st							
22nd							
23rd							
24th							
25th							
26th							
27th							
28th	?	29·275	?	85	Calm	Nil - -	Cloudy, hazy.
29th	29·250	29·300	72	80	S.E.	*Rain.*—Heavy a.m.	Afternoon clear.
30th	29·350	29·300	73	86	S.E.	Nil - - -	Cloudy a.m. Sunny afternoon.
31st	29·300	29·175	71	84	N.E.	Nil - -	Cool fresh day.

August (1904).

(The observations from 1st August to afternoon of 8th August were made during the march from Wa-fang-tien to Hai-cheng. From the afternoon of the 8th August to the morning of the 26th they were made inside the town of Hai-cheng. From the 8th August onwards they were made in the field during the advance from Hai-cheng to Shou-shan-p'u, south of Liao-yang. Thermometer readings are at sunrise and at 3.30 to 4 in afternoon.)

Date, 1904.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	A.M.	P.M.			
August 1st	29·025	29·050	74	88	?	Nil - - -	Cloudy and hot sun, muggy.
2nd	?	29·010	74	94	?	Nil - - -	Hot, sunny.
3rd	28·975	28·900	94	84	S.E.	Nil - - -	Cloudy and cool, pleasant breeze.
4th	28·975	29·200	74	90	S.E., strong	Nil - - -	Hot, sunny.
5th	29·300	29·300	80	94	S.	Nil - - -	Hot day. Max. inside town of Kai-ping.
6th	29·300	29·250	74	89	?	Nil - - -	Cloudy, hot day.
7th	29·200	29·150	77	80	?	*Rain.*—Heavy all day.	Rain torrential.
8th	29·025	28·900	69	76	N.E.	*Rain.*—Heavy all night. Drizzling during day.	Cool day. Morning sunny. Then dust-storm. Then hot, sultry afternoon, and thunderstorm.
9th	29·015	29·025	70	83	?	*Rain.*—Thunder-storm 5 to 6 p.m.	Morning and afternoon, hot and sunny.
10th	29·150	29·176	70	84	Calm	*Rain.*—Heavy during night.	Clear, sunny day.
11th	29·350	29·300	68	88	S.W.	Nil - - -	Hot, sultry day.
12th	29·310	29·275	70	92			
13th	29·200	29·175	74	90	?	Nil - - -	Cloudy, sultry day.
14th	29·150	29·150	74	76	S.	*Rain.*—Continuous forenoon and in afternoon.	Cool wind. Steady rain.
15th	29·150	29·150	74	73	Calm	*Rain.*—Continuous all day.	Steady rain.
16th	29·125	29·075	70	82	"	*Rain.*—Continuous forenoon.	Cleared in afternoon.
17th	29·125	29·075	74	74	"	*Rain.*—Heavy afternoon.	Cloudy forenoon. Then rain.
18th	29·100	29·025	74	76	?	Nil - - -	Sunny morning. Cloudy afternoon.
19th	29·125	29·125	62	68	?	Nil - - -	Cold, chilly, and cloudy.
20th	29·275	29·225	63	71	Calm	*Rain.*—Slight a.m.	Cloudy day.
21st	29·200	29·250	68	74	"	*Rain.*—Drizzling a.m.	Cloudy all day.
22nd	26·400	29·350	65	86	?	Nil - - -	Clear, sunny day.
23rd	29·475	29·325	70	86	?	Nil - - -	Morning cloudy. Afternoon sunny.
24th	29·400	29·350	70	90	?	Nil - - -	Hot and sunny.
25th	29·350	29·250	70	88	?	Nil - - -	" "
26th	29·250	29·225	71	86	S.	*Rain.*—Steady at night.	Morning sunny. Thunderstorm at 3.15 p.m. Then rain.
27th	29·275	29·225	70	78	N.E., strong	*Rain.*—Continuous till afternoon.	Cloudy in afternoon, after rain.
28th	?	29·325	62	78	N.	Nil - - -	Pleasant, sunny day.
29th	29·275	29·225	66	82	Calm	*Rain.*—Afternoon	Hot day.
30th	29·150	29·050	72	76	?	*Rain.*—Heavy all day.	Rain specially heavy afternoon and evening.
31st	29·050	29·025	62	76	?	*Rain.*—Afternoon	Morning sunny. Afternoon, at 3.0 and 5.30, thunderstorms.

SEPTEMBER (1904).

(From the 1st September to the morning of the 6th September the observations were made during the battle of Liao-yang, at Sha-ho and Shou-shan-p'u, 10 and 5 miles S. of Liao-yang. From the afternoon of the 7th onwards they were made at Liao-yang Railway Settlement. The morning observations were made at sunrise, the afternoon observations at 3 or 3.30, except when marked *, when they were made between 4 and 5 p.m. The observations were made on plain, not hilly country. Lat. about 41° 10′ to 41° 15′ N., Long. 123° 3′ to 123° 10′ E.)

Date, 1904.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	A.M.	P.M.			
September 1st	29·150	29·200	68	84*	Calm	Nil - - -	Clear, hot, sunny day.
2nd	29·200	29·250	69	84	S.	Nil - - -	Clear, sunny day.
3rd	29·210	29·125	68	86	Calm	Nil - - -	Hot, sunny day.
4th	29·250	29·150	67	84	?	Nil - - -	Very foggy morning. Cool breeze. Hazy day.
5th	29·250	29·150	66	80	?	*Rain.*—Heavy thunder showers.	Showers at 7 a.m. and 10 p.m.
6th	29·150	29·150	58	72*	N.W.	Nil - - -	Cool, clear day.
7th	29·175	29·125	62	80	S.W.	Nil - - -	Sunny day.
8th	29·200	29·225	70	70		*Rain.*—Heavy, forenoon and 8 to 9 p.m.	Thunder 1.30 p.m. Sunny morning.
9th	29·350	29·400	64	82	?	*Rain.*—During night.	Hot, sunny day.
10th	29·500	29·500	64	83*	?	Nil - - -	Clear, sunny day. Cloudy evening.
11th	29·475	29·400	70	80	?	*Rain.*—At night -	Cloudy. Lightning in evening.
12th	29·400	29·325	68	80	W., light	Nil - - -	Clear, sunny day.
13th	29·325	29·325	70	83*	Calm	Nil - - -	" "
14th	29·300	29·250	72	90	S., strong	Nil - - -	" "
15th	29·325	29·375	70	76	?	Nil - - -	Cloudy.
16th	29·425	29·350	66	77*	?	Nil - - -	"
17th	29·350	29·275	62	80	?	Nil - - -	Sunny day. Evening sultry.
18th	29·350	29·375	64	62	?	*Rain.*—Drizzling all day. Heavy at night.	Cold and chilly day.
19th	29·400	29·250	46	61	S.W.	Nil - - -	Sunny and cold a.m. Afternoon cloudy.
20th	29·200	29·275	50	52	?	*Rain.*—Steady drizzle in evening.	Cold day.
21st	29·300	29·300	41	52	?	*Rain.*—Heavy 9 a.m. to 2 p.m.	"
22nd	?	29·350	42	65	?	Nil - - -	Sunny, mild day.
23rd	29·300	29·400	52	72	?	Nil - - -	Sunny, warm day.
24th	29·400	29·450	50	76	?	Nil - - -	Clear, bracing day.
25th	29·510	29·450	50	80	S. strong	Nil - - -	Sunny. Dusty.
26th	29·500	29·500	63	72	Calm	Nil - - -	Cloudy.
27th	29·500	29·400	48	73	?	Nil - - -	Clear and sunny.
28th	29·300	29·225	49	86	S.W., strong	Nil - - -	Hot, dusty day.
29th	29·350	29·375	72	80	"	*Rain.*—Thunderstorm evening.	Dust-storm continues.
30th	29·550	29·500	58	80	Calm	Nil - - -	Clear and sunny day.

October (1904).

(Until the morning of the 10th October the observations were made at the Railway Settlement, Liao-yang. From 10th to 17th October the observations marked * were made in the field, during the battle of the Sha-ho, in the plain S. and E. of the river. From the observations on the 17th, marked †, to the end of the month, the observations were made at Pa-chia-tzu, a village E. of and near the railway to Mukden, about 1½ miles S. of the Sha-ho.)

Date, 1904.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	Sun-rise.	3 p.m.			
October 1st	29·575	29·525	58	78	Calm	Nil - -	Sunny day
2nd	29·500	29·575	56	75	„	Nil - -	„ „
3rd	29·500	29·650	60	55	N.	Nil - -	Cloudy day.
4th	29·700	29·650	38	53	N.	Nil - -	Sunny day. Surface of pools had ice in morning.
5th	29·450	29·375	38	62	N.	Nil - -	Sunny day.
6th	29·400	29·425	39	60	Calm	Nil - -	„ „
7th	29·375	29·600	42	48	S., then N.E.	Nil - -	Hot and dusty till noon, when the temperature was 60°; then cold and cloudy.
8th	29·675	29·850	27	48	Calm	Nil -	¼ inch ice on pools. Sunny.
9th	29·700	29·600	40	54	S.W.	*Rain.*—Afternoon	Chilly and dusty.
10th	29·700	29·800*	54	56*	N.	Nil - -	Clear, sunny day.
11th	29·700*	29·600*	40*	64*	Calm	Nil - -	Sunny a.m., cloudy p.m.
12th	29·500*	?	46*	?	„	Nil - -	Warm and sunny.
13th	29·250*	29·200*	56*	70*	S.	*Rain.*—Heavy during night. Thunder.	Warm, sunny day.
14th	29·200*	?	54*	?	Calm	*Rain.* — Heavy thunderstorms afternoon and evening.	Warm day.
15th	?	29·475*	46*	49*	N.	Nil - -	Cold, chilly.
16th	?	29·450*	34*	56*	Calm	Nil - -	Foggy, frosty morning; then warm and sunny till 4 p.m., when cloudy.
17th	29·450*	29·375†	46*	70†	S.	Nil - -	Warm, sunshine and cloud.
18th	29·575	29·600	42	48	Calm	*Rain.*—Continuous all night and a.m.	Some sun in afternoon.
19th	29·400	29·300	46	52	„	Nil - -	Clear, sunny day.
20th	29·300	29·250	37	51	„	Nil - -	Foggy, chilly morning; afternoon sunny.
21st	29·500	29·400	29	40	N.W., strong	Nil -	Morning sunny, then wind and cloud.
22nd	29·350	?	40	?	S.	Nil - -	Pools frozen. Sunny day.
23rd	29·300	29·150	40	58	S.W. gale	Nil - -	Pools frozen. Sunny.
24th	29·650	29·600	30	38	Calm	Nil - -	Sunny day.
25th	29·500	29·400	40	50	„	Nil - -	Cloudy morning, then warm and sunny. No ice.
26th	29·500	29·350	32	48	„	Nil - -	Clear, sunny frosty.
27th	29·425	29·250	34	48	„	Nil - -	Thin ice on pools. Warm, sunny day.
28th	29·500	29·500	32	50	N., evening	Nil - -	Warm and sunny. Evening cloudy.
29th	29·500	29·615	26	40	Calm	Nil - -	Sunny day.
30th	29·600	29·500	24	40	„	Nil - -	„ „
31st	29·425	29·375	28	48	„	Nil - -	„ „

NOVEMBER (1904).

(With the exception of observations on 21st to 24th November inclusive, the observations were made at Pa-chia-tzu, near the railway line from Liao-yang to Mukden, and about 1½ miles S. of the Sha Ho. The observations from 21st to 24th November were made at Shi-li-ho, a village about 5 miles further south.)

Date, 1904.	Barometer.		Thermometer. (°F. in Shade).		Wind.	Rain or Snow.	Remarks.
	A.M.	P.M.	Min.	Max.			
November 1st	29·200	29·175	44	58	S.	Nil - -	Cloudy, dusty, warm day.
2nd	29·450	29·400	28	48	Calm	Nil - -	Clear and sunny day.
3rd	29·300	29·275	38	50	S.W.	Nil - -	Warm and sunny.
4th	29·500	29·450	28	44	S., light	Nil - -	Sunny day.
5th	29·500	29·525	28	32	N., strong	*Snow.*—Afternoon.	Cold and cloudy.
6th	29·400	29·375	17	48	Calm	Nil - -	Clear and sunny. Ice 1 inch on pools.
7th	29·375	29·200	19	50	„	Nil - -	Sunny day.
8th	29·300	29·225	24	54	„	Nil - -	Warm, sunny day. Ice on pools melted.
9th	29·250	?	32	63	S.	Nil - -	Warm, sunny day. Dusty.
10th	99·200	29·275	42	56	Calm	*Rain.*—Slight, a.m.	Morning foggy. Afternoon sunny.
11th	29·400	29·375	25	60	S.W.	Nil - -	Dusty wind.
12th	29·375	29·400	37	60	Calm	Nil - -	Warm, cloudy day.
13th	29·450	29·525	34	38	N.	*Rain and Snow.*—During night.	Cloudy and chilly day.
14th	29·525	29·425	15	29	N.	Nil - -	Sunny day.
15th	29·375	29·375	17	30	N., strong	Ni - -	Biting wind. Sunny day.
16th	29·500	29·450	11	30	Calm	Nil - -	Sunny day.
17th	29·600	29·525	14	41	N. a.m., to S. p.m.	Nil - -	Mild afternoon. Sunny day.
18th	29·400	29·375	27	53	S.	Nil - -	Warm, sunny day.
19th	29·600	29·575	24	32	N.	Nil - -	Morning cloudy. Afternoon sunny.
20th	29·450	29·375	18	49	S.	Nil - -	Cloudy day.
21st	29·525	29·500	17	41	?	? - -	?
22nd	29·650	29·550	14	27	?	? - -	?
23rd	29·425	29·450	19	38	?	? - -	?
24th	29·425	29·375	20	50	?	? - -	?
25th	29·125	29·175	27	36	?	*Snow.*—Heavy afternoon.	Cloudy day.
26th	29·500	29·375	9	28	Calm	Nil - -	Snow frozen hard. Sunny day.
27th	29·225	29·375	16	46	S., strong	Nil - -	Warm, sunny day.
28th	29·700	99·675	15	30	N.W., moderate	Nil - -	Sunny day.
29th	29·825	29·775	9	28	Calm	Nil - -	„ „
30th	29·675	29·500	13	34	S.	Nil - -	„ „

December (1904)

(The observations from 1st to 14th December, inclusive, were made at Pa-chia-tzu, as noted in previous month. The remaining observations were made at Shi-li-ho, a village on the same plain and about 5 miles further south.)

Date. 1904.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain or Snow.	Remarks.
	A.M.	P.M.	Min.	Max.			
December 1st	29·425	29·325	26	46	S.	Nil	Warm and sunny. Ice melting.
2nd	29·250	29·250	30	44	Calm	Nil	Warm, sunny day.
3rd	29·150	29·250	28	48	„	Nil	Afternoon, some cloud.
4th	29·400	29·500	17	31	N., strong	Nil	Biting cold wind, with dust.
5th	29·525	29·325	5	27	Calm	Nil	Sunny day.
6th	29·125	29·050	19	50	S.W.	Nil	Cloudy morning. Afternoon sunny. Ice melting.
7th	29·325	28·350	16	20	N., strong	*Rain.* — During night.	Biting wind. Cloudy.
8th	29·575	?	6	?	Calm	Nil	Sunny day.
9th	?	29·350	?	38	S.	*Snow.*—During night, heavy. *Rain.* — Afternoon.	Cloudy, mild day.
10th	29·650	29·725	15	20	N.	Nil	Cold wind. Max. temp. was at sunrise.
11th	29·825	29·850	− 4	10	Calm	Nil	Sunny day.
12th	29·775	29·750	− 7	15	„	Nil	„
13th	29·825	29·675	− 6	17	„	Nil	„
14th	29·775	29·450	− 3	23	„	Nil	
15th	29·450	29·625	17	32	S.W. a.m., N. p.m.	Nil	Morning warm, then sudden change to cold N. wind. Max. temp. at 10 a.m.
16th	29·675	29·675	1	17	S.W., light, to N.	Nil	Sunny day.
17th	29·750	29·675	1	13	N., light	Nil	„
18th	29·625	29·625	− 3	20	„	Nil	„
19th	29·600	29·500	4	38	S.W.	Nil	„
20th	29·650	29·500	10	26	Calm	Nil	Warm and sunny
21st	29·600	29·550	1	20	N., light	Nil	Cloudy.
22nd	29·600	29·650	2	20	„	*Snow.*—Slight fall during night.	Sunny day.
23rd	29·700	29·725	− 3	19	Calm	Nil	„ „
24th	29·750	29·575	− 3	23	„	Nil	„ „
25th	29·500	29·575	16	32	„	Nil	„ „
26th	29·650	29·725	5	25	„	Nil	„ „
27th	29·775	29·850	3	29	„	Nil	„ „
28th	29·900	29·800	3	26	„	Nil	„ „
29th	29·850	29·850	8	18	N.W., strong.	Nil	Dusty N.W. wind.
30th	29·900	29·675	− 3	20	S.W., strong.	Nil	Dusty wind.
31st	30·000	?	4	24	S.W.	Nil	Sunny day.

JANUARY (1905).

(The observations were made at Shi-li-ho, a village near the railway line, half-way between Liao-yang and Mukden; Lat. about 41° 30′ N., Long. about 123° 25′ E.; on the E. side of the plain of the Sha-ho.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain or Snow.	Remarks.
	A.M.	P.M.	Min.	Max.			
January 1st	29·500	29·525	9	41	S.W.	Nil - - -	Warm and dusty day.
2nd	29·475	29·425	25	42	S., light	Nil - - -	Warm and sunny day.
3rd	29·425	29·425	20	41	S.	Nil - -	Warm and cloudy day.
4th	29·375	29·500	28	46	S., strong	Nil - - -	Warm and dusty.
5th	29·675	29·500	10	33	Calm	Nil - - -	Sunny day.
6th	29·375	29·375	18	43	"	Nil - - -	" "
7th	29·525	29·550	13	39	"	Nil - - -	" "
8th	29·500	29·450	13	45	"	Nil - - -	" "
9th	29·500	29·475	18	40	"	Nil - - -	" "
10th	29·550	29·550	10	45	"	Nil - - -	" "
11th	29·600	29·600	13	51	"	Nil - - -	" "
12th	29·550	29·525	21	43	S.	Nil - - -	Cloudy morning. Dusty.
13th	29·500	29·425	23	41	S.	Nil - - -	Some cloud. Warm.
14th	29·525	29·500	15	30	Calm	Nil - - -	Foggy. Much hoar frost.
15th	29·425	29·300	12	42	"	Nil - - -	Sunny. Warm.
16th	29·400	29·350	20	36	"	Nil - - -	Morning foggy, and hoar frost. Afternoon sunny.
17th	?	?	18	36	W. afternoon.	Nil - - -	Cloudy and calm in morning.
18th	?	?	16	36	S.E.	Nil - - -	Sunny day.
19th	?	?	20	42	Calm	Nil - - -	" "
20th	?	?	18	38	"	Nil - - -	" "
21st	?	?	20	40	S.W.	Nil - - -	" "
22nd	?	?	28	46	S.W.	Nil - - -	" "
23rd	?	?	18	40	N.	*Rain and Snow.* —During night.	Cloudy day.
24th	?	?	0	18	N.	Nil - - -	Sunny day.
25th	?	?	0	18	N.	Nil - - -	" "
26th	?	?	− 1	18	S.	*Snow.*—All night.	Snow steadily during night.
27th	?	?	− 4	16	N.	*Snow.*—Afternoon	Sunny morning. Then snow.
28th	?	?	− 2	18	S.	Nil - - -	Sunny day.
29th	?	?	− 6	14	N	Nil - - -	" "
30th	?	?	− 10	16	N.	Nil - - -	" "
31st	?	?	− 6	24	Calm	Nil - - -	" "

February (1905).

(Observations were made at Shi-li-ho, as noted in previous month, until the afternoon of 26th February, when the observations marked * onwards were made at a village, Ku-cheng-tzu, about 12 miles W. of Shi-li-ho, on the plain between the Sha Ho and the Hun Ho. The observations on the afternoon of the 26th February, marked †, were made at T'a-t'ai, about 4 miles W. of Ku-cheng-tzu, on the same plain.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	Min.	Max.			
February 1st	?	?	− 6	18	N.	Nil	Sunny day.
2nd	?	?	− 14	18	N.	Nil	" "
3rd	?	?	− 10	20	Calm	Nil	" "
4th	?	?	− 2	24	"	Nil	" "
5th	?	?	− 6	16	"	Nil	" "
6th	?	?	− 2	24	N.W. to S.E.	Nil	" "
7th	?	?	− 2	25	Calm	Nil	" "
8th	?	29·625	− 8	13	"	*Snow.*—Slight	" "
9th	29·700	29·625	− 10	28	"	Nil	" "
10th	29·600	29·500	0	28	"	Nil	" "
11th	29·500	29·500	4	28	"	Nil	" "
12th	29·550	?	3	33	"	Nil	" "
13th	29·600	29·500	8	35	"	Nil	" "
14th	29·650	29·600	8	34	"	Nil	" "
15th	29·500	29·450	10	32	"	Nil	" "
16th	29·500	29·525	6	32	"	Nil	" "
17th	29·650	29·500	3	27	"	Nil	" "
18th	29·600	29·500	− 2	32	"	Nil	Mild and sunny day.
19th	29·400	29·375	14	38	S.	Nil	Sunny day.
20th	29·675	29·700	6	28	Calm	Nil	" "
21st	29·875	29·850	1	20	N.	Nil	" "
22nd	29·700	29·600	− 3	21	Calm	Nil	" "
23rd	29·600	29·625	5	30	"	Nil	Overcast morning. Sunny afternoon.
24th	29·825	29·750	− 1	33	"	Nil	Sunny day.
25th	29·775	29·675	8	43	S.W.	Nil	Warm. Dusty.
26th	29·650	29·700*	20	25*	N. afternoon.	*Snow.* — Afternoon.	Morning mild and cloudy. Then, suddenly, a blizzard.
27th	29·900*	29·850*	0*	25*	N.	Nil	Sunny day.
28th	29·950*	29·875†	− 1*	25†	N.	Nil	" "

March (1905).

(The observations from the 1st to 10th March, inclusive, were made at various places along the Hun Ho plain from T'a-t'ai to Mukden during the battle of Mukden. The remaining observations were made in the grounds of a temple, situated between the city of Mukden and the railway line, about 1 mile N.E. of the railway station. Lat. 41° 56′ N., Long. 123° 32′ E. Height above sea level about 160 ft.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain or Snow.	Remarks.
	A.M.	P.M.	Min.	Max.			
March 1st	29·950	29·825	0	35	Calm	Nil - - -	Sunny day.
2nd	29·800	29·775	18	45	S.	*Snow.*—Heavy a.m., occasional p.m.	Dull, cloudy morning. Afternoon occasional sunshine and snow.
3rd	29·950	?	10	32	N.	Nil - - -	Clear, sunny morning. Dusty afternoon.
4th	29·900	29·900	8	32	N.	Nil - - -	Clear, sunny day.
5th	29·900	29·750	8	28	N.W.	Nil - - -	" "
6th	20·925	29·775	7	38	W.	Nil - - -	" "
7th	29·775	29·700	11	42	Calm	Nil - - -	" "
8th	29·925	29·725	13	43	S.W., light	Nil - - -	Sun hot. Ice beginning to thaw.
9th	29·750	29·400	14	53	S.W. gale	Nil - - -	Clear, sunny morning. Then a severe dust-storm mid-day.
10th	29·700	29·523	20	52	N., light	Nil - - -	Warm, sunny day. River flowing.
11th	29·100	(?)	20	50	Calm	Nil - - -	Cold, chilly day.
12th	29·550	29·400	21	49	S., light	Nil - - -	Sunny forenoon. Then cloud.
13th	29·275	?	37	47	S.W., then N.	Nil - - -	Morning warm and mild. Then violent dust-storm, followed by cold N. wind.
14th	29·650	29·575	11	29	N., light	Nil - - -	Cold, sunny day.
15th	29·700	29·675	11	30	N.W.	Nil - - -	Sunny, but cold dusty afternoon.
16th	29·775	29·650	12	35	Calm	Nil - - -	Sunny, but chilly day.
17th	29·650	29·600	19	48	S.W.	Nil - - -	Mild, sunny day.
18th	29·725	29·650	26	48	N.W., light	Nil - - -	Sunny day.
19th	22·650	29·526	22	52	S.W.	Nil - -	Warm and sunny. Dusty.
20th	29·600	29·500	25	56	S.W.	Nil - - -	Dusty day.
21st	29·500	29·500	31	57	Calm	Nil - - -	Sunny, but dust haze.
22nd	29·500	29·500	32	60	S.W.	Nil - -	Sunny, but dust haze. Ice has disappeared from pools.
23rd	29·525	29·450	32	61	N.W.	Nil - - -	Dust haze and cloud.
24th	29·500	29·475	34	61	Calm	Nil - - -	Dust haze. Warm day.
25th	29·475	29·375	32	66	"	Nil - - -	" "
26th	29·400	29·375	38	63	"	Nil - - -	Forenoon mild. Afternoon cloudy and raw.
27th	29·525	29·425	38	58	W., light	Nil - - -	Dust haze. Chilly.
28th	29·425	29·550	34	52	S.W.	*Rain.*—Afternoon and evening.	Dull and windy.
29th	29·575	29·425	31	42	Calm	*Snow* - -	Dull, cloudy. Snow thawed as it fell.
30th	29·325	29·325	36	38	"	*Rain and Snow.*—All night, forenoon, and afternoon.	Overcast, dull day.
31st	29·375	29·425	30	40	N.E.	Nil - - -	Fresh ice on pools. Cold, with dry wind, and sunny day.

April (1905).

(The observations were made at Mukden, as noted in particular of the previous month's observations.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain or Snow.	Remarks.
	A.M.	P.M.	Min.	Max.			
April 1st	29·500	29·400	26	45	N.E.	Nil - - -	Occasional cloud. Cold.
2nd	29·375	29·325	27	51	Calm	Nil - - -	Sunny and warm day
3rd	29·375	29·350	31	52	"	Nil - - -	" " "
4th	29·325	?	34	52	S.W.	*Sleet.*—Afternoon	Sunny a.m. Showers of sleet p.m.
5th	29·500	29·425	32	50	Calm	*Snow.*—Afternoon, heavy and continuous.	Morning sunny. Afternoon heavy cloud, then snow.
6th	?		34	52	"	Nil - - -	Thick fog most of day. Then snow thawed, and afternoon clear.
7th	?	29·525	34	49	N., strong.	Nil - - -	Cloudy, and sunshine occasionally.
8th	29·550	29·400	34	51	S.W., moderate	Nil - - -	Sunny day.
9th	29·500	29·375	42	64	S.W., strong to gale.	Nil - - -	Dust-storm in afternoon.
10th	29·375	29·325	43	63	S.W.	*Rain.*—Heavy during night. Thunder and hail afternoon.	Foggy morning.
11th	29·575	29·575	37	53	Calm	Nil - - -	Clear and sunny day.
12th	29·500	29·450	34	51	S.	Nil - - -	Cloudy.
13th	29·525	29·450	37	53	Calm	Nil - - -	Clear and sunny day.
14th	29·400	29·350	36	49	S.W.	*Rain.* — Slight, evening.	Cloudy day.
15th	29·525	29·450	33	51	Calm	*Rain.*— Drizzling, evening.	Morning clear. Afternoon cloudy.
16th	29·425	29·350	36	51	N., moderate	Nil - - -	Cloudy day.
17th	29·200	29·325	31	52	N.	Nil - - -	Clear, sunny day.
18th	29·225	29·100	38	51	S.W.	*Rain.*—Drizzling, evening.	Cloudy day.
19th	29·075	29·150	42	49	Calm	*Rain.* — Heavy night and a.m.	Cloudy afternoon but rain stopped.
20th	29·275	29·450	36	44	N.	*Snow.*—Occasional falls during day.	Cold day.
21st	29·475	29·400	34	32	N.W., moderate	Nil - - -	Sunshine and cloud.
22nd	29·600	29·550	36	56	Calm	Nil - - -	Clear, sunny day.
23rd	?	29·450	38	66	S.	Nil - - -	Sunny day.
24th	29·425	29·300	38	62	S.	Nil - - -	Cloudy, with some sunshine. Dusty day.
25th	29·300	29·250	38	63	S.W., strong	Nil - - -	Dusty, sunny day.
26th	29·300	29·350	44	71	Calm	Nil - - -	Warm, sunny day.
27th	29·575	29·550	42	62	"	Nil - - -	Morning sunny. Afternoon cloudy.
28th	29·575	29·500	39	69	S.W.	Nil - - -	Morning sunny. Afternoon sultry and dusty.
29th	29·530	29·300	43	69	S.W., strong	Nil - - -	Morning sunny. Afternoon dust-storm.
30th	29·075	28·975	48	56	S.W.	*Rain.* — During night and a.m.	

May (1905).

(Until the morning of 10th May the observations were taken at Mukden, as in the previous month. Observations of 10th and 11th, marked *, were made at Tie'h-ling, near the railway station there. From observations on 11th, marked †, onwards, the records were made at Ching-yun-pu, a village on the plain of the Liao Ho, about 6 miles N. of the river and 12 miles W. of Kai-yuan, near the Willow Palisade. Lat. about 42° 33′ N. and long. 123° 40′ E.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	Min.	Max.			
May 1st	29·000	28·975	45	63	S.W. gale	Nil	Sunny, a.m. Then dust-storm.
2nd	29·100	29·150	46	60	S.W. gale to N.W.	Nil	Dust-storm continues.
3rd	29·350	29,325	38	59	N.W., moderate	Nil	Clear, sunny day. Evening cloudy.
4th	29·500	29·350	40	70	N., light to calm.	Nil	Clear morning. Afternoon sultry and hazy.
5th	29·375	29·250	54	62	S.W. gale	Nil	Dull morning. Afternoon dust-storm.
6th	29·300	29·450	47	66	W., moderate	Nil	Dust haze.
7th	29·600	29·650	46	60	N., light	Nil	Clear, fresh day.
8th	29·500	29·425	40	74	N. a.m., S.W. p.m.	Nil	Clear, a.m. Dusty afternoon.
9th	29·300	29·175	50	80	S.W. gale	Nil	Hot, dry, and dust-storm.
10th	29·325	29·350*	50	75*	N., light	Nil	Clear, sunny day.
11th	29·375	29·050†	48*	86†	N., light, a.m., S. gale, p.m.	Nil	Clear, sunny, a.m. Hot, dust-storm afternoon.
12th	29·225	29·300	69	82	S. gale	Nil	Dust-storm, severe, continues.
13th	29·425	29·250	60	72	Calm	*Rain.*—Evening.	Cloudy, muggy day.
14th	28·975	28·875	54	62	S.W., moderate	*Rain.*—Night and day.	Showers, then continuous rain.
15th	29·000	29·025	53	70	S.W., moderate	*Rain.* — Night, drizzling.	Cloud and sunshine.
16th	29·075	29·100	54	69	Calm	*Rain.*—Night and p.m.	Sunshine and cloud a.m. Then continuous rain.
17th	29·125	29·075	53	73	N.W., light	*Rain.*—Night and a.m.	Afternoon clear and sunny, with cirrhi.
18th	29·200	29·125	49	78	Calm	Nil	Clear, sunny day.
19th	29·050	29·150	54	68	N., light	*Rain.*—Drizzling p.m.	Cloudy day. Clear evening.
20th	29·050	28·925	43	72	S.W., moderate	*Rain.* — Slight p.m.	Morning clear and cold.
21st	28·700	28·825	42	64	N.W., light	Nil	Dull day.
22nd	29·950	29·950	40	73	Calm	Nil	Cloudy and muggy day.
23rd	28·975	29·075	51	75	N.W., moderate	Nil	Dusty day. Evening clear, with cirrhi.
24th	29·075	28·925	45	75	N.E., light	Nil	Cloudless day.
25th	28 875	28·850	53	71	N., light	*Rain.*—Evening	Morning calm and clear.
26th	28·675	28·625	51	61	N.	*Rain.* — Heavy, continuous.	Rain commenced during night and continued all day.
27th	28·825	28·950	54	64	N., moderate	*Rain.*—All night	Sky cleared towards evening.
28th	29·000	28·925	49	74	S.W., moderate	Nil	Morning clear. Afternoon cloudy.
29th	28·975	29·025	61	84	S.W., strong	Nil	Hot dust-storm afternoon. Cloudy and sultry
30th	29·150	299025	62	88	S., strong	*Rain.* — Evening heavy.	Hot, sunny day.
31st	29·075	29·175	62	76	Calm	*Rain.*—Night and a.m.	Heavy rain. Cleared in afternoon.

JUNE (1905).

(From 1st June till the morning of the 11th June the observations were made at Ching-yun-p'u, particulars of which are noted in observations for May. The remaining observations were made at Tung-hsiang-kung-t'ai, a village on rising ground about 2½ miles N. of Ching-yun-p'u and on the banks of the Liang Ho. It is about 12 miles W. of Kai-yuan, and about 30 feet above the plain of the Liao-ho.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	Min.	Max.			
June 1st	29·200	28·975	60	86	S. gale	*Rain.*—Evening	Foggy, a.m. Gale and thunderstorm afternoon and evening.
2nd	29·275	29·225	56	68	N., light	Nil	Sunny day, with cirrhi.
3rd	29·150	28·750	49	74	Calm	Nil	Sunny day. Cloudy towards evening.
4th	28·850	28·775	61	89	S. gale	Nil	Clear, sunny morning. Then a dust-storm.
5th	28·975	28·925	63	89	N., light	Nil	Hot, muggy day.
6th	28·975	29·075	67	81	N.E., moderate	Nil	Hot and sunny. Somewhat dusty.
7th	29·200	28·975	50	81	S., light	*Rain.*—Evening	Rain at 9 p.m. Day clear.
8th	29·070	28·900	57	87	Changeable, gusty.	*Rain.* — During night.	Day clear.
9th	28·875	28·800	61	87	S., moderate	Nil	Hot and sultry.
10th	28·900	28·950	64	84	S.W., moderate	Nil	Cloud and sunshine.
11th	28·850	28·825	62	80	S.W., light	*Rain.*— Drizzling, then continuous.	Dull morning. Rain after sunset continuous.
12th	28·850	28·850	60	82	S.	*Rain.* — Showers night and day.	Distant thunder and lightning.
13th	28·925	28 850	62	82	Calm	*Rain.*—Night, continuous. Day, showers. Evening thunderstorm.	
14th	28·875	28·900	63	89	,,	*Rain.* — Heavy thunderstorm at mid-day.	Clear morning, with cirrhi. Sultry evening.
15th	28·975	28·950	62	86	N.	*Rain.* — Heavy 10.30 to 11.15 p.m.	Hot, sunny day, with cirrhi. Bridges carried away by rain.
16th	29·050	29·025	64	89	Calm	Nil	Hot, sunny day, with cirrhi.
17th	29·025	28·975	66	93	S.W., strong	Nil	Hot, with dust haze.
18th	29·075	29·025	69	93	N., light	Nil	Hot and calm greater part of day.
19th	29·100	29·025	66	92	N., light to moderate.	Nil	Hot and sunny. Evening cloudy.
20th	29·100	29·100	67	85	S. a.m., N. p.m.	*Rain.*—Afternoon, 20 minutes torrential. Evening, continuous.	Dull morning. Thunder shower at noon. Torrential at 4 p.m. Continuous rain after 9 p.m.
21st	29·225	29·175	63	85	N.E.	*Rain.* — Evening, thunder showers.	Local showers, short and heavy, in evening. Day sunny, with cirrhi.
22nd	29·200	29·200	62	89	Calm	Nil	Sunny day, with cirrhi.
23rd	29·200	29·050	61	92	N. a.m., S. p.m.	Nil	Sunny day with cirrhi. Evening muggy.
24th	29·075	28·950	67	92	S., strong	*Rain.* — After 10 p.m.	Sunny a.m. Then dust, sultry, and cloudy.
25th	29·075	29·075	68	73	S.	*Rain.*—Continuous night and day.	Cloudy a.m. Still, clear evening.
26th	29·125	29·050	66	87	S., light	Nil	Sunny day, with cirrhi.
27th	28·975	28·875	68	85	S.W., moderate	*Rain.*—Continuous after 4 p.m.	Cloud and sunshine till afternoon rain.
28th	28·925	28·950	59	78	S.W., light	Nil	Clear and sunny day.
29th	28·950	28·900	57	82	E., moderate	Nil	Clear day, with cirrhi. Evening cloudy.
30th	28·900	29·000	62	85	E., moderate	Nil	Cloud and sunshine. Local rain in vicinity

JULY (1905).

(All the observations were made at Tang-hsiang-kung-t'ai, as noted in previous month.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	Min.	Max.			
July 1st	29·100	29·150	62	87	S., moderate	*Rain.*— Thunder afternoon; continuous evening.	Cloudy morning.
2nd	29·200	29·125	67	89	S., light	Nil - - -	Cloud and sunshine.
3rd	29·200	29·125	69	81	Calm	*Rain.* — Early morning.	Cloudy, muggy day.
4th	29·125	29·050	67	90	"	Nil - - -	Clear. Hot.
5th	29·100	29·050	69	95	"	Nil - - -	Hot and muggy. Cloudy evening.
6th	29·100	29·100	74	97	S., light to gusty.	Nil - - -	Dusty. Evening cloudy.
7th	29·000	29·025	76	95	S., strong	Nil - - -	Morning cool. Cloudy, dusty day.
8th	28·950	29·025	75	77	Calm	*Rain.* — Continuous all day.	After dark cleared. N. wind set in.
9th	29·125	29·075	62	81	N., light	Nil - - -	Clear, cool, sunny day.
10th	29·025	28·925	61	87	N., light	*Rain.* — Towards midnight.	Clear a.m. Cloudy, sultry p.m.
11th	28·875	29·000	67	82	S., to calm	*Rain.*—Drizzling, morning.	Cloudy day. Towards evening sunshine.
12th	29·125	29·075	68	91	S., light	Nil - - -	Clear and sunny, with cirrhi.
13th	29·125	29·100	69	94	S., light	Nil - - -	Clear and sunny, with cirrhi.
14th	29·050	29·050	75	94	S.	Nil - - -	Hot, some cloud, and muggy.
15th	28·975	28·975	74	80	S., light to strong.	*Rain.* — Continuous and heavy all day.	Rained from early morning.
16th	29·025	29·025	74	88	S., strong	*Rain.*—Evening -	Cloud general. No rain till evening.
17th	29·075	29·000	71	83	Calm	Nil - - -	Cloudy a.m. Sunny p.m.
18th	29·025	29·025	66	90	Calm to N., moderate.	Nil - - -	Clear and sunny.
19th	29·100	29·100	63	83	N., moderate	Nil - - -	Clear and sunny.
20th	29·100	29·025	60	90	Calm	Nil - - -	Clear and sunny.
21st	29·075	29·000	64	92	S., light	Nil - - -	Clear and sunny. Evening very muggy and still.
22nd	28·975	28·850	67	90	S., light	*Rain.*— Afternoon drizzling, then continuous.	Muggy, sunny morning. Then cloud and rain.
23rd	28·725	28·625	70	85	Calm	*Rain.* — Evening drizzling.	Steady rain during night, but day dry, though cloudy and muggy.
24th	28·600	28·600	72	83	S.	*Rain.*—Night and day, with thunderstorms.	Thunderstorms and heavy rain off and on.
25th	28·725	28·775	69	84	Calm	Nil - - -	Cloudy.
26th	28·750	28·725	65	79	N.	*Rain.* — Light drizzle, occasional.	"
27th	28·750	28·775	68	81	S., igh	*Rain.*—Drizzle to continuous, forenoon.	Cloudy a.m. Cleared p.m., with sunshine.
28th	28·875	28·875	66	85	Calm to E., light.	*Rain.*—Occasional showers.	Sunshine and shower.
29th	28·975	29·025	70	85	S., light	*Rain.* — Showers, a.m.	Sunshine and heavy showers a.m. Afternoon clear and sunny.
30th	29·075	29·050	72	90	Calm	*Rain.* — Thunder shower afternoon, drizzling evening.	Hot, muggy, night and morning.
31st	28·975	28·975	72	83	S. wind gusty; to N. suddenly at sunset.	*Rain.* — Very heavy forenoon, thunder showers afternoon.	Thunderstorm at sunset, followed by sudden change of wind to N.

August (1905).

(The observations were made at Tang-hsiang-kung-t'ai, as noted in the table for June, with the exception of those marked *, which were made at Chang-t'u Fu, Lat. 42° 43′ N., Long. 123° 51′ E., and at an elevation probably 200 feet higher than the Liao Ho plain at Tung-hsiang-kung-t'ai.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	Min.	Max.			
August 1st	28·975	28·975	74	91	S., moderate	*Rain.*—Thunder-storm evening.	Cloudy. stormy day, but no rain till night, when heavy thunderstorm.
2nd	29·025	29·000	67	88	S. to calm	Nil - -	Sunshine and cloud.
3rd	29·050	29·025	70	89	Calm	Nil - - -	Clear, sunny day, with cirrhi.
4th	28·975	28·675*	68	93*	"	Nil - -	Hot, sunny, muggy day at Chang-t'u-fu.
5th	28·600*	28·600*	72*	82*	N.E.	*Rain.*—Forenoon continuous.	Afternoon cleared up at Chang-t'u-fu.
6th	28·675*	28·925	64*	87	S., moderate to calm.	*Rain.*—After-noon thunder-storm.	Sunny and cool forenoon. Muggy, still evening.
7th	28·975	29·050	67	84	S.W., moderate	Nil - -	Sunny, with cirrhi.
8th	29·125	29·050	57	83	Calm	Nil - - -	Cool, clear, buoyant, with crisp feeling in air.
9th	29·000	29·025	61	90	"	Nil - -	Hot, muggy, sunny after-noon. Morning clear and cool.
10th	29·075	29·050	70	93	"	Nil - - -	Hot, muggy, sunny day, with some cloud.
11th	29·125	29·100	72	92	S.	*Rain.*—Short thunder shower a.m.	Hot, with some cloud. After shower, sunny and clear.
12th	29·150	29·125	68	88	Calm	Nil - -	Hot, sunny day.
13th	29·200	29·200	66	90	"	Nil - - -	Clear and sunny day.
14th	29·225	29·175	65	91	"	Nil - -	Clear and sunny.
15th	29·200	29·125	66	93	"	Nil - - -	Clear and sunny. Even-ing muggy.
16th	29·176	29·075	71	90	S.W., to calm	Nil - -	Some cloud.
17th	29·075	29·025	70	89	Calm to S.W., E. at sunset.	Nil - - -	Hot, mug y, with cloud and sunshine. E. wind in evening. Cool. Lightning to west.
18th	29·075	29·075	67	86	S.W., light to calm.	Nil - -	Cloudy, dull day.
19th	29·025	29·000	68	80	Calm	*Rain.*—Heavy during night.	Cloudy, dull forenoon. Sunny afternoon.
20th	28·975	28·975	60	85	Calm?	Nil - -	Forenoon cool, sunny. Local thunderstorms in vicinity.
21st	28·775	28·750	61	85	Calm to N.	*Rain.*—Heavy, mid-day and afternoon. Thunder.	Morning clear, with cirrhi. Then thunder clouds and rain.
22nd	28·725	28·750	62	78	N., moderate	Nil - -	Cirrhi, cumuli and rain cloud, but no rain.
23rd	28·725	28·725	57	82	Calm	Nil - - -	Hazy morning, with much dew. Then sunny.
24th	28·700	29·150	59	84	"	Nil - -	Hazy morning, with dew. Then much sun.
25th	28·875	28·850	60	85	N., moderate	Nil - - -	Clear, sunny day. Cirrhi.
26th	29·150	29·100	58	83	N., light to calm.	Nil - -	Clear, sunny day. Even-ing muggy.
27th	29·175	29·125	60	88	S., moderate	Nil - - -	Hot day, cumuli.
28th	29·175	175	65	87	S., strong	*Rain.*—After-noon shower.	Cloud and sunshine. Hot. Showers light.
29th	29·250	29·250	63	87	S., moderate	Nil - -	Cool, pleasant breeze. Clear, sunny, with cirrhi and cumuli.
30th	29·325	29·225	65	88	S., moderate to strong.	Nil - - -	A hot, sunny day.
31st	29·200	29·075	70	87	S.W., strong, gusty.	*Rain.*—After 9 p.m. slight, then steady.	Overcast and cloudy most of day, with occa-sional sun. Hot, dry wind. At 8.50 p.m. cool N.E. wind, followed by rain.

SEPTEMBER (1905).

(Observations were made at Tang-hsiang-kung-t'ai, as noted in previous months.)

Date, 1905.	Barometer.		Thermometer (°F. in Shade).		Wind.	Rain.	Remarks.
	A.M.	P.M.	Min.	Max.			
September 1st	29·125	29·250	69	75	Still a.m., N.E., moderate, p.m.	*Rain.*—All night and a.m.	Cloudy. Sunshine towards evening.
2nd	29·125	29·050	55	80	N., light to still.	Nil - - -	Sunny day. Some cloud.
3rd	29·075	29·075	60	79	N., strong to moderate.	Nil - -	Cold, cloudy a.m. Sunny afternoon.
4th	29·050	28·875	55	86	Calm	Nil - - -	Hot, sunny, oppressive day, with some heavy clouds.
5th	28·825	28·775	62	82	S.W., strong	Nil - -	Still morning. Hot, sunny day, with wind. Chilly after sunset.
6th	28·900	29·250	54	78	W., moderate	Nil - - -	Sunny day.
7th	29·275	29·175	52	81	E., light	Nil - -	Sunny day. Cloud towards evening.
8th	29·225	29·150	59	84	S., light	*Rain.* — Slight 11 to 12 p.m.	Cloudy all day.
9th	29·075	29·075	64	84	N., light	*Rain.* — Slight during night.	Sunshine and cloud. Still, muggy afternoon.
10th	29·000	29·000	65	76	S., strong	*Rain.*—10 a.m. to 2 p.m.	Cloudy.
11th	29·125	29·125	56	80	S., light	Nil - - -	Foggy morning, but day very sunny.
12th	29·100	29·025	57	85	S., strong	Nil - - -	Cloudy and hot wind. Very little sun.
13th	29·000	28·950	68	85	S., moderate	Nil - -	Heavy, cloudy day. Gusty wind.
14th	29·025	28·975	65	71	N., strong to light.	*Rain.* — Very slight during night.	Cloudy day. Some sun in afternoon. Colder day.
15th	29·275	29·200	49	72	N., light to moderate.	*Rain.* — A few drops about 5 p.m.	Cloudy, cold day. Some sun in forenoon.
16th							
17th							
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24th							
25th							
26th							
27th							
28th							
29th							
30th							

(45) The Russian Medical Service.

Report by Colonel W. H. H. Waters, C.V.O., C.M.G., Royal Artillery.

In theory the Army Medical Department in Russia is supposed to provide for all the sick and wounded of an army, but in practice it was supplemented by a very large staff of the Red Cross organization.

The personnel of the Red Cross Society was, as a general rule, of very superior quality; its principal surgeons were men of the highest attainments, and they performed valuable services. On the other hand, there was undoubtedly a good deal of self-advertisement about the Red Cross organization. Some of its sections were provided at the sole expense of certain wealthy Russians well known in St. Petersburg society, and, while one should not look a gift horse in the mouth, the hope of social reward was sometimes partly the reason for their liberality.

It is not necessary to describe the army medical system here. The only remark needful to make is that the arrangements are on much too small a scale for modern great battles. Such battles were numerous; a French officer said in May 1904, that there would certainly not be as many as eight days of them, whereas by the end of October there had been seventeen, exclusive, of course, of advanced and rear guard actions, and fights on a smaller scale.

During the first three or four months of the war the railway was largely employed in forwarding to Harbin, Mukden, and Liao-yang numbers of Red Cross sections with their equipment in order to be ready for the troops coming later. From a purely military point of view the wisdom of this policy is much open to question, for it was soldiers who were urgently needed.

The Red Cross Society was organized in five great divisions at Port Arthur, Vladivostok, Liao-yang, Chita, and Irkutsk respectively. The divisions at the front were subdivided into sections, and these into subsections, the smallest unit being composed of one or two surgeons, three or four medical students, and as many bearers. Such a unit is termed a "flying detachment." Sometimes, when the mud was very bad, six men would be necessary to carry a man on a stretcher, so that these detachments were often very hard worked. They rendered first aid to the wounded, who were then supposed to be evacuated to the divisional hospitals by their own regiments. The "flying

detachments" had pack transport only, and were, therefore, very mobile.

There was admittedly, however, not sufficient co-operation between the Red Cross Society and the Army Medical Department. The male personnel of both was always armed when performing its duties. A number of Red Cross trains (twenty-three) on the 16th August is employed in evacuating sick and wounded. These trains have a very small red cross painted on each vehicle, which may easily account for the charge sometimes made, that the enemy wilfully fired on such trains. A standard ambulance train consists of sixteen coaches of all kinds, and has 250 beds. These trains circulate between Irkutsk and the front; they are very completely equipped, but had to be supplemented by others composed of covered goods wagons. On the 16th June, the day after the battle of Te-li-ssu, such a freight train reached Wan-chia-ling; it carried 500 wounded, about fifteen men being placed in each wagon, and they were attended to by six surgeons on the station platform. There was, it may be mentioned, a general deficiency of operating tables, and of medicines for sickness, during the campaign. The Red Cross nurses all had to have diplomas of efficiency—so I was informed by one lady whose services were refused on this ground.

When a battle was expected to take place, the Red Cross Society was directed to prepare for a certain estimated number of wounded; for instance, the branch at Liao-yang was told to arrange for 4,000 wounded just before the battle of Ta-shih-chiao on the 24th July, and covered goods wagons were prepared for eight men each, four on each side, namely, two above and two below, the fittings being of timber. All Russian freight wagons have spring couplings.

The management of the Army Medical Department in Manchuria is a dual control; there is a Principal Medical Officer at Army Head-Quarters, whose functions are purely medical or surgical. But a new post was created in the shape of a Director of Medical Services, the incumbent being a military officer, Lieut.-General Trepov. He is the principal administrative and executive medical officer, and, besides arranging for the movements of sick and wounded, as well as of the ambulance trains, can inspect any military hospital on his own initiative. Thus his duties overlap, in some respects, those of the Director of Railways.

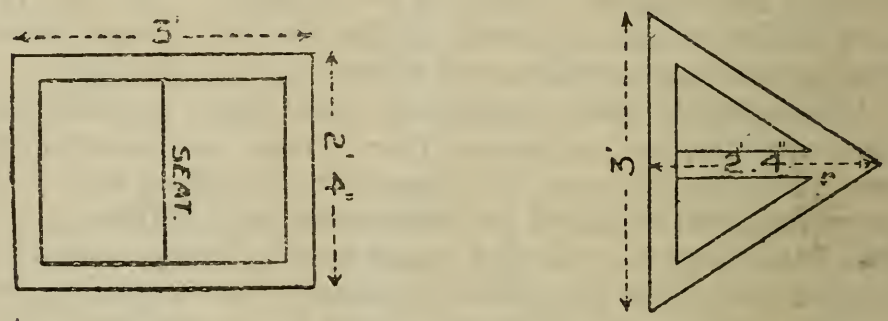
I heard from a competent medical authority at Liao-yang that the Red Cross Hospitals were far better and cleaner than those of the Army Medical Department. I visited the "Evangelical Lutheran Hospital" at Liao-yang. It contained 130 beds, and is said to be the very best managed hospital with the army, the personnel being German from the Baltic Provinces, and not a single Russian being connected with it. The transport for this hospital consists of two-wheeled one-horse covered ambulance carts, each of which takes two men lying down.

At the battle of Te-li-ssu the principal dressing station was at the railway station, about three miles in rear of the fighting line, and some of the smaller dressing stations had to change their positions three or four times during that battle, so I was informed.

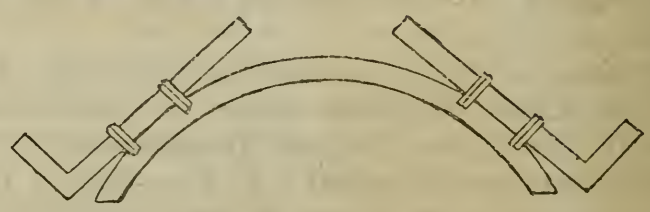
In order to relieve the railway to some extent, arrangements were made to utilize the Sungari River from Harbin to its junction with the Amur, and thence to Khabarovsk, for the evacuation to that town of sick and wounded. A foreign military attaché told me that there were, when navigation was open, 16 hospital lighters, each containing 130 beds, or 2,080 beds in all. These were divided into "fleets," each fleet consisting of two lighters towed by one tug.

The Red Cross road transport for wounded men was both pack and draught; as regards the former method, the best method, as it appeared to my unprofessional eye, was a chair made of wood with a seat of American cotton, and the accompanying sketches explain it.

Plan. Profile.

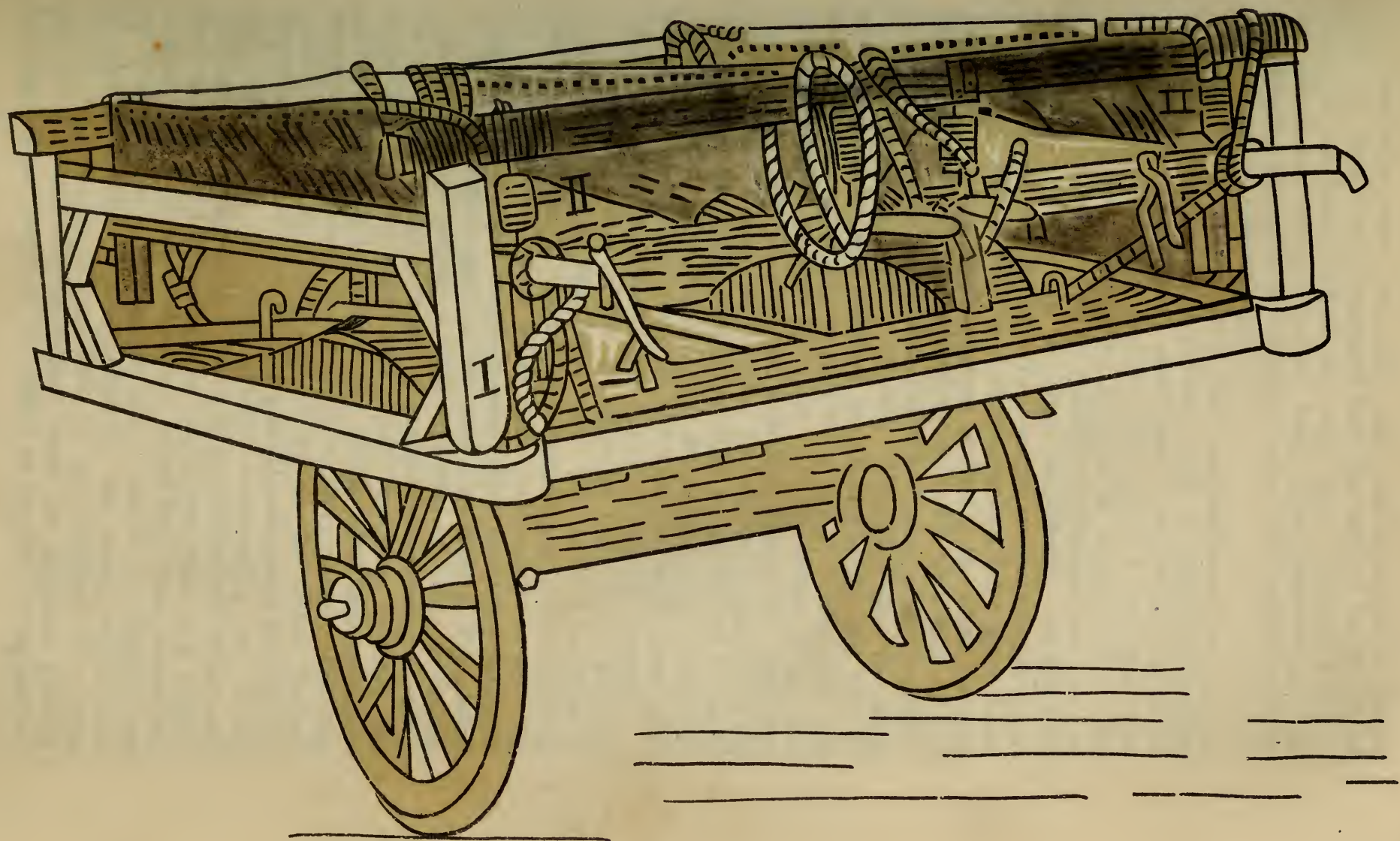


Each pack animal carried two of these chairs, one on each side, the chairs being fastened together by leather or rope, and slung across a Chinese pack saddle. The latter is merely a curved piece of wood placed on plenty of felt, but I added to mine two iron legs on each side to support the packs, and this was so much admired that some of the Red Cross sections adopted the same principle for their pack chairs. The following sketch shows the saddle and one leg on each side, the legs being fastened by iron to the saddle.



The Army Medical Department, as well as the regimental transport for sick and wounded, consists chiefly of the small two-wheeled one-horse carts of universal pattern, but large numbers of Chinese country carts had also to be employed.

RUSSIAN TWO-WHEELED AMBULANCE CART.



To face page 54.

Complaints were frequently made that there was no dentist with the army, and it was said that one was to be appointed, but I do not know whether this was done. Perhaps it was, as an official meteorologist joined Army Head-Quarters, and was consistently wrong in his prognostications, although his services were valued at a high figure.

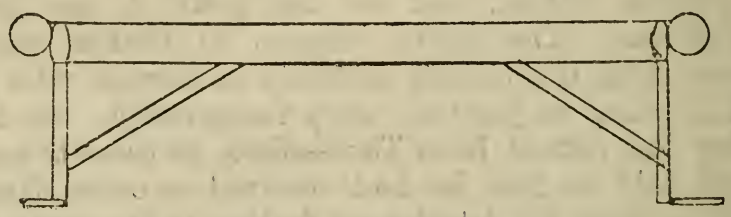
Considering all the money that was somehow spent, and all the arrangements which had been made, it might be imagined that no effort would have been spared to utilize all this to the utmost possible extent, and on this point I can give some expert evidence. The senior surgeon in charge one of Red Cross detachment is a man of celebrity in Europe, who gave up his work in order to join the army temporarily. On the 22nd June, after the retreat from Te-li-ssikou, he came to see me at 6 a.m., and told me that he had received an order three hours previously to move his detachment further to the south, but that nobody could tell him where to go. He said that he had originally expected confusion, but not, "even with Russians," confusion such as actually existed. He added that the corps staff to which he was attached told him nothing, and that he was, therefore, constantly compelled to work in the dark, and arrange matters as best he could. He also informed me that some serum was to have been sent from Russia for dysentery and bad cases of diarrhœa, but that he had lately heard from the Ministry of War in St. Petersburg that it would not be ready before August. My informant is a serious man, and his remarks about confusion carry great weight with me, for he must have been cognisant of much of which I was necessarily ignorant.

A medical officer of the 1st Siberian Army Corps told me, on the 20th August, that there were 138 military hospitals in the theatre of war, of which only 82 were then in use, and that, in these 82, there were 5,100 beds unoccupied on the 2nd August. The military hospitals seem to have about 250 beds each.

On the 25th August it was said that General Kuropatkin was thinking of paying a visit to Harbin in order to inspect the hospitals there. I heard a general commanding an army corps, say that he hoped this report was true, as there was malingering among the troops, men being taken into ambulance trains and evacuated to the north without passes. His own medical officer, who does not belong to the Army Medical Department, denied this, but the general maintained his opinion, and added that the major-general commanding one of his divisions had informed him that a non-commissioned officer and two men had got taken into an ambulance train at a certain station, where we then were, and when they were discovered by their regimental authorities they "had to be dragged out of their cots," and nothing whatever was wrong with them. I saw a general stop two men on one occasion who were just about to enter an ambulance train; he suspected them of malingering, as they had no passes as required by regulation;

but it turned out that the hospital authorities had neglected to issue these, another instance of carelessness.

The regimental stretchers consist of two wooden transoms with iron rings for the two wooden poles; the canvas is wrapped round one of the poles when not in use. Generally speaking, one soldier, with or without a rifle, carries one or both poles, and another the two transoms. The transoms have two wooden struts or strays, and two iron feet for resting them on the ground. The sketch shows a transom.



On the 14th November 1904, the Governor-General of Irkutsk, in reply to a request from the Ministry of War to provide accommodation for from ten to fifteen thousand sick and wounded, said that owing to the density of the population of Irkutsk, which is the largest town in Siberia, and has over 70,000 inhabitants, and its "extremely unsatisfactory sanitary condition," not more than 2,585 beds could be arranged for, and that this number should be reduced as much as possible. The Governor of Krasnoyarsk, a city of 30,000 inhabitants, informed the Ministry of War on the 3rd December 1904, that 1,000 beds was the maximum which could be provided there. Most of the sick and wounded evacuated from the theatre of war must, therefore, be sent on to Russia, thus further encroaching on the capacity of the railway.

(46) Russian Medical Administration in the Field.

REPORT by Major J. M. HOME, 2nd P.W.O. Gurkhas.

Medical Administration in the Field.—The Chief of the Medical Service of the Manchurian Army was the Adjutant-General of the Army. The Adjutant-General exercised general supervision, but the real working chief was Lieut.-General Trepov, a selected combatant officer on the staff of the Commander-in-Chief, with the designation of Chief Sanitary Inspector of the Manchurian Army.

The duties of Lieut.-General Trepov, under the general supervision of the Adjutant-General, were mainly administrative. His authority extended over all hospitals of the army, both temporary and permanent, except any mobile hospitals actually moving with divisions, which were under the divisional commander; should, however, these hospitals become immobile owing to their being filled with sick, they came under his orders. He was responsible for the supply of hospital stores and the maintenance at full strength of all hospital establishments. He was bound to keep in close touch with the Plenipotentiary of the Red Cross Society regarding the co-operation of the personnel, &c., of which he disposed; with the General of Communications regarding the transport of the sick and wounded; and with the Chief Intendant of the Army regarding the supply of provisions, &c., to medical establishments from the intendance magazines. He was responsible for the enlargement of permanent hospitals, the provision and distribution of extra mobile hospitals, the formation of sanitary stations, detachments of sickly men, sanitary trains, and generally for the evacuation of sick and wounded.

Immediately under the orders of the Chief Sanitary Inspector was the Surgeon-General of the army, an army medical officer. This officer, Surgeon-General Wreden, under the supervision of the Chief Sanitary Inspector, was mainly responsible for medical as opposed to administrative matters.

He was responsible for all sanitary and medical measures for the preservation of the health of the army, for the treatment of the sick and wounded, for the proper selection of men for evacuation, for the proper preparation of lists of medical stores, &c., to be indented for, and for the general supervision of the medical personnel of the army. The Surgeon-General

received and dealt with the reports of all superior officials of the following departments :—

1. The Medical Department.
2. The Sanitary Department.
3. The Apothecary's Department.
4. The Veterinary Department.

Directly under the Surgeon-General's orders were two military hygienists, one at Harbin, the other with the army in the field; they were army medical officers with the rank of colonel, and reported on all hygienic matters; in case of epidemics they would have been sent to deal with them. There was also a civilian bacteriologist under the orders of the Surgeon-General.

The third important personage in the medical hierarchy was the Plenipotentiary of the Red Cross Society. This personage had at his disposal all the resources supplied by the society. He was in charge of all the establishments of the society, and reported to the Adjutant-General and the Head-Quarters of the Society. He worked in close co-operation with the Chief Sanitary Inspector and the Surgeon-General of the army, from whom he received all information as to how the resources of the society could be most usefully employed.

Army Corps Medical Administration.—Each army corps had a corps surgeon, who was the adviser of the corps commander on all sanitary matters; sometimes there was a second official known as the corps sanitary officer. These officers were usually of colonels', but were sometimes of generals' rank; both reported to the Surgeon-General of the army; they principally worked together, and their position was practically co-ordinate; when there was no corps sanitary officer the corps surgeon performed the duties of both appointments. The corps surgeon's duties were mainly professional, and the sanitary officer's mainly administrative. The corps surgeon was responsible for all treatment, supervised the arrangements for dressing stations before an action, and during an action attended to their working, and supervised the treatment of wounded; he had authority also over all Red Cross personnel attached to the army corps, which he could move about from unit to unit as he thought necessary. The corps sanitary officer 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.

Divisional Medical Administration.—Each division had a chief surgeon with a sanitary inspecting officer under his orders. The chief surgeon was directly under the orders of the divisional commander, but, so far as medical questions were concerned, came under the orders of the corps surgeon. The duties of the chief surgeon were mainly professional. He was the immediate head of the medical establishments attached to the division, but his main duty was to endeavour to get the divisional hospitals emptied

of sick and wounded as soon as possible, and so render them capable of accompanying the division in the field. The sanitary inspecting officer, under the orders of the chief surgeon, was mainly responsible for routine administrative work.

The above short account shows that the keynote of all Russian medical organization is to separate administrative from professional work. Thus doctors are purely doctors, and, as a rule, have no disciplinary or administrative powers, these duties being generally carried out by combatant officers. This system may have its advantages, but it leads to endless routine correspondence and divides responsibilities, and the fact that the man who is responsible for the supply of medicines, comforts, &c., is not responsible for their use cannot tend to efficiency.

Medical Establishments and Equipment with Units.—An infantry regiment had material for a small hospital of 16 beds, consisting of bedding, clothing, cooking and eating utensils, medicines, instruments and medical comforts. A four-battalion regiment had 5 and a three-battalion regiment 4 doctors; in addition, the former had 22 dressers and the latter 18, each had a few hospital orderlies as well. Each company had 2 stretchers and 8 stretcher-bearers. Each battalion normally had one ambulance, capable of accommodating 4 patients lying down, but the effort was to replace each four-wheeled ambulance by 2 two-wheeled ones.

A cavalry regiment had a small hospital of 6 beds, with 3 doctors, 14 dressers and 1 apothecary; in addition, each squadron had 4 stretcher-bearers, 2 stretchers and one two-wheeled ambulance.

An artillery brigade had a hospital of 6 beds, 2 doctors, 7 dressers, 12 stretchers, 36 stretcher-bearers and 6 two-wheeled ambulances. If a battery was working independently it had 1 doctor, 1 dresser, 1 two-wheeled ambulance, 2 stretchers and 6 stretcher-bearers. The above establishments were normal, but the Surgeon-General told me that the endeavour was to increase infantry, regimental and artillery brigade hospitals up to 25 or 50 beds, with one or two large tents, each accommodating 25 men.

As a matter of fact, however, units seldom had their full hospital equipment with them; for example, the Primorsk Dragoons south of Wa-fang-kou only had one doctor and their dressers and stretchers with them, but no ambulances or stores.

Each dresser always carried on his person a medical haversack with certain medical appliances for first aid packed in it.

Each division in the sanitary division of the divisional supply column had one divisional hospital and two mobile field hospitals. A divisional hospital, which corresponds to an English bearer company, was supposed to have accommodation for 200 men, and had 8 large tents. Its personnel consisted of the divisional surgeon, 4 other doctors, 1 combatant officer for discipline and administrative work, 1 hospital overseer, 5 dressers, 1 for veterinary work; 22 hospital assistants, 217 men, personnel of the bearer company section, and transport drivers. There were

50 stretchers, each stretcher being provided with a bandaging knapsack; in addition there were the necessary medicines, instruments and comforts. I could get no details with regard to transport; the details given in the handbooks were modified considerably in Manchuria owing to local conditions and to the increase in the number of tents.

A mobile field hospital comprised—1 senior surgeon, 1 senior assistant surgeon, 2 junior assistant surgeons, 1 army officer for discipline and administration, 1 apothecary, 80 medical rank and file, clerks, &c.; transport personnel and 4 sisters of mercy (nurses).

The stores issued were calculated to be sufficient to allow for the accommodation of 10 officers and 200 men. Amongst the stores may be mentioned 210 beds, 40 stretchers, tables, chairs, medicines, instruments, linen, &c. There were supposed to be 52 carts; but only 3 large tents were carried, it being estimated that native houses would be available for the balance of the patients. In addition to the two mobile field hospitals belonging to the division in the sanitary division of the supply column, each division had mobilized for it two mobile field hospitals, which were placed at the disposal of the Chief Sanitary Inspector of the Army. These two mobile field hospitals had the same composition as those in the sanitary division of the supply column.

Reserve field hospitals were mobilized according to requirements; they had the same strength and composition as mobile field hospitals, but had no transport.

At Liao-yang, Harbin, Chita, and other places, several spare field hospitals were joined up and formed into large combined field hospitals.

The tents mentioned above are really only supposed to accommodate 20 patients; but in Manchuria they had to take 25. They are double fly tents weighing about 1,200 lb.

The Surgeon-General told me each army corps had 20 hospitals; but I could not ascertain how they were arrived at, as the above-described organization only gives 10; possibly others were mobilized or some of the reserve hospitals were attached to army corps, or Red Cross movable hospitals were included in the twenty.

System of Medical Assistance from Front to Base.—Every soldier had a packet of first field dressing on his person, which was either put on by himself or by the personnel of the regimental hospital, which in action forms the first line of medical assistance. The regimental hospital remains with the reserve and establishes advanced dressing stations to which the wounded are brought in and at which first aid is applied.

The second line of medical assistance is formed by the divisional hospitals, which correspond to our bearer companies. The divisional hospitals establish main dressing stations, the positions of which are selected by the divisional surgeons, search for the wounded, bring them in from the dressing stations

established by the regimental hospitals, and co-operate in despatching the wounded to the mobile field hospitals allotted to them.

Dressing stations are marked by the red cross and the national flag by day, and at night by lanterns. For the despatch of wounded from the main dressing stations the ambulances of all units and the carriages of all medical units are used, supplemented, if necessary, by hired or requisitioned carriage.

The third line of medical assistance consists of the mobile field hospitals, of which there are two in the sanitary division of the supply column. Their position in action is selected by the divisional surgeon, and to them are brought the wounded who have been attended to in the regimental and field hospitals.

The main duty of the surgeon in charge is to get them emptied so as to be able to follow his division as soon as possible. As soon as the surgeons in charge of these hospitals receive notice, they select the patients for removal. If the journey is not more than a day, the carriages belonging to the hospital can be sent, otherwise other arrangements have to be made; the personnel in charge is provided by the hospital concerned.

Line of Communication.—The medical service on the Lines of Communication was superintended by the same authorities, namely, the Adjutant-General, the Chief Sanitary Inspector and Surgeon-General of the army, the evacuation service being attended to by a special section of the Adjutant-General's office.

Along the Lines of Communication detachments of weakly men were formed who did not require hospital treatment; they were formed at stations where there were hospitals, and were under the supervision of the chief surgeon of the hospital, but for discipline under a selected combatant officer.

Line of communication hospitals are formed from the reserve hospitals; they are under the Chief Sanitary Inspector and Surgeon-General for administration, and under station commandants for discipline. They receive the sick of troops passing through, those from lines of communication troops, and men from sick convoys who cannot bear further movement.

Evacuation.—Evacuation committees were formed in the immediate rear of the army and also on the Line of Communication. The localities for the formation of these committees and collecting points for the sick and wounded were fixed by the Chief Sanitary Inspector under the supervision of the Adjutant-General.

The committees arranged for the collection of the sick and wounded, the selection of those for evacuation, the supply of food and clothing, the transport of the sick to the rear, and the provision of personnel to accompany them. Collecting points

were under the committees who worked in close connection with the Red Cross Society. Evacuation was carried out by road in ambulances or requisitioned carriages, by rail or sanitary or ordinary trains, and by water on specially-fitted steamers.

Description of Ambulances and Stretchers.—The ordinary ambulance was a four-wheeled wagon drawn by four horses, with accommodation for four men lying down; this ambulance was seldom used, as it was much too heavy for the bad roads of Manchuria. So far as possible, four-wheeled ambulances were being replaced by two-wheeled ones. Two-wheeled ambulances were nothing more than two-wheeled carts, described in the section on transport, fitted with a canvas top to keep off the sun or rain, and containing two stretchers side by side. They were most unsuited for the work of transporting wounded, being without springs and were very cramped, but for want of better they had to be used.

The Russian authorities offered a money prize for the best class of two-wheeled ambulance; the one submitted by the Harbin railway workshops, with slight modification, was adopted, and a great many were ordered to be constructed. I never saw this ambulance, but the following is a short description of it.*

It is a two-wheeled carriage, with wheels on iron axles, with an arrangement of two frames 6 feet 7 inches long and 5 feet 10 inches wide; these frames are fastened by uprights (I.), 2 feet high, 2 inches by 4 inches thick; the lower frame is strengthened by being connected by two cross-bars 8½ inches from the inside corner. The frame is fastened to the platform by these cross-bars. From upper cross-bars are suspended springs (II.) of ¼-inch steel with fourteen spirals fitted with a hook and ring attached to their lower ends. The wooden handles of the stretchers are passed through these rings, the stretchers are in addition to the springs held up by ¾-inch rope. The stretchers are furnished with tarpaulin sides, which are held up by cords pulled taut round the transversals of the upper frame.

The stretchers with handles are 8 feet 3 inches long, 2 feet 2 inches wide, actual length of lying down space 6 feet. To assist in loading the stretchers the back portion of the upper frame is made removable. To prevent lateral motion the stretchers are held by cords fastened to the hooks at the end of the springs, and firmly attached to the platform. A canvas tent cover is fitted on top of the frames to keep out rain and sun. The width between wheels is 3 feet 6¼ inches. When the stretchers are taken out the cart can be used to carry supplies, the stretches and tent cover being packed on top of the stores to keep out rain.

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* *See* plate opposite.

The only satisfactory way of moving seriously wounded men was found to be by hand, as the ambulances jolted too much; this was the more readily adopted, as the scene of most of the fighting was not far from the railway, and once the wounded were brought as far as the railway they were transported further by hospital trains. I saw some stretchers fastened to bicycle wheels which were pushed along by one or two men, but they did not strike me as very practical, as the roads were very bad and there was a good deal of jolting.

Stretchers.—The stretchers seemed very similar to those in use in our service. I saw one fold-up stretcher, made of bamboo with aluminium joints and canvas bottom; this was very light and folded up into a small compass, and was easily carried by a mounted man slung over his shoulder; the mounted detachments of the Red Cross Society had several of these stretchers.

Supply of Medicines, &c.—A certain number of field dispensaries were organized under the supervision of the Chief Sanitary Inspector of the army, each of these dispensaries was supposed to have medical stores, &c. for four months' consumption for one army corps; but the supply of medicines, &c. was distinctly a weak point, and I heard many complaints of the difficulty of obtaining medicines and medical supplies.

Hospital Trains.—Both military and Red Cross hospital trains were used in Manchuria.

The military trains were fitted up in the railway workshops, supplied with drugs, medical instruments, appliances, and comforts by the Red Cross Society, and worked entirely by the military authorities with military personnel.

The composition of these trains as regards number and nature of vehicles and personnel varied considerably. They consisted generally of twenty-one ordinary third-class carriages fitted up with twelve cots for the conveyance of serious cases. These cots were nothing more than canvas stretchers slung from the roof of the carriage, in two tiers, six cots on either side with a central passage. In addition to the carriages fitted for accommodation of serious cases there were carriages for the train staff, kitchen, operating room, baggage wagons for stores, medicines, linen, &c., and a certain number of ordinary third-class carriages, not specially fitted for the conveyance of slightly wounded; the number of these ordinary carriages varied considerably, but there may have been an average of five such carriages, which would give accommodation for 160 slight cases, all ordinary carriages having accommodation for 32 men, who can all be provided with lying-down accommodation. This allows for 412 sick in a train, and I repeatedly saw as many as 500 in a train after an action, but they were tightly packed and the slightly wounded cases did not get lying-down accommodation.

All these trains were fully supplied with the most modern appliances, and the operating rooms had all requisites for modern surgery.

All Russian carriages have latrine compartments at each end, which with slight improvements were used in these trains.

In many trains ordinary horse wagons took the place of third-class carriages; in these wagons eight cots were slung from the roof, but they were much more confined than the third-class carriages. None of the military trains worked west of Lake Baikal, but were solely employed on the Trans-Baikal, Southern Ussuri, and Eastern Chinese railways.

There were many Red Cross hospital trains in addition to the purely military trains. These trains were all organized in European Russia. The Empress organized one, there were at least two organized by Grand Duchesses, and there were several sent by the nobility of different governments.

With the exception of the Empress's train they all seemed to be formed of ordinary rolling stock converted for the purpose, with the exception of special carriages, such as operating rooms, &c.

I was shown over the train organized by Her Imperial Highness the Grand Duchess Maria Pavlovna.

This train consisted of 20 carriages as under:—

6 carriages fitted with lying-down accommodation for serious cases.
5 carriages fitted with lying-down accommodation, ordinary third-class carriages, slightly altered.
3 carriages for the staff of the train.
1 carriage fitted up as an operating room.
1 carriage fitted up as a pharmacy and surgery.
1 carriage fitted as a mess-room with bath-room attached.
1 carriage fitted up as a kitchen.
2 goods wagons for general stores.

The staff consisted of:—

1 *chef de train*, a reserve officer who represented the Grand Duchess, and made all payments.
1 commandant, a regular officer for discipline.
2 doctors (civilians).
5 medical students.
9 nurses.
3 cooks.
35 medical attendants.

The carriages for serious cases were ordinary third-class carriages emptied of all their fittings, which gave a floor space of 30 feet by 10 feet. In each carriage there were twelve iron cots, with wire spring mattresses, the feet of the cots being sunk in blocks of india-rubber to deaden the motion of the train. Each cot was fitted with handles, which enabled the cot to be used as a stretcher if required; when not in use the handles bent down, and so did not get in the way.

The carriages were fitted up as miniature hospital wards, and contained all crockery, cutlery, &c., required by the patients, and each cot had a complete supply of hospital clothing for its occupant.

The carriages for slight cases were ordinary third-class carriages with their ordinary fittings slightly altered. Mattresses, sheets, blankets, and clothing were provided for each patient.

The total accommodation of the train was thus for 232 patients, 72 serious and 160 slight cases, but I saw this train carry away 500 patients, more than 32 were put into the carriages for slight cases, and extra carriages were added from the ordinary rolling stock.

Carriages for the staff consisted of one first, one second, and one third-class carriage, for the officers and doctors, for the students and nurses, and for the medical attendants respectively. The first and third-class were unaltered, but the second-class carriage was slightly changed so as to give room for the baggage of the nurses and students.

The operating-room was a specially constructed carriage, the size of an ordinary passenger carriage, made of steel; the inside uncovered with wood, merely painted; the floor was covered with zinc. Beyond an operating table, and a few small tables for instruments, &c., the carriage was empty.

A specially-constructed carriage contained two compartments, one fitted up as a pharmacy and the other for minor operations.

The mess-room occupied half of the carriage, the other half contained a pantry and a bath-room for the staff; the bath, a large zinc one, was fitted with hot and cold water.

The kitchen was divided into three parts, a cold-storage room, a larder, and the kitchen proper. In the kitchen proper was a large range and two boilers, one for soup, the other for porridge; all utensils were of untinned copper.

There was one baggage wagon exclusively for linen, another for various stores.

There was through communication from end to end of the train.

The train was entirely worked by the Red Cross Society, and had it not been for the commandant for purposes of discipline, it would have been purely civil.

The other Red Cross hospital trains were all more or less on the above lines, but generally speaking, with the exception of the Empress's one, not so elaborately found.

Red Cross hospital trains worked west of Lake Baikal as well as east of it.

Water was carried in iron or zinc cisterns in the roofs of the carriages which were refilled as required *en route*.

Latrines were provided on the usual hole in the floor opening on to the line system.

There were linen depôts at various stations on the railway where the dirty linen was exchanged for clean.

The hospital trains were very well organized, and replete with every modern appliance; so many were available that, except after heavy fighting, there was no necessity for any crowding.

Special Sanitary Precautions. — About the beginning of May, five special sanitary and ten disinfecting detachments were ordered to be 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.

These detachments owed their origin to the initiative of the Commander-in-Chief, their object being to prevent epidemic diseases. They were all to be 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 investigation and preliminary disinfecting measures. A disinfecting detachment would immediately follow the sanitary detachment, and if the bacteriological investigation showed the existence of any serious infection, it would carry out 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 the water which the army had to use for drinking purposes.

Statistics.—The total number of sick and wounded officers and men, inclusive of those evacuated per thousand of the paper strength of the Manchurian Army, was up to the 26th June, 71·36 and 39·43, respectively, divided as follows:—

Officers - -	10·24 wounded,	61·12 sick.
Men - - -	6·51 „	32·82 „

Out of the sick 2·19 per thousand were suffering from stomach disorders, of which the largest proportion ·96 were suffering from dysentery.

Up to the 9th July, the latest figures I could obtain, there were 83·44 officers and 46·46 men per thousand (paper strength) sick and wounded, divided as follows:—

Officers - -	29·12 wounded,	54·72 sick.
Men - - -	9·04 „	37·42 „

Of the sick 8·52 per thousand were suffering from stomach disorders, of whom 1·99 were suffering from dysentery.

Wounds.—A doctor who had had a great deal to do with gunshot wounds told me there was little to choose between the effect of the Japanese and Russian bullets. The Japanese bullet, provided it did not ricochet, made a small, clean wound which healed very quickly; in the case of a ricochet, however, it made a dangerous wound. He told me he had had cases of bullets going clean through bones without splintering, but that

these cases were rare, as the bullet usually splintered bones where it struck them. The worst wounds were caused by bullets fired at ranges between 500 and 1,000 yards, at which distances the effect seemed to be much more serious than at others.

Some doctors affirmed that wounds caused by Japanese bullets healed completely to all intents and purposes in three weeks, but that the wounds when serious opened up again in six weeks. The majority, however, did not confirm this theory, but said that the wounds healed quickly and satisfactorily and gave no further trouble.

Several cases occurred where men, shot through the lungs, walked ten miles, and one officer whom I knew rode one hundred and forty miles after having been shot through the stomach; cases of men to all appearances badly wounded but not suffering any inconvenience are too numerous to mention.

The Red Cross Society.—In spite of the really excellent hospital arrangements made by the military authorities, had it not been for the Red Cross Society the hospital arrangements would have been totally inadequate for the number of men assembled in Manchuria.

The war budget does not admit of really adequate medical arrangements being made for the huge army Russia can put into the field, so the Red Cross Society is encouraged by the authorities to supplement the military medical arrangements, and in this way the hospital arrangements are brought up to requirements by a voluntary tax, which, however, is very often collected by the employment of considerable pressure. I was told by a Red Cross official that 1,000,000*l.* had been subscribed by the Russian public to the Red Cross Society from the outbreak of war to the end of May. The nobility of forty-two governments had subscribed 120,000*l.* by the end of June.

Practically all modern appliances, drugs, &c., were supplied by the Red Cross Society. The only X-rays I heard of in Manchuria were in a Red Cross hospital at Mukden.

The chief of the Red Cross (Senator von Kaufman) resided at Irkutsk, which was the Head-Quarters of the Society, and a Plenipotentiary, Councillor Alexandrovski, was attached to the Manchurian Army and another one to the Ussuri Army.

The Red Cross Society, besides organizing large stationary hospitals, formed mobile detachments which accompanied the troops and supplemented the military mobile hospitals. These mobile detachments, in addition to supplying medicines and medical comforts, and supplementing or in many cases doing the work of army medical officers, supplied the troops with many small luxuries such as tea, sugar, and tobacco. In the fighting south of Wa-fang-kou, when I could not get food by any other means, I was always certain of finding a meal and a hearty welcome from the members of the mobile Red Cross

detachment attached to the cavalry. The army medical authorities at the commencement of the campaign said that they had no need of Red Cross personnel beyond the base, and only wanted the Society to send material to supplement that of the army mobile hospitals, but the Red Cross mobile detachments were very soon working some of the most advanced dressing stations.

The doctors were excellent, comprising amongst their number the most eminent surgeons and physicians in Russia. The subordinate personnel, however, was not nearly so good as were the doctors, many of the former being absolutely without training. Among the nurses some were trained who were paid for their services, but the vast majority were volunteers; but when there was any serious emergency, it was always as might be expected, the trained nurses who came to the fore; the volunteers, however, were a self-sacrificing and hard-working body of women, and did all that they could to supplement their want of training by zeal and energy.

The Red Cross had established large hospitals at Omsk, Tomsk, Irkutsk, Baikal Missovaia, Chita, Nerchinsk, Blagovieschensk, Khabarovsk, Nikolsk-Ussuriski, Spasskoe, Stretensk, Harbin, Mukden and Liao-yang, besides numerous smaller ones and mobile detachments. It also had a large number of hospital trains as well as floating hospitals on the Sungari and Amur.

The Red Cross hospital at Liao-yang was organized by the 1st May for 200 beds, but it was soon increased to 400. It was established in a Chinese village, and was replete with every comfort, plenty of doctors, nurses, and subordinate staff, and everything was done regardless of expense. The only exception that I could take to the arrangements was the extremely primitive, and to my mind unsanitary, latrine arrangements.

(47) The Health of the Russian Troops.

REPORT by Colonel W. H. H. WATERS, C.V.O., C.M.G., Royal Artillery.

I have been promised over and over again that I should see the medical statistics concerning the health of those troops to which I was attached. The Commander-in-Chief asked me once, on his own initiative, if I would like to have this interesting information, and I heard him tell the Chief of the Staff of the 1st Siberian Corps to give it to me. General Stakelberg, the Corps Commander, also told that officer to let me see the statistics in question, but never would he allow me to do so.

Nevertheless, I gleaned some interesting news on the subject in conversation with medical officers, army and civilian. I also saw a good deal for myself, so that altogether I have not returned empty-handed as regards the question of health, considered apart from casualties caused by wounds, which come under the head of "Losses," in another section.

On the 21st May, at Hai-cheng, General Stakelberg had under his command about 30,000 men of all kinds, combatant and non-combatant, widely distributed they were then, and only 168 were on the sick list. A general officer told me that Russian soldiers suffered more from heat than from cold, owing to their carelessness in drinking foul water, which fault, he said, cannot be remedied. He expected to have a much larger number of sick when the weather should become hotter, and his expectation was verified.

General Stakelberg told me, on the 11th June, that the last sick state which he had received had shown only 17 fresh cases, mostly syphilitic, and that until he made enquiries he thought the medical officers had been deceiving him with inaccurate reports.

But this satisfactory state of affairs did not last long, for the three days marching by day or night, after the defeat at Te-li-ssu, on the 15th June, and the consequent bivouacking in very changeable weather, brought on several hundreds of cases of diarrhœa, especially among the troops of the 2nd Brigade of the 35th Infantry Division. This brigade had arrived in the Far East in the preceding autumn from Europe, and was not so well acclimatized as the East Siberian Rifle divisions, which are also recruited largely in European Russia.

Considering all that the forces under Stakelberg had gone through after the 13th June, one might have thought that they

would be allowed to rest when possible. On the contrary, they were not. Kuropatkin inspected the 1st Siberian Corps at Kai-ping on the 20th June, and distributed several decorations to officers and men. The former had a great supper in consequence, and kept a regimental band playing in bivouac from 9.15 p.m. until 11.30 p.m.

An aide-de-camp to the Commander-in-Chief told me on that day 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.

Professor von Manteuffel, in charge of a section of the Red Cross organized by Her Majesty the Dowager Empress, told me a couple of days later, that numerous cases of diarrhœa had a dysenteric tendency, but that a patient would recover after about four days if properly treated.

On the 24th June a senior medical officer told me that there were just about 400 cases of dysentery in the 1st Siberian Corps, which then had an effective combatant strength of perhaps 17,000 men.

On the 13th July I noticed an ambulance train proceeding north from Ta-shih-chiao; it held 400 men, of whom 18 were wounded, while the remainder were under treatment for dysentery.

A disease peculiar to the troops in Manchuria, so I was told, made its appearance in the shape of a combination of typhoid and influenza, but with proper care a man might be cured in about three weeks. On the 9th August I heard from a reliable authority that dysentery had commenced to decrease, but that there was a great deal of other kinds of sickness, several hundreds of cases of sunstroke having occurred in the 1st Siberian Army Corps alone, which was not surprising, as the men were always fully equipped, and only had peaked forage caps for their headgear.

On the 12th August, that is to say, at a time when no fighting was going on in the south, I was informed by a foreign military attaché, an old friend of mine, that he had been told at Army Head-Quarters that the daily rate of sick was 100 for each of the 1st and 4th Siberian Corps, or 6,000 a month for both of them. My friend said this was almost incredible. The weather was certainly very oppressive during July and August, but many of the cases were no doubt trifling.

On the 16th August a medical officer told me that the weekly number of sick for the 1st, 2nd, and 4th Siberian Corps had latterly amounted to 1,400, and that illness was increasing. Taking this statement in conjunction with the preceding paragraph, the 2nd Corps had no sickness, or next to none, and this may easily have been the case, for it had had a quiet time, while the 1st Corps had done much more work than the 4th, which, however, had 32 battalions to the former's 24.

On the 20th August a medical officer of the 1st Siberian Corps told me that on the 2nd August there were 15,500 sick and wounded in the Manchurian Army, exclusive of those who had been evacuated to Russia, whose numbers he professed not to know. Kuropatkin may have had at this time about 180,000 combatants. Not being attached to Army Head-Quarters, I was never able to ascertain how many men had been evacuated from Manchuria on any given date.

A medical officer of the 1st Siberian Corps also told me that the excreta of patients suffering from dysentery had been examined in Liao-yang and at the Kharkov Laboratory in Russia, and they showed no new bacillus.

On the 23rd August a foreign military attaché told me he had been informed by a health officer that, in round numbers, 20,000 troops had been evacuated from the theatre of war between the 14th June and the 13th July.

By the middle of September the health of the 1st Siberian Corps, at any rate, was very satisfactory, and on the 12th of that month General Stakelberg told me that he had only about 400 sick (apart always from wounded) out of about 16,000 effectives. The weather then began to get cool at night, and from the 12th September to the 12th October, when the battle of the Sha Ho began, there were some showers on four occasions, but on the 13th October there were very heavy thunderstorms during the battle, accompanied by violent downpours of rain. The result was that the three corps composing the Eastern Army, to which I was then attached, and which had been for some days and were still undergoing great hardships, began to suffer a good deal from fever.

On the 20th October the weather began to get really cold, and the troops, especially those in the trenches at night, felt the frost and bitter north wind very much, as there was no warm clothing available for them. Shortly afterwards they were provided with warm Chinese cotton garments, and this was the state of affairs when I left the army on the 1st December, 1904.

Having been denied detailed information concerning the health of the troops, I can only estimate it, chiefly from my own observations. 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 the utter absence of any sanitary arrangements. I never heard of one case of cholera, which disease had been fully expected to show itself.

The Russian soldier is of such good physique, and as a rule so inured to privation in his own home, that he can, in my opinion, stand campaigning better than any other European soldier now that I have seen him in the field, amid all kinds of discouraging surroundings.

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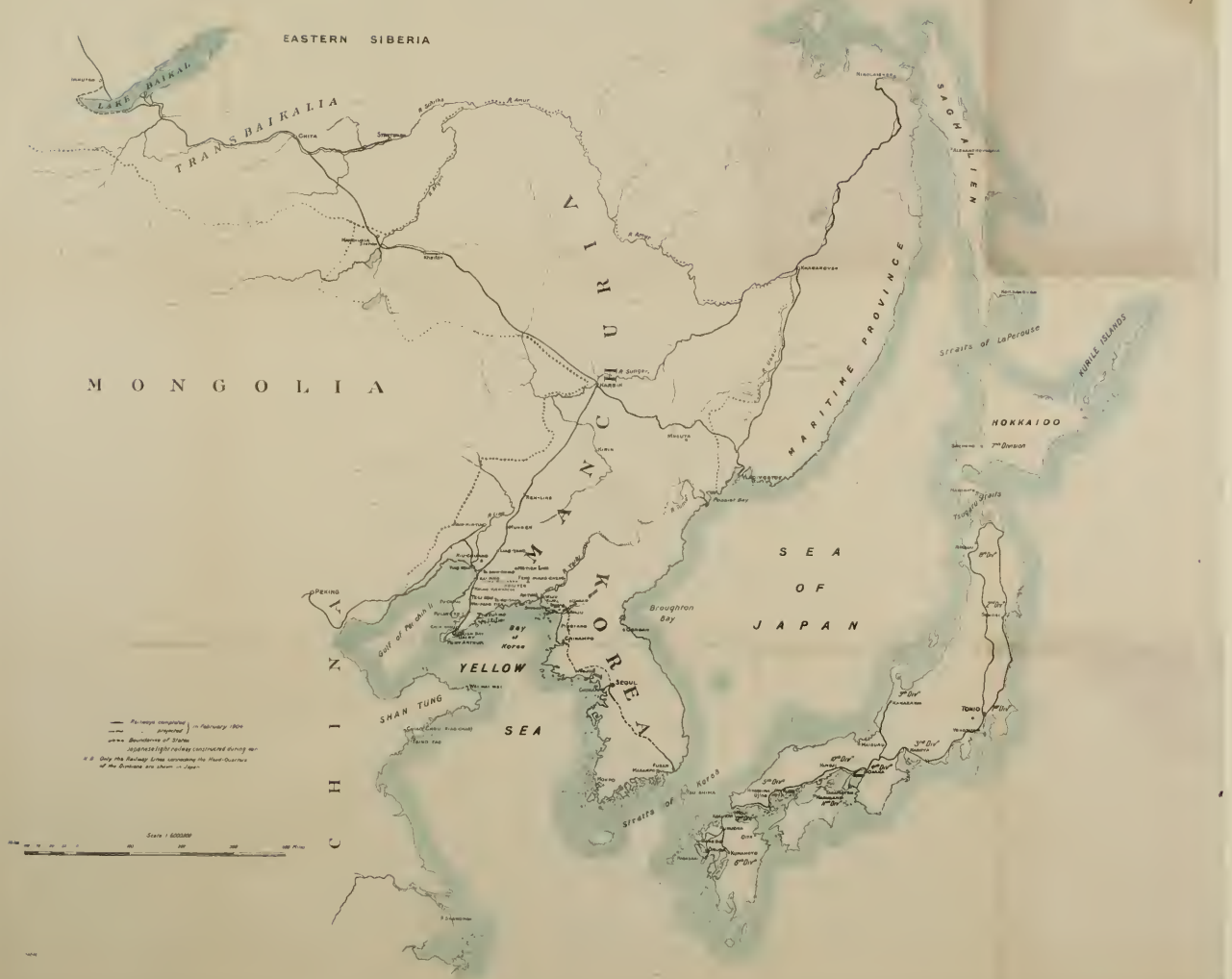
Map 1.

1.

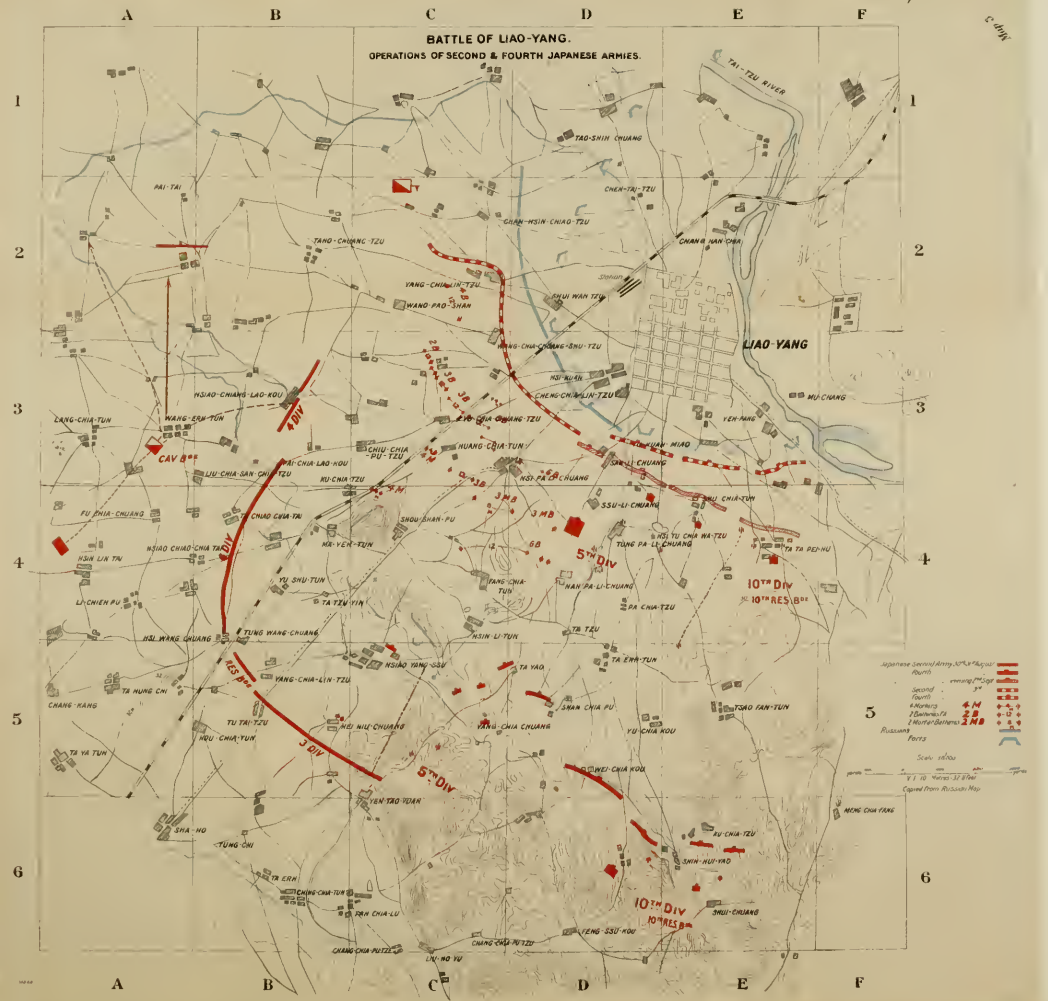
Map 1.

SKETCH MAP OF THE THEATRE OF WAR, 1904.



SKETCH TO ILLUSTRATE ADVANCE OF JAPANESE ARMIES ON LIAO-YANG.

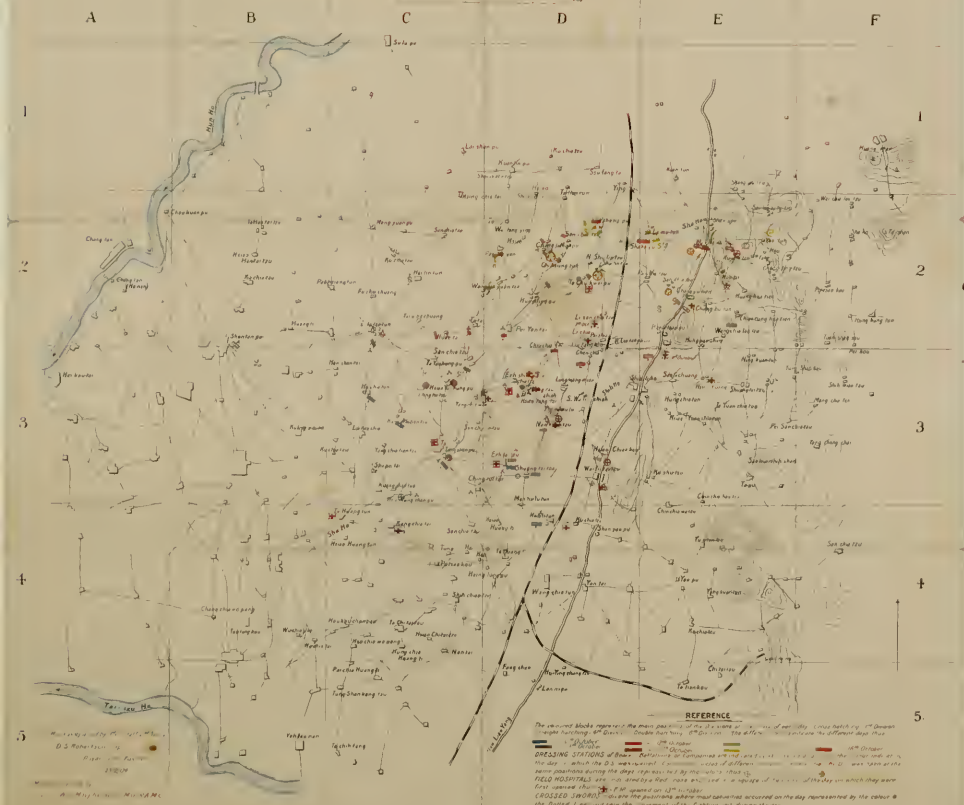
Map 3


BATTLE OF LIAO-YANG.
OPERATIONS OF SECOND & FOURTH JAPANESE ARMIES.
A
B
C
D
E
F
1
2
3
4
5
6
TAI-TZU RIVER
TAO-SHIH CHUANG
CHEN-TAI-TZU
PAI-TAI
CHAN-HSIN-CHIAO-TZU
CHAN-HAN-CHIA
TANG-CHUANG-TZU
YANG-CHIA-LIN-TZU
WANG-PAO-SHAN
SHUI-WAN-TZU
LIAO-YANG
HSI-AI-LIN
CHENG-CHIA-LIN-TZU
HU-CHANG
WANG-CHIA-CHUANG-SHU-TZU
WSIAO-CHIANG-LAO-KOU
LANG-CHIA-TUN
WANG-ERH-TUN
4 DIV
CAV B^DE
CHIU-CHIA-PU-TZU
HUANG-CHIA-TUN
YEH-HANG
HUAN-MIAO
SHA-LI-CHUANG
LIU-CHIA-SAN-CHI-TZU
TAI-CHIA-LAO-KOU
KU-CHIA-TZU
HSI-PA-LI-CHUANG
3 M
3 MB
SSU-LI-CHUANG
SHU-CHIA-TUN
FU-CHIA-CHUANG
CHIAO-CHIA-TAI
SHOU-SHAN-PU
HSI-TU-CHIA-WA-TZU
TUNG-PA-LI-CHUANG
TA-TA-PEI-HU
HSIN-LIN-TU
NSIAO-CHIAO-CHIA-TAI
HA-YEN-TUN
6 B
5TH DIV
10TH DIV
10TH RES B^DE
YU-SHU-TUN
YANG-CHIA-TUN
NAN-PA-LI-CHUANG
PA-CHIA-TZU
LI-CHIEN-PU
TA-TZU-TUN
HSI-WANG-CHUANG
TUNG-WANG-CHUANG
HSIN-LI-TUN
TA-TZU
TA-EWA-TUN
NSIAO-YANG-SSU
TA-YAO
YANG-CHIA-LIN-TZU
RES B^DE
TA-HUNG-CHI
CHANG-KANG
SHAN-CHIA-PU
TAO-FAN-TUN
TU-TAI-TZU
HSI-NIU-CHUANG
YANG-CHIA-CHUANG
YU-CHIA-KOU
HSU-CHIA-TUN
TA-YA-TUN
5 DIV
5TH DIV
WEI-CHIA-KOU
YEN-TAO-YUAN
MENG-CHIA-YANG
SHA-HO
TUNG-CHI
FU-CHIA-TZU
SHIH-HUI-YAO
TA-ERH
CHING-CHIA-TUN
10TH DIV
10TH RES B^DE
SHUI-CHUANG
JAH-CHIA-LU
YENG-SSU-KOU
CHANG-CHIA-PU-TZU
LIU-HO-YU
Japanese Second Army, 30th August
Fourth
Second
Fourth
4 Mortars
7 Batteries
1 Mortar Battery
Russians
Forts
Scale 1:80,000
Copied from Russian Map

Map 4

BATTLE OF THE SHA HO
OPERATIONS OF SECOND JAPANESE ARMY
October 1904
SHOWING POSITIONS OF MEDICAL UNITS.

Scale 200000



Map 5

APPENDIX A

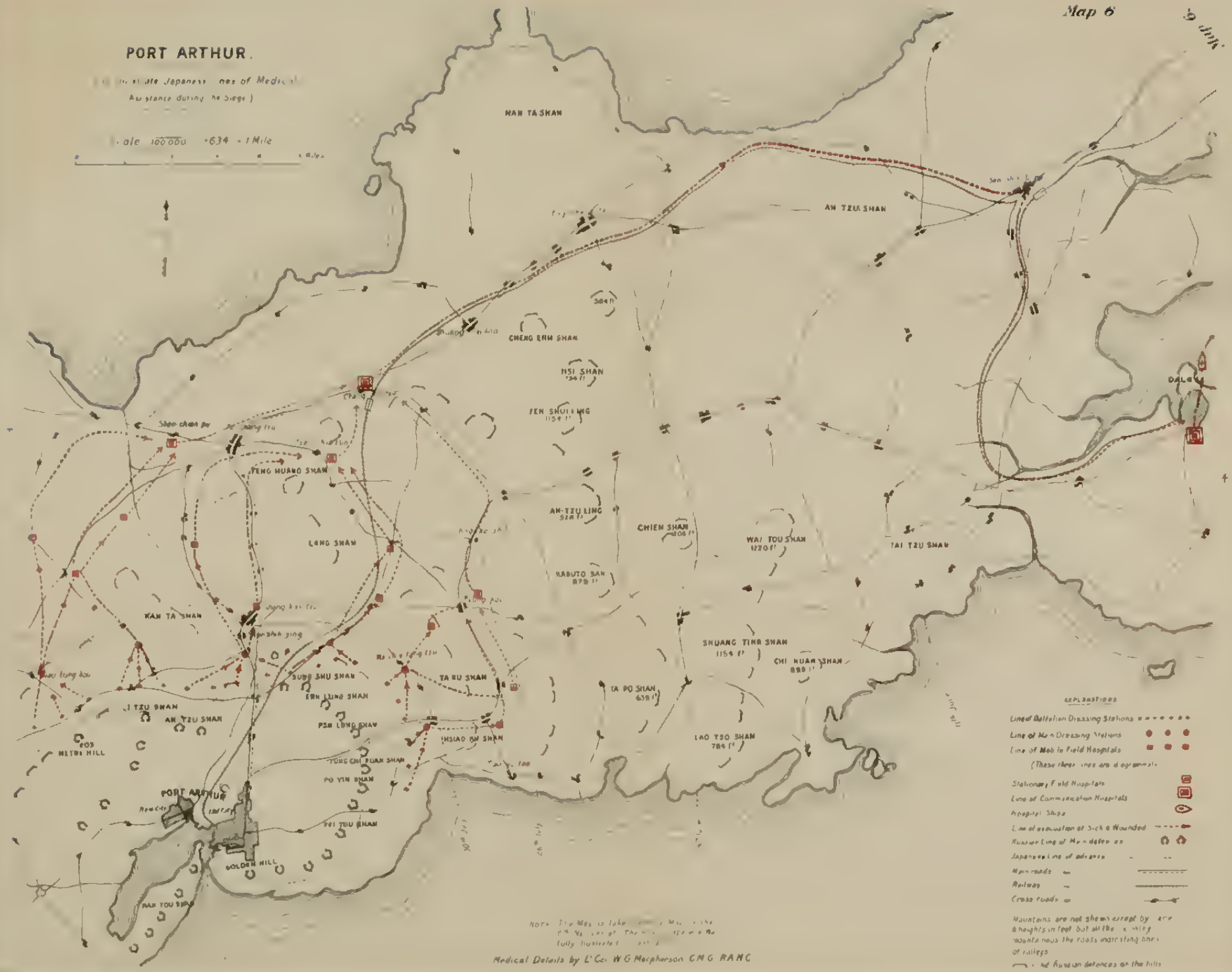
BATTLE OF MUKDEN.

POSITION OF SECOND JAPANESE ARMY AND OF PORTIONS OF OTHER ARMIES ON FLANKS

TO ILLUSTRATE POSITION OF MEDICAL UNITS

A Haldane
Lieut Colonel
General Staff

Medical details by [illegible]


Map 6
PORT ARTHUR.
Scale 100000 = 1 Mile
NAN TA SHAN
AN TZU SHAN
CHENG ERH SHAN
HSI SHAN
FEN SHUI LING
FENG HUANG SHAN
AN-TZU LING
CHIEN SHAN
WAI TOU SHAN
TAI TZU SHAN
LONG SHAN
KABUTO SAN
KAN TA SHAN
SHUANG TING SHAN
CHI HUAN SHAN
SUDE SHU SHAN
ERH LUNG SHAN
TA BU SHAN
TA PO SHAN
PSH LONG SHAN
HSIAO SH SHAN
LAO TSO SHAN
PO YIN SHAN
PORT ARTHUR
GOLDEN HILL
Medical Details by L'Col W G Macpherson C.M.G. R.A.M.C.

Map 7.

PLAN OF THE TOWN OF HIROSHIMA

AND ITS CONNECTIONS WITH THE PORT OF UJINA, SHOWING POSITIONS OF THE RESERVE HOSPITAL AND ITS VARIOUS SECTIONS AND THE LINES OF TRANSPORT OF SICK AND WOUNDED FROM THE SHIPS

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APPENDIX A

DIAGRAM OF THE MEDICAL SERVICE OF A JAPANESE ARMY OF 3 DIVISIONS IN THE FIELD

CONVENTIONAL SIGNS USED IN THE DIAGRAM.

Headquarters of the Army in the Field	
Temporary Dressing Station	
Field Hospital Open	
Field Hospital Closed	
Reserve Medical Personnel Unit	
Sick and Wounded Transport Department Unit	Hospital Ship
Medical and Surgical Inspector Depot	
Rest Station	
Stationary Field Hospital	
Various Hospitals	

Conventional signs in red are for use on maps intended to represent units and are connected with Evacuation. Those in blue, black and brown are connected with Supply. Green, violet and light orange are Hospital Signs.

The three Dressing Stations represent the three stages of Dressing Stations in Reserve Hospitals only, but the Reserve Hospital Depot, Dressing Station and Dressing Station, as a rule, take all the sick and wounded in the Field and Base Hospitals in addition.

SWEDEN AND NORWAY. Armies of. Handbook. 1901. 1*s.*

SWISS ARMY. Handbook. 1898. 6*d.*

TACTICAL STUDIES of the Battles of Columbey-Nouilly and Vionville. 4*s*

TACTICS. Modern. Précis of. Second Edition. 1896. 3*s.* (*Out of*

TELEGRAPH. Army. Field Telegraphs. Manual of Instruction in. 1897 (*Out of*

TELEGRAPH LINES. FIELD. Instruction in Laying and Maintai 1907. 6*d.*

TELEGRAPHS IN WAR. Regulations for Working. 1897. 1*d.*

TELEPHONES IN THE FIELD. Technical Instructions for the Us Provisional. 1908. (*In the*

TELESCOPIC SIGHTS. Handbook. Land Service. 1904. 4*d.*

TERRITORIAL FORCE:—

Definition of "Corps" for the purposes of the Army Act. Special A.O., Mar 1908, enclosing the Royal Warrant dated March 30, 1908. 1*d.*

Leaflets:—No. 1. Organisation and Principles; No. 2. Terms and Conditio Service; Service of the Imperial Yeomanry. 1*d.* each, or 6*d.* per doz 3*s.* per 100.

Organisation and Establishment. Special A.O., March 18, 1908. 6*d.*

Regulations for the, and for County Associations. 9*d.*

Scheme for the Transfer of the Honourable Artillery Company, the Im Yeomanry in Great Britain, and the Volunteer Force, and their Reorgani into the Territorial Force. Special A.O., March 18, 1908. 2*d.*

Training. Provisional. 2*d.*

Transfer of Units to the. Special A.O., March 20, 1908, enclosing the Ord Council dated March 19, 1908. 2*d.*

Uniform. Special A.O., June 12, 1908. 1*d.*

TRACTOR TRIALS held by the Experimental Sub-Committee of the Mech Transport Committee at Aldershot, Sept. and Oct., 1903. Report on. 6*d.*

TRAINING MANUALS. Appendix to. 1905. 1*s.*

TRANSPORT MANUAL. (Field Service). 1905. Part I. Provisional. 4*d*

TRUMPET AND BUGLE SOUNDS for the Army. With Instructions fo Training of Trumpeters and Buglers. 1903. 1*s.* (*Under rev*

TRUMPET AND BUGLE SOUNDS. Part 3A. Field Calls for Ca 1907. 1*d.*

TYPHOID (ANTI-) INOCULATION COMMITTEE. Report on Blood Ch following Typhoid Inoculation. 1905. 1*s.* 6*d.*

UGANDA PROTECTORATE. Précis of Information. Sept., 1902. 5*s.* 6*d.*

URDU-ENGLISH PRIMER. For the use of Colonial Artillery. 1899. 15*s.*

VALISE EQUIPMENT. Instructions for Fitting:—

Pattern 1888 with pattern 1894 Pouch opening outwards. 1895. 1*d.*

Bandolier pattern. 1903. 2*d.*

VALPARAISO. The Capture of, in 1891. 1*s.*

VENEREAL DISEASE. *See* Medical Services.

VETERINARY CORPS. Army:—

Regulations for Admission. 1906. 2*d.*

Standing Orders. 1906. 4*d.*

VETERINARY SERVICES. Army. Regulations. 1906. 3*d.*

VOLUNTEER FORCE:—

Regulations. 1901. Corrected to July 31, 1904. 1*s.*

In Brigade and Regimental Camps, or when encamped with the Regular F Orders and Regulations for. 1902. 1*d.*

WAR OFFICE LIST. 1908. *Sold by Harrison & Sons*, 45, *Pall Mall.* 5*s. net.*

WAR ON LAND. Laws and Customs of. As defined by the Hague Conventi 1899. Edited by Professor T. E. Holland, K.C. 1904. 6*d.*

WHAT TO OBSERVE AND HOW TO REPORT IT. For Instructi N.C. Officers in Reconnaissance. 7th edition. 1904. 6*d.*

X-RAY APPARATUS. Hints Regarding the Management and Use of. 3*d.*

YEOMANRY. Imperial. Regulations. 1906. 1*s.*

ZULULAND. Précis of Information concerning. With a Map. Dec., 1894. 4*s*

ZULU WAR OF 1879. Narrative of the Field Operations connected with the. (*Reprinted* 1907). 3*s.*