

## THE PROBLEM OF MECHANIZATION AS IT AFFECTS THE MEDICAL SERVICE.

BY LIEUTENANT-COLONEL R. R. G. ATKINS, M.C.,  
*Royal Army Medical Corps.*

MECHANIZATION in the Army has advanced considerably since its inception. Trials have been made, defects found and rectified. Tests with the different arms have shown the effect of mechanization on the organization, administration, and fighting of a unit.

The Royal Army Medical Corps must needs wait for a definite mechanized organization of the Army before it can decide whether the present field medical organization will be suitable.

In what follows I have given some of the effects of mechanization, and made suggestions as to how it might affect the present medical arrangements for war.

Mechanized forces are of two general types: (i) A completely mechanized fighting force; (ii) a motorized force, carried in vehicles with mechanical transport.

There are certain rules on which mechanization is based, these are: (i) A "peace-time" standard engine and chassis must be adopted. (ii) As few types of vehicles as possible must be used. (iii) Road-space between vehicles takes up room on the road; therefore each vehicle should be as big as is consistent with its rôle. (iv) The efficiency of a unit depends on its absolute mobility. Therefore: (a) No equipment should be carried that is not essential; (b) "B" echelon must be as small as possible; (c) the number of vehicles in any unit must be cut down to a minimum consistent with efficiency.

Mechanization leads to road congestion, and this is liable to be increased by the present organization of the Army which has been adopted to allow the weight of a force to be swung on to the decisive sector.

Road congestion, causing a slowing-up or even leading to complete immobility is a factor that can counteract mechanization, and might have very far-reaching effects on the success of a campaign.

Every unit "mechanizing" must take two factors into consideration: (i) Whether mechanization of other units produces new factors which will have to be catered for; and (ii) whatever organization is adopted, as few vehicles as possible must be put on the road.

Mechanization produces the following new factors which alter the medical problem. These are: (i) Units may be employed on a wide front, in contradistinction to a contracted one; (ii) the range of action of a unit is increased; (iii) manœuvre will, in some cases, be more rapid; (iv) one or more units may be separated from the main force by a considerable

### 322 *Problem of Mechanization as it Affects the Medical Service*

distance and the intervening ground may or may not be protected; (v) a raid to some distance may take place into enemy country; (vi) many moves will be by night.

As units are responsible for collecting their own wounded, when deployed on a wide front, hand carriage by regimental stretcher bearers would be too tiring and slow. **TRANSPORTATION OF WOUNDED ON WHEELS WITHIN A UNIT WILL HAVE TO BE ARRANGED FOR.**

If manœuvre in action is rapid, unless wounded are to be left unattended for a long time, collection and grouping of wounded will have to take place quickly. Unit stretcher bearers know where casualties have occurred. The stretcher bearers must accompany their unit on the next bound, otherwise they would have great difficulty in locating their unit and at night they would not find it. If, under these circumstances the collection of wounded is left to field ambulance bearers, it will involve a long and difficult search of the area and precious time will be lost.

This again brings us to the fact that carriage of wounded on wheels within a unit will have to be adopted.

When units are separated from the main force by unprotected ground the same fact is again apparent. In the past cavalry have often had to abandon their wounded. Mechanization has given us the means of preventing this, so let us make full use of this new factor.

The first medical problem is therefore to arrange some form of wheeled transport with which a unit can collect the wounded, and, if necessary, retain some of the wounded with the unit.

This could easily be done when we realize that the unit stretcher bearers have to be carried on wheels. A motor ambulance should therefore be provided as the normal means of transport for a certain number of the regimental stretcher bearers.

The type I visualize is a car with a light low body which could lie up behind hedges, "hull down," without being seen. The chassis would be the ordinary 30 cwt. platoon truck, and would take three stretchers side by side. It should not have a red cross on it. The stretcher bearers, when this was in use as an ambulance, would be carried in the seats of other vehicles previously occupied by the killed or wounded.

A similar type would be the "light" ambulance for field ambulances.

A motor-bicycle side-car stretcher, if adopted, would also be of great use. It would go as far forward as possible, and when used over short distances at a slow rate, acting as a feeder to the unit ambulance, it would answer the unit problem of collecting and grouping wounded quickly.

#### THE MOTOR-BICYCLE SIDE-CAR AMBULANCE.

This is not a new idea as they were used in France during the Great War by two British ambulance sections attached to the French Army, i.e. Section Sanitaire Anglais, Nos. 2 and 5.

The first model was introduced by F. Fox, of No. 5 S.S.A., as he found

it impossible to get motor ambulances anywhere near the line owing to the nature of the country. This was in the Vosges mountains where roads and tracks were similar to the hill station roads and paths in India. In the winter these were covered with snow and ice. This model proved such a success that he formed a unit of thirty such machines. This was at the end of 1915; it is interesting to note that twenty-four of these machines came back to Havre at the end of the war, and four were brought to England. The whole twenty-four were sold in good running order. No. 2 S.S.A. also adopted these side-car motor-bicycle ambulances under D. Preston. These were working on the Oise Sector, similar to those occupied by the British Army. General Gamelin (now holding the corresponding position in the French Army to our C.I.G.S.) said of these units: "The convoys have done magnificent work. A great number of lives have been saved by the expeditious way in which these cycles have enabled the Medical Services to get their wounded into hospitals early."

The French Army asked for fifty more. These were being arranged for when the Armistice came. One may question why more of these machines were not asked for earlier. It was only after the big German offensive of 1918 that the French fully realized their value. In front of the Oise the French retreated for four days after a heavy bombardment of all roads. These cycle ambulances were the only form of motor vehicle which could get forward. They acted as feeders to ambulance cars and they cleared 1,700 stretcher cases during these four days of retreat, when all roads were very badly broken up. Surely this record speaks for itself.

The following is a résumé of questions addressed to Mr. Fox and D. Preston, and the answers which they were kind enough to give.

Q.—Did you experience troubles from breakages of the side-car chassis.

Ans.—"The first model broke continually, but I soon found the weak points and I had these fitted with pinned-in steel linings. Our final model never broke and stood up well to real rough usage."

Q.—Do you think the wounded were jolted more than in a motor ambulance.

Ans.—"No. They were just as comfortable, if not more so, but the driver must have the interest of his patient at heart and regulate his pace according to road surface. The patient is happier going feet first as he can see where he is going. In a car, especially on the top shelf when going down hill, he is standing on his head so to speak." (M. Preston adds) "I have driven both cars and bicycles. In cars men often scream, as they are shut in and can hear shells bursting; they also imagine that you are bumping them unnecessarily when the going is bad. I have never heard a man scream in a cycle. There is personal contact between driver and patient as you can talk to him. He can see what is going on around him. Surely the lessening of the added mental terror must mean that when he arrives at a C.C.S. he is in better condition for an immediate operation." (This is a factor which I had not previously thought of and I give it due weight.)

## 324 *Problem of Mechanization as it Affects the Medical Service*

Q.—What about the exposure of a case on a cycle?

Ans.—“The case is also exposed on a hand-carried stretcher and you get him back more quickly by cycle. Quicker movement through the air does cool him down, so we always carried small metal hot-water bottles. Some machines were enclosed with a hood clamped on to the stretcher. Men invariably asked to have, at any rate, a part of it open. Our later models had side windows.”

Q.—Did you take sitting cases en-pillion?

Ans.—“Yes. We had a special seat constructed and whenever possible made a point of carrying pillion wounded. The weight gave an added grip to the back wheel in mud, snow or ice.

Advantages of a motor-bicycle side-car stretcher : (i) Rapidity of evacuation, except in very forward and exposed positions, when acting as a feeder to a motor-car ambulance; (ii) saves stretcher bearers; (iii) low initial cost; (iv) economical to run; (v) very easily manœuvred; (vi) easy to extricate if ditched; (vii) capable of travelling over tracks impracticable for cars; (viii) “contact” with patient; (ix) sprung for the weight it will be carrying (a car ambulance is sprung for ten or twelve people, a load it is not carrying when seriously wounded are being carried); (x) road blocks : (a) by traffic—a motor cycle stretcher would pass where a car ambulance could not; (b) cratered roads—a motor cycle can be wheeled around the edge, the side-car wheel “floating” over the crater; (xi) single cases could be collected more economically by a cycle than a car. The R.A.M.C. orderly sitting pillion.

Disadvantages : (i) Unless specially protected, wounded would be liable to be more exposed. (ii) Not suitable for cases which struggle; usually chest cases, or certain types of gas poisoning. (iii) More vehicles on the road.

The Royal Army Service Corps tried out motor-bicycle side-cars some years ago, but did not continue their use as the chassis continually broke. In view of the model produced in 1915 by F. Fox, which did withstand rough usage, I cannot see why, in 1937 the same cannot be achieved. In fact, it is obvious that a useful model could easily be produced by a large scale manufacturer, which would be a standard production.

There are certain points in design which would have to be catered for. These are :—

(i) The position of stretcher should be regulated so that a stretcher suspension bar would not interfere with the handle-bars.

(ii) Full protection from splash, in case one drove over mustard contaminated ground. This should include the under surface of the stretcher and spare wheel.

(iii) A portable cover for the patient to be clamped on to the stretcher, to be made of gas-proof material.

A portable and collapsible wheeled stretcher would be most useful in forward areas. A model is being made, and will shortly be presented, in

which the axle breaks in the middle so that each stretcher bearer carries half the wheeled stretcher as well as the stretcher.

The medical organization I suggest for an infantry battalion or corresponding unit is:—

One light motor ambulance.

Two motor-bicycle side-car stretchers.

Four portable and collapsible wheeled stretchers.

Tank battalions and armoured car regiments would not require the wheeled stretchers.

If this organization was adopted wounded could be grouped or brought rapidly to a R.A.P. from any scattered area, i.e. either a long front or from a position held in depth. In the above cases the R.M.O. would be some distance back so as to be more nearly equi-distant from each flank, or at the back of a position held in depth. In most cases this would mean better protection and accommodation, and consequently better treatment.

This provision of special unit vehicles for the carriage of wounded would allow of a few seriously wounded being carried with the unit until they could be transferred to a field ambulance.

#### TO MECHANIZE A FIELD AMBULANCE.

When we consider the rules that apply to any mechanized unit and at the same time take into consideration the new tactics resulting from mechanization, we realize that merely to put the present field ambulance on wheels does not solve the problem.

The type of field ambulance which would suit is a matter for study. I believe that a unit, based on what I am about to describe would be suitable, and furthermore that it would not only be applicable to a mechanized division, *but that it would be a standard field ambulance.*

To realize the points on which this conception is based it is necessary to start on very elementary facts.

Object of a field ambulance: To clear R.A.P.'s of wounded. To administer any necessary treatment and to evacuate them to an operating centre.

Factors which affect the object: There are many factors incidental to the collecting of wounded, etc. but there is only one which I wish to stress here, and that is TIME. The reason for this is, that all wounded which have to be operated on should arrive at an operating centre in sufficient time to have an excision, and either primary or delayed primary suture operation performed. This can only be done if the operation is carried out eighteen hours after the receipt of the wound, and the sooner the better. *In these cases any treatment for the wound other than operation is a waste of time.* The only permissible treatment in front of an operating centre should be: (a) Control of hæmorrhage; (b) efficient splinting; (c) treatment for, and for the prevention of shock. (This in some cases means

### 326 *Problem of Mechanization as it Affects the Medical Service*

absolute rest); (d) in gas cases, decontamination, or lying accommodation, whichever is required; (e) suture of sucking chest wounds.

This time factor implies rapid evacuation, *with no unnecessary halts en route.*

All the treatment outlined above *can be done at one dressing station—so why have two?* A wounded man should pass through *one dressing station only.* This is only possible by making full use of mechanization. A few more miles in a motor ambulance will not make any difference to the average wounded man, in fact, an earlier operation is in his favour.

As regards the field ambulance; this means less equipment *and, all important, fewer vehicles.* It also implies a reduction of personnel, so more vehicles are saved and also their provision and upkeep; fewer supplies would have to be brought up. The scheme reacts right through the force from base to front.

More vehicles would be saved by medical officers being carried in box-bodied cars, which would also hold some of the equipment. This equipment would consist of duplicate sets, so that a portion of the unit could be detached if necessary. Say four sets of equipment, any of which could form a small dressing station.

Some of the vehicles saved by this method should be replaced by *ambulances which would form a divisional reserve under the A.D.M.S. This would be in keeping with other arms of the Service under the new organization of the Army, namely, being able to swing the weight of any branch of the Service on to the decisive sector.* M.A.C.'s either in whole or part, would also be attached to this divisional reserve, and would act as field ambulance cars, all cars taking cases from the one dressing station to the clearing area.

The general effect of this idea would be a smaller, more compact and highly mobile unit, which would rely on rapid evacuation rather than on treatment. The essential treatment would always be given.

One can visualize situations where two dressing stations are essential, e.g., when a dressing station has to "leap-frog" before it is clear of wounded. One or more of the duplicate sets of equipment would be sent forward to form the new dressing station. Occasions might also arise where extra medical equipment would be required. These would be exceptions and could very easily be arranged for. One can imagine a force getting out of touch with its advanced hospitals. This should be foreseen, and a light section of the C.C.S. prepared to meet the situation. These exceptions should not, however, be allowed to interfere with the general idea of the field ambulance.

As much as possible of the bulky equipment should be converted into folding patterns. G.S. panniers with contents more or less loose are not economical. Tents, when carried, could be packed flat and carried on the roofs of lorries. Our great-grandfathers packed them in sacks; why should we? Certainly not, unless we have a very good reason for doing so.

Every effort should be made to reduce packing space, in an endeavour to meet the most urgent need of mechanization—to get as many vehicles as possible off the road.

It would be impossible to forecast the actual saving in vehicles by this suggested organization.

A rough estimate of the saving in vehicles is seen in the following table:—

|                                  | H.Q. |     | "A" Coy. |     | "B" Coy. |     | Total |     |        |        |
|----------------------------------|------|-----|----------|-----|----------|-----|-------|-----|--------|--------|
|                                  | Old  | New | Old      | New | Old      | New | Old   | New | Saving | Added. |
| Motor cycles .. ..               | 3    | 3   | 1        | —   | 1        | —   | 5     | 3   | 2      |        |
| Cars, 2-seater .. ..             | 3    | 2   | 1        | —   | 1        | —   | 5     | 2   | 3      |        |
| Cars, 4-seater .. ..             | 1    | 1   | 1        | —   | 1        | —   | 3     | 1   | 2      |        |
| Lorries, 30 cwt... ..            | 5    | 3   | 4        | —   | 4        | —   | 13    | 3   | 10     |        |
| Officers' Mess, 30 cwt. ..       | 1    | 1   | —        | —   | —        | —   | 1     | 1   |        |        |
| Artificers, 30 cwt. ..           | 1    | 1   | —        | —   | —        | —   | 1     | 1   |        |        |
| Lorries, 3 ton .. ..             | 1    | 3   | 1        | —   | 1        | —   | 3     | 3   |        |        |
| Water tank .. ..                 | 1    | 2   | 1        | —   | 1        | —   | 3     | 2   | 1      |        |
| Ambulances, heavy ..             | 8    | 2   | —        | —   | —        | —   | 8     | 2   | 6      |        |
| Van, 12 cwt., dental ..          | 1    | —   | —        | —   | —        | —   | 1     | —   | 1      |        |
| Motor-bicycle side-car ambulance | —    | 2   | —        | —   | —        | —   | —     | 2   |        | 2      |
| Ambulances, light ..             | —    | 2   | —        | —   | —        | —   | —     | 2   |        | 2      |

Total saving in Division Saving 21 vehicles per Field Ambulance  
 3 Field Ambulances at 21 = 63 — 28 (A.D.M.S. Reserve) = 35 vehicles

| A.D.M.S. Reserve         | Old      | New       |
|--------------------------|----------|-----------|
| Ambulance, light .. ..   | —        | 6         |
| „ heavy .. ..            | —        | 20        |
| 12 cwt. dental van .. .. | —        | 2         |
| <b>Total .. ..</b>       | <b>—</b> | <b>28</b> |

It will be interesting to see if there are other officers in the Corps who have ideas on "mechanization," in which case some useful correspondence may result.

**JRAMC**

## **The Problem of Mechanization as it Affects the Medical Service**

R. R. G. Atkins

*J R Army Med Corps* 1938 70: 321-327  
doi: 10.1136/jramc-70-05-06

---

Updated information and services can be  
found at:  
<http://jramc.bmj.com/content/70/5/321.citation>

---

### **Email alerting service**

*These include:*

Receive free email alerts when new articles  
cite this article. Sign up in the box at the top  
right corner of the online article.

---

### **Notes**

---

To request permissions go to:  
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:  
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:  
<http://group.bmj.com/subscribe/>