SPRING TRANSPORT FOR A DIFFICULT CASE.

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The following brief account with its illustrations of a method used for transporting a serious case may be of use to others for similar occasions.

The case in point was that of L. ——, who was shot through the neck in Waziristan in June, 1937. The bullet entered the right shoulder and came out on the left side of the base of the neck. In its course it affected the posterior parts of the 5th and 6th cervical vertebrae.

The patient was in hospital in Razmak in a plaster jacket for some two months and made considerable progress. In the third week in October he was, however, in a state of considerable hyperaesthesia of the limbs, with rigidity of arm and leg joints, there were sores over pressure points in spite of great care and attention to nursing and his mental condition was deteriorating.

Opinions varied somewhat as to the immediate need for laminectomy; but one urgent need was quite evident, namely that he should be got away from Razmak as soon as possible. It should be explained that Razmak is somewhat isolated in central Waziristan with a road sixty-nine miles to Bannu in one direction and one hundred and twelve miles to Dera Ismail Khan in the other.

This road, although possessing a very fine surface, is a hill road which crosses many ravines and watercourses and several passes.

There is an air-landing ground at Razmak, but it is restricted and too dangerous for large transport planes. The patient also was not in a fit condition to be placed on a stretcher, and therefore air transport was out of the question.

An attempt had been made to transfer him out of Razmak by slinging his bed in a three-ton lorry by means of suspension springs and straps. The three-ton lorry is a big awkward thing to drive, and requires constant gear-changing on the Razmak-Bannu road and gear-changing produces harsh vibrations throughout the vehicle.

A journey of three miles in three-quarters of an hour was accomplished, but the patient could not stand much more and in addition difficulties as to road picketing and timings had to be considered. The road to Bannu was picketed the whole way and times were limited. A speed of four
miles an hour would have made the journey much too prolonged to complete in one day.

Having seen pictures and a description of the appliances used in the three-ton lorry one was immediately struck with the idea that a lighter, well sprung, more powerful vehicle was obviously indicated for the work. Ford V-8, two-stretcher, ambulance cars had recently been issued to various districts and it appeared to the writer that if a spring bed could be slung in one of these, the problem of transport would be solved.

Accordingly a Ford V-8, two-stretcher, ambulance car was borrowed and a spring mattress bed, B.T. pattern, was procured to try out the possibilities.

The writer made a trial trip over very bad roads with a spring mattress bed merely placed in the ambulance car. The results were satisfactory.

The ambulance car with the bed was taken to the R.I.A.S.C. (M.T.) Heavy Repair shops and the idea explained; namely to have the bed adapted for slinging in the ambulance car by cutting off the legs and head piece and by providing springs on clips from which to hang the bed from the hood of the car. Without technical knowledge it was not possible to decide whether the hood was strong enough to carry the weight of the bed and patient.

If the hood of the car was not strong enough to take the weight of the slung bed, then, it was explained, that a framework in which the bed could be slung and which could be lifted into the car would meet the case. In fact the second method would be much better for the special patient under consideration.

The technical Motor Transport officers immediately vetoed slinging the bed to the hood because of its lack of strength and agreed to make a framework in which the bed could be slung and lifted as a whole into the car.

The ingenious device illustrated below was produced by them ready for the road in two and a half days, the work being carried on all night.

The Ford V-8 ambulance body only takes two stretchers and so only had just enough room for the bed in a frame. Therefore all stretcher and seat fittings had to be removed. Runner channels were fixed on the seats to allow the frame to slide in easily and to hold it in position and stout wooden guides were also fixed to take the weight of the steel frame.

These runners were placed so that the frame was to one side of the body, thus allowing an attendant just room to attend to the patient, if required (see fig. 3).

The legs and upper part of the head of the spring mattress were removed. The foot piece and half the head were retained in order to give firm support to any mattress and bedding used by the patient and also to give easy hand-hold for lifting the bed.

Swingle-tree hooks (screw hooks) were bolted to the bed, five at each side and three at each end. On to these hooks pairs of springs were
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fastened on wire loops. Quick release hooks, four at each side and two at each end, were also bolted to the bed to take the counter-tension springs (see figs. 1 and 3).

The springs were canopy springs, i.e. the springs which are normally used to hold down the sides of the bonnets of lorries.

The steel frame was made as shown in fig. 1, all transverse supports being at the bottom. Swingle-tree hooks were bolted to the lower edge to take the counter-tension springs, quick release hooks being fixed to the upper edge.

Fig. 1.—Steel frame with bed completely slung ready for loading. Note the pairs of suspension springs above and the counter springs below. In whatever direction pressure is exerted on the bed, spring action is immediately brought into play and reduces the extent and severity of the movement. Note also the ball-bearing trolley wheels at the head end of the steel frame; one is visible at the left-hand bottom corner of the steel frame.

The process of loading a patient is as follows:—When the patient is ready on the bed, this is lifted by the head and foot pieces above the steel frame and lowered into it until the frame of the bed rests securely on the wooden blocks.

The pairs of springs are then fixed on to the screw hooks on the bed by the wire loops and the upper ends clipped on to the quick release hooks on the steel frame, care being taken not to jar the patient. The head and foot of the bed are finished first and the side hooks afterwards. The bed is now suspended from the top of the steel frame.

The counter tension hooks are similarly applied and the whole is now ready for loading (see fig. 1).

The whole steel frame is raised, with the bed suspended in it, and the
head end placed in the ambulance car with the two trolley wheels engaging in the runners fixed to the seats of the car. The whole steel frame can then be easily pushed in its final position in the car (see fig. 2).

When the whole steel frame has been pushed into position a pair of straps secure the bottom of it to the floor of the car as shown in fig. 3. The step is then raised and fixed in position for travelling. A wooden batten has been fixed on to the edge of the step and this engages with the bottom of the steel frame and securely holds it from any backward movement (see fig. 3). The front partition of the body was partly removed and a flap cover substituted so that the attendant, seated beside the driver, can easily see and attend to the patient if the necessity should arise.

![Fig. 2.—Sliding the loaded frame into the car. Note the springs, hooks and clips are very clearly shown.](image)

A trial run over the training mountain track showed the result to be very satisfactory at speeds up to fifteen miles per hour and complete comfort was observed at 35 miles per hour on ordinary straight roads.

It should be noted that a set of large size low pressure tyres, which will be the future standard tyre for ambulance cars, was available and these were fitted to this ambulance car for this journey.

Two points were noted during the trial and steps were taken at Razmak to deal with these for this occasion.

The first point was the lateral roll of the patient on the bed when the car cornered. This was overcome by bolsters on each side of the patient.

The second was the ultra-spring movement of the mattress of the bed which gave too much body movement to the patient. This was most in-
geniously overcome by interposing a large sheet of Cellotex fibre board (used for ceilings) between the spring mattress of the bed and the Dunlop pillow mattress on which the patient was lying. This device damped down the vertical movements of the centre of the bed.

The car reached Razmak in a day and a half and after a trial by the officers in charge of the case was, with the corrections mentioned above, found to be satisfactory for transport of the case.

![Fig. 3.-The apparatus loaded and ready for the journey. Note, there is just room for an attendant to pass alongside the steel frame and get at the patient. Note also the runner channel and guides on the seat of the car on left side. The wooden batten on the step engages with and holds the steel frame when the step is raised into the closed position.](image)

The actual journey was performed in three stages. Razmak to Bannu sixty-nine miles. The patient arrived in excellent condition and spent a good night without any drugs, still on the bed in the frame, which was carried into the ward.

Bannu to Kohat and on to Peshawar. Seventy-nine plus forty miles. This journey was done without the aid of any drugs. The patient stated that at times it was painful (probably on account of his sores). The Kohat pass was climbed at fifteen to twenty miles per hour without changing gear.
A day's rest was allowed at Peshawar, the patient remaining on the bed, which was supported on boxes in the ward.

Peshawar to Rawalpindi one hundred and five miles. Paraldehyde was given for this journey which was done in three hours; thirty-five miles per hour being the speed used, wherever cattle fairs and similar obstructions allowed of such a pace. The Staff-Serjeant driver, a most experienced man specially selected for this journey, was full of praise for the amazing lack of vibration in the car.

The patient arrived in excellent condition and has been showing remarkable progress since his arrival. It is hoped that this account, together with the excellent photographs provided by the R.I.A.S.C. officers concerned with the construction of the apparatus, will prove of use should others require to move a difficult case of this type.

I would like to record our special thanks to the officers and staff of the R.I.A.S.C. who produced this apparatus in such a short space of time and assisted in the transport of this case and in particular to Lieutenant-Colonel R. J. Wilkinson, O.B.E., and Major J. D. P. Fisher under whose expert guidance it was devised.

My thanks are also due to Major-General W. H. Hamilton, C.B., C.I.E., C.B.E., D.S.O., K.H.S., I.M.S., D.D.M.S., Northern Command, for permission to carry out the idea and to offer this account for publication.

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Echoes of the Past.

THE MEDICAL SERVICES IN GERMANY DURING THE SEVEN YEARS WAR, 1758-1762.

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In 1756 a league was formed by France, Austria, Russia, Saxony, and Sweden to crush the rising power of Frederick the Great of Prussia. The invasion of Saxony by Frederick followed, which was the commencement of the Seven Years War.

Our immediate interest, the protection of Hanover being involved, a large subsidy was voted for the support of the Hanoverian Army which took the field under the Duke of Cumberland in 1757. In June this Army suffered defeat at Hastenbeck, and Hanover and Brunswick were overrun by the French.

In September 1758 it was decided to send British troops to Germany to be placed under the command of Prince Frederick of Brunswick, a most capable general who had already forced the French back over the Rhine. Their immediate Commander, the Duke of Marlborough, died soon after