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OF

MILITARY OBSERVERS

ATTACHED TO

THE ARMIES IN MANCHURIA

DURING THE

RUSSO-JAPANESE WAR.

(OCTOBER 1, 1906.)

PART II.

Reports of—

Colonel VALERY HAVARD, Assistant Surgeon-General.

Colonel JOHN VAN R. HOFF, Assistant Surgeon-General.

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The Russo-Japanese war presents prominent features, apparently the result of the normal evolution of modern warfare, which affects the medical department as well as other branches of the service. This book presents a series of reports by United States Army assistant surgeon-generals attached to the Russian Army as observers in the Russo-Japanese War. Special attention is paid to the changes in military medicine and the types of wounds caused by new weaponry in modern warfare. The observers record statistics of casualties and scrutinize the increasing importance played by the relatively new Red Cross societies; they also study how the climate and terrain affected soldier's health and the ability to hospitalize and evacuate the wounded. There are detailed descriptions of life in Russian Army hospitals, and photographs and written descriptions of ambulances and wheeled litters used to transport the wounded

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NOTE.

It has not been practicable to publish the complete reports of Colonels Havard and Hoff on account of their length, and numerous omissions have been made in the text.

Report of Col. Valery Havard, Assistant Surgeon-General, U. S. A., Observer with the Russian Forces in Manchuria.

NOTE.—Colonel Havard sailed from New York for the seat of war on November 16 and arrived in St. Petersburg on December 7, 1904. Here he was delayed until December 27, waiting for the authority of General Kuropatkin to proceed to Manchuria. He left St. Petersburg on December 28, 1904, and arrived in Harbin on January 18, 1905. After visiting all the hospitals at the latter place he proceeded south on February 3 and reached Mukden on February 8.

On the occupation of Mukden by the Japanese, on March 10, 1905, Colonel Havard (with Captain Judson, Corps of Engineers, U. S. Army), was captured and sent to Japan, where he was released and allowed to return to the United States.

GENERAL CONSIDERATIONS.

The Russo-Japanese war presents prominent features, apparently the result of the normal evolution of modern warfare, which affect the medical department as well as all other branches of the service. These features may be enumerated as follows:

1. The enormous strength of the active armies in the field. Thus (counting both sides), 410,000 men at Liaoyang, 475,000 at the Sha River, 800,000 at Mukden. It shows the tendency of modern nations to rely not only on improved training and armament, but also, like Napoleon, on more and bigger battalions.

2. The great length and irregularity of the line of battle, extending over 10 miles at Liaoyang, 60 at the Sha River, and 80 at Mukden; therefore the more independent action

of corps and division commanders and the greater probability of the separation and isolation of medical units.

3. The impossibility for the general commanding an army corps, or larger force, to see more than a very limited part of the battlefield. Hence the necessity of an effective telephone service quickly organized in rear of the advancing columns and centering at his headquarters. He thus fights the battle without perhaps seeing a shot of it. Marshal Oyama and his chief of staff, Kodama, directed the movements around Mukden from their headquarters at Yentai, 28 miles south of that city.

4. The great difficulty or impossibility of successful frontal attacks on account of the number and strength of entrenchments; hence the necessity of flanking or turning movements by wide detours involving a more or less complete separation from bases, much forced marching, and many hardships.

5. The long period of time covered by the series of engagements which constitutes what is conventionally called a battle. Thus the fighting at Liaoyang lasted five days or more, on the Sha River eight days, and about Mukden twenty days. It is not meant that the whole line is engaged during that number of days, but that fighting is going on at several points, with a possibility of its extending at any time in any direction, or to the whole line, and that each individual soldier is subjected to greater fatigue and nervous strain, as well as exposed to greater danger.

6. The frequent night fighting, the action being continued after dark, renewed or begun during the night or before dawn. During such nocturnal engagements mêlées are inevitable and the bayonet plays an important part.

7. The almost complete disregard of weather and climatic conditions, the most rigorous winter not interfering with active operations. Thus the battle of Chentanpu was fought from January 20 to 30, the very coldest period of the winter, a northerly blizzard blowing during several days of it.

8. The increased importance of field artillery which plays a more decisive and preponderating part than ever before in the issue of a battle.

9. The continued demonstration of the benign or humane effect of the small caliber, hard-jacketed bullet

10. The enormous proportion of casualties occuring in regiments, brigades, or divisions bearing the brunt of the battle, sometimes almost amounting to annihilation, while the general ratio of killed and wounded to the whole strength of combatants is not very much greater than in former wars.

11. The full recognition by both belligerents of the rights and privileges of the wounded soldier, in accordance with the spirit of the Geneva convention.

12. The increasing importance of the part played by Red Cross societies, a part hardly secondary to that of the Medical Department, and therefore the desirability to promote their development and efficiency.

From these features of the Russo-Japanese war obvious conclusions suggest themselves, so far as the Medical Department is concerned.

In any war in which we may become engaged our skeleton army would have to be rapidly expanded to many times its present strength. Therefore a system must be devised whereby a sufficient number of qualified medical officers can be obtained. We must have a large reserve corps of able physicians and surgeons willing, when the emergency comes, to be mustered into service. It is specially necessary to secure the services of all our eminent surgeons for duty at base or general hospitals.

The wide extension of corps and divisions makes it more difficult for the chief surgeon to keep in touch with his several organizations and send assistance wherever necessary. In fact, this becomes impossible without the help of the electric wire. Therefore the telephone system must include the field hospitals within the zone of its operation. But telephonic communications can not always be relied on, and consequently it is more desirable than ever that divisional organizations be fully manned and equipped, so as to be capable of independent action in case of separation and isolation. The importance of having one or more bearer companies and field hospitals in reserve in each corps, so that assistance may be sent wherever needed without depleting any organization already in line, is also strongly accentuated.

The extended formation of an army in the field, with seldom more than a brigade of 3,000 to 4,000 men to the mile, has a most important bearing on the hygiene of camps;

it precludes large agglomerations, prevents the rapid spread of contagious diseases, and accounts to a large extent for the absence of epidemics in either the Russian or Japanese army.

The center of an army being its strongest point, the safest place for the first line of hospitals and supply depots will be in its rear; in that situation they will also probably have the advantage of better railway connections. The flanks are less securely held, more liable to severe attack, and more likely to shift; therefore field hospitals attached to the wings of an army, if not behind a naturally strong position, should be farther to the rear.

The continuance of a battle for several days renders the task of surgeons and hospital corps more arduous than ever, the more so that night does not necessarily bring a temporary cessation of fighting. The wounded accumulate in greater number and are less likely to receive prompt attention. The service of evacuation is taxed to the utmost and, unless very well organized, is in danger of breaking down.

The great and rapid accumulation of wounded men at certain points makes the task of the surgeons an impossible one unless ably assisted by a well-instructed personnel. Hospital Corps noncommissioned officers and, if needful, privates, first class, must be thoroughly qualified to apply the first-aid dressing. The importance of a well trained and instructed hospital corps on the battlefield can not be overestimated.

The effects of night fighting, from the surgeon's point of view, are simply horrible, not only because of the larger proportion of bayonet and sword wounds, always very grave, but on account of the impossibility of searching the field and bringing in the wounded, who are thus likely enough to remain one, two, or more days without medical assistance.

Very important in modern warfare are abundant means of evacuation, especially steamers and trains, so that patients may be safely but speedily conveyed beyond the zone of conflict or of probable conflict. Thus Russia had its base hospitals scattered at all convenient points from Manchuria to Irkutsk, west of Lake Baikal, a distance of nearly 2,000 miles. Field hospitals should always get rid of their inmates as quickly as

possible, so that they may be able to follow their respective divisions; but prompt evacuation is much more imperative when a battle is likely to last several days.

Since neither excess of heat (as at Santiago de Cuba) nor of cold (as in Manchuria) necessarily interferes with military operations, great care must be exercised in providing clothing well adapted to the climate, making suitability the first and chief requirement of the uniform. Whenever troops operate in very cold or very hot weather an added responsibility rests upon the medical corps to watch with greater solicitude over the hygienic surroundings of the men and their diet.

One of the consoling features of the Russo-Japanese war is the fullness and sincerity with which the spirit of the articles of the Geneva convention has been carried out. As a very general rule each belligerent has, whenever practicable, removed the wounded of the enemy from the field and taken care of them. There was hardly any hospital, Russian or Japanese, where wounded of both nations were not found lying side by side in the same wards and receiving the same care. The humanity of the enemy relieves the surgeon from great anxiety and should influence his line of conduct in a certain class of cases; I mean very serious to desperate cases. Such patients on the defeated side if picked up hurriedly and carried several miles on rough conveyances are almost necessarily doomed to death. It would seem decidedly to their interest to be left at the dressing stations to be taken care of by the victors.

After carefully observing the working of the Russian Red Cross Society, and, to a lesser extent, that of the Japanese, I have come to the conclusion that the aid of such societies in modern wars is invaluable and indispensable provided they are efficiently organized and thoroughly subordinated to the medical department. Whatever may be the strength and excellence of the medical department, there are always times and places in a campaign when it is unequal to the demands made upon it and when, unless outside help is obtained, the sick and wounded are exposed to severe and prolonged suffering from inevitable delays in attending them.

A Red Cross society to be available in time of war must

be organized and trained in time of peace—in other words, it must be a permanent society, as in Russia and Japan, always ready to assist the victims of accidents, catastrophes, tornadoes, famine, etc., and with well-matured plans of mobilization in case of war. Such society offers to all citizens not actually mustered in the service an opportunity to furnish whatever help they can to the Government in its hour of danger. It should take particular pains to get on its rolls the names of all the eminent surgeons in the land unwilling to be mustered into the volunteer service.

CLIMATE.

Manchuria is free from endemic or prevalent disease of any kind and may be considered one of the healthiest countries in the world. Its climate, like that of our middle Northern States and other continental countries, is characterized by extremes of heat and cold, with sudden transition from winter to summer, and moderate rainfall. Freezing weather begins in November. The coldest months are December, January, and February, the lowest minimum ranging from —25° to —30° F. at Harbin (latter half of January), from —15° to —20° at Mukden, and —5° to —10° at Port Arthur. June, July, and August are the hottest months. At Harbin the maximum temperature ranges from 90° to 95° F., at Mukden and Port Arthur from 95° to 100°. Thawing takes place in April, often producing deep mud. Then there is an interval of dry weather until the beginning of the heavy rains in June.

The increase of temperature from Harbin to Port Arthur is uniformly regular, being somewhat less south than north of Mukden. Thus the mean annual temperature for Harbin (computed from the observations of five years) is 38° F., that of Mukden (from the observations of seven years) 46°, and that of Port Arthur (from the observations of two years) 50.5°, from which it appears that the increase of temperature is 1.78° for each degree of latitude from Harbin to Mukden, and only 1.28° from Mukden to Port Arthur. The greater mean of Port Arthur is due chiefly to the milder winter weather; thus while the mean temperature for January is —1.66° at Harbin and 20.12° at Port Arthur, a differ-

ence of nearly 22°, the difference for July between the same two places is less than 4°.

If we compare the climate of Manchuria with that of our interior States within the same latitudes, we find that it is much colder. Thus Harbin, although on the latitude of Montreal, Duluth, and Bismarck, has the mean annual temperature of Quebec, northern Ontario, and of the northern boundary line of Minnesota and North Dakota. Mukden, although on the latitude of Providence, Cleveland, and Omaha, has the mean annual temperature of Portland, Me., Kingston, and St. Paul. Port Arthur, although on the parallel of Richmond, Louisville, and St. Louis, has the mean annual temperature of Boston, Hartford, and Cleveland. In round numbers it may be stated that the isothermal of any parallel in middle and southern Manchuria would run at least 3° of latitude farther north in our Atlantic and Middle States and 6° or more in our Pacific States. I shall not attempt to explain this difference.

It should be mentioned that last winter (1904–5), in Manchuria, was less severe than the average, the lowest temperature at Mukden, in January, not falling below 10° F. and in February not below 6°.

The average precipitation (rain and snow) at Mukden is 33 inches (mean of seven years), somewhat more than at Harbin and more than twice as much as at Port Arthur. The southern end of the peninsula is therefore very dry and barren. This precipitation occurs mostly from May to October (27.43 inches), the period from November to April being practically rainless and almost snowless.

The winter, then, can be characterized as being very cold and very dry; a persistent, relentless cold, with a brightness of atmosphere which, on calm days, makes perfect winter weather. Rivers are frozen solid until April; and as there is seldom any snow upon the ground, travel and transportation in wheeled vehicles are easy on roads, and possible in any direction on horseback. Unfortunately, strong winds are common, raising thick clouds of dust along the roads and in the vicinity of towns. Soldiers operating in Manchuria and other parts of China in winter do not need snow glasses, but (like the Japanese soldiers) should be provided

with dust glasses and a piece of gauze to protect nose and mouth. After the heavy rains set in the rich loam, of which the fertile soil of Manchuria mostly consists, becomes thoroughly soaked to a great depth; then the use of wheeled vehicles is almost impossible and horseback riding difficult.

WINTER QUARTERS.

Russians seem to require a higher degree of heat than most other people. Summer and winter they wear more clothes than people of other countries with about the same climatic conditions. Cold, in their judgment, is the greatest of physical evils. To keep warm in winter is the first preoccupation. To do this without too great an expenditure of fuel is the problem which they have successfully solved. The Russian stove is essentially a very large brick stove, cemented or stuccoed or often covered with decorative earthenware. From the fire box the flue describes a series of curves within extending the whole length of the stove, never less than three, causing the heat to come in contact with a large extent of the brickwork and propagate itself to the whole structure, enough becoming stored to last several hours after the fire goes out. Such stove, fired once in the morning and evening, gives off sufficient heat for ordinary purposes; but if fuel is available, the fire is not allowed to go out. The advantages of this system deserve attention. There is a great saving of fuel; the heat being constant, never excessive, there is no danger of accidental burning and no parching of the air such as renders the atmosphere of a room heated by an ordinary stove or hot-air furnace so very unpleasant to breathe; finally, as the draft of the fire box is rather slow, ventilation is obtained without objectionable currents. This stove is found in all Russian houses, as well as in hospitals and other public institutions in which the more modern systems of water and steam heating have not yet been introduced. In Manchuria it forms part of all new buildings. In Chinese houses, occupied by Russians, it takes the place of the khan.

Ordinary sheet-iron stoves are also frequently used on account of their convenience and cheapness, but the Russian always strives to increase the heat-absorbing capacity by

adding a layer of brick, refractory brick if obtainable, inside or outside. A special kind of iron stove was sometimes seen, of corrugated iron lined with brick, and with pipe describing a downward loop, the apex resting on the ground, before ascending to the flue.

In Manchuria the use of tents in winter, even were it possible to provide enough of them, would be impossible to the Russian soldier who could not keep warm in them. Log huts would require too much timber and labor. Therefore he burrows into the ground and constructs dugouts. The Russian dugout, or zemlank, is of variable size, according to the number of its inmates, sometimes large enough to accommodate a whole company. It consists of an excavation 3 to 4 feet deep, covered with gable roof, front and rear carefully closed in. In the ordinary small dugout the door is the only opening; if a pane of glass or transparent Chinese paper be available it is set in the roof, but oftener no provision is made for light. The framework is made entirely of poles, consisting of uprights supporting a ridge upon which rest the rafters. Over these are spread the stout stalks of kaoliang (species of sorghum, the most abundant agricultural staple of Manchuria) and a thick layer of earth. On each side of the central excavation, which is used as a passageway, is an earth platform 1 or 2 feet high and some 8 feet wide, where are the cots, matting, or straw upon which rest and sleep the occupants. In a small dugout only intended for a few people the platform may be of any size and in any convenient position, but most zemlanki occupied by troops are as above described, and therefore seldom less than 18 feet wide, namely, the width of both platforms and passageway separating them. The stoves, of brick or earth, are placed at regular intervals along the middle line, or better, along the edge of one of the platforms so as not to be in the way. The chimney passes right up through the roof, or, probably oftener, is built just beyond the edge of the roof, being connected with the stove by an underground flue dug through the platform. The zemlanki are often substantially built; occasionally they are well lighted, with regular sashes set in the roof, and even have ventilators in the shape of air

boxes through the roof. As a rule they are always comfortably warm, and this sums up all their hygienic advantages. The men sleep side by side on the platforms upon straw ticks or, when straw fails, upon or in their overcoats. Hardly ever is a blanket seen. The question of air space is not considered. The zemlank being at once squad room, dormitory, and messroom, one can easily realize the difficulty of keeping it clean and tidy, and the foul condition of the air. Yet it is a notorious fact that during the winter the men remained in very good health and were remarkably free from the usual camp diseases.

Instead of one platform on each side of the more deeply excavated passageway the zemlank may be wide enough, as when constructed for a whole company, to have two passageways and four platforms. At Mukden were two large comfortable hospitals in zemlanki having four passageways and eight platforms, and capable of accommodating hundreds of patients. In these hospitals the outside platform—that is, the one nearest to the roof on each side—was used only for supplies, clothing, and linen. The heating was effected by two rows of brick stoves placed on the platforms.

In Manchuria zemlanki become uninhabitable in spring (April) as soon as snow and earth begin to thaw. Therefore the Russians made extensive preparations about Mukden to replace them by light improvised barracks without any excavation. Quite a number of these had already been built at the time of the battle of Mukden, and the enormous accumulation of material showed an intention of constructing them on a very large scale. They consisted of a simple framework of poles, covered with kaoliang and earth, the mud walls being about 3 feet high and the sleeping platforms of earth or wood raised 1 or 2 feet above the soil.

Canvas was seldom seen in camps or hospitals. As one looked from a height upon the line of Russian positions along the Sha River no "tented field" was visible, only patches of minute earth mounds on the plain under the crest of ridges or on the slopes of hills. Such camps had the great merit of inconspicuousness; in the plain they were not very different from Chinese villages.

Also frequently used as winter quarters, especially in the

vicinity of towns, was the yurtz of the nomadic tribes of Siberia and Mongolia. It is a circular, low-domed tent of thick, coarse felt, about 15 feet in diameter and 10 feet high in center. The walls consist of pieces of trellis work, with jointed meshes, permitting partial closing (for packing) and expanding (for setting up), covered with felt on both sides. The roof is supported on rods converging from the walls to a hoop forming the summit. Inside the hoop passes the stovepipe.

The fuel used to heat the Russian army in winter quarters was almost exclusively wood. Much of it was brought from Siberia, and a large proportion was also obtained in situ, with the result that nearly all trees were cut down and most of the uninhabited Chinese houses demolished.

The usual Chinese method of heating is as follows: In each room are two lateral platforms about 2 feet high running the whole length of the room; these are the khans; upon them are the mats or bedding, upon which sleep the inmates. Each khan is heated by two flues passing under it and into the chimney outside. The fire pit is in the hall; four fires are often seen in the central hall, two on each side, or a fire for each khan. Over the fires, or some of them, are commonly large basins, so that hot water is always at hand. As the draft is often insufficient and irregular, the heating of the khans is quite variable and smoking frequent.

EFFECT OF COLD ON SOLDIERS.

Experience in different lands and at different times has demonstrated that active warfare can be successfully conducted in the coldest winter weather. Winter has advantages for the movement of an army, especially if snow is scant or entirely absent, as in Manchuria. All streams and marshes being frozen solid, troops can proceed, with cannon and vehicles, in any direction without serious topographical obstacles.

During the present Russo-Japanese war the belligerent lines, after the battle of the Sha River, settled themselves into winter quarters on each side of that historic stream. For three months they remained comparatively inactive, but

probably not so much on account of the cold as because of the need of recuperation and reenforcements. On about January 20th the Russians began their movement on the right, which culminated in the battle of Chentanpu. The Russians doubtless entertained the belief, frequently echoed in their newspapers, that the Japanese were severely suffering from the rigorous winter weather; that they were badly clothed and insufficiently protected; that, anyway, coming from a mild climate, they had but feeble powers of resistance to the cold, and if obliged to come out of their sheds and face the prevalent northerly wind would be badly handicapped and unable to put up a stout defense. The Russians accordingly crossed the Hun and were at first partly successful, but were afterwards driven back, recrossing the river on the 29th and reoccupying most of their old positions on the 30th. The result was a decided advantage for the Japanese, whose losses were much less than those of the Russians. During this period of about ten days the weather was unusually cold, ranging from 5° to 10° F. below zero, the icy northerly wind blowing into a gale from the 24th to the 28th and driving the thin dry snow that fell at intervals, so that much of the fighting took place in a blizzard. The Russians had wind and snow in rear in advancing, but in the face on retreating. The Japanese had to face the storm most of the time, but when on the defensive, during the first days, had the advantage of being more or less sheltered behind their works. Therefore the exposure was about the same on both sides.

Which side suffered most from frostbites would be hard to determine, each claiming to have suffered much less than the other. The Japanese reported that the number of men who had to leave the field on account of frostbites was only 505—300 in one division and 205 in another—while nearly one-half of the wounded were more or less affected, but not many seriously. In rare cases was the amputation of a toe or finger necessary. Very few of the men had more than one pair of gloves (cloth), but their hands were comparatively little affected. I have not seen any account of the number of frostbites on the Russian side, but it probably was not much smaller. I saw but few cases of frostbites in the

Mukden hospitals requiring amputation, but it is impossible to say how many may have been sent direct to hospitals farther north.

The fate of the wounded in freezing weather is doubly terrible. There is no doubt that hundreds of them must have perished from congelation, the more so that the task of the litter bearers is rendered much more arduous. The tearing or cutting of part of the clothing to apply a dressing is often a cause of dangerous exposure, and the choice of evils must be considered. It was also noticed that many frostbites resulted from the freezing of blood on the skin.

The Japanese noticed that those among them who wore two or three pairs of socks fared badly unless their shoes were unusually large. This is attributed to the resulting tightness impeding circulation. They appear to have an antifrostbite plaster (tosho-ko) from which they claim excellent results.

The remarkable power of resistence to cold displayed by the Japanese has caused general surprise, but it can doubtless be readily explained by their general vigorous constitution, their home habits of wearing scant clothing in all seasons, and going barefooted even in winter, of living in thin-walled houses heated, if at all, only by braziers. The Japanese soldier did also seek shelter in dugouts, but not to the same extent as the Russians, being more easily satisfied with tents, sheds, and Chinese houses, and less opposed to ventilation. It should be borne in mind that he is provided with blankets and a pocket stove.

As an instance of Japanese endurance to cold and fatigue may be noted the famous march of General Kawamura, who landed with his army at the mouth of the Yalu at the close of January and before the end of February was in position to take an important part in the battle of Mukden, having marched at least 200 miles over a roadless country in the depth of winter.

CLOTHING, UNIFORM, AND EQUIPMENT.

Russians, as a rule, wear about the same kind of underclothing throughout the year. The changes rendered neces-

sary by difference of temperature are made in the outer garments. Furs are held to be absolutely necessary in winter in St. Petersburg, although not usually worn in towns of about the same latitude in Sweden and Norway. If this be not a matter of habit, it should be attributed to the penetrating quality of the damp cold of the Russian capital, a cold against which only fur can protect.

The uniform of the Russian infantry soldier on active service consists of a dark-green double-breasted blouse, not cut to fit except in the guards, and fastening with hooks and eyes, with stand-up collar and cloth shoulder pieces, dark-green knickerbockers with piping only in the guards, a dark-green flat cloth cap, circular at top, with colored band and no peak, and long boots reaching to the knee. The great coat is of heavy grayish-brown cloth (friezelike), reaching to halfway between knee and ankle, and a sheepskin coat reaching to the knees is worn under it in winter.

The cavalry soldier also wears the dark-green uniform, but with two rows of buttons on coat. Except in very cold weather the sheepskin coat and overcoat are seldom worn together. In summer, blouse, trousers, and cap of white linen are worn; but being very conspicuous, they were partly replaced by articles of brown material. The dark-green trousers are also often worn with the blouse and cap. The footgear consists of cloths, used instead of socks, and boots. In winter the boots are of thick felt, sometimes large enough to go over an inner pair of leather boots. To protect the hands, brown cloth mitts are worn, with thumb and two fingers, one for the index and the other for the remaining three fingers.

With the overcoat is issued a hood of brown camel's-hair cloth, called bashlick, but they can be worn independently, not being fastened to each other. This hood has two long tails, which can be passed under the shoulder pieces and secured under the belt. These tails permit the hood to be used for other purposes—for instance, as a muffler to protect head and face. It is highly appreciated by officers and men. The fur hat, or papahah, the winter headgear of the Russian soldier in Siberia and Manchuria, is of sheepskin, the wool outside and dyed black. It is unmilitary, looking like an unkempt, disheveled head of hair, and unsuitable, as it can not be pulled over the ears without also covering the eyes.

Its color makes it very conspicuous in the field. On that account it was covered with a grayish cloth in some regiments. The better fur bonnet of the officers is open to the same objection—that it does not protect the ears. The Nansen cap, with earlaps, is undoubtedly the best form of headgear for winter service in cold climates. The Japanese soldier transforms his ordinary cap into a winter cap simply by the addition of fur earlaps. It may also be noticed that the Chinese wear their winter hat with fur inside, cut low on the side to cover the ear, or else an ordinary hat with independent, detachable ear pads.

The fur cap and gloves issued to American soldiers for winter service in northern latitudes are far better than any similar articles used by Russian or Japanese soldiers.

In each division the four regiments are distinguished by the color of the cap band and the coat collar, the number of the regiment being shown on the cap band and that of the division on the shoulder piece. In winter nothing but the shoulder piece of the overcoat can convey information of the soldier's status.

The winter clothing of the Japanese soldier differs in many ways from that of the Russian. In the first place his underwear is of thick, ribbed flannel, with long abdominal band wrapped around. On his feet and legs he wears one or two pairs of ribbed, woolen socks or stockings, shoes, and a canvas bandage wound round, over his trousers, to the knee. Sometimes woolen toe caps are also issued to wear over the stockings. This footgear is not sufficient; he should wear something warmer and softer in winter. His feet, unused to restraint, or stiff covering of any sort, are easily chafed and excoriated by the army shoe and many men are disabled from that cause. On his hands he wears dark, thick cloth gloves or mitts. Neither Russian nor Japanese soldier has his hands properly protected in cold weather. The Japanese ordinary black overcoat of home service is replaced, for winter field service, by a long sheepskin vest, buttoning on the side, and an ample overcoat of drab, thick and soft wool, with fur collar. This vest seems preferable to the Russian sheepskin coat, being more easily put on or taken off and not interfering with the free use of the arms.

Blankets do not form part of the Russian equipment. The Japanese soldier, on the contrary, is provided with two of them, and this partly explains his ability to stand successfully the Manchurian winter. Other interesting parts of the Japanese equipment are a pocket stove, semicylindrical in shape, 1 foot long and 4 inches in diameter, dust glasses, and a band of gauze to protect nose and mouth in dust storms.

MEDICAL VEHICLES AND TENTS.

STRETCHER.

The Russian stretcher consists of two poles 9 feet long, passed through a bottomless canvas bag 6 feet long and 28 inches wide, and kept apart by two unjointed traverses. The canvas is tightened at each end by two tapes tied around the traverses. The traverse is a solid piece of wood with ring at each end to slip over the corresponding pole, and bearing two plain iron legs 8 inches long, each strengthened by a small brace. No head rest is provided. The stretcher is taken apart by untying the tapes of the canvas bed and slipping off the traverses; one man carries the poles with canvas rolled around them, another the two traverses. Slings were not provided but were sometimes improvised. The canvas was of poor quality, easily yielding and sagging. There is not a single feature in this stretcher which I can point out for our imitation.

The Japanese stretcher is light, but otherwise very defective. Each traverse consists of two iron pieces, one screwing into the other so as to vary the tension of the canvas, but the device seldom works well; much time is spent in folding and opening the litter. The feet are light iron stirrups about 6 inches long, which fold under the poles when the stretcher is closed and fall down perpendicularly when it is opened, being locked in position by a metal ring.

AMBULANCE WAGON.

The Russian regulation ambulance, as I saw it in Manchuria, is a large, heavy, canvas-covered vehicle, intended for four recumbent or nine seated patients. It is well suspended

on easy springs, but much too high for stability, the floor being 4 feet or more above ground. It weighs 2,088 pounds and can carry a load of 1,656 pounds. It requires special stretchers—the two lower rest upon the floor, upon which they slide by means of rounded blocks 2 inches high, which take the place of legs; the two upper are supported in leather loops, except the inner front handles, which rest on a forked prop. When not in use, the lower stretchers are carried under the floor of the ambulance and the upper over transverse rods in the dome. The benches for seating patients are carried outside the bows and held by the canvas cover; when needed they are slid out and hooked to the sides, resting on iron legs.

As elsewhere stated, the few regulation ambulances brought to Manchuria were hardly ever used.

DVUKOLK.

In the absence of ambulances, the usual, and one might say official, wheeled vehicle for the transportation of the wounded was the dvukolk—that is to say, a light, but strong, two-wheeled, springless cart, with shafts for one horse, but often with an additional horse hitched to an improvised swingletree. The body is 5 feet long, with sides and tail gate 2 feet high, the floor about 28 inches wide, and the distance between the slanting sides above 36 inches. The dvukolk is a convenient vehicle for baggage or supplies in rear of marching troops, being able to go wherever wheels can go, but, to me, it has been a cause of amazement that such a conveyance should be adopted as the ordinary means of transport for the sick and wounded. Probably the explanation is that it was on hand and nothing better available. It was used in various ways; three or four slightly wounded men could be accommodated on the floor upon straw or improvised seats, or two lying recumbent provided they were placed on their side, with legs flexed, since the floor is not wide enough for two men lying on their backs nor as long as the average length of a man. A better way, and one frequently used, is to open the tail gate about a foot (turning it on its hinges to an angle of about 45°), thus increasing the length of the vehicle above to about 6 feet. Then a piece

of canvas is stretched between the sides and tail gate, secured to them by strong hooks slipped over their edges and supported along the median line by a horizontal pole. One patient is laid on each side of the pole, a very narrow and cramped bed for him. The patients were covered and protected from the cold in various ways, mostly by overcoats, blankets being seldom seen. Occasionally the vehicle had a canvas top, on bows, lined or not with felt. At Huanshan (headquarters First Army) I saw, as part of the material of a transport column, 100 dvukolk thus covered, the canvas dome lined with felt, with two straw ticks and blankets laid on the suspended canvas bed, and an interesting feature is a small stove underneath, consisting of a flat iron box placed inside a larger box, the smoke pipe passing out and standing up by the side of the cart, an opening in the tail gate permitting ready access to it. In whichever way the dvukolk is used there is no room for the driver, who walks by the side of the horse.

The Chinese cart or aba was frequently requisitioned and used on a large scale to carry the wounded. It is a heavy, clumsy vehicle, the axle and wheels revolving together, but preferable to the dvukolk, having a larger area and, with plenty of straw, permitting a man to lie down comfortably.

THE TWO-HORSE LITTER.

This is an excellent, safe, and comfortable means of transport used for the gravely wounded. It was seldom seen in the beginning of the war, but as its advantages became recognized, more were constructed and a certain number accompanied all transport columns. Yet, upon the whole, they played but an unimportant part in the system of transportation of the wounded, and can never be more than a useful adjunct to such system. The Russian two-horse litter consists of two bamboo poles fastened to light packing saddles, worn by the front and rear horses, and a canvas bed with straw tick and blankets. In cold weather the patient is completely covered with a hood of canvas lined with felt, opening upon hinges.

TENTS.

For hospital purposes, whenever tents are used at all, the official type in common use is 30 feet long, 24 wide, and about 14 high to the ridge, with walls 4 feet high. It is supported on four uprights, the ridgepole consisting of three jointed pieces. The fly rests directly upon the ridgepole by means of strong webbing loops. In pitching the tent the ridgepole must therefore be slipped through the loops before the tent is raised. The interval between fly and tent is from 6 to 10 inches. Four openings in the ridge of the tent, guarded below by a piece of canvas stretching across, serve as ventilators. Each corner of the tent is held up by a small pole. The canvas is of hemp linen, of various degrees of strength. This tent and all other military tents have green borders. For winter use it is made with double front and rear and double walls; the walls may also be lined with felt or blanketing. Two stoves are necessary to heat it in very cold weather. It is intended for twenty patients. Four are issued to the ambulance hospital, three to the field hospital, and one to the transport column.

The insuperable objection to such a tent is its weight (1,404 pounds) and bulk, therefore the great difficulty of pitching, striking, packing, and transporting it. In my opinion it is totally unsuitable for military purposes; even if deemed practicable for stationary hospitals, certainly it is not admissible for field and ambulance hospitals. Another objection is the manner of suspension of the tent from the ridgepole, instead of being borne upon it, as in our tents; it causes necessarily a great strain on the canvas where the loops are attached and frequent tears of the ridge.

There are two smaller types of hospital tents, obtained by reducing the length of the above tent without altering the width—one 18 feet long, the other 12 feet long, both held up by two uprights. What the advantages of such curtailed tents may be, so much wider than long, is not apparent.

FOOD AND RATION.

The ration of the Russian soldier is not so ample nor so elastic as that of the American soldier, but, judging from his

excellent physical condition, it seems to be sufficient and satisfactory.

In the field, Russian officers, in addition to their pay, receive a food allowance of $2 per day for colonel, $1 for lieutenant-colonel or major, $0.50 for captain, and $0.30 for lieutenant. On their way to and from the field this allowance is reduced to one-half. If unable to provide their own food, they are entitled to gratuitous rations in kind, each officer receiving the same ration as the private soldier, with the addition of 1 pound of meat and about one-half pint of vodka.

The ration of the soldier in the field consists of: Black bread, 2¼ pounds, or hard bread (sukhari), 1 pound 9 ounces; fresh meat, 14⅖ ounces, or preserved or salt meat, 10⅘ ounces; grits or cereals, 3⅗ ounces; vegetables, 9 ounces fresh, or the equivalent of the compressed or dried article; tea, sugar, salt, butter or fat (for cooking), and pepper. Vinegar, as well as vodka, may be issued when ordered by the corps commander.

The bread is a coarse, black bread made from unbolted rye flour. It contains more fat and more mineral salts than white wheat bread, and is said by those using it to be more tasteful and satisfying—that is to say, one can more easily dispense with the usual accompaniment of butter, gravy, or jam. It dries rather quickly, crumbling readily under pressure of the fingers. I noticed that several of the foreign attachés and Russian officers with whom I was associated ate more or less of it, but never to the exclusion of white bread. The Russian soldier is said to prefer it, but with him it is a taste developed from habit, having seldom known any other. To the average American palate it is hard, dry, and unpalatable, and whatever slight superiority it may have in nutritive properties is, I believe, more than offset by inferior digestibility. Black bread has a well-marked property, due to its bran constituent; it acts as a gentle but reliable laxative, and as such is often of much value in the field. In garrison, whatever is not consumed is made into kvass, a wholesome beverage very popular in Russia.

Each division in the field has its bakery, consisting of several ovens partly sunk into the ground, and of a certain number of special tents, each solidly supported upon three A

frames. As it never rains, and very seldom snows during the winter in Manchuria, the ovens were left unprotected.

The hard bread, or sukhari, is simply black bread dried in an oven, and has nothing to recommend it.

Each infantry man carries in his knapsack as a reserve $2\frac{1}{2}$ rations of hard bread (about 4 pounds), and $1\frac{1}{2}$ rations more of it are carried for him in the regimental baggage train, besides 3 rations of cereals or grits, 6 of salt, 4 of tea and sugar. This constitutes, as it were, the first line of food supply.

The meat was generally good, most of it being obtained from Siberia and Mongolia. During the winter there was no difficulty in its preservation and transportation, it remaining hard frozen from November to April. In summer live cattle are issued.

The emergency ration of the Russian soldier consists of the hard bread described above and a can of either roast or stewed beef, 10 ounces or less.

The cereals or grits issued to troops in Manchuria consisted of rice and also largely of the local Chinese staples, namely, kaoliang, a species of sorghum, the principal crop of the country, and shamisa, or millet.

The vegetables consisted chiefly of cabbage, peas, beans, potatoes, beets, and carrots, and were mostly obtained from Manchuria and neighboring country. Compressed vegetables were rarely seen.

Probably the most popular national dish in Russia and Siberia is tschi, an excellent and very palatable soup, of which the principal ingredients are beef, sauerkraut, and beets. Most foreigners soon learn to like it.

Tea is the national nonalcoholic beverage of Russia. It is generally made very light, from blackish, well-flavored Chinese leaves containing but little tannin, and one may drink many cups or glasses of it without any unpleasant after effect. Few Russians venture far from home without tea and teapot. Boiling water is found at all stations along railways, so that at any time of day soldiers and passengers may always have a cup of hot tea.

Tea, in my opinion, is the ideal drink for the soldier in the field. We should, in our service, substitute it for coffee,

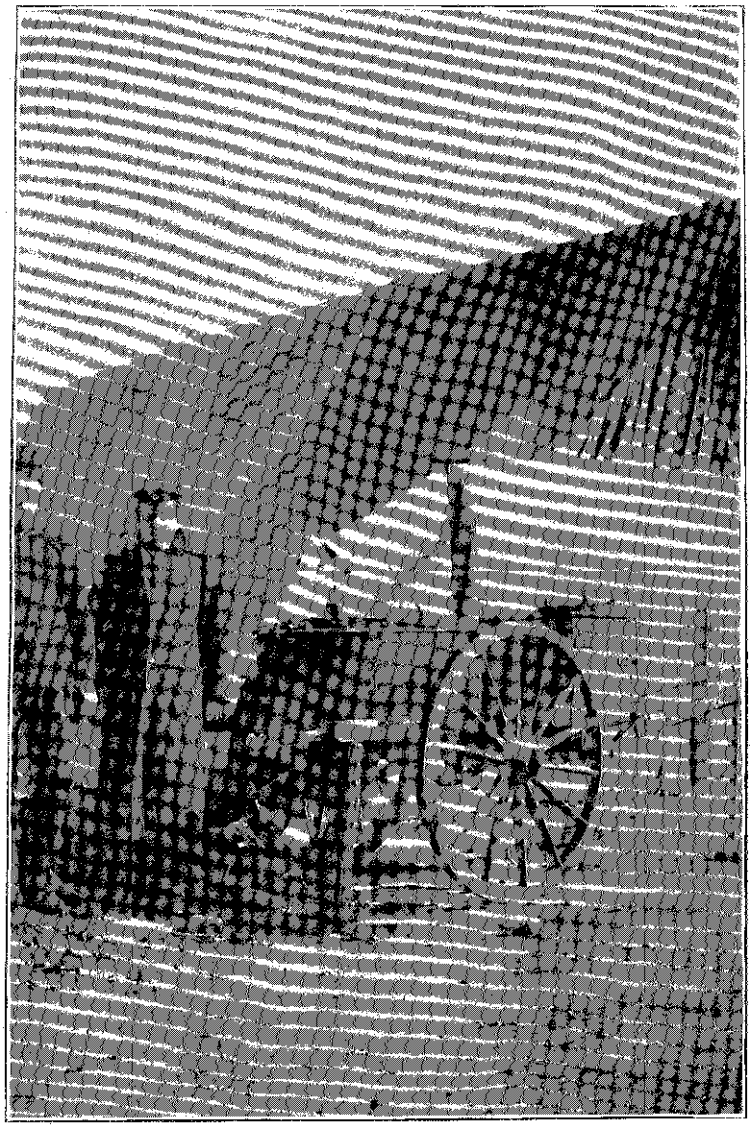
imitating, in that respect, the English, Russians, and Japanese. It is much easier to transport, preserve, and prepare, and if the infusion be made very light, can be drunk almost ad libitum without injurious effects, thus easily taking the place of water wherever water is suspected of contamination.

THE AMBULANT COMPANY KITCHEN.

One admirable feature of the Russian service in the field is the ambulant or traveling company kitchen. The kitchen for infantry or artillery, intended for 200 to 240 men, is a four-wheeled vehicle drawn by two horses, consisting essentially of a large boiler, with fire box and chimney, mounted upon a two-wheeled frame, and of two boxes mounted upon another two-wheeled frame, the two frames separable and connected in the manner of limber and gun. The boiler, of a capacity of 82 gallons, is double, the inner wall of copper, tinned inside, the outer of iron, lined with asbestos. The iron lid consists of two halves separately hinged to a diametral band and opening independently; it can be screwed down air-tight so that the contents can be cooked under considerable pressure, the danger of explosion being prevented by a safety valve. A removable, folding, perforated aluminum bottom, for cooking grits or cereals by steaming, can be placed in the boiler. The fuel is mostly wood; the products of combustion pass under and around the boiler and escape up the jointed chimney. When not in use the chimney is bent down upon a rest.

The boxes upon the limber contain oats and hay for a pair of horses for two days, various kitchen utensils, and food for the company for a whole day. The covers of these boxes, when opened, serve as tables for the cooks to cut the meat on, to chop up or clean vegetables, etc. Upon the front box sits the driver; in the rear is an iron cage to hold the wood. With a consumption of about 50 pounds of wood the food is cooked, whether in camp or on the march, in about two and one-half hours.

The cavalry kitchen is a two-wheeled vehicle drawn by one horse, with boiler and box upon the same frame. It is intended for 120 to 140 men, the boiler having a capacity of 51 gallons.



TYPE OF RUSSIAN AMBULANT FIELD KITCHEN.

Whether designed for infantry, cavalry, or artillery the ambulant kitchen is strong, light, well balanced, cooks quickly with comparatively little fuel, burning either coal, wood, straw, or turf, and its construction is so simple that any soldier can manage it. It is low enough to permit the cook to inspect the food even without stopping, if on the march, and is easily cleaned.

Into the boiler are put the meat, grits, vegetables, fat, salt, and pepper of the soldiers' ration. The result is an excellent soup containing a large proportion of nutritious and savory principles. In the hot, fragrant broth the men soak their hard, black bread. The meat is forked out, carved into equal pieces (by careful weighing), and eaten as a second course; it has the quality of being always thoroughly cooked and in a very digestible form. The grits may be cooked separately on the perforated bottom.

A Russian company on the march with its ambulant kitchen fares about as follows: Before leaving camp in the morning, tea and bread; at noon, soup, with one-third pound of meat per man; at 4 or 5 o'clock, tea again; on arrival at the night camp, a thick soup, with one-third pound of meat.

The advantages of the ambulant kitchen are obvious. There are few places where it can not follow its company. On the march, when resting for the noonday meal, or on getting into camp it is not necessary to gather fuel and start a fire. The hungry soldier is not obliged to wait an hour or two for a hastily prepared and probably badly cooked dinner. If the company is divided into several detachments, the kitchen drives along and supplies soup and meat or hot water for tea wherever needed. The ambulant kitchen also doubtless provides the most economical way of preparing food, and this is of moment in the field, where it is so often necessary to reduce the ration. I believe that the experiences of the present Russo-Japanese war will convince the Russians more than ever of its great utility and induce other countries to adopt it.

Unfortunately for our service, soup is not properly appreciated by the American soldier. His distaste for it is doubtless the result of past experience, for cooking is a neglected

art among the classes from which he generally comes, and soup requires careful preparation. But after a few demonstrations of what good, thoroughly cooked, palatable soup is his prejudice, born of ignorance, would soon be overcome. There is still the objection that everything is boiled; that there is no variety in cooking, except as to cereals or grits, which can be steamed on the false bottom, as explained. It is certainly better, especially in the field, to cook food well in one way than badly in several ways. Still the objection, which does not exist in the Russian service, might be a serious one with us. It can be easily removed, without affecting the efficiency and other advantages of the ambulant kitchen, by making certain changes in its construction which would enable the cook to boil, steam, and roast. Such developed kitchens are also manufactured, and a few were seen in the Russian service for the use of officers. They could easily be altered, if necessary, and made to answer all the needs of the American soldier.

STATISTICS.

The statistics so far published by the Russian and Japanese authorities are rather scant and doubtless much in need of revision. The information obtained outside of official sources is of some value, but seldom reliable. It is hoped that more satisfactory data will be published after the war, but it is well to bear in mind and take into account, in estimating the value of war statistics, the strong natural propensity for each side to minimize its losses and exaggerate those of the enemy. All that I can attempt now is to approximate the number of combatants and casualties at the principal battles as near as my information permits.

At Liaoyang (August 28 to September 5, 1904) the Japanese strength was about 220,000 and that of the Russians 190,000. The former admitted 17,539 casualties, namely, 7,681 in Oku's army, 4,992 in Nodzu's, and 4,866 in Kuroki's. The Russians admitted 16,000 casualties, namely, 4,000 killed and 12,000 wounded. The number of killed is probably near the reality, being confirmed by the Japanese reports, but that of the wounded is doubtless too low. It is a fair estimate to set the losses of the Japanese at 20,000 and those of the Russians at 18,000, making a total of 38,000.

At the battle of the Sha River (October 9 to 20), the Russians had 200,000 infantry and 26,000 cavalry, against about 250,000 Japanese. The number of casualties on the Japanese side, as officially reported, is 15,879 killed and wounded; it will be quite safe to raise this number to 20,000. On the Russian side it was announced from St. Petersburg that the wounded amounted to 43,868, and that the killed were estimated at 12,000, a total of 55,868 casualties. The number of killed is certainly not too high, and may be low, in view of the report of the Japanese staff that 13,333 had been left on the field. It is not improbable that many bodies were counted twice by the Japanese; but, on the other hand, bodies falling within Russian lines, or carried thither, could not be counted by them. There is seen to be an enormous difference in the number of casualties between the two belligerents. It is explained by the fact that the Russians took the offensive and did not succeed in dislodging the Japanese, who, much of the time, remained behind the shelter of their works and afterwards pursued a retreating enemy.

The next battle of magnitude is that of Chentanpu, from January 20 to 30, 1905, when General Kuropatkin, again taking the offensive, directed General Grippenberg to turn the left flank of the Japanese. The strength of Grippenberg's army was about 75,000, and that of his opponent, General Oku, 50,000. The movement was a failure, the Russians being obliged to retire to their old positions. The losses of the Russians are closely estimated at 12,000, including 2,400 killed, one-half of which were left on the field. The Japanese reported 842 killed and 8,014 wounded, a total of 8,856; as there were also 500 reported missing, we may safely raise their total of casualties to 9,000.

We now come to the series of engagements culminating in the evacuation of Mukden and Tiehling, waged from February 20 to March 16, 1905. Both armies had been considerably reenforced, the Russians putting 380,000 men in line, against about 425,000 Japanese. Never before had such immense forces been pitted against each other in civilized warfare. The total Japanese casualties, according to official sources, were about 11,000 killed and 46,000 wounded. The

Russian losses are difficult to estimate, no reliable report having been published. From all accounts it is believed that the number of killed could not be less than 25,000, including the three great zones of the conflict, namely, on the Sha and Hun rivers up to March 10, about Hsingking up to March 13, and about Tiehling up to March 16. The proportion of the wounded to the killed in Russian troops must have been about the same as among the Japanese; they may have been slightly more exposed to the artillery fire in certain situations during their retreat, but this is fully offset by the more benign character of the wound inflicted by the smaller Japanese rifle bullet. The proportion of killed to the wounded among Japanese troops in this battle being 1 to 4.2, the same ratio would give us 105,000 wounded Russians, which, to avoid possible exaggeration, may be reduced to 100,000. The total Russian casualties, therefore, may be set down, in round numbers, at 125,000.

So far as we may set store by the above figures and consider them approximately correct, they give us the following percentages of casualties:

	Russian.	Japanese.
	Per cent.	*Per cent.*
Liaoyang	9.47	9.00
Sha River	24.33	8.00
Chentanpu	16.00	18.00
Mukden	32.89	13.41

The mean percentage for the Russians, in the four battles, is 24.21; for the Japanese, 12.27; and for both sides together, 17.5.

These figures indicate that although the losses in the present war are not so great as in the decisive battles of our civil war and the Napoleonic campaigns, yet they are sensibly higher than in the Franco-German war and all subsequent wars.

It is difficult to obtain enough reliable figures to get at the exact ratio between the killed and wounded. I believe it is not sensibly different from that of previous wars with the long-range, small-caliber rifle; what may have been gained with the more slender, harder, and smoother bullet has been more than offset by the increased efficiency of artillery fire. From

available statistics I find that the proportion of killed to the wounded in the Japanese army has been 1 to 4.5; in the Russian army, 1 to 3.96, and, in both armies together, 1 to 4.22. Doctor Wreden, medical director in chief, expressed the opinion (on or about March 5) that, so far as he had observed, up to that date the ratio in the Russian army was 1 to 4.5.

In siege operations, where artillery plays a preponderating part, we may expect a higher ratio of killed with respect to the wounded. Thus the estimate of Japanese casualties at Port Arthur (from Japanese sources) is given as 10,000 killed and 36,000 wounded, or 1 to 3.6; if this estimate is too low, we may assume that the error affects both killed and wounded to the same degree.

Among officers on the Japanese side the proportion of killed to the wounded at the battles of Chentanpu and Mukden was 1 to 4.58.

Comparing the ratio of casualties among officers to that among men, we find that on November 28, 1904, the wounded officers and men in all Russian hospitals were as 1 to 23. At the battle of the Sha River the proportion on the Russian side was 1 to 56. At the battles of Mukden and Chentanpu on the Japanese side it was 1 to 39.

Surgeons do not contribute a large quota to the list of casualties. Among the Russians, up to November, 1904, only 2 had been killed and 10 wounded; a few had been taken prisoners. Among the Japanese, up to October 22, 1904, 13 surgeons (2 first class, 3 second class, and 8 third class) had died of wounds or disease. According to the Japan Times of March 11, 4 were killed and 11 wounded in the battles near Mukden.

ARTILLERY FIRE.

The losses caused by artillery fire have been decidedly greater than in any previous war, but it is difficult, in the absence of official statistics, to form even an approximate estimate of them. In many fights the artillery fire kept the contending lines too far apart for effective rifle shooting; in such cases the majority of wounds would be from shrapnel

shells. Thus at Liaoyang, in certain exposed trenches, 75 per cent of the wounds were by artillery fire.

Some figures collected by a Japanese surgeon and published in the "Nippon" are interesting as showing the relative proportion of rifle and artillery wounds. At three fights around Port Arthur he ascertained that on the Japanese side 1,101 men were wounded by artillery and 3,025 by rifle, a proportion of 1 to 2.75, or 27 per cent. He remarks that even in the siege of a fortress the rifle is used on every possible occasion, often at short range, and always produces a preponderance of casualties. At four of the engagements near Mukden he ascertained that 725 men were wounded by artillery and 2,158 by rifle, a ratio of 1 to 2.97, or 25 per cent. The above numbers only refer to the wounded and take no account of the dead, but we know that of those hit by shrapnel a greater proportion are killed than of those hit by bullets; therefore if we take the greater number of casualties (killed and wounded) the percentage by artillery fire would be found still greater than as given above.

The same Japanese surgeon produces other figures which tend to show that, contrary to the opinion generally held, the Russians lost a smaller percentage of men by artillery than the Japanese, a difference resulting from the larger caliber and longer range of the Russian guns. What the Japanese lost by the inferiority of their guns they endeavored to make up by the accuracy and quickness of their fire and their ability to concentrate many pieces on one point.

It was roughly estimated by the military attachés and correspondents who witnessed these battles that at Liaoyang 50 per cent of the casualties were caused by artillery fire; at the Sha River, 33 per cent, and at Chentanpu, 12 per cent. According to Doctor Iline (Voenno Med. Journal, Dec., 1904), of 1,170 wounded at the battle of the Yalu 86 per cent were caused by bullets, 13 per cent by shrapnel, and 0.5 per cent by hand grenades. Here again no account is taken of the killed.

The increase of artillery casualties has increased the proportion of grave wounds and of major operations in hospitals. It is doubtless true that the range and accuracy of modern artillery keep the firing lines farther apart, so that

a greater proportion of rifle wounds are produced at long range and less likely to be fatal; therefore one of its effects is to reduce the ratio of killed to wounded by rifle bullets, but this is more than offset by its own murderous projectiles, so that the total ratio of killed, with respect to the wounded, is really greater than formerly; that is to say, instead of 1 to 5+ it is 1 to 4+ or —.

BAYONET AND SWORD WOUNDS.

The experience of the Boer war and that of the present Russo-Japanese war has shown that the bayonet is not yet an obsolete weapon and that we must still reckon with it. But its effect, I believe, is chiefly moral, for the number of wounds it inflicts is practically negligible. It is impossible to determine with any degree of accuracy the proportion, in the total number of casualties, which should be attributed to it. Before the battle of Mukden it was roughly estimated that 500 Russians had been killed and wounded by the bayonet—a ratio of less than 0.3 per cent of total casualties. It may be safely assumed that among the Japanese the proportion was much higher. In the night encounters the Russians made frequent use of the bayonet and sometimes with good, although exaggerated, effect. According to a statement attributed to General Oku, and which I heard General Kuropatkin quote, of the Japanese wounded up to November 17, 1904 (21,180), 85 per cent were hit by bullets, 8 per cent by artillery projectiles, and 7 per cent by side arms. This ratio of wounded by artillery and side arms is so greatly at variance with that given by careful observers that I must consider it erroneous and entirely unreliable. That only 8 per cent should have been struck by artillery fire and as much as 7 per cent by bayonet is simply incredible. It is very probable that in hand to hand conflicts many men partly disabled by bullets are finished with the bayonet, sometimes with much unnecessary brutality. In this manner many casualties may be wrongly ascribed to the bayonet which are really due to the rifle.

At the battle of the Yalu, already referred to, out of 1,170 wounded only 0.5 per cent were put hors de combat by side arms.

MEDICAL CORPS.

The medical faculty of the University of St. Petersburg is known as the "Imperial Military Medical Academy," and is the only military medical school in Russia. It has from 800 to 1,000 students, who wear a military uniform, with sword, and are subject to military discipline. Their average age at entrance is 18 years, the minimum age being 17. The curriculum covers a period of five years; it is exactly the same as that of the medical faculty of all other Russian universities. No special instruction is given in the technical field duties of the military surgeon nor in military surgery, medicine, or hygiene beyond what is part of the course of all universities. The first 7 of the graduating class are authorized to continue their studies during three years longer and obtain the doctorate, after which the most promising are sent abroad by the Government for special courses.

To give the students some experience of military life, those of the first year, before beginning the second year's course, spend two months in a military camp. The Imperial Academy is in a vast and well-equipped hospital containing all classes of patients, men, women, and children, so that clinical material is always at hand. The facilities for instruction—libraries, amphitheaters, laboratories, etc.—are very good and seem to compare favorably with any in Europe.

On graduating, the students are free to enter the army forthwith (without further examination) or go into civil life, as they may choose. Exception is made in the case of those (a rather large proportion) who had scholarships; they are under obligations to serve a year and a half in the army for each year of gratuitous instruction. Hardly one-half of the graduates enter the army, not nearly enough to fill up vacancies. But graduates from other medical schools may likewise be commissioned, and they form about one-fourth of the whole number of military surgeons.

Students of medical schools are exempt from all military service, but, upon graduating, if they do not enter the army, are placed in the reserve, where they remain fifteen years, being liable at any time during that period to be called for duty in the field as military surgeons. More than this,

unless at the expiration of that period they make an official application to be discharged, they are carried on the rolls as volunteer reserve surgeons and still liable to serve. When called these medical reservists must start within five days. They enter upon their military duties with but little knowledge of them and no experience in their performance. In the present war the majority of surgeons sent to Manchuria are reservists, mostly married men, who have been settled a variable number of years as civil practitioners. Such men may be skilled surgeons and excellent physicians, but are necessarily unsatisfactory medical officers.

There are two medical degrees in Russia—the first, conferring upon the graduate the title and dignity of vratch or physician, which enables him to practice in any part of the Empire, and the doctorate, which may not be obtained until at least two years have elapsed since graduation. In the army, the doctorate helps in getting the first promotion; that is, the vratch who becomes doctor is at once advanced to the eighth grade of the Chin, which he could only reach otherwise after four years' service. All military surgeons wear, pinned to the left side, the Esculapian badge of twining serpents and laurel leaves—of silver for the vratch and of gold for the doctor.

The Russian military surgeon is not an officer, except by courtesy, but a military official or functionary. He wears the sword of the officer. His uniform, coat, trousers, and cap are of dark-green cloth, piped with scarlet. His shoulder piece, lined with silver lace, bears the bars and stars of his grade, but, instead of the officer's width of 3 inches, it is reduced to 2 inches. The white cockade on his cap and fur papahah is also smaller than the officer's and round instead of oval. In the field his relations with officers, so far as I noticed them, are harmonious and cordial and his services fully appreciated; but different are those relations in time of peace, in city life. Then it generally happens that officers regard military surgeons as belonging to a different class, declining to associate with them upon a footing of equality as brethren of the same uniform and excluding them from their clubs. Only three or four years ago the question whether military doctors were entitled to the military salute

came up to the general staff for consideration; it was decided in the affirmative.

The Russian medical department does not yet possess complete autonomy, and it seems difficult, in high places, to get rid of the idea that, being a professional body, it is incapable of governing itself. Until recently it was entirely under the direction of staff and line officers. In 1903 a commission, appointed for the purpose, reorganized the medical service and gave it partial autonomy. Base and field hospitals, for instance, are now under the command of the chief surgeon, who has line officers under his direction for the discharge of interior administrative duties. On the other hand, transport columns, sanitary trains, the service of evacuation, etc., are still in charge of line officers. I believe that this war will tend to show the great evils of divided responsibility and that eventually the medical department will have full control of its personnel and material.

The young graduate entering the army takes his place in the ninth grade of the Chin—that is, the great hierarchy of civil functionaries—with the official title of "titular councilor." His shoulder piece is that of the army captain (longitudinal bar without star), but reduced in size. No examination is required at any step of his promotion. In four years he ascends to the eighth grade, becoming "college assessor," and in six years more to the seventh grade, becoming "court councilor," when he puts on the abbreviated shoulder piece of the lieutenant-colonel (the rank of major not existing). If, three years later, he occupies the position of regimental senior surgeon (not otherwise), he is promoted to the sixth grade, that of "college councilor," and puts on the shoulder piece of the colonel (two longitudinal bars without stars). Thus it is seen that the military surgeon in the Russian army reaches the grade corresponding to a lieutenant-colonelcy after ten years' service. Thereafter promotion is by selection, but the "college councilor" may not be promoted to the fifth grade and become "state councilor" (brigadier-general) in less than three years, nor the latter promoted to the fourth grade and become "actual state councilor" (major-general) in less than five years. It follows that the military surgeon may, and often does, reach

the rank corresponding to that of major-general after twenty-one years' service.

The director-general of the medical department is of the third grade, "privy councilor" (lieutenant-general), and is the only member of the medical corps holding that high rank. The personnel of his office consists of 59 officials and 54 noncommissioned officers, privates, clerks, and messengers, besides a scientific committee for the consideration of technical questions. Quite a number of surgeons reach the fourth grade (major-general), whereupon their names are inscribed on the rolls of the nobility and entitled to the prefix of "excellency."

In the field the entire medical department, as well as the Red Cross Society, is under the command of a major-general of the line, an officer of presumed great executive ability. Next to him is the chief medical inspector (fourth grade), whose authority likewise extends over the several armies. Where their respective spheres of command and responsibility begin and end I am unable to say. Each army has a medical inspector (likewise fourth grade) acting under the high supervision of the chief inspector. These inspectors are generally military surgeons, but not necessarily so; thus the inspector of the First Army, while I was with it, was neither a doctor nor an officer, but one of the Emperor's chamberlains, appointed by General Kuropatkin on account of his well-known administrative experience in the Red Cross.

To direct and superintend the technical and professional work, there is a medical director in chief for the several armies and a medical director for each army, all with the rank of state councilor (brigadier-general). The chief surgeon of the corps is fourth grade (major-general); the chief surgeons of division and brigade are fifth grade (brigadier-general); the chief surgeon of the divisional sanitary service (including bearer company and hospitals) is likewise fifth grade. Regimental surgeons are sixth and seventh grades (colonel and lieutenant-colonel), while battalion surgeons are eighth grade (captain).

The relations of rank and duty, as in our service, are not strictly drawn. Within certain limits a man may be as-

signed to the duty he has shown himself fitted for, independently of his rank. He draws the pay of the position he fills, and therefore not necessarily that of his rank; thus, a battalion surgeon, with corresponding grade of captain, if detailed as regimental surgon, draws the pay of the grade corresponding to lieutenant-colonel. At a bacteriological station I visited two surgeons of grade corresponding to lieutenant-colonel were on duty. The senior, in charge, drew the pay of colonel.

The pharmacists in the Russian army, as in all other European armies, form a separate commissioned class of officials in the medical corps; they rank in the Chin from the fifth grade downward.

Formerly the veterinary surgeons also formed part of the medical corps, but since 1902 they have been properly separated from it. They likewise rank in the Chin from the fifth grade down.

We should also mention as commissioned personnel or officials on duty with the medical department the line officers, who, in field and base hospitals, perform the duties of commissary and quartermaster, as well as bookkeepers and chaplains.

HOSPITAL CORPS.

The hospital corps consists of feldshers, hospital sergeants, nurses, attendants, bearers, and transport men.

The feldsher, or aid-surgeon, is special to Russia. He is found not only in the army, but all over the Empire, practicing medicine and minor surgery wherever doctors are not available. There are five feldsher schools in Russia, the chief ones (each containing about 300 students) being in St. Petersburg, Moscow, and Kiew. The pupils are put through a three or four years' course of instruction and receive practical training in hospitals. In the army the feldsher's services are invaluable. There are senior, junior, and pupil feldshers, their grades varying according to their duties, as company, battalion, or regimental feldshers, the latter sometimes being raised to the fourteenth grade of the Chin, with privilege of wearing sword. The pupil feldsher is a man who, after serving one year or more in the ranks, is trans-

ferred to the hospital corps and trained in hospital, where he receives a course of instruction for three years; he may graduate as feldsher if able to pass the required examination. There is also the dispensary feldsher, particularly trained in the preparation and dispensing of drugs.

Hospital sergeants are mostly administrative and disciplinary noncommissioned officers, usually placed in charge of wards. Male nurses, generally poorly trained, work under the supervision of the feldshers and female nurses. Attendants and orderlies do the manual labor. In field and base hospitals hospital corps men wear the uniform of the fourth regiment of an infantry division (green collar and cap band), with the number of the hospital on the shoulder piece, followed by the first three letters of the word "Lazareth;" they also wear the Red Cross badge on the left arm, except the transport drivers, who carry hatchets and therefore may not be considered noncombatants. Bearers are of two kinds, regimental and divisional. They do not wear any distinctive uniform. They receive little or no instruction in time of peace and probably have not much opportunity to receive it in time of war.

There should also be mentioned, as part of the hospital corps personnel, clerks, cooks, bakers, and drivers.

The nursing in field and base hospitals is done chiefly by women, mostly trained nurses belonging to various Red Cross communities and known as "sisters."

COMPOSITION AND ORGANIZATION OF THE SERVICE OF THE FRONT.

This subject having been fully treated by various competent observers,[a] I shall merely sketch the outlines of it for the better comprehension of what follows.

A division of infantry consists of 2 brigades of 2 regiments of 4 battalions each, besides artillery and train, and num-

[a] See articles of Col. Frank Howard in Journal of the Association of Military Surgeons, October and December, 1904; of Prof. Frederic Antony in Archives de Medecine et Pharmacie Militaires, February, 1903; and pamphlet by Col. J. Van R. Hoff, U. S. Army, on "Outlines of the Sanitary Organization of some of the Great Armies of the World."

bers 18,019 combatants—namely, 383 officers and 17,636 men, a proportion of 1 to 46.

When mobilized for active service, the medical personnel of a regiment of infantry (3,956 combatants) consists of 5 surgeons, 22 feldshers, 1 hospital sergeant, 3 male nurses, and 9 transport men. Its material consists of 4 one-horse carts for supplies, 1 two-horse wagon for litters (32 provided), and 4 four-horse ambulances, all following in the immediate rear of the regiment.

Litter bearers are detailed from the battalions when needed at the rate of 8 per company, 32 per battalion, and 128 per regiment.

The medical personnel of a cavalry regiment (700 to 1,000 combatants) consists of 2 surgeons, 6 feldshers, and 24 bearers, its material comprising 2 two-horse ambulances, 1 one-horse medical cart, and 6 stretchers.

The second line of help is formed, as in most European armies, by the ambulance hospital, an organization composed of two distinct elements, a large dressing station and a bearer company. Its personnel consists of 1 line officer in command, 5 medical officers, 1 overseer (official), 5 feldshers, 4 female nurses, 22 nurses and attendants, 2 clerks, 39 transport men, and 200 bearers, under 17 noncommissioned officers. Exclusive of officers, official, and female nurses, we have a total of 285 noncommissioned officers and men. As material, it has 27 vehicles, including 8 ambulances, and 4 large tents.

The third line of help is formed by the field hospitals. Each division of infantry in active service is allowed 2 field hospitals, each capable of accommodating 10 officers and 200 men. One immediately follows the division with the ambulance hospital; the other is half a day in rear with the second echelon of the division train. Two other field hospitals per division of exactly the same capacity and composition are also mobilized, but remain at large, so to speak, under the direction of the inspector-general of the army.

The personnel of the field hospital consists of 1 chief surgeon in command, 4 surgeons, 1 pharmacist, 2 line officers as quartermaster and commissary, 1 bookkeeper, 1 chaplain, a total of 10 officers and officials; also 10 feldshers, 3 clerks,

1 sacristan, 4 female nurses, 1 hospital sergeant, 1 quartermaster-sergeant, 63 nurses and attendants, and 28 transport men, a total of 107 noncommissioned officers and men. The material comprises 25 vehicles, namely, 19 two-horse wagons, 1 four-horse wagon for heavy parts of tents, 4 one-horse medical carts, and 1 four-horse carriage for female nurses; also 210 bedsteads, 105 small tables, 40 stretchers, bedding and clothing for 210 patients, 3 large tents, 24 small tents, etc.

The kind and number of vehicles used were quite variable, and the personnel would change accordingly. Thus in the eighth field hospital the hospital corps consisted of 9 feldshers, 1 sergeant-major, 5 sergeants, 25 attendants, first class, 34 second class, and 50 drivers; while the wheeled material was made up of 50 one-horse carts—42 for baggage and 8 for medical supplies.

Besides the above three lines of organized help we may also count as in the service of the front the 20 transport columns, "sanitary convoys," or about one for each corps actively engaged, which, according to regulations, are provided as auxiliaries for the removal of the sick and wounded from the battlefield to the rear. Officially, each consists of a line officer in command, 1 line officer as commissary, 2 surgeons, 5 feldshers, 2 clerks, 2 female nurses, 19 attendants, and 68 drivers, under 3 noncommissioned officers, a total of 97 noncommissioned officers and men; while its material comprises 36 vehicles, including 27 ambulances. But its composition is subject to many variations. Thus the perfectly equipped transport column I saw at Kuanshan (headquarters First Army) had a force of 173 noncommissioned officers and men, with over 100 carts and 9 mule litters.

For convenient reference we may present the above enumerations in a tabular form, as follows:

	Officers and officials.	Feldshers and clerks	Sergeants, nurses, attendants, etc.	Litter bearers.	Transport men.	Total.
Regimental organization	5 surgeons	22 feldshers	4 (1 sergeant, 3 male nurses).	128	9	168
Ambulance hospital	7 (5 surgeons, 1 line officer, 1 official).	7 (5 feldshers, 2 clerks)	26 (4 female nurses, 22 attendants).	217 (17 noncommissioned officers, 200 privates).	39	296
Field hospital	10 (5 surgeons, 2 line officers, 1 pharmacist, 2 officials).	13 (10 feldshers, 3 clerks)	70 (2 sergeants, 1 sacristan, 4 female nurses, 63 attendants).		28	121
Transport column	4 (2 surgeons, 2 line officers).	7 (5 feldshers, 2 clerks)	21 (2 female nurses, 19 attendants).		71	103
Total	26	49	121	345	147	688

To obtain the strength of the medical personnel of a division 18,000 strong we must first multiply the regimental organization by 4, that of the field hospital by 2, and then add the ambulance hospital and transport column. The result is a grand total of 1,313, namely, 51 officers and officials, 14 female nurses, and 1,248 noncommissioned officers and men. A hospital corps of 1,262 would give a proportion of exactly 7 per cent of the combatants, which is ample; much greater than that of any other European or American army. But we have counted a whole transport column in the medical strength of a division, whereas, in reality, there is hardly one column to each corps in active service, so that we should deduct at least half a column, or 48 men, from our computation, thus reducing the percentage to 6.7. But, on the other hand, we have seen that 4 field hospitals are mobilized for each division, although only 2 are attached to it. It is presumed that the other 2 can also be put to its credit when in presence of the enemy, in which case the grand total rises to 1,436 noncommissioned officers, nurses, and men, or a percentage of 7.96, which, according to all authorities, is unnecessarily large.

Concerning medical officers, on the basis of 4 regiments, 1 ambulance hospital, 4 field hospitals, and one-half transport column, we obtain a total of 46, or a ratio of 2.55 per 1,000 combatants. This is hardly enough for the efficient service of the front, but if we bear in mind the valuable technical assistance given by the feldshers the deficiency may be overlooked. However, we assume that the medical corps of 4 field hospitals is present and available, but this was rarely the case.

As will appear hereafter, the full complement of officers and men during the present war in Manchuria was not always present, and, not infrequently, personnel and matériel fell below what is strictly necessary for efficient work. The difference between the letter of the regulations and the extent to which they are carried out in practice seldom fails to exhibit itself in any war, and it is certainly evident in the Russian service. Thus, for instance, ambulances are entirely absent in the field, being replaced, so far as replaced at all, by carts and other unsuitable vehicles.

FIRST AID AND SERVICE OF THE FRONT.

Each regiment is followed by its medical personnel and matériel. As it goes into action a place is selected for the dressing station. This was almost always in the nearest village or compound, the mud walls of the buildings affording reasonable shelter against rifle bullets and shrapnel. The hard, frozen ground made it easy for the medical carts to find their way to the dressing station, but some were often missing. However, thanks to the pouches carried by the feldshers as well as the first-aid packets of patients, the supplies, especially dressing material, appeared to be adequate. Occasionally, owing to regimental changes of position, one or two subsidiary stations would be established.

Officers and men are required to carry a first-aid packet on their person. So far as the men are concerned this order is not carefully observed; furthermore, there seems to be no definite place prescribed for it; most soldiers have it in one of their trousers pockets, together with many other articles, so that it gets very much soiled and is always in danger of being lost. It is about 3½ inches long, 2½ wide, and 1 thick. It contains 2 sublimated bandages, gauze, cotton-wool compresses, and safety pins, the bandages and gauze being colored pink. All men are supposed to receive some instruction in applying it, but I was not able to ascertain to what extent this had been done.

The regimental surgeons do not follow the men into the fight. They remain at the dressing station, together with the feldshers and nurses. Therefore the only help given on the line of fire is by comrades or litter bearers.

Bearers do not form part of the regular medical personnel, and probably are always an uncertain quantity. As in all other European armies, they are men temporarily detached from their battalions, who at the beginning of a battle report to the surgeon at the dressing station. Eight bearers, or two litter squads, are thus detailed from each company, making 32 per battalion and 128 per regiment. They leave their equipment near the medical carts, and, each squad of 4 taking a litter, advance to the battlefield, give first aid to the wounded, so far as practicable, and bring them to the dressing station.

The bearers of each regiment work under the direction of a single line officer, assisted by 1 noncommissioned officer from each battalion. They mess with their respective companies.

Stretchers for the regimental bearers, instead of being brought to the front in the battalion medical carts, as in the French system, are carried in a special two-horse wagon, 32 being thus provided. This is necessary on account of the bulk and weight of the Russian stretcher, while with the lighter and otherwise much better litter of the French it is clearly advantageous to save the additional vehicle. This stretcher wagon was not often seen, and litters were always so very scarce that I doubt if there was anywhere a full complement of them. However, let us render justice to those bearers who had litters and were sent to the front. From all accounts they did their duty bravely, being easily seen among the line of combatants, a good target for the enemy.

Whatever may have been the activity of the bearers, a majority of the wounded would still find their way to the dressing station on foot, helping each other or helped by sound comrades who left the ranks for the purpose, and resting in every sheltered spot.

The usual manner of carrying the loaded litter in the field in the Russian army (as well as in the Japanese and French armies) is by 4, on the shoulder, a mode of carriage especially cautioned against in our service on account of the great danger to the wounded in case of a bearer tripping, stumbling, or falling. Such accidents to the bearers, with fall of patient to the ground, happened rather frequently, I was informed, on the rough, rocky hills, where many engagements were fought, especially when rendered slippery by frost.

Improvised litters, generally clumsy and heavy, were often carried by 6 men, either on shoulder or at arm's length. Whether carried by 4 or 6 men, it was not unusual to see a few extra men marching along to take the place of the tired bearers. All this reminded me forcibly of our own experience in Santiago de Cuba in 1898.

Litter slings appear to be unknown; at least I have not seen any except a few improvised ones made of rope.

As already stated under the heading of organization, the

strength of the hospital corps for the service of the front as provided by regulations is ample, ranging from 6 to 7 per cent of the combatants. There must have been something wrong in the carrying out of the regulations. It is possible that the field hospitals "at large" were not mobilized or sent to the right places, thus reducing the divisional strength of the hospital corps by 222 men. It is also probable enough that all the regimental bearers were not turned out; few battalion commanders think of parting with 32 combatants at the beginning of an action, unless compelled by the habit of strict discipline. And all these possible irregularities were certainly accentuated in the medical work of the front by the lack of authority and, therefore, the sense of irresponsibility of military doctors who are not officers, as well as by the lack of experience in field work of a majority of them, namely, those coming from the reserve.

At the dressing stations I visited I noticed a general laxity of discipline and want of organization, as if nobody was in command and responsible. The work, however, if rather slow appeared to be well done and in accordance with modern principles, so far as these principles are capable of application on or near the battlefield. The best work I saw on the first line of help as to quantity and quality was done by an advanced Red Cross column. It is useless to say that this primary treatment was necessarily of the simplest kind, seldom more than the application of the first-aid packet and of splints in case of fracture. No attempt was made to wash or otherwise sterilize wounds. I do not remember seeing a single tourniquet put on for hemorrhage. No effort was made to tag the patient, although I believe it would have been quite practicable to do so.

The functions of the divisional ambulance hospital (in the Russian and all other European services) is to form a main dressing station and, by means of its bearer company, to help the regimental bearers in removing the wounded from the battlefields. As soon as these have received first-aid treatment it carries them to the field hospitals. In reality, with a well-equipped service, a second and larger dressing station, between the first-aid stations and the field hospitals, is entirely unnecessary; a patient once loaded in an ambulance or other suitable vehicle should not be un-

loaded until he reaches the field hospital. In Manchuria the first dressing stations are almost always near roads and readily accessible. Unfortunately ambulances were absent and the vehicles used of the most unsuitable kind; every wounded man who could walk or in some manner drag himself along avoided them. Under such circumstances a second dressing station or ambulance hospital where men could rest, get restoratives, and have their dressings overhauled would be very useful. These ambulance hospitals were seldom established, and the organization generally reduced itself to the bearer company.

It must be admitted that the three most important duties of the medical department at the front are the collection of the wounded, the application of first aid, and their transport to field hospitals. As a general rule, the wounded found their way or were helped to the dressing stations. A majority received first aid there and many others at the field hospitals. It is said that in the early days of the war a certain proportion of wounded were carried as far as Mukden, or even north of it, without primary treatment and remained several days before receiving it. In the Harbin hospitals I saw patients who had been between one and two weeks without medical attendance. On the train which carried me to Dalny were two wounded Russian prisoners, who stated they had been four days on the field (near Mukden) before being attended to. I doubt whether this can be avoided after pitched battles between powerful armies, when casualties amount to one-fourth or one-fifth of the combatants, especially as regards the defeated side, for however magnanimous may be the victor, he will collect his own wounded which are nearest before he searches the more distant field of the enemy. As to the means of transport from dressing stations to field hospitals, they were woefully lacking and defective. There were few available stretchers and no ambulances. On the dusty roads one met limping patients painfully struggling along, occasionally a litter with a wounded officer, but oftener improvised stretchers of poles and rope or of rifles and slings.

During the various engagements of the battle of Mukden the bearer companies and transport columns which came

under my observation appeared to me strangely careless and inactive. Thus on March 7, west of Mukden, a mile from the railway station, was a bearer company at rest. Two miles farther was a large dressing station with patients rapidly accumulating. Two or three hours later, returning on the same road (covered with straggling wounded), I found the same bearer company still resting and expectant. The next day I visited another dressing station, north of Mukden, a mile or so beyond the Imperial Tombs. I left it at about 2 p. m., and on the road going south overtook many groups of wounded resting by the wayside or plodding along. The fighting at that place and to the left and right of it had been going on the whole day, but the first transport column going in that direction—that is, means of transport of any kind, in the shape of Russian and Chinese carts, most brutal vehicles for the purpose—was not met until 3 p. m., still several miles from the field. An hour later, near the Khukha Tower, about 5 miles from Mukden, I found another transport column, or bearer company, halted, with most of its carts and mule litters loaded. It seemed imperative that it should at once proceed to Mukden, where were the nearest hospitals, unload the wounded, and return for a fresh load. It had been apparently at rest for some time before my arrival, and when I left, half an hour later, there was no sign of any preparation for moving. The best equipped transport column I have seen was at Huanshan, the headquarters of the First Army; on March 2 it was still encamped and lying idle there, although there was fighting going on along the whole line.

I believe that this want of diligence and activity, betraying incompetency and defective organization, is chargeable to the line officers who are in command of the means of transport. Medical officers probably could not help it, and, furthermore, they have never been encouraged to assume any responsibility beyond their specified duties.

The absence of the ambulance wagon is entirely inexplicable; nobody seemed to know of any satisfactory reason therefor, or to care much about it. Russian surgeons were strangely indifferent as to the desirability or importance of such a vehicle. It is true that the Russian ambulance is

large, heavy, and wide gauged, but it could have been used on the hard winter roads without difficulty. Even the few that were shipped to Manchuria were hardly ever tried.

It is also worth noting that the Japanese, so far as I am correctly informed, are likewise destitute of ambulances. With them I presume it is simply a question of economy. They make up the deficiency to a great extent by great quantities of litters and large detachments of Chinese coolies impressed and used as bearers.

The example of Russia and Japan does not, in my opinion, in any way tend to discredit the ambulance or show its impracticability in the field. On the contrary, I do not know of any winter campaign where it could have been used to better advantage. But I think it shows a tendency to reduce the size and weight of all the vehicles of an army, and brings up the question whether a light ambulance, for two recumbent patients, is not preferable to the usual larger pattern, considering the various conditions of terrain and climate.

To take the place of the ambulance the small, springless cart, or dvukolk, shipped in large numbers to the theater of operations as a convenient vehicle for suplies of all kinds, was also required for the transport of the wounded, but, as before explained, it has none of the qualities of an ambulance; it is as rough a vehicle as can be devised, and even badly wounded men loaded into it often begged to be let out, if at all able to stand.

No fault can be found with the horse litter; all patients carried in it speak well of it. Its only objection is that it requires two animals and two drivers for each patient, and therefore can never be used for a large number of men.

Several Red Cross organizations brought with them light ambulances of different patterns; only the Finnish ambulances were in sufficient number to do good service. Those of the Hesse hospital arrived at Mukden only a few days before the evacuation of that city.

From February 25 until the evacuation of Mukden, on March 9, groups of wounded men on foot reported constantly at the distribution hospital near Mukden, often after marches of many weary miles, and daily arrived also columns of Russian and Chinese carts full of patients suffering from

every variety of severe wounds, crowded and jostled in all sorts of irksome and distressing positions, their sufferings still aggravated by the intense cold and whirls of thick dust. The groans and lamentations from these vehicles were heartrending to anyone whose sensibilities had not been blunted by the habit of such scenes. Frequently men were found dead on arrival.

The distribution hospital was a large, commodious, and well-heated dugout, but insufficient for its purpose and without facilities for the segregation and classification of patients. The great majority of the wounded coming to this hospital had a primary dressing on. The tag system was nowhere attempted. An effort was made to register them as they entered, but this could only be imperfectly done for want of room and personnel, for the work was incessant and would have required at least two complete shifts to be done well; that is to say, at least twice as much personnel as was available.

FIELD HOSPITALS.

The great number of villages scattered through Manchuria made the establishment of field hospitals comparatively easy. Half a dozen adjoining houses, with annexes, would answer the purpose. The brick or mud walls and thatch roofs, with few repairs or additions, afforded adequate protection against cold and dust. As a rule the various departments of the hospital were conveniently installed, with plenty of water from the wells, a sufficiency of wood for fuel, and practicable connections with the supply depots. The khans made convenient platforms for beds, but as a mode of heating were seldom acceptable. Russian brick stoves were generally built in the main rooms.

Three large tents, each for 20 patients, and a few smaller ones for 2 patients, are part of the material of the field hospital, but in winter, owing to the difficulty of heating them, were not used. The large tents, as before noted, are entirely too heavy and cumbersome for their purpose and only fit for use at permanent hospitals.

The first line of field hospitals was at places of election, 2 or 3 miles in rear of the firing line. A second line was placed

10 or 12 miles farther back for the overflow of sick and wounded, always as near the railroad line as possible. All field hospitals in the same army are numbered consecutively, whether or not attached to divisions. Thus the eighth hospital (on the advanced line) was attached to the Fifth Division, Second Corps, First Army, while the thirty-third and thirty-fifth (on the second line) were hospitals at large.

At the eighth field hospital, while at Huanshan, near the Sha River, the monthly expenses, including salaries, food of personnel, lighting and heating, and rental of the premises from the Chinese owner, amounted to $5,830. To this sum should be added the cost of the patients' food, for which the allowance was 30 cents a day for men and 60 cents for officers.

Before the battle of Mukden the field hospitals had been established such a long time in the same places that they had assumed the character of stationary hospitals and acquired facilities for operative surgery which field hospitals rarely possess. Thus the eighth hospital up to January 1 had performed 6 amputations, 3 laparotomies, and 56 other, mostly minor, operations. Since the beginning of the war up to the above-mentioned date it had admitted 107 officers and 3,261 sick and wounded. On the day of my visit (February 25) a patient with perforating wound of the abdomen was brought in, and in the evening laparotomy was decided. The operating room was large, clean, and equipped with all necessaries. Matting was spread out over floor and khans. Cotton sheeting covered the ceiling. Good light was furnished by the "stop" incandescent portable lamp, manufactured by Jokim, of St. Petersburg. This lamp gives a bright, white steady light, produced in two or three minutes with any kind of alcohol, and can be held in any position. The operation in question lasted one and one-half hours, three perforations being successfully closed. Morphine and chloroform were the anæsthetics, and it was difficult to keep the patient alive to the end.

It is not customary to perform serious operations in temporary hospitals under ordinary circumstances, but it is a rule with many exceptions. Whenever such hospitals are situated like hospital No. 8, above mentioned, with all necessary facilities and a skilled operator, it would seem better

to perform a laparotomy, for instance, when the symptoms show it to be the only hope and last resort, than to subject the patient to the jeopardy of a rough ride of many miles to a base hospital. Doctor Oettingen, of Berlin (Professor Bergmann's assistant), directed a field hospital near the railway station at Mukden. On March 6, while visiting his operating room (in a neat Decker portable pavilion), he called my attention to a patient just brought in on a stretcher. "I do not believe in performing laparotomy in field hospitals," said he, "unless one is obliged to, as in this case," and, lifting the dressing, showed me a large lumbricoid worm crawling out of the wound. The torn intestine was successfully repaired with a Murphy button. However, it must be remembered that the best surgeons are generally at the base hospitals, and that in field hospitals young surgeons are prone to undertake operations which may add to their experience, but are not always to the advantage of patients.

In field hospital No. 15 the usual mode of dressing was described thus:

> The skin is cleaned all around the wound with brush, soap, and alcohol, and a simple compress of aseptic gauze applied, always avoiding to touch the wound with the fingers. In case of infection the compress may be dipped in sublimate solution, but even then the simple aseptic compress is often preferred.

The number of field hospitals provided by the regulations, namely, four to a division, when all are available (which is far from being always the case) accommodates less than 5 per cent of the combatants, and at first sight may seem inadequate. But I do not believe that in this respect any European service makes more liberal provisions, and furthermore I doubt the necessity of doing so. The capacity of a field hospital is of much lesser moment than the number and quality of its personnel and the transport facilities thence to the rear, for most wounded brought to the field hospital, after receiving an efficient dressing and resting a few hours, are able to continue their retreat, either on foot or in a vehicle. The question, then, is not so much how many can the hospital accommodate, but rather how many can its personnel attend to and speed on to the rear. In Manchuria the shortcomings of the advanced field hospitals were miti-

gated by the setting up of other hospitals at favorable points farther to the rear and the facilities of evacuation by rail. Still it must be admitted that after the battles of Liaoyang and Sha River many wounded reached Mukden and even Harbin without any primary dressing.

An interesting question is the number of patients, taking them as they come, which can be dressed by one surgeon in a given time. This must necessarily vary within wide limits. The ambulance hospital of the Second Division, Fourth Siberian Corps furnished the following information: At Liaoyang, 20 surgeons worked eight hours and attended 1,500 wounded, a ratio of 9⅓ wounded an hour, per surgeon. No operation of any importance was performed, but many fractures were secured and extensive shrapnel wounds dressed. On the Sha River, September 28, the same hospital received 700 wounded, but the 4 surgeons present, working eighteen hours, could only dress 450, or 6¼ per hour, the remaining 250 being evacuated without dressing. After the battle of the Yobe, the Fifteenth field hospital received 1,036 wounded, giving 115 to each surgeon working twenty hours, or at the rate of 5.7. From all the above statements it would appear that little had been done at the dressing stations in the way of effective primary dressing, and that many patients arrived directly from the battlefield without any first-aid treatment.

In closing this subject, I should say that, as a rule, the supplies were sufficient, and the medical attendance, nursing, and feeding as satisfactory as could be expected under the circumstances. The excellent services of the female nurses were nowhere more conspicuous than in the field hospitals.

STATIONARY AND BASE HOSPITALS.

In February, 1905, while the belligerent lines were facing each other on the Sha River, the nearest permanent hospitals were at Mukden, and into them the stream of the sick and wounded flowed intermittently. North of Mukden groups of hospitals were located along the railroad at Tiehling, Kunchuling, and Harbin. Beyond Harbin the most important hospital centers were at Nikolsk, on the east, and, always on the railroad line, at Nonni River, Manchuria City, Chita, and Irkutsk on the west. Most of these hospitals were

installed in very substantial and roomy barracks only recently built for troops, most of them never occupied and readily adapted to hospital purposes. Others were in equally good brick and stone houses, erected in great number and with magnificent liberality by the railroad company for its employees. Besides the above buildings, a large number of substantial frame pavilions were also erected for hospital purposes at many places where barracks and other structures were absent or insufficient.

There were times, before the close of the year 1904, when the installation and operation of hospitals met with serious difficulties owing to want of supplies and personnel. This is readily inferred, for instance, from the following extract from a letter published in the Military Medical Journal of St. Petersburg, December, 1904, describing the work of a base hospital established at Tiehling, June 20, 1904:

> There was a lack of everything, especially of personnel, which was reduced to 2 surgeons, 5 female nurses, and 8 male attendants. All the care required by 200 wounded devolved upon 2 nurses, and 6 attendants, * * * 4 nurses worked in the linen room, took charge of the pharmacy, and helped in the operating room. The attendants were partly Chinese and partly Russian, the former did not understand Russian, while the latter were nearly always drunk.

From a correspondent's letter, describing conditions in Mukden during and after the battle of the Sha River, the following is pertinent:

> The wounded commenced to arrive at Mukden on October 11, and the heaviest day was October 16, when the main road leading to the city was absolutely choked with ambulances, carts, and litters. * * * Still the facilities were miserably inadequate. A large portion of the much-needed hospital supplies were not forwarded to Mukden, the result being that the Red Cross was handicapped in every way. Train loads of wounded were sent direct to Tiehling, and all who could bear the journey were shipped to Harbin, but there remained thousands of cases which required immediate attention, and these were ordered to Mukden. The doctors have been practically without sleep for a week. Several nurses are reported to have actually died of exhaustion. * * * The supply of medicines and surgical appliances has run short. It is estimated at at least 28,000 wounded have been treated at Mukden. Scores of them have died before surgical assistance could reach them.

The long period of comparative rest which followed the battle of the Sha River enabled the medical department to

complete and improve its organization, so that with the opening of the present year conditions were much more favorable for the sick and wounded.

In Harbin during the time of my visit (January 18 to February 3) all available buildings had been converted into hospitals—barracks, hotels, clubs, theaters, workshops, etc. A very fine hotel, just completed, with all modern conveniences, made an excellent hospital for officers. The extensive, nearly finished workshops of the railroad company were turned over to the Red Cross Society, which converted them into very commodious hospitals. Most of the regular military hospitals were located in the numerous barracks erected between new and old Harbin. It was calculated that in the three nearly contiguous towns making up Harbin (old town, new town, and port) 30,000 patients could be taken care of, namely, 6,050 by the Red Cross, in 24 hospitals, and 24,000 by the medical department, in 60 or more hospitals. But this was evidently deemed insufficient, for in that city the construction of hospital pavilions never ceased during the winter. These pavilions were substantial and comfortable. The walls consisted of two thicknesses of board about 6 inches apart, the interval filled with earth; the interior surface was covered with felt, then lathed and plastered, while the exterior was clapboarded. The roofs were all of Chinese tile.

In New Harbin the Central Hospital, near the railway station, originally intended for railroad employees and families, but then used for all classes of civilians, covers extensive grounds and presents quite an array of fine buildings. Unfortunately its internal arrangements have never been perfected, the water supply and sewerage system being very inadequate.

The largest and best equipped Red Cross hospital I have seen is that of the nobility (Dvoriansky), in New Harbin, consisting of 9 pavilions built for the purpose, each for 45 or 50 patients, with bathroom and water-closets. The personnel includes 68 female nurses and about 150 male attendants. The water is pumped from a well into a tank, filtered through charcoal before distribution, and boiled before being used. The method of filtering is more than open to sus-

picion, and, I believe, adds nothing to the purity of the water. The hospital has its own electrical plant and a fine X-ray machine. The disinfection plant consists of three parts—a steam chest, set of bichloride casks, and crematory, all under the same roof.

The hospitals of the Red Cross are of various kinds, all represented at Harbin and Mukden—namely, those directly managed by the society, those organized by provincial governments or municipalities, those of the nobility, and those supported by individuals. Thus, for instance, at Old Harbin, in a music hall, was the Warsaw hospital, maintained by that city for Polish soldiers and directed by a professor of the University of Warsaw; also, in a club, the Sisters' Hospital, supported by Her Majesty the Empress, for sick female nurses, and in a barrack, the Shuvalov Hospital, maintained by the Countess Shuvalov and directed by a professor of the University of St. Petersburg.

All Red Cross hospitals and other Red Cross organizations are under the direct control of the president of the society, or his delegates, to whom they render all professional and technical reports, but the society itself, so far as its operations are concerned, is under the control of the inspector-generals of the medical department.

Until recently military hospitals were always in command of line officers, and medical officers strictly confined to their professional duties; but the objections to that system were so obvious that shortly before this war an important change was made in this respect and greater authority given medical officers. To-day the chief surgeon is the commanding officer of the hospital, with complete control over personnel, management, and expenditure. The line officers who attend to the administrative work are under his direction.

As a general rule the military hospitals are neat and clean, well lighted, and comfortably heated by large brick stoves, the windows always double, but without ventilating panes. The floors were sometimes asphalted and painted, but generally boarded, without any attempt at oiling or polishing, and resting on the ground, without any ventilation underneath. The most serious defect of these hospitals is the absence of waterworks and water-closets. The substitutes—

vaults, latrines, removable tubs, or cans, pails, etc.—were generally defective, insanitary, and did not come up to our standard of what could or should be done under those conditions. The original system in the barracks often consisted of sheds, with seats over iron carts, which received the excreta and carried them off; but this system, intended for soldiers, was seldom available for patients, and very uncomfortable for anybody in winter. Bathing facilities were quite limited. The always practicable and economical shower bath was not seen. In several hospitals were the popular steam baths, of which all Russians are fond, but which are of little use to patients.

The largest hospitals were furnished with X-ray machines (hospital No. 3 with one giving a 20-inch spark and making fine skiagraphs), old-pattern steam disinfection plants, and simple but sufficient portable bacteriological laboratories.

The beds are of various kinds; most of them appeared to have been improvised, chiefly narrow, wooden bedsteads with straw tick, pillow, sheets, and blankets. These beds are necessarily crowded, regardless of all hygienic principles, the clear floor space between and around them being generally less than the area actually covered by them, each bed seldom having more than 30 square feet of floor space. To economize space and furniture beds are often arranged in sets of twos (the two beds of the set contiguous) with a small table between the sets, each table for the two adjoining beds. The result of this crowding is that when a majority of beds are occupied the ventilation is almost always bad, especially in winter, when loss of heat is carefully guarded against at the expense of natural perflation. I have entered wards where the fetid atmosphere, complicated with tobacco smoke, seemed to me irrespirable, although the patients did not seem to be inconvenienced, nor did the Russian officers accompanying me express any surprise or give sign of discomfort. It should be stated that the Russian soldier is patient and submissive to the point of stolidity. When sick he accepts his sufferings and discomforts uncomplainingly, giving but little trouble to his attendants, who, on the other hand, may, on account of his silent resignation, overlook his serious condition.

The supplies of dressings, appliances, and instruments were generally sufficient and of good quality, admitting of ready sterilization. Many came from Paris and Berlin, although most were furnished from the Government manufactory in St. Petersburg. Some of the old-pattern instruments with wooden handles were still in use. Sets of instruments were often in ebonite casing, a composition said to be liable to crack in boiling water. A distinguished Russian surgeon, in letters to a medical journal, complained that there were not enough hæmostatic forceps and that he had no apparatus for normal salt injection.

The food of patients seemed to be good and well cooked, including meat, poultry, bread (black and white), vegetables, cereals (oatmeal, rice, sago, etc.), fish, eggs, milk, jam, kisel, etc. Milk, costing 40 or 50 cents a quart, is something of a luxury. Fish and eggs were also difficult to procure. Tea, with sugar, of good quality and well made, is the ordinary beverage.

The allowance for food in military hospitals was 30 cents a day for men and 60 cents for officers. In some hospitals large savings were made. The cook may be one of the attendants, in which case he is paid $25 extra per month, or else a civilian (generally Chinese) hired for the purpose. The total costs of patients to the Government is estimated at $1.25 per day. The cost of food is about the same or a trifle higher in the Red Cross hospitals. In one of these, where special attention was given to cooking and dieting but managed on a strictly economical basis, the cost was 20 cents per day.

The Red Cross hospitals, in a general way, appeared to be more comfortable and better managed than the regular military hospitals, possibly because of ampler means. Their personnel for each 100 patients was 2 to 3 surgeons, 6 to 10 female nurses, and 12 to 20 attendants. The number of female nurses was greater but that of feldshers smaller than in military hospitals. There was the same overcrowding of beds. These were of all types, mostly of iron with wire bottom, but a large proportion with board bottom or with the Chinese rope bottom. Straw ticks likewise took the place of mattresses. In the hospitals supported by the Empress

Dowager, at Harbin, the bedsteads were of iron, with canvas bottom, which could be tightened as desired; a canvas bag on each vacant bed contained fresh hospital clothing, to be put on by the patient when admitted, and received his own personal effects.

In all these hospitals, military and Red Cross, earnest efforts were made to apply the principles of modern surgery. The operating rooms were well located and equipped with simple, inexpensive, but adequate material. Separate rooms for the dressing of wounds were used whenever practicable. As good asepsis as possible was always aimed at, and, on the whole, with gratifying success. The chief surgeons are all men of mark. In the Red Cross hospitals can be seen many of the most distinguished surgeons of Russia. The nursing could not always be good, owing to the crowding of patients and the marked inaptitude for it of the Russian male attendants, but the knowledge and zeal of feldshers and female nurses prevented it from ever being very bad.

The Mukden hospitals showed the Russian medical service under the stress of war, when its efficiency was severely tested. It is chiefly to them that the following remarks apply:

The operating table consisted almost invariably of two plain narrow deal tables, the one corresponding to the head shorter than the other, set end to end. When necessary to bandage the chest or abdomen, the tables were drawn apart so as to leave the necessary gap between. Such efficient simplicity highly commends itself. Much of the gauze first supplied was sublimated and tinted rose. It was found objectionable not only on account of its irritating quality, but also because it masked the inflammatory redness and made it difficult to appreciate its extent and import. Doctor Wreden has proposed to replace the sublimate by creosote whenever an antiseptic gauze is needed. An advantage of creosote is that it keeps flies away, a matter of importance where flies abound, as in Manchuria. Doctor Oettingen spoke highly of collargol, which he employed in the shape of small pellets dropped in the corners of infected wounds, but other surgeons who had given it a trial ended by discarding it. No iodoform or antiseptic of any kind was used as a rule.

Plain sterilized gauze was generally preferred, even in septic wounds. Irrigation was not countenanced, dry dressing being resorted to whenever possible. Absorbent cotton was freely used, and so was the cheaper lignine, made from birch bark, a soft elastic substance more hygroscopic than cotton and less likely to become incrusted upon the wound. In Russia it costs only 17 cents a pound. After the dressing is completed Professor Butz is in the habit of marking the date of application and any other useful information upon it with an aniline pencil, a device eminently practical. Plaster of Paris was never used, not because it was not valued, but apparently because it was not supplied. Immobilization was mostly obtained with thin pasteboard splints and starch bandage. No felt or wire splints were seen in hospitals or at the front. In a campaign where so many wounded had to be transported hundreds of miles before finding their final resting place it seems regrettable that plaster of Paris was not used, and freely used, especially in field hospitals.

Chloroform is the invariable anæsthetic in all the Russian hospitals I have seen, often preceded by a hypodermic of morphine. Doctor Butz, of the University of St. Petersburg, one of the most efficient hospital chief surgeons in Mukden, claimed that in his professional career he had used chloroform in at least 15,000 cases without accident.

The cleaning of the hands and arms of the operator and assistants was done with brush, soap, alcohol, and sublimate, and the toilet of the patient attended to as well as possible. There was not the same scrupulous care in the observance of these preliminaries that would have been the case had patients been fewer and time longer, but every essential requirement was heeded, and the results appeared to be very satisfactory. The surgeons did not wear caps, nor did they use rubber gloves. This last omission was doubtless a serious fault, unless made necessary by reason of economy, for I can not imagine any kind of surgical work in which gloves would be more convenient and beneficial.

Many wounds of the head were brought into the Mukden hospitals, and trephining was a common operation. It was usually done with chisel, mallet, and cutting forceps. Hernia cerebri frequently resulted from such wounds, but under

plain aseptic dressing it generally went down to complete recovery.

As already noted, infection of wounds was very common in winter owing to thick clothing and dirty skin, especially in patients left several days unattended, but even such wounds responded nicely to treatment, so that cases of gangrene, erysipelas, and septicemia were rare, while tetanus was hardly ever seen. On account of this tendency to infection it was a common practice to incise all wounds showing signs of inflammation and suppuration very freely and let them heal by granulations with daily dressings. To prevent the infection of wounds, especially bullet wounds, the edges were frequently painted with iodine. In quite a proportion of lodged bullets infection occurred in the tract of the wound; this was especially noticed in those patients who had been carried long distances in rough, shaky vehicles.

In perforating abdominal wounds the tendency was strongly toward conservatism. If the patient reached the base hospital alive his condition was likely to be either hopeless or else quite favorable and not calling for operation. Very few laparotomies were performed in the Mukden or Harbin hospitals. The Shuvalov Hospital, at Harbin, appears to have been an exception. Out of 200 wounds treated, 15 were cases of abdominal wounds; 10 laparotomies were performed with at least 3 deaths. I could not obtain particulars in these cases, but the presumption is that these patients, having survived at least a week of rough riding in freight cars, would have had excellent chances of recovery without surgical interference.

Several cases of urinary fistula from bullet wounds were healing without other treatment than free incisions and drainage. The same beneficent results was observed in a case of urino-stercoral fistula caused by a bullet passing through bladder and intestine and coming out near the anus.

Laminectomy, for gunshot wounds involving vertebrae, was done by several surgeons with very able results. Professor Butz performed the operation six times—2 cases, brought in in a desperate condition, died, 2 have recovered, and 2 remain in the same condition.

A very interesting and instructive question is that of the

mortality in the Mukden base hospitals. Professor Butz, on February 21, claimed that of the 6,000 cases admitted in his hospital since the beginning of hostilities the mortality had not exceeded 1 per cent, and that until the winter set in and infected wounds became frequent, it did not exceed one-half per cent. It is hoped that accurate statistics, including all base hospitals, will be published, but, meanwhile, there can hardly be a doubt that hospital mortality in warfare has fallen to a minimum almost beyond the hope of the most sanguine believer in the wonderful efficacy of modern surgical treatment.

DISINFECTION DETACHMENTS.

On February 24, 1905, there were 10 of these detachments with the Russian army, some with field, others with base hospitals, each having a personnel of 1 surgeon, 3 feldshers, 6 nurses, and 4 drivers. The material comprises 4 vehicles, 1 steam chest, and 3 formaldehyde generators, namely, 2 Esculap (Berlin) for paraform pastilles and vapor of water combined, and 1 Tsarevitch, the ordinary formalin type. The steam chest, devised by Rapchesky, of St. Petersburg, is a heavy, clumsy vertical cylinder of difficult transportation, with fire box below and space above for hanging infected objects.

There seemed to be but little work for these detachments, and much of the material at the above date had never been used.

The Red Cross has also a few very complete disinfection and laundry plants in specially constructed railway cars, which are taken and used wherever needed.

BACTERIOLOGICAL STATIONS.

During the winter (1904–5) there were three of these, one at Harbin, one in Mukden, and one near Huanshan. The personnel consisted of 2 surgeons, 3 feldshers, 6 nurses, and 5 drivers. The material was carried in 5 carts. All necessary appliances, including microscope, are contained in a portable box 2 by $2\frac{1}{2}$ feet (system of Doctor Munche, of Berlin). There were also medicines and dressings on hand for the treatment of patients while under observation. From

what I could see and hear these stations have not been very active; the one I visited at Huanshan had no record of any examination made.

HOSPITAL TRAINS AND EVACUATION.

For the transport of troops, as well as for the evacuation of the sick and wounded, freight cars are mostly used. The Russian freight car is about 20 feet long and a few inches wider than the American car. It opens by a large sliding door and is lighted by two small dormer windows on each side. On the outside is the painted notice that it accommodates 40 men or 8 horses. In reality it seldom carries more than 34 men with their bundles and boxes, and even then with considerable crowding. The interior fittings consist chiefly of two superposed platforms built around, against one side and both ends, wide enough for men to lie down upon, and a small stove. The lower platform is high enough to permit loaded stretchers to be placed under it (resting upon the floor) when the car is used for the wounded, but the space was very rarely utilized for that purpose. There is no bedding provided for the traveling soldier, nor any toilet conveniences; for the calls of nature he must avail himself of the long and frequent stops at and between stations.

In Russia and Siberia one travels slowly but comfortably. The passenger cars open at the ends and connect, as in the American system. There are four classes of trains for passengers, all but the fourth class easily convertible into hospital trains. In the first class each closed compartment accommodates two passengers, and there is a toilet room between each two compartments. In the second and third classes the car is divided into open compartments by cross partitions extending to about 3 feet of the other side, leaving space for a narrow passageway and set of lengthwise seats. The last compartment contains toilet room and heating plant. The third-class cars are those almost always utilized to transport the seriously wounded. They are divided into eight compartments, exclusive of toilet room. Each compartment has three superposed seats or couches on each side, but in hospital cars the top one is used only for baggage

and clothing, so that 32 patients are readily accommodated, the seats alongside the passageway being replaced by shelving and cupboards. In second-class cars there are fewer compartments and more space. The heating is by steam and very satisfactory; the ventilation is also very good. Of the toilet room I can not speak in praise; it was always untidy, seldom clean, and frequently out of order. The water-closet (hardly every flushed) is an open one, the excreta falling upon the track, and therefore, in case of infectious disease, becoming a source of danger. The seats in third-class cars when used for couches have a band of strong linen stretched in front and secured to studs above so as to prevent the occupants from rolling out.

Hospital trains are of four types:

(1). White trains or trains de luxe (painted white), provided by members of the imperial family and wealthy aristocracy—some eight or ten.

(2) Regular military trains, consisting, in part, of third-class cars as described above—ten in all.

(3) Red Cross trains, the same as No. 4, but with a few added comforts—about a dozen.

(4) Freight trains, with cars fitted out with platforms as described above—number indefinite.

All hospital trains, military and Red Cross, are in command of line officers, generally of the rank of captain, having complete authority over the medical staff and personnel.

The white trains are nearly all that the most exacting humanitarian could expect in the way of safe and comfortable transport judging from the two I visited, those of the Grand Duchess Maria Pavlona and of Princess Yosupovoi. The only critcism one could offer is the want of special facilities for the introduction and removal of patients. Their capacity was about 200 beds, outside of staff and personnel. The appointments were such as met the approval of all surgeons. The operating room, occupying an entire car, had all the conveniences one finds in any good hospital. The pharmacy and dressing room occupied another car. The grave cases were laid on wire-bottom beds resting on the floor, six on each side, the beds being easily moved by jointed handles which when not needed were bent down out of the way.

The less serious cases were disposed on Kruger beds. Several of these trains were provided with disinfection plant and steam laundry, adjuncts which were taken and left wherever most needed. One of the Red Cross trains carries a complete ice plant, producing some 4,000 pounds of sterilized ice daily.

I traveled from Harbin to Tiehling in a regular military hospital train (Siberian military sanitary train No. 16), and its description will closely apply to all others of that class. It consisted of 28 cars, 20 for patients, as follows: Four for serious cases, each accommodating 18 men on Kruger beds; 6 for light cases, being adapted third-class cars, each for 32 men; 10 ordinary freight cars, each for 20 men. Of the 8 remaining cars, 1 was pharmacy, operating room, and bath (therefore divided into three sections), 1 for officers, 1 for female nurses and linen room, 1 for hospital corps personnel, 1 for kitchen and supplies, 2 for baggage, and 1 for ice (in winter used for other purposes). The personnel consisted of 1 line officer (captain) in command, 3 surgeons (the senior with assimilated rank of colonel), 1 quartermaster and commissary (official), 5 feldshers, 9 female nurses, and 46 male attendants (9 of whom were furnished by the railroad company). As the train was returning empty to the seat of war I did not see its personnel at work, but I judge that any weak point would be found among the male attendants, men with no aptitude and but little training for their duties. The car in which they were crowded was very untidy and ill smelling.

The train normally accommodates 464 patients, but under stress of necessity can be crowded to 600. It first arrived at Harbin in August, 1904, and up to February 5, 1905, had transported 4,600 sick and wounded to Irkutsk, making 10 trips from Liaoyang and Mukden and one from Nikolsk, or an average of 418 patients for each trip.

The Kruger system of bed suspension, the usual one in hospital trains for serious cases, consists of a row of uprights on each side of the car, two for each bed, each upright giving off two superposed horizontal arms projecting inward and bearing springs; upon these springs the beds are laid, nine on each side. or eighteen in all. The springs under the beds

soften vertical motion, while lateral motion is deadened by an inward and an outward spring set into the upper part of each upright and playing within a longitudinal bar. A great advantage of this system is the facility with which patients are placed upon and removed from beds and their needs attended to.

The kitchen on this train was well appointed, containing a large modern range and three capacious boilers heated by steam from a steam generator in a contiguous room.

The freight cars were lined with felt or cotton batting, sometimes boarded over. A few of them had also a double door—that is, a smaller door inside the large sliding one, so as to save heat.

The freight cars used in any class of train for the transport of the sick and wounded have but little to recommend them besides their simplicity and inexpensiveness. They seem to be well heated in winter, but the ventilation is always imperfect and the air often very foul. The patients lie on hard board platforms with or without the interposition of blankets. Only around the stove, near the door, can one stand up. The only light is what comes through the two very small dormer windows above the upper platform on each side. A bucket is provided for excreta, and, it is said, was frequently omitted in the early days. Most of the hospital trains have now a kitchen car, from which the patients are fed. Great difficulty was formerly experienced in feeding patients at étapes along the road, and the present system has proved much more satisfactory.

Besides hospital trains I should also mention the flotilla of hospital boats built by the Government and partly by the Red Cross for the evacuation of the sick and wounded from Harbin, by the Sungari River to the Amur, to be distributed along that mighty stream to Khabaroff, Blagovestchensk, and Chita. These boats are flat, two-decked barges, with a capacity of about 130 beds, towed by tugs. The scheme was a failure. Owing to the variable stage of water in the Sungari in summer, from flood to complete dryness, the travel up and down the river is very uncertain, many days being spent on sand banks. In winter the boats, bound up in ice, become too cold to be habitable. They have been abandoned.

The evacuation of the sick and wounded has had enormous difficulties to contend against, owing to the multitude of patients to be transported from a few hundred to a thousand or more miles, and the existence of only one line of evacuation—namely, a single-track railway. The perseverance and energy with which this work of evacuation has been prosecuted and the many excellent results obtained under such adverse conditions are certainly worthy of admiration.

The Russians have always been very diligent in securing their wounded and helping them to places of safety, often, as stated before, at the risk of depleting the line of combatants, so that comparatively few have fallen into the hands of the enemy. This solicitude for the removal of their wounded, the gravest as well as the lightest cases, is undoubtedly a natural and humane trait, but it may well be asked whether it is always for the benefit of the patient. At least 1 out of each 10 or 12 wounded is in such critical condition that transportation, however short and gentle, is exceedingly dangerous and, in Russian vehicles, almost necessarily fatal. In every column of carts arriving at Mukden were nearly always corpses of men who had died on the way. Therefore, when dealing with a civilized enemy, a signatory to the Geneva Convention, it would seem reasonable and clearly in the interest of the wounded to leave such critical cases at the dressing stations, to be moved later when their condition justifies it or to fall into the hands of the enemy, if needs must. The chances are that the victorious enemy, whose field hospitals are advancing, will not have to subject them to much handling.

An interesting fact is that in all their hurried retreats the Russians always succeeded in completely evacuating their hospitals and getting away with their sick and wounded. Mukden might be considered an exception, but it was all the better for the wounded. When the situation there became desperate, on the 8th of March, at least 5,000 men were evacuated in twenty-four hours, the last train leaving on the morning of the 10th, just as the Japanese bullets were beginning to render the railway station untenable. Only 300 or 400 of the gravest, untransportable cases remained behind, and it is probable enough that had another train been

available these, too, would have been carried off. One may readily imagine the conditions under which such hurried evacuation is likely to be made. Hospital trains were too few and badly prepared for such emergency. For instance, the chief surgeon of one of the largest hospitals needed at least 20 cars to accommodate his patients, but 10 is all he could secure, and they were crowded accordingly. The same precipitation and crowding occurred upon the evacuation of Liaoyang. I have been told by a witness that some 2,000 wounded were there packed on a train of some 50 cars without convenience of any kind. There was no arrangement in those days to feed the patients along the line, and during the tedious journey of several days to Harbin many must have severely suffered from hunger and thirst, and not a few died of exhaustion.

A curious incident at Mukden shows that even in war with a civilized enemy it is always well for the personnel of a base hospital to be ready to assume the duties of combatants. In the very few hours which lapsed between the retreat of the Russians and the advent of the Japanese, bands of Chinese looters proceeded to set fire to the abandoned hospital buildings, and it was only by the arming of the personnel and its determined show of resistance that the two hospitals, containing the remaining wounded, were saved from the flames.

The policy of the evacuation committee seemed to be to transport the wounded as far as possible from the scene of operations, leaving the gravest cases in the nearest base hospitals, so that Mukden and Tiehling during the first year of the war always had a high percentage of these cases. In June, 1904, the wounds necessitating admission at Tiehling affected the different parts of the body as follows: Abdomen, 20 per cent; cranium, 20 per cent; vertebral column, 15 per cent; chest, 8 per cent; extremities, 12 per cent; multiple wounds, 5 per cent. But as hospital trains become more numerous and better equipped, the badly wounded were often carried as far as Harbin or even much farther before being admitted to hospital; thus, as already noted, at the hospital Shuvalov, at Harbin, out of 200 patients treated up to January 12, 1905, 15 were cases of perforating wounds of

the abdomen. All hospital trains coming from the south stopped at the distribution hospital in Mukden, near the railway station, and all critical cases, or as many as the hospitals could accommodate, were to be left there. But the segregation of cases had necessarily to be cursorily done, and many went that should have been kept, and vice versa, while not a few were assigned to freight cars who ought to have traveled in bed.

The distance from Mukden to Harbin is only 334 miles, but the rate of speed is so slow and the stops so frequent on that overtaxed line that it is not unusual to spend four or five days, or more, on the journey. Then if the patient's destination is Chita or Irkutsk, he has another week or two of exhausting traveling ahead of him. Furthermore, when he arrives at his destination he may have to wait in his car until a place is found for him in one of the hospitals. Thus a number of trains arriving at Harbin after the battle of the Sha River had to wait three or four days before they could be unloaded, no preparation meanwhile having been made for the feeding of the patients.

The medical department, profiting by its experience, has made earnest efforts to remedy its shortcomings and deficiencies so far as lies in its power, so that I believe it will be more difficult for the disinterested observer hereafter to find subjects to criticise.

PROJECTILES AND GUNSHOT WOUNDS.

The shells of the Japanese field artillery are of two kinds—the ordinary shrapnel shell and the shimose shell. The shrapnel shells were much more numerous and did most of the execution. The shimose shell explodes with great noise in striking the earth, excavating a little crater and giving off a small cloud of thick brown smoke. Except when exploding within a short distance, it does but little mischief, for it breaks into a multitude of fragments, most of them minute and without much power of penetration. Thus it is not infrequent to find a patient whose skin is peppered with numerous tiny bits of metal, none of which penetrates the deep fascia. I was told of a patient who survived the removal of 300 fragments from his skin and muscles.

The Japanese bullet is hardly ever deformed in the human body and its smooth, clean jacket rarely broken or detached from the core. It is certainly, on all grounds, one of the most humane bullets ever used in warfare. It has been known to pass through all the structures of the body, including heart and brain, without fatal effect. According to Dr. Zoge von Manteuffel, there have been officers who after being shot through one leg, or through the chest or neck, were not disabled and continued at their posts during the battle. He has seen five cases of wounds of the heart recover without treatment. I was assured by Doctor Butz, chief surgeon of one of the large Red Cross hospitals at Mukden, that in at least three cases under his observation, which entirely recovered, the bullet, judging from the location of the holes of entrance and exit, must have passed through some part of the heart. Doctor Zeldovitch mentions soldiers who, after being shot through the lungs, walked 12 to 18 miles almost immediately afterwards.

As in previous wars, it has been noted that men not mortally wounded on the battlefield have excellent chances of rapid recovery. The wounded who reach a base hospital alive are almost sure of getting well, or at least of saving their lives, the mortality in such hospital being very small. It is the opinion of Russian surgeons that one-third of the wounded are returned to duty within a month or six weeks. This is especially true of wounds received in summer, when the clothing is thin, scant, and comparatively unsoiled, therefore when infection of the wound is less likely. The chief surgeon of a field hospital reported that among the 310 wounded returned to duty within six weeks after the battle of the Yalu there were 8 cases of perforated chest and 3 of perforated abdomen.

Severe hemorrhage is hardly ever seen during transportation or after admission to hospital. The patient rapidly bleeds to death on the field, or else the hemorrhage is easily controlled. That serious injuries to blood vessels from gunshot wounds may occur without fatal result is not infrequently demonstrated. Thus I was shown in the hospital Shuvalov (by Professor Sianojentzky) a piece of femoral artery perforated (not severed) by a Japanese bullet, and

fragments of a tibial artery which had been completely cut, both patients getting well.

The following statistics of work done at the battle of the Yalu, by field hospital No. 15, may give an idea of the relative proportion in which the parts of the body are hit, and some of the results:

Out of 1,129 wounded the parts struck were as follows:

Parts struck.	Number.	Per cent.
Lower extremities	416	37
Upper extremities	309	27
Chest	221	19
Abdomen	107	9
Head and neck	76	6

Bone injuries were found very benign, splintering or comminution existing only in 9 cases. In wounds of the cranium, only 3 were complicated with extensive fracture. In wounds of the joints of the lower extremities, recovery was very slow. In perforating wounds of the chest (37), hemoptysis was always noticed, but subcutaneous emphysema was quite rare.

Of perforating wounds of the abdominal cavity, 25 cases came under treatment. No operation was possible or attempted. Within twelve days 7 died, a mortality of 28 per cent. Some of these cases had traveled 40 miles in rough carts; others came on horseback; only a few were brought on stretchers; 8 arrived with peritonitis. That only 7 died under such conditions is, indeed, most remarkable.

Doctor Kholine, of Moscow, noted that in 39 cases of perforating wounds of the thorax the bullet lodged in only 1 case. In 21 cases there was hemoptysis lasting from one to six days, while subcutaneous emphysema was only noticed in 3 cases. He also reports that out of 27 cases of abdominal wounds only 1 death occurred. Doctor von Manteuffel thinks that peritonitis in such cases is mostly the result of rough transportation, and this opinion is shared, I believe, by most Russian surgeons.

The innocuousness of abdominal wounds inflicted by the Japanese bullet is often wonderful. In Harbin I saw a patient who had been shot simultaneously through the abdomen (antero-posteriorly) and the fleshy part of the thigh. When

brought to the hospital several days later the thigh wound was infected and painful, but the abdominal wound had entirely closed up, and the patient hardly remembered that he had been shot in that region.

Wounds of the head and spine continue to be very dangerous. Wounds of the neck often show remarkable instances of the narrow escape of blood vessels and spinal cord, the bullet separating tissues rather than cutting them. To note only two cases I saw in Mukden, both convalescing: In one, the bullet entered at the point of the chin and came out close to the spine on the right side; in the other (Prince Murat, volunteer French officer) the bullet perforated the neck from side to side, coming out close to the internal carotid, or between it and the jugular vein.

There has been less stress laid on the so-called explosive effects of the bullet in this war than in previous wars. It may be partly because most of the battles were fought at middle or long ranges. I doubt whether I saw more than one or two cases in the Mukden hospitals which could be attributed to explosive action. Doctor von Manteuffel, in his treatment of numerous wounded after Liaoyang, did not find a single instance of explosive effects, although some of the wounds had been received within a range of 100 yards. However, he is not prepared to state that such effects do not take place in the brain, as all the wounds of the cranium he observed had been received at distances of at least 900 yards.

Cases of multiple wounds are common, patients being hit by several bullets simultaneously or within a short time, often in the same exposed part. One patient is reported as having received 8 separate wounds, 6 of which were in the left lower extremity, and to have survived. I saw, in one of the Mukden hospitals, a patient whose lungs had been perforated by three separate bullets and his arm smashed by a piece of shell. General Keller, when killed, was struck by 5 fragments of a bursting shell and 31 shrapnel bullets in different parts of the body.

WOUND INFECTION.

Nothing in this war has disproved the general belief that the modern bullet is practically aseptic. That the infection

of wounds depends chiefly upon the skin and clothing of the soldier is well shown by the striking difference in the proportion of infected cases between summer and winter. Thus in the Mukden hospitals hardly 10 per cent of the wounds were infected in summer, while in winter hardly 10 per cent escaped infection, despite the primary dressing applied to most of them. The cause is evidently the difference in the condition of the skin and clothing, a difference much more accentuated in Russian than in Japanese troops. In summer men are more inclined and have better opportunities to bathe, the clothing is thinner, mostly of cotton, and the underwear more frequently changed. In winter the clothing is not only thicker, but some of it lined with fur, and in his warm, soiled garments, the soldier remains day and night for days and weeks. The natural result is contamination of the wound through dirt or particles of clothing, becoming the more marked according to the number of days the wound is left unattended. This infection, however, is not usually serious; except in cases greatly neglected it remains superficial and localized and seldom gives rise to marked constitutional symptoms.

Of the two causes of infection above mentioned—dirt and particles of clothing—it is quite probable that the first is much more common than the second. Doctor Kholine, in his examination of the clothing of many wounded men, found that the hole made by the bullet had almost always the appearance of having been cut as by the point of a knife, without the least loss of substance, so that the carrying of shreds into the wound must be a very rare occurrence.

Dirt, whether from the surrounding skin or soiled garments, is not only much more abundant in winter than in summer, but has generally more time to act upon the wound on account of the greater difficulties in transporting the wounded to the first-aid stations and field hospitals, and therefore, the longer time elapsing before they receive appropriate treatment. If it be true that the bullet is aseptic and that no particle of clothing enters the wound, then infection must take place principally after the receipt of the wound and, I believe, chiefly from contact of soiled clothing.

After pitched battles it always happens that many

wounded can not receive prompt attention. However well organized the service may be, a certain number of patients will be brought to field hospitals without dressing two, three, or four days after the receipt of their injuries, at least it was so among the Russians, and I doubt very much whether such a misfortune could always be avoided on the Japanese side. But even in such cases, it is remarkable how quickly these old, neglected, infected wounds respond to antiseptic treatment and how easily blood poisoning can be averted. I saw a patient slowly recovering from suppurating wounds of both thighs, who had been left unattended for two weeks. Cases of gangrene must be rare. I only remember seeing one patient who had lost his leg from gangrene for want of timely treatment.

From the above remarks the conclusion might be drawn that were the soldier able to carry out all the prophylactic measures which military hygiene suggests, he should, on the eve of a battle, take a warm bath, with brush and soap, put on fresh thin linen, and don his cleanest and lightest uniform. He might carry these measures still further by taking a purgative and going into the fight with an empty stomach or a very light liquid meal. The soldier should be well fed, but on the day of battle his intestines should be vacuous. It is interesting to note that among Japanese officers there is an old custom of washing the body and putting on clean underclothing before a fight, arising from the commendable desire not to expose an unseemly corpse to the enemy.

DISEASE AND HYGIENE IN THE RUSSO-JAPANESE WAR.

The excellent health condition of the Russian and Japanese armies is a most gratifying feature of this war, one upon which the whole civilized world may well congratulate itself. It is evident that the lessons of the past have borne some fruit, and we may fairly hope that the wars of the future will not be attended with the frightful mortality from camp diseases which, up to this war, has always so greatly exceeded the mortality from wounds incurred in battle.

Complete statistics will doubtless be published on both sides upon the close of the war, but even now we have enough

data to present a near estimate of the sanitary status of the Russian army during the past year.

According to General Trepoff's statistical report of July 28, 1904, the ratio of the sick, before the rainy season, up to June 13 was (officers excluded) 32.82 per 1,000 of strength. On July 26, after the rains had set in, the ratio had increased to 37.42; that is, less than the ratio of men generally excused from duty at most of our posts in time of peace. On that date the number of sick with contagious diseases was 1,117, including all cases of dysentery and diarrhea. There were only 34 cases of typhoid fever, 15 of typhus, and 9 of recurrent fever. The number of typhoid-fever cases, however, rapidly increased up to 951 on August 26.

Owing to the difficulty of preparing and transmitting reports in the field and the strong tendency of human nature to minimize whatever is to our disadvantage, it may be fairly assumed that the figures here given always more or less understate the reality.

The official report issued in December, 1904, gives the ratio of the sick per 1,000 of strength in the Manchurian armies for each month (excepting January and December) as follows:

February	26.22	July	39.19
March	19.78	August	29.28
April	11.98	September	31.51
May	15.71	October	23.21
June	28.69	November	19.98

These ratios were less than for troops in Russia during the same months.

On December 8, 1904, there remained in all hospitals and other sanitary establishments 819 sick officers and 17,384 sick soldiers, being at the rate of between 3 and 4 per cent. On that date the capacity of all available hospitals in Manchuria and adjoining zones was at least 30,000 beds.

On February 8, 1905, there remained in hospitals 873 officers and 17,892 soldiers.

Medical Director Bistroff, in Harbin, on January 24, before the wounded from Chentanpu had begun to arrive, informed me that from the beginning of the war 118,000 sick

and wounded had passed through Harbin, about an even number of each, rather more wounded than sick. But this does not entirely agree with the annual report of General Trepoff, which I will now consider.

The official report of General Trepoff, commanding-general of the medical department in the field, for the period from the beginning of the war to the end of the year 1904 (January 14, Gregorian calendar), furnishes us valuable information. According to this report the total number of sick and wounded evacuated to Harbin and to places east and west of it (Nonni, Chita, Irkutsk, Nikolsk, Khabarofak, etc.) was 130,439 officers and men, namely:

	Officers.	Men.	Total.
Wounded	1,710	53,890	55,600
Sick	2,308	72,531	74,839
Total	4,018	126,421	130,439

Who were disposed of as follows:

	Wounded.			Sick.			Grand total.
	Officers.	Men.	Total.	Officers.	Men.	Total.	
Dead	45	1,232	1,277	62	2,668	2,730	4,007
Invalided	.....	.....	6,474	.....	.....	11,248	17,722
Returned to Russia	559	4,121	4,880	670	4,079	4,749	9,429
Remaining in hospital	152	4,953	5,105	634	15,815	16,449	21,554
Returned to duty	.....	.....	38,064	.....	.....	39,663	77,727
Total	.....	.....	55,600	.....	.....	74,839	130,439

If we assume (as we may) that one-third of the sick and wounded remaining in hospital ultimately recovered, then the numbers returned to duty would be 39,765 wounded (nearly three-fourths of the total) and 45,146 sick (nearly two-thirds of the total).

To obtain the total number of sick and wounded at the close of the year 1904 it would be necessary to add to the number evacuated to or beyond Harbin those remaining in all the hospitals south of Harbin. Of the number of the latter I have no data; I do not believe it was very great, since the policy of the medical department was to ship patients as soon and as far as possible, so as to keep the

field and nearest base hospitals always available. We may set it down as between 5,000 and 10,000.

The percentage of deaths among the sick and wounded after their evacuation from the front, namely, 3.64 for the sick and 2.29 for the wounded, is remarkably small when the hardships and sufferings inseparable from the methods of transportation are considered.

The number of sick is seen to be greater than that of the wounded in the proportion of 1.35 to 1. If we add the killed to the wounded the total of sick would still be somewhat greater than the total of casualties, as 1.12 to 1.

During the year 1904 the total number of Russians killed in action or who died from wounds can not have been less than 20,000; during the same period the number of deaths from disease, according to the above report, was only 2,730, a ration of 7 to 1.

During the year 1905, up to the close of hostilities, about May 1, two important battles were fought and various skirmishes, with a resulting total of wounded that can not be less, but is probably more, than 100,000. If during this period of four months we assume the same ratio of sickness that prevailed in 1904 (and there is good reason to believe that it was rather less than more), the number of sick would be under 40,000. Adding together the data of both years we find that for the whole war, or, more strictly speaking, up to May 1, the total wounded is to the total sick as 155,000 to 115,000, or in the proportion of 4 to 3.

As to the comparative numbers of deaths from disease and wounds we find that they were approximately 6,000 and 47,000, respectively, or in the proportion of about 1 to 8, a result far transcending the most sanguine expectations of military hygienists.

During May and thereafter newspapers contained rumors of serious epidemics of dysentery or even cholera at Harbin and vicinity, but they have not been confirmed and were evidently due to grossly exaggerated accounts of the usual increase of diarrheal complaints which might be expected during the rainy season.

The number of cases of epidemic diseases for the first

week of December, 1904, for all troops east of Lake Baikal (about 570,000 men), was as follows:

	Remaining Dec. 1.	During the week.		Remaining Dec. 8.
		Admissions.	Discharges.	
Dysentery	346	57	118	285
Typhoid fever	1,981	215	329	1,867
Typhus	10	4	6	8
Recurrent fever	13	3	1	15
Undetermined fevers	13	3	12	4
Grippe	287	141	186	242
Gastro-enteritis	4	1	.....	5
Malarial fevers	110	28	34	104
Anthrax (Siberian pest)	64	28	32	60
Erysipelas	51	15	19	47
Scurvy	2	1	2	1
Smallpox	.....	2	.....	2
Tetanus	.....	.....	.....	.....
Unclassified	53	11	52	12
Diarrhea	410	159	216	353
Total	3,344	668	1,007	3,005

The status of epidemic diseases for the first week of February, 1905, was as follows:

	Remaining Feb. 1.	During the week.		Remaining Feb. 8.
		Admissions.	Discharges.	
Dysentery	120	9	8	121
Typhoid fever	389	45	9	425
Typhus	24	9	15	18
Recurrent fevers	2	1	.....	3
Undetermined fevers	1	2	.....	3
Grippe	206	173	138	241
Gastro-enteritis	3	5	3	5
Malarial fevers	59	43	37	65
Anthrax (Siberian pest)	34	9	16	27
Erysipelas	43	15	13	45
Scurvy	11	9	11	9
Smallpox	10	6	1	15
Tetanus	3	9	4	8
Measles	4	2	4	2
Diarrhea	245	134	86	293
Total	1,154	471	345	1,280

If we take typhoid fever by itself, we find that during the month of November, 1904, the numbers reported in all military hospitals east of Lake Baikal were as follows:

Remaining on November 1	1,962	
Admitted during the month	1,262	
		3,224
Cured	297	
Convalescing	1,558	
Dead	204	
Remaining on November 30	1,165	
		3,224

To make the number remaining on November 30 agree with that remaining December 1 (tabular statement of p. 78) it is necessary to suppose that a large proportion of the convalescents should be added to it.

If in the above statement we add the convalescents to those marked remaining on November 30, we have a total of 2,723, which is the highest number reported at any time, giving a ratio of about 4.75 per 1,000 of strength. It is very doubtful whether this ratio ever exceeded 5 per 1,000 (up to May 1, 1905). We may compare it with the ratio of 192 per 1,000, which prevailed in the United States camps in 1898.

According to the above data the rate of deaths was about 6.5 per cent. While visiting the Harbin hospitals in January I ascertained that the mortality then and there was about 10 per cent, rather more than less, a number of patients having doubtless died from the result of the long railroad journey.

A certain proportion of cases was characterized by a peculiar eruption, consisting of red, slightly papular spots not disappearing on pressure, almost petechial in character, as if there was a slight admixture of typhus infection. Such cases were always serious.

Typhoid fever is not rare among the Russian civil population of Manchuria, but has never prevailed in epidemic form. In Harbin it begins in July or August and lasts until November or December. During the year 1904 there were about 250 cases treated in the civil hospital of that town.

Outbreaks of typhus might have been reasonably expected in winter, considering the crowded condition and bad ventilation of the dugouts. A few cases were always present in the Mukden hospitals, the original contagion having probably been brought from Russia. I saw at least half a dozen. They were in a ward by themselves, but without any special measures of isolation. Yet this disease never spread beyond the sporadic form.

Dysentery is not rare in Harbin among the civil population from May to August—that is, during the rainy season—under the amœbic and bacillar (Shiga) forms. Among sol-

diers it has never been epidemic. In fact, true dysentery is uncommon, most cases so called being dysenteric diarrhea, from which patients recover in a few days.

Port Arthur during the siege would seem to have combined the most favorable conditions for the spread of epidemic diseases, but after its surrender and before many patients had been removed, toward the end of February, there were only 3 cases of typhoid fever and 48 of dysentery, scurvy (1,997 cases) being by far the most prevalent disease.

Malarial fever, speaking broadly, does not exist in Manchuria, the few cases on record having probably originated in Russia and Siberia.

Venereal diseases are not mentioned in the official lists, but it is well known that they were widespread and far exceeded all other classes of diseases. They formed the subject of a general order issued by General Kuropatkin mostly aimed at the officers, who suffered from them at least as much as the men. A Russian surgeon in charge of a sanitary train told me that on his last trip, out of 250 sick about 100 were venereal, and that one of his colleagues had informed him that on his train, out of 400 sick about 125 were venereal. These cases were transferred to distant hospitals west of Harbin, at least two weeks' journey from Mukden. It is not understood why they should have been so far removed from the scene of operations, unless easily replaced by other equally good or better soldiers. Except in Harbin, practically a Russian town, the regulation of prostitution was difficult and seldom effective, nor, so far as I could find out, were the men subjected to any special examination or restriction.

Smallpox was entirely absent among the troops in the field, a condition reflecting great credit upon the medical department and testifying to the care with which all soldiers are vaccinated or revaccinated before entering Manchuria and whenever exposed to infection. Likewise absent, or nearly so, were the other specific fevers—scarlatina and rubeola.

An interesting infectious winter disease in the Russian army, imported from Siberia, where it is endemic, but prob-

ably never before seen to the same extent in any campaign, is anthrax, the "Siberian pest" of the Russians, evidently contracted from infected garments, chiefly the fur cap and sheepskin coat. It manifests itself by a large pustule, mostly on the neck or face, and moderate febrile movement. During January, 1 or 2 cases were daily admitted at Mukden into the hospital specially set apart for it. The type was quite mild, the mortality being only 1 to 2 per cent. The treatment consisted in the injection of a 5 per cent solution of carbolic acid into the base of the pustule and painting the surrounding skin with tincture of iodine.

Of beriberi, the scourge of the Japanese army, there is no trace among Russian troops. Whether the Japanese army, exclusive of beriberi, has a smaller rate of disease than the Russian army I am unable to say, but there is hardly room for doubt that, including beriberi, its rate is higher.

In Manchuria, among Russian troops, one might have fairly expected certain diseases to break out in epidemic form, such as typhoid fever, typhus, dysentery, cholera, smallpox, and scurvy. The experience of previous wars made us apprehend that such would be the case as the result of the enormous aggregations of men under very trying hygienic conditions. But not only have epidemics been absent, but the usual camp diseases have not been prevalent, so that the health of the Russian army in the field has not been any worse, and during certain months was better, than at home in peaceful time.

Very plausible reasons have been adduced for this happy state of things. It is certain that serious efforts were made by those in high authority to place the soldier in as good sanitary condition as possible. No money was spared to secure comfortable quarters, wholesome food, and a sufficiency of well-equipped hospitals. The critical foreign observer can easily detect shortcomings and, here and there, lack of organization and management, but it is doubtful whether any other civilized nation would have been able to exhibit better results.

The interest of commanding generals in questions of sanitation is well shown, for instance, in the following order,

issued by General Nadarov, commander in chief of the Army of the Rear:

HARBIN, *January 16, 1905.*

I desire Lieutenant-General Kugel to perform the duties of commandant of the hospitals of the Army of the Rear and Colonel Bogdanov * * * to assume the duties of director of the chancellery (clerical bureau) of the medical department of this army. * *

I beg Lieutenant-General Kugel to enjoin upon the directing personnel of all hospitals strict compliance with these two fundamental rules:

(1) Hospital buildings should be kept even cleaner than my own quarters.

(2) The hospital linen should be frequently washed and kept even cleaner than the linen I wear.

The rest accordingly.

In general, I desire that business on hand receive the chief attention while paper work should occupy a secondary place.

NADAROV,
Lieutenant-General.

We may question the practicability of the above two rules, and therefore the wisdom of enjoining their execution, but there can be no doubt that they were the expression of a genuine solicitude for the welfare of the sick and wounded. General Nadarov not only issued orders, but personally inspected hospitals to ascertain to what extent they were carried out, and some of the hospital surgeons complained that he also meddled with professional matters beyond his competency.

Concerning the hygiene of camps, it varied much, as must always be the case, according to the knowledge and experience of commanding officers and the extent to which they saw fit to carry out the recommendations of the medical officers. An excellent feature from the hygienic point of view was the scattering of troops, seldom more than one regiment (3,000 to 4,000 men) being encamped together. In fact, as part of each regiment was constantly on duty along the line of positions, it was unusual to have more than one or two battalions at the same time in each regimental camp. The extended and more or less scattered formation of troops in modern warfare certainly helps in preventing insanitary conditions and the spread of disease.

Nearly all the drinking water was obtained from wells 20 to 40 feet deep. In the cold, snowless Manchurian winter

such wells can be kept entirely free from contamination, since the frozen ground does not permit any drainage of surface waters into them. They are greatly preferable, as source of water supply, to a stream flowing near or through many camps and surrounding villages and susceptible of infection at many points, although such a stream would also be much less liable to contamination in winter than in summer. This well water, as a very general rule, was remarkably good, somewhat rich in mineral substances, but tolerably free from organic matter.

I was assured that, in the first part of the war, including the Liaoyang campaign, the sanitation of camps was very much neglected; that, for instance, no latrines were dug, a place, perhaps, being simply set apart for defecation. If so, during the winter of 1904–5, the conditions had certainly much improved. The several regiments I visited at the front had the same system of privies. In some spot, as far as possible from kitchen and water supply, parallel narrow trenches were dug, a foot wide (or less) and 1 to 2 feet deep, over which the men generally squatted astride in defecating, the earth from the new trench being thrown over the trench already filled up. I saw no evidence that these latrines were not used by all the men. In winter, when the earth is hard frozen, digging is hard work, but becomes easier the deeper one goes, so that it might have been more advantageous to make the trenches 6 or more feet deep; but, on the other hand, this would have required greater width and the use of a pole, with supports, for the men to sit on, and economy of material had to be considered. It must also be admitted that, with shallow trenches, there is less danger of well contamination.

The regimental camps I saw were kept clean, most of their area being swept every day, and the garbage being either burned or buried. Sweeping in camps, especially in a dusty country, should, I think, only be done when and where necessary, and with judgment, a general daily sweeping of all grounds being productive of more harm than good. Each camp, if somewhat permanent, had a bath house for hot water and vapor bath, but such bath house was necessarily crudely equipped; it was too small and the supply of water and fuel too limited to enable many of the men to avail themselves of it.

Most of the food and drink of the Russian soldier are so prepared that they can not transmit infectious germs. All the ration, bread excepted, is thoroughly cooked in the company kitchen, and therefore sterilized as well as rendered perfectly digestible. The bread (rye brown bread), as already stated, is mildly laxative, so that constipation is unknown in the Russian army, the bowels always moving freely and abundantly, a matter of importance from the hygienic point of view. The Russian soldier's ordinary beverage is tea, a mild infusion of a grayish-black Chinese tea which can be drunk in large amounts without unpleasant effect. The Russian is not satisfied with hot-water tea; he always wants it made, as it should be, with boiling water, which is easily obtained from the company kitchen boiler. Most of the liquid ingested, therefore, is in a sterilized form, either as tea or soup.

It is also true that hospital accommodations are adequate, so that infectious diseases can be promptly segregated; no febrile case is kept in the regimental infirmary, a most important and efficient measure of prevention.

In spite of all this I can not help thinking that the absence of typhoid fever and dysentery, in an epidemic or very prevalent form, is not yet satisfactorily explained. The Russian soldier preferably drinks tea, but tea is not always within reach, and, on frequent occasions, in summer and fall, he quenches his thirst at any convenient well or stream, any order to the contrary notwithstanding; and, in that regard, follows the example of the Japanese soldier.

Flies have been accused of being the chief transmitters of typhoid infection. They breed numerously in Manchuria and in summer swarmed in the camps. Excreta are not lacking; in most instances even where trenches are used they are more or less exposed and accessible to the flies. Another conveyer of infection, dust, is also abundant. Manchuria is the land of dust, especially in the fall and winter, and no possible precaution in camps can prevent soldiers from ingesting it with their food and inhaling it with their breath. Means of propagation, then, are not wanting, and if the Russian as well as the Japanese soldier remains exempt it is, I believe, because there is in them a natural want of suscep-

tibility to those diseases, the same insusceptibility that we observe in the Chinese and other native races of Asia and Africa. This comparative immunity may be explained in two ways: In the first place, we know that the Japanese as well as the Chinese utilize all fecal discharges in manuring gardens and fields, and it is quite possible that a large proportion of the population thus constantly exposed to the infection contract the disease in infancy or childhood, probably in a mild form. On the other hand, it is contended that diet plays the chief part in causing this immunity. Asiatics eat but little meat, and subsist mostly on vegetables, cereal and leguminous, whereas English-speaking and other people who suffer most consider meat an essential, often the most essential, part of their diet. Which of these causes is most effective, or whether both are operative, it is at present impossible to determine. I am myself inclined to attach great importance to the preventive action of a vegetable diet.

From this war it would seem that we might well draw the lesson in the physiological economy of nutrition that Professor Chittenden has drawn from his very remarkable experiments. Both Russian and Japanese, although fed upon rations which American and English soldiers would reject with scorn, are men of vigorous constitution, who for strenuous work and endurance of hardships can hardly be excelled in the civilized world.

The Japanese attribute their physical and mental strength to their plain, frugal diet, the free use of water (internally and externally), gymnastics, and temperate habits. A laborer will work a whole day on a dinner of tomatoes, cucumbers, and salad, but I hope it is seldom that he is obliged to do without his favorite bean soup or boiled rice. Tea is taken without milk and sugar. The national alcoholic beverage, sake, is hardly stronger than beer; it is drunk only by those who can afford it and always in great moderation. Smoking is indulged in with a diminutive pipe holding a few pinches of tobacco. The result of this régime is a race of small stature (as compared with Chinese and Koreans), prone to beriberi, but hardy and sturdy, and with wonderful mental power of expansion and assimilation.

THE RUSSIAN RED CROSS SOCIETY.

ORIGIN, DEVELOPMENT, AND HISTORY.

The origin of the Russian Red Cross Society may be traced back to the Crimean war, in 1854, when was founded, for the purpose of nursing sick and wounded soldiers, the "community" of the Exaltation of the Cross, consisting of so-called sisters of charity, 120 of whom, under the direction of the great surgeon Pirogoff, went to Sevastopol and labored there, it is claimed, a whole year before Florence Nightingale and her English nurses appeared. Their efficient work in the Crimea, where 10 of their number died from infectious diseases, proved the usefulness of female nurses in the field, and detachments of them from various "communities" have followed Russian troops in all subsequent wars.

In 1867 was officially organized "The Russian Society for the Assistance of Sick and Wounded Soldiers" which, in 1876, assumed the name of "Russian Red Cross Society."

Under the high patronage of the Empress Maria Alexandrovna the society soon extended its beneficial activities in all directions. Not only did it work strenuously relieving friend and foe in the wars in which Russia participated, but also effectively intervened in foreign wars whenever permitted by the belligerents.

In all Russian wars, including the most distant and adventurous military expeditions, it took a conspicuous part. In 1868 it sent material to Turkestan, in 1871 personnel and material to Siberia, as well as 2 surgeons, 4 nurses, and 76 boxes of material to Khiva. In 1877–1879, during the Turco-Russian war, it assumed enormous proportions, not only cooperating with but, seemingly, often taking the place of the medical department. From April, 1877, to December 31, 1878, the society spent 17,000,000 rubles ($8,500,000), exclusive of large quantities of material. Before this war was over it sent a sanitary detachment with the Akhal-Teke expedition, organizing its own horse and camel transport, and, across the endless Transcaspian desert, establishing etapes where food, clothing, and bedding were distributed. Its activity in that region was renewed in 1881 during the

war against the Turkmenes-Tekes, in which it spent more than 600,000 rubles.

Russia remained at peace until 1900, when broke out the Chinese Boxer rebellion, necessitating the forwarding of large bodies of troops to Manchuria. The Red Cross quickly organized flying columns of relief, established field hospitals, provided a hospital ship, and opened lines of evacuation. It supplied during the war a personnel of 600 persons, including 51 surgeons, 41 aid-surgeons, 319 sisters of charity, 18 brothers of charity, 103 male nurses, 16 female nurses, 17 lady nurses, etc., opened 46 hospitals and stations with capacity of 1,957, and spent 1,400,000 rubles of the total amount of 1,780,000 spontaneously contributed by the people.

But, as mentioned before, it readily and always extended a helping hand to all countries at war to a degree never equaled nor approximated by any other nation.

In 1870–71, in the Franco-German war, it sent 30 surgeons, many nurses, and a large amount of material to both countries.

In 1873, during the civil war in Spain, it sent 10,000 francs to that country to be equally divided between the belligerents.

In 1876, during the wars between Montenegro and Turkey, and between Servia and Turkey, it sent numerous personnel and abundant material, spending in both wars about 700,000 rubles.

In 1886, in the war between Servia and Bulgaria, it again promptly intervened, sending a sanitary detachment and supplies to each belligerent.

In 1894, when broke out the Sino-Japanese war, it sent a field hospital to Japan with material for 25 beds.

In 1896 it assisted in two different wars. To the Spanish Red Cross it sent 5,000 francs to be used in Cuba, and when began the attack of Italy against Abyssinia offered a sanitary detachment to each side. Italy declined, but the other detachment proceeded to Abyssinia, reached its capital, and there for many months rendered signal services.

In 1897 it took an active part in the relief of the wounded in the Greco-Turkish war, later effectually assisting the ruined Thessalians by cash and three transports freighted with food and clothing.

In 1898, when began the Spanish-American war, it again, as on every previous occasion, offered its help to both belligerents. It was declined by the United States but accepted by Spain, and 40,000 francs sent to the Spanish Red Cross.

In 1899, during the Boer war, help was declined by England but accepted by the Boers. A sanitary detachment was sent to South Africa, where it treated hundreds of patients and spent 112,000 rubles.

The Russian Red Cross soon recognized the importance of giving special attention to the hygiene of the sick and wounded in the field. After his experience in the Franco-German war, Pirogoff declared that surgery and therapeutics in war were of secondary importance; that hygiene alone could prevent wound infection. Since then the society has always endeavored to teach its personnel the great principles of the prophylaxis of infectious diseases and believes that by opportune isolation and evacuation in several campaigns it has prevented epidemics and the loss of many lives.

So far we have only seen one aspect of the manifold activity of the Russian Red Cross. The society soon realized that to be really effective and to receive the popular sanction and support which was necessary to its complete success, it was not enough to have an organization intended for war, to be set to work only when troops were mobilized for the field, but that it was also absolutely needful to have a permanent establishment with special personnel, taking an active part in the relief, so far as it is able, of all evils which afflict humanity, beginning with the usual every-day diseases which fill up hospitals in normal times and extending a strong, helping hand in famines, epidemics, and all public calamities. In pursuance of this object the Red Cross has well-appointed hospitals and dispensaries in most cities where all indigent applicants are admitted. It also sends sanitary detachments, in charge of physicians, to various remote provinces where medical attendance is scarce to give free consultation and treatment to the destitute peasants. It has even provided relief detachments for the help of emigrants at various distributing points in Siberia.

Since the year 1872 the Red Cross has been the chief factor in the relief of epidemics (plague, cholera, diphtheria, scarlet fever, typhus, typhoid fever, and dysentery), conflagrations of towns and villages, hailstorms, wrecks at sea, railroad accidents, floods, earthquakes, and famines. The bad harvests occurring in several years between 1891 and 1900 produced widespread destitution in many provinces of Russia, with the usual sequels of typhus and scurvy. In collecting and distributing supplies and spending millions of rubles for its relief the Red Cross was the trusted agent of the Government and of the people.

To complete the description of the scope of the operations of the Red Cross, it is also necessary to state that it maintains 4 asylums for its aged or invalid "sisters," 8 for crippled soldiers, 1 for soldiers' widows, 4 for the children of invalid soldiers, and 2 sanitariums for children. Furthermore, it is a pension bureau. Any soldier with valid claim receives cash or artificial limb, is admitted to an asylum, sent to a watering station, or his case is presented to the proper department of the Government for consideration. As an instance of its initiative and solicitude in finding and relieving all needs, let us note that since hearing of the straitened circumstances of Mr. Henri Dunan, the promoter of the Geneva Convention, it awards him an annual pension of 1,000 rubles.

If the Russian Red Cross is capable of such excellent work, it is chiefly due to the quality of its personnel, and this consists chiefly of women—trained nurses or (so-called) sisters of charity. There are in Russia, in the polity of the Greek Orthodox Church, regular cloistered nuns, wearing the cylindric black hat, which is also the characteristic headgear of the popes. With these nuns we are not concerned. The sisters of charity under consideration are quite different. They belong to various lay orders or "communities" (St. George, St. Eugenie, Exaltation of the Cross, Alexander, Elizabeth, Iverskaia, etc.), founded at different times under the auspices of members of the high nobility, often of the imperial family. The spirit and discipline among the communities may vary slightly, but their aim and object are practically the same. Any woman of good character, unmarried or widow, between the ages of 20 and 40 may be

admitted to a community. She does not renounce the world, takes no vows, and may at any time (upon previous notification) leave the sisterhood; but while in the community she must submit to the established discipline, devote herself to the care of the sick, and strictly perform her duties. She also pledges herself in case of war to respond to the first call of the Red Cross and proceed to the seat of military operations. The only distinctive part of their dress is a white kerchief over the head, hanging upon the shoulders, and gathered together under the chin.

Of these sisters there are two classes—the sisters properly called, forming the great majority of the communities, and the "aid physicians," or matrons. Both classes receive their instruction and training in the establishments of the Red Cross, the first for a period of from one and one-half to two years, while the matron follows a three-years' course and may be admitted to the practice of medicine.

The first community of sisters of charity (Holy Trinity) was founded in 1844 for the care of the sick in general. In 1854, during the Crimean war, as already noted, was founded the community of the Exaltation of the Cross, for the special purpose of helping the sick and wounded in war. The third was inaugurated in 1859, and was soon followed by many others. When the Society of the Red Cross was finally organized, in 1876, nearly all these communities merged into it and became subordinated to it, the few exceptions being of the older communities founded long before the Red Cross.

The society, thanks to the great interest which it aroused, was soon able, through the generous contributions of the public, to establish houses in every city of the Empire. In 1902 their number amounted to 89, and were found in Europe, Siberia, and Manchuria. The number of sisters of charity in the same year was 2,579, while the total number of women who had received more or less instruction in the communities, and available in case of war to nurse the sick and wounded, was estimated at 4,000.

The band of sisters which, under Pirogoff, did such noble work at Sebastopol in 1854 and 1855, may not have been the first women helping wounded soldiers, but they may doubtless claim the credit of belonging to the first order especially

created for war. In the United States and other countries there is a serious doubt as to the desirability of admitting women to or near the battlefield, any farther than base hospitals. This doubt does not exist in Russia. The sister of charity follows the surgeon wherever he may lead, and makes herself indispensable in field hospitals. She does not hesitate to undertake long, hazardous journeys with sanitary detachments, to keep in touch with troops and attend to their wounded. In Russia it may be said that nursing, in all situations, is done by women. This is due in part to the intemperate habits and marked inaptitude of the men, but more to the noble and self-sacrificing spirit of the women.

To form an idea of the work of the communities, let us look at the figures reported by that of St. George, at St. Petersburg, although not the largest nor the best endowed. It was founded in 1870, and has gradually developed into a large, well-equipped, up-to-date institution, which, in 1900, treated 879 patients in its wards (including 108 surgical cases) and 226,000 in its dispensaries. Following the trail of war, sisters from this community were sent to Montenegro in 1875, Turkey in 1877, Servia and Bulgaria in 1885, Transvaal in 1899, and Manchuria in 1900.

The sisters of charity supply the nursing personnel of all military and other Government hospitals and of most municipal hospitals. Some are found in the poorest and most distant provincial infirmaries. They also nurse patients in private families. In all their duties (except in war time) they labor gratuitously, receiving food, clothing, and other necessities in kind. When on duty outside the community the compensation (20 to 40 rubles per month) is paid to the community.

In 1897 the Red Cross also instituted a course of instruction for male nurses, or brothers of charity, which bids fair to give good results. It is believed, however, that they will always play a secondary and unimportant part in the technical care of the sick and wounded in Russia.

That the services of the Red Cross are highly and gratefully appreciated by the people is shown by the generous contributions which have poured into its treasury, and which still constitute its chief resource. These voluntary donations

of money and material have steadily and rapidly increased, so that the assets of the society (exclusive of real estate), which were 93,000 rubles in 1868, rose to 1,250,000 rubles in 1877, 4,018,000 in 1880, 6,833,000 in 1890, 11,920,000 in 1900, and 12,498,000 in 1901. It owns, besides, real estate worth 6,000,000 rubles. It is to be noted that of all sums donated, according to the statutes of the society, two-thirds are to be held as reserve capital for use in war time or in preparation for war. Any encroachment on this reserve made necessary by an emergency must be made good as soon as possible.

ORGANIZATION AND STATUTES.

The society is under the high patronage of Her Majesty the Empress Dowager, Maria Feodorovna. It is regularly incorporated under the laws of the Empire. It may appeal to all public authorities for help in increasing or extending its sphere of action and to attain its objects. It may acquire and transfer property. In all its transactions and contracts it is exempt from the usual internal-revenue stamp taxes. It may appeal to private charity through the ecclesiastical authorities and, with their assent, place trunks in churches, or solicit contributions in all other public places with the assent of the police.

The emblem of the society on its seal, its flag, and its brassard is the red cross of the Geneva Convention, and no one may use this emblem in the Empire, except when authorized by the central committee and only for the purposes of the society.

MEMBERSHIP.

Includes active and honorary members, as well as contributors and benefactors.

Honorary members and benefactors are elected as such by the general assembly and confirmed by Her Majesty. In a state or local branch they are elected by the general assembly of the branch and confirmed by the central committee.

An active member is anyone making annual payment of 10 rubles ($5) or a single payment of at least 200 rubles ($100) to the central committee, or anyone making a payment of 5 to 10 rubles or a single payment of at least 100 rubles to a local committee.

A contributor is anyone making an annual payment of 3 rubles or one payment of at least 60 rubles to the central committee, or anyone making an annual payment of 1 to 3 rubles or a single payment of at least 25 rubles to a local committee.

ADMINISTRATION.

The executive power is vested in a central committee, state, and local committees.

Outside of Finland, European Russia is divided into 60 states or "governments," and each one may have a committee.

The central committee sits in St. Petersburg and has the supreme direction and control of all the affairs of the society. The state committees have their headquarters in the capitals of their respective states; their organization and regulations must be approved by the governors of the states. Local committees may be organized upon the recommendation of the state committee, with the approval of the governor of the state, and provided the number of applicants for membership is at least five.

The state and local committees elect thier own officers and send yearly a complete list of their members to the central committee.

All members of committees perform their duties gratuitously.

The central committee consists of 25 members elected by the general assembly. Its president is appointed by Her Majesty, patroness of the society, from two names submitted by the members. In the same manner the two vice-presidents are appointed from the four names submitted. Six members go out yearly, in order of seniority and are replaced by the general assembly. The outgoing members are eligible for reelection. The president and vice-presidents hold office for a term of two years. Any member of the central committee remaining absent from its meetings for eight months is considered as having resigned, unless his absence was on business connected with the service of the Government or of the society.

The central committee has a secretary, assistant secretaries,

treasurer, auditor, and the necessary clerical personnel all appointed by the president, but the treasurer must be confirmed by the committee. Their pay is determined by the committee.

The state committee consists of from 8 to 16 members. They select from among themselves a president (man or woman), vice-president, secretary, treasurer, and assistant treasurer, to serve for a term of two years. One-fourth of the members is renewed each year. The committee may appoint such clerical personnel as may be necessary and determine its pay.

The central committee, the soul of the society, initiates and directs all the operations of the society. One of its chief duties is to secure and maintain a sufficient sanitary personnel by founding communities of "sisters" and arranging for their technical instruction in their own establishments or outside local hospitals.

It may, first, execute all kinds of contracts in behalf of the society; second, sue in its name and defend its interests before the courts; third, enter into relations with all governmental and public institutions; fourth, confirm and sanction the regulations of sisters' communities, asylums, infirmaries, etc.

It meets once a month, or oftener if judged necessary by the president or whenever desired by six or more members. Its decisions are valid only when at least five members are present at the meeting. But for the amendment of statutes, questions of budget, real estate, and subsidies, at least seven members and two-thirds of the votes are necessary.

All communications involving financial transactions or pledging any of the resources of the society must be signed by the president, two members, and the secretary.

The central committee furnishes state and local committees with models of all printed forms, so as to secure as great uniformity as possible in the rendition of reports and accounts.

ACCOUNTABILITY.

The state and local committees must as soon as possible publish in the newspapers the list of all donations made to the society.

All moneys received must be converted into Government securities and deposited in the Bank of Russia or any of its branches.

At the end of each year all committees balance their receipts and expenditures and prepare their budget for the following year, so that the general assemblies may know the assets in hand and take the necessary measures to solicit and procure the amounts needed. They also prepare their annual report, a copy of which is sent to the central committee.

Of the total amount received during the year, with the single exception of the sums donated for special purposes, the state and local committees must remit 10 per cent to the central committee to meet the expenses of the society. The remaining 90 per cent, after deduction of the expenses of the committees, are divided into three parts, of which two are placed to the credit of the fund reserved for war, and the third to the credit of the fund used for the benefit of crippled soldiers and public charities.

GENERAL ASSEMBLY.

A "general assembly" is convened at the end of each year, or oftener if the central committee deems it necessary and whenever a petition to that effect is presented by at least 50 members.

It consists of all members that choose to attend, and is presided over by the president of the central committee or his substitute. To be legally constituted it must consist of at least 30 members, exclusive of the members of the central committee, who must be at least 5.

Its chief duties are, first, the examination of the annual report of the central committee; second, the auditing (by a committee of three members) of the accounts of the central committee; third, the study and solution of questions and measures proposed by the central and state committees; fourth, the amendments of statutes; fifth, the election of members of the central committee, honorary members and benefactors, etc.

Each state having a branch of the society also convenes a general assembly, which is legally constituted by the pres-

ence of at least one-half the members of the committee and a larger number of other members.

OPERATIONS OF THE SOCIETY IN WAR.

The chief function of the Red Cross Society in war is to assist the medical department of the army first in rear, and when necessary and possible also at the front.

It supplies military hospitals with female nurses and, in case of need, also with male attendants. It furnishes them when required with dressings, instruments, linen, clothing, articles of special diet, etc. It helps the evacuation of the wounded and, through the local branches, assists the sick and wounded soldiers brought home. It organizes supply depots and feeding etapes.

With the assent of the military authorities it may develop its own formations for active work at the front, operating dressing stations, flying columns, field hospitals, and means of evacuation (trains, boats, vehicles). In such case it receives a compensation according to the terms of a tariff prepared by the minister of war.

Upon declaration of war and the mobilization of the army the central committee puts itself in relation with the minister of war and determines the character and extent of its probable operations, its programme being submitted to the patroness of the society, the Empress Maria, for approval. The general assembly is convened to advise the members of the measures taken, ascertain the sentiment and desires of the society, and devise ways and means.

Upon the theater of hostilities the decisions of the central committee are carried out by, first, chief delegates, one for each army or each zone of operations; second, simple delegates, one to each state, municipality, or small group of organizations. They are all appointed by the central committee, with the approval of Her Majesty the Empress Maria, and possess full powers with their limits, the chief delegate being only responsible to the central committee and to the general officer in command of the medical department of the corps or army with which he is serving. One of their principal duties is to watch over and protect the Sisters, making the best disposition of them and, as much as possible, keeping

them in groups of three or more together, each group under the direction of a superior.

The chief delegate selects and discharges his own officials, assistants, and other personnel. He is required to keep the strictest accountability of all sums and material placed at his disposal.

The simple delegate is under the direction of the chief delegate of the army or zone to which he belongs, unless otherwise determined by the central committee, and supervises all the branches or organizations of his state or placed in his charge.

The central committee may, if deemed necessary, send one of its own members as special delegate, with plenary powers to inspect and investigate the administration of chief delegates or of any part of the work of the society.

The relations of the Red Cross delegates with the military authorities are defined in the army regulations. Although under the command of a general officer so far as their movements and sphere of action are concerned, they are allowed almost complete autonomy in the administration of their hospitals and other organizations.

THE RUSSIAN RED CROSS SOCIETY IN THE RUSSO-JAPANESE WAR.

The magnificent work accomplished by the Russian Red Cross at home and abroad in all previous wars, as outlined above, had prepared us for the prodigious efforts it put forth during this war and the very important part it played in the relief of the sick and wounded on the battlefield, in hospitals, and along the lines of evacuation.

At the very beginning of hostilities the central committee elected an executive committee of seven members, to preside over which Her Majesty, patroness of the society, appointed Count Varonzof-Dashkof, later succeeded by Prince Obolenski. Upon this committee devolved the duty of organizing and directing all the operations of the Red Cross during the war. Likewise, all state and local committees elected from among their members smaller executive committees for the better transaction of business.

An earnest appeal was made to all organized charities,

municipalities, associations, and individuals for contributions in money and kind. Wherever committees already existed the marshals of the nobility, presidents of zemstvos, mayors, and delegates from merchants' guilds were requested to join them, and where committees did not exist these representative functionaries were exhorted to organize them. Local committees extended their propagandism to all towns and villages, so that before long money and donations in kind began to flow abundantly from all directions into the coffers and warehouses of the society.

In order to prevent irregularities and possible embezzlements, the executive committee appointed a "commission of control" of ten members, and furthermore invited all State and local committees to send special delegates to the front to supervise the expenditure of their respective funds.

Manchuria and eastern Siberia, which were to be the field of active operations, were divided into five zones and each zone placed under the direction of a chief delegate, as follows:

(1) Zone of Irkutsk, under Senator P. Von Kaufmann.

(2) Zone of Chita and Upper Amur, under Prince Sherbatov.

(3) Zone of the Northeast, with headquarters at Vladivostok, under Prince Vasilchikov.

(4) Zone of actual hostilities, with headquarters at Mukden, under the Chamberlain Alexandrowsky, later succeeded by Mr. Gutchkov.

(5) Zone of Port Arthur, under Master-of-the-hounds Balashov.[a]

The plan of the society from the beginning included five special fields of activity:

(1) Establishment of supply depots.

(2) Evacuation of the sick and wounded, by rail and water.

(3) Assistance to the military medical service in personnel and material, supplementing everything needful not found on the supply tables of the war department.

(4) Relief to the sick and wounded by base hospitals in

[a] It will be noticed that these chief delegates were selected on account of their social standing, high civil functions, and, presumably, their executive abilities, but that none had a medical training.

rear as well as by field hospitals and flying columns at the front.

(5) Organization of feeding stations.

The question of supply depots being very important, received early attention. The principal ones were at St. Petersburg, Moscow, Penza, Irkutsk, Chita, Harbin, and Nikolsk. Secondary ones were also established at Mukden, Liaoyang, Kabarofsk, etc. They received money and objects of all kinds. To Penza, on the main railway line to Siberia, were sent all small gifts to be collected and sorted for shipment when in sufficient quantity, large shipments, one car or more, being sent directly to Manchuria.

Of the several depots in St. Petersburg the largest and most important was the one organized in the Winter Palace by Her Majesty the Empress Alexandra, where as early as July, 1904, $650,000 had been received in cash and a vast amount of hospital material and clothing accumulated. There, under the personal supervision of Her Majesty, hundreds of ladies were busily engaged making garments and all kinds of hospital dressing material.[a] The gorgeous halls of the Kremlin, in Moscow, had likewise been converted into depots and workshops where sometimes 2,000 women, many of the highest aristocracy, worked gratuitously under the direction of the Grand Duchess Elizabeth.

At the end of the year 1904 it was estimated that the Red Cross, outside of the supplies carried by the many organizations already gone to the front, had shipped about 3,000 cars of material to Manchuria and eastern Siberia, each car with capacity of 20,000 to 25,000 pounds. There were, besides, more than 200 cars awaiting shipment. Every day one Red Cross car full of supplies left from St. Petersburg and one from Moscow, attached to passenger trains. With each car was an attendant who every day telegraphed his where-

[a] The list of objects in kind sent to this depot would be a long one. It included underwear, foot gear, winter garments, thousands of yards of cloth, linen, flannel, cotton, field packages for officers and soldiers (containing toilet and other necessary articles), bandages, gauze and antiseptic material by the ton, surgical instruments, medicines, camp cots, wheeled litters, camp kitchens, bibles, writing paper, books and periodicals, tea, coffee, sugar, cocoa, wines, preserves, lemons, chocolate, condensed milk, tobacco, tobacco pouches, cigarettes, matches, pipes, candles, buttons, pins and needles, etc.

abouts to St. Petersburg, where this information was entered on the descriptive card of the car, a complete record being thus kept of each car.

The Red Cross assumed a large part, perhaps the larger part, of the service of evacuation. Within two months after the beginning of hostilities it had equipped a hospital ship, the *Mongolia*, in Port Arthur, with capacity for 300 beds. she was never able to leave this harbor. Another ship, the *Orel*, was outfitted in Toulon (France) by the joint contributions of the Russian and French Red Cross societies and the Russian navy. It accompanied Admiral Rozhestvenski's ill-fated fleet and was captured by the Japanese, who kept it, on the plea that it had violated neutrality by conveying information to the Russian admiral.

For the evacuation of the sick and wounded by water during the summer and fall, from Harbin northward to the Amur, the Red Cross gave very material assistance in the organization of a flotilla of 17 two-decked barges and 7 tugs, with total capacity of 2,000 beds. As explained in the first part of my report, the scheme was a failure owing to the variable stage of water in the Sungari River, from flood to complete dryness, and the flotilla had to be abandoned.

The Red Cross also manned, equipped, and operated a number of hospital trains. At the beginning of the war it had entire charge of the service of evacuation from Port Arthur, Dalny, Dachichao, Inku, and Liaoyang to Mukden, supplying and manning the first 6 hospital trains. Thereafter it always took a most important part in the railway transportation of the sick and wounded. Some of its trains, about 10, called " white trains " from their color, contributed by members of the imperial family and wealthy aristocracy, were supplied with all possible comforts and many luxuries. the operating room, with all modern appointments, occupying an entire car, while the pharmacy and dressing room occupied another. Several of these " white trains " had a laundry and disinfection car; one had a complete ice plant with daily output of 4,000 pounds of sterilized ice.

Other Red Cross trains, 15 to 20, consisted of ordinary freight cars, with inside platforms built around the walls for the patients to lie upon, and were very much like ordi-

nary military hospital trains, but provided with blankets, pillows, and other conveniences.

The Red Cross also supplied female nurses to all military hospital trains, and a large proportion of the bedding, dressings, and medicines.

All hospital trains, whether Red Cross or military, were in command of line officers, but the medical officers retained the direction of the personnel.

The Red Cross, during the war, became a complex organism consisting of various elements from very different sources, but all under the general direction of the executive committee and chief delegates.

These elements, or constituents, may be grouped into four classes, as follows:

1. The society proper, with its regularly and permanently organized branches, its numerous communities of sisters, and great resources in personnel, cash, and material.

2. The committees organized in all great cities by the zemstvos and municipalities.

3. The committees organized by various corporations, institutions, and associations, Russian and foreign.

4. Private individuals.

Thus in June, 1904, four months after the breaking out of hostilities, there were in operation 138 Red Cross hospitals and "flying detachments," with capacity for 15,055 beds. Of this number of beds, 7,320, or nearly one-half, had been provided by cities and zemstvos, 5,360 by the society, 1,340 by corporations and associations, and 765 by individuals. This total number was rapidly increased, but always with about the same proportion between the four groups. In December, 1904, the number of Red Cross hospitals and beds was as follows:

	Hospitals.	Beds.
Zone of active operations (Middle Manchuria)	[a] 98	[a] 9,005
Zone of Vladivostok	35	6,375
Zone of Chita	15	3,270
Zone of Irkutsk	80	4,200
Zone of Port Arthur	2	800
Total	230	23,650

[a] Included 22 field hospitals with 1,525 beds, and 28 flying detachments with 775 beds.

The Red Cross hospital accommodations continued to increase until the summer of 1905, reaching a total capacity of at least 30,000 beds, from Irkutsk to Vladivostok and from Kabarofsk to Kungchuling, 12,435 being in the zone of active operations, from Harbin to Kungchuling.

Harbin, from the beginning to the end of hostilities, was the great hospital center where all the sick and wounded were eventually transported for admission or distribution to other places. In November, 1904, the Red Cross had accommodations in that town for 2,245 beds, but they were rapidly extended so that, in January, 1905, the society could take care of 6,000, and, in April, of 7,385 patients in some 30 hospitals. All these Harbin hospitals were under the able direction of Prof. Eugene Botkins, of the Imperial Academy of St. Petersburg.

Of the constituent elements of the Red Cross, grouped under the third class, as above, we may mention:

The nobility of the Empire, ladies committee, Southeastern Railway, Protestant churches, Israelite Society of Odessa, Polish Society, Finnish Society, Merchants' Guilds of Nijni-Novgorod and Kharkoff, German Hospital, Dutch Hospital, etc. Of these the most important was the nobility of the Empire, which, by combined efforts established and maintained a base hospital at Harbin, the largest and best equipped of all Red Cross establishments in Manchuria; a smaller hospital; a flying detachment and transport column at the front; a hospital train, and a supply depot; all under the direction of Grand Marshal Michael Stackhovitch.

Of the individuals who founded and maintained hospitals those most deserving of mention, next to their majesties the two Empresses, are Countess Bobrinska (340 beds), Countess Shuvalov (100 beds), and Mrs. Boeckel (50 beds).

The buildings occupied by the society for hospitals purposes in Manchuria were of all kinds—barracks, hotels, clubs, theaters, workshops, private houses, etc. Its hospitals, in a general way, appeared to be more comfortable and better managed than the regular military hospitals, possibly because of ampler means. The personnel for 200 patients was 5 surgeons (chief surgeon in command), 1 commissary, 1 pharmacist, 15 sisters, and 20 feldshers and attendants; for

100 patients, 4 surgeons, 1 commissary, 1 pharmacist, 10 sisters, and 12 feldshers and attendants.

There was the same unavoidable crowding of beds as in military hospitals. These beds were of all types, most of iron with wire bottom, but a large proportion with board bottom or with the Chinese rope bottom. Straw ticks always took the place of mattresses. In the hospital supported by the Empress Maria, at Harbin, the bedsteads were of iron with canvas bottom, which could be tightened as desired. A canvas bag on each vacant bed contained fresh hospital clothing to be put on by the patient when admitted, and received his own soiled personal effects. Several hospitals were comfortably installed under canvas, like that of the Countess Bobrinska, near Kwan Shan, and that of the Countess Shuvalov, at Mukden.

The water supply was entirely drawn from wells and, even in Harbin, hardly ever distributed by pipes, so that bathrooms were scantily supplied and water-closets impossible, conditions which, in the field, are generally unavoidable. The hospital of the nobility (Dvoriansky) at Harbin, the largest of the Red Cross hospitals, was a striking exception, and modern in all its equipment. It consisted of 9 pavilions built for that purpose, each for 45 or 50 patients, with bathrooms and water-closets. The water was pumped by a steam engine into a tank and filtered through charcoal before distribution, that for drinking being boiled besides. This hospital had its own electric plant and a fine X-ray machine. Its disinfection plant consisted of three parts—steam chest, set of sublimate casks, and crematory, all under the same roof. Its personnel included 68 female nurses and about 150 male attendants. It had its own herd of cows, and before that had paid 50 cents for each quart of milk.

In all Red Cross hospitals the food, so far as I could ascertain, was good and well cooked, including everything needful, except milk, fish, and eggs, which, although not entirely absent, were seldom seen. Rather scant also were the various canned preparations of well-known digestible and nutritive foods. The cost of feeding patients, enlisted men, averaged about 38 cents per day, ranging from 24 to 50 cents, according to circumstances; for officers it was about double.

It is hardly necessary to say that, as a general rule, the supply of dressings, appliances, and instruments were sufficient and of good quality.

The chief surgeons were all men of mark, many of them university professors and among the most skilled operators in Russia. Especially conspicuous at the front were Doctor Davidov, of the Hospital St. George No. 1; Doctor Butz, of the Hospital of the Exaltation of the Cross; Doctor Dsirne, of the Hospital Stavropol; Doctor Sianojentsky, of the Hospital Shuvalov; Doctor Von Manteuffel, of the Hospital of the Empress Maria, etc.

Earnest efforts were made to apply the principles of modern surgery, and the results, as shown in my first report, have far excelled those obtained in any previous war.

Red Cross hospitals enjoyed complete autonomy in their internal administration. Each chief surgeon received orders only from his delegate, and to him alone rendered all professional and administrative reports; but the delegates were under the command of the inspector-generals of the medical department, so far as their movements and sphere of action were concerned. This system appeared to work satisfactorily, the relations being such as to secure discipline and harmonious cooperation without friction and waste of effort.

When the final decision to abandon Mukden was taken, Chief Delegate Gutchkov, the personnel of two Red Cross hospitals (one under Professor Butz and the other under Professor Sianojentsky, both of the University of St. Petersburg) and that of a military hospital were directed to remain behind, surgeons, officials, sisters, and attendants, in all about 130 persons, to look after the wounded which could not be removed. They were treated with kindness and generosity by the Japanese, and in due time allowed to return with their patients into the Russian lines, an interesting episode highly honorable to both countries.

Very remarkable was the prompt and efficient action of the Red Cross in the early part of the war. As the troops were hurrying to the front it provided a large number of tents and set up small ambulant hospitals at points of rendezvous. When the chief delegate (Alexandrowsky) arrived at Harbin, on February 29, 1904, he already found two field hos-

pitals organized. Other detachments arrived successively, some taking forty days en route, the quickest not less than twenty days, but by May 1, 1,370 persons were available. Hospitals had then been established in Harbin, Liaoyang, and Port Arthur. From the beginning the Red Cross, not content to work in rear, aimed to cooperate with the medical department at the front, sometimes taking its place. At an early date it pushed detachments to the south and east of Liaoyang. When, on May 1, occurred the first important battle of the war on the Yalu it was in a position to take care of more than 400 wounded. In all the other engagements which preceded the campaign of Liaoyang it likewise took an active part, especially at Vafandian and Vafanga, where it gave first help to a majority of the wounded.

The so-called flying detachments of the Red Cross worked on the battlefield and in the immediate rear, setting up their own dressing stations. They had a variable personnel, generally consisting of 1 surgeon, 4 medical students, 6 to 10 male nurses, and a few packers and drivers, the material being carried on pack horses or in carts.

These flying detachments, as well as the field hospitals, were badly handicapped for want of ambulances or other suitable vehicles to carry the wounded, as well as from a great scarcity of hand litters. In this respect the Red Cross was not worse off than the medical department and, like it, had to rely mostly on Chinese carts and small quartermaster carts. In fact, it was not quite so badly off, for committees from several cities, especially from the Baltic provinces, succeeded in forwarding some ambulances, or acceptable substitutes therefor, to the front, although too few to play an important part in the transport of the wounded. This absence of ambulances and scant supply of stretchers was one of the unpleasant surprises of the war.

As the war progressed and the medical department developed its organizations, the Red Cross reduced, to a large extent, its active operations at the front, leaving to the medical department the chief care of the wounded at the dressing stations and their transportation to the field hospitals, devoting itself to other fields of activity more in harmony with its material.

Its other noteworthy organizations not yet mentioned were:

(1) Feeding stations along lines of evacuation, sometimes between the zone of fire and the field hospitals, where wounded or exhausted soldiers could get hot soup and tea and often clothing. Here the work of the sisters is said to have been particularly efficient.

(2) Dental stations, one in Harbin and one in Mukden.

(3) Bacteriological laboratories, two stationary and five ambulant, one of the latter admirably installed in a special car. They were but little used.

(4) Three disinfecting detachments, with all necessary appliances.

(5) Infirmaries or dispensaries at all principal railway stations.

(6) A special hospital for sick sisters at Harbin.

(7) Several hospitals for the insane.

(8) Bureaus of information, correspondence, and for the distribution of gifts sent to individual soldiers.

What were the resources of the society during the war? At the time hostilities began it had 460 organizations throughout Russia and Siberia and a large personnel of trained sisters, probably not less than 3,000. Within a month or two the number of committees, big and small, had risen to 800. The objects and needs of the society were brought to the attention of everybody and contributions actively solicited on all sides. In its behalf were given exhibitions, concerts, theatricals, fairs, and bazaars, and imperial palaces were converted into workshops and storehouses. In all churches, public buildings, hotels, and places of amusement were little padlocked trunks bearing the ever-conspicuous red cross, and inviting donations. In cafés and restaurants match safes had little special appendages into which could be dropped one's spare kopecks. On June 1, after the first heavy expenditures, the society had an available balance in cash of over $4,000,000. The Government favored it in every possible way. For its benefit a surtax of 10 kopecks (5 cents) was put on every railroad ticket and one of 5 kopecks on every telegram. All imported articles intended for the society were admitted free of duty. Its hospital material

was carried to the front by rail without charge and all other articles at a reduced tariff. It is roughly estimated that during the war the amount of cash expended, plus the material in kind distributed by the Red Cross, amounted to at least $20,000,000.

I may here refer to the help extended to Russia by foreign countries. It was, on the whole, but a poor return for the generous assistance which Russia had never failed to tender to all countries in need. Germany only gave help on a large and effective scale. The German Red Cross maintained a hospital of 200 beds at Kungchuling (between Mukden and Harbin), which, under its chief, Doctor Brentano, did most excellent work. The Dutch also maintained a small hospital in Manchuria to show their appreciation of the services of the Russian Red Cross in the Boer war. Bulgaria likewise had a hospital of 60 beds at Irkutsk. The Grand Duke of Hesse sent a field hospital for 50 beds with 20 light ambulances to Mukden but only a few days before the evacuation of that city. A committee of French ladies provided the necessary material for a hospital of 25 beds without any personnel; it also helped in outfitting the hospital ship *Orel* and contributed some supplies to the depot of Her Majesty the Empress in St. Petersburg.

In the field the Red Cross personnel consisted of delegates or directors, chief surgeons, surgeons, pharmacists, commissaries, students, feldshers, female nurses (sisters), and sanitars (male attendants). A great number of medical students volunteered for duty and rendered excellent services, especially at the front with the flying detachments. Feldshers, as already explained, are male nurses of experience and specially instructed, often doing the work of physicians. Officials and men wore the military uniform without sword, and as distinctive insignia the red cross on cap and shoulder straps. The men's cap had a red band piped with green, bearing in front a round white shield with a red cross in the center. The shoulder straps were blue. The overcoat bore on the lapel the same shield that was on the cap. The fur hat had a blue top crossed by two red lines. All wore, or were expected to wear, the brassard.

The pay of the Red Cross personnel was as follows: Chief surgeon, 500 rubles a month; surgeons, 350; students, 125 and their food while in the field. The feldshers were paid 75 rubles, the sisters and sanitars 30, with food and clothing.

The total monthly expenditures of the Red Cross in the zone of active operations in the first part of the year 1905 for salaries and purchases made in Manchuria were about 500,000 rubles.

Besides the many delegates, directors, and inspectors, mostly members of the aristocracy and high civil functionaries who devoted their time and energies to the work of the Red Cross with no other compensation than their daily food, mention should also be made of the women surgeons, of undoubted professional skill and executive ability, who were found in a number of responsible positions, such as Princess Gedroitz, chief surgeon of a hospital train; Countess Bobrinska, in charge of a large hospital; Madames Reno, Kerinska, Ottinger, etc.

The female nurses were of two classes—sisters or members of the Red Cross communities and volunteers. As the number of sisters was obviously insufficient an appeal was made for volunteer nurses, to which a large number responded, many from the aristocracy and the higher classes of society, making up in zeal and self-denial what they lacked in experience, and often spending their pay on their patients. A certain proportion were ignorant and otherwise objectionable women, but they were soon eliminated, so that at the time of my arrival in Manchuria, in January, 1905, I heard nothing but expressions of praise and satisfaction for the work of sisters and all other female nurses. As already stated, nearly all nursing in hospitals was done by women, not only in Red Cross, but also in all military hospitals. In January, 1905, there were more than 3,000 sisters in the zone of active operations and several thousand more in the other zones. They were not only in base, but also in field hospitals, and sometimes even at dressing stations, within sight and range of the enemy's fire. As I said on another occasion, "All honor to the Russian Red Cross sister! For natural aptitude, endurance of hardships, contempt of danger, and single-hearted consecration to her humane task she is unexcelled if not peerless."

REMARKS AND CONCLUSIONS.

In the light of the experience acquired during our civil war and all subsequent wars, especially the Russo-Japanese war, what may we think of the practical utility of Red Cross societies, either in peace to relieve the victims of famine, pestilence, and catastrophies, or in war as an auxiliary to the medical department of the army.

I believe all thoughtful military surgeons are agreed with philanthropists and humanitarians that such societies, in our modern civilization, are invaluable and indispensable. The less military a nation and the larger the volunteer element in the composition of its armies, the greater will be the need of civilian help in war. But however perfect may be the organization of an army and strict its discipline there will always be times and places in a war with a first-class power when the sick and wounded will be too numerous to be disposed of without long delays and much suffering unless civilian help is available.

Furthermore, modern war is no longer brought about by the mere will of a king or emperor, by a dynasty or private interests; it must be a national war; it will certainly be so in this country should we again be forced to take up arms in defense of our rights and honor. Therefore all classes of people, men and women, should be given an opportunity to contribute more or less directly to the comfort and welfare of the fighting soldiers and to the relief of the sick and wounded, and this can best be done through a Red Cross society, a society which, under the auspices of the Government, becomes the acknowledged recipient as well as dispenser of all private contributions.

Let us beware of disunion in our efforts to operate such a society. In peace and war there will always be enterprising and energetic persons, well-meaning, but misguided, who dislike to walk in beaten paths and be merely followers; especially when a war is imminent; they will desire to organize rival societies, independent of the National Red Cross. Such efforts should be frowned down upon; they tend to waste of energy, confusion, and inefficiency. Let it be understood that in time of war the National Red Cross only shall be recognized and admitted upon the zone of active operations.

A Red Cross society to be efficient must be not only well organized, but every member of it should acquire some practical knowledge of first aid and experience in handling patients. Therefore it must be a permanently active society, not only for work in time of war, but always ready to assist the victims of famine and all disasters in which public assistance becomes necessary. In such cases it should be the trusted public agent, the channel through which help is applied. In this manner will it become a familiar institution, brought to the knowledge of every American, winning his respect and obtaining his support.

I believe that a very important means of developing the Red Cross and attaining its objects is to follow the example of Russia and establish in all large cities special Red Cross hospitals for the gratuitous relief of the poor, and the instruction and training of its personnel. In no better way can the necessary experience be gained in the management of hospitals, a sufficient reserve personnel secured, or greater interest be aroused among the public in its aims and purposes.

However, in time of peace, it must never lose sight of its primary purpose, which is the care of the sick and wounded in war. Therefore it should plan and carefully work out a complete scheme of field organization, provide a sufficient reserve of trained personnel, and accumulate as large a cash balance as possible, so that when the emergency comes it may mobilize all its active forces promptly, thoroughly, and without confusion. Especially incumbent upon the Red Cross is the fitting out of hospital ships and sanitary trains; therefore all necessary preliminary measures should be taken to insure their being ready upon the beginning of hostilities. Also very important is it to enroll in its reserve all the eminent surgeons of the country for duty at base hospitals; at least all those unwilling to be mustered in the medical volunteer service.

We must assume that our National Red Cross, following the noble example of Russia, will intervene in foreign wars—that is, offer assistance to belligerents in wars in which we are not involved. It would then appear desirable that, with such object in view, cadres of suitable detachments of personnel, with necessary material, be worked out and kept on

hand, so that the detachments may be readily mobilized at the proper time and shipped to the theater of hostilities without delay.

A very practical question for us is what rôle should our Red Cross play in the field. Should it, like the Russian and Japanese societies, in the ardor of its patriotism, seek glory on the battlefield under fire? No; this is not its proper place. Such work may have been necessary in the Russian army in the early part of the war on account of the insufficiency of the medical department (and the Red Cross should always be ready to give relief wherever needed and not otherwise provided for), but I believe it will obtain better results by limiting itself to its proper sphere of action, which is the rear, beginning with base hospitals and extending along lines of evacuation and repatriation to the soldier's home. I would not draw a hard and fast line, for we know how changeable, unexpected, and surprising are the conditions of modern warfare, and any rule we may formulate will always suffer many exceptions. There will be circumstances when the Red Cross may extend its activities to the field hospitals, and even, perhaps, to first-dressing stations. As a general principle, however, the medical department must be relied on for relief on the battlefield, at the dressing stations, and for the removal of the wounded to the field hospitals. This removal is the most important duty of the medical department at the front, and involves the use of ambulances and other vehicles or appliances which the Red Cross would seldom be able to procure.

What of the female nurses? What are their duties in the zone of active operations? In the Russian army they appeared to have unlimited privileges and were allowed to go to the edge of the battlefield and sometimes to dress wounds under fire. One had a limb shattered by a shell in the Liaoyang campaign, requiring amputation. Such heroism excites our admiration, but, in my judgment, is out of place. It should not be necessary and should not have been permitted. It indicates a defective organization of the medical department. The female nurse has no place on the battlefield nor at the first-dressing stations. The Hospital Corps

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of our Army, if what it ought to be, should be trusted to meet all the needs of these advanced positions. Whether it is best, as a general proposition, to have female nurses in field hospitals, as in the Russian army, admits of a difference of opinion, according to national characteristics, qualifications of the nurses, and efficiency of the hospital corps. Our service regulations do not provide for them in such situation, and, I believe, for good reasons. As a very general rule, therefore, the duties of female nurses in our service will begin at base hospitals and be conterminous and coextensive with those of the Red Cross.

A last question, and perhaps not the least, is, What should be the relations of the Red Cross with the military authorities? Should it retain its internal autonomy, as in the Russian system, or lose its identity and be merged into the medical department as in the Japanese system? Of course we admit that it must be completely subordinated to the medical department. The character and amount of its work and its sphere of action must be mapped out and determined by the chief surgeon of the army with which it is connected, under the approval of the general in chief, and all its professional returns and reports should conform with those of the medical department so as to secure correctness and completeness of statistics. Beyond this I do not think it wise to go. Military discipline and the same strict military system should not be expected from the Red Cross hospitals. It is therefore better to give them full freedom of internal administration and permit such methods as, under the circumstances, are likely to produce the best results.

The American National Red Cross having been incorporated by act of Congress and placed under the supervision of the Government, it may be assumed that its relations with the Medical Department in time of war will be explicitly determined and, when approved by the Secretary of War, made the subject of official regulations for the information and guidance of all concerned, so that when mobilized for the field both services may work harmoniously from the beginning without wasting valuable time in adjusting points of disagreement.

Report of Col. John Van R. Hoff, Assistant Surgeon-General, U. S. A., Observer with the Russian Forces in Manchuria.

NOTE.—Colonel Hoff arrived from the United States in St. Petersburg on June 9, 1905. On June 28 he proceeded to Manchuria, and arrived at Kungchuling on July 21. He remained on duty as an observer with the Russian army in the Far East until September 30, when he left Kungchuling for St. Petersburg, where he arrived October 17, 1905.

MEDICAL STATISTICS.

The morbidity and mortality bills which the Russian army has been called upon to meet from February 10, 1904, to September 14, 1905, exclusive of Port Arthur, total as follows:

TABLE I.—*The movement of sickness and wastage (from death and disability) among all grades of the (Russian) Manchurian field armies and services in rear of the same due to wounds and disease from February 10, 1904, to September 14, 1905.*

	Wounded.		Sick.	
	Officers.	Men.	Officers.	Men.
Sent to hospital	3,393	110,362	7,445	230,027
Dead, with organization	54	479	14	185
	.....	.....	a 22	a 431
Died in hospital	147	2,861	125	4,665
Discharged for disability	.....	8,237	.....	16,018
Returned to duty	1,755	57,037	3,711	111,142
Evacuated (transferred)	1,461	41,635	2,585	74,713
Remaining in hospital	30	378	1,024	22,664
Remaining in convalescent institution	.....	214	.....	825

a From sudden death.

The foregoing table, which is official, presumably includes every case that appears on the hospital registers of the armies for which the medical department became responsible, together with 1,185 cases of death, with organization, making a grand total of 352,412 cases. Of these 8,983 died, 24,255

were discharged for disability, 120,394 were transferred to hospitals west of Lake Baikal, 173,645 recovered, and 25,135 remained under treatment.

I have no official writing as yet showing the mortality among the cases "transferred." This, with additional statistics, was promised to be sent me here, but I have a note of a personal conversation had with Doctor Kozlooski, the statistical officer, Harbin, September 22, 1905, during which he told me that the total mortality from disease was 18,830. Deducting the 5,442 deaths accounted for in the foregoing table from the number given by the statistical officer, and there remain 13,388 deaths which must have occurred among those "transferred," a rate of 173 per thousand. As only serious cases were, as a rule, sent away from the army, this rate, though high, may be regarded as not excessive. This deduction is, of course, open to correction.

TABLE II.—*Battle losses*[a] *(Russian army) during the war by months (Russian calendar).*

Month.	Killed.		Wounded and contused.		Died of wounds.		Missing.	
	Officers.	Men.	Officers.	Men.	Officers.	Men.	Officers.	Men.
1904.								
February	.....	4	.....	2	.....	.....	.....	.....
March	1	8	4	16	.....	5	1	3
April	26	623	50	1,130	.....	12	4	474
May	4	56	16	285	2	31	6	71
June	19	668	133	2,926	2	73	23	1,166
July	27	974	189	5,350	12	113	19	928
August	91	2,243	477	15,379	26	326	18	1,957
September	107	2,433	474	16,847	23	232	23	2,308
October	83	1,842	406	13,511	22	530	18	2,526
November	2	98	21	708	6	91	1	28
December	11	140	59	704	12	59	.....	63
1905.								
January	49	1,670	378	10,746	23	212	25	1,277
February	233	7,638	1,455	47,272	35	640	282	28,156
March	7	181	40	1,165	20	659	.....	225
April	.....	103	13	483	1	206	1	58
May	4	68	10	341	7	88	.....	28
June	3	51	24	405	7	41	.....	40
July	.....	.....	11	287	3	16	.....	.....
August	.....	.....	19	150	.....	6	.....	.....
Total	667	18,800	[b]3,779	[c]117,707	201	3,340	421	39,308

[a] Exclusive of Port Arthur.
[b] Of these, 386 remained on duty.
[c] Of these, 7,345 remained on duty.

The foregoing table accounts for 184,223 cases, of which 19,467 were known to be killed and 3,541 died of wounds. Total, killed, 23,008; wounded, 121,486; missing, 39,729.

The extraordinarily large proportion of missing is accounted for by the fact that the Russians having been driven from every battlefield were forced to leave their dead to be buried by the Japanese, and as there were no means of identifying the Russian dead the Japanese could but bury them as "unknown," and the Russians carry them as "missing."

It is not to be presumed that any considerable number of the Russians deserted to the enemy; they could hardly expect a hospitable reception from the Chinese, and they could not get home, so it is safe to assume that practically all "missing" Russians were buried on the battlefield. As this fact is not susceptible of absolute proof, in making my estimate of "killed" I shall have to depend upon the statistics of other wars to reach a reasonable basis of calculation.

But before proceeding to a discussion of this question I will submit the following table of Russian losses by battles:

TABLE III.

Place.	Date.	Killed.		Wounded and contused.		Missing.		Strength.[a]
		Officers.	Men.	Officers.	Men.	Officers.	Men.	
The Yalu	Apr. 30–May 1, 1904.	26	564	38	1,081	6	679	.....
Telissu	June 13–15, 1904.	18	459	85	2,155	10	754	.....
Motienling	July 17–19, 1904	8	215	37	1,069	2	224	.....
Tashihchiao	July 23–24, 1904	4	141	30	646	3	107	.....
Yangtzuling	July 31, 1904	10	349	42	1,192	2	219	.....
Liaoyang	Aug. 24–Sept. 2, 1904.	87	2,027	414	12,486	10	1,461	156,600
Sha River	Oct. 8–18, 1904.	190	4,894	861	29,531	35	5,838	168,200
Chentanpu	Jan. 25–29, 1905	49	1,670	378	10,746	25	1,277	.....
Mukden	Feb. 24–Mar. 14, 1905.	233	7,638	1,455	47,272	282	28,156	336,400
Lesser battles and skirmishes.	.....	42	843	439	11,529	46	593	.....
Total	.....	667	18,800	3,779	117,707	421	39,308	.....

[a] The "strength" is given on the authority of General Kuropatkin.

Assuming that the proportionate losses at the battles of Liaoyang, Sha River, and Mukden are a fair index to the proportionate losses in other battles, it is not difficult to deduce the real strength of the Russian army in every battle

nor to arrive at a reasonable conclusion as to total proportionate losses. The total casualties[a] in the specified battles are 21.45 per cent of the strength given by Kuropatkin. Of this total, 10.5 per cent were killed, 64.5 per cent were wounded, and 25 per cent missing, or 1 killed to 2.5 missing, to 6.5 wounded.

The statistics of the German army in their war of 1870 show a loss of but 4.12 per cent of the total force engaged, of which 0.75 were killed, 2.83 wounded, and 0.54 missing, or, roughly, 1 missing to 1.5 killed, to 5.66 wounded. If, then, we assume the German figures as proportionately applicable to the Russian army, we must take from the "missing" and add to the "killed" enough to make the proportion of 1 to 1.5. By reference to Table I it will be seen that 3,541 cases of wounds died, and it is more than likely that a proportionate number of the 13,388 estimated mortality among "transferred" cases died from wounds; but of these I have no record, and will leave them out of consideration in this report. Add the 3,541 wounded cases to the 19,467 killed, and the total dead from the "legitimate results of war" is 23,008, or killed and missing 62,737, of which we may assume from German experience that 37,642 were killed, making a total of 37,642 killed, 121,486 wounded, and 25,095 missing; total, 184,223.

I find it difficult to believe, assuming all the Russian prisoners in the hands of the Japanese to have been identified and reported, which I understand is the case, that 25,095 "missing" Russians are still in the land of the living. Yet this seems to be the only acceptable basis on which to work, and I will therefore adopt it.

By reference to Table I and comments thereon it will be seen that up to September 14, 1905, 18,830 soldiers had died from disease, which is almost exactly 1 to 2 dead from battle injuries. It may be safely assumed that this proportion will not vary by more than a small fraction when the final statistics are compiled, and it stands as the best sanitary record up to this war.

[a] Exclusive of prisoners.

The Russian losses, by arms of the service, were as follows:

TABLE IV.

Arm.	Killed.		Wounded and contused.		Missing.		Proportional strength of fighting effectives.[a]
	Officers.	Men.	Officers.	Men.	Officers.	Men.	
							Per cent.
Infantry	602	17,873	3,246	111,309	379	37,789	84.4
Cavalry	20	366	159	2,060	20	395	5.0
Artillery	29	427	310	3,671	15	748	7.0
Engineers	4	34	42	282	2	126	3.0
Frontier guard	10	98	15	342	3	196	.6
Other services	2	2	7	43	2	54	(b)
Total	667	18,800	3,779	117,707	421	39,308	

[a] I am indebted to Major Macomb for the estimate of proportionate strength.
[b] Embraces the noncombatant branches, the strength of which is 10 per cent of the fighting effective.

The military population which furnished the foregoing statistics has been variously estimated and generally overrated until after Mukden, since which battle it has probably been underestimated by all except the two most interested nations. I have no statistics as to the Russian strength before the date of my arrival in the Far East, but I have the unofficial statement of General Kuropatkin, which may be accepted as authoritative. He says (the reasons are not here necessary to enumerate) that "in spite of our (Russian) apparent superiority in number of battalions, we were always numerically inferior to the enemy. Thus at Liaoyang we had altogether 135,000 bayonets, at Sha River 145,000 bayonets, and at Mukden between 275,000 and 290,000. The exact figure has not yet been determined. In spite of this we took the offensive from Mukden, well knowing that the enemy was superior in number." Add to the foregoing 16 per cent to cover the other combatant forces present in these battles, and we find that the Russians had at Liaoyang 156,600, Sha River 168,200, and Mukden 336,400.

August 20, 1905, the chief medical inspector told me in conversation that the combatant strength east of Baikal was 870,000.

October 2, 1905, the statistical officer informed me that

the total strength of the Russian forces east of Baikal on that date was:

In the field	729,000
Etape and rear	112,000
Pre-Amur district	116,000
En route from Russia	80,000
Total	1,037,000
Add 10 per cent for noncombatant services in the theater of war	95,700
Grand total	1,132,700

From these statistics it would appear that during the year 1905 Russia sent to the Far East nearly 800,000 soldiers, or an average of 100,000 per month, and at the time of the declaration of peace had assembled an army numbering more than 1,100,000 men, almost every one of whom had been transported over a single-track railway for more than 5,000 miles.

Having briefly considered the primary results of the war upon the Russian soldier, due weight being given to the fact that the statistics are necessarily tentative, I will invite your attention to some of the means by which these results were reached.

THE SANITARY DEPARTMENT.

Organization.—During the period of my service in the Far East the entire region beyond Lake Baikal was under the jurisdiction of General Linevich, the commander in chief of the Russian forces. The troops were distributed among four armies, First, Second, and Third Armies at the front and the Rear Army. Indeed there were five armies, the Fifth being in the pro-Amur district, which included Vladivostok.

West of the lake the line of communications was given over to institutions of the rear, which were controlled from St. Petersburg, the sanitary department of this region being under command of Major-General Chlinowsky, general staff, stationed at Irkutsk.

A word to recall the organization at army headquarters. Of the heads of the different staff corps those that have to do with inspections of special troops, supplies, pay, and

audit report directly to the commander in chief. These are intendence (food, clothing, and forage), inspectors of artillery and engineers, chief paymaster, and controller. The so-called military staff, quartermaster-general, adjutant-general, and general of roads and communications, are directly under the chief of staff.

Among the subsidiary departments are the sanitary, the judge-advocate's, and chaplain's departments, which, according to regulations, are under the adjutant-general.

The organization of the sanitary department of the Russian army is sui generis, as laid down in regulations, and I should fancy more or less impracticable because of its complicated methods and divided authority. I am informed that the paper organization was largely disregarded and what was had was an organization devised by General Kuropatkin on the ground, probably to meet a threatened or actual breakdown. Under this plan the sanitary department was given an independent status with a chief reporting directly to the commander in chief. I endeavored to ascertain the reasons for the modified organization, but no one whom I asked was able or willing to answer. When I inquired of the chief medical inspector how the work of his department was done during the early days of the war, he replied that this had been made the subject of report to St. Petersburg, and said no more.

The situation must have been one demanding high organizing and administrative capacity, for the sanitary department was first placed under the command of General Trepov, who later returned to St. Petersburg to become chief of the general staff, and was succeeded in his sanitary duties by General Ivanov, a lieutenant-general of artillery. These officers were members of the staff of the commander in chief and reported directly to him.

The subdivisions of the sanitary department were: (1) the medical department, (2) the Red Cross, (3) the evacuation, (4) the veterinary department.

The senior representative of each of these subdivisions was in immediate charge of his own division and was a staff officer of the chief of the sanitary service.

Each of the five armies had a chief sanitary officer, a lieu-

tenant-general or major-general, usually, though not necessarily, of the general staff with assistants representing the various subdivisions of his department, all of whom were independent of each other. I understand that there was a chief sanitary officer in each corps, and it was not until the division was reached that the medical officer had much administrative responsibility. A large number of line officers, probably not less than 500, were employed in various capacities in the sanitary department. Doubtless many of these were incapacitated for field service by reason of wounds or other causes. Line officers were on duty with field hospitals, railroad hospital trains, convoys, evacuation commissions, etc.

The total strength of the entire sanitary department was approximately 75,000, about 7 per cent of fighting effective.

Among the many things the interesting experience with the Russian armies in the Far East brought to my attention, those which, perhaps, most impressed me are the following:

First. Their appreciation of the necessity for an exact organization, as shown by their regulations.

Second. Their failure to observe the regulations and supply an adequate military medical organization, thus forcing the Red Cross to substitute, rather than supplement, what an army should always freely provide for itself at the front.

Third. The inadequacy of the number of trained personnel, especially among the men. The number was apparently sufficient, but so far as I could learn, in the matter of nursing, especially the men, were of small account, and the women, even though little trained, were relied upon for this essential work right up to the firing line. If hospital men are not taught and required to do nursing in peace time, they will certainly never learn it during war.

The permanent army physicians were, as a rule, not trained administrators, and the "reserve" physicians knew nothing of military matters. They were not trained because they were given no opportunity to become so. Their professional work was above criticism.

Fourth. An administration and execution following strict military standards. This certainly was the case in the Far

East, for much of this part of the sanitary work was done by purely military officers, who were not specially trained sanitarians, and it was apparently well done.

As the roster shows, generals of exalted rank were assigned to the duty of directing the sanitary department, and line officers were taken from their units to assist in administering this department, even though, as Kuropatkin said, their services were sorely needed with the troops.

I conclude from this that the Russians regarded the work of the sanitary department as of real military importance, and, having to choose for its directors between military men who were not sanitarians and sanitarians who were not military men, they properly selected the former. In making their selection it will be observed that high ranking officers were chosen as directors. There could be but one reason for such selection, the responsibility and arduousness of the work.

The application of this to our own service, it seems to me, is that our military sanitarians must be trained as administrators, and that the importance of their work should be recognized by other military men and regarded as real military duty.

Other impressions are noted in the course of the report. So far as I know, we have no sanitary organization back of the lines and nothing defining the relations of relief societies to the military body in active service.

THE MEDICAL DEPARTMENT.

So much regarding the organization of the medical department of the Russian army has been recently published that it seems unnecessary to burden this report with anything more than an outline of the peace organization.

Up to the present time there appears to have been a medical corps—i. e., a body of military physicians—but no medical department. This corps has at its head a chief military medical inspector, at present Doctor Spiranski, privy counselor (the third grade in the chin), assimilating to the rank of lieutenant-general. He presides over the central military medical board, whatever that may be, to which the military medical scientific committee is attached. As I under-

stand it, the functions of this committee are to consider purely professional questions, to recommend sanitary measures, the establishment of hospitals, etc.; it also has supervision of the manufacture or purchase of medical supplies, and it keeps the medical statistics of the army. The central military medical board has jurisdiction over district boards and the medical inspector who presides over them.

The medical inspector of an army corps reports to the medical authorities of the district in which he may be serving, and his medical subordinates report to him. Of course all surgeons of whatever grade serving with troops are directly under military authority.

There is also a so-called central military sanitary committee, which is attached to the war council and which has to do with mobilization.

I was told that the chief military medical inspector has recently been made a member of the staff of the minister of war and in the absence of the latter is authorized to decide questions relating to medical affairs. Just how much authority he has over army physicians outside his own office I am unable to say, but I fancy not a great deal, as I was told that the general officers in the field usually selected their own chief medical inspectors, though the detail had to be confirmed by the Emperor.

In looking over the report of personnel in the office of the field medical inspector, Gobacevich, who was at the head of the medical department in the Far East, I found no "state" of underpersonnel.[a]

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[a] The functions of a field medical inspector who is under the immediate command of the chief of the sanitary service, are:

First. The assignment to duty of military physicians below the grade of division surgeons. (I understand that seniority within any grade may be ignored in making assignments, and a lower-grade official may be temporarily placed above one of higher grade, but the detail requires the authority of the Emperor to make it permanent.)

Second. The inspection of hospitals as to their professional features.

Third. The supplying of medicines, surgical material, hospital furniture, tools, equipment, clothing, etc.

Fourth. The keeping of a record of all sick and wounded.

Fifth. The informing of the commander in regard to the movement of sickness in his command.

Sixth. The making of sanitary examinations and the advising of the commander regarding the sanitary conditions.

From this I infer that he had nothing to do with the administrative control of the underpersonnel.

The permanent military medical staff is recruited chiefly from graduates of the army medical school, though any Russian physician may be appointed to the army by the minister of war, with no requirement beyond that of graduating at a medical school, no examination being at any time demanded for or after entrance, though I understand there is a period of probation before an appointment is made permanent.

All Russian physicians belong to the reserve and are liable for service until 45 years old. Unlike their colleagues of the German army, they have not up to the present time been required to serve in the ranks, and their work in times of peace is so wholly professional that, as a body, they know little of the duties of an administrative medical officer.

Military medical service is not popular in Russia, largely because the reward is not commensurate with the effort demanded, and, moreover, the status of the army physician—he not being an officer—is one of isolation if not ostracism. It is the old story—in a community where rank is the guinea stamp the man without the stamp does not pass current.

Like most other nations Russia has long maintained a military medical academy, from the graduates of which have come the larger part of her army and navy physicians.

It was my pleasure while in St. Petersburg to visit this magnificent institution, established by Peter the Great, and which celebrated its centennial about the time we were inaugurating our own modest army medical school. One is astonished at the extent and perfection of the plant. A stately academic building with capacity for 750 students, a completely appointed hospital of 850 beds, a medical library containing over 100,000 volumes and receiving 700 current medical publications from the entire world; anatomical, physiological, and bacteriological laboratories in a great building containing all the latest advances in apparatus and teaching appliances, a physico-chemical institution, a botanical garden, a laboratory of hygiene (established in 1865). Besides these there are a school for feldshers (male nurses), quarters for commandant (a physician), parks, etc., all covering an area of 100 acres in the heart of a great city and

representing an investment of not less than $20,000,000. The students and personnel of this great institution number approximately 2,000.

The faculty consists of 34 professors and 70 assistant professors, in addition to whom there are 47 prosectors curators, etc., exclusive of the clinical assistants and others directly attached to the hospitals.

The academy is not exclusively devoted to the education of physicians for the public service. Its doors are open to all medical students under the conditions of entrance, only those who are beneficiaries of the Government being held to service, at the rate of eighteen months for each year spent in the academy as a beneficiary—a maximum of five years.

Beneficiaries of the school are appointed by the minister of war from applicants who are graduates of a classical or real lyceum (gymnasium), corresponding to a collegiate course with us, culminating in a degree in arts or science. Latterly the standard was somewhat lowered, so that at present military cadets (graduates of the second grade military schools) and seminarists (graduates of ecclesiastical schools) are admitted to the academy. Candidates for the army or navy do not receive a money allowance until they enter upon their third-year course.

The curriculum of the academy is identical with that of the medical sections of the Russian universities. The first two years are devoted to the study of the natural sciences and the remaining three years to strictly medical subjects.

The money allowance is 420 rubles per annum, and from the date of its acceptance the beneficiary is in the service of the State. The number of such medical cadets allowed is 412.

Students who are not candidates for the public service pay a tuition fee of 60 rubles per annum.

The graduates number annually about 125, of whom the larger portion enters the services.

The military medical academy has other important functions which, however, are subsidiary to its primary object—the training of men for the medical corps of the army and navy—and need not be mentioned here.

I could not learn that there were any courses in this insti-

tution whose object was to impart a knowledge of those subjects special to the medical officer, as previously stated, the curriculum not differing from that in the other medical schools. The professors all have chin rank, wear swords, and are saluted, but so far as I could learn are not medical officers, as we understand the term, either in theory or practice.

General Kuropatkin, who has the reputation of being the most advanced military thinker in Russia, realized that the medical department of that army was archaic in organization, and recently, while minister of war, determined upon a reorganization on modern lines. I am told that he was impressed with the fact that the army physician, if he was to assume the administrative responsibility of the sanitary department, must have a sufficient military education to enable him to appreciate its relation to the other parts of the body military, and he had about determined to require of all candidates for the medical department a year's preliminary service in the line, such as is the case in Germany. As a beginning an edict was issued requiring the medical cadets to serve a number of weeks with the colors during the vacation season (June–September), and this, I understand, they were doing when the war with Japan began.

Appointments to the army and navy are not confined to graduates of the medical academy, but may be made from the alumni of any Russian medical school without examination other than that required by the school, and all graduates in medicine from all the universities are ipso facto members of the reserve. Such are not required to serve in the ranks, and are without military training.

It is needless to say that the position of the medical man in the Russian army is not desirable. As one of them remarked, "There is a huge book defining our duties, but not a word as to our rights," and no physician, either active or reserve, with whom I spoke regarding the matter was satisfied with the conditions.

The sociological situation in Russia is so peculiar that it is difficult for an outsider to gain an intelligent appreciation of it. The people are divided into two grand divisions, the civil and the military, both of which are mutatis mutandis

organized on almost identical lines. The priesthood constitutes a third division.

The Russian army physician belongs to the civil official class; but he has no military rank and occupies an uncertain position somewhere between the chinovaik and the officer; he wears a uniform, as do all Government employees of whatever class, a sword, epaulets, and a cockade on the band of his cap. This last fact was pointed out to me with great pride by one of the brightest physicians I met as evidence of the fact that he belonged to the soldier class. He is also entitled to a salute. Whether he is accepted or rejected socially by the officers depends entirely upon himself, but he is really never recognized as one of them. He is, as a Russian remarked, "not regarded as their comrade, but as a foreign element in the regimental family." Intellectually he is usually much superior to his associates of the line of the army.

I have gone somewhat into detail as to the recruitment and status of the army physician, for we must study the man if we wish to find out the why and wherefore of results.

On permanently entering the army a physician takes the ninth civil grade, titular counselor, assimilating that of captain in the military grade. His official designation is Dr. ——— ———, T. C., though I am not sure that he must have received the doctorate or only a lesser degree.

Thereafter his promotion depends upon length of service, four years being ordinarily required in each grade until the sixth grade of the chin, collegiate counselor (assimilating colonel), is reached, after which promotion is made by selection, with the approval of the Emperor.

Doctor Gorbacevich, chief field medical inspector, is a civil counselor, assimilating major-general; he entered the service the same time I did and is about my age. Doctor Speranski, the senior official of the Russian military medical department, is a privy counselor, assimilating lieutenant-general; he is apparently a very old gentleman.

The pay of the army physician corresponds to that of officers of assimilated grade in other branches of the service, and will be shown in tables giving the organization of medical units. Increased pay and allowances are given for serv-

ice outside of Russia, and I understand that army physicians are permitted to accept other opportunities of emolument when such do not interfere with their regular duties. Details to other branches of the public service are not unusual.

There is compulsory retirement for age in the Russian military service which applies equally to army physicians. Lieutenants must retire at 53 years of age, captains at 55, and those of higher grades, with exceptions, at 60. Should the physician have attained the office of medical inspector he is continued on the active list after reaching 60 years.

As the pension or retired pay is really part of the army physician's emoluments, I will here add a word on this subject.

The pension for twenty years' service is equal to half the pay of the next higher grade, and for thirty years full pay. When disabled the amount of pension is determined by the extent of the disability.

In addition to retired pay the physician as well as the officer becomes the beneficiary of an official insurance, called "emerital pension." The fund for this pension accrues from a deduction of 6 per cent from the annual pay of all officers, and reaches the beneficiary after he has served twenty-five years. Should an officer die or otherwise quit the service before completing this period, the amount actually paid in is wholly repaid to him, or in part to his heirs, the widow getting half and the minor children one-fourth.

Upon completion of twenty-five years' service the officer becomes a beneficiary and receives an annuity for his life, one-half of which is continued to his widow and one-fourth to his minor children.

The Alexander commission, founded and endowed by Alexander I, has for its object assistance to the needy military personnel, including their widows and children. In addition to the income from the endowment, the funds of this commission are sustained by sequestering the increased amount of pay of the first three months after promotion of all officers, by concerts, private contributions, etc.

In addition to physicians there are pharmacist officials who form a part of the cadre of the medical department. They, too, have rank in the chin, beginning somewhat lower

than physicians, with the assimilated rank of lieutenant and ending with that of colonel. These officials are in charge of the dispensaries of the larger hospitals, of the supply depots, etc. All civil pharmacists belong to the reserve up to the age of 45 years.

Officials belonging to the intendance are usually on duty in the larger hospitals in connection with subsistence matters.

UNDER PERSONNEL.

The under personnel of the medical department is made up of women nurses (sisters), men nurses (feldshers), and orderlies (sanitaries).

There are also clerks, noncommissioned officers, etc., whose numbers are comparatively small, but who frequently come up to plague one in search of the details of the apparently complicated organization.

Women nurses have been employed in the Russian army ever since the Crimean war. There is, however, no nurse corps in that army, and no training school.

Training schools for nurses are maintained in many of the larger hospitals of Russia and Siberia. The oldest, largest, and most influential of the nursing sisterhoods is that known under the title of the Society of the Sisters of St. George, located in St. Petersburg. So far as I could ascertain, the course of instruction, covering two years, was on the same plan as in our schools, and the outcome quite up to our best results.

The employment of nurses in Russian army hospitals is entirely a local affair, and is in the hands of the local medical authority. Should he desire a nurse, he sends to the nearest training school and one is sent. If she is not satisfactory, she is returned and another sent to replace her. The nurses always continue their connection with their own sisterhood or training school, and look to it in all that a home implies.

I am told that there is ordinarily no difficulty in getting all the trained nurses desired, who are employed in number averaging 1 to 20 beds. (More in Red Cross hospitals.) The nurses have a status somewhat higher than feldshers (noncommissioned officer, hospital corps); they receive in

home hospitals 20 rubles monthly and on the frontier or during war 30 rubles. They are boarded and lodged, and when these allowances are commuted the rate is the same as for a subaltern officer, 1.5 rubles per diem for subsistence and 75 kopecks for quarters.

In each hospital one of the nurses is detailed as head nurse, but her pay and allowances remain the same as for the other nurses.

I am told that the service is generally liked and the nurses often remain until superannuated. There is no retiring allowance, but there are several homes for aged and infirm nurses supported by private contribution.

At the beginning of the war the trained nurses volunteered in large numbers, and well met the emergencies of that most trying period of a military medical department. But the supply was soon exhausted and was reenforced by the good women of the country who, actuated by patriotic motives, volunteered in large numbers. These women, oftentimes the wives or daughters of officers serving at the front, many of them delicately nurtured and highly educated, were required to take a short course (six weeks) in a hospital before enlistment. At the close of the war 75 per cent of the so-called "trained" nurses were of this class.

Of course they were not "trained," but I have no doubt their ministrations were far more acceptable than those which otherwise would have had to be given by rough soldier hands even less "trained" and certainly far less intelligent.

I found women nurses in the mobile field hospitals at the extreme front, and heard of their being at the dressing stations in the very midst of battle; indeed, several of them lost their lives on the field. The concensus of opinion among army physicians is that their proper place is in fixed hospitals at the rear, where they can be suitably surrounded and where they can do their best work. One day returning from the extreme front I met in the railroad train a "sister," almost a child in appearance, who was the daughter of a general officer on duty in the lines. She told me that she had volunteered for the war from patriotic motives, and to

fit herself for the work took a three months' course in one of the hospitals at Moscow.

She had been on duty on a military hospital train for a year, plying between the front and Harbin, with occasional trips to Irkutsk. The train on which she was serving was made up of freight cars, with passenger cars for the personnel.

Her duties consisted in taking charge of the sick in four cars, administering remedies, looking after diets, linen, and other property, and attending to the police of patients and cars, in which she was assisted by a "sanitary" (orderly), one to a car. In turn, she was detailed for the day on duty in the kitchen, where she verified the diets, seeing also that they were properly cooked and served, though she had nothing to do with the actual cooking.

The senior nurse had charge of all the nurses, and her assistant was in charge of the linen. I might add that the train, consisting of 30 cars, was commanded by a line officer and had 2 physicians, 5 sisters (nurses), and 30 sanitaries (orderlies).

The instruction of the male underpersonnel runs in about the same lines as with ourselves. The chief medical inspector informed me that after the annual maneuvers a certain number of men were told off for special instruction in hospitals. This was given by the physicians, but they gave no other instruction to the men, this being done by their own officers.

Except the feldshers, the medical department has no underpersonnel that actually belongs to it, such as it has being detailed from the active troops in peace times and the reserve in war. These soldiers when so detailed are called "sanitaries;" they remain under command of their own officers, who are detailed to medical units.

The military feldsher corresponds to our noncommissioned officer of the Hospital Corps, with far less responsibilities. Like the physician, his work is technical; he is nurse, dresser, dispenser, clerk, but has little or nothing to do with administration or discipline.

The feldsher has the same professional status in Russia as the practicante has in Spain or the like in other coun-

tries. He is not a physician, but has a legally recognized status and is allowed to undertake simpler medical practice. In civil life he "is the peasants' doctor, elected and paid by them. He must have passed some preliminary examinations and have had a certain regular training before he obtains his diploma," etc.

I have already referred to the great feldsher school in connection with the military medical academy in St. Petersburg. Such schools are also established in every large garrison town; moreover, men are instructed in regimental schools by the surgeon. The latter, I am told, are usually not so well instructed as are those taught in the regular schools.

The character of the instruction given in the regular feldsher schools is indicated by the following curriculum, taken from official sources:

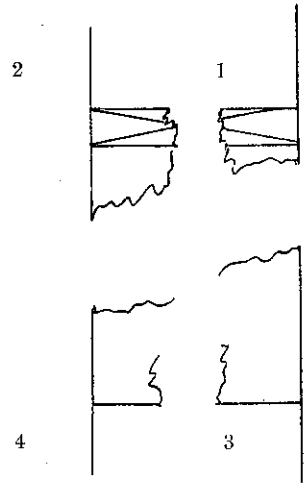
Theology.
Russian language.
Latin.
Arithmetic.
Geometry.
Drawing.
Geography.
History of Russia.
Penmanship.
Zoology.
Botany.
Physics.
Anatomy.
Physiology.
Pharmacognosis.
Chemistry and pharmacy.
Pharmacology.
Prescriptions.
Pathology and therapy.
Diseases of children.
Surgery.
Desmurgy.
Mechanurgy.
Massage.
Care of ill and injured.
First aid.
Poisoning.
Hygiene.
Venereal diseases.
Skin diseases.

Women are received as pupils in these schools and practice as feldshers. Midwives are educated in special schools.

All male feldshers, like physicians, belong to the reserve.

The consensus of opinion is that the feldsher is an indispensable part of the military medical personnel; he is in the Russian service, within the limitations of his work, what our noncommissioned officer of the Hospital Corps is in our service, and is very much in demand.

The Russians have a bearer drill. Each litter has four bearers, who take posts at the litter as follows:



From double rank:

2 1

4 3

The method of lifting the patient is the same as we formerly had, the relative positions of the numbers being different.

1

2 4

3

The passing of obstacles, the placing of a patient in the saddle, carrying upstairs, and loading of ambulance are all as we used to do.

The use of litter slings is not shown in the illustration, but I saw them in practice, and when they were not used the litter was almost invariably carried on the shoulders of the bearers.

One day while watching Chinamen carrying wood aboard a steamboat on the Sungari River I observed a method of

using slings that struck me as exceedingly practicable. The load, weighing in the neighborhood of 500 pounds, was carried by two Chinamen on two poles about 10 feet long. The bearers stood one at either end between the poles and supported the load by slings passed over one shoulder, thus avoiding the uncomfortable pressure at the back of the neck. This way of using the sling is applicable to our new drill, as thereby the front bearer has simply to slip the sling from the shoulder and drop it when the litter is lowered.

Regarding general instructions in first aid I heard different stories; some told me it was given and others said it was not. I think both were right. The instruction was probably given in those organizations where the commanding officer and the surgeon appreciated its necessity and neglected in others. I saw plenty of sick and wounded carried on litters, but no bearer drill.

We have glanced at the man, let us now consider the machine.

Field sanitary organization in all armies is essentially the offspring of war and has no existence in peace times. It must be organized at the moment of utilization, and like all new machinery is sure to work roughly and unsatisfactorily in the beginning. At the start it is almost always underengined, for in the throes of war the killing department must take precedence over the curing, and when it is a question of bullets or bandages the bullets necessarily always win. War is not waged for the purpose of succoring the wounded. Then, too, the engine crew is almost entirely unaccustomed to the machine and must learn it as it is being driven at full speed.

The logical deduction from this is that the least friction will result if all the material for the engine has been assembled and the principal personnel assigned in advance to specific work in setting up and running the machine, so that the underpersonnel will know at least where it belongs and can be quickly taught what it has to do.

Russian soldiers are too well versed in the theory and practice of war to fail to have appreciated the requirements of a military sanitary department in active service, and if these

requirements were not met, it must have been because of exigencies, some of which can be surmised, though none is absolutely known to me.

I am informed that the actual mobilization of military hospital accommodation was 420 beds per division with the troops, 420 beds immediately in their rear, and 840 beds in reserve, making a total of 1,680 beds, 8.4 per cent of the effective; or, eliminating the division and mobile field hospitals, 4.2 per cent for the base, which is 6 per cent less than experience has taught us is necessary.

General Kuropatkin stated that when the war broke out, Russia neither expected nor was prepared for it. The demand for soldiers was imperative, and the very limited resources of the uncompleted trans-Siberian railroad had to be devoted to the transportation of men and material absolutely essential to their fighting efficiency. This is one probable reason why the units mobilized by the medical department were inadequate.

Later this defect was measurably remedied by the Red Cross mobilizing a duplicate medical department, so to speak, without which there must have been a serious breakdown in the sanitary arrangements.

The scheme of field organization followed the lines which experience has taught to be the most practicable and which I will now endeavor to describe. It was essentially the same as that of the Japanese, which is modeled on the German system.

The sanitary organization directly attached to active units has a continuing existence and is practically the same in peace and war. The regulation allowance of personnel, material, and transport therefor is as follows:

PERSONNEL.

Lazarets with troops.	Infantry regiment.	Battalion artillery, park brigade.	Cavalry or Cossack regiment.	Artillery brigade.	Horse battery.
Surgeon	1	1	1	1	1
Assistant surgeons	4	1	1	1	.....
Feldshers, senior	1	1	1	2	1
Feldshers, apothecary	1	.....	1	1	.....
Feldshers, junior	12	1	7	8	1
Feldshers, students	14	4	6	4	1
Feldshers, company	.....	4	.....	.....	.....
Hospital sergeant	1	1	1	1	.....
Orderlies	3	2	2	4	1

MATERIAL.

Number of beds[a]	16	4	6	6	4
Litters	32	8	.....	12	2
Bearers, company	128	32	24	36	6
Ambulance wagon for 5 patients (4 lying and 1 sitting)	4	1	2	3	1
Knapsacks, feldshers', in each 10 dressings	16	4	.....	6	.....
Medical chests, in each 50 dressings	.....	.....	6	.....	1
Medical knapsacks, in each 20 dressings	32	8	.....	12	.....

HOSPITAL COMFORTS.

Conserves:					
Soup	80	20	30	30	.....
Meat	80	20	30	30	.....
Fruit extract.....pounds..	2	½	1	1	.....
Sugar.....do....	24	6	10	10	.....
Tea.....do....	4	1	2	2	.....
Wine.....bottles..	8	2	2	2	.....
Vodka.....kegs..	1	.....	.....	.....	.....
Do.....bottles..	.....	4	6	6	.....

TRANSPORT.

Wagons, 2-horse	1	.....	.....	.....	.....
Ambulances, 4-horse	4	1	.....	3	.....
Carts, hospital, 1-horse	4	2	3	3	2
Carts, veterinary, 1-horse	.....	.....	1	.....	.....

[a] Usually 1 tent is issued.

As a matter of fact, there were considerable departures in the Far East from the allowance above outlined, as was to be expected.

As I understand it, during peace time we must make the most perfect organization and plans for active service we are capable of, and in war endeavor to come as near to them as possible, but can never hope to reach their full measure. Actual war is always a compromise between the best and the possible.

The dispensaries, or lazarets, as the Russians call them, with the troops in active service, were opened only under exceptional circumstances for the care of hospital cases.

Such cases were sent to the division field hospital at once or as soon as possible, so that all of the sanitary resources of the combatant units might be free and ready to accompany the commands to which they belong. The Russians quite appreciated that a regimental hospital for the treatment of protracted cases is an anomaly in war; if it is to accompany its unit it can not entertain such cases, and if it does not accompany it, then it ceases to be a regimental hospital.

In battle the regimental sanitary personnel organized advanced dressing stations, to which the wounded were brought by the company bearers and where they received such treatment as they might require or the circumstances would permit.

The vehicles pertaining to the regimental lazaret were placed conveniently near at hand, under such shelter as was available, and were employed in carrying the wounded back to the main dressing station of the division.

All organizations in rear of the firing line which pertained to the medical department in the field came into existence only when the army was mobilized, some as a development from existing elements and some de novo.

The Russian military medical department mobilized the following medical units: (1) Division lazarets, (2) field hospitals, (3) rest (etape) stations, (4) convalescent depots, (5) sanitary convoys, (6) sanitary railroad trains, (7) field supply depots (dispensaries), (8) intermediate supply depots (dispensaries).

THE DIVISION LAZARET.

The division lazaret was the central feature of battlefield sanitation, its function being the initiation of the great scheme of evacuation of the wounded, for which, so far as I

know, our regulations make no provision, though its satisfactory performance demands a necessarily intricate organization and exact execution.

This organization, of which there was one per division, consisted of a dressing station section and a transport section, the personnel of which was as follows:

Office.	Number of personnel.	Annual salary with proper deductions.				Rank of office.	Class of pension.
		Pay proper.		Ration allowance.	Increased ration allowance (war).		
		Peace.	War.				
MEDICAL STAFF.							
		Rubles.	*Rubles.*	*Rubles.*	*Rubles.*		
Division surgeon	1	507.00	759.00	829.20	331.20	6	4
Division surgeon, assistant	1	414.00	621.00	553.20	276.00	8	5
Junior surgeons	3	333.00	498.00	276.00	220.80	9	6
Feldshers:							
Medical, senior	1	60.00	90.00	.....	.....	.....	.....
Medical, junior	2	36.00	54.00	.....	.....	.....	.....
Pharmacist, senior	1	60.00	90.00	.....	.....	.....	.....
Veterinary, junior	1	36.00	54.00	.....	.....	.....	.....
INTENDANCE AND TRANSPORT.							
Officer: Inspector and commander of bearers	1	(a)	.....	600.00	.....	.....	.....
Official assistant to inspector	1	420.00	630.00	420.00	.....	9	7
Clerks:							
Upper grade	1	36.00	54.00	.....	.....	.....	.....
Lower grade	1	24.00	36.00	.....	.....	.....	.....
Orderlies (unassigned conscripts):							
Senior	2	24.00	36.00	.....	.....	.....	.....
Junior	20	2.70	5.25	.....	.....	.....	.....
BAGGAGE.							
Warrant officers:							
Senior	1	18.00	27.00	.....	.....	.....	.....
Junior	1	4.05	7.80	.....	.....	.....	.....
Bearers:							
Sergeant-major	1	24.00	36.00	.....	.....	.....	.....
Warrant officers—							
Senior	4	18.00	27.00	.....	.....	.....	.....
Junior	12	4.05	7.80	.....	.....	.....	.....
Privates	200	2.70	5.25	.....	.....	.....	.....

a According to rank.

RECAPITULATION.

Surgeons	5
Feldshers, hospital corps	5
Officer	1
Official	1
Clerks	2
Orderlies	22
Noncommissioned officers	19
Privates	200
Total	225

The division lazarets I inspected were in camp, and, so to speak, out of commission. These organizations had no de-

fined functions off the battlefield except to serve as a reserve from which physicians and other personnel could be drawn for temporary work with other medical units in the division. The apparently large amount of transportation was also available for this purpose.

Those organizations which fell under my observation coincided quite closely in personnel and outfit with the regulation requirements, though all four-wheeled ambulances were eliminated. The military officer on duty with the lazaret seemed to be in command, was addressed as " commandant," and was usually sent for when I wished any information outside of purely professional matters.

I found considerable variety in the views of the physicians on duty with the lazarets as to the exact functions of this organization and how its work is done. It is but fair to say that most of those I questioned on this subject were reserve surgeons, recently arrived and without practical experience on the field. Those who had been at the front during the active period of the war were well informed in this matter, though hazy as to details.

As there was no battle while I was in the Far East I saw no dressing station in operation, and am obliged to rely upon the statements of eyewitnesses as to their working.

The division lazaret was the medical headquarters of the division, where the division surgeon was to be found during battle, and from which he supervised the work of his department.

The lazaret established a principal dressing station, to which, theoretically, all the wounded of the division were brought. Exactly how this station was organized I am unable to say, but I presume on the same lines as in other armies, which have under one or another designation sections for receiving the slightly wounded, dispensary, operating, kitchen, miscellaneous, etc. At the dressing station the wounded were given such professional treatment as was absolutely necessary, were fed, and finally transferred back to the division field hospitals by the transport section of the lazaret, or received religious consolation and were buried.

The Russians at the beginning, being far outnumbered by the Japanese, had no recourse but the Fabian policy of fighting and falling back, until time enough had been gained in

which to assemble their forces and create an army. The fighting consequently always occurred along the line of the railway. Indeed this road was the peculiar tactical feature of the war; without it war could not have been carried on, and yet had it not existed there would have been no occasion for this war. It cut a stupendous figure in the immediate evacuation of the wounded, who were frequently sent from the dressing station, usually established in some joss house or finca near the railroad, directly to the hospital trains. Otherwise the wounded were as rapidly as possible sent back to the division or Red Cross mobile hospitals and thence to rear by rail.

By this means the Russians managed to get most of their wounded away, and though some hospitals remained on the field after the Russians retreated, in several battles, the number of wounded left behind was comparatively small.

A Russian physician, relating to me his experience at a dressing station during the battles of the Sha River, said:

> The dressing station was established at a convenient point, somewhat sheltered from fire, though an occasional shell would fall near by and the location was too exposed to permit the wheeled transportation to approach. The personnel consisted of 3 physicians, 3 sisters, a few feldshers, and some 15 sanitarians. An attempt was made to organize the station systematically and conduct it in an orderly way. At first but few wounded were presented, and the required records were kept, but soon the battle became fiercer and fiercer, the maimed came in by scores and hundreds, and there was hardly time to render professional aid, leaving wholly out of consideration the keeping of records, so the wounded were bandaged as rapidly as possible and passed to the rear. There was much confusion and disorder, and presently the sanitaries shirked, being worked out, but the surgeons and the sisters worked on for twenty-four hours continuously until upward of 2,000 cases passed through their hands. Such patients as required it were sent back on litters by hand to the field hospitals, and thence were transferred to the hospital trains.

The collecting of the wounded, the rendering to them of first aid, and their transportation to the dressing stations is the specific duty of the company and divisional bearers, and no other was authorized to leave the ranks for this purpose. I am told that the regulation was not strictly enforced; that often the wounded were accompanied by other than company bearers, and in numbers in excess of the necessities of the cases. I presume this has been so in every war, and will

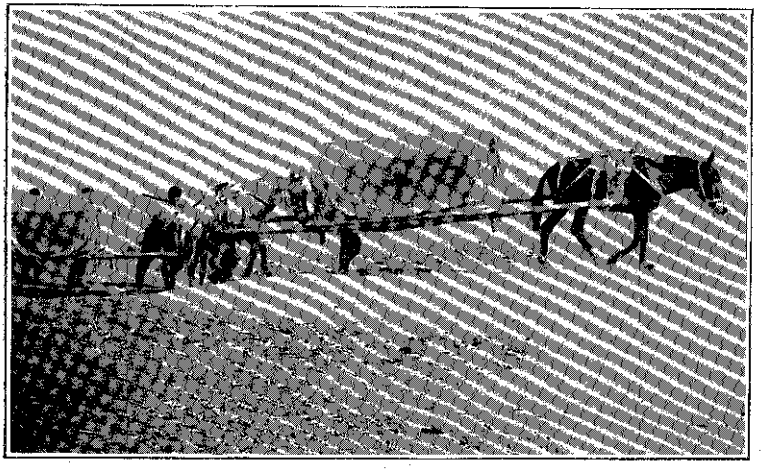
continue to be, yet it is my conviction that specifically designated and marked company bearers should be part of the war organization of every unit, not only for the efficiency of the work, but as a deterrant against one cause of unauthorized absenteeism from the firing line. No company bearer was permitted to go behind the regimental aid station, and his work of collecting the wounded was done under the supervision of a regimental line officer. The transport column or ambulance company was responsible for the transfer of the wounded from the regimental aid stations to the dressing station, for which purpose the regimental medical transport might be used. It had a liberal personnel and transport. The variety of vehicles issued to it were, from one cause or another, gradually reduced to the simplest form, the dvukolka, or cart, of which there were altogether 64, or were, in the seventeenth division, nineteenth corps, for example, each capable of carrying two patients most uncomfortably.

The regulation transport of the division lazaret was 3 carts (1-horse), 15 wagons (2-horse), 9 ambulances (4-horse), 4 horses (mounts), 3 horses (spare), and 117 hand litters.

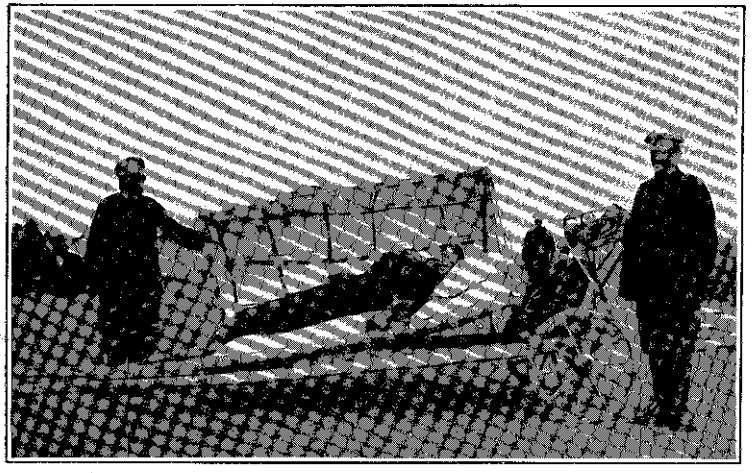
It is hardly necessary to say that the regulations were not—indeed, could not be—strictly observed in the Far East. The four-wheeled ambulance was said to be too heavy for roadless Manchuria, though I think the real reason why it was not used was the difficulty in transporting such vehicles by rail, and the sick transport resolved itself down to the simplest elements.

The Russian cart was taken as the unit. This is a springless, one-horse vehicle, very practical for the transportation of inanimate things, but entirely inappropriate for the carriage of the wounded. The body of the cart is about half the size of that of our escort wagon, being 5 feet long. The sides, 2 feet high, sloped somewhat, giving a width at the floor of about 30 inches and at the top of 36 inches. With the tail gate lowered one man could lie extended with room enough, but two men would have to fit in spoon fashion. On heavy roads an extra horse was hitched at the side, or one on either side, of the shaft horse.

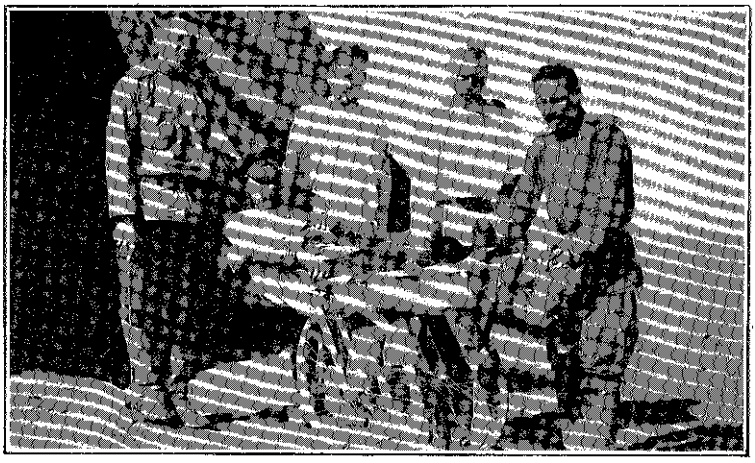
It was necessary to improvise a practical means for trans-



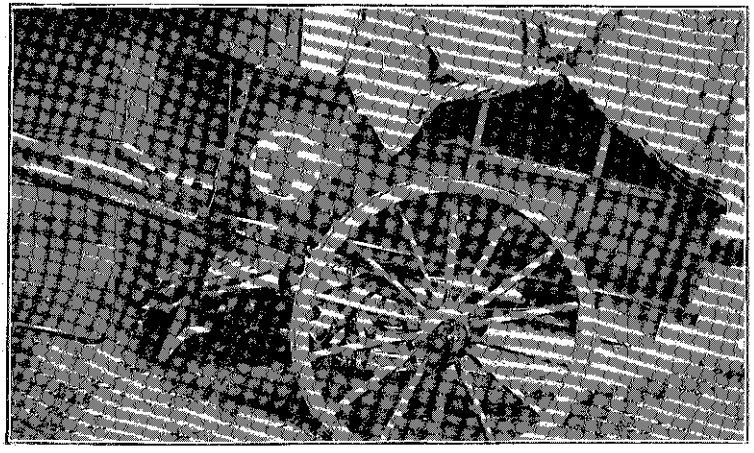
HORSE LITTERS.



WHEELED TRAVOIS.



WHEELED LITTER.



FINN CART AMBULANCE.

porting the wounded, and, as was to be expected, these improvisations took the form of the horse litter and the travois.

The horse litter was regarded as the most comfortable; but as it required two animals to carry one man, it was too expensive for general application.

The wheeled travois was found to be very comfortable and had certain advantages, as it furnished transportation for the driver as well. It is interesting to observe that it followed the plan of a travois devised by Captain McDougal, of our Army, many years ago, though the McDougal travois was without wheels, which I think an advantage.

Special two-wheeled ambulances were used by the Red Cross "flying detachments."

The four-wheeled vehicles, when there were any, were used for the transportation of matériel.

The division lazaret had four hospital tents. These tents were more than twice the size of ours, being 25 by 40 feet and 15 feet to the ridge, with accommodation for 20 patients. I thought them much too large and unwieldy, and those with whom I discussed the matter agreed in this opinion. The Red Cross avoided them and used other patterns.

The equipment of the lazaret was entirely an emergency outfit. To be sure there were surgical instruments, but these were only for surgical emergencies. The patients who came under the care of this organization were transients, to be gotten rid of as quickly as possible. No provision was made for their permanent care, and none should be, for were this done the lazaret would become a field hospital, which is not its object. Colonel Havard, in speaking of the division lazarets, said he noticed "a general laxity of discipline and want of organization, as if nobody was in command or responsible." It has not been my fortune to see such an organization operating under the stress of battle, but from what has been told me by eyewitnesses and what I have read I am constrained to believe that the management of a dressing station in battle is a stupendous task, and its success depends upon experience, or, lacking that, rehearsal—in a word, frequent drills. An army that waits for war to develop all its divisional sanitary personnel will pay largely in the diminished efficiency of its fighting units—the soldier

man in suffering and the nation in prestige—not to mention pensions. I might add that before a battle the division lazaret, which with other divisional medical units belonged to the first line of the train, joined the second, going behind the company ammunition carts and in front of the artillery park.

FIELD HOSPITAL.

(210 beds.)

The regulation personnel of the mobile field hospital was as follows:

Office.	Number of personnel.	Annual salary with proper deductions.				Rank of office.	Class of pension.
		Pay proper.		Ration allowance.	Increased ration allowance for war.		
		Peace.	War.				
MEDICAL DEPARTMENT.		*Rubles.*	*Rubles.*	*Rubles.*	*Rubles.*		
Chief physician	1	414.00	621.00	553.20	276.00	8	5
Assistant physician:							
Senior[a]	1	414.00	621.00	553.20	276.00	8	5
Junior	2	333.00	489.00	276.00	220.80	9	6
Director of pharmacy	1	387.00	582.00	553.20	.....	8	2
Feldsher:							
Medical—							
Senior	3	60.00	90.00	.....	.....	.....	.....
Junior	4	36.00	54.00	.....	.....	.....	.....
Pharmacist—							
Senior	1	60.00	90.00	.....	.....	.....	.....
Junior	1	36.00	54.00	.....	.....	.....	.....
Veterinary, junior[b]	1	36.00	54.00	.....	.....	.....	.....
INTENDANCE.							
Inspector	1	600.00	900.00	600.00	.....	8	6
Assistant inspector	1	420.00	630.00	420.00	.....	9	7
Bookkeeper and clerk	1	300.00	450.00	300.00	.....	9	7
Priest	1	900.00	1,080.00	.....	.....	.....	.....
Psalmist	1	240.00	360.00	.....	.....	.....	.....
Women nurses[c]	4	360.00	.....	.....	.....	.....	.....
Clerks:							
Higher grade	1	36.00	54.00	.....	.....	.....	.....
Lower grade	2	24.00	36.00	.....	.....	.....	.....
Hospital inspectors:							
Surgeon, sergeant-major.	1	36.00	54.00	.....	.....	.....	.....
Junior—							
Armorer	1	24.00	36.00	.....	.....	.....	.....
Subsistence	1	24.00	36.00	.....	.....	.....	.....
Laundry	1	24.00	36.00	.....	.....	.....	.....
Ward master	2	24.00	36.00	.....	.....	.....	.....
Ward inspectors:							
Senior	5	12.00	18.00	.....	.....	.....	.....
Junior	20	9.00	13.50	.....	.....	.....	.....
Servants	34	2.70	5.25	.....	.....	.....	.....
Drivers:							
Warrant officer—							
Senior	1	18.00	27.00	.....	.....	.....	.....
Junior[d]	1	4.05	7.80	.....	.....	.....	.....
Privates	26	2.70	5.25	.....	.....	.....	.....

[a] A division mobile field hospital is allowed 3 senior surgeons.
[b] Reserve field hospitals have no veterinary feldsher and but 2 drivers.
[c] Women nurses receive quarters, fuel, lights, and food of the officer standard. The men, of course, receive rations, quarters, etc.
[d] Two for reserve hospital.

RECAPITULATION.

Surgeons:		Nurses, women	4
Field hospitals	4	Hospital noncommissioned officers	6
Division hospitals	5	War orderlies	25
Pharmacist	1	Servants	34
Feldshers:		Transport:	
Field hospitals	9	Noncommissioned officers	2
Division hospitals	10	Privates	26
Officers or officials	2		119
Priest	1		
Psalmist	1		
Clerks	4		

It will be observed that the foregoing table, unlike that of the personnel of the division lazaret, does not provide in specific terms for a line officer, but for an "inspector," or superintendent, whose pay is greater than that of any other connected with the hospital.

Existing regulations specify that the senior physician on duty with the field hospital shall command it. This seems to be a concession to modern ideas, but as during peace times Russian military hospitals are commanded by line officers and little or no opportunity is given army physicians to learn administration, it is not surprising that in war the command often continues with the line. I found this to be the case in some instances, the surgeon not understanding administration, being willing to relinquish authority that he might be relieved of responsibility. However, as increased emolument went with the responsibility, it was usually accepted by the physician.

Of the 8 hospitals per division mobilized by the Russians for Manchurian service 4 were mobile and 4 were fixed. Of the 4 mobile field hospitals 2 were assigned to each division and were controlled by the division commander and 2 were held in reserve under the direction of the chief of the sanitary service. The latter were always in immediate touch with the troops and ready to supplement or substitute the division hospitals.

On the march at least one division hospital invariably accompanied its command. Both hospitals marched with the medical section of the divisional transport, and their function was to receive the wounded from the division lazaret during and after battle and at other times the sick from the troop lazarets.

The division hospitals were required to be evacuated at the first opportunity and never immobilized for any length of time. They might be emptied into the mobile field hos-

pitals immediately at hand or their sick transferred to the fixed hospitals farther to the rear.

The fixed or "reserve" hospitals were established on the line of the railroad well to the rear in more or less permanent structures. These organizations had the same personnel (except for the transport) as the mobile field hospitals, like them were designated by number, and when needed as field hospitals could be quickly developed into mobile organizations. In practice the "reserve" hospitals were often combined into 420 or 630 bed hospitals.

The regulation transport for a mobile field hospital was as follows:

Carts, one-horse	4
Wagons, two-horse	19
Ambulances, four-horse (four-wheeled)	2
Horses, riding	4
Horses, spare	3

Several of the wagons were used for the transportation of the personnel, the rest for matériel, of which they carried about as much as our escort wagon. The ambulances were substituted by carts. There was no absolutely fixed allowance of tentage; three were regularly allowed, the idea being that ordinarily the hospital would be established in some convenient building, but as there were few such in Manchuria, the division hospitals were in tents, an average of ten hospital tents being used for ward purposes.

There was furniture for sick officers only. When the camp was more or less permanent, platforms were made on which the sick soldier men were laid, but otherwise they lay on the ground, over which was strewn a litter of straw or leaves, etc., or on litters. In the fixed hospitals there was of course more or less furniture, some of which was of iron and quite up to date. Very good bedsteads of wood were made in Harbin, where I saw them in use. I might here state that I presented three of our field cots to the Russian medical authorities, and they seemed very much pleased with them, Doctor Gorbacevich saying that he should recommend their adoption in his service. I saw nothing that could compare with our cot in efficiency and portability.

The matériel of the mobile field hospital was packed in 36 boxes, weighing either 140 or 280 pounds each, and the

bedding in sacks. The armamentarium was simple, very few tablets were used, and the ensemble was in no wise comparable with ours, which I believe is unequaled anywhere.

Permanent hospital accommodation is provided in fortresses for 12.5 per cent of the strength of the garrison. When additional accommodation was required, fortress temporary hospitals with beds for 20 officers and 400 men were organized. The personnel of this hospital was just double that of the field hospital, i. e., the inferior personnel, there being of course but 1 chief surgeon, 1 inspector, 1 priest, 1 psalmist, and no transport personnel. As a matter of fact the field hospital of 210 beds seemed to be the unit, and all other military field or temporary hospitals were simply multiples of this, both as to personnel and matériel.

In addition to the hospital accommodation above set forth there were at the disposal of the commander of the army:

First. All permanent hospitals, military and civil, in the region occupied by the army.

Second. Foreign and newly opened hospitals in allied and neutral countries in accordance with special conventions.

Third. Hospitals belonging to the enemy taken according to the rules of war.

Fourth. Medical institutions of the Red Cross societies.

Besides the military personnel proper, all persons in any way attached to the army or its transport service and all sick military prisoners were admitted to military hospitals for treatment.

At all étape points there were rest stations which might be called emergency dispensaries. These institutions had accommodation for a dozen transients, but their chief work was in the out-patients' department, where a greater or less number of patients, men en route to or from their commands, reported throughout the day for treatment. Ordinarily these stations had a personnel of one or two physicians, a nurse, dispenser, cook, and a half dozen orderlies, depending upon the demands made upon the particular station. In addition to the étape dispensary at Kungchuling there was a first-aid station in the railroad depot at which a surgeon and nurse were always on duty. I was informed

that over 10,000 cases had there received professional assistance.

The Russian regulations provided for the establishment of convalescent depots for from 50 to 200 men, weaklings, slightly wounded, or those not requiring regular hospital treatment. These depots might be established in connection with fortress or nondivisional hospitals or separately.

At Harbin a section of the city was given over to this purpose and was known as "Convalescent Town." There were accommodations for a large number of men, but while I was in Manchuria there were very few occupants.

In addition to the transportation pertaining to troop and divisional sanitary units heretofore noted, there was provision made for hiring or requisitioning transportation for the transferring of sick and wounded (1) from the troop lazarets to hospitals; (2) from the division larzarets to hospitals; (3) from one hospital to another, to railroad stations, wharves, etc.

This transportation might be utilized in carrying men who have been returned to duty back to their commands, etc. Such transportation was organized in so-called "convoys," each capable of transporting 200 men—140 sitting and 60 recumbent—and could at once completely empty a mobile field hospital. The regulation transport consisted of 7 two-horse wagons, 28 four-horse wagons, and 1 cart. These convoys were usually under the control of the medical inspector of the army, but might be assigned to specific organizations as corps, divisions, or detachments, and even to hospitals.

Like other sanitary units in Manchuria, the transport was resolved into its simplest elements. The personnel of a sanitary convoy was as follows: Officer, 1; physicians, 2; clerk, 1; feldshers, 4; orderlies, 19; drivers, etc., 73. I understood that 7 such convoys were organized.

Should the sanitary convoys be inadequate to the required duty, the transportation pertaining to the mobile hospitals, or to the troops generally, might be used.

As previously stated, the railroad was a large factor in the strategy of the recent war in the Far East, and it certainly cut a considerable figure in the distribution of the ill and injured. There were 78 hospital trains, more or less, constantly on duty, of which 38 plied between the front and

Irkutsk, 22 between Irkutsk and Moscow, and 18 between Umsk and Moscow.

These trains were of two classes—one permanent, made up of specially arranged cars, with accommodation for 250 patients, and the other temporary, usually made up of freight cars (21 by 9 feet), and accommodating from 250 to 400 patients. The permanent trains were known as military and Red Cross, five of the latter being the "white" trains, veritable traines de lux, presented and supported by members of the royal family, except one furnished by the "richest woman in Russia."

The permanent trains had 14 Pullman cars (so called because they have four-wheeled trucks), 10 for wards, 1 for administration and officers' quarters, 1 for surgical operations, dressing, and dispensary, with quarters for nurses, 1 for kitchen and messroom, and one for underpersonnel. In addition there were usually 3 or 4 freight cars for stores, ice, etc.

These trains were commanded by line officers, the rest of the personnel consisting of 3 physicians, 1 intendence official, 5 women nurses, 5 feldshers, 33 sanitarians, 1 cook, and 9 mechanics.

The cars assigned as wards were arranged for a proportionate number of severe and light cases, 32 of the former to 18 of the latter. The severe cases were placed on litters in two tiers parallel with the long axis of the car, according to the Kruger system. The lighter cases were in bunks attached to partitions transverse of the cars, having an aisle at the side.

The kitchen was equipped with a modern range and all utensils necessary to Russian cooking. The cook might be soldier or citizen as the circumstances determined. The serious objection to this style of car was the difficulty in loading it, as the end door and crooked passageway would not permit the entrance of a loaded litter.

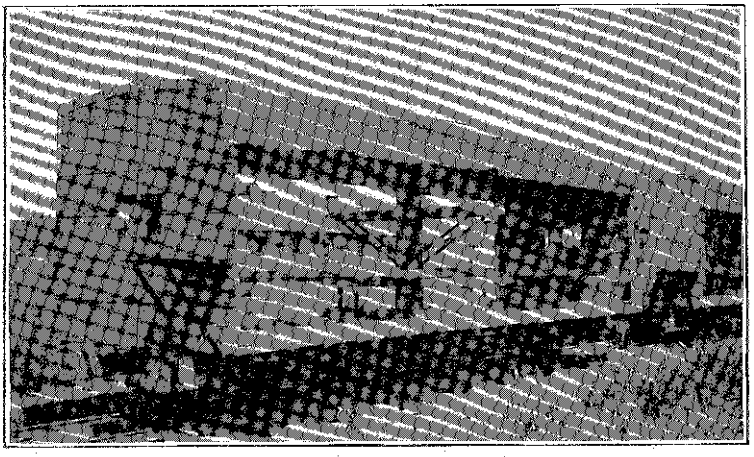
Prince Vicilchikov, the principal delegate of the Red Cross in the Far East, was of the opinion that the "temporary" hospital trains made up of the ordinary freight cars were much more practicable for ordinary use than were the permanent trains.

The temporary trains having been largely used in the

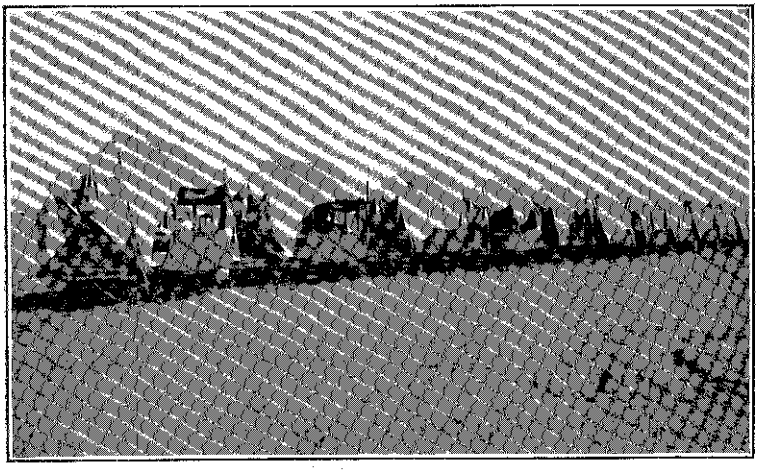
immediate theater of war, their arrangement and equipment were closely studied. The following are some of the suggestions which have been made:

All interior fittings should permit of easy removal, disinfection, and cleaning; they should be of such character that their removal and replacement could be done in a few minutes, say ten minutes for each car; and they should be folded to permit of close packing. The entire equipment should be capable of storage in three cars. The side entrances should remain as now, one on either side, and of ample size. The car should be well lighted, capable of being heated, and should have a kitchen (field) and water boiler. Proper provision should be made for the personnel, at least two "Pullman" cars, and there should be a car for dispensary and surgery, also an ice car. One-fifth of the accommodation should be for serious cases.

Professor Manteufle, who was principal consulting surgeon in Manchuria, asserts that the use of the ordinary passenger car for hospital purposes is impracticable, the upholstered seats of the first and second class cars do not permit of satisfactory disinfection, while the fixed wooden seats of the third class are filled with cracks and crevices. Manteufle says that he knows of but two comfortable types of beds suitable for use on temporary hospital trains, viz, litters on horizontal springs, the Kruger system of permanent trains, and the other in which the ordinary stretcher is suspended, or rather the handles rest upon spring brackets. The latter is the method of the German Red Cross, the apparatus consisting of four tubes, each tube containing two brackets playing in slots and resting on spiral springs. The tubes are secured to ceiling and floor, and each set accommodates two litters, one above the other. By this method 12 litters can be placed in an ordinary freight car, and by crowding room can be found for 4 more. Various methods of suspending the litter were employed, including the well-known method Zavodosky. The latter was not regarded as satisfactory, as the suspending ropes communicated too much motion to the litter. The simplest and quite satisfactory way was to rest the handles of the litter on two planks placed transversely across the car and secured to the opposite walls at a suitable height. The serious objection to the use of the



DECAUVILLE RAILROAD WAGONETTE FOR SICK.



DECAUVILLE RAILROAD HOSPITAL TRAIN.

freight car was the lack of end-to-end communication. Various experiments were made to overcome this difficulty, none of which was satisfactory. Manteufle stated that through communication was impracticable without undue loss of space, and he had no substitute to suggest except the keeping of an attendant in each car and putting the serious cases in "Pullman" cars.

The Fogelsong field kitchen was found most useful in connection with the temporary hospital trains.

In concluding the subject of railroad transportation I will say that the Russian surgeons seem to agree that appliances for the transportation by rail of the ill and injured in war must be of such character that they can be readily fitted to ordinary freight cars, for it is only by the employment of such cars that the sudden and enormous demands of modern warfare can be met.

The great question of supply and resupply seems to have been satisfactorily met by the medical department during the late war, though I observed that the Red Cross supply depot seemed to be a much busier place than the military medical supply depot. The regulations say that "for the supply of medical material to medical units with troops and to field hospitals field dispensaries are, when necessary, established in the theater of war; they draw their supplies from permanent medical supply depots, and, if such are too distant, from temporary intermediate depots."

The central supply depot of Russia is located at St. Petersburg, under the administrative control of the chief medical inspector (spiranski). Here is manufactured much of the matériel of all kinds used by the medical department, including medicines and instruments; there are also principal depots at Moscow, Bobr, Kiev, Tiflis, Omsk, Tashkent, Dvina, Brest-Litovski, Warsaw, Kremenchuz, Kazan, Khabarooka, at some of which certain special work, such as the preparation of sera, is done.

At Harbin were installed a supply depot or magazine, as it is denominated, which supplied the rear army and the depots and a field medical supply depot for each of the three front armies, while at Kungchuling was a flying or advance depot located on a train of cars.

This advance depot was organized when there was but

one army, with a "magazine" at Harbin, and was attached to the first army. With the organization of separate armies a separate supply was also organized, but it was not found necessary to locate the depots farther to the front than Harbin, about 150 miles back of the lines. Requisition was made directly upon its own depot by each unit of each army, except the first, and the material was sent out direct from Harbin. The advance (railroad) depot resupplied itself from its own depot in Harbin.

The personnel of the magazine was as follows:

Director of store	1
Pharmacists:	
Senior	2
Junior	3
Bookkeeper and corresponding secretary	1
Bookkeeper and corresponding secretary, assistant	1
Pharmaceutical feldshers:	
Senior	3
Junior	4
Clerks	4
Surgical-instrument maker	1

The personnel of the depot was as follows:

Director and senior pharmacist	1
Pharmaceutical feldshers:	
Senior	1
Junior	2
Servants	6
Surgical-instrument maker	1

The personnel of the advanced (railroad) supply depot was:

Chief apothecary	1
Apothecaries	2
Feldshers	4
Sanitarians	8

It had 8 cars, of which 1 was a passenger coach used as an office and quarters for officials. Of the 7 freight cars, 1 was used for underpersonnel, 2 for packing materials, and the remainder for stores.

The armamentarium medicorum in the printed supply table consisted of 99 medicines. To these were added 21 more or less recent remedies, a concession to the "reserve" physician, as follows: Tannalbin, asperin, bismuth salicylate,

cupri citrate, diuretin, fluid extract hydrastis canadensis, adonalis, vernalis, lanolin, hydrargarum, amydoto bichlor, menthol, protargol, urotropin, xoroform, adrenalin hydrochl., santonin, extract felix mas, cocoa butter, salol.

The supply table fixed the allowance for each unit, and this had to be maintained by requisition made as frequently as necessary. An abstract of issues and receipts was kept by the supply official, which, with the receipts from the surgeons, constituted the papers of the office. The accounts will be settled at the close of the war. Requisition for supplies received the approval of the chief medical officer of the organization, above the units, but in case of emergency issue could be made direct and the case reported. In war the routine of the depot was somewhat relaxed. Requisitions were necessarily made by the requiring officer, but the rest of the paper work was done in the depot. Two receipts were made out, which were signed by the receiving surgeon. One of these was sent to the chancery at Harbin and the other retained by the issuing official. No invoices were given. It might be well to here state that each medical unit had a fund which, among other purposes, could be used for emergency purchases of medicine.

The various remedial and preventive toxins were freely used in the practice of Russian physicians in the Far East.

The supplies appeared to be sufficient in amount and variety, but in comparison with our own seemed very simple. In fact, this might be said to be the case with everything relating to creature comforts. There was enough, and what there was, so far as I could see, was not wasted. Doctor Botkin, speaking of the matter of supplies, particularly in the field, said: "In the aggregate there was enough, but it was not always where it was wanted." At Vladivostok there were over three years' supplies on hand.

Regarding the transportation of medical supplies, this was done by the department of roads and transportation. In active service, when small lots were to be transported, they were sent direct to the railroad station master with a request that they be shipped. Carload lots were sent only on the order of the officer in charge of transportation, and this was the case with all shipments in peace times. The request for

transportation must of course originate with the shipping officer.

The interior economy of the Russian military hospitals does not differ greatly from our own, except in the simplicity of equipment and economy of management, their standard being the ruble's worth, while ours is the dollar's worth. I made the following note of a visit to the military (venereal) hospital at Irkutsk. This hospital was located in a substantial barrack of ancient construction and not particularly fitted for hospital purposes. It had accommodation for 420 patients, with the regulation staff provided for such sized unit except women nurses. A company of the line, under its own officers, was attached to the hospital and supplied under the personnel and the necessary guard.

There was an official of the intendence whose special duty was to take charge of the mess, etc. "The furniture is quite primitive. The cots or bunks have sawbuck legs and board bottoms. These are furnished with bed sacks filled with straw, changed monthly, and covered with a double cotton sheet, one edge of which was pinned to a coarse blanket of felt-like appearance." At the time of the visit the hospital contained very few patients, and its appearance was as good as structural conditions permitted. The operative room was primitive; it had a folding operating table of wood, strong, but not very ingenious. There was an excellent field operating case, new and quite up to date. As this was not an operating hospital, I presume a complete operating outfit was considered unnecessary. I inspected the kitchen and bakery, and tasted the soup and black bread made there, both of which were very palatable. The table furniture consisted of a tin bowl and a wooden spoon. There was, however, no table, or rather mess room, the food being served in the wards. There were two messes, one for the patient and the other for the soldier orderlies. The latter were allowed 15 kopecks daily for housekeeping purposes. Of this, 10 kopecks were expended for meat and vegetables and 5 kopecks for bread, tea, laundry, etc. The sick were allowed somewhat more. It might be well to state here that the ration allowance for all varied in different places according to market prices, and was fixed by the general commanding. During the latter days of the war it was about a ruble. I saw a number of

officers in this hospital in wards in a separate building. They were allowed 35 kopecks for ration. There was a laundry in connection with the hospital in which women were employed. The rule of the hospital was that all patients on entering should don hospital clothing. This consisted of a suit of white pajamas and a coarse brown woolen dressing gown. The patient's own clothing was washed and kept in a locker room until the man was sent out. The sanitary appliances were very primitive, there being no waterworks or sewers. I saw one bathroom with three tin tubs, the water for which had to be pumped in from a barrel, and the waste ran out into the street gutters across the sidewalk. The dispensary was primitive. The hospital records were kept with less view to determining a pensionable status than are ours; they will be mentioned more in detail later. I inspected many other and better hospitals than this one at Irkutsk, those at Harbin being on a very high plane of efficiency in all respects, while the naval hospital at Vladivostok was quite the finest hospital I saw while abroad and well worth description here. My notes made at Vladivostok, September 18, 1905, read as follows:

"The naval hospital at this station as it now stands has been built about ten years; it has a capacity of 630 beds, and in its interior economy is ahead of all the hospitals I have seen in the Far East." (It was really about the only permanent hospital there.) "The plan of the main building is that of a central corridor with wings alternating on opposite sides. There are several appendixes to the hospital (in separate structures); indeed, the main building is entirely given over to the actual care of the sick. The out-patients' department with its dispensary is at one end and above it are the officers' wards. At the other end are wards for women, wives of officers, or others attached to the service, and between are wards for the sailor men, together with operating room, surgical dressing rooms, X-ray rooms, laboratory, etc. The chief dispensary (really a medical supply depot) is in a large separate building, under the immediate charge of a pharmacist official, with three assistants (feldshers). Here there is a fine working chemical laboratory. The kitchen, bakery, and laundry are together in a separate building.

There are also eye and ear, venereal diseases, and infectious diseases clinics, each in separate buildings. There are quarters for officers, a chapel, etc., but sui generis is a bomb-proof ward tunneled under a hill to meet the emergencies of a siege and bombardment. All buildings are heated by steam and lighted by electricity." There were other military hospitals worthy of description did time and space permit.

It might be well to add a few words further regarding interior economy and records.

The commandant of the field hospital, by regulation the senior physician, paid the entire personnel of his hospital from public funds which he drew on his own check from a depository (bank) after having submitted an estimate of funds. This money was put in the hospital safe, on which an armed soldier constantly sat. The surgeon commanding also purchased all matériel for his hospital, except, ordinarily, medical and surgical supplies. He fed all, and clothed as well, the enlisted personnel, both well and ill. The accounts, which were apparently carefully kept, were audited each month by a company (hospital) council made up from the physicians on duty in the hospital. A written order was given for the purchase of everything required, which was filed in the order book, and becomes a sort of voucher to the account. I did not understand that receipts were taken. The accounts were open to audit by an inspector when the responsible officer was relieved or the hospital discontinued. I understand that 10,000 rubles was the average amount of the fund. All unserviceable property was sold by the responsible officer and the proceeds taken up in his money account.

Each patient on entering a hospital was given what might be called a "diagnosis sheet," containing the usual data, name, organizations, etc. On this sheet the case record was kept, and when the patient was disposed of it was sent to the statistical bureau. All these sheets were duplicated in a book which corresponded to our register of patients. No nominal reports of sick were made, but the completed hospital register was finally sent to the office of the chief medical inspector, St. Petersburg.

The following professional reports were made:

1. Daily numerical report of sick under general classification (21 headings), sent to local authorities.

2. The daily reports were consolidated and submitted weekly, with report of personnel, to the field medical inspector.

3. Monthly numerical report with more detailed classification (123 headings), sent to the statistical officer of the army.

4. Trimonthly numerical reports, consolidation of the monthly reports sent to statistical officer of the army.

5. Annual numerical reports, about same as foregoing.

I inquired why so many reports of the same kind were sent to the same authority, and the reply was "For verification purposes." This, however, seems improbable, and I presume the reports were required for different bureaus of the Government.

A "disposition" book was kept in which the name of every patient disposed of in any way was entered. The slip, which was a duplicate of the stub, was sent to the office of the chief medical inspector, St. Petersburg. There was also a "transfer" book with stub and duplicate slips, one of which went with the man to his destination and the other to his company commander. I heard the familiar complaint about the amount of clerical work.

So far as I could understand the Russian system of hospital records and reports, it seemed rather involved. There were apparently too many reports of the same kind required, all of which except the weekly report could have been compiled in offices at the rear where there was no other work to be done. To be sure, numerical reports require much less work than nominal reports, but no unnecessary report should be required of a field unit. A formal method of notifying a commander of an absent organization of the receipt and disposal of his man seems to me desirable.

The foregoing brief résumé of the medical department of the Russian army, I trust, gives a fair idea of its organization and work in the Far East.

I am required to give the proportion of medical personnel to combatant force. I was never able to get from the Russian authorities a specific answer to this question, and if answered at all it must be by estimating the regulation allowance rather than by quoting an official "state." Doctor Gorbacevich's statement of the personnel reporting to him, pre-

viously quoted, throws some light upon the question. He said, further, that on August 20, 1905, there were 280 field hospitals in operation east of Baikal, in each of which there were employed besides the physicians a maximum of 6 women nurses, 9 feldshers, and 115 "sanitaries" (1 "sanitary" to 8 patients, and the others as cooks, drivers, etc.).

If we assume that there were twenty-three army corps in General Linevich's command (I have the designations of twenty-one, not including the pre-Amur troops, and Kuropatkin's authority that there were 1,030,000 fighting men in the East), there should have been 92 division hospitals, 92 mobile field hospitals, and 184 reserve field hospitals.

This coincides quite closely with Doctor Gorbacevich's report of August 20, provided it excluded the division hospitals, which is undoubtedly the case, as they were under the respective division commanders, whereas the mobile field and reserve hospitals were under the chief of the sanitary department of the entire army.

The sanitary personnel of an army corps is as follows:

Physicians	75	Clerks	20
Pharmacists	4	Orderlies	212
Veterinarians	5	Noncommissioned officers	56
Officers and officials	9	Privates	592
Nurses (women)	18		
Feldshers (all classes)	290	Total	1,415
Underinspectors and ward masters	134		

This is 3 per cent of 46,300, the total strength of an army corps, exclusive of the company bearers, which add more than an equal per cent in actual battle.

The extra divisional medical units were:

	Number.	Physicians.	Others.
Mobile field hospitals	92	368	10,580
Reserve field hospitals	184	736	16,560
Railroad hospital trains (military)	60	180	3,240
Sanitary convoys	7	14	686
Supply depots	5	.....	95
Administration, receiving hospitals, rest stations, etc., estimated	.....	50	500
Total	.....	1,348	31,661
Add the sanitary personnel of 23 army corps	.....	1,725	30,820
Grand total	.....	3,073	62,481

This I believe to be a close estimate of the number of people actually employed in the military medical units in the Far East, of course exclusive of the personnel of the Red Cross institutions. Add to the strength of the 23 army corps (1,064,900) 5 per cent for the noncombatants not included in the corps (53,245), and we have 1,118,145, which closely approximates the number given by the statistical officer as the total strength of the Russian forces in the Far East.

The percentage of medical personnel to total strength was 5.8 per cent, exclusive of Red Cross and other auxiliary personnel.

The percentage of military physicians to total strength was 0.27 of 1 per cent. These figures, I believe, closely approximate the actual numbers of the military medical personnel.

The attitude of the Russian army reserve physician toward his service is not without its lesson for us. Quite two-thirds of the surgeons in the far East were from the reserve, they knew nothing of the military phases of their duties, which, fortunately under the Russian organization, was of little consequence to that army, and they served unwillingly, having left home, family, and business to take part in a war in which they had but slight interest. Moreover, they resented their status not only in relation to their own medical superiors, whose superiority they regarded as official only, but to the military officer as well by whom they were looked down upon. They considered themselves unjustly treated both as to rank and pay, and I have no hesitancy in saying that a very large proportion of the reserve surgeons would not have entered the army had they not been compelled to.

We must bear in mind that these gentlemen are in all respects, except that of compulsory service, on the same footing as our civil practitioners, and of all officials I came in contact with they were the most anxious for peace, and most desired to get home after peace was decided upon. It is probable that the chief reason for this lay in the fact that they were solicitous as to home affairs, as a physician's business is wholly personal and can not be delegated for any length of time. A protracted absence means annihilation

of a practice which might have taken years to build up. However, these men did their duty well, and their complaints were whispered.

Looking back to our experience in the Spanish-American war, I am impressed with the similarity of views held by the Russian reserve physician and our own volunteer surgeons. The same criticism of their superiors, not loud there, but deep, due largely to ignorance of the conditions and limitations of war practice, and the same desire to get home to family and business after the first flush of adventure had passed, and the awful grind of unaccustomed field work pressed in upon them.

I think they had legitimate cause for complaint, because their positions were anomalous, a fact largely due to hereditary sociological conditions, which savor more of the fifteenth than of the twentieth century. I also think that our volunteer surgeons had legitimate cause for complaint because of their anomalous status, not due to caste, but to defective military organization. We had physicians commissioned as division surgeons, brigade surgeons, and regimental surgeons of volunteers, all with the rank of major. And the former were often placed in high administrative positions over their fellows whose commissions, carrying the same rank, antedated theirs. I think with hardly an exception the regimental surgeons held commissions in our volunteer forces in 1898 antedating those of the division surgeons under whom they served. The absurdity of such a situation needs no comment. No man should be commissioned to an office—we learned that in the civil war—he should be appointed to a corps or arm with what rank the appointing authority may determine and assigned to an office. Moreover, I am of the opinion that the office should often carry local rank, so to speak, so that the proper man might be selected for detail to it no matter what his rank in his corps. If our regimental surgeons are to have the rank of major, then should the office of brigade surgeon, if we are to have such, carry the rank of lieutenant-colonel, and that of division surgeon the rank of colonel.

The Russians recognized that there must be a difference in the rank of their army physicians, and they gave them a definite standing toward each other, though they had no

such toward the rest of the army. Moreover they selected men for office irrespective of chin grade and gave them the equivalent of local rank.

The physicians in every country must be reckoned with; they can not be ignored, for no army can be without them, especially in these days. What nation would to-day dare to send its soldiers into the field without a sanitary department, even if it could get them to go under such circumstances? And there can be no sanitary department without physicians, no matter how many combatant officers are thrust therein.

The immense importance that Russia finally attached to her sanitary department and the sacrifices she made to have it properly administered—for her combatant officers were confessedly needed with the troops—should teach us the necessity of magnifying our administrative sanitary officers—for we really need them quite as much as any other—for this is a humanitarian age and the people will demand for their soldiers the best that science can give.

Russia has done much to train physicians for her army—her medical school is an enduring witness to this—but thus far she has done little or nothing to train medical officers. A year's service in the ranks as prerequisite to admission as a candidate for the medical department is now being considered. We might well imitate her in the organization of a school for the education of medical cadets, but we should not stop with the completion of the curriculum of the medical school. West Point is no longer considered the ultima thule of military education, but only the beginning. We have to-day post-graduate courses for all military branches of the service. Are they necessary? If they are, then some like course in medico-military instruction is necessary for the Medical Department. In these days of correspondence schools it would not be difficult to devise some scheme of instruction. Indeed, such was actually carried out by General Woodhull of our corps ten years ago, but was asphyxiated.

The medical supplies were apparently ample, and surgical equipment up-to-date. The interior economy of the hospitals was good. I saw very few military hospitals that were not well kept, even under difficult circumstances, a fact due to a sufficient personnel and probably because of no stress.

There was nothing in the way of equipment except the field kitchen that I thought would strengthen our armamentarium.

EVACUATION OF NONEFFECTIVES.

The "methodical disposition of the sick and wounded so as to assure the retention of those effective on the field of battle, and to relieve the fighting force of the noneffective" laid down in our field-service regulations as part of the duty of the Medical Department in war, is the raison d'être of one of the most important divisions of the Russian sanitary department, viz, evacuation. The ramifications of this organization extend from the division hospital into the very homes of the people, covering en route all sorts and conditions of medical institutions. It is the most important military feature of the sanitary department, as through it the army is relieved of the demoralizing and dangerous burdens of the ill and injured.

The regulations governing the disposition of the Russian military invalid are most explicit, and so far as my observation went were well executed. But it must be remembered that I did not reach Manchuria until sixteen months after the war began, and during the period of my sojourn there was no great battle, so that beyond the current requirements in the daily movements of sickness there was no demand made which should not have been easily handled by the organization. I have heard it said that on the actual field, especially in the earlier battles, the wounded were not removed as quickly as might have been done. A report to the Emperor, dated April 15, 1905, reads:

'Altogether up to Baikal there are, including all army medical institutions, more than 80,000 beds, of which at the present time not more than 20,000 are occupied. At Harbin, the intermediate evacuation point, there are 35,500 beds, 6,000 belonging to the Red Cross, of which 32,000 are unoccupied. The rapid evacuation of all the wounded was carried out without special effort owing to the large number of sanitary railroad trains, 60 of which constantly ran to and fro between the theater of operations and Irkutsk. Of these trains 22 were equipped by the Red Cross.

The report continues:

Having arrived at the very time when the work of evacuation of sick and wounded after Mukden was at its height, I saw how, thanks

to the measures based on the experience of the battles of Liaoyang and Sha River, this last evacuation was carried out in excellent manner.

The general management of the evacuation at the front, as prescribed in regulations, is under the inspector-general of the army, and within the Empire under the general staff. I understand, however, that the execution of the evacuation in the Far East was placed under the chief of the sanitary department, who controlled the body especially charged with this duty. This is known as the evacuation commission.

The regulation reads: "For the purpose of determining the questions concerning the distribution of the sick, according to the kind of disease, and supplying the necessary means of transportation, a special commission is organized at the general staff, consisting of representatives from the transport and medical departments." I take it that the function of this commission in the general staff is the preparation of the policy and general plans of evacuation of the sick and wounded rather than their execution, though within the Empire the responsibility centers in the general staff.

To facilitate the work of removing the ill and injured, the theater of operations is divided into as many evacuating regions as the situation demands, those of the first line being called front regions and those of the second line rear regions.

For each of these there are organized a front, a rear, and an interior evacuation commission, and with the former there is always established a collecting point or transit hospital for the reception, temporary care, and distribution of the sick. Like stations may also be established in connection with the interior evacuation commissions if necessary, but such is not usually the case.

To still further facilitate the transportation, distribution, and supervision of the invalids, state and district evacuation committees are established. These committees are appointed by the governors of the respective states, and are under their supervision, but receive their instructions from the evacuation commission or general staff.

The course of the evacuation may be outlined as follows: The inspector-general of the army indicates to the front and rear evacuation commissions the general direction of the evacuation and the basis of distribution of the ill and injured and assigns to them the necessary personnel, matériel, and transport. The general staff instructs the interior evacuation commission, which receives its personnel, etc., from the military administration where it operates.

The inspector-general, or general staff, according to jurisdiction, determines the location of the respective commissions, the place being so situated that all the invalids evacuated into the region of a commission shall actually pass its scrutiny.

While I was in the Far East the front evacuation commission was stationed at Kungchuling with a substation at crossing 84. At the latter was received the sick of the Second and part of the Third Armies, who were sent thence to Kungchuling by rail, while the invalids of the First and most of the Third Armies came directly to Kungchuling. You will recall that the headquarters of the armies were located here, though the commander in chief was quartered some 15 miles in advance, at Gotsaidan. All patients from station 84 were loaded on hospital trains and were passed through Kungchuling, where some were transferred to hospitals there, but the larger number were sent to the institutions of the rear jurisdiction.

At Harbin, 175 miles back of the lines, were located the headquarters of the army of the rear and the evacuation commission of that region, though, indeed, the latter's functions were more those of the front than of the rear. The Harbin commission received all the injured and ill sent to it from the front evacuating regions, including the pre-Amur district. Here were located an immense receiving point with ample hospital accommodations, a great railroad yard, and everything necessary for the receipt, rest, and redistribution of thousands of patients.

In Harbin alone there was hospital accommodation for nearly 40,000 patients, and it will be recalled that over 300,000 sick passed through the Harbin evacuation commission.

The rear commission is charged not only with the distribution of the sick within its region, but it also determines the clearing out of the hospitals there, for which purpose it is required to indicate to these institutions the basis of redistribution of the different classes of cases, together with its extent and the order of evacuation.

From Harbin westward stretches the broad continent of Asia, with Russia 5,000 miles away. The entire region to Lake Baikal was under the jurisdiction of the commander in chief, and from Harbin to that point the medical institutions pertained to the rear evacuation commission.

From the lake westward a new military jurisdiction, that of the étape, appears, and at Irkutsk was established an intermediate evacuation commission, whose jurisdiction extended westward to Chiliabinsk, with hospital accommodations for some twenty-odd thousand patients.

The location of the interior evacuating commission, properly so called, is at Moscow, and through it have passed 100,000 patients from Manchuria. The function of this latter commission is the distribution of the invalids to the military medical institutions under its own control, thence through the state and district committees to the civil hospitals of the country, and even into the very homes of the people themselves.

It must be borne in mind that though the state and district evacuation committees are appointed by the civil governors they are subject to the directions of the evacuation commission and are under the orders of the general staff.

The personnel of an evacuation commission consists of a president, not below the rank of colonel; a vice-president, usually lieutenant-colonel; a chief physician; an officer representing the transportation department; the commandant of the étape station where the commission is located, and a representative of the Red Cross. The interior commissions may have in addition such persons, civil or military, as might be found useful in their work.

As previously stated, all of the personnel are subject to the orders of the chief of the sanitary service, otherwise known as the inspector of hospitals, whom it is presumed takes his orders from the general in chief when in the

theater of operations or from the general staff when in the rear.

The regulations are quite specific as to the duties of the president of the commission, who is the executive head, not figurehead, of this important organization. He assigns the various members to specific duties and is himself responsible for the entire work of his commission. His relation to the Red Cross is rather advisory than mandatory. He indicates to the representative of this institution, after receiving information from him concerning the means at his disposal, when and how they might be applied. He has, however, no right to demand that the Red Cross so apply them, neither has he any right to interfere with the internal affairs of the society nor its expenditures.

It is the president's duty to accomplish the evacuation of the sick as rapidly as possible, for which purpose he is authorized to apply, when necessary, directly to the proper authority for any additional means he needs. He is required to make such periodical reports to the chief of the sanitary service (inspector of hospitals) as may be prescribed by the inspector-general. He is responsible that the collecting station hospital is adequate, properly equipped, and supplied, and that the invalids who come under his jurisdiction have shelter, food, medical attendance, medicine, and proper care. He must see that the transportation facilities are adequate and efficient; that the invalids are properly assorted; that they are supplied with linen and clothing; that they are duly paid, and that while en route they have proper attendance. The president has the disciplinary and administrative powers of a local commandant of hospitals and is authorized to permit the expenditure of 1,000 rubles at one time upon the construction of the necessary fittings in the buildings of the collecting stations, etc. He is kept informed as to the number of free beds in the region of his commission and the various places available for the distribution of the sick, and his orders regarding such distribution and further evacuation must be obeyed.

The vice-president when acting as such is directly in charge of hospital and other stores.

The principal physician is the director of the medical personnel on duty at the hospitals of the collecting station as

well as with the sanitary transport of all kinds, including hospital trains. He supervises the separation of the sick according to disease, and sees that those transferred are supplied with everything necessary during the time of travel. The medical supplies of the station are under his jurisdiction. From the very nature of the duty the chief physician is the controlling factor in the work of evacuation.

The duties of the other members of the commission are easy to appreciate. The representative of the department of roads and communications is the organ of the commission in matters relating to transportation. Under the direction of the president he looks after the assignment of trains, the outfitting of cars and boats, the meeting of trains, etc.

The military commander of the station is required to keep the commission informed as to the military transport arriving within his jurisdiction, which on the return trip may be available for temporary use in evacuating the sick. He is also required to cooperate in collecting in the region of his command the necessary personnel and matériel required in the evacuation, such as laborers, carts, etc., and he must also detail the necessary guard and escorts.

The representative of the Red Cross cooperates with the commission, under the advice of its president. I find in looking over the regulations of the Red Cross in the Far East that this organization took a very active part in the evacuation of the sick. It had a supervisor of evacuation, who was required to inform himself regarding every sanitary train that left the region of the active army and to see that it was equipped with everything necessary, both as to personnel and matériel, for the proper care of the invalids, viz, medicines, surgical dressings, bed and wearing linen, food, and, if necessary, medical personnel. The regulation proceeds:

> To enable the supervisor of evacuation to carry out his duties, special assistants subordinate to him will be nominated (after consultation between him and the director of the Red Cross) for duty with every evacuation commission, both in the field and on the lines of communication.

The importance of the work was appreciated, and it was safeguarded in all possible directions.

The office of the evacuating commission is in immediate

charge of a secretary appointed by the president and confirmed by the chief of the sanitary service.

The foregoing may be regarded as a general description of the machinery by which the Russians "relieve the fighting force of the noneffective." As previously stated, the regulations are minutely specific, and though in detail perhaps not applicable to our service, still the principles of evacuation of the noneffective, like those of strategy, are immutable, and I believe the application of these principles to our service must be made in some appropriate form and definitely prescribed in our field service regulations if the best results are to follow.

THE VETERINARY CORPS.

The veterinary corps of the Russian army is organized on the lines of the medical corps, of which department it was until recently a part, but is now independent. The veterinarian is educated in his profession, and, so far as I could see, had about the standing in the army as the physician with whom he took rank in the "civil grade."

During peace times there are veterinary personnel and matériel (hospitals) with mounted units as follows:

Cavalry and cossack regiments, detached squadrons or sotnias, and cadres of the cavalry reserve; artillery brigades and mortar regiments, horse artillery, and cossack batteries; train battalions.

The veterinary hospitals receive all public animals and the private mounts of officers, for all of which forage is authorized. The regulations are quite specific as to the interior economy of veterinary hospitals. They require that such shall consist of three subdivisions—(1) for convalescents or slightly sick, (2) for seriously sick, and (3) for infectious diseases (quarantine). The duties of the veterinary surgeon are prescribed in detail in the veterinary regulations.

In war sick horses are treated in veterinary organizations at the front, in the train, and at the depots. The veterinary hospitals of the first two categories follow their respective organizations, and are designated by their names, those of the third are assigned for the care of the reserve horses and the animals attached to corps, and are designated by

numbers. The first named, being with troops, are practically always organized; the list of such is given above. The veterinary hospitals of the second category are for the trains of the infantry, rifle and reserve divisions, cavalry and cossack divisions, pontoon divisions, and military transport. The hospitals of the third category are assigned one to each corps. These may be supplemented in case of necessity by additional veterinary hospitals assigned to separate horse reserves or to fortresses.

Veterinary hospitals for the division trains are established by the division commander, for the pontoon battalions by the corps or detachment commander, and for the transport by the chief of communications.

The hospitals with the horse reserves are under the supervision of the chief veterinary surgeon of the military zone, those with the corps are under the corps chief veterinarian.

The personnel of a depot veterinary hospital and the money allowance of the same are as follows:

Officials.	Number.	Yearly allowances.				Class of office.	Class of allowances.
		Pay.		Table money.			
		Original.	Increase.	Original.	Increase.		
		Rubles.	*Rubles.*	*Rubles.*	*Rubles.*		
Superintendent of hospital	1	420.00–387.00	630.00–582.00	600.00	553.00	8	Vet. 2
Assistant veterinarian	1	360.00–333.00	540.00–498.00	300.00	276.00	9	Vet. 3
Senior feldsher	1	34.28– 33.60	66.12– 64.80	.....	.....	.....	
Junior feldsher	3	25.87– 25.35	49.90– 48.90	.....	.....	.....	
Sergeant clerk	1	24.49– 24.00	36.73– 36.00	.....	.....	.....	

The staff of a veterinary hospital is based on the requirements of 100 patients.

Military veterinarians have the same rights as military physicians, with corresponding allowances for quarters, subsistence, and servants. Feldshers and sergeants receive clothing and subsistence in addition to the above.

The senior veterinarian of the depot is in command of it and is charged with its administration. He is accountable for the public property pertaining to the hospital, including the public funds for subsistence of personnel and patients, and of all records. He is responsible for the discipline of the personnel and is authorized to issue orders thereto, which

are entered in the hospital order book. He has the rights of a regimental commander in administering his command.

Veterinary hospitals in the theater of operations receive their supplies of medicines, surgical instruments, and dressings, etc., from field veterinary dispensaries and temporary supply depots.

The following schedule indicates the diseases for which horses should be admitted to hospital in war time. I might state here that in battle regular veterinary first-aid stations are established in the different organizations.

Cause of admission to train veterinary hospital: Severe wounds, sore backs or shoulders, lameness from diseased feet, etc., varicocele, severe diseases of the eye, and exhaustion requiring rest and nourishment. The depot hospitals receive cases of like character.

Destruction is ordered in the following conditions: Glanders, madness, complicated wounds, fractures, paralysis, wounds of joints, etc., in which the cost of cure is likely to exceed the value of the animal, complicated sprains, hoof rot.

The following is the form of register used in veterinary hospitals:

Name and duties of horse.	Organization.	Disease.	Admitted.	Discharged.	Recovered.	Died.	Incurable wounds.	Incurable disease.	Glanders.
				Transferred to other hospital.					

Month and day of admission and discharge of each horse is entered in column "recovered," "transferred," or "died."

Animals admitted to a train hospital may be accounted for on the forage requisition of the divisional train, or on that of the organization where the hospital is located, but their subsistence is independent of the hospital as a special detachment. Professional reports are rendered to the chief veterinarian.

Commanders of organizations at the front are required to evacuate to train or depot hospitals all animals that can not be treated with the command. Such animals must be supplied with halters, nosebags, brushes, currycombs, and

blankets, and be accompanied by a certified ration return. When recovered the animals are returned to their commands with a like certified ration return. When it is impracticable to return the horse to his command he is turned into the nearest horse depot or other organization as may be directed. All veterinary hospitals are subject to inspection by field army veterinary inspectors.

The foregoing somewhat desultory account will at least indicate that Russia has given considerable attention to organization for the care of the animals of her armies in the Far East, and I will now endeavor to show something of what has been accomplished by the veterinary department.

The following is based upon a statement made by the chief veterinary inspector of the Army of the Rear, Doctor Dorbrotvorsky, civil counselor. Doctor Dorbrotvorsky was impressed with the fact that the problems for solution by the veterinary department in the Far East were, mutatis mutandis, quite as difficult as those of the other branches of the service. The long journey across Asia subjected the horses to constant exposure—to anthrax, which is enzootic in that region. This disease manifests itself among the Russian horses in the intestinal form, caught from food or stable litter, with a mortality of from 50 to 80 per cent, and there was every reason to expect a possible epizootic, and certainly a considerable loss from this infection. Preventive inoculations of antitoxin, introduced by Professor Langsh, of Kasan, Russia, were used with the most satisfactory results. Doctor Dorbrotvorsky reports that this invaluable remedy can be used at any time or place without interfering with the use of the animal, and it is undoubtedly due to Langsh's serum that the army horses escaped an epizootic of anthrax. Glanders is universal in Manchuria, but was so effectively controlled by sanitary measures, constant inspection, immediate isolation, and destruction in declared cases that the actual loss was less than 1 in 1,000. Surra did not appear among the Russian animals. In this connection it is stated that the forage obtained in Manchuria—corn, oats, barley, kaoliang beans, bean cake, shu-mi-tzu (hill rice) straw, and even kaoliang stalks—caused no disease worse than an occasional attack of mycotic inflammation of the digestive tract.

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Rinderpest is epizootic in Manchuria. This very infectious disease, which ordinarily is only eliminated by destruction of the infected animals, was satisfactorily controlled by the use of antipest toxin, prepared at the Chetinska and Iro antitoxin stations near Troits Kosavaska. This remedy, Doctor Dorbrotvorsky reports, not only prevented but actually cured the disease, and rendered unnecessary the destruction of cattle which would have ordinarily been demanded in 66 per cent of all the animals received. Where used as a preventive, the antitoxin does not produce the disease in modified form. Doctor Dorbrotvorsky reports that "antipest toxin made it possible to feed the Russian army with fresh meat, and without it we would have been compelled to rely upon tinned meat, which contingency was considered in connection with our having to purchase our meat supply in America. This war has settled beyond question the fact that we will not have to depend upon tinned meats so long as cattle on the hoof are available and have been immunized by antipest toxin." Besides rinderpest, there are no cattle diseases of importance. Aphthæ, pleuro-pneumonia, etc., are little to be feared.

I regret that it was impossible to obtain the full morbidity and mortality statistics of animals used by the Russian armies in the Far East. I addressed a letter to the chief veterinary inspector in the field, but received no reply thereto. The statistics of the Rear, furnished from the Harbin office, are as follows:

Horses received from Russia, including Siberia, January 1, 1904, to August 1, 1905, 225,819, and exclusive of 542 sick; horned cattle from Siberia, 150,419; horned cattle dead from rinderpest, 10,000; sheep passed through Harbin, 100,611.

There is a very careful system of inspection. There are two veterinary hospitals at Harbin; the statistics of one are as follows:

Treated in hospital: July, 1905, 133 horses; August, 1905, 123 horses; September 1 to 20, 1905, 113 horses. During this period 267 horses were treated in quarters. The mortality was as follows: Anthrax, 1; glanders, 7; hydrocephalus, 4; apoplexy, 2; lumpy jaw, 4. Among some of the other diseases treated were influenza (epizootic), 60; rhinitis, 23; lumpy jaw, 13; colic, 27.

I find on looking over the notes of an interview with the chief intendant that he stated the wastage of animals had not then been computed. He further said that 150,000 mules had been purchased in Manchuria.

The important lesson for us in the Russian veterinary experience is the successful use of antitoxin sera in the treatment of animal diseases. Nothing is said of tetanus by the veterinarians, from which I infer there was little among the animals in the Far East. I presume there must have been some cases, and a large percentage of these probably died if the veterinary experience was the same as the medical. Russian physicians regard the antitoxin of tetanus as at present made as of little or no value. But with anthrax and rinderpest the results were most satisfactory, and I believe the antipest serum has a present and future value to us which should not be overlooked.

Another lesson we might learn is one of organization. We have no real veterinary department, for a small percentage of veterinarians scattered here and there do not constitute such a department. Do we need such? If so, let us have the best that can be organized and not a mere makeshift.

SPECIAL DISEASES.

It goes without saying that the time for a decisive discussion of the sanitary statistics of the war in Manchuria has not yet arrived. It took a number of years for the statistics of our civil war to crystallize into their present form, and we must expect this to be the case with the statistics of the Russian and Japanese armies in the war of 1904–5. General Kuropatkin himself states that he does not yet know whether he had 275,000 or 290,000 bayonets at Mukden. I find by reference to my notes that on August 11, 1905, the following telegraphic report was sent to the Emperor:

	Officers.	Men.	Total.
Sick	975	24,004	24,979
Wounded	52	1,313	1,365
Grand total			26,344

Of the cases under treatment within the theater of war of that date there were:

	Cases.		Cases.
Typhoid fever	1,151	Anthrax	2
Typhus fever	22	Variola	21
Dysentery	418	Scurvy	233

From the beginning of the war up to July 14, 1905, there had been under treatment:

	Cases.	Died.
Typhoid fever	10,449	1,041
Typhus fever	201	35
Relapsing	170	11
Dysentery	5,456	256
Variola	209	12
Scurvy	1,180	10
Measles	11	1

Report of morbidity of August 14, 1905, handed me by Doctor Gorbacevich September 5, 1905, read as follows:

	Wounded.	Sick.
Officers under treatment	38	945
Enlisted men	1,116	26,796

The infectious-disease cases on that day were:

Dysentery	677	Anthrax	3
Dysentery, pseudo (?)	181	Erysipelas	71
Gastero enteritis (epidemic)	299	Scurvy	281
Typhoid fever	2,709	Measles	3
Typhus fever	19	Smallpox	21
Grippe	1,013	Total	5,759
Relapsing fever	9		
Malarial fever (intermittent)	473		

This report does not seem to agree with that sent to the Emperor.

MORBIDITY AMONG THE RUSSIANS IN THE FAR EAST.

On September 13, 1905, there were:

	Officers.	Men.	Total.
Sick	1,024	23,489	24,513
Wounded	30	592	622
Total			25,135

Of which there were:

	Cases.		Cases.
Typhoid fever	5,287	Anthrax	1
Dysentery	646	Erysipelas	41
Typhus fever	40	Scurvy	104
Grippe	1,089	Smallpox	4
Malaria	559	Measles	4

From the foregoing, it will be seen that the morbidity experience of the Russian armies in the Far East has been different in certain important particulars from that in recent wars. There was, to be sure, typhoid and dysentery in not inconsiderable amount, but malaria cut very little figure, while mumps and measles, which we always look for, practically failed to appear. There was a considerable amount of scurvy, probably much more than is of record, and venereal was of little moment. In fact, the comparatively small number of deaths from disease (18,830) indicates a state of healthfulness unequaled in military history. The question naturally arises as to why this was so, and this I will endeavor to explain.

The Russian peasant who reaches the age of maturity is the survival of the fittest, for the conditions of his life from the beginning are such as only the strongest can endure. Huddled together with the rest of his probably large family in ill-constructed and unventilated habitations, poorly fed and worse clad, the child grows up in an atmosphere of privation, is subjected to all of the diseases of infancy, endures the rigors of a harsh climate, and survives only because of his own intrinsic resisting powers.

Owing to Russia's enormous population, the amount of material available for military purposes is practically unlimited, and from this material she took the best for service in the Far East. Starting in perfect physical trim, the men of the mobilized units traveled slowly for two months across the continent of Asia, under constant observation and frequent critical inspections, so that every man who by any chance might have been suffering from latent infection at the beginning or who developed such infection en route was at once separated from his command. Thus it was that the troops reached the theater of operations free from in-

fection and in good condition to resist the morbific influences they would necessarily be subjected to in active service.

Of the climate of Manchuria little need be said here. That part of the country I saw (Harbin region) reminded me of our own Mississippi Valley in many respects—soil, vegetation, temperature, streams, etc. The summer is comparatively short, and there are many warm days, while the winter is correspondingly long and cold, the mercury lingering around zero and often falling much below it in January and February. In July and August is the rainy season, during which there are at least daily showers and often continuous downpours, the result of which is that the whole country goes into solution. The snowfall is light and does not remain on the ground for any length of time, being blown away by the wind or vaporized by the sun.

I was told that the prevalent diseases among the natives are typhoid fever, dysentery, and smallpox. In 1899 bubonic plague appeared in Niuchwang, but was confined to that region. I heard of but one outbreak of plague within the Russian lines during my sojourn in Manchuria. This occurred at Dgailainov, a station on the railroad not far from the border, September 22, 1905, just before I started for home and seems to have been accepted by the authorities as veritable plague. The disease was apparently confined to one family, eleven of which died. As strict quarantine precautions were at once instituted I presume there was no extension of the infection, though I left the country before this could be determined. In 1902 a quite severe epidemic of cholera began at Vladivostok and reached westward to Harbin, but no cases of the disease were reported while I was in the Far East.

It is important to add that there are but few mosquitoes, and those I saw belong to the Culex family. During the rainy season the common house fly swarmed in countless numbers, and I was forced to protect myself from their nightly attacks by using my mosquito bar.

The conditions of the campaign in Manchuria until after the battle of Mukden (March, 1905) were such as to demand frequent changes of camping grounds, there being at least one battle monthly, so that before Mukden the army

was not exposed to great danger from soil pollution. During the Russian occupation of Mukden, and subsequent thereto, until June, 1905, the troops were quartered in "dugouts."

The army ration is adequate and well balanced, but much of the time all its components were not obtainable. During the winter I am told that vegetables were scarce and the dietary was largely meat, bread, and tea.

The Russian food habits and method of cooking are ideal, from a military standpoint. Everything except the bread is boiled, and is thus not only thoroughly sterilized, but is placed in the best possible condition for assimilation. Moreover, the universal use of soup and tea reduces the demand for raw water to a minimum and largely eliminates the probability of infection from this source. The Russians, though constantly driven back, were not demoralized. Attacked furiously and persistently by overwhelming numbers, this army was never captured and was always ready to fight, though not until the last so well prepared as was its adversary. So the moral effects of persistent defeat cut little or no figure in the mortality bills.

From the foregoing outline of sanitary conditions obtaining among the Russian forces it would have been easily possible to predict what the sanitary results must be.

Typhoid and bacillary dysentery were endemic in Manchuria, and these diseases were bound to appear in the army with greater or less virulency, even though the troops arrived in perfect health and as a rule lived rationally. I say "bound," because these infections were widespread, and under the conditions of military life could not be wholly avoided. The question for us is, Was the best done that the conditions permitted?

In attempting to answer this I will briefly consider the etiology, prognosis, and results of some of the diseases specified, especially of typhoid fever and dysentery.

I think that in the light of present experience we are justified in believing that certain factors of dissemination of typhoid infection cut a much larger figure in camp typhoid than in house typhoid. Based upon the report of a board appointed to investigate the typhoid epidemic in our camps of mobilization in 1898, there seems little doubt that flies and

personal contact were the important factors in spreading the germs, while water was secondary or even negligible. This conclusion, which was certainly revolutionary, and which I think is largely justified by the evidence, is accepted by us more freely than abroad, where fly and personal convection are not so seriously regarded.

In discussing the causes of typhoid in the Russian camps Doctor Gorbacevich, chief medical inspector, stated his opinion to me as follows:

First. The fouling of the surface of the ground by infected excrements.

Second. Constant employment of men in the trenches. (Soiling with earth and exhaustion.)

Third. Impossibility of personal cleanliness in camp during the rainy season, which is the typhoid season among the natives.

Fourth. Crowded state of the military population in camp and the unaccustomed conditions of military life.

Fifth. The infection of drinking water by surface washing, especially during the rainy season.

Doctor Gorbacevich stated as his opinion that flies had nothing to do with the spread of typhoid fever in the armies of the Far East, though they were an important factor in spreading dysentery and anthrax.

He said that typhoid fever is epidemic in Russia during cool weather, reaching its maximum in October and November, and thereafter diminishing until February, when it disappears. This is the rainy season in southern Russia, but there are no flies. In northern Russia the epidemic disappears with the coming of snow. All the Russian physicians with whom I conversed on this subject agreed with the views expressed by Doctor Gorbacevich.

Nothing is more certain than that typhoid fever is a water-borne disease, and I think that we are perfectly justified in believing that infected water is the chief cause of typhoid fever in house dwellers, for they have no open sinks, and flies are excluded. But with the tent dwellers the conditions are different, for in military camps the population is dense, the sinks open, personal cleanliness and camp police often indifferent, infection almost always present, and dur-

ing the beginning of the typhoid season flies always abundant. Here the man and the fly are the disseminators of typhoid.

Before considering several of the facts regarding typhoid fever as seen in Manchuria, I will briefly state what seems to be the accepted views of the medical profession on the rôle of the fly in disseminating the bacillus typhosis. The report above referred to of the board on typhoid fever in our camps of mobilization, 1898, of which disease the board states that there were over 20,000 [a] cases and a mortality of 7 per cent, indicates that water played an unimportant part, but that the infection was carried by flies, dust, and personal contact. At Chickamauga I saw kitchens and latrines "cheek by jowl" in numerous cases. I saw flies breeding by millions in the latrines and horse manure heaps at hand.

Then, too, because of the inadequacy of the Hospital Corps, we were forced to call upon the line for details to assist in the hospital work, thus inviting further spread through personal contact, and our recommendations that infected commands be isolated were ignored until all became infected. This was universally the case; there was proportionately no more typhoid at Chickamauga than in the other camps. All were equally infected, and the only redeeming feature about the situation was that the mortality was so comparatively small. The sanitation of our camps was execrable, but the professional work of the medical corps was remarkably successful, for it saved all but 7 per cent of its cases, while 10 per cent died in Manchuria, and this is the average loss even under the best conditions.

Returning to the causes of camp infection, Veeder asserts his belief that flies are the chief factor in transmitting infection during the autumn, the period of most pronounced activity of the disease, a conclusion reached during an investigation to determine the origin of a local epidemic. Interesting experiments were instituted by Ficker to determine if flies could be infected by feeding on typhoid cultures, how the bacilli acted within the insects, if flies could transmit the infection to human beings, and, if so, for how

[a] The German army had over 73,000 cases of typhoid fever during the year of the Franco-Prussian war.

long a period. The conclusions reached were that the common house fly could eat the typhoid bacillus without danger to itself and that it could transmit the infection for a period of twenty-three days. The bacilli were found in the head, wings, and legs on the fifth day and in the intestines on the ninth day after the ingestion of the infected material.

That personal contact cuts a considerable figure in the transmission of typhoid fever is shown by the investigations of Tolayvoch, who reports that between 1881–1899 6.3 per cent of the cases of typhoid fever occurring in the German army were hospital infection.

It must not be inferred from the foregoing that I am inclined to disregard the importance of water as a cause of typhoid infection. This has long passed the period of surmise and has become universally accepted. Certainly in the light of experience no military sanitarian can ignore the pernicious effects of the average raw water. Indeed, I have contended that the use of boiled water should be as much a part of military routine as the use of boiled potatoes or any cooked food. In campaign our only safety lies in regarding all water as infected. This involves the training of our soldiers to use boiled water at all times and the constant employment of some sterilizing apparatus, with a personnel to properly care for it. The extra work and cost involved would be amply repaid by the decreased noneffectiveness from water-borne diseases.

I believe the campaign in the Far East fully sustains the position heretofore taken by military sanitarians regarding camp typhoid, and it certainly shows how difficult it is to exclude this disease, no matter how favorable the conditions may be.

It has already been shown that the Russian soldier reached the theater of war free from infection, and that he campaigned in a country where typhoid fever is endemic. Let us now consider the movement of this disease during the war.

By reference to the table showing the movement of sickness from the beginning to July 1, 1905, it will be seen that 10,449 cases of typhoid fever had come on sick report, of which 1,041 died in Manchuria.

I learn that on July 18, 1904, there were 100 cases in hospital, of which 50 came from the front; October 26, 1904, 4,350 cases, of which 3,700 came from the front, and on December 31, 1904, 900 cases, of which 800 came from the front.

From January 1 to July 1, 1905, there was a daily average of 175 cases of typhoid fever on sick report. July 15, 1905, there were 800 cases; July 23, 1,500 cases; August 1, 2,400 cases; August 15, 3,500 cases; August 23, 4,400 cases; September 1, 5,287 cases.

I am indebted to Doctor Gorbacevich for the following table:

Movement of typhoid fever during August and September, 1905 (including last week in July).

	Fourth week in July.		First week in August.		Second week in August.		Third week in August.	
	Rate per 1,000, all diseases.[a]	Actual number of cases of typhoid taken sick.	Rate per 1,000, all diseases.[a]	Actual number of cases of typhoid taken sick.	Rate per 1,000, all diseases.[a]	Actual number of cases of typhoid taken sick.	Rate per 1,000, all diseases.[a]	Actual number of cases of typhoid taken sick.
First army	.....	234	34.7	180	22.2	167	17.4	199
Second army	.....	394	39.0	254	35.5	285	26.5	193
Third army	.....	166	29.9	66	34.0	157	27.9	86
Rear army	.....	166	.....	123	.....	354	.....	227
Pre-Amur district	.....	19	.....	20	.....	109	.....	51
Total	.....	679	.....	643	.....	1,072	.....	756

	Fourth week in August.		First week in September.		Second week in September.	
	Rate per 1,000, all diseases.[a]	Actual number of cases of typhoid taken sick.	Rate per 1,000, all diseases.[a]	Actual number of cases of typhoid taken sick.	Rate per 1,000, all diseases.[a]	Actual number of cases of typhoid taken sick.
First army	19.2	256	.....	193	.....	82
Second army	31.7	148	.....	132	.....	97
Third army	20.8	132	.....	73	.....	64
Rear army	.....	103	.....	70	.....	55
Pre-Amur district	.....	54	.....	36	.....	40
Total	.....	693	.....	504	.....	338

[a] Of the cases under treatment 9.1 per 1,000 were in hospital.

The rate is based on the strength of the respective armies.
By reference to page 118 it will be seen that the three field armies had a combined strength of 729,000.

On September 16, 1905, the total number of cases of typhoid fever under treatment was 5,898.

Information received from another source was as follows:

	July.		August.	
	Officers.	Men.	Officers.	Men.
Taken sick	136	2,662	149	3,884
Died	3	359	8	672

From the beginning of the war to September 1, 1905, there were 17,033 cases of typhoid, of which 2,077 died.

It will be observed that there are considerable discrepancies between the statements of the different authorities as to statistics. Such must be expected and averaged. Statistics take a long time to crystallize and during the process are constantly changing, though always pointing in the direction of the final permanent form.

It will also be observed that there was a steady decrease in the number of cases from the middle of August, which it is reasonable to assume will continue until normal endemicity is reached. This decrease was undoubtedly due to the stricter enforcement of sanitary orders, the observance of which had been considerably relaxed. The best evidence of the good results following such enforcement is obtained from our own experience in the Spanish-American war, in which typhoid was reduced from 5 per cent in September to a fraction of 1 per cent in December, 1898.

It might be well to here consider some of the individual and collective habits of the Russian soldier man as causative factors in the dissemination of typhoid infection.

I have heretofore stated that the preparation of the ration is ideal from a sanitary standpoint, the food reaching the soldier hot, diluted, and with every bit of its nourishment in the best condition for easy assimilation. His favorite beverage, tea, demands the ingestion of a large amount of hot, sterile, and stimulating liquids. His bread is a more likely source of infection, but being made from a flour containing all the elements of grain it permits peristaltic action and keeps the digestion regular. I look with suspicion on the bread as an inviter of flies and of hand-and-mouth infection.

This possibility seems to have impressed itself upon the Russian physicians, for I observed in the venereal ward of the naval hospital at Vladivostok that every patient was required to keep his ration of bread in an individual bag hung at the head of his bunk and was not permitted to expose it except at meal time. Here is a note I made August 25, 1905, at the étape eating station, Kungchuling:

Contiguous to the bakery are a number of kitchens, and in the open air many tables at which the men were standing, eating their rations in apparent content. I watched the process with interest. On the table in front of a squad were a dish of soup and one of cassia (buckwheat), and scattered around at convenient points hunks of black bread. Each man was provided with a wooden spoon (individual) about the size of a large tablespoon, which he dipped indiscriminately into the soup, the cassia, and his mouth; chunks of meat carved with a jacknife were eaten from the hand. I did not observe many flies about the table this morning, but on other occasions have seen them swarming on the food, the tables, the men, and everything in the neighborhood, including the sinks. The possibilities in the spread of typhoid under such conditions are great, especially when the sink habits of the men are considered.

I think that this war has demonstrated, what is now accepted by us, "that flies are, under active-service conditions, one of the most important disseminators of the typhoid germ, and that soiled hands cut no small figure."

It will be recalled that the troops had been in the same camps from shortly after Mukden. Until May they had burrowed in the ground and thereafter had gone under canvas. The camps soon assumed a state of permanency and were generally well kept to outward appearance. The Russian soldier's tent is square, with a nearly flat or gently sloping roof. Its dimensions are, height, to peak 7 feet 8 inches, to eaves 5 feet 2 inches. The walls actually measure 6 feet, but with the slope the tent is but about 5 feet high at the eaves. Its area is 12 by 12 feet, and its maximum occupancy 20 men. The tent is pitched on a center pole, and inside at each corner is a corner pole. Ropes sewed into the canvas of the roof run from the center to the corners. The length of the center pole, which is jointed, is 7 feet 8 inches, and of the corner poles 5 feet 2 inches. There is a long guy rope at each corner which is secured to a large tent pin 3 feet long and 3 inches in diameter. The walls and the roof are separate, the former

being suspended from the latter, the spaces between them serving for ventilation. This is covered by a flap sewed to the roof. The material is light (probably 10 ounces) flax duck. The door is at the point where the ends of the wall meet. The shelter tent was much in evidence; in fact, it was almost universal at the front. This tent is much like our own, but instead of being pitched for 2, I observed that a squad of 6 usually combined their shelter halves.

The most comfortable arrangement I saw was a camp in which the tents were pitched on a turf wall 2½ feet high. Within on either side was a platform of boards separated by a narrow passageway. The platform and aisle were covered with Chinese matting, and the tents presented a very neat appearance.

This plan of fixed walls was quite generally followed, even when shelter tents were used, and there was always an attempt made to get the men off the ground level, even if nothing but an earthen platform was available. I observed many tents with wickerwork walls, which certainly promoted ventilation.

Some of the tents were so badly worn that per se they no longer afforded shelter, and all sorts of material, chiefly mud, were used to patch them up.

Of course everything that tended to permanently fix the tent prevented its frequent removal to another site and the aeration of the occupied ground, so necessary to the healthfulness of the tent dwellers.

The Russian camp latrine or sink is quite different from those used in other armies, and opens wide its hospitable arms during the typhoid season to the swarms of visiting flies.

I am informed that before the large increase in the number of typhoid cases very little attention was paid to the regulation which required the construction and use of camp latrines, the soldier preferring a neighboring copse or swale to the uninviting latrine, and I remember to have seen scarcely any vessels for night urination. I find in a note made at Kungchuling, July 28, 1905, the following: "So far as I have observed in going about here, there is very little conservancy of pits and sinks." Later there was a thorough

house cleaning, but this did not occur until after the typhoid epidemic had become established. The police of the camp grounds was usually excellent when such was at all practicable, but with mud a foot deep police of place or person was impossible, and the soil and the men became mutually toxic. The sink habits of the men regarding personal cleansing I believe cut some figure in disseminating typhoid germs. Paper was scarce in Manchuria. At best, newspapers are not very plentiful among the Russians, and the men had nothing to wipe themselves with except leaves or grass, and not always these; so the cleansing was done, if done at all, with the fingers, which in turn were wiped off on the most convenient thing, as there was nothing else to do.

Deep wells (60 to 80 feet) were dug for the use of the troops. The standing regulations governing the use of water are quite drastic. They read as follows:

The drinking of raw water is prohibited, except of spring or well water free from the possibility of infection, which will be determined by physicians after consideration of the sources of the spring and the construction of the well.

Muddy water containing suspended matter not traceable to its source must be clarified, etc.

Water suspected of being pathogenically infected must not only be clarified, but purified by the indicated means.

The responsibility for the adoption of the means devolves upon the surgeons of the units and hospitals.

The rules given are well known, generally accepted, and need not be repeated here, though there might well be a constant reiteration of the following regulation:

The best method of sterilizing water is by boiling it, and the most practical way to enforce its use is to give it with tea, which should be done whenever possible. All water used by the men for drinking should be boiled, for which purpose proper apparatus should be supplied. Water may be considered safe if boiled for thirty minutes, not counting the time consumed in bringing it to the boiling point. Boiled water should not be kept for more than twenty-four hours and must be kept in clean receptacles, which must be frequently washed, must be supplied with metal faucets, and tightly covered. The taste of boiled water may be improved by adding citric acid.

The wells I saw were supplied with windlass and bucket, and many of them were under guard.

I have already alluded to the food, which will be described

more in detail in the chapter devoted to that subject. The preparation of the food has excited the admiration of everyone who has seen the Russian method, and as a military proposition this, more than any other feature, demands our careful consideration.

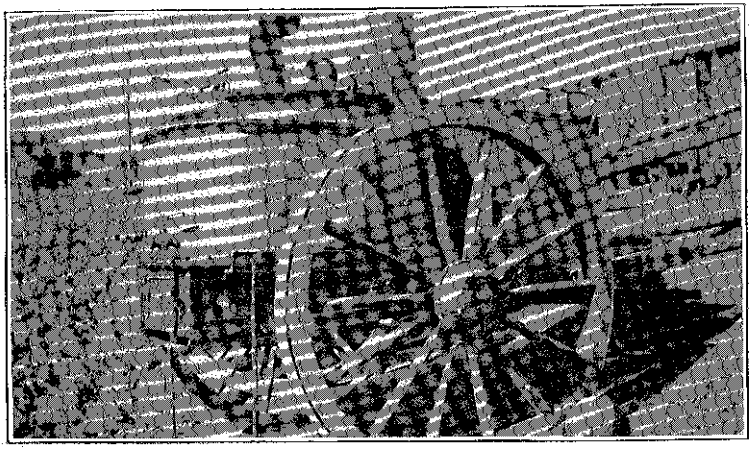
This matter is gone into in extenso in Colonel Havard's report and need not be further elaborated here. I understand that Germany is now carefully considering the question and has offered a prize for the best cooking apparatus for field service, with view to its adoption by the army of the country. There was not an attaché with whom I spoke who did not seem to be impressed with the military importance of the Russian field kitchen, which could be, and actually had been, taken up to the very skirmish line loaded with hot food and drinks for those actually engaged in battle.

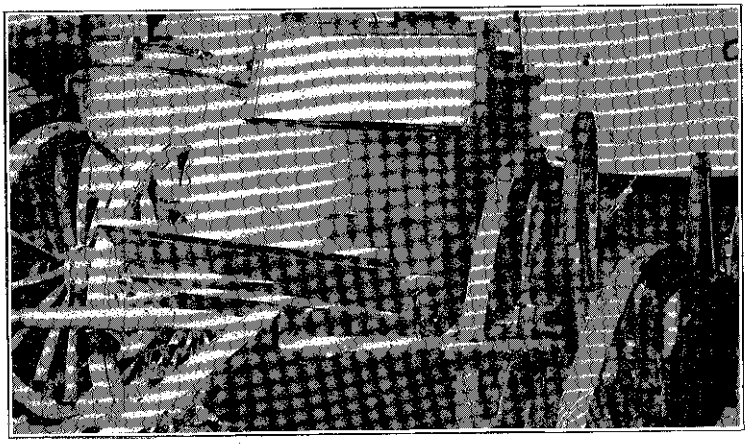
The Russian peasant is accustomed to the simple life, and the life of the Russian soldier, itself simple enough, is a promotion to him. I have it from the Emperor's own lips that his soldiers in Manchuria were better fed than his peasants at home.

The soldier's material wants are well met, but he has little or nothing with which to obtain other than that his Government gives him.

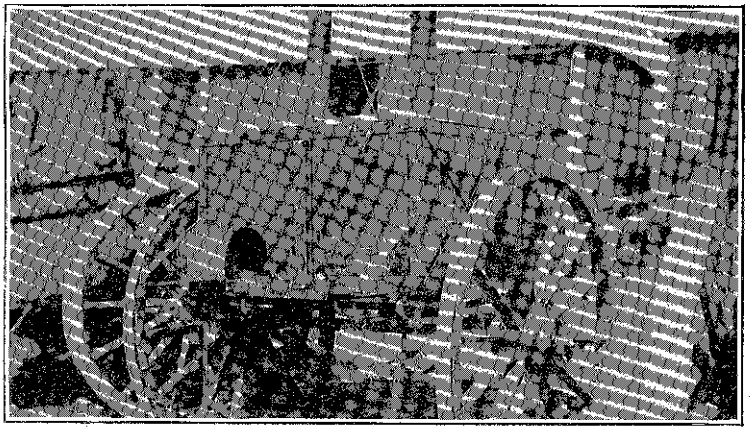
In the Far East everything was under absolute military control. Nothing could be brought into the country except by military authority, and consequently little or nothing got there in the way of food or drink that could harm the soldier even had he the wherewithal to purchase it. I observed some stores where many necessaries and a few luxuries could be purchased at little more than home prices. These were branches of army cooperative stores in St. Petersburg and Moscow. Cigars and wine in moderation were obtained by officers, but the enlisted man's choice was very limited—tobacco, some sweet crackers, needles, thread, etc. I mention this to show that the Russian soldier was not subjected to the evil influence of the pie and beer vender, not to speak of viler stuff, and his intestinal tract was not thereby rendered inviting to the microbes seeking to destroy him.

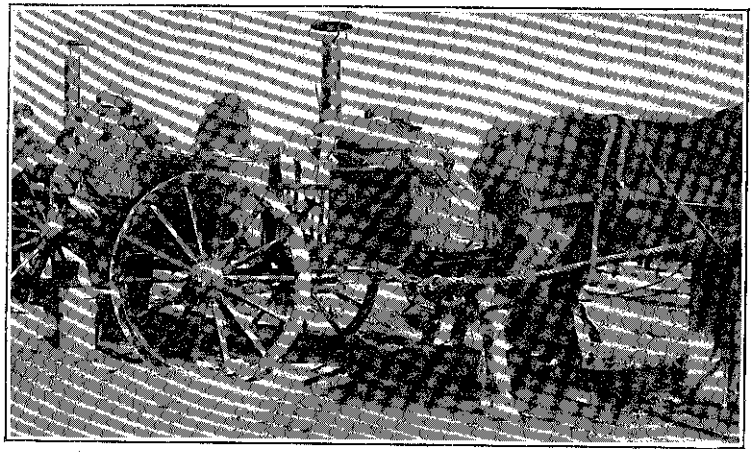
I can not but feel that the Russian authorities placed too much stress on one of a number of causes of typhoid epi-



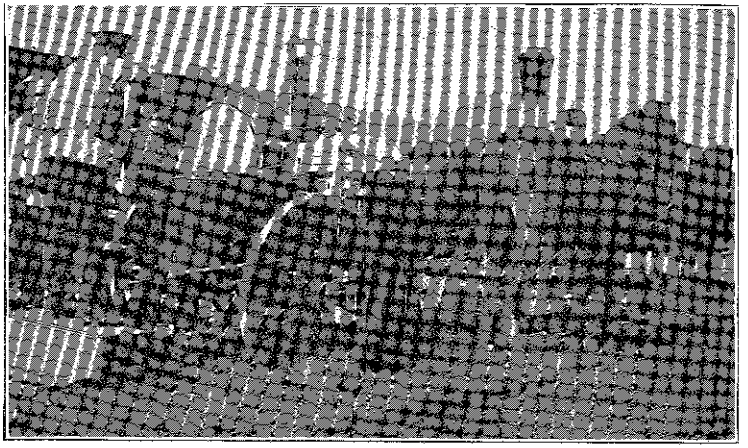


TYPES OF RUSSIAN AMBULANT FIELD KITCHENS.





TYPES OF RUSSIAN AMBULANT FIELD KITCHENS.



TYPE OF RUSSIAN AMBULANT FIELD KITCHEN.

demic and lost sight of others of equal, indeed, greater, importance in camp typhoid. I am told that the Japanese isolated their cases of typhoid as strictly as those of smallpox, and who can question their wisdom in so doing? I know not what their typhoid statistics may be, but I am very sure that if isolation was strictly practiced the figures will be comparatively insignificant.

I do not think the necessity for isolation was fully appreciated by the Russians. They certainly sent the typhoid cases out of their camps in large numbers, but I was unable to learn of any extraordinary effort having been made to search out and isolate suspected cases, which is an important part of prophylaxis. Let us not forget, however, that the Russians were, at the time this epidemic appeared, thinking more of the enemy in front of them than that in their midst.

The conditions obtaining, in at least some of the hospitals I inspected, strongly impressed me with the opinion that the dangerously infectious character of the disease in its epidemic form was not appreciated by the hospital authorities. I have only a note here and there of cases of hospital infection, but they occur frequently enough to indicate that such was rife.

The chief of the Red Cross at Kungchuling told me that the type of the disease was severer in 1905 than in 1904; that a Red Cross physician and nurse had died during the preceding week, and that several others were critically ill.

I find the following note (August 25, 1905), illustrative of the hospital conditions:

This afternoon I visited the St. George Red Cross hospital No. 2, where there are 120 typhoid cases under treatment, with two or three deaths daily. The typhoid and other cases are treated in the same wards practically, as broad doorways connect all the wards and the doors are constantly open. The windows are without screens, the beds without bars, and the flies come and go as they list. The dejecta are received into bedpans that contain no disinfectant, are covered with a solution of calcium chloride, and at once thrown into a privy vault, which is the receptacle of all the kitchen and other wastes from the hospital, and which vault is emptied by Chinese labor once weekly. I had a long talk with the head nurse and told her about the dangers of the disease she was treating, regarding which she seemed ignorant, though anxious to learn. The well from which was drawn the water used in the hospital is about 50 feet from the latrine above described.

In this hospital several of the personnel came down with typhoid fever. Apparently no precautions are taken to disinfect linen, dishes, hands, etc.

I later visited military hospital No. 83, contiguous to the above-mentioned Red Cross hospital. Here one of the physicians told me that the dejecta are received into a dry bedpan, are disinfected in the pan, and thereafter placed in a large receptacle filled with disinfectant and there remain for twelve hours. He further told me that all the personnel are required to disinfect the hands after handling patients or infected material, which material was also disinfected. In proof of his statement he showed me his finger nails, which were discolored, presumably by the disinfectant. I did not personally see the above-described routine. In the physician's opinion the hospital well was infected (though this had not been demonstrated bacteriologically), as the latrines were on higher ground and seepage therefrom into the well probable. He added that he had no doubt the whole place was thoroughly infected, as last year (1904) the buildings were occupied by military hospital No. 1, which was used as a typhoid hospital. Ten of the personnel had been taken with the disease, five in one week. I observed that the windows were screened, but the doors were hospitably open to flies and the patients were not protected by bed nets. It was stated that attempts had been made to protect the patients through the use of veils made from gauze, but they threw them off. Upon the whole, I am impressed with the conviction that any effort made in the hospitals to prevent the spread of typhoid infection was, to say the least, inadequate.

A study of the health conditions at Vladivostok are interesting. This fortress, located at the seaport of the same name, is considerably south and east of Harbin, though in eastern Siberia. The port is of some importance and there is a civil population of about 20,000 at present. The strength of the garrison was in 1904, 19,378; in 1905, 66,000, with outlying forces numbering about 35,000 additional.

The movement of sickness was as follows:

	1904.		1905 (to September).	
	Cases.	Deaths.	Cases.	Deaths.
Typhoid fever	132	22	68	4
Scurvy	3	.....	425	.....
Dysentery	7	.....	36	3
Grippe	223	.....	422	.....
Syphilis	128	.....	215	.....
Other venereal diseases	342	.....	(?)	.....
Enteritis	204	.....	663	.....
Diseases of lungs and throat, acute	417	21	560	6
Accidents and injuries	165	2	321	2
Diseases of the eye	61	.....	327	.....
Diseases of the skin	533	.....	(?)	.....
Other diseases	1,754	19	4,070	28
Total	3,970	64	7,107	43

Average strength of commands, not including sailors.

	1904.	1905 (to September).
Officers	378	(?)
Men	19,000	66,000

The water at Vladivostok is bad. There are no waterworks and no sewer system.

During 1904 the following cases were treated in the naval hospital at Vladivostok:

Typhoid fever	3	Pneumonia	19
Malarial fever	11	Insanity	4
Smallpox	1	Tuberculosis	23
Venereal	497	Wounds	151

Among these were 80 deaths. I was not given the statistics for 1905. In passing through the hospital, which was quite the finest fixed hospital I saw during my absence abroad, I saw a number of cases of typhoid fever scattered throughout the various medical wards mixed in with other cases. The surgeon told me that they were convalescents. The cases certainly must have been mild, as the cards indicated not over three weeks in hospital. I was informed that all cases were confirmed by bacteriological tests. The administration of this hospital was otherwise excellent, and yet here were typhoid cases treated alongside of other diseases as though contagion was the last thing to be avoided.

As a practical fact I don't think that the Russians have

yet come to realize that camp typhoid fever is a quarantinable disease.

In glancing back over the foregoing somewhat disconnected story one is impressed with the fact that the troops in camp on the lines were the sufferers from typhoid. It can not be said that there was overcrowding such as we had at Chickamauga, for instance. The positions covered a front of more than 50 miles, and while they were occupied by 700,000 men, the camps were not continuous, but the troops were camped by regiment or even battalion. I did not, of course, see all the camps or even a larger part of them, but those I did see were certainly not overcrowded, there was, as a rule, ample space within the unit camps, and ample surrounding space for organizations.

The men went into camp in May after a winter in dugouts, following a series of terriffic battles, and with none too much food; indeed it has already been stated that the scorbutic taint prevailed extensively. The question arises as to whether these were the men attacked by typhoid or were the late comers the victims. So far as I could learn by inquiry of those with whom I could speak the men longest on the ground were those first attacked; but not when they came out of winter quarters and presumably were most debilitated, not during the cold of the spring, but during August, three months later. As Doctor Gorbacevich said, during this time they were working in the trenches, but typhoid remained at its minimum until July, when it began to increase. There were two universal conditions in July which had not before obtained during the year—rain and flies. According to Doctor Botkin, the camp conservancy had not been good and the surface of the ground surrounding the camps, including the camp wells, was probably infected. We know that dejecta were scattered about on the surface, and we also know that there were some typhoid and some bacillary dysentery among the men. There was, however, no marked increase in the average number of dysentery cases. Regarding the use of rain water the regulations seem to be specific enough, but I fancy were difficult to enforce.

The water, some of it, was analyzed, for every medical chief of a corps had a hygienist and laboratory attached to

his staff. Besides these, there were three laboratories at Harbin and one at Kungchuling, not counting the Betkin railroad laboratories. The director of the latter told me that he had made thirty water analyses from samples taken about Harbin, as the result of which five wells were condemned and filled up, colon bacilli having been demonstrated. I got no such definite statement from other laboratories. Doctor Shaffer, of the German army, said, so far as he had observed, the soldiers drank when thirsty the water most convenient to get. Moreover, during the warmer weather they drank more than usual. It is a fair presumption that in Manchuria all running water is typhoid infected, as typhoid as endemic there. So much for this possible cause of the typhoid epidemic. It has been heretofore stated that the common house fly made its appearance in July in swarms and continued in swarms until frost came. The sinks were convenient, the fly ubiquitous. How considerable a factor was the fly in this typhoid epidemic? Then, too, during the rainy season the men lived in the mud; they could neither keep themselves, their habitations, nor their camp grounds clean. Were they factors in spreading the epidemic? If the typhoid bacillus was spread by these means, then why not the Shega bacillus?

I quote from my notes of September 13, 1905, made while en route to Vladivostok:

Speaking of the typhoid epidemic, which is likely to spoil the splendid health record of the Russian army, I am impressed with the belief that the following factors enter into it:

First. The endemicity of the disease in Manchuria and in the army, many cases occurring every month.

Second. The depreciation of the health of the army during the winter in sod houses, the result of which was a marked scorbutic taint.

Third. The long continuance in the same camps.

Fourth. The rainy season, which began July 10 and continued through August.

Fifth. The appearance of flies, which occurred in June.

All of the conditions except the second are identical with those which appeared in our camps during the Spanish-American war. The advantage with the Russians was that they could get no food other than that issued to them and no stimulant other than tea.

The epidemic of typhoid attacked probably 1 per cent of the fighting army, say 7,000, for most of the cases came from the front. Of this probably 12 per cent died, as the infection was more severe in 1905 than in 1904, say 840 men. This is about the same number of cases as reported in Philadelphia in 1904. Can a field army do better? I think so, but there will have to be wider dissemination of a knowledge of the laws of right living before the white man will do it.

I learned nothing new regarding the treatment of typhoid. The same routine of sponging, diet, and watchful care. There were new facilities for tubbing. Soup, always acceptable to the Russian, was the diet, no milk being available, and those who desired it were permitted to eat bread. I heard of no operations for perforation, though frequently asked if such had been done. When I left Manchuria the time had not yet arrived for compiling the detailed statistics of the epidemic, and what is noted here is from the point of view of a hygienist rather than a clinician.

DYSENTERY.

Dysentery has always been recognized as one of the most important causes of noneffectiveness in field armies. It was a veritable scourge to the Russian forces in China during the Boxer uprising. Doctor Gorbacevich told me that the mortality from this disease in that campaign was 16 per cent of the cases, whereas during the present war it is less than 5 per cent. The Union Army lost from dysentery during the civil war 24.77 per thousand, nearly twice the number dead from typhoid fever. Kean, quoting from the medical and surgical history of the war, says:

> These disorders (dysentery and diarrhea) occurred with more frequency and produced more sickness and mortality than any other form of disease. They made their appearance at the very beginning of the war, not infrequently prevailing in new regiments before their organization was complete, and although as a rule comparatively mild at first, were not long in acquiring a formidable character. Soon no army could move without leaving behind it a host of the victims. They crowded the ambulance trains, the railroad cars, and the steamboats. In the general hospitals they were often more numerous than the sick from all other diseases and rivaled the wounded in multitude.

Even as comparatively recently as the publication of this remarkable work—1879—there was but a glimmering of the true causes of this scourge of armies. Lieut. Col. J. J. Woodward, Medical Department, U. S. Army, its distinguished author, in summing up his classical consideration of the causation of dysentery, says:

> For myself, I strongly incline to adopt the view of the contagion of the stools for a certain class of dysenteric cases, yet I frankly admit the recorded evidence on this head is by no means so conclusive as that which we possess with regard to typhoid fever.

We now know that dysentery in its various forms is produced by definite organisms and is infectious. The history of the numberless epidemics in armies, reports of which have been made as far back even as Herodotus, all point to this essential fact, and yet it was not until 1888 that Chantemesse and Widal first described the bacillus of dysentery, and not until 1898 that Shiga, a Japanese scientist, proved conclusively that the bacillus which bears his name is the true cause of epidemic dysentery.

There is, to be sure, a so-called tropical dysentery, due to amœba, but of this no case was found among the Russians in Manchuria, and it need not be considered here.

The contagium of dysentery is contained in the dejecta of the sick, and, like that of typhoid fever and cholera, must be eaten or drunk; in other words, taken into the intestinal tract, to produce the disease.

The conditions under which dysentery becomes epidemic are identical with those of typhoid fever, though some authors entertain the opinion that water is a less important factor in the spread of the Shiga (dysentery) than of the Eberth (typhoid) bacillus. This view seemed to be entertained by the Russian army physicians who, it will be recalled, attributed the typhoid in their armies to water infection and the dysentery to fly infection.

Epidemics of dysentery usually occur during the late summer and autumn—coincidentally with those of the typhoid and the fly seasons.

As a practical fact, however, the obtainable statistics show but 5,456 cases of dysentery for the period of the war ending July 1, 1905, of which 256 died.

On August 1 one report shows 418 cases and another 677, with 181 cases of pseudodysentery. On September 1 the report shows 646 cases of dysentery. At no time did the number of cases reach beyond about half the number of typhoid cases, and the mortality was less than half the rate for typhoid fever.

It is interesting to speculate as to why the two diseases did not increase proportionately, since the conditions were so favorable to propagation—with this possible difference, that dysentery is not a water-borne disease, or at least water plays a minor rôle in its distribution.

I find by reference to my notes regarding military hospital No. 31, Harbin, assigned as the contagious disease hospital, the following, under date of August 3, 1905:

There are to-day under treatment 35 cases of typhoid, 135 dysentery epidemica, 2 varioloid, 1 diphtheria, and 23 erysipelas. About 100 cases of typhoid have been treated in this hospital during the last sixteen months, with a mortality of from 5 to 6 per cent, and a number of cases of varioloid.

For the last four months a dysentery (Shiga) serum manufactured at the Government laboratory, St. Petersburg, was used with the most satisfactory results, so the surgeon stated. It was used in the 200 cases received since May last, among which but 3 deaths occurred. The average mortality, the surgeon said, being 4 per cent. The dose was from 10 to 100 gms. hypodermically. Four injections could be given daily, the total amount not exceeding 100 gms. The serum should be kept in a cool, dry place and is efficient for a year. I obtained a sample of it.

There is an excellent laboratory at this hospital under charge of a professor from the University of Tomsk, which seems to be a working institution. I was told that all cases of typhoid were proved by the Widal test. No amœba have been found in the stools of any of the dysentery cases.

Except for the serum, the usual routine of treatment was observed in the dysentery cases. Regarding the serum treatment, I have not sufficient data to base a conclusion, but it certainly seems most promising and will bear further investigation—nay, demands it, so far as we are concerned, for thus far our experience with dysentery has not been happy.

From Kean's table I learn that during the four years of the civil war we had an annual average of 735.96 cases per thousand of diarrhea and dysentery, with a death rate of

22.91, and Colonel Woodward writes in the medical and surgical history of that war that "these disorders occurred with more frequency and produced more sickness and mortality than any other form of disease."

In the list of diseases given at the beginning of this chapter it will be observed that epidemic influenza looms up somewhat prominently. I have no doubt of the existence of this disease in Manchuria, for I had an opportunity to observe several cases of it on the attaché's train. I am quite sure that the diagnosis was often a tentative one, for I was told in the hospitals that not infrequently cases admitted with this diagnosis subsequently developed well-marked typhoid symptoms. Both typhus and relapsing fever were constantly present with the army, though in small numbers. Of the former there were 201 cases up to July 1, 1905, with a mortality of 35, and of the latter 170 cases, of which 11 died. I saw some of these cases in the quarantine hospital.

Smallpox cut very little figure in the mortality tables—209 cases, of which 12 died. All men who join the Russian army are vaccinated, and this is repeated before starting on a campaign, and thereafter whenever necessary, so there was no reason to expect a severe manifestation of the disease, even though it is endemic among the natives of Manchuria.

The 1,180 cases of scurvy, with 10 deaths, probably represents but a small proportion of those more or less affected by the scorbutic taint. I learned from many sources that scurvy modified the course of both medical and surgical cases, and I have actually seen cases of typhoid fever with well-marked scorbutic symptoms.

Anthrax was always present in the army. This was accounted for by the Russian physicians on the hypothesis that the infection came from the sheepskin lining of the overcoats. It will, however, be seen by reference to the chapter on the veterinary department that anthrax was epizootic in Siberia and might easily have reached the army through sheep, which were brought from there by the thousand. These cases were treated antiseptically, but all surgical procedure was avoided.

The remarkable absence of mumps and measles will be noted.

I have no record of the total number of cases of pulmonary and cardiac diseases.

The statistics of venereal diseases from the beginning of the war to September 1, 1905, are as follows:

	1904.	1905.
Syphilis	2,867	1,600
Gonorrhea and chancroid	5,756	3,276

The statistical officer estimated that gonorrhea was to chancroid as 2 is to 1.

The total number of insane was 1,081, of which 244 were officers.

The foregoing résumé of the morbific conditions and results among the Russians in the Far East, so far as at present known, should afford lively satisfaction to those interested in the welfare of the soldier, both from a humanitarian and a militant standpoint. Russia, to be sure, had the advantage of the example of our sanitary errors—inexcusably bad—followed by those of the British in South Africa—not so bad as ours, but bad enough—and there was no reason why her soldiers and physicians should not have been fully alive to the importance of military sanitation. Then, too, the people of Russia were stimulated by the widely heralded sanitary work of their adversaries and spared no efforts to produce equally good results in their own armies.

Truly the war in the Far East has taught us many valuable lessons, but none is more valuable than the sanitary lesson of that conflict.

SOME SURGICAL SUGGESTIONS.

I was officially informed by the Russian authorities that wounds were inflicted by different missiles in the following proportion:

	Rifle.	Shrapnel.	Shell.
	Per ct.	*Per ct.*	*Per ct.*
Officers	71	11	18
Men	79	13	8

The statistical officer—Harbin—stated to me that wounds from cold steel were almost negligible; he had made no official compilation of such, but estimated that in 1,000 cases of wounded 17.5 suffered from saber or bayonet wounds. Of this number 17 per cent were inflicted by the saber and 83 per cent by the bayonet. In other words, in the total number of wounded (113,755, see Table I) about 2,000 were the victims of cold steel, 340 receiving saber and 1,600 bayonet wounds. I presume if the "dead" and "missing" had been examined this proportion would have been maintained.

I find in a report of the sick and wounded treated in the Red Cross hospitals of the Premorsk district the following:

Cause of admission.	Total to be accounted for.	Cured.	Died.	Transferred.	Remaining.
Gunshot wounds	14,737	9,262	54	5,216	162
Saber and bayonet wounds	57	41	1	12	2
Other wounds	983	605	1	320	42

The extraordinarily large proportion of wounded by artillery fire is certainly impressive. No other war has shown 29 per cent of all wounded officers and 21 per cent of men placed hors de combat by this arm. Wolseley says (Soldier's Pocket Book, p. 121): "According to the German medical returns, the number of all ranks in the German army killed and wounded by rifle bullets during the war of 1870 was 6,969 killed and 49,093 wounded, whilst by artillery fire the numbers were 695 killed and 4,389 wounded—that is, out of every 100 men (wounded) 91 were hit by infantry and 9 by artillery fire." Wolseley continues: "I have laid stress upon the fact that the effect of artillery fire is more moral than actual," etc. There seems to have been a very actual effect in Manchuria. The chief surgeon, writing from Kungchuling September 2, 1904, in concluding a report on the action of the Japanese jacketed bullet, says:

> But all this bears no comparison with the progress made in the artillery arm. On the 17th and 18th of August our (Russian) artillery fired more than 100,000 shells, and the Japanese artillery by far exceeded this. The havoc wrought by the latter can only be recalled with a shiver. The wounds caused by artillery fire were terrible and usually fatal.

It is interesting to note that the Russians report (Table I) but 3,008 dead of the wounded treated in hospital. This is exclusive of the dead from wounds of those "evacuated," which, if in the same proportion, numbered approximately 1,120, or a total of 4,128 in 113,755 wounded. The reported "killed" numbered 19,467 and the "missing" 39,729, which may be counted as killed.

Based upon present information, we have, then—

	Killed.		Wounded.		Died in hospital and quarters of wounds.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
Russians	[a]59,196	57.4	113,755	43.8	4,661	4
Japanese	43,892	42.6	145,572	56.2	9,054	6

[a] This includes the "missing," but not the Port Arthur casualties.

These figures are significant, or would be if we knew all the facts.

Why were 12 per cent more Japanese wounded than Russians?

Why were 14 per cent more Russians killed than Japanese?

Why did one-third more wounded Japanese die in hospital than did wounded Russians?

I quite appreciate the danger of drawing conclusions from insufficient data, and it is probable that my views will be somewhat modified when all the facts are available, so what is here said must be accepted tentatively, as the statistics are tentative.

I am uncertain whether or not there are new lessons for us to learn from this war regarding the stopping effects of the small-caliber high-powered projectile.

Is it possible that the 7.60 mm. cupro nickel-jacketed bullet of the Russians, which weighs 13.7 grams and has an initial velocity of 640 meters ($mv^2=551$), is more humane than the 6.50 mm. German silver-jacketed bullet of the Japanese, weighing 10.5 grams, with an initial velocity of 725 meters ($mv^2=552$)?

This can be answered in the affirmative if to kill is considered more humane than to wound.

The chief surgeon, writing from Liaoyang May 31, 1904, where "most of the wounded passed through my [his] hands," says:

The experience here convinced me that the Japanese rifles are better than ours. The range of this weapon is very great. Within 200 meters, though the track of the bullet is small, the wounds were very fatal owing to the explosive effects, there being extensive shattering of bone, or in the abdomen tearing of intestines. At longer ranges, 400 to 800 meters, the wounds were less serious. Except in abdominal lesions the wounds inflicted by the Japanese rifle healed quickly. Even in abdominal cases, with severe lacerations of the intestines, several patients recovered after suture of the intestines where asepsis could be maintained. Wounds of the lungs were usually of a less serious nature, particularly those received at the higher ranges. Beyond 1,000 meters the bullet disintegrated, and the wounds of entrance and exit were considerably larger than the channel made by the missile in its course through the tissues, and bones were seldom shattered.

The chief surgeon is my authority for the statement that at the shortest ranges infection of the wound was infrequent, but at the higher ranges this was more often observed, due, he says, "to the foreign matter, especially clothing, driven into the wound." In concluding his report, he writes:

We can say that the Japanese bullet is modern and humane. About 52 per cent of the wounded were returned to the fighting line inside of one month.

Later this same authority wrote on the subject of "humane" bullets in a less optimistic frame of mind, as follows:

Fight only during the warm season, before frost; let the battle be on soft, dry ground, free from stones or rock, at ranges not less than 250 meters. See that the men go into the fight with empty bowels and bladder and that there be no shooting at heads. If these conditions can be enforced, then the bullet so deadly to-day might prove "humane."

Doctor Wreden thinks that the modern jacketed bullet is, under certain conditions, more destructive than the old (large caliber) bullet, and that the lessened mortality among the wounded is wholly due to improved surgical technique. He says:

From the beginning of the war to January 1, 1905, only 1 amputation was required in every 200 cases.

The statistics above quoted would indicate that the Japanese bullet is humane, as it was the chief factor in killing

outright 35 per cent of all Russians hit and wounding 65 per cent, of whom but 3 per cent died. To be killed outright is certainly more humane than to suffer long from painful and disabling wounds.

The shrapnel bullet is more than twice the caliber of the rifle bullet and with but one-sixth its velocity; it is not jacketed, and when the projectile bursts the shrapnel frequently deforms, assuming all sorts of shapes. While the shrapnel has no hydrodynamic effect, it inflicts very severe wounds, with great destruction of both hard and soft tissues.

Of shrapnel Colonel Havard writes: "These shells were much more numerous and did most of the execution." Of the shimose shell he says it "explodes with great noise on striking the ground, excavating a little crater and giving off a small cloud of thick brown smoke. Except when exploding within a short distance, it does but little mischief, for it breaks into a multitude of fragments, most of them minute, and without much power of penetration."

Has the time yet arrived for us to draw anything more than very general conclusions from the sanitary statistics of this war? I think not. I find in looking over my notes numerous entries which give some indications of the direction in which the experience will probably work out. August 16, 1905, Doctor Brentano, of the German Red Cross hospital, said that altogether 600 cases of all kinds had been treated in his hospital. These include 127 surgical operations, of which 4 were amputations—1 shoulder, tetanus, died; 1 thigh, lower third, shrapnel wound, infected, recovered; 1 arm, middle third, tetanus, died; 1 leg (Gritti operation), shrapnel wound, recovered. There were three resections, 2 of hip and 1 of wrist, all of which recovered. About 10 per cent of the surgical cases died, as follows:

Tetanus, 4; sepsis, 4; peritonitis, 1; meningitis, 2; empyema, 1, and rupture of spleen, 1. Only 1 celiotomy was done for gunshot wound of abdomen with peritonitis. This resulted fatally. Four pelvic abscesses following gunshot wound of abdomen were evacuated per rectum and recovered. No cases of bayonet or saber wounds were received. Doctor Brentano further said that almost all cases of shell and shrapnel wounds arrived infected. In one case (noninfected) a shrapnel bullet penetrated the right lung and was

removed from the back. Cases of gunshot wounds from rifle bullets were usually sterile.

Doctor Butts, in charge of a Red Cross hospital at Gotsaidan, furnished the following statistics: From 10 to 20 per cent of all missiles lodged; 3 to 4 per cent of bullets lodged. All shrapnel wounds were infected and but few bullet wounds. Of 50 cases of infected wounds of head operated upon, one-half died; of 150 sterile cases, 10 per cent died. Doctor Butts is also of the opinion that rest and surgical noninterference are the indications in wounds of the abdomen; 50 per cent of such cases die of peritonitis. He reports 5 cases of abdominal abscess following wounds, all of which recovered.

Among 915 operations there were 75 amputations, 15 resections, 25 excisions, 3 aneurisms, 200 trepanations.

Doctor Butts treated 24 cases of gangrene, of which 23 died, and 3 cases of tetanus, all of which died.

Regarding the anatomical location of wounds, I have no data of sufficient extent to be of general value. I have heard it stated casually that the number of wounds of the head and right upper extremity was unusually large, due to the necessary exposure of these parts in the act of firing, but I have not regarded this as an authenticated statement.

From what I have been able to gather from conversation with Russian surgeons, I think it probable that we will have no occasion to modify our views regarding the effects of high-powered bullets at different ranges. Doctor Wreden writes:

> The explosive effects of the Japanese bullet in spongy bone tissue is observed only at close range (100 m.), beyond which the distinction is slight, but in dense osseus tissue explosive effects are observed up to 800 m. Within 200 m. wounds of the cranium are usually fatal, the hydrodynamic effects being most marked, and within 100 m. the calvarium is greatly comminuted. Beyond 200 m. tangental wounds of the head are not usually fatal, but penetrating wounds are lethal up to a 1,000 m.

Doctor Wreden regards wounds of the face and neck as serious, and if the latter are complicated by injuries to arteries, trachea, or esophagus they are usually fatal. Colonel Havard reports a wound of the cervical region in the case of Prince Murat in which the bullet transversed the neck from

side to side, coming out close to the internal carotid artery, and another case in which the missile entered at the point of the chin and emerged close to the spine on the right side. Both of these cases were convalescing.

So far as I could ascertain, there is a general consensus of opinion that bullet wounds of the lungs are not serious.

The impression left on my mind is that celiotomy for any purpose was a rare operation. This impression was gained not from statistics, for such were not obtainable except from a single hospital here and there, but from conversation with many surgeons. The only really definite statement I have on the subject is found in a report made by a chief surgeon, of which I will submit a free translation:

Among the most serious wounds we have encountered are those of the abdomen, in the treatment of which very little has been accomplished. We can only say that the more rest the patient can have from the very moment of the infliction of the wound the better the result. The character of the missile—bullet, shrapnel, shell, or cold steel—is of great importance in determining the result, and lesions caused by each of these should be considered separately.

The severity of wounds of the abdominal region caused by the modern bullet is directly proportionate to the range. As the result of the experience gained in several operations done for penetrating gunshot wounds of the abdomen at close range, I was deeply impressed with the great explosive effect of the modern bullet. In some of the cases in which the stomach was full it was burst into pieces and entirely separated from the surrounding organs. A like result followed with a full bladder, and great havoc was wrought in liver, spleen, and kidneys. In such cases, as was to be expected, the symptoms of shock were pronounced and resembled those of internal hemorrhage. The wounded man almost invariably fell to the ground, complaining of intense pain in the belly, but did not lose consciousness. If left quiet, the pain subsided and the shock disappeared.

The report adds:

These cases never spoil the statistics of the rear hospitals, for they die on the field or at the dressing station.

Beyond 400 meters the explosive effects were not observed, and the patients did not at once fall. Soon, however, symptoms of shock supervened, with vomiting, especially in alcoholics, and the wounded man laid down. This condition usually continued for several days and has led to early operative interference, which only resulted unfortunately.

The reporter estimated the mortality from rifle-bullet wounds of the abdomen at 40 per cent of such cases. This was based upon nine months' experience in the Far East.

Shrapnel wounds pentrating the abdomen were much more serious than bullet wounds, the mortality being about 80 per cent. The same Russian surgeon, writing of these wounds, says that when they involve the liver, spleen, or kidneys they caused death quickly from extensive hemorrhage; but in the stomach, intestines, or bladder the shrapnel inflicted much severer wounds than the rifle bullet even within the explosive ranges.

Wounds of the abdomen from ricochet bullets or shell splinters were usually so extensive that surgical interference even under the best conditions would probably have been ineffective. Such wounds were particularly observed among artillerymen. The external appearance of these wounds differed from that made by the ordinary bullet, the wound of entrance being considerably larger; moreover, the course of the bullet was much more irregular. Large pieces of shell sometimes caused immense destruction of tissues, with almost instant death, and yet such cases sometimes recovered.

I have a report on saber, lance, and bayonet wounds which I will venture to quote. The reference to Cossack lance wounds is interesting as involving the question upon whom the wounds were inflicted, for there were not many Japanese prisoners and the Russians did not remain on the field long enough to examine the dead.

> The wounds from the Cossack lances are large and of the most serious nature, for not only does the point enter the body, but the entire weapon up to the handle. Such wounds are almost inevitably fatal, the wounded dying on the field or en route to the dressing station.

In considering bayonet wounds a word must be given to the weapon. The Russian bayonet is rapier shaped. It is made for thrusting, not cutting, and it inflicts only punctured wounds, the edges of which quickly contract upon withdrawing the weapon.

The Japanese bayonet is a knife, long, strong, pointed, and sharp, and with it not only can punctured wounds be inflicted, but incised, contused, and lacerated wounds as well. Wounds of the abdomen caused by the Japanese bayonet are generally long gashes, through which the abdominal cavity is emptied of its contents, causing speedy death.

The chief surgeon above quoted, in summing up his conclu-

sion, says that to recommend the doing of laparotomy in a divisional mobile military hospital during the progress of a battle with a constant inflow of wounded is unwise.

From among several evils the least should be chosen, and time and strength are not available for such operations under such conditions. These abdominal cases should not be operated on, but should be given rest, temporary dressing, and morphine.

Finally, he says, active surgical interference in abdominal cases depends upon the temporary location of the wounded, his condition, and upon the kind of weapon with which the wound was inflicted. * * * The result of treatment depends upon the method adopted, and in all such cases absolute rest is essential for at least a week. Morphine is our sheet anchor in all wounds of the abdomen.

I have nothing but praise for the first-aid packet which is carried by every officer and enlisted soldier. The officer usually attaches the packet to the scabbard of his sword, thus assuring its constant presence, for a Russian officer is never without his sword.

The soldier is supposed to have a special pocket in the front of his breeches, on the right side, which is devoted to the first-aid packet, but, so far as I saw, this rule seemed more honored in the breach than the observance, though a place was always found for the packet somewhere.

The Russian first-aid packet is much like ours in general appearance and size. It contains 1 antiseptic bandage of sublimated gauze, 3 meters; 2 antiseptic compresses of sublimated gauze and cotton, and 1 safety pin.

These are hermetically sealed in a rubber (waterproof) cover, and the packet is thus issued for use at the dressing stations, etc., but when issued to the man it has an additional cotton-drill cover on which is printed a list of contents and the following directions:

1. Take off the outer (cloth) cover.
2. Open the (rubber) package, take out the compresses, and place them on the wound, absolutely dry.
3. Apply the antiseptic bandage over the compresses, but not too tight.
4. Fasten the end of the bandage with the safety pin.

NOTICE.—In case of a perforating wound, place one of the compresses over each opening.

The first-aid packets, and, indeed, all other surgical dressings, were manufactured in the Government fabrique at St. Petersburg. Pharmaceutical preparations, surgical instruments, in fact everything pertaining to the armamentaria medicorum et chirurgicorum, were made at this great plant. I spent some time inspecting this interesting place and could have profitably spent much more. The care with which the dressings were prepared was most minute. I made the following note regarding the first-aid packets, 16,000 of which were turned out daily at a cost of 15 kopecks (7 cents) each.

The raw materials (for dressings) are purchased by contract, much of it coming from Germany, and all are antisepticized by heat (steam under 1.5 atmospheres). A certain amount of the dressings is sublimated; indeed, all that is used in the first-aid packets and the field. This is stained a pinkish color to distinguish it. The dressings in these packets are rolled under glass, are compressed, and then hermetically sealed in rubber cloth as above stated. I saw a number of these packets suspended in water, where they had been for two years, and the contents yet remained dry.

I might here add that I observed a method of packing gauze and cotton, which is the invention of one of the army physicians on duty in the factory, which is a great advance over anything I have seen at home. Instead of being rolled it is folded in accordion plaits, by which method only so much as is needed is withdrawn from the package at a time, thus avoiding possible contamination of the unused part.

A chief surgeon wrote just subsequent to the battle of Liaoyang that he was impressed with the care shown in distributing the first-aid packets and the careful way they were carried by the officers and men. The first-aid bandaging was readily done by the men, though not under strictly aseptic conditions; nevertheless, though the heat was great and flies plentiful, there was no sign of infection during the first twenty-four hours. The first-aid packet proved of invaluable service to the wounded during transportation. Doctor Werden objected to the red dye in the gauze, which he thought occasioned a cutaneous inflammation, aggravated by heat and perspiration. But might not this have come from the sublimate itself? Doctor Werden suggested that the gauze should be soaked in a 5 to 10 per cent solution of

creosote, the especial advantage of which is that it would keep flies away from the dressing.

The first-aid packet has passed beyond the experimental stage and is now universally recognized as a legitimate part of the soldier's field equipment. It has both a positive and a negative value—positive because of its appropriateness and negative because it prevents the use of an inappropriate dressing, which would surely happen if a proper dressing was not available.

The consensus of opinion among the Russian surgeons with whom I discussed the matter was that rifle-bullet wounds were usually sterile and wounds from artillery projectiles usually infected. In summer there was much less wound infection than in winter. This is explained by the fact that the body and clothing were more frequently washed in summer than during the cold season and that the clothing was lighter and less likely to harbor infection. I find this somewhat startling statement in a report to the Emperor under date of April 15, 1905:

> The last evacuation (Mukden) was carried on in excellent manner, being completed only by the difficulty in healing the wounded who suffered from blood poisoning and gangrene, resulting from fur clothing and cold weather.

Doctor Botkin told me that after Mukden there were many cases of frostbite, and there was also a peculiar anæmic condition with purpura, which some of the physicians thought was due to the cold, which reduced the fibrinogen. I fancy they had not seen much scurvy in their practice up to that time. Doctor Chervinsky told me that after the battle of Sandipas a number of wounded were frozen to death as they lay on the ground.

I inquired of many surgeons if they had used or seen used any new or special methods of treatment, but none had. Doctor Shaffer, of the Germany army, told me he had not infrequently observed the Russian surgeons painting the surface about wounds with tincture iodine, but he did not learn the reason therefor. This remedy seemed to be a favorite one among Russians, and always occupied about the largest bottle in the dispensary.

I could get no exact information as to the percentage of infected wounds that came under treatment.

The surgeons at Irkutsk told me that all the cases they received were infected. By the way, that reminds me, I saw 6 cases of hip-joint amputation in one Red Cross hospital there, all of which were doing well.

Tetanus was by no means an infrequent complication of wounds. In the surgical clinic (military hospital No. 2), Harbin, through which 7,000 patients had passed, there were 12 cases of tetanus, of which 2 recovered. The serum treatment was ineffective.

The statistical officer at Harbin reported that tetanus was in the proportion of less than 2 to each 1,000 of wounded. Of the 250 cases of tetanus, 87 per cent died.

Doctor Chervinsky said that his largest number of cases of tetanus occurred after Mukden. He got the best results from chloroform and chloral, but nothing from antitoxin.

Erysipelas was always present, and it totaled 5 cases per thousand of wounded.

I believe that the latest surgical procedures were used in the hospitals in the Far East. I saw a great many surgical cases in the wards and but few in the operating room.

Rubber gloves were not generally used; in fact, I think their routine use was only required in the German Red Cross hospital, though I saw an occasional pair in the Russian hospitals.

Silk was universally used for ligatures and sutures. The Russian surgeons were quite emphatic in their condemnation of animal ligatures in field service, and some of them told me they never used any other than silk ligatures under any circumstances, as there was no certainty of sterility in any other suitable material. Doctor Chervinsky told me that linen thread treated with celloidin was quite as good as silk and much cheaper. So far as observed, the surgical armamentarium was good. In the beginning of the conflict there were obsolete instruments on hand, which, as with us, were thrown in to meet the emergency, and quickly disappeared, to be substituted by modern instruments. Regarding instruments, a Russian surgeon writes:

I am sorry to say that I saw (May, 1904) many instruments with bone and wooden handles. There was a great shortage of artery forceps and hypodermic syringes. The recently introduced lamps proved of the greatest service, especially after Liaoyang, where we worked

three days and nights. This battle not only illustrated the advance made in surgery, but also the great improvement in weapons. We can figure 1 dead to 3 wounded.

I have not burdened this report with an account of the many interesting surgical cases I saw in the Far East, but so far as possible have endeavored to deduce lessons for our guidance from the general surgical experience of the war.

We learn therefrom that there is no occasion to modify the views heretofore held that celiotomy on the battlefield is interdicted. In such cases expectancy is the correct procedure, and rest and morphine the treatment. The suggestion that we should follow the rule of the ancient warriors, who went to battle in clean raiment and clean body, is valuable. Add to these an empty stomach and bladder and there is little left to be done but trust in Providence.

So far as I could learn through inquiry no special precautions were taken in disposing of the dead after battle. I was informed that those bodies buried by the Russians were usually put into the excavations made in constructing earthworks and covered with earth. The Russian people are particular in their funeral rites, and an orderly ritual indicates respect for their dead. Even in the field the grave was, when possible, marked by a wooden cross, no matter how crude.

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