A COMPARISON OF MOUNTAIN RESCUE STRETCHERS USED IN BRITAIN

By RON JAMES

(Two illustrations: nos. 52–53)

THE adequacy of the stretcher is one of the main factors in saving an injured climber without deterioration and without exposing rescuers to undue danger.

For the patient, the main considerations are that his injuries, particularly breaks, should be easily immobilised and protected, that he should be comfortable, shielded from the weather and that mentally, he should be able to relax. For the rescuers, ease of movement and saving of strength are most important; hence they prefer stretchers which are easy to carry uphill and on rock (even to climb with), easy to load and to lower down crags, either vertically or horizontally for specific injuries, and especially easy to carry loaded downhill on any type of terrain. If the stretcher can be taken apart for transport, it must be easy to re-assemble in bad conditions, and there must be no danger of losing any vital parts and straps. More generally, the robustness of the equipment is important in increasing its safe life.

I have attempted a numerical assessment of the various types of patient-carriers which I have used. The results seem to agree with other rescuers' general impressions, but I would point out three factors which are not perhaps obvious. First, that this is a general assessment and that for any specific rescue, say a broken back on a sea cliff or an exposure case on Ben Nevis in winter, certain factors would have overriding importance. Secondly, the calibre, both as mountaineers technically and physically, and as rescuers, of the rescue party would have a very great influence on the value of the more sophisticated methods. Finally, some knowledge of the three make-shift methods could, quite often, prevent deterioration of a situation, so that ultimate use of proper equipment would not be needed.

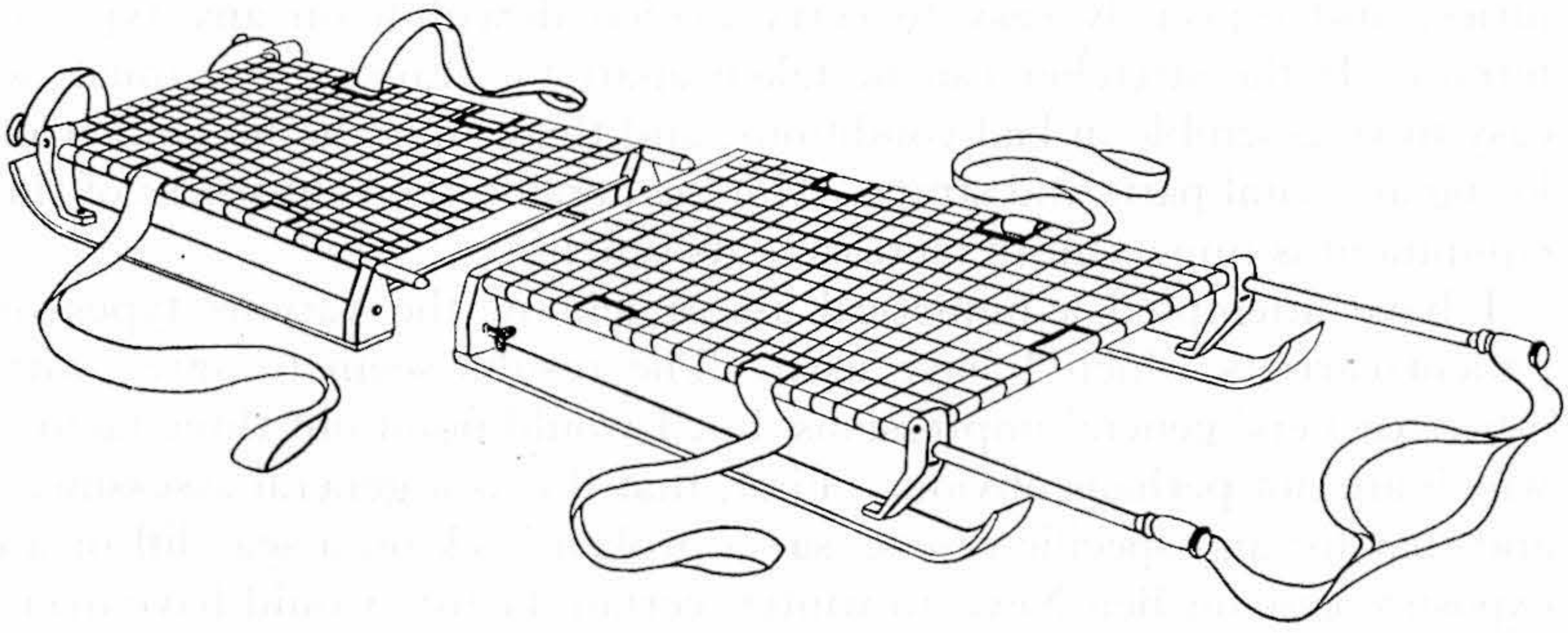
Standard Thomas Stretcher

This robust stretcher, together with a double leg splint and a casualty bag, is the standard equipment at most British Mountain Rescue Posts. There is little to go wrong and it is suitable for nearly all types of injuries, but it is awkward to carry and is particularly difficult in scrambling territory (such as the North ridge of Tryfan) when frequent hauling or lowering, using ropes, is needed. However, with plenty of labour, albeit unskilled, an adequate rescue is possible. Lowering is not too

difficult although horizontal lowering for broken backs is awkward unless two jockeys, with the increased problem of ropes and lowerers, are used. Also, little protection is available for patient or jockey. Finally, the carrying straps for the two main carriers seem to be very poorly designed.

Split Thomas with Mesh Head Guard

This is an improved Thomas which splits into two parts for ease in carrying. Two methods of splitting are available, the M.R. Developments method evolved in the Lake District which involves the addition of various castings etc, and the Mountain Rescue Committee approved method by Kirkmans which is simpler, cheaper and lighter, and therefore preferable. The carrying straps serve as rucksack straps for carrying and face routes (not chimneys!) of Grade III standard can be followed carrying these sections. The mesh head guard protects the patient's head and shoulders (and even the jockey's on vertical lowers) and it can be reversed to provide a back support for sitting injuries. On this



SPLIT THOMAS STRETCHER (KIRKMAN METHOD)

stretcher the canvas or nylon net bed has been replaced by a plastic covered wire net which again gives advantages. This stretcher is used now for almost every rescue at two of the Welsh Rescue Posts, and it seems to be withstanding the rough usage exceptionally well.

MacInnes Stretchers (Mk. 1 and Mk. 3).

These alloy stretchers are produced by Hamish MacInnes in Scotland in an effort to provide a folding stretcher for use in the difficult terrain and long distances found in the Highlands. They are not as comfortable to carry uphill as a half Thomas, and are also heavier. The Mk. 3 has many straps and is fairly complicated to assemble so that it needs trained rescuers. A wheel can be attached to it to ease the work on long carries

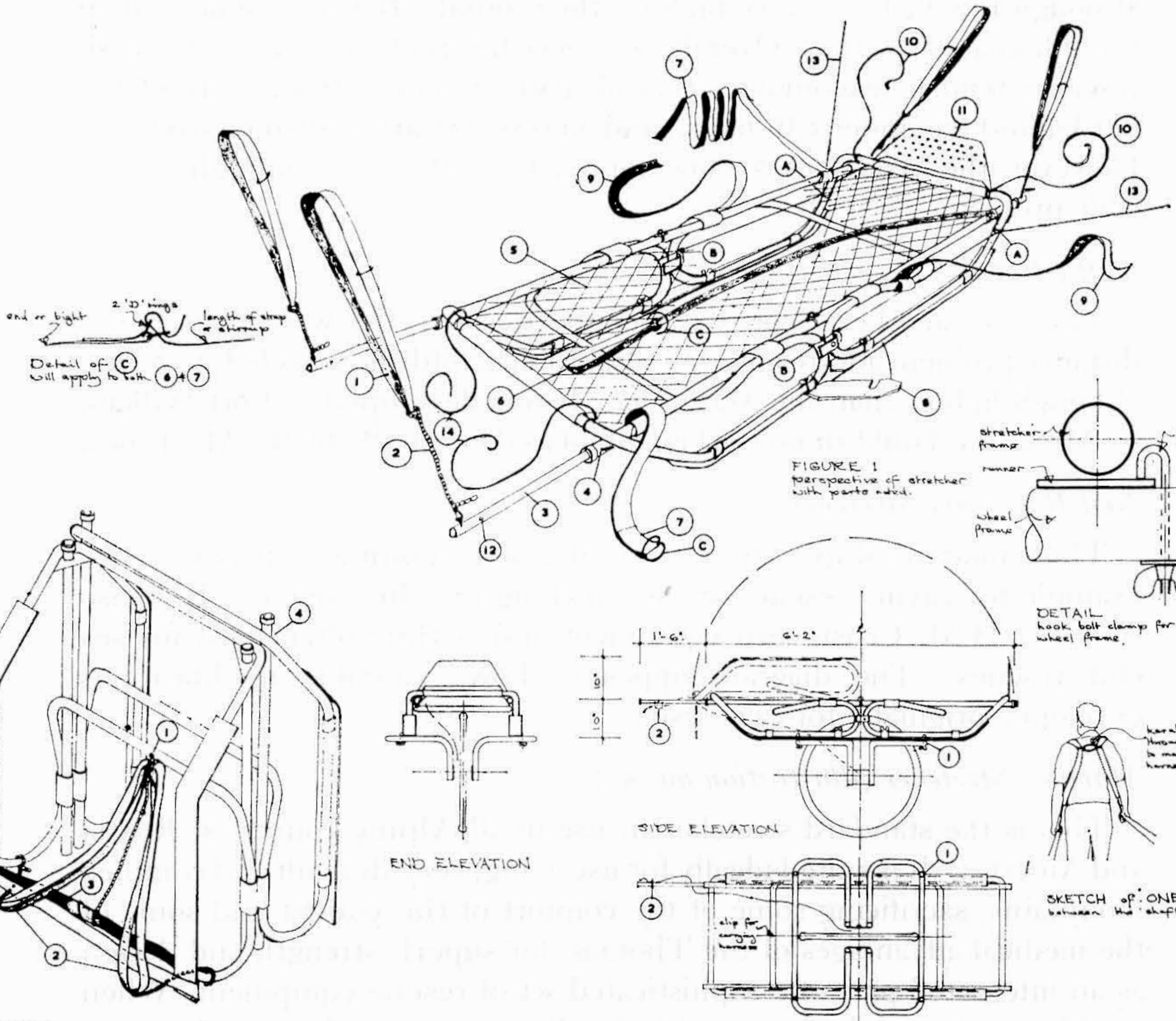
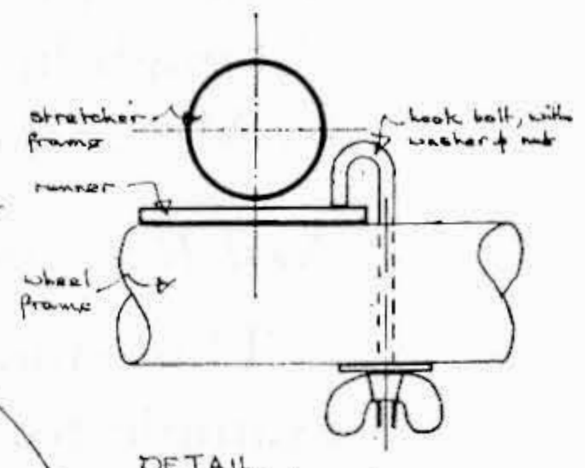


FIGURE 1
perspective of stretcher with parts noted.



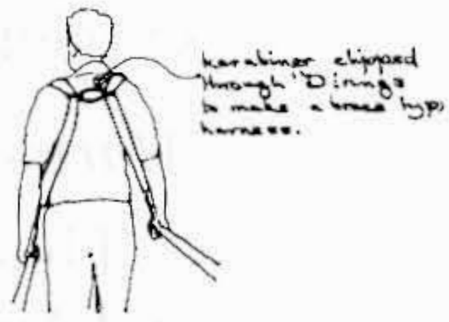
DETAIL
hook bolt clamp for wheel frame.

FIGURE 2
stretcher folded.
with parts noted.

END ELEVATION

SIDE ELEVATION

PLAN
of underside



SKETCH of ONE MAN between the shafts

THE MacINNES STRETCHER Mk. 3

Key to Figure 1

1. **Shaft shoulder harness:** also rucksack type straps for transporting stretcher on back.
2. **Chain:** adjustment with small karabiner clip which clips into eyebolt.
3. **Telescopic shafts**
4. **Pin:** for locating shaft in position; for location, the eyebolt should be uppermost which allows pin through hole in shaft.
5. **Stretcher net bed**
6. **Patient stirrup:** to go inside casualty bag, over uninjured foot and adjusted.
7. **Patient securing strap:** long 2 in. wide nylon strap goes round patient and stretcher, missing out injured sections and is secured to short end with 'D' rings and pulled tight.
8. **Swinging plate:** locks the two stretcher sections together, locked by tightening the two wing nuts on either side.
9. **Side bearer straps**
10. **Chest harness:** 1 in. white nylon straps, pass underneath shoulders up through armpit and tied across chest (if patient **is not** suffering from chest injuries).
11. **Head protector**
12. **Removable eyebolt:** if stretcher is supplied with wheel removed to fit brake lever for wheel-brake.
13. **Lowering ropes:** should be attached at each side to point A with a clove hitch and to point B with a bowline round **both** central members.
14. **Feet ties**

Key to Figure 2

1. **Shoulder straps—2 harnesses:** 'D' rings clip onto cross-bar to karabiner clip.
2. **Bottom of shoulder straps:** go **under** waist strap and clip chains around stretcher frame, the straps require to be quite tightly adjusted.
3. **Waist strap—1 harness:** loops over ends of runners with 'D' ring and chain at back and clip into cross-bar clip after shoulder straps are in place.
4. **Stretcher sections:** are held together with the chest tapes or feet ties tied round frames. The fourth harness is put round top of opposite runners and clipped to net for security.

The Wheel

1. **Hook bolts:** clip to stretcher runners.
2. **Brake lever:** fits at point 12 on front left shaft, eye-bolt provided.

(*Designed: Hamish MacInnes, B.E.M. Drawn: Graeme A. Reid*, '67

although this makes it very high off the ground. It is also shorter than the Thomas stretcher. Overall, one gets the picture (which Scottish rescuers tend to encourage), that all patients come from south of the border and are under 5 ft. 6 ins., and all rescuers are Scotsmen over 6 ft. However, the MacInnes is a fine approach to solving a well nigh impossible problem.

Duff Stretcher

This was another Scottish attempt to solve the weight–strength–distance problem and resulted in a less robust, folding, wheeled stretcher, although lighter than the MacInnes. It was developed in Fort William by Mr. D. G. Duff but now is being replaced gradually by the MacInnes.

Neil Robertson Stretcher

This standard ship's stretcher is useful in confined spaces, as for example for caving rescues or for winching into helicopters. It is also standard H.M. Coastguard equipment and is thus often used for sea cliff rescues. The diagram opposite shows valuable modifications developed originally for cave rescue.

Mariner Stretcher (*illustration no. 52*)

This is the standard stretcher in use in all Alpine countries, Russia and America. It is suited ideally for use in big, very difficult and complex mountains, sacrificing some of the comfort of the patient and some of the medical advantages of the Thomas, for superb strength and design as an integrated part of a sophisticated set of rescue equipment. When used by professional rescuers with the allied wire-rope lowering systems it is a fine solution to rescue problems. However, for long carries, one gains the impression that it has been designed for transport by two Alpine porters rather than the British idea of six or even ten carriers. The leg splint attached to it seems very efficient although a little flimsy, whilst the handles are very good.

Tragsitz

This is another piece of Alpine equipment. It is a carrying seat for use with patients whose injuries are such that they can be transported safely in the sitting position. This is, of course, very portable, and is quite easy to use on crags when lowered via a friction device (illustration no. 53). However, on scree and poor paths, even when using a pole for support, it is difficult to carry a patient for very long.

Perche Barnarde

This is a French stretcher which is very portable, breaking up into five loads, each about 6 lbs. When assembled it resembles a pole with a patient in a hammock below it. It gives the patient little protection and

Photo: North Wales Press Agency] [*Copyright: ditto*

MARINER STRETCHER AND LEG SPLINT (SEE PAGE 226).

(No. 52)

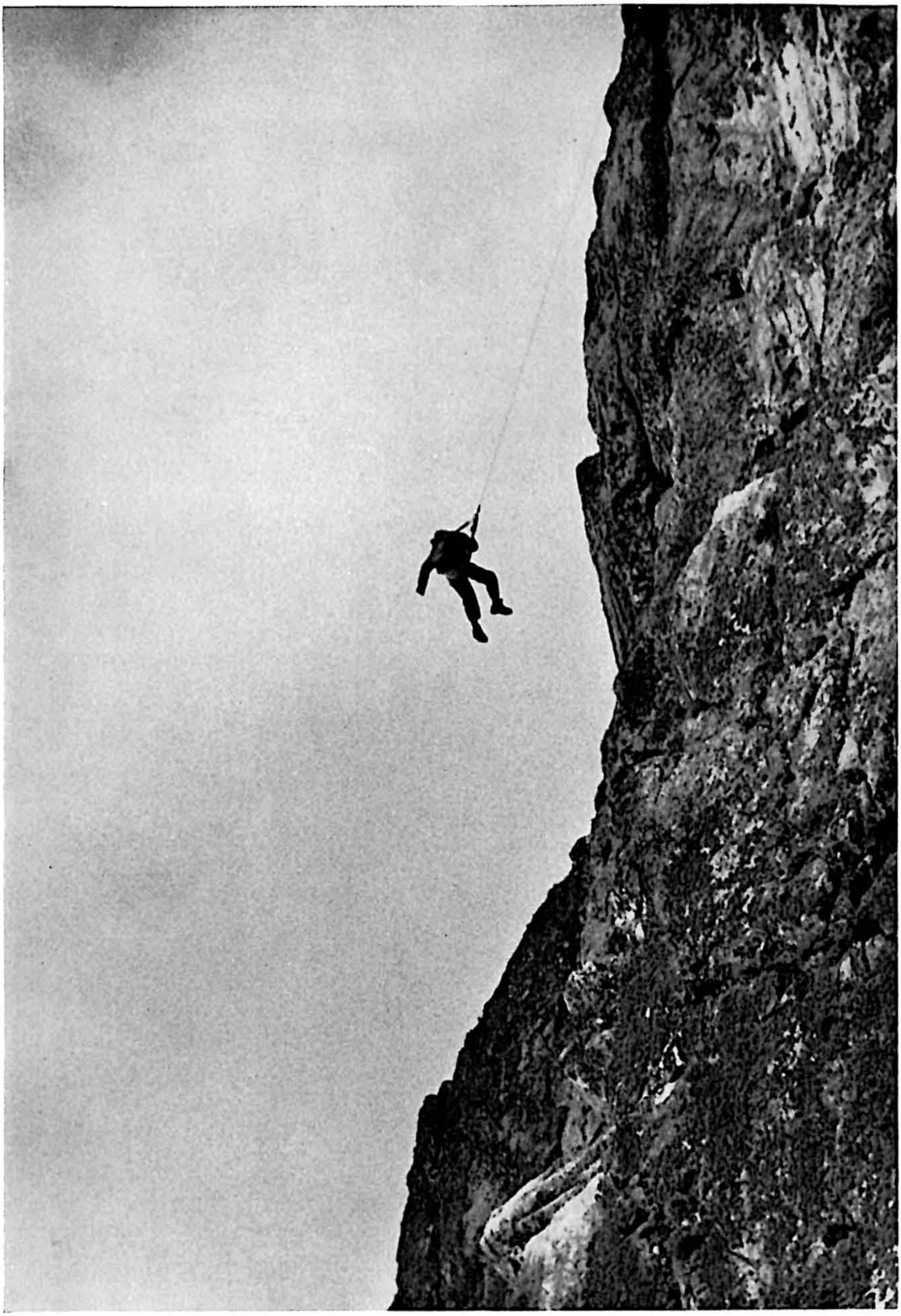
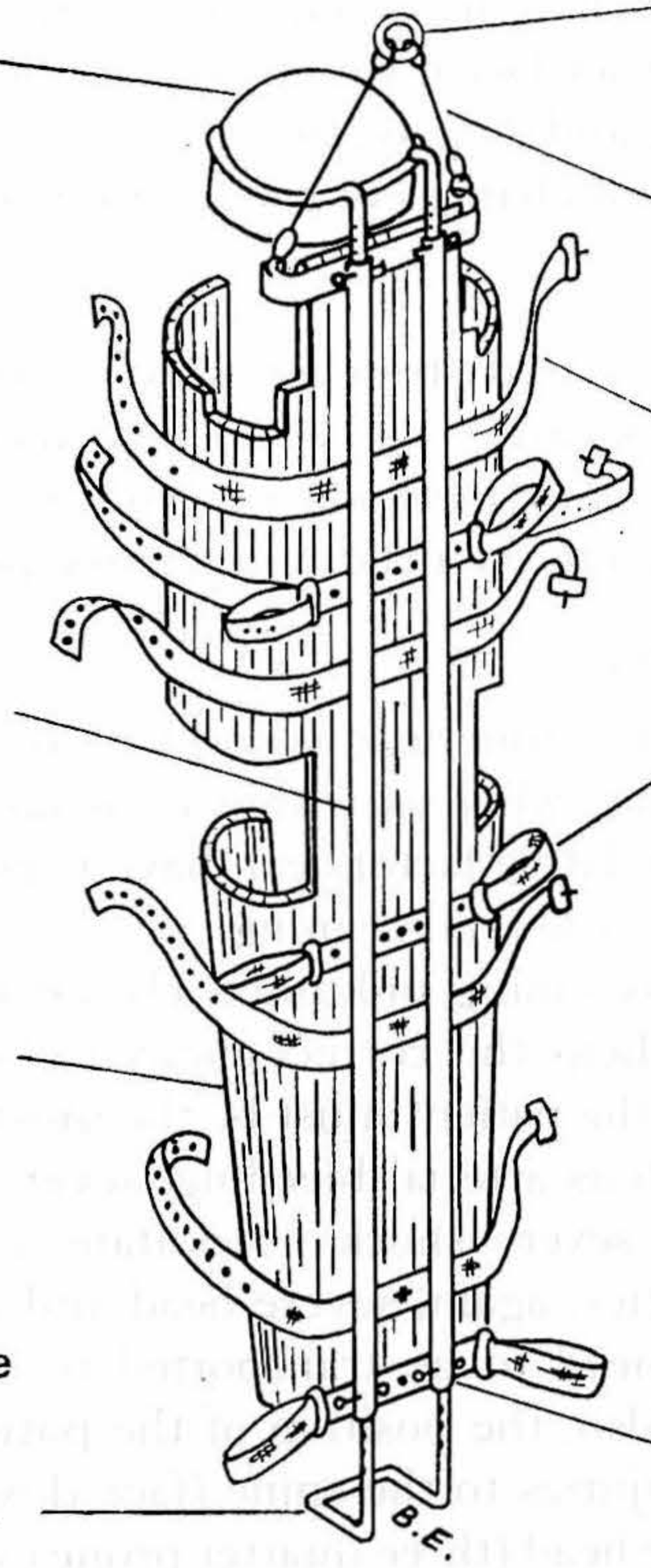


Photo: Howell Evans]

USE OF TRAGSITZ CARRIER (SEE PAGE 226).



MODIFIED NEIL ROBERTSON STRETCHER

[*Diagram by courtesy of Don Robinson*

once again, it is carried by just two people. It cannot be slid on rock, snow or the ground. However, on searches for exposure cases it is quite a useful piece of equipment to take high into the hills.

Rucksack Seat

This is the first of the make-shift methods and involves the cutting of two holes in the corners of a rucksack and carrying or, using extra slings, lowering patients sitting in it. It has many obvious weaknesses, and that of the rucksack itself is the most serious. However, it is worth noting that this method plus a slight knowledge of first aid has saved at least one life on the Welsh hills and could have saved others if it had been known.

Split Rope Carrier

This method can be used only on easy terrain with a slightly injured companion. It has all the disadvantages of the rucksack seat and is also

much less comfortable. For the evacuation of an exhausted or slightly injured climber from a rock face it would be better to use a triple bowline with a chest sling added, and then use the rope in this fashion for transport down the path. Frequent changes of carrier are necessary.

Pigott Rope Stretcher

This is another improvised stretcher which can be made from 100 ft. of rope. It is very awkward to carry and very uncomfortable to lie on. Indeed, all these make-shift methods are painful for the patients and should always be padded to the maximum degree possible.

Summary table (*opposite*)

It is obvious that the numerical assessment of stretchers can only be comparative and that, whereas within each factor the grading can be fairly accurate, the relative factors can have very different values, so that the totals can have little real meaning.

In any one rescue, assuming unlimited choice of equipment, three pieces of information help the correct choice to be made.

First, the injuries of the patient must be the most important factor to consider. Injuries such as arterial bleeding, severe head, severe chest, abdomen injuries and severe shock necessitate a degree of urgency. Another group of injuries, again, severe head and neck injuries, spine, abdomen and pelvis, need to be transported in as near a horizontal position as possible. Also, the position of the patient on the stretcher is dictated by severe injuries to the spine (face down), the chest (lying on injured side) and the head (three quarter prone) whilst for some chest injuries it may even be better for patients to travel in a sitting position. Hence an accurate attempt to diagnose the injuries is vital to the selection of the best equipment, and if this is not possible, a stretcher giving maximum rigidity and comfort must be used.

The second factor influencing the choice is the position of the patient in terms of distance, terrain, weather, safety and daylight.

Finally, the size, strength, and ability, both as mountaineers and medically, of the rescue party has a large influence on the selection of equipment.

If a person called upon to organise a rescue spends a few minutes collecting the maximum information concerning these factors before setting out, he can decide about equipment (and indeed any other help etc. needed) with a fair degree of success, thus ensuring that the patient gets the best possible chance of being rescued safely and comfortably.

A COMPARISON OF MOUNTAIN RESCUE STRETCHERS USED IN BRITAIN

Type of Equipment	For the Patient				For the Rescuers												Robustness	Safety		Total[4]
	Comfort	Variety of injuries	Weather protection	Psychological	Ease uphill			Ease up Rock	Ease of loading	Ease of lowering		Ease of carrying			If split			On carries	On lowers	
					Weight	Size	Shape			Vertical	Horizontal	Paths	Screes	Snow	Ease to re-assemble	Parts to lose				
	5	10	5	5	5	5	5	10	5	10	5	10	5	5	5	5	5	10	10	125
Standard Thomas with casualty bag.	5	9	5	5	4	3	3	4	5	10	4	9	5	5	5	5	4	10	8	107
Split Thomas with head guard and casualty bag	5	10	5	5	4	4	4	7	5	10	5	9	5	5	3	4	4	10	10	113
MacInnes Mk. 1 with casualty bag.	4	9	5	5	2	4	3	5	5	10	4	8	4	5	4	4	5	10	8	104
MacInnes Mk. 3 with wheel and casualty bag.	4	9	5	5	2	4	3	5	5	10	4	9	5	5	4	3	5	10	8	105
Duff with a sleeping bag and a wheel.	4	8	5	5	4	4	3	5	5	9	1	9	4	5	4	4	4	10	8	101
Mariner with a sleeping bag and a wheel.	4	7	5	5	4	4	3	6	5	10	5	9	3	5	4	4	5	10	9	107
Neil Robertson	4	7	5	4	4	4	4	8	5	10	4	7	3	4	5	5	4	9	9	105
Tragsitz with duvet and cagoule	3	3	4	3	5	5	5	10	4	10	0	7	2	2	4	5	5	6	8	91
Perche Barnarde with a sleeping bag.	3	5	5	3	5	5	4	9	4	5	5	6	3	3	3	3	5	5	5	86
Rucksack seat	2	2	2	2	5	5	5	10	3	4[1]	0	4	1	1	4	5	2	4	4	65
Split rope carrier	1	2	1	2	5	5	5	10	3	4[2]	2[3]	3	1	1	3	5	5	4	4	66
Pigott rope stretcher	2	4	2	1	5	5	5	10	5	0	2	4	2	2	1	5	4	2	2	63

Notes. 1. Safety rope-seat needed for patient. 2. Bowline on bight and chest sling used. 3. Using a complicated Dutch-lacing method.
4. As the make-up of the totals varies according to the relative weights given to the constituent factors, this column gives only the most approximate guide.