A REPORT UPON THE TRANSPORT OF THE SICK AND WOUNDED IN THE FIELD.

By MAJOR T. P. JONES.

Royal Army Medical Corps.

"An efficient transport is so essential for the ulterior result of all military operations, whether on a large or small scale, that no pains should be spared to ensure this essential element of success to every commander." These remarks, quoted from Colonel Furse's work on "Military Transport," are peculiarly applicable to the medical service, for it is universally agreed that an efficient transport for the sick and wounded is of the highest importance, both in removing the wounded from the battlefield and in preventing the accumulation of non-effective soldiers with the force.

Our present system, although on the whole it works well, still does not seem to me to make sufficiently ample provision to meet the varying conditions of warfare; for instance, the ambulance transport with cavalry is the same as that for infantry, and there is no special provision for sick transport on the lines of communication when railways are not available. Furthermore, when the troops are split up into small columns as was the case at the end of the South African War, our present system does not lend itself readily to the ambulance requirements of these small forces.

I propose in this paper to consider the transport of the sick and...
wounded from the front, down to the stationary hospitals or posts on the railway.

I shall discuss this subject under the following heads:—

(A) Equipment.

(1) Stretchers.

(2) Ambulance vehicles.

(3) Country carts.

(B) Organisation and method of working in the field.

(1) Regimental stretcher bearers.

(2) The Field Medical Unit: (a) For Cavalry, (b) For Infantry.

(C) For Lines of Communication.

(3) Ambulance transport in mountain warfare.

(4) General observations.

A.—EQUIPMENT.

(1) Stretchers.

The present pattern field stretcher (Mark 5), is very strong and serviceable and does not leave much room for improvement. Its poles could, I think, be made slightly lighter without seriously impairing its strength. The pillow is not essential for field service, it adds greatly to the bulk of the closed stretcher and its place can generally be taken by some improvised article. A fold of canvas forming a bag, as in the "Furley Stretcher," or the ordinary valise, might be added; it can readily be stuffed with grass, straw or some other soft material, and made into a comfortable head-rest.

A stretcher similar to the Mark 5, but fitted with a hood and with four side handles, was also used during the last South African Campaign. The great drawback to this stretcher is its weight. The hood is no doubt a great convenience but, if necessary, some protection from the sun can be extemporised and the side handles are not really required.

I have often found it necessary to have stretchers sent long distances by mounted orderlies, and on these occasions I have noted the great difficulty in carrying the ordinary stretcher on horseback. I therefore consider it essential that a certain number of folding stretchers should be provided for work with mounted troops.

The stretcher which I am proceeding to describe was originally designed for carriage on a bicycle, but I have made experiments with it on horseback and have found it well adapted to the purpose. The stretcher consists of two jointed poles and two traverses to which the canvas is attached (vide plate). The poles are of ash, one
and a half inches in diameter, and have hooks along their length. They are fitted in the centre with a hinged socket joint carrying a strut, to which two steel rods are attached. These, when the poles are extended, act as tension bars, thus giving great strength to the light poles. The canvas is provided with "D"-shaped eyes on each side, which fit on the hooks of the poles. At each end it is attached to the traverses, which are provided with rollers, and fit into slots on the poles, the necessary tension being provided by a metal key.

The dimensions and weight of this stretcher are as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of poles when extended</td>
<td>7 ft. 9 ins.</td>
</tr>
<tr>
<td>Length of canvas</td>
<td>6 ft. 4 in.</td>
</tr>
<tr>
<td>Width of canvas</td>
<td>1 ft. 11 in.</td>
</tr>
<tr>
<td>Weight of jointed poles, 6 lbs. each</td>
<td>12 lbs.</td>
</tr>
<tr>
<td>Weight of canvas and transverse bars</td>
<td>8 lbs.</td>
</tr>
<tr>
<td>Total weight</td>
<td>20 lbs.</td>
</tr>
</tbody>
</table>
Transport of the Sick and Wounded in the Field

The mode of carrying this stretcher on horseback is well seen in the photograph. The poles are doubled and slung one on each side by means of a leather strap, which is passed twice round the pole and secured to the "Ds" of the saddle. The canvas is rolled up on the traverse bars and fastened behind the saddle by the cloak straps. The method of slinging the poles is the same as that used by signallers in carrying their heliograph tripod.

Stretchers and conveyances borne by men are the most comfortable class of sick transport, but their use is limited by the numbers of bearers which are required and the difficulty of providing for them. They are most used in wars in the East, when a large number of natives accustomed to the work are available. Thus in the war between China and Japan the land transport was almost entirely by means of stretchers (Report by Sir W. Taylor, K.C.B., on the medico-military arrangements of the Japanese army in the field). Similarly in our Indian campaigns dhoolie bearers are utilised both on the field and on the lines of communication to the railway, conveyance by vehicles being reserved for cases which are not serious.

(2) Ambulance Vehicles.

A controversy into the respective merits of carts and waggons need not be entered upon here; it will suffice to say that, for working with mounted troops, a proportion of two-wheeled vehicles are necessary on account of their mobility, but that waggons are infinitely preferable when with infantry. The essentials of a good ambulance waggon are that it should be strong, of light draught, easy to load, and capable of transporting the patients with the minimum of discomfort. It should be able to contain four lying-down cases on stretchers, or twelve men sitting up. It should be of a distinctive shape from all other army vehicles, as the red cross, however large it may be, is difficult to distinguish at long range. Besides this there must be space for kits, and provision for the carriage of water and a small amount of dressings and medical comforts. It must above all be capable of going over any ground that the other transport can go over.

These conditions are easy to enumerate, but no waggon which satisfactorily fulfils them has yet been tried in the field. I shall here briefly notice some of the best known types which have lately come under my observation.

Ambulance Waggons Mark 3 and Mark 5.—These are too familiar to need a detailed description. Taking them all round they
are most useful vehicles and well adapted to their purpose. They are often supposed to be most uncomfortable to the patients, but due allowance is not always made for the nature of the ground passed over; wheeled transport over rough country or on bad roads can scarcely fail to cause great suffering to badly wounded men. The objection usually made is, that in these waggons comfort has been sacrificed to strength, but I am of opinion that they are quite as comfortable as any form of ambulance waggon which was used in South Africa, and there is no doubt that they best stood the hard work of the campaign. It would be a great improvement if both these waggons were fitted with rubber-tyred wheels. The weak points peculiar to each I have found to be as follows:—

Mark 3 Waggon.—The defects in this waggon are: (a) It only carries six patients; this is caused by there being no arrangement by which seats can be provided in the space for lying-down cases, should sitting-up accommodation be required; (b) it takes some time to load with lying-down patients as the back board has to be removed; (c) the fore-carriage is liable to be detached from the body owing to the absence of a connecting pole between the fore and rear carriages, and the brakes are not strong enough.

Mark 5 Waggon.—This is a good strong waggon but might be improved in some particulars. I have noted the following defects with regard to it: (a) There are no lockers to carry spare dressings or medical comforts in. This is a great drawback; lockers could easily be arranged beneath the floor of the waggon, or on each side as in the Mark 3 waggon; (b) the drinking water is carried in a wooden cask. This should be replaced by a zinc tank; (c) The fore-carriage is not strong enough. The weak point lies in what are known as the "guides" being constructed of too light timber; if improvement was effected in these respects the waggon would scarcely ever need repairs, as, in my experience, this is generally the only part to break down. The fore-carriage also does not lock under, hence the waggon is difficult to turn; (d) the brakes are ineffective. This is a serious defect necessitating the frequent use of the drag shoe, which besides being troublesome to adjust and take off, causes discomfort and jarring to the patients.

Ambulance Waggon Used by the New South Wales Army Medical Corps.—This waggon bears a close resemblance to our own Mark 5, and is capable of containing the same number of patients. It is hung low; this, while increasing its stability, is a disadvantage when rivers have to be forded, the water in this case soon rising over the floor. There is an excellent arrangement inside the waggon by
which the jolting is much minimised. Two springs are clamped to
the floor of each compartment, and on these the field stretchers rest,
their handles lying in sockets at the extremities of the springs.

Ambulance Waggon built by the Gloucester Waggon Company.—
I notice this waggon as it was extensively used in South Africa,
having been brought out by some of the private hospitals. It affords
accommodation for the same number as the Mark 5 service waggon,
but possesses the advantage of being of lighter draught, weighing only
17 cwt., so that it can with ease be drawn by six mules. Its dura-

ability has however been sacrificed to attain this end, and my experi-
ence with this waggon is that it is not sufficiently strong to stand

hard field work. It does not afford more comfort to the patients,
and the height of the floor, which is 3 ft. 8 in. from the ground, makes
it more unstable than the service patterns. Another disadvantage
is that, when it is loaded with lying-down cases, the stretchers are
not separated by a partition. It is well fitted with lockers, and the
arrangement for carrying water is an excellent one. This consists
of two cylindrical receptacles of block tin strapped to the sides of
the waggon.

Two-wheeled Ambulance Vehicles.—Of these the tonga is the
most suitable type. This vehicle, as used for sick transport in
India, is fitted for bullock draught and is larger and heavier than
the ordinary pattern. It carries four men sitting up or two lying
down, this being provided for by an ingenious arrangement for
lowering the centre board and extending the seat so that a level
floor is prepared. At the commencement of the late war, some of
these were brought over to Natal by the field hospitals with the
Indian contingent, but not being adapted for rapid work, they were
useless for mobile columns and their small capacity was against
their employment on sick convos. The ordinary form of tonga
was, however, used with great success, the pattern being that which
is commonly used in the Punjab. This tonga is able to carry one
man lying down on a stretcher and two men sitting up, or four
sitting-up cases. It is not a good conveyance for a lying-down
patient, some method of lashing the stretcher having to be improvised; an improvement in this respect might, I think, be effected on the lines of the "Indian Ambulance Tonga" which I have noticed above. It is best drawn by two mules of the size supplied to mountain batteries, and in this way I had mine equipped; one driver is then sufficient and the handiness of the vehicle is increased. A great advantage of the tonga is that being hung low and almost impossible to upset, it can traverse any country. In addition to this it is easily driven, a point of great importance when travelling over difficult ground, or on night marches, when a long team of mules is most difficult to handle. It is invaluable on the line of march when it is necessary to pick up a man quickly who has fallen far out on the flank.

During the recent Boer War, a number of these vehicles were sent over by Dhanjibhoy of Rawal Pindi, fully equipped with their own drivers and ponies. First sent to the cavalry division where they proved of great service, they were afterwards used with most of the small mobile columns employed in clearing the country.

(3) Country Carts.

In every war it has been found necessary to use local conveyances as auxiliary transports, and, when suitably fitted up, some of these can be made useful vehicles for the conveyance of the less serious class of cases. In South Africa ox trek waggon and Cape carts were thus often employed. The Cape ox waggon is eighteen to twenty feet long and four feet broad, and can with ease carry four men lying down or sixteen sitting up. It has no springs, but a fair amount of comfort can be secured by the liberal use of mattresses and pillows, or by fitting up a frame called a "cartel" inside the waggon. Over grassy country these vehicles moved smoothly, their great weight crushing through the small inequalities of the surface, but over rocky ground they caused great suffering. Cape carts were often used when no other two-wheeled vehicles were available; they were fitted up by having the seat made removable, so that a stretcher with a lying-down patient could be received. Though occasionally found useful, yet they had not much to recommend them, as they are very rough and quite unfit to carry a serious case in; they are also easily upset.

Waggonettes fitted with hoods are common in South Africa and were much used for sick transport during the late War. They vary in size, but can generally contain six men sitting up, or, if the internal fittings be removed, two lying-down patients without
stretcher bearers. They are strongly built, with good springs, and the hood forms an efficient shelter.

B.—Organisation and Method of Working in the Field.

(1) Regimental Stretcher Bearers.

Regimental sick transport should be limited, as it is now, to the provision of stretcher bearers; wheeled sick transport, though advocated by some, is, I think, unnecessary as a part of regimental equipment. There are no doubt many occasions, such as the battalion being detached or being on rear guard, when an ambulance wagon is required by the officer in medical charge, but in these cases the necessary transport can be lent by the Bearer Company or Field Medical Unit.

Regimental stretcher bearers ought always to be unarmed, and should hand in their rifles at the beginning of a campaign; the present regulation, by which the bearers march fully armed and exchange their rifles for stretchers at the commencement of an action, cannot be carried out. As a general rule in action, the duty of all regimental stretcher bearers should be confined to applying first aid and bringing the wounded into shelter; carrying men to the rear under a heavy fire is impracticable and will only cause heavy loss to the bearers and possibly further injury to the wounded, while bringing them back long distances is to be deprecated on account of the length of time the bearers will take to rejoin.

Cavalry.—The present number of stretcher bearers, namely, four per squadron, is sufficient; each bearer should be equipped with a folding stretcher of the pattern I have described, and in addition should carry some of the appliances invented by Lieutenant-Colonel Hathaway, R.A.M.C., for supporting wounded men in the saddle; a stretcher with each bearer may seem superfluous, but it ensures a sufficient number in case of breakage or loss. In cavalry actions, slightly wounded men are often brought in on their own horses; if necessary a comrade can ride on each side of the patient to support him, a method which was usually practised by the Boers. It is essential that all cavalry stretcher bearers should be well mounted. The French, recognising the wide extent of ground that has to be covered, do not employ any regimental stretcher bearers with cavalry, the wounded, after the necessary dressings have been applied, being supposed to await the arrival of the "ambulance." No doubt if the cavalry are advancing against a retiring enemy this will often be the best plan, but still there are many occasions on which it would entail great hardship on the wounded.
PHOTOGRAPH SHOWING METHOD OF CARRYING ON HORSEBACK.

To illustrate paper by Major T. P. Jones.
Infantry.—The present proportion of stretcher bearers, namely two per company, though often inadequate, is all that it is feasible for a regiment to supply. Instead of being detached with their companies, these should, while on the march, move as a party in rear of the battalion. The advantage of this is that the stretchers can then be carried on the Maltese cart, thus saving the men's strength—a point of the utmost importance. Before an action, or should the companies become scattered, the bearers can easily take their stretchers from the cart and rejoin.

Artillery.—Two stretcher bearers, as at present allowed, are sufficient for each battery, as, when the battery is split up, stretcher bearers, if required, can be supplied by the escort to the guns. Furthermore, as a general rule, artillery are within easy reach of the Field Medical Unit.

(2) Field Medical Unit.

It has, I think, been the opinion of most officers who have lately served in South Africa that the present Bearer Companies and Field Hospitals should be amalgamated. By forming them into a single unit, as in India, much of the difficulty attending the transport of the sick on the line of march would disappear, the work would be more evenly distributed, and some slight economy in the personnel would be effected. A Field Medical Unit, capable of being divided into sections, each complete with the requisite means for the transport and the treatment of the sick and wounded, must be considered the most efficient organisation, especially when there is a possibility of the force to which it belongs being split up into small columns. I should further recommend that the personnel for the wheeled transport of this unit should be provided by the Royal Army Medical Corps, and that all the horses, wagons, &c., should be in the charge of the officer commanding. In connection with this the following remarks by Colonel Furse ("Military Transport," p. 10) may be quoted: "In advocating that the transport of an army should form a branch of the commissariat we must make an exception with regard to regimental and medical transport," and again, "It will be urged against a separate transport that the medical pressure for transport is occasional, whereas with supplies it is constant. . . . Yet the importance of a separate transport for this department cannot be over-rated."

The chief objection which might be made is that the R.A.M.C. could not supply sufficient numbers for the purpose, but it is unlikely that the A.S.C. itself could ever provide a complete...
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personnel for medical transport from its own ranks. The solution appears to me to lie in the formation of a separate transport section of the Corps; to this it might further be objected that R.A.M.C. officers on service have not time to spare for looking after transport, but this objection must be over-ruled; the experience of the Canadian Army Medical Corps, the New South Wales Medical Corps, and our own R.A.M.C. Volunteers may be cited, indeed it appears to me that transport is so intimately connected with the medical service in war that it is impossible to dissociate ourselves from it.

On active service the advantages of the plan I have suggested would be many. The unit would be homogeneous, and the N.C.O.'s and men of the transport section, who ought all to have some training in general hospital duties, and possess an adequate knowledge of “first aid,” would therefore be able to render help in an emergency. They would also all be permanently non-combatants, and the question of men discarding and re-assuming their red cross brassards would no longer arise.

To ensure efficiency, enough transport for training purposes must be maintained in peace time. This should, as far as possible, be stationed in camps or large garrisons, and might be partly used in the conveyance of sick to hospital. The transport duties of the Royal Army Medical Corps differ quite as much from those of the Army Service Corps as do the latter from the Royal Engineers, who have their own transport; and it is just as reasonable that horses and waggons should be kept for their training as that they should be so kept for other branches of the service.

Assuming, therefore, that the present bearer company and field hospital are combined into a single unit, for which the name “Field Ambulance” may be suggested as a designation, I propose that there should be three distinct types fitted respectively for service with cavalry, infantry and convoys, or on lines of communication. It may be objected that this would cause confusion by multiplying equipment, but I do not see why such should be the case any more than with artillery, where it is necessary to have horse, field, and heavy batteries, all units capable of moving at different rates of speed.

I shall now briefly consider these three different forms from a transport point of view, using the term “Field Ambulance” to denote the combined unit.

The Cavalry Field Ambulance.—The combined strength of the existing bearer company and field hospital, for a cavalry brigade is
157, inclusive of the attached personnel from the Army Service Corps. This is the same strength as in an infantry brigade, and the organisation and transport material are also similar.

It is, I think, obvious that not only is ambulance work in the field with mounted troops of a very different character, but also that less transport is required for a cavalry brigade about 2,000 strong, than for an infantry brigade about 4,000 strong. This was recognised in South Africa, and after April, 1900, a half-bearer company, and a half-field hospital were allotted to each cavalry brigade.

So long ago as 1882, the late Sir Herbert Stewart K.C.B., in the appendix to the report of Lord Morley's committee, wrote as follows in condemnation of the bearer company arrangements for this arm of the service: "With regard to a bearer company I consider the present organisation entirely unsuitable to cavalry. . . . . I think that a mounted bearer company should take the place of the present bearer company, as far as cavalry is concerned."

### CAVALRY FIELD AMBULANCE

**Proposed War Establishment.**

<table>
<thead>
<tr>
<th>DISTRIBUTION</th>
<th>RANKS</th>
<th>HORSES</th>
<th>VEHICLES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Officers</td>
<td>Warrant officers</td>
<td>Staff-Sergeants and Corporals</td>
</tr>
<tr>
<td>Commanding Officer</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>General duty</td>
<td>2</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Quartermaster</td>
<td>1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sergeant-Major</td>
<td>—</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Qu.-Master-Sergeant</td>
<td>—</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Wardmasters</td>
<td>—</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Stewards</td>
<td>—</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Compounders</td>
<td>—</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Pack Store N.C.O.'s</td>
<td>—</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Cooks</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Ward Orderlies</td>
<td>—</td>
<td>—</td>
<td>10</td>
</tr>
<tr>
<td>Clerk</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>C.O.'s Orderly</td>
<td>—</td>
<td>—</td>
<td>—</td>
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<tr>
<td>Detachment for Ambulance Waggons</td>
<td>—</td>
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<td>3</td>
</tr>
<tr>
<td>Detachment for Tongas</td>
<td>—</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Drivers of other Transport Vehicles</td>
<td>—</td>
<td>—</td>
<td>14</td>
</tr>
<tr>
<td>Batmen</td>
<td>—</td>
<td>—</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

Mounted, 41; waggons orderlies, 4; drivers, 26; personnel carried on two waggons, 20; total, 100.
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It must be admitted that it is a physical impossibility for dismounted stretcher bearers to work with rapidly moving cavalry, and in the recent Boer War it was found necessary that as many of the R.A.M.C. as possible should either be mounted or carried on wagons. It has been suggested that the remedy lies in increasing regimental aid, but I believe that the best plan is the formation of a "Field Ambulance for Cavalry" which, as I have noted above, should combine both bearer company and field hospital functions, and should also be capable of division into a right and a left half.

I attach a suggested "War Establishment" for this unit in which it will be noted that the detachments engaged in bearer company duty are mounted, while the N.C.O.'s and men of the hospital section are carried on two light wagons. It is, I think, the most efficient arrangement for cavalry, that the men who have to keep in close touch with the troops should be well horsed, while wheeled conveyance is provided for those who are engaged in hospital duties, and therefore only required to move at the same rate as the regimental transport. Another reason why it is ad

visable to mount the hospital section is that, on account of their work in camp, they would not have time to look after their horses. For ambulance transport it will be seen that I have allowed 4 four-horsed wagons and four tongas, and this ought to be sufficient. A mounted detachment of one officer, four N.C.O.'s, and twelve men accompanies the wagons, and a similar detachment the tongas; each wagon also carries a wagon orderly as usual. The wagons should each be equipped with four, and the tongas with two, stretchers of the ordinary "Mark 5" pattern; in addition to this four folding stretchers of the pattern I have described should be carried with each detachment, and each man should also carry a couple of Lieutenant-Colonel Hathaway's saddle supports.

The mode of working in action may be outlined as follows: The tongas would keep well ahead, extended on a broad front as close to the troops as possible, while the wagons would come on more slowly but still keeping touch with the brigade. If the tongas were kept well up the regimental stretcher bearers would have a very short way to fall back with the wounded and could quickly transfer them, the tonga detachment of course picking up casualties themselves when possible. Tongas when loaded would retire to the wagons or to the dressing station, should one be established, and after handing over their wounded would go forward again. The wagons would be extended, or not, according to circumstances, forming dressing stations when practicable, and would bring back
the wounded to the hospital section, if the hospital was established within reach; otherwise they would have to carry on the wounded until the end of the action.

The Infantry Field Ambulance.—This should consist of the present bearer company and field hospital combined, and, like the "Cavalry Field Ambulance," should be capable of division into a right and a left half. In this unit, therefore, the transport for sick and wounded will consist of eight stretcher squads and ten four-horsed waggons; tongas I do not consider necessary in the case of infantry. It may here be remarked that owing to both units being combined, more men can be utilised as stretcher bearers according to the judgment of the commanding officer.

The mode of working in the field will largely depend on circumstances, but as a general rule the stretcher squads must keep well up so as to relieve the regimental stretcher bearers as much as possible, and the waggons in turn must be pushed forward as far as the nature of the ground and the fighting allows. The relative distances over which conveyance by stretcher or by waggon is required will vary greatly, as was well seen in the last Boer War. In the early stages of this campaign, when our army was generally obliged to attack strongly held positions, the wounded had to be carried a long way by stretchers, but towards the close of the war, when most of the actions were against a retreating enemy, the waggons could generally be driven close to the wounded, except when rocky or mountainous ground rendered hand carriage necessary.

The Collecting Station must be regarded as obsolete; in fact, I have rarely known an occasion on which one could be formed; actions in modern warfare are fought over so wide a front that the collection of the wounded in any one place, prior to their transport to the dressing station, is seldom practicable and would only entail more suffering to the patients and labour to the bearers. The waggons, in fact, taking advantage of any available cover, must be ready to move about, pick up the wounded in all directions, and bring them to the Dressing Station.

The Dressing Station should be as close to the front as is compatible with the safety of the patients, and its position will depend almost entirely on the cover that can be obtained for it.

Conveyance of the Wounded from the Dressing Station to the Rear.—If the force is on the defensive or operating against an enemy holding strong positions, and therefore is unlikely to be moving on rapidly, the hospital section of the "Field Ambulance"
may possibly be established within easy reach; in that case the wounded should be sent back to it as quickly as possible. However, it will more commonly be found that from various causes, such as the force advancing quickly or the brigade transport being delayed, it will be impossible to pitch the hospital tents until nightfall. Even if the hospital is established, unless it is very close, it will be inadvisable to send any waggons back to it before the end of the action; there are at the most only ten waggons available—often less, as some may be required for sick—and their primary function must be to collect the wounded, not to send them back long distances. At the end of the day, when the site of the camp or bivouac has been selected and the hospital tents pitched, the wounded can be moved in, but until then, as a general rule, they are best kept at the dressing station.

The Lines of Communication Field Ambulance.—In most countries railways are the chief means for freeing the force at the front from the encumbrance of non-effective soldiers, but in cases where troops are operating at a distance from the line, where there are no railways, or where these have been obstructed, it will be necessary to move large convoys by road. It is of little use to have good transport at the front unless suitable means are provided for passing the patients along the lines of communication, still for this service no definite scheme is laid down, though sometimes ordinary bearer companies or field hospitals are used, as in the Tirah campaign, where two British and two Native Field Hospitals were detailed for this duty.

Under the present arrangements there is also a heavy strain on the sick transport when a force is moving and is compelled to take its sick and wounded along with it, for various reasons, such as there being no stationary hospital within reach nor any place at which the patients can be left. If fighting is expected it is necessary to keep most of the ambulance waggons empty and ready for action, and still there are always a number of cases for which transport by ordinary vehicles is unsuitable. What is required is a special unit which might be called the “Lines of Communication Field Ambulance.” The sick transport for this unit should consist of eighteen two-horsed ambulance waggons, organised in three sections of six waggons each, supplemented when necessary by empty supply waggons and local conveyances. The establishment should be calculated for a sick convoy of 150 or of 50 for each section; no stretcher bearers need be included in the personnel, which should consist solely of a sufficient number of officers, N.C.O.’s and men to
look after the sick convoy on the march and in camp, together with
the necessary N.C.O.'s and men for transport duty.

These field ambulances might be attached to the supply columns,
and their working would therefore be largely governed by that of
the ordinary convoys, according as these adopted a system of staging
or of direct transit. If the staging system was employed the
sections could work between the various posts along the lines of
communication, as was done in the Tirah campaign where posts
about 15 miles apart were formed from the front down to the
railway at Khushalgar; on the other hand, if posts are not estab-
lished, the system of direct transit must be employed. In civilised
warfare the sick convoys could, of course, proceed independently if
so desired.

The formation of special field ambulances for this service would
not only prevent the medical units at the front being weakened by
having to provide for their own sick convoys, but would conduce
greatly to the comfort of the patients. They would also be available
for the formation of temporary hospitals when an accumulation of
sick or of badly wounded might render such a course necessary,
and if kept in close touch with the troops would enable the field
ambulances at the front to be always ready for action by constantly
relieving them of their sick and wounded.

The number required for each campaign will vary greatly.
Besides the strength of the Field Force the chief factors to be taken
into consideration are the length of the lines of communication and
the number of railways available.

(3) Ambulance Transport in Mountain Warfare.

Ambulance transport in hill fighting presents peculiar difficulties,
especially if the war is against a savage enemy, when the failure to
remove wounded may mean their death amid circumstances of
great barbarity. Every endeavour must be made to remove
promptly all men who fall, and bring them to some central
sheltered position, as otherwise there is great danger of their being
overlooked, hence the services of combatants will generally be
required even at the risk of weakening the firing line. The number
of wounded is not usually great, but this is made up for by the
difficulty of removing them from precipitous positions. In Tirah
they often had to be carried down by hand or in a blanket, six men
were often required to carry one soldier with his rifle and equip-
ment, and while doing so they were generally a target for a
murderous fire. Stretchers often cannot be used at all, in fact
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they are unsuitable for steep hillsides, as there is nothing to prevent the patient from sliding off the canvas. Under these circumstances it is necessary that the combatants themselves should have some ready way of carrying their wounded comrades into shelter. Such an appliance has been invented by Lieutenant-Colonel Corker, R.A.M.C. This consists of a large meshed net about twenty inches square, which, with a couple of rifles passed through it, forms an efficient contrivance for carrying wounded down steep declivities. It is light, easily carried, and might with advantage be given to troops engaged in hill-fighting in the proportion of one to each sub-section.

In the absence of any special contrivance the wounded will have to be got down in the best way possible, either on the backs of their comrades or by some extemporised means, such as in great coats or blankets. The infantry sash was formerly used for this purpose. The stretcher bearers or dhoolie bearers must, of course, keep up as close as possible, ready to remove the casualties further to the rear. A certain number of riding ponies should always accompany the force into action; they should be kept under shelter in some convenient spot, and would be utilised for the conveyance of the less serious cases into camp.

On the line of march through a mountainous country, if no wheeled vehicles are possible, the ambulance transport will consist of dandies or stretchers for the serious cases, and of riding ponies or some form of pack transport, such as mule cacolets or camel kujawahs, for the others. Mule cacolets are objected to on account of their weight; the ordinary load for a mule is 222 lbs., including the pack, saddle and bridle, but a mule carrying in cacolets a couple of men at eleven stone each, would be loaded with a total weight of 426 lbs., which, unless for very short distances, is an impossible burden for any but the best stamp of gun mule. The objection to camel kujawahs is chiefly the great discomfort they cause to the patients, on account of the peculiar gait of the camel. Saddle transport on ponies or mules is an efficient method and one that is in use in India, where eighty riding ponies are allowed to a field hospital for this purpose. It is essential that the animals should be quiet and well trained.

(4) General Observations.

After great battles the regular means of transport will never be sufficient, and will have to be supplemented in various ways. Thus special bodies of men may be raised, such as the Imperial Bearer
Corps, which was formed by Sir T. Gallwey, K.C.M.G., C.B., in the early period of the Boer war, and without whose help the Natal battlefields could not have been so promptly cleared. During an action the employment of combatants to remove their wounded comrades is to be deprecated, but after the fight their services may be requisitioned if necessary.

When the wounded have all been collected or when there are large numbers of sick, it is then that the real difficulty is experienced. It is important for military reasons that non-effective soldiers should be as quickly as possible removed far from the front, not only because of the encumbrance they are to the force but also on account of the uncertainty of being able to move up supplies to them. Places on the lines of communication one day are far removed from them the next, and the difficulty of providing for isolated collections of sick may be considerable.

Colonel Furse in his work on "Military Transport," on p. 188, writes: "The only efficient system is one which provides for a continual stream of patients from front to rear without interruption, for the least interruption will again bring on that accumulation of sufferers which it is desirable in the interest of the army and population to avoid." This undoubtedly should be the ideal at which to aim, but to carry it out will often strain the resources of the medical transport to the utmost.

If the line of advance is on a railway much of the difficulty disappears, thus after the battles of Belmont, Graspan, Modder River, and Magersfontein, the wounded were rapidly transferred to the base hospitals at Wynberg by means of an efficient service of ambulance trains. It may be objected that the necessary movement of the wounded largely increases their sufferings and often minimises their chance of recovery. Sir F. Treves, Bart., K.C.V.O., C.B., in his evidence before the South African War Commission, lays special stress upon this and advocates the formation of large field hospitals in the immediate vicinity of the fighting force, a measure which was carried out in Natal, where the wounded from the battles of Colenso and Spion Kop were detained for a considerable time at the field hospitals before being sent down. This is, however, only admissible when ample railway communication and facilities for forwarding supplies exist, and also when the force is not likely to move rapidly. In the Orange Free State and in the Transvaal the conditions were very different from those in Natal, and such a system would have been impracticable.

There are, however, certain classes of cases, such as abdominal
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wounds and fractures of the femur, where rest is above all essential, and it is always advisable to keep these from being moved, but if compelled to travel, their sufferings may be much minimised by due care. Thus when a rocky part of the road is encountered it is a good plan to have them removed from the waggons and carried by stretcher bearers. In this way I have often seen serious cases conveyed long distances without ill effect.

In this paper I have only attempted to discuss the question of the transport of the sick and wounded by road and on the field. I have therefore not included hospital trains or transport by rail.