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TREATMENT  
OF  
THE SICK AND WOUNDED,

ILLUSTRATED BY OBSERVATIONS MADE AT

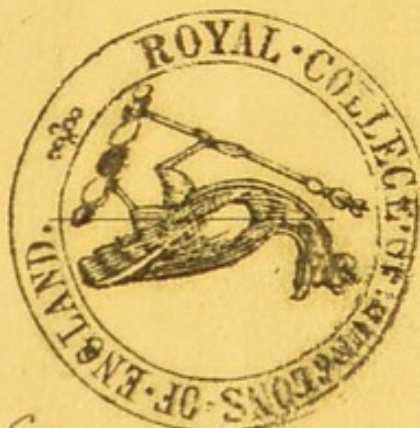
THE SEAT OF WAR;

BEING THE INTRODUCTORY ADDRESS IN UNIVERSITY COLLEGE,  
OCTOBER 3RD, 1870.

BY

BERKELEY HILL, M.B. Lond., F.R.C.S.,

ASSISTANT SURGEON TO UNIVERSITY COLLEGE HOSPITAL.



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# TREATMENT OF THE SICK AND WOUNDED.

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THE present moment, when the minds of all are engrossed in the contemplation of the fearful drama passing through its weary acts on the other side of the channel, appears to me an appropriate occasion for comparing the modes of succouring the sick and wounded in military service during the present and recent wars, with those employed before science had made its several important changes in the conduct of warfare.

In this examination, we must consider in what the modes of receiving and treating the sick and wounded in battle have been altered from the means employed during the wars of the last, and even in those at the commencement of the present century.

Frederick the Great, we are told, experienced such insuperable difficulties in the way of adequately providing for his wounded, that he suggests that all wounded should be recognised by belligerents as neutrals—such, indeed, was the agreement between Earl Stair, commanding the English forces, and the Duc de Noailles, on the French side, in 1743—or, failing this mutual concession, he suggests it would be not only a more convenient, but a more humane practice to abandon the wounded on the field of battle, arguing that with the means at command in those days, any care that could be bestowed on the sick and wounded rarely did more than stave off death for a time, and so uselessly prolong the sufferings of the wounded.



But other views have prevailed; the physicians who attended the forces engaged in these very struggles in the middle of the last century laid down and sufficiently defined most of the main principles of military hygiene, which nevertheless did not, until quite recently, receive much attention.

The military authorities of this country neither copied the improvements of other nations, nor, during the peace subsequent to Waterloo, did they profit by the experience gained in the wars against Napoleon. The true advance for this country in the practice of military hygiene began when the English nation learned, through the English press, the ravages that death and disease from preventible causes were inflicting on the fine troops sent to the Crimea. This discovery at once aroused the national sympathy, and created the determination to compel the authorities to make the necessary exertion, which, supplemented by the abundance sent from private sources, quickly converted a miserable exhausted remnant of a gallant force into an army complete at all points, and in the highest state of health and efficiency.

The English expedition to the East landed in the Crimea almost entirely destitute of transport and hospital supplies; those sent after the army were mostly wrecked in the Balaclava storm; as a consequence, nearly 10,000 men died from preventible disease in the first winter. In the second winter, on the contrary, the loss by death was but 600; scurvy, typhus, and other diseases originating in hardship and neglect, were unknown. Indeed, through the wise and successful exertions of the government and of the nation, the health of the British forces in the Crimea was as good or even better than it is at home in the time of peace.\* At the same time, the French army, which,

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\* Medical and Surgical History of the British Army in Turkey and the Crimea in 1854-5-6. Presented to Parliament, 1858. Vol. II., p. 43.



through their preparations for war, imperfect as they were, suffered less from disease during the first winter, sending in that period from sickness alone 81,000 cases to the hospital, with a mortality of 10,000, sent in the second winter 106,000, with a mortality of 21,000, or twice as large as that of the first winter.

Let us now consider the consequences of neglecting or of observing two of the most important principles of army hygiene.

One of the most incontestably proved principles of military hygiene is *segregation*, or avoidance of overcrowding either of the sick or of the healthy. Still this important condition of health was not ensured to our troops until the middle of the Crimean War, since which time it has been upheld in every campaign as of first-rate importance. For instance, Sir John Pringle, medical officer in the campaigns of the British forces in Germany under George II. in 1742-43, and in Scotland and the north of England in 1745-46, gives the plainest possible examples both of the effect of overcrowding in producing disease, and of isolation in arresting its progress when at its worst. He tells us that after the battle of Dettingen in the year 1743—which you may remember was the last occasion of an English king being present on the field of battle—nearly half the English forces of about 16,000 men fell sick of dysentery. The village of Feckenheim was employed as a hospital. In it 1,500 sick were lodged. Hospital fever soon broke out, and spread even to the doctors and attendants, causing great mortality throughout the army. At last the camp was raised, and the disease at once rapidly abated. But 3,000 sick were left behind. Of these nearly half died, and with them the unfortunate inhabitants of the village were almost wholly destroyed. So again, in the campaign against the rebellion of 1745, the sick of the army under the Duke of Cumberland suffered most severely from typhus, or “jail fever,” as it was then called, through the



sick men being crowded into the workhouse at Lichfield; yet Pringle says that at all other places where there was no common hospital, and the sick could not be collected together, the jail fever was unknown.\*

All large hospitals are necessary evils; necessary, because it is impossible to manage and attend to large numbers of sick or wounded without grouping them together; evils, because each patient is a copious source of poisonous emanations, which, if not rapidly and continuously cleared away, breed disease and death for himself and those around him. This being admitted, it remains to be seen how far we understand the method of diminishing the mischievous consequences of aggregation so that they shall not outweigh the advantages the sick receive from medical attendance and nursing. These evils so rapidly gain strength that, as it has been remarked by several of the earlier writers on military hygiene, a bad hospital system will destroy an army faster than the most energetic government can recruit it.†

In preventing the evils of over-crowding, the quantity of *pure air* deemed indispensable has undergone gradual augmentation, as special researches on hospital sanitation have successively increased the quantity, until at least a superficial area of 100 square feet and a cubical space of 2,000 feet is now pronounced necessary for each patient. The air of this space must be renewed every hour, and for fever or pyemic patients even twice in the hour. Indeed for the latter, treatment almost in the open air appears to be most beneficial. Yet Mr. Hammond, Surgeon-General to the Federal forces during the late American war, in a report on the condition of the hospitals of Western Virginia and Maryland during an early stage of the war,

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\* Sir John Pringle, M.D.: *Observations on Disease in the Army*. Fifth Edition. London, 1765, p. 41.

† Fergusson's *Recollections of a Professional Life*.



states that in several of the hospitals two or three hundred cubic feet, and in one instance only 84 cubic feet per patient, was the space allowed. It needs not further comment for us to believe that comparatively few of the patients left those receptacles alive. Jackson, writing on the Peninsular war, says, "it was often proved in the history of the late war that more human life was destroyed by accumulating sick men in low and ill-ventilated apartments than in leaving them exposed to severe weather at the side of a hedge or common dyke. It is fit that the military officers bear this fact in mind, and also that churches and palaces are less proper receptacles for military sick than barns, hovels, and open sheds."

Dr. Parkes\* remarks that the effect of a great supply of air for some diseases is marvellous; he relates how the patients with spotted fever in 1814, at Paris, were placed with great reluctance in consequence of the crowded state of the regular hospitals in the abattoir of Montfaucon; and that contrary to expectation, they recovered infinitely faster in this structure than in the ill-ventilated wards of the regular hospitals. So again, Donald Munro, writing 100 years ago a treatise replete with minute and practical directions for maintaining the health of troops, tells us† that in 1755, some men of war carried out to North America a malignant gaol fever, brought by convicts impressed from prison to make up the strength of the crews, not an uncommon practice in those days. The fever continued to spread among the crews while the ships were at sea, but at Halifax the sick were lodged in huts or very old shattered houses, that admitted the air freely, and this change put a sudden and effectual stop to the disorder.

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\* Practical Hygiene. Third Edition.

† Observations on the Means of Preserving the Health of Soldiers and of Conducting Military Hospitals. Second Edition. 1780. London.



The experience of former wars received so little attention in even recent campaigns, that, for example, the overcrowding of the French hospitals in the Crimean war, and at Genoa in the Italian war of 1859, was acknowledged to have greatly increased the mortality of the French sick.\* During the Crimean war, much of the enormous loss by sickness in the French army was the consequence, we are told by Chenu, of the inability of the French *Intendance* to appreciate the importance of the most clearly recognised rules of sanitary science. In spite of the remonstrances of their chief medical officer, and of requests that quarters should be changed from time to time, the same field hospitals for the immediate reception of the sick and wounded were employed throughout the war—with what disastrous consequences may be judged by contrasting the sickness and mortality of the three successive periods of six months which the French army passed in the Crimea. In the first six months 51,000 were sent to the tent or field hospitals, with a mortality of 4,960; in the second, 85,000, with a mortality of 12,000; in the third, 61,000, with a mortality of 11,000. Similar testimony is borne by the results of treatment in the large general hospitals established by the French at Constantinople to receive their sick from the field hospitals. The vast number of sick soon filled the accommodation the hospital originally provided, and the corridors were fitted up with beds in spite of the protest of M. Michel Lévy, the chief medical officer of the army. Thus 2,100 beds were installed in a single palace. The result was a mortality of 12 per cent. in the first six months, 18 per cent. in the second, and 27 per cent. in the third. This loss in the third six months was almost entirely from sickness, for active hostilities having almost ceased, only 300 wounded were treated.

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\* Chenu: *Statistique Médicale de la Campagne d'Italie en 1859 et 1860*. Paris, 1869. *Observations générales*, p. xxiv.



The undeniable evils that result from overcrowding in hospitals, and the rapid improvement that takes place in even apparently hopeless cases, when either by accident or design they obtain a free supply of fresh air, have led to the opinion that sick persons should never be collected together, and that the obvious advantages, both to the sick themselves and to the cause of science, of housing them together in hospitals, are outweighed by the evils that they inevitably suffer from propinquity to each other.

Dr. Farr\* first attracted attention to this point by a series of statistics, which showed that in our large Metropolitan hospitals the mortality was twice as great as that in similar but much smaller institutions situated in provincial towns or in country districts, and concluded that this difference was due to the unhealthy and over-crowded condition of our London hospitals. This important suggestion excited much discussion at the time. Dr. Guy, of King's College, suggested that possibly some part of this enormous difference should be ascribed to the difference in the kinds of cases admitted to our London hospitals from those attended in provincial institutions. This suggestion of Dr. Guy's was shewn to be the true explanation by Messrs. Holmes and Bristowe, who were charged by the Medical Department of the Privy Council to visit the different hospitals of the United Kingdom, to report upon their relative healthiness and upon the causes which determine the mortality in these institutions.† The large London and Provincial hospitals admit a far greater proportion of acute medical cases of which the mortality, wherever treated, is high. From these gentlemen's report it would appear also that those diseases which are chiefly met with when large numbers of wounded are collected together—diseases that are doubtless much in-

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\* Twenty-fourth Report of Registrar-General, pp. 229 *et seq.*

† Appendix to the Sixth Report of the Medical Officer to the Privy Council.



creased by defective ventilation, such as erysipelas and pyemia—form but a small percentage of a London hospital's mortality, and are by no means unknown in the rural hospitals.

The late Sir James Simpson, who turned his energetic mind to solving the question of mortality in hospitals, arrived at the conclusion that it is impossible to prevent a high mortality if more than a very few patients are placed together under one roof, and that the advantages of hospital treatment without preponderating evils can be afforded to the sick only by locating them in a series of small detached buildings. Sir James showed that of 2,098 amputations in private practice 226 died, and of 2,089 amputations in hospital practice 825 died. This gives a surplus of 629 deaths in hospital practice, and, taking St. Bartholomew's to represent a large, well-managed London hospital, he showed that, whereas 1 in 9 of the rural amputations died, 1 in  $2\frac{1}{2}$  died of those performed in that hospital. Moreover, Sir James pointed out a fact that, to my mind, is most cogent—namely, that the difference in mortality was greatest, not in amputations of the thigh (which operation, it has been suggested, is resorted to in the country for less severe injuries than in town, and would thus show a larger percentage of recoveries), but that the mortality after amputations of the forearm is fifteen times greater in St. Bartholomew's than in country practice.

Ultimately Sir James Simpson put forward this table of the results of 6,000 cases of limb-amputation:—

In Parisian hospitals .....	1 died in $1\frac{1}{2}$ or 3 in 5
„ British „ over 300 beds .....	1 „ „ $2\frac{1}{2}$ „ 2 „ 5
„ „ „ from 300 to 150 beds..	1 „ „ 4
„ „ „ „ 120 to 50 „	1 „ „ 5
„ Cottage „ .....	1 „ „ 7
„ Private practice .....	1 „ „ 9
„ of frequent operators .....	1 „ „ 12

Against this at first sight most striking series of statistical facts, it has been advanced with much truth that



while we know pretty accurately what were the conditions of the patients operated on in the hospitals, and can estimate how far their previous conditions influenced their recovery from operation, we have no means of doing the same by those operated on in private practice; hence the comparison lacks a condition essential for accuracy. Until these data are supplied, the question is not ripe for discussion. In the meantime, Mr. Callender\* has introduced a fact that goes far to exonerate the hygienic condition of large town hospitals from increasing the mortality after operations. He showed that the mortality of a small series of amputations on persons sent to Bartholomew's Hospital from the country, and, therefore, presumably in a constitutional state similar to those operated on in the country, was 1 in  $5\frac{1}{2}$ , or almost identical with that set down for rural hospitals by Sir James Simpson. Nevertheless, until the question is settled, it is open to presumption that some part of the enormous difference in the relative mortality of town and country hospitals is caused by faulty hygiene, and it may fairly be expected that the experiments on that subject, now being carried out on so large a scale, will give us some valuable results for elucidating the question.

Having adverted to the enormous loss that attends overcrowding and neglect of hygiene, it is very reassuring to mark how nearly all arrangements for treating the sick and wounded in the present war have been subordinated to this principle of segregation. Our own Government has since the Crimean War made most important steps in this direction, though leaving still something to be done before all that past experience indicates as necessary is adopted.

The unsuitableness of dwelling-houses, churches, and other ill-ventilated buildings has been very extensively recognised, and a great portion of the hospital accommo-

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\* "British Medical Journal," Oct., 1869.



dation prepared for the wounded consists of hut-hospitals, either erected for the purpose or contrived from open sheds, in which the necessary free ventilation can be satisfactorily obtained.

Let me, then, for a moment occupy your attention with a brief sketch of the arrangement of the hut-hospitals, called "Barack Lazarethen" in Germany.

The most successful military hospitals of modern times have been constructed on the plan first devised in the Crimea, by Mr. Brunel, under the instructions of the sanitary officers. The hut-hospitals have proved that certainly hospital fever and hospital gangrene, and probably pyemia (diseases which have destroyed so many of the wounded in former wars) can be entirely prevented in military hospitals.

In construction they are extremely simple, and can be erected from the commonest materials in a very short time. A short description of the hut-hospital at Saarbrück, one of the best in point of sanitary excellence I saw during my recent visit to Germany, will serve to explain their mode of construction. In an open garden, clear of the town, the series of single roomed huts which formed the hospital were arranged in a double row, each hut being separated from its neighbours by a space equal to its own height. Light and air can thus penetrate freely around. The ground was well drained to carry off rain-fall water, and a distinct system of pipe sewers removed the excreta and refuse of the hospital. Water laid on from a neighbouring mountain rivulet was present in any quantity. The huts, built of rough weather boarding, were raised on stages two feet above the ground, so that air penetrates freely between the planks of the walls, the floor, and the roof. Besides this, at the floor level, apertures were purposely left for the entry of fresh air, while the ridge of the roof was lifted above the rest to a height of eight inches along the whole length of the hut, in order



to afford an easy exit for the heated air of the interior. The windows consisted partly of glass, but chiefly of light shutters that could be raised or lowered at pleasure, being fixed above on hinges and free below. Each hut contained about fifteen beds, at the time of my visit almost all occupied. The kitchen and other offices, and abode of the surgeons, nurses, and attendants, were constructed in additional huts of a more complex and permanent kind; but the sick were entirely housed in isolated batches of fifteen, in domiciles through which the wind blew freely in and out on all sides. The atmosphere of the interior was as fresh as the air outside. This absence of anything like a sick room smell I noticed only in the hut-hospitals; in buildings of every other kind it was easy to detect that peculiar odour so universal in continental hospital wards, and not unknown in even our better managed English hospitals. In all the hut-hospitals I visited, the condition of the patients was most satisfactory, not a single case of pyemia had occurred. In the houses and other buildings converted into hospitals, in too many instances hospital diseases had begun to appear. For example, I visited at Saarbrück a large building, the school-house of the town, which had been occupied as a hospital about six weeks. I found one ward had been entirely emptied for purification; four patients had died of pyemia in the few days before my visit, and other cases of pyemia and hospital gangrene had previously occurred. Yet this building was apparently well adapted for its new use, being situated in the outskirts of the town, consisting of lofty rooms, with wide easily opened windows, and reached by a wide airy staircase. So again, in the hospital for wounded in the Bessunger Orangeriehaus, at Darmstadt, a parallel condition of things existed. This beautiful hospital is situated in a fine garden, lent by the Duke of Hesse Darmstadt. It consists of a series of huts, built on the plan I have described, the gifts of various



charitable persons, and of three houses, used in winter for storing the orange-trees which in summer decorate the garden. These orange houses at first sight appear well suited for hospital use; they are wide, lofty rooms, with windows on the sunny southern side, reaching from ceiling to floor, and opening freely. But the absence of doors or windows on the other sides, renders thorough ventilation extremely difficult, and in these orange-houses several cases of pyemia, and one of extensive gangrene, have already occurred; the latter, however, ceased to spread directly the patient was removed from the Orangery to a small tent, of which the sides were open all round. My visit to the hospital, in managing which the Princess Alice takes an active part, was extremely interesting; the surgeons were carrying out the newest methods of conservative surgery with great zeal and assiduity. Thoroughly impressed with the unfitness of the Orangeries for the reception of wounded men, they are very anxious to get huts to receive all the 240 patients under their charge; but their funds are nearly exhausted, and the £200 necessary for the construction of two more huts is a great difficulty.

In towns smaller than Darmstadt and Saarbrück, single hut-hospitals have also been prepared. In large cities like Berlin, hut-hospitals have been prepared on the enormous scale found so successful and economical in America during the late war. Such a one to receive 1,300 patients is now preparing in an open space near Berlin, under the superintendence of Professor Virchow. It is in its main features a reproduction of the great hospital at Philadelphia, and other large cities of the United States. The plan which hangs before you represents the Mower General Hospital of Philadelphia, which consists, as you see, of a series of one-storied huts, disposed round an interior area, in which the offices and abodes of the administrators are situated. The site was a high and



airy plateau, on which fifty huts afforded accommodation for 5000 patients. These huts were arranged like spokes of a wheel around a central corridor, open freely to the air, and warmed in winter by stoves, and this afforded, at all seasons, a pleasant lounge for the convalescent patients. A tramroad ran round the corridor, on which waggons brought the food and supplies to the end of each hut-ward without delay. A telegraph connected the huts with the kitchen, with the director's office, and other parts of the administration. A branch from the railroad permitted the railway cars, in which the patients had been laid near the battle field, to discharge their freight at the door of the hospital. Thus the patients suffered only one change—from the railway to their bed. Among other arrangements there was a printing establishment on the premises, which printed a newspaper, edited by one of the chaplains, and filled with news and with articles written by the patients and medical officers. This journal was distributed gratis to all the patients, its cost being defrayed by the sum received for the slush from the hospital kitchen. A telegraph and post-office completed the communication of this vast sick asylum with the outside world.

TRANSPORT.—Having described the receptacles for sick and wounded which have been constructed on the principle of segregation, and which it must be recollected have been prepared to a greater or less extent in every town of Germany, with the double object of preventing too great an agglomeration of the sick, and of distributing the burden of their care and maintenance equally over the community, I next proceed to the question of transport, which, since the American War, has attained, through the addition of voluntary aid, such marvellous progress in its organisation.

As late as the wars of the first French Republic the only means of transport for the sick and wounded were



the baggage carts, and the services of soldiers from the ranks when they could be spared.

The first Baron Larrey, while attending the Republican armies on the Rhine, devised a system of special carts, with sick-bearers, to convey the wounded from the front; for, at that time, the field hospitals were one league in rear of the attack, consequently twenty-four hours always elapsed before the wounded were got into hospital. This was the commencement of the system of ambulances, which is now employed by the French army, and has, with many modifications, been adopted by all other military nations. It will, perhaps, be as well to explain the different meanings attached to the word "Ambulance." Abroad it signifies a *moving hospital*, i.e., a corps of surgeons, attendants, stores, waggons, and horses. In England the term is frequently, but erroneously, applied to the waggons for conveying the sick from place to place. I shall always use it in the continental signification. In the hands of the French the ambulance system frequently breaks down. The direction and supply of the material, waggons, horses, stores, are entrusted to the *Intendance*, a department that manages commissariat, transport of supplies of all kinds, even the convoy of ammunition, and, consequently, has far too much to do to be able to meet sudden emergencies in the medical requirements of the army.

Again, an invariable consequence of this over-centralisation is a general break down when the army to which it is attached suffers defeat, as in the present war. The French *intendance* has been utterly unable to assist in the conveyance of their wounded, who have been left entirely in the hands of the Germans, and of the few volunteer French and foreign ambulances that have been able to get to the battle fields. Nay, when the army is in a friendly country, or victorious in a hostile one, the *intendance* has been unable to meet even trifling demands



when of an unexpected kind. For example, the Emperor Napoleon III., at the outset of the Italian campaign of 1859, decreed that the baggage of the officers should be carried for them by the intendance. This could only be done by taking for that purpose the cattle which were attached to the hospital field waggons.\* It is, therefore, not surprising that, a few days later than the date of this decree, we learn that for four days after the battle of Montebello, 20th May, 1859, 800 wounded were fed entirely by the charity of the inhabitants of that town, as the Intendance had failed to bring supplies, and still worse, that surgical necessities of all kinds were badly wanted.† In short, had the French been fighting in a thinly inhabited, or hostile country in 1859, their loss from sickness, even great as it was (for the enormous number of 193,186 men were sent to hospital during the short stay of the French army in Italy), would have been largely increased.

But far more disastrous than this was the condition of the English army in the beginning of the Crimean war, and of the Americans in the beginning of their last war. The English army landed in the Crimea with a means of sick transport of one pony and ten canvas stretchers per regiment. Notwithstanding that the principal medical officer of the Crimean army had before the campaign, as he stated in evidence before the Sanitary Commissioners, asked for forty-two waggons, 336 canvas stretchers, and 672 men for his hospital corps, he actually received three waggons without horses, harness, or drivers.‡ In consequence of this neglect our army was delayed two days after the battle of the Alma collecting the wounded, and many lives would have been lost

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\* Chenu: *loc. cit.*, p. 6.

† Ibid., p. 30.

‡ "Official History of the British Army in Turkey and Crimea," vol. ii., p. 253.



had not the French lent their litters and mules to transport our sick and wounded to the shore, where the crews of the men of war conveyed them to the hospital ships. Again, after the battle of Inkerman, the French lent us 500 mules to bring in the wounded, and, in great measure, to their aid we owe it that the English wounded on that occasion were in bed and attended to by ten o'clock of the evening of the battle. Indeed, it is reported that from December 1st, 1854, to January 20th, 1855 (seven weeks), 8,000 sick belonging to the British army were borne on mule-litters and cacolets lent by the French from our camp to Balaclava, where they were embarked for Scutari, a voyage of seven to eight days. These miserable creatures were often so crowded together that it was impossible for the attendants to get near enough to them to supply their wants. A large number died on the voyage, and were thrown overboard. Of these no account could be taken; but when those who survived these miseries arrived at Scutari, they were without their kits, and almost without clothing; numbers of them in a dying condition, unable to tell either their own names, or the regiments to which they belonged.\*

It is gratifying to learn that in the second winter, when we were so well housed, efforts were made by the British to assist the French, on whom fell most of the fatigue necessary to prevent the Russians escaping from Sebastopol after active hostilities had ceased. Dr. Baudens tells us that Sir Henry Storks offered to construct and maintain accommodation for 1,000 sick in the French camp, saying, "Whatever we do, we cannot repay what the French did for us last year."†

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So, also, we must rejoice that during the present unhappy crisis in France, we have been able to return to the

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\* Shrimpton: "The British Army and Miss Nightingale," Paris, 1864, p. 19.

† Chenu: *loc. cit.*, p. civ.



French sick and wounded some of the aid which our distressed countrymen received from their army in the Crimea.

The want of a pre-arranged system of transport and machinery for receiving the sick and wounded was most grievously felt in the early battles of the American war. Mr. Hammond, afterwards the American Surgeon-General, writing eight days after the first battle of Bull Run, tells his superiors that 600 wounded then remained on the battle-field, where many poor fellows had already died of starvation. So also after the battle of Manassas Gap, 7th September, 1862, 2,000 wounded lay from Saturday to Wednesday on the field, without food or water; the surgeons even were starving with their wretched patients. Again, Dr. Agnew, a member of the American Sanitary Commission, estimated that 500 lives were lost after the battle of Antietam, September 17th, 1862, for want of proper transport.\* The news of these and similar horrible mischances, acted upon the Americans of the Northern States as thoroughly as that of our Crimean disasters did on us, and a Volunteer Aid Association was formed that quickly replaced neglect and destitution by succour and plenty. The volunteer aid and transport were so perfectly organised that on many occasions, notably on that of the battle of Fredericksburg, December 13th, 1862, the carts and agents of the Volunteer Aid Societies were under fire on the field of battle several hours before the ambulance carts of the regular forces reached the scene of action. These volunteers carried off the wounded, as they fell, to hospital tents, where their injuries were dressed and their wants supplied. Or, again, at Gettysburg, July, 1863, one of the battles which decided the war, where 20,000 Federals fell in the three days of the battle, and at least

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\* Official letter to the United States' Secretary-at-War. Quoted by Longmore, "The Transport of Sick and Wounded," pp. 16 and 17.



as many Confederates, the agents of the Sanitary Commission were again so close to the moving columns with their supplies and assistants, that by the day after the fighting ended, every wounded man was in hospital, his wounds dressed, and his clothes changed.

The transport and aid for the sick and wounded was developed to a higher perfection by the Americans in their war, than by any other nation. In the present war many of their expedients have been copied, notably that of the arrangement of hospitals for receiving the wounded away from the scene of war; and again, that of the hospital trains, etc., which form part of the means of transport immediately to be described.

The German system of transport is in two parts—one organised by the military department, the other the volunteer transport, which, though recognised and aided by Government, is entirely dependent for its funds on the contributions of individuals.

The military system of transport. In the Prussian service, each army corps of 30,000 men is considered a complete army, and is supplied with equipments of every kind to enable it to act independently if advisable. Therefore each army corps has its medical staff of 20 head surgeons, with proper proportion of assistants, dressers, carriers for the wounded (*Krankenträger*), drivers, horses, litters, stores, waggons—some to convey the wounded, and others to convey surgical stores, water, etc. On going into action, certain of the surgeons, with the sick bearers, litters and waggons, are detailed to follow the corps d'armée closely; the remainder post themselves in the neighbourhood, to form the field hospitals. To these the surgeons of the detachment with the forces engaged in action despatch the wounded, as fast as they are gathered by the sick carriers from the field of battle. The wounded receive attention to their most urgent wants without delay; each soldier carries on his person a bandage and a piece of lint, which



he sick-bearers are taught to apply, as well as to put in force means of stopping loss of blood, should that be necessary, before the wounded man is raised from the ground. The sick-bearers are likewise instructed in the best way of carrying the man according to the nature of his wounds. With these precautions, the wounded are taken to the surgeon, who is close to the scene of action. He examines the wound, applies splints, or what dressing is necessary to enable the man to reach the field hospital, and inscribes on a slip of paper provided for that purpose the nature of the injury, and what has been done to relieve it. Thus, when the man reaches hospital needless examinations are saved. All these officials are in time of peace carefully drilled in their duties, and have as their sole charge the collection and attendance of the wounded in battle, or the sick who fall out on the march. Thus the combatants not only fight with better heart, knowing that, if disabled, a body of skilled bearers will come at once to their rescue, but they have no excuse to leave their ranks at a critical moment of the fight to carry a wounded comrade to the rear.

The wounded or sick being safely disposed of in the field hospital, the next step is to restore them to such a condition that they can be distributed into the permanent hospitals in Germany, which are ready to receive them. This precaution, first extensively carried out by the Austrians in 1859, is always most advisable, because the field hospitals are rarely, if ever, supplied with the best means of repairing injuries, nor are they salubrious abodes. It is also necessary to clear out these primary hospitals, to make room for fresh cases constantly coming from the front. Indeed, the heavy slaughter of the recent battles was far greater than the field hospitals could meet, and thus the neighbourhoods of the battles have been crowded with wounded and dying, in a condition, as far as they are concerned, almost as bad as if no provision whatever had been made beforehand. Again, the necessities of the



campaign required the staff of surgeons, with their assistants, to leave their wounded and follow the marching columns, to be ready for the next engagement. In these emergencies the volunteer aid associations have rendered such important service. Their organisation enabled them to undertake the conveyance of the wounded already sufficiently restored to bear locomotion to their permanent abodes; to take charge of those not yet ready to move, and even to go to the scene of battle and aid the regular medical staff in applying the first dressings to the wounded.

The transport of the sick is accomplished in the following manner:—Trains of ambulance waggons and of country carts—when, as often happened, the former did not suffice—were organised to travel to the nearest station on a railway open to the Germans. To this station was sent a service of trains composed partly of the long American cars used on the Würtemberg lines, and partly of luggage vans. These carriages are fitted up with one or two tiers of cots, supported on elliptical springs fastened to the floors. In each train travel a surgeon, attendants, and nurses, with provisions and supply of medicines for use *en route*.

When all is ready for evacuating the field-ambulance, the patients are fed, their wounds dressed, and their wants supplied as well as the resources they are about to quit will allow; and they are placed in the carts, too often, alas! of the rudest description, in which they travel, whatever may be the weather, to the railway station. Here a corps of the Volunteer Association is ready to receive them, to lift each man from his waggon, carry him to the sheds, where the surgeons quickly change his dressings, often sorely in need of it, feed, and change his clothing, before he is deposited in his cot in the train. When all of the convoy are removed from the carts, the



latter return to the field hospital for a fresh detachment, and this process is repeated day after day.

The train starts on its journey, halting two or three times every day at towns *en route*, which receive a telegram announcing the approach of the convoy, in order that when the train arrives everything may be ready for dressing their wounds, and giving the sick a hot meal. The surgeons and dressers prepare their stores of lint, bandages, clean clothes, etc., and by the time the train is due numbers of clerks, lads from shops and elsewhere, volunteers who have enrolled themselves for this purpose, appear on the platform, ready to convey their patients to the dressing places. If the train arrives after dark, the well-lighted platform becomes, as the cars cease to move, a scene of picturesque activity. Carriage after carriage is quickly entered, the sick borne out, and their wants supplied. If they have not, as often happens, changed their clothes since the battle, they are re-clothed from head to foot. Having received a good meal, cigars, or tobacco, and if they can write, having delivered their letters to a clerk, who undertakes to post them, they are carried back to the train, which as soon as all its occupants have been refreshed, resumes its journey. The lamps are extinguished, the bearers, dressers, and cooks disappear, and stillness reigns where, a quarter of an hour before, all was bustle without disorder. A striking feature of this scene was the contrast between the pain-stricken and hungry, though patient countenances of the wounded, and the fresh, cheerful, I may even say merry, faces of their attendants, who work with such hearty goodwill, that for a moment the idea suggested itself that these young lads must be relatives of the wounded soldiers they waited upon with such tender devotion.

When the train has deposited its burden in the destined hospital, it returns to the gathering-place for a fresh convoy. In this way enormous numbers of wounded and sick



have reached the Fatherland, and even their native town. As many as 40,000 patients have passed through Mayence alone since the first battle of the war; indeed, they still come in crowds, 13,700 having been attended to at the halting-place of Mayence during the eight days preceding my visit. Besides railway hospitals, sixteen Rhine steamers have been fitted up, and have conveyed many thousands down the river to the cities on its banks in the easiest manner possible. By these means, the sick, at first hastily collected into churches, houses, and hovels, their wounds treated as well as the means at hand would allow, have been rapidly deported into permanent and properly prepared hospitals, the Germans into Germany, whither also the slightly wounded French have been marched as prisoners of war, as soon as their recovery was sufficiently advanced. The French who were severely wounded in the battles near the frontier are passed into Belgium, where they have been received into hospitals, prepared in every large town, and treated with extreme assiduity and skill, under the immediate supervision of the king and queen, who, as is well known, are ever active in the cause of benevolence. Belgium, by allowing her railways to be used for the heavy traffic of the thousands of German wounded, and by receiving any German wounded who chose to stay in her hospitable cities, besides providing for thousands of luckless French, has not only suffered inconvenience, but also serious loss by the war; she will, I trust, be well repaid by the lasting gratitude of both France and Germany.

Having thus depicted, but very imperfectly, the manner in which the Volunteer Aid Societies of Germany perform a small portion of their self-imposed duties, namely, their share in the transport of the sick and wounded, I may detain you a few minutes with some account of the organisation of those societies. That their work is of the highest value will, I trust, be clear to every



one after a little reflection, since, from the greatness of the emergency, regular medical staffs and hospital corps must fail to supply adequate attendance to the vast masses of men who, in the battles of the present day, are suddenly rendered helpless. This want can only be met by volunteers, who must supplement the action of the regular medical staff in every way. This insufficiency has, from time immemorial, called forth the charity of individuals, and has in later times, here and there, even set on foot some slight organisation for the aid of the sick and wounded. The earliest I am acquainted with is the Ladies' Union (Frauenverein) of Frankfort, which was formed in 1813 by three ladies of that city to succour the wounded in the great struggle which led to the discomfiture of Napoleon I. In peaceful times it preserves its organisation by working for the poor. In 1847, the short war of the Sonderbund called forth a society at Zurich, which, however, came to an end with the termination of hostilities. This was unfortunately the fate also of the Aid Societies formed in Austria for the wars of 1859 and 1864, so that in the war of 1866 these useful associations had to be constituted afresh. The Crimean struggle was the occasion for the noble efforts of this country, and the generous devotion of Miss Nightingale; but no organised society sprang up in that national crisis, and the need for volunteer aid having passed away, the nation no longer interested itself in the matter. In the late struggle in the United States a Volunteer Aid Association, the American Sanitary Commission, grew up, which had a career of the utmost success. The Commission was inaugurated May 22nd, 1861, and consisted of about twenty eminent men of various professions, well known for their experience in sanitary affairs and for their tact and probity. The objects were—1st. To employ medical inspectors to visit the camps and hospitals, and report and advise on the



numerous causes for disease existing therein. 2nd. To supply to soldiers those articles of need and comfort not furnished by the Government so far as the means of the Commission enabled that to be done. 3. To print and circulate among the soldiers simple sanitary rules. The influence of the Commission rapidly became enormous; it soon undertook the chief direction, both in collecting supplies and in their distribution, and also advised the Government continually on most important questions of the sanitary position of their armies. The machinery it instituted was extremely simple. A chief centre at Washington, a sub-centre in the east and west, collected supplies from the national generosity, which it stimulated by promulgating in their several districts frequent accounts of the work already done, and of the needs of the armies in the field. The distribution of the enormous funds supplied was effected in the following manner:—At each centre were chief inspectors, who received daily reports from sub-inspectors allotted to stated districts or particular armies. These were responsible for furnishing exact and full information of the condition of the soldiers in camp and in hospital, and of the need for supplies in the reporter's district. To these inspectors discretionary power was given to draw supplies when urgently needed, from depôts established along the line of communication with the combatant armies. Other agents of the Commission were employed to follow the armies with carts and stores, and thus on innumerable occasions were of the greatest service during or immediately after a battle. In a multitude of ways, this association was of eminent service. In the three years of its existence it collected no less than  $2\frac{3}{4}$  millions sterling, and saved, it is said, 100,000 lives.

The German aid societies (*Hülfsvereine*) have had a very similar organisation. Called into existence by the urgent needs of the Prussian army in the Schleswig-Holstein war of 1864, and again still more actively engaged in the war



of 1866, the Volunteer Aid Societies of Northern Germany have continued their organisations, and, thus experienced, have prepared in the intervals of peace the supplies of money and goods which have been so incalculably useful in the present war. Many independent associations exist, working in the districts in which they have been established. Most of the larger ones are represented by a delegate to a central committee in Berlin, which receives contributions from the smaller societies, and disburses them directly through its agents at the seat of war and among the hospitals in Germany, and also sends subsidies to the various societies whose resources are drained by extraordinary demands. One of the principal of these individual societies is the Knights of St. John, which ancient corporation has, in this new field of action, begun again its useful labour. Its regular members are mainly drawn from the aristocracy, many of them soldiers, taking active share in the campaign, who eagerly devote any leave or leisure they may obtain in aiding their brethren who are continuously engaged in the good work. Under the direction of this order, which, owing to its importance, enjoys a position recognised by the German Government, and possesses many privileges, bands of volunteer assistants are enrolled, and held ready to be despatched for service where they are most required. It is said that over 13,000 volunteers are employed in various capacities in the present war, in succouring the sick, wounded and distressed soldiers. The carrying out of these arrangements of this and other societies has been greatly facilitated by the German Convention, by which all wounded and their attendants are treated as neutrals, and their supplies are not liable to capture. This is the first war in which this Convention has operated throughout.

THE SURGERY OF THE WAR.—The progress of surgery during the last twenty-five years has not been without



effect in modifying the treatment of injuries received in warfare. In this period most important changes in the art and practice of surgery have been established. The general use of anesthetics is perhaps the most striking change.

When the Crimean war commenced, the opinion of military surgeons was divided on the expediency of using it in very severe injuries, it being supposed by some that chloroform diminished the chance of recovery when the patient was prostrated by the shock of a severe injury; while, on the other hand, the sharp agony of the amputating knife was deemed useful to rouse the wounded sufferer from his exhausted condition. This belief was rapidly exploded, and in the English camp at least, the use of chloroform became universal in all operations of any magnitude. In the present war, the bounteous supplies contributed by charitable persons have also enabled the use of chloroform to be very general, and the cases where it was not used are very few. Luckily the nervous condition of soldiers while excited by the struggle, prevents them from feeling painful operations nearly so acutely as do civilians when injured under ordinary circumstances. It is difficult to believe, yet it is perfectly true, that a young soldier immediately after undergoing amputation of the arm declined to stay in the bed where he had been placed, and, with a cigar in his mouth, returned to the operating room, to watch with lively interest a similar amputation performed upon a comrade. Besides chloroform, subcutaneous injection of morphia, and the new narcotic, chloral-hydrate, are being largely employed with enormous benefit to those with severe suppurating wounds and extensive laceration of the flesh. Nitrous oxide is also to be tried largely, but how far it will practically be of use we do not yet know.

Of far greater importance is the substitution of resection of injured joints for amputation of the limb. The ex-



perience of English, American, and German surgeons has demonstrated that in cases of injury to the shoulder, the elbow, and, perhaps, to the wrist, the limb left after resection of the joint, in many cases becomes more useful than any artificial appendage to a stump. Some very remarkable instances of the serviceableness of a limb so crippled have occurred in the surgical practice of the New Zealand war. Of eight cases operated in New Zealand, which, on their arrival at Netley, were examined by Professor Longmore,\* considerable usefulness had been regained in most of the injured limbs, in some to a remarkable degree. A sergeant whose shoulder had been resected for gunshot injuries, had recovered so well that he is able to load and shoot off his rifle, and to lift considerable weights with the injured limb. Similarly good accounts are given of the resection for injured joints of the upper limb in the German wars of 1864 and 1866. Though it must be admitted that recently Hannover,† of Kiel, describing the present condition of certain Danish soldiers who had been treated by resection in the German military hospitals during the war of 1864, throws considerable doubt on the ultimate usefulness of limbs of which the joints have been resected. In most cases, he says, the limb is an encumbrance, capable of very little use, and a source of constant anxiety lest it should receive injury. This intelligence, which, perhaps, must be accepted with some reserve, clearly shows that the advantages of resection over amputation, though in some cases of undoubted reality, and the rules for selecting either operation, are not yet fairly set down in surgical practice. We may however confidently look forward to the results of the present war making a considerable advance in this respect.

But from the observations I was able to make in the

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\* Army Medical Reports for 1863 and 1864.

† Hannover: Medizinische Jahrbücher, 18th Bd., 1869, p. 109.



hospitals and houses where the wounded were being treated, during my recent visit to the scene of war, I am convinced that, before the niceties of conservative surgery can have fair trial, much more must be done in the provision of hospital and surgical accommodation. How greatly are the chances of recovery cut down in a case of compound fracture if the patient lies in a damp hovel, on straw, half-starved, without anodynes to soothe his pain, without splints or apparatus to fix the injured parts at rest. Or, even supposing the patient is fairly well cared for, is immediately lodged in dry and not overcrowded quarters, and has an appropriate splint, how severe the ordeal of fifteen or twenty miles in a springless waggon over rough roads, in drenching rain, and then 300 miles in a railway truck on straw—and such has been the fate of thousands—until the patient at length reaches the proper habitation, and receives the assiduous care that he needed a fortnight before, when first wounded. The consequence of this want of rest of all kinds has been to cause matter to collect along the track of the bullet, to excite general fever, and not unfrequently blood-poisoning, in which case the patient's only chance for life is amputation. This is not surgery, as we understand it, nor as it is practised in all decent hospitals. Until these adverse conditions are removed, it will be impossible to appreciate scientifically the various modes of treatment to practise in gun-shot injuries. Many limbs are now lopped off that undoubtedly in better conditions of hygiene might be saved. And to these limbs, so amputated, a fair chance is not given by a long railway journey. The attachment of the healing surfaces are shaken asunder, so that conical stumps and protruding bones were by no means unfrequent in the hospitals that I had the privilege of visiting, where the primary amputations had been received.

In face of the enormous pressure, the preparations fell far short of the requirements of the occasion, and of the



utmost efforts of the surgeons, who were rarely able to carry out the most approved practice of modern surgery. The application of the plaster of Paris splints to compound fractures, though generally approved, was, where I went, the exception, not the rule, simply because the means were not at hand for employing them. Of Lister's method of treating wounds by carbolic acid I did not see a single instance. Carbolic acid is much used it is true, but as a wash, or as an oily solution spread on a handful of charpie secured by a bandage. Doubtless, the carefully considered instructions published by Professor Lister for the use of military surgeons will be followed in several of the hospitals throughout Germany; but the colossal scale of the war, and the enormous difficulties that overtax the energies and resources of the surgeons at the seat of war, have prevented anything like a general application of the best surgery of the present day, though here and there no doubt the perseverance of our comrades has enabled them to put the best methods of treatment in operation.

This lecture has already taxed your patience most severely; I had intended to include an outline of the means this country should adopt in preparations for the medical treatment of our soldiers in war, should that unhappily be forced upon us. It is, however, abundantly manifest to all who have watched the progress of the present war in the public prints, that no government can adequately meet the exigencies of actual warfare; that it is not enough to enlarge the regular medical staff, and supply it with every appliance for the collection and treatment of the sick and wounded; the Government must establish it with means of transport quite distinct from the military train, which—the system in the American army—I regret, has not been adopted in the British service, where the French system of Intendance has been too closely followed. In addition to this, it must enlist the services of a staff of volunteer assistants,



by encouraging the establishment of societies in time of peace ; by assisting them with its advice and experience, and by promoting the drill and equipment of those who undertake at the outset of war to put themselves at the disposal of the military authorities.

I must now conclude ; only let me congratulate you who to-day enter our noble profession, on the auspicious moment you have chosen. Never was the value of the physician or of the surgeon more generally acknowledged, or his opportunity better for rendering the great services that our professional training enables us to lavish on the unfortunate victims of a perverted civilisation. I assure you, many a time did I feel a glow of pride, though only a bystander, in belonging to the profession whose skill and devotion were bringing ease of mind and body to hundreds of miserable fellow-creatures, starving and dying in agony. Prepare yourselves ; your opportunity will come, I trust not in so bloody an epoch as this, but in occasions less exciting, and, therefore, conferring the more credit on you who undertake the often tedious duties of our sacred calling. Your vocation will not lead you to the highest offices of the state, nor to the renown attainable by the soldier or the lawyer ; but of true glory, and of the noble satisfaction that rewards a well spent life, you can attain your just share. May you begin to-day a prosperous career !