First aid in the Royal Navy.

FIRST AID IN THE ROYAL NAVY

FIRST AID

IN THE

ROYAL NAVY.

LONDON:
PRINTED UNDER THE AUTHORITY OF HIS MAJESTY'S STATIONERY OFFICE
BY EYRE AND SPOTTISWOODE, LTD., EAST HARDING STREET, E.C.,
PRINTERS TO THE KING'S MOST EXCELLENT MAJESTY.

To be purchased, either directly or through any Bookseller, from
WYMAN & SONS, LTD., 29, BREAMS BUILDINGS, FETTER LANE, E.C.,
and 54, ST. MARY STREET, CARDIFF; or
H.M. STATIONERY OFFICE (SCOTTISH BRANCH), 23, FORTH STREET,
EDINBURGH; or
E. PONSONBY, LTD., 116, GRAFTON STREET, DUBLIN;
or from the Agencies in the British Colonies and Dependencies,
the United States of America, the Continent of Europe and Abroad of
T. FISHER UNWIN, LONDON, W.C.

1914.

Price Ninepence.

CONTENTS.

x (12)25004 Wt 30442—290 10,000 11/14 A 2

ILLUSTRATIONS.

INTRODUCTION.

(1) OBJECT OF "FIRST AID."

Everyone in the Navy, especially the officers, must know enough "First Aid" to be able to help themselves and others in case of need.

The object of First Aid is not to teach surgery, but to teach purely temporary measures to save life or relieve pain till the doctor comes. First Aid should always be very simple in methods and in wording, so that anybody can understand. It is, therefore, not always absolutely scientifically the best treatment, but is rough and ready, and the best under the circumstances.

(2) SUBJECTS OF LECTURES.

This book is written in the form of four very concentrated lectures. You must, therefore, rivet your attention on every single word, and you must read and re-read the lectures and

practise the methods described until you feel confident that you will know what to do when the day comes.

Briefly, the subjects of these four lectures are :—

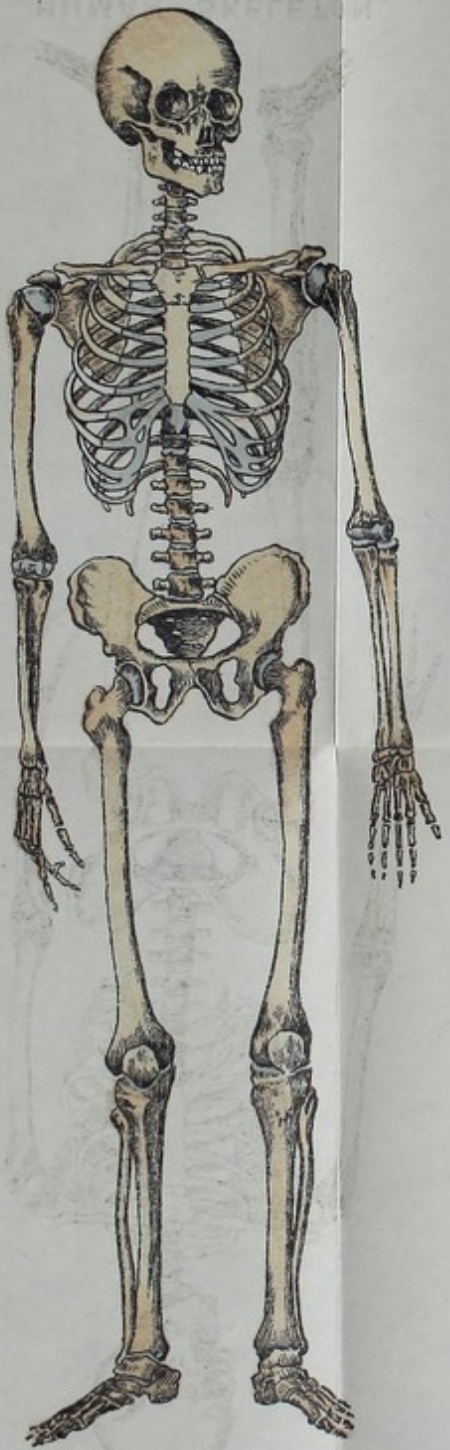
First.—Bones : Fractures and their treatment.

Second.—Circulation of the Blood : Bleeding and its treatment.

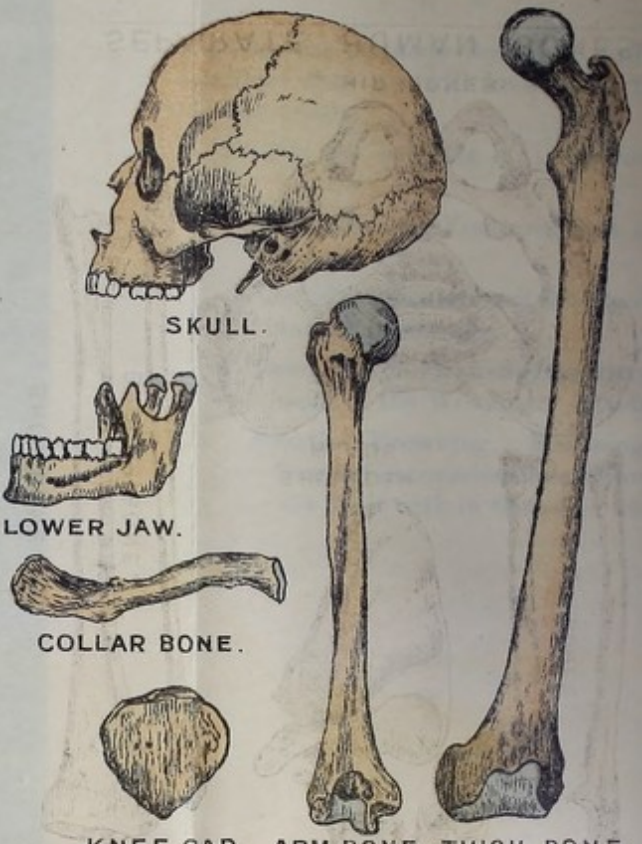
Third.—Wounds, including Burns. Treatment of the Wounded. Stretchers, &c.

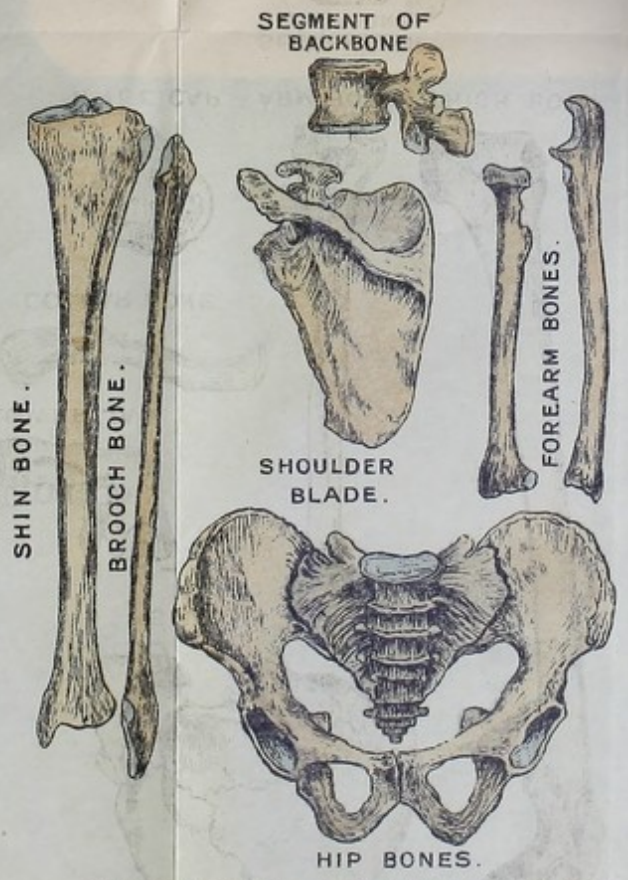
Fourth.—Drowning. Poisoning. Various forms of unconsciousness. Many accidents not dealt with in the other lectures.

To face page 9.



HUMAN SKELETON.





SEPARATE HUMAN BONES.

5395. 20442/290. 10,000. 12. 14.

Malby & Sons, Lith.

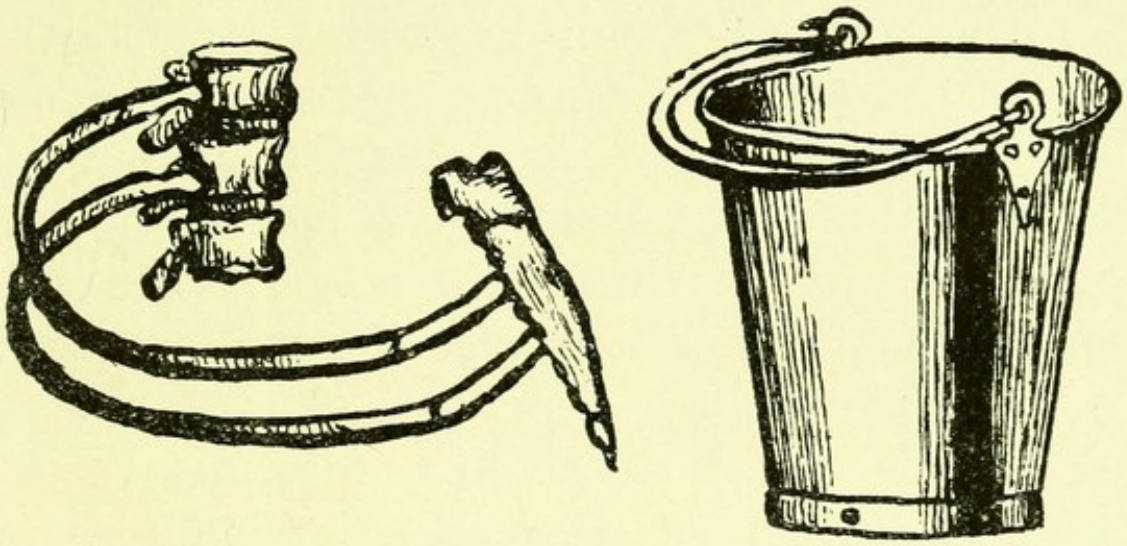
FIRST LECTURE.

(1) HUMAN SKELETON.

The picture of the human skeleton is here produced. You must keep it spread out while you read the following pages, and you must study it long and attentively so as to retain a mental picture of it. Thus you will roughly know what the bones are like in each part just as if you could see them through their fleshy covering. Next study the pictures of the bones separately. The skull is a bony box containing the brain. It is all in one piece, except the lower jaw, which works in a hinge-joint just in front of the ear. The skull rests on the upper end of the backbone. The backbone, as you see, is made up of a series of small bones, somewhat like reels of cotton. Let us first follow the backbone to the lower limbs, and then return to the ribs and upper limbs. At the lower end of the backbone are the hip-bones, forming a basin supporting the contents of the belly. On the outer surface of the hip-bone, on either side,

is a cup-shaped socket, into which fits the rounded head of the thigh-bone, forming the ball-and-socket joint of the hip. The thigh-bone is like a gigantic drum-stick, and ends at the knee in a hinge-joint with the strong shin-bone which can be readily felt under the skin. On the outer side of the shin-bone is attached the slender brooch bone, so called from its resemblance to the pin of a brooch. In front of the knee-joint is seen the knee-cap, a rounded piece of bone about the size and shape of a 5*s*. piece. Its use is to take the rub of the thigh muscles off the front of the knee-joint. At the ankle the foot joins on in a hinge-joint. The foot is composed of many small bones of peculiar shapes, and a description of them would be too complicated for this lecture.

Returning again to the backbone: on either side twelve ribs are attached. Each of these is like the handle of a bucket and loops round the chest from the backbone behind to the breast-bone in front (*see* illustration). The breast bone is a flattened dagger-shaped bone, lying under the skin, and its shape can be practically seen and



RIB MOVES LIKE A BUCKET-HANDLE.

felt in the live subject. At its upper end, on either side, is attached the collar-bone, which goes horizontally out to the point of the shoulder and serves to keep the shoulder out. It is like the old letter *f* and lies so close under the skin that it can be seen and felt quite easily. The outer end of the collar-bone joins with the outer end of the shoulder-blade to make the shoulder-girdle. The shoulder-blade is a triangular bone lying on the back of the chest, and is very visible in thin, weak people, and led to the old superstitious belief that when people with consumption and other wasting diseases showed their shoulder-blades very plainly, these were their angels' wings beginning to appear. At the outer corner of the shoulder-blade is a shallow socket, in which works the ball-shaped upper end of the arm bone. This bone at its lower end forms the hinge-shaped elbow-joint with the two forearm bones, and they join with the hand at the wrist. The hand, like the foot, is made up of many small bones too complicated for description in this lecture.

You will notice that there is a general similarity of arrangement of the upper and lower

limbs. Both join the body with a ball-and-socket joint, then a single drum-stick-shaped bone, and then a hinge-joint with two more or less parallel bones next, which join by a hinge-joint to the hand or foot, these latter structures being composed of a collection of small bones. The cause of this similarity is that man at one time was a quadruped and all four limbs were very similar, and then, as he assumed the erect posture, his upper limbs became modified to suit his new conditions.

(2) FRACTURES.

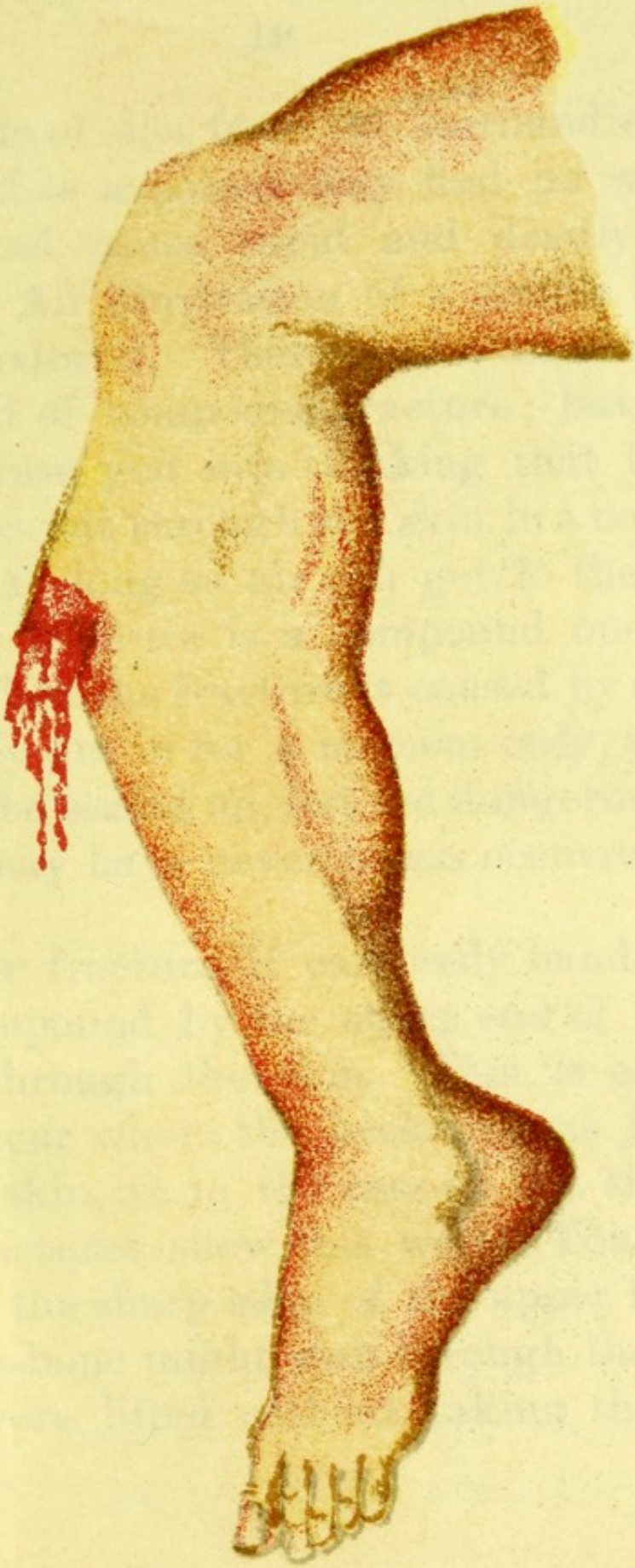
You must now learn about fractures. A fractured bone is a broken bone. There are two principal kinds, the compound fracture and the simple fracture. The *simple* fracture is one in which the bone is broken in one or more places, and may be more or less severe, but the simple part of it means that nowhere, and at no time, does air reach the broken bone. In this latter point it differs from a compound fracture. A *compound* fracture is one in which *air reaches the*

broken surfaces of the bone. The word "compound" is a very bad one, and is very apt to lead to confusion in your mind. Everybody is confused with it at first. Remember it does *not* mean that the bone is broken at more than one place. Such a fracture is called *comminuted.* You can remember this from the word "minute" and think of the bone being broken up into minute pieces as an example of the most pronounced kind of comminuted fracture. You can have a simple comminuted fracture, or a compound comminuted fracture, the difference being as before stated, whether air reaches the broken bone or not. It is very important to remember the difference between a simple and a compound fracture, for there is a great difference in the seriousness of the two injuries. Whereas a simple fracture is usually easily treated and has but few complications, and these of not very serious consequence, a compound fracture is one of the most dangerous accidents that can happen. Not only may the patient lose his limb, but possibly also he may lose his life. The reason of this need not be explained in a First Aid lecture, but suffice it to say that where air can enter so

SIMPLE FRACTURE.

3395.20442/290.10000.12.14.

Malby & Sons. Lith.



COMPOUND FRACTURE.

Malby & Sons, Lith.

also all kinds of dirt from the surroundings may enter and thus a poison may find its way into the bone and cause rapid and deadly blood-poisoning. An illustration of a simple fracture is here introduced. There is also an illustration of one kind of compound fracture; but do not let this confuse you into thinking that the bone always sticks out through the skin in a compound fracture. As long as air can get to the broken surface the fracture is a compound one, as, for example, when the fracture is caused by a bullet. The air may get in for a moment only, and then the wound be sealed up, but the dangerous blood-poisoning may have nevertheless occurred.

A simple fracture, if carelessly handled, may become compound by the sharp end of the bone breaking through the skin. This is especially liable to occur where the broken bone lies close under the skin, as in the case of the shin-bone. The two pictures show this well. You can see how easily the sharp edge of the upper fragment of the shin-bone might stab through the skin, if the limb were lifted without taking the weight of the heel.

(3) WATCHWORD OF FIRST LECTURE.

This leads to the most important thing in this lecture—the thing which you must remember even if you forget all else—and that is, "*Do not allow a simple fracture to become a compound fracture.*" This precept must be dinned into you now and at all times. It is the watchword of this lecture. Better by far that you should leave the injured person alone altogether than that you should improperly handle him so as to make his simple fracture into a compound one

(4) SIGNS OF FRACTURE.

You must now learn how to know that a bone is broken. The history is always useful, and before you begin to examine the patient obtain as full and as accurate an account as possible of how the injury occurred. For instance, the leg is more likely to be broken if a steam roller has gone over it than if a perambulator has done so. Sometimes the patient or a bystander may have heard a snap when the bone broke, and in many

other ways the history may prove most useful. After obtaining the history, you should ask the patient such questions as : " Can you move your limbs ? " " Which is the most painful spot ? " " Are you hurt in several places and if so which " are they and which is the worst ? " Then the limb is examined, and to do this properly the clothing should be very gently removed from the part. It is best to cut this off by cutting the stitches of the seams. Many authorities advise that in First Aid the clothing should not be removed, but if only great care be taken to support the limb it is probably best to obtain a full view of the part. In handling a limb supposed to be broken you should spread out your two hands as broadly as possible, so as to grip a large area of the limb and the grip should be firm and steady and situated at and around the probable seat of the fracture. It is also advisable to obtain the help of one or two reliable onlookers and direct them to support the remainder of the limb, bearing in mind to move the limb as little as possible and to remove the clothing if possible without lifting the part at all or scarcely at all off the ground. You should now have a good

look at the injury while the patient lies before you. Do not think that you must at once begin to handle him. The following eight signs of fracture should be remembered and looked for. These eight signs are :—

1. Loss of power.
2. Pain.
3. Deformity.
4. Shortening.
5. Swelling.
6. Irregularity.
7. Unnatural mobility.
8. Bony grating.

Learn them off by heart even if you do not now understand them; you will later learn their meaning. You must remember that no one of these signs is conclusive proof of the presence of a fracture; but when several of them occur together—then they are of importance. In all cases of doubt always act as if the more serious thing had happened. It is always wise to be on the safe side in First Aid. An instance of this may be mentioned. A medical officer was called to a merchant ship one evening in a foreign port

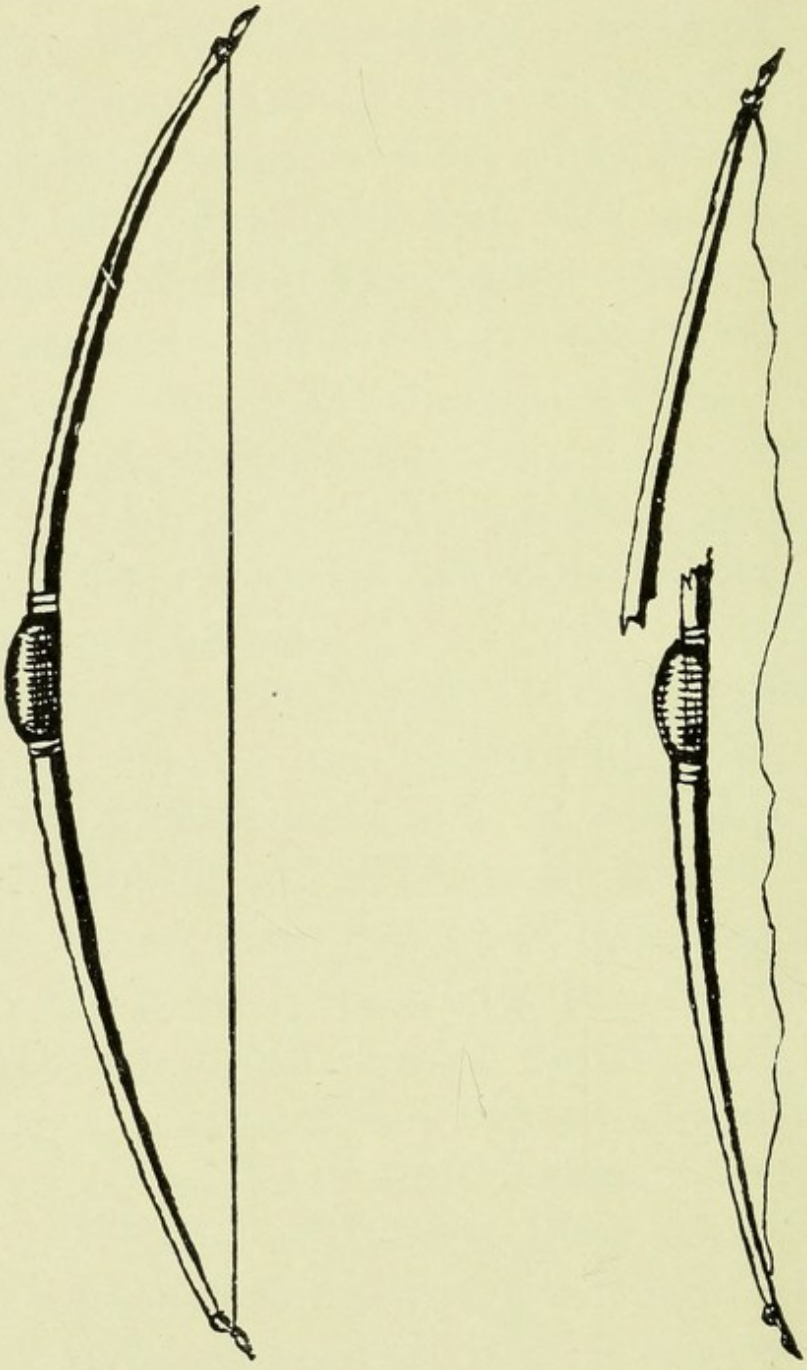
to see a man who had, whilst fighting, fallen from a height of about 12 feet on to the back of his neck. The patient was unconscious, and as he might have broken his neck, and moving him might have led to crushing of the spinal cord, with instantaneous death, the medical officer gave orders that until the patient recovered consciousness, treatment should be carried out as if the more serious accident had occurred. Sandbags were placed round the head, neck, &c., so as to prevent all movement, an awning was rigged over the patient and the captain was told to keep the patient like that till the following day when the medical officer of the port should be sent for. Well, the man was only stunned; he recovered in a few hours and turned to, and the next day the ship sailed for England. The merchant skipper was fully convinced that the medical officer was an ignoramus, but as a matter of fact the treatment and precautions were perfectly correct, and the following companion story with its tragic ending will help to teach you a lesson which you will not forget:—A boat's crew went ashore to get sand. After getting sand they bathed, and one man dived into shallow water,

struck his head, and broke his neck. He was taken out of the water unconscious, carried to the railway station, thence 50 miles or so by train, then taken to a hospital, brought into the ward and put into bed still alive. A well-intentioned nurse then moved one of the pillows, the patient's head fell forward, and death was instantaneous. The spinal cord was crushed just as thoroughly as when a murderer is hanged.

To return now to the eight signs of fracture, it will help you to remember them if they are briefly explained.

1. "Loss of Power."—This must obviously happen when a bone is broken. The pain which occurs if the bone is moved will stop the patient from moving it. The tearing and bruising of the muscles and nerves and the internal bleeding will temporarily paralyze the part, and so also contribute to the loss of power, and lastly there is the mechanical loss of power due to the bone being all on the wobble instead of being rigid.

2. "Pain."—There is little to say about this. All injuries are painful, but it is remarkable how little pain there often is in a severe injury, and *vice versâ*.



SHORTENING IN FRACTURES.

3. "Deformity."—The limb can be seen or felt to be of a different shape from its fellow. It may be bent or twisted, or both. It is important to inquire if the two limbs were alike before the accident, for, of course, the limb may have been previously deformed.

4. "Shortening."—This is a very important sign of fracture, but not always easy to notice. Most careful measurements from very definite rigid points are required. The cause of the shortening may seem clear to you if the bone be compared to a bow and the muscles to a bow string. If the bow be broken, the tense string would at once pull the two pieces together so that they overlapped, as you see in the accompanying pictures.

5. "Swelling."—With every fracture there is bleeding in among the torn flesh round the broken ends of the bone. This, and the thickening which necessarily occurs with shortening, are chiefly responsible for the swelling.

6. "Irregularity."—If a bone lies so closely under the skin that it can be easily felt, as is the case with the shin-bone, then, if that bone be

broken and the fragments displaced, an irregularity will be easily felt on sliding the finger up and down the bone. Especially will this be noticed if the fellow limb be examined at the same time.

7. "Unnatural Mobility" explains itself. Mobility, such as bending or twisting, can only take place at the joints. If it takes place where there should be rigid bone, then that bone must be broken.

8. "Bony Grating."—The last sign of fracture is the gentle click which is felt, or, perhaps, even heard, when the broken ends of the bone are rubbed against one another. This causes much pain to the patient, so should not be repeated when once discovered, and, as it requires the experience of the surgeon to be sure of it, *it is not a sign that you should try for.* You would only be giving pain without doing good. To the surgeon it is the most sure sign of all.

Before leaving the signs of fracture you must be again reminded that, taken singly, they teach you little or nothing, but, when found combined, they surely tell you that the bone is broken.

Finally, you should bear in mind that there may be several fractures. You should therefore have a good general look round before you start your treatment, as otherwise you may be doing harm to one fracture while you are treating another.

(5) FIRST AID FOR FRACTURES.

Having then decided that you are probably, or even possibly, dealing with a fractured bone, you must proceed to apply First Aid. Remembering that your chief object is to *prevent a simple fracture from becoming compound*, your first aid is chiefly directed towards preventing any movement of the broken bone. With this in view, you do not allow the patient to be lifted or moved until the broken bone has been fixed on to some stiff object, such as a piece of board. This fixing is surgically called "splinting," and the stiff object used is the "splint." In nautical language it is called "fishing," and most of you have probably seen a broken spar fished by lashing on pieces of wood at the site of the break.

(6) SPLINTS.

In surgery light pieces of board are generally used, but you may not have such a splint available, in which case the natural resourceful ingenuity of the sailor will at once suggest to your mind many suitable things. The following list of extraordinary possibilities may be useful to you :—

1. Rifle.
2. Bayonet.
3. Cutlass.
4. Sabre.
5. Scabbard.
6. Single-stick.
7. Rocket stick.
8. A bundle of twigs, *e.g.*, a birch.
9. Various tools, *e.g.*, hammer, tenon saw, foot rule, spanner.
10. Broom handle.
11. Shovels.
12. Any metal rod or bundle of rods, *e.g.*, stair rods.
13. Straw cases for bottles, stuffed one inside the other.

14. Metal pipes, *e.g.*, water spouts, small boiler tubes, &c.
15. Bamboo of various sizes and lengths makes excellent material for splints.
16. Newspapers wrapped up as they are when they come by post.
17. Cardboard, *e.g.*, covers of books, corrugated packing paper, old boxes.
18. Leather, *e.g.*, a flattened stiff sea boot, short lengths of stiff leather hose.
19. Linoleum wrapped round the padded limb.
20. Corticene in strips, several thicknesses being used.
21. Strips of tin, zinc, or other stiff metal, perforated or otherwise.
22. An old tin can may be flattened out and used as a splint.
23. Wire netting wrapped up to suitable thickness.
24. Ruler.
25. A stocking tightly filled with sand, earth, hay, chaff, or paper, and securely tied up.
26. A pillow firmly wrapped round the broken limb will act as a fair splint.

27. Sandbags laid alongside the limb make very comfortable splints.
28. Slates or other flat stones of suitable shape.
29. Expanding cover for flower pots.
30. Long thin stiff books of suitable shape.
31. Boat's stretchers, boat hooks, or other light spars.
32. Gratings.
33. Bottom boards.
34. Gunwales.
35. Cask stave.
36. Telescope.
37. Stiffened felt, *e.g.*, an old top hat.
38. Basket work, *e.g.*, a lid of a hamper.
39. Laths of a bedstead.
40. Stiff gaiters, especially patent leather ones.
41. Telegraph wire can be bent into various shaped frames.
42. Paper knife.
43. Tightly rolled up canvas or carpet.

Remember that your choice should be made of something stiff, light, and flat, with bevelled square edges and sides—in fact, as much as

possible like a surgeon's wooden splint. For a medium-sized man (5 ft. 7 ins.) the following sizes of splints are a fair average :—

Broken thigh - -	Side of body and lower limb, from armpit to below foot, 53 ins. × 6 ins.
Broken knee-cap -	Back of lower limb, from just below buttock to just above heel, 26 ins. × 7 ins. (upper end), and 4 ins. (lower end).
Broken leg between knee and ankle -	Ditto.
Ditto -	Side of leg, from knee to below foot, 18 ins. × 5 ins.
Broken ankle -	Ditto.
Broken upper arm -	$7\frac{1}{2}$ ins. × 4 ins.
Broken fore-arm -	16 ins. × 5 ins.
Broken wrist - -	Ditto.
Broken hand and fingers - -	Ditto.

The thickness of the wood should be about $\frac{1}{4}$ in. for the shorter splints and $\frac{1}{2}$ in. for the

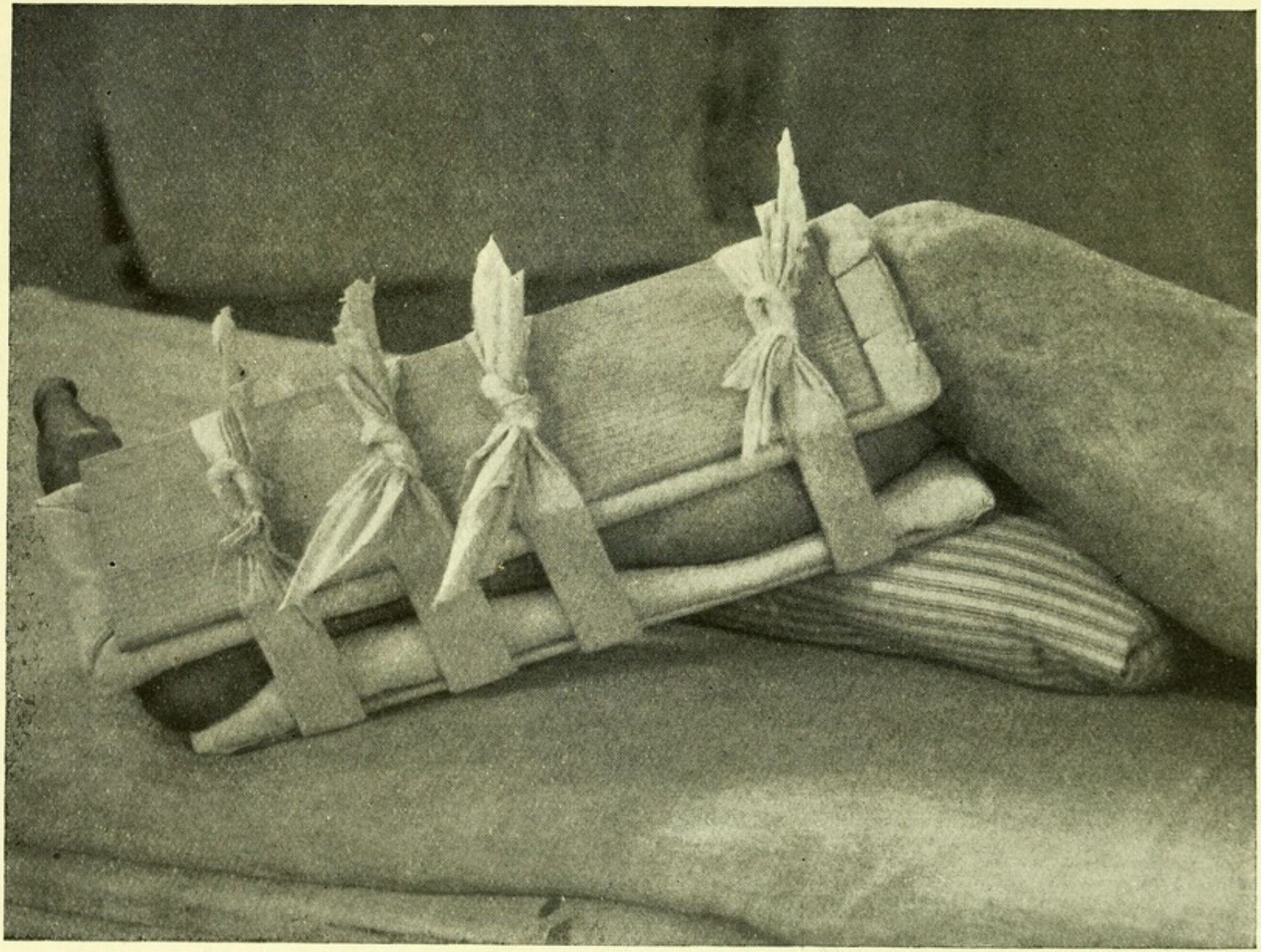
longer splints. (N.B.—On the cover of this book will be found a 4-in. scale.)

As additional security, or if no suitable splints can be obtained, you must know that very good First Aid treatment for all fractures may be obtained by securely binding the patient to a stretcher with a sheet wrapped completely round him and the stretcher and fixing it with stout pins.

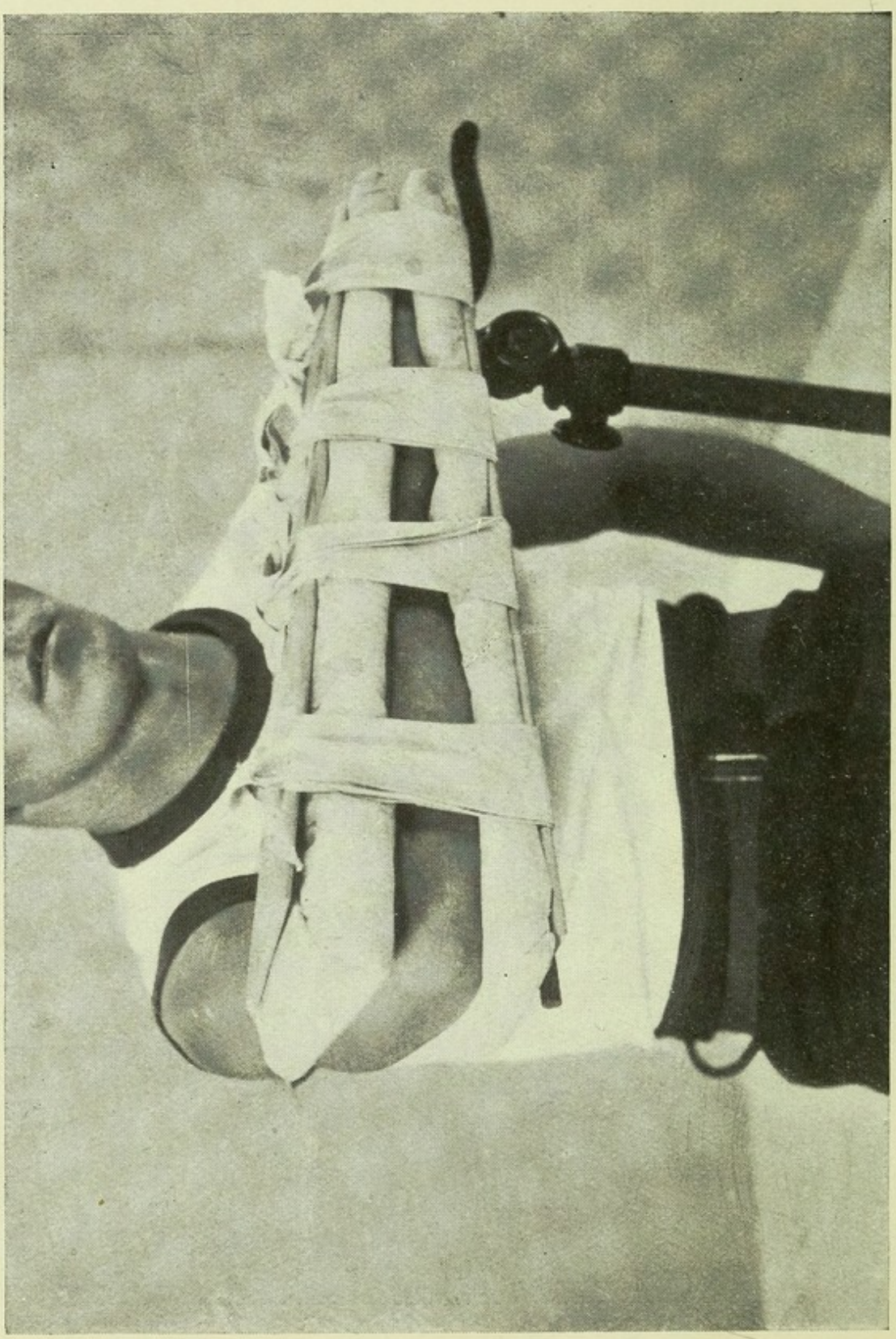
Besides applying a splint, an excellent plan in the case of a fractured lower limb is to tie the two limbs together, so as to make the sound one act as a splint for the injured one. So also, if the fracture be in the upper limb, bind it to the side of the body.

(7) HOW TO APPLY A SPLINT.

Now as regards applying the splint, surgeons have to observe many very important rules. This is not so necessary for you, as yours is only First Aid and is not going to last. In a few hours your apparatus will be changed by the surgeon, the broken bones will be set in their proper position, and permanent splints will be



SURGICAL SPLINTS APPLIED.



SURGICAL SPLINTS APPLIED.

applied. Still, if you have choice of materials and plenty of time, you should aim at making as good a job as possible. The pictures on pages 35 and 36 have been drawn from actual cases.

The splint should be well padded, so as to prevent the ill effects of possibly too tight bandaging. If a hard substance be pressed against the skin for a long time it will cause a sore place, a "splint sore," most difficult to heal. Tow or cotton wool are generally used for padding a splint. You could wrap some clothes round the splint, or a handful or two of straw could be used.

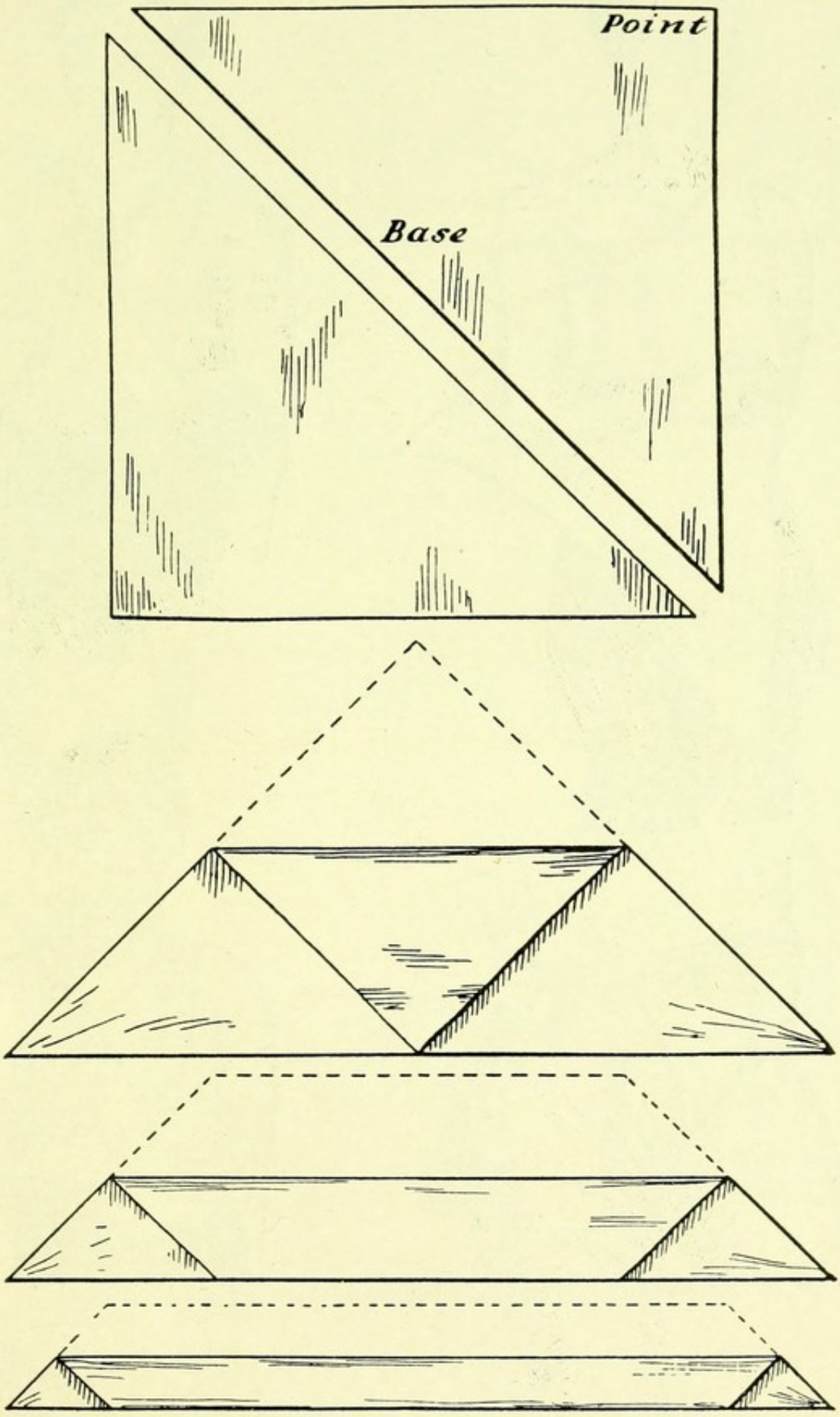
The splint should be too long rather than too short; a long splint gives you a better purchase for fixing the broken bone. A rule in surgery is to fix, if possible, the joint above and below the fracture. For example, in a broken shin-bone both the knee and the ankle joints should be prevented from moving.

The splint should be too broad rather than too narrow. This prevents stoppage of the circulation from too tight bandaging, as it leaves an angle on either side where the bandage cannot press on the limb.

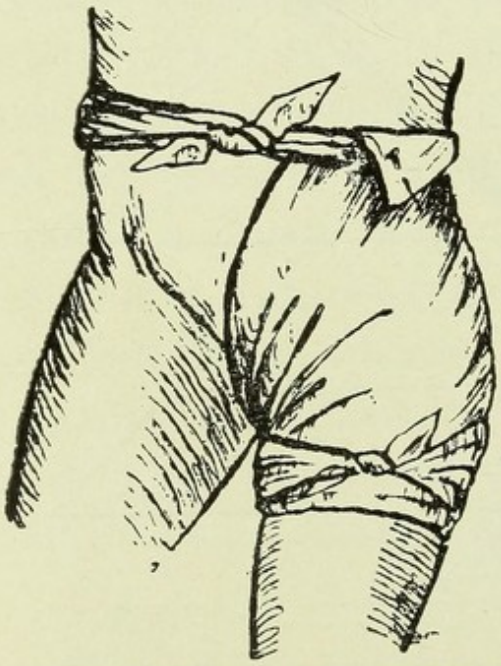
The clothes having been removed with great care, the splint or splints are laid along the limb and bound by handkerchiefs or other forms of bandage. Remember that the most important places to apply binders are at the extreme ends of the splint and immediately above and below the position of the fracture. The exact position, however, of the fracture is often not known, even to experienced surgeons; it is best, therefore, for you to apply as many binders as possible, remembering that the more you apply, the less tightly need they be tied.

(8) TRIANGULAR BANDAGE.

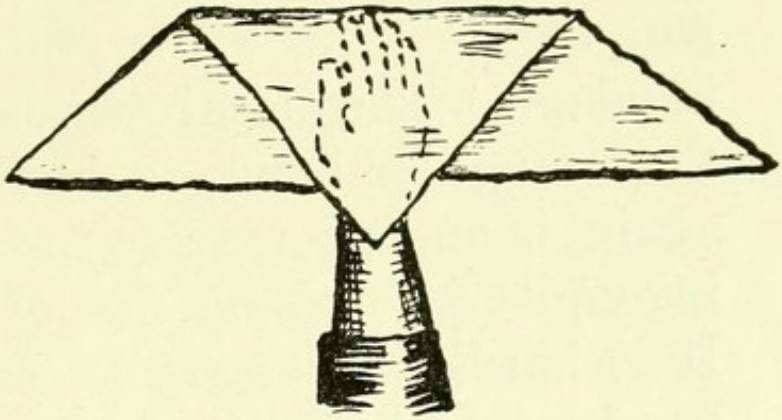
The usual bandage for First Aid is the triangular bandage. It is made by taking a piece of strong material, such as unbleached calico, 40 ins. square, and cutting it diagonally, thus making two triangular bandages. Some of these are sold with very instructive pictures on them showing various ways in which they may be used. For fastening splints, it is best to fold them into broad or narrow bandages by bringing the point to the centre of the base and then folding once or twice more. The bandage may also be

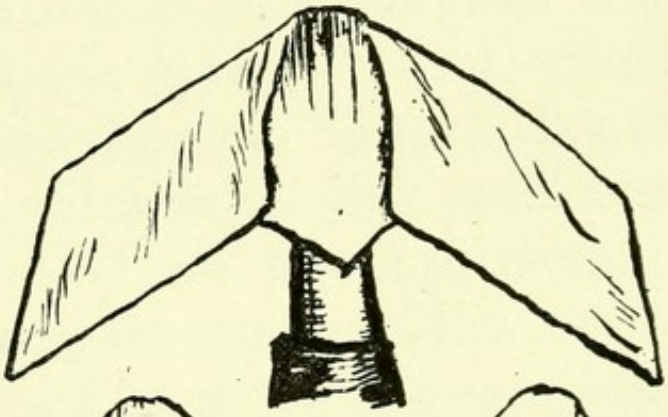


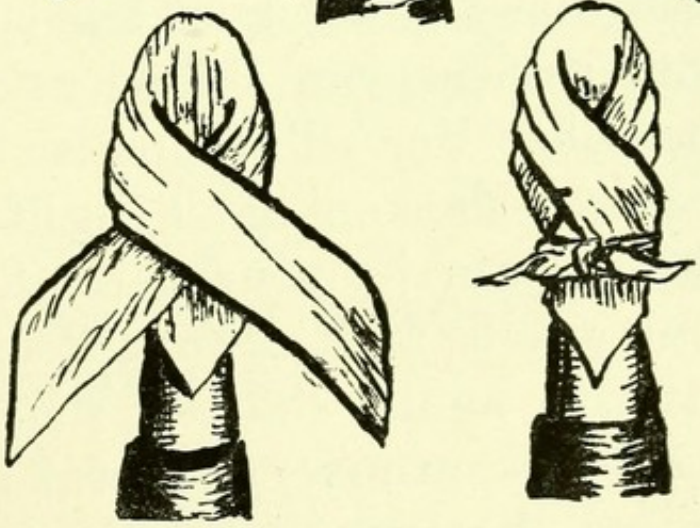
TRIANGULAR BANDAGE.



USES OF TRIANGULAR BANDAGE.







USES OF TRIANGULAR BANDAGE.

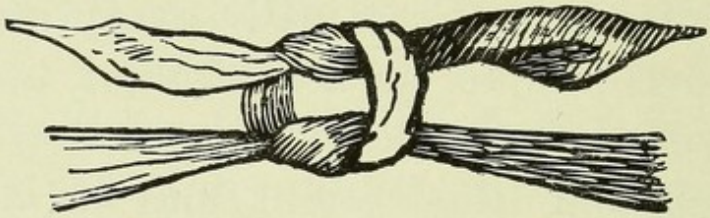
used as a broad or narrow sling. The accompanying pictures show you various uses of the bandage. The usual bandage for First Aid is the triangular bandage, but remember that here, again, is an opportunity for you to exercise your ingenuity in making use of anything available. It is hardly necessary to explain that a broad band would be preferable to a round cord, as it would cut less into the flesh. The sailor's black silk handkerchief, when folded, will do excellently for fastening a splint to a limb; any broad strip of clothing material, if fairly strong and long, will be suitable; a towel may be torn into strips; and no doubt many other alternatives will suggest themselves to your minds. And now, when you have finished bandaging your patient, you should ask him if he is comfortable. You will then discover if some bandage requires slackening or tightening. You should also remain by your patient, for later when the limb swells, as it always does, you will probably have to again slacken some of your binders. Sandbags are very useful and comfortable as splints, because with them no bandages are necessary.

(9) REEF KNOT.

In surgery it is very important to tie a knot that will not slip. A reef knot is therefore the one that is used. Practically every man in the Navy knows how to tie a reef knot, but in case any of you do not know, the following short description and illustrations may be useful. A single knot is first tied, and then the loose ends are brought to cross one another again. If you cross them in the right way, a reef knot is tied; if in the wrong way, a "granny" knot is tied. The right way is to cross them so that each end lies alongside its own part of the single knot (*see* illustrations). If anyone is uncertain as to whether he can tie a reef knot, let him practise until he is certain, because only practice can teach him.

(10) FIRST AID FOR SPECIAL FRACTURES.

The treatment of certain special fractures which do not allow of splints being applied to them, must now be described.

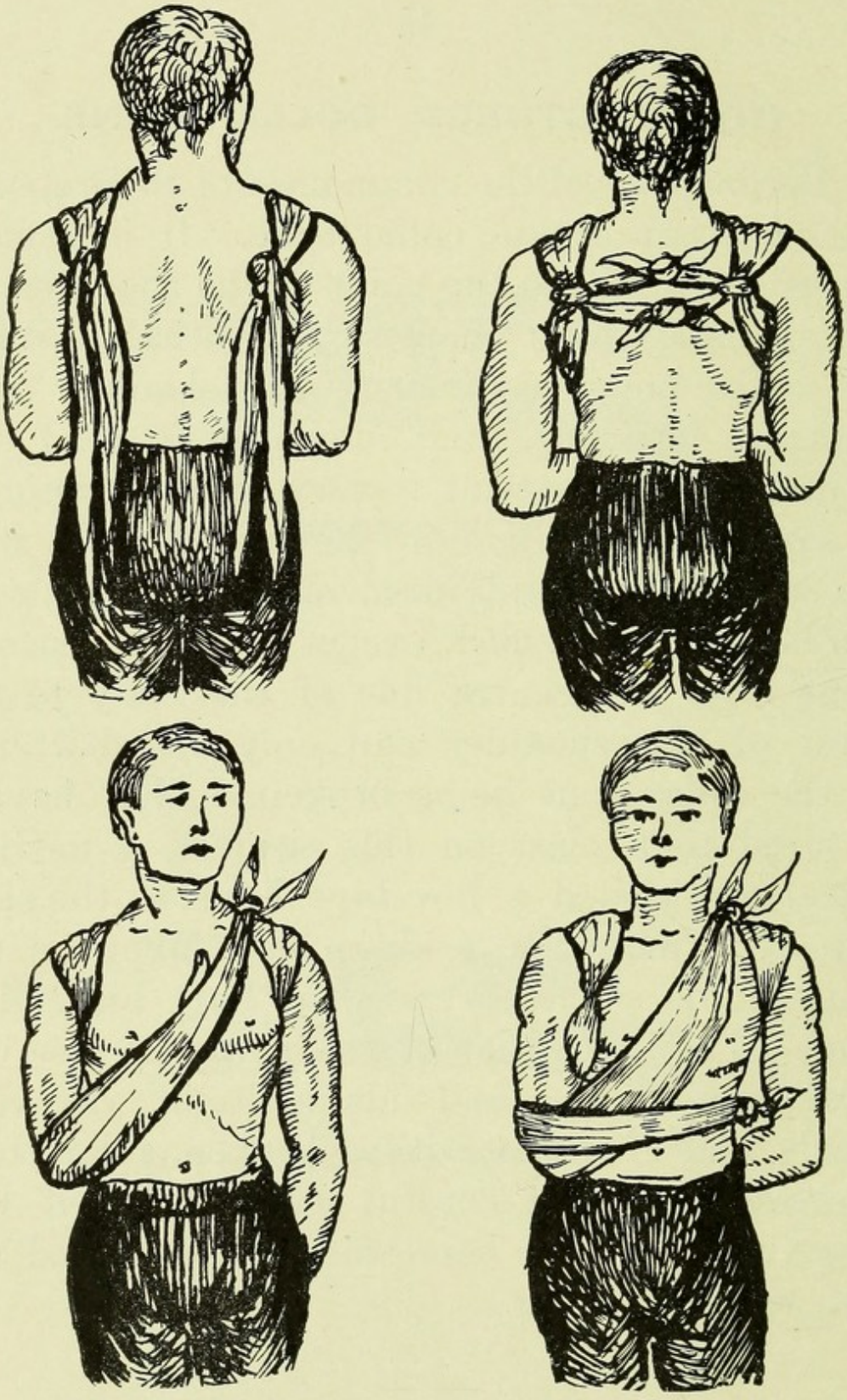


REEF-KNOT.

GRANNY-KNOT.

(11) FRACTURED COLLAR-BONE.

Perhaps one of the commonest of these special fractures is a broken collar-bone. It is usually caused by a fall on the point of the shoulder, as, for example, when charged at football. When the collar-bone is broken, the shoulder falls inwards, forwards, and downwards, and the attitude of the patient is very characteristic, as he supports the elbow of the injured side with the hand of the uninjured side. This attitude can be nearly assumed, except that the measurement from the centre line of the body to the point of the shoulder can only be shortened by the collar-bone being broken. After having lectured to a class on this subject, a medical officer was visited a few days later in the sick-bay by a man who said he had fallen on the point of his shoulder and had hurt his collar-bone. The expression of the patient's face was most woe-begone, and his attitude was very nearly that of a man with a broken collar-bone. However, on most careful examination it was discovered that the bone was uninjured and the man was shamming.



THREE HANDKERCHIEF METHOD FOR BROKEN COLLAR-BONE.

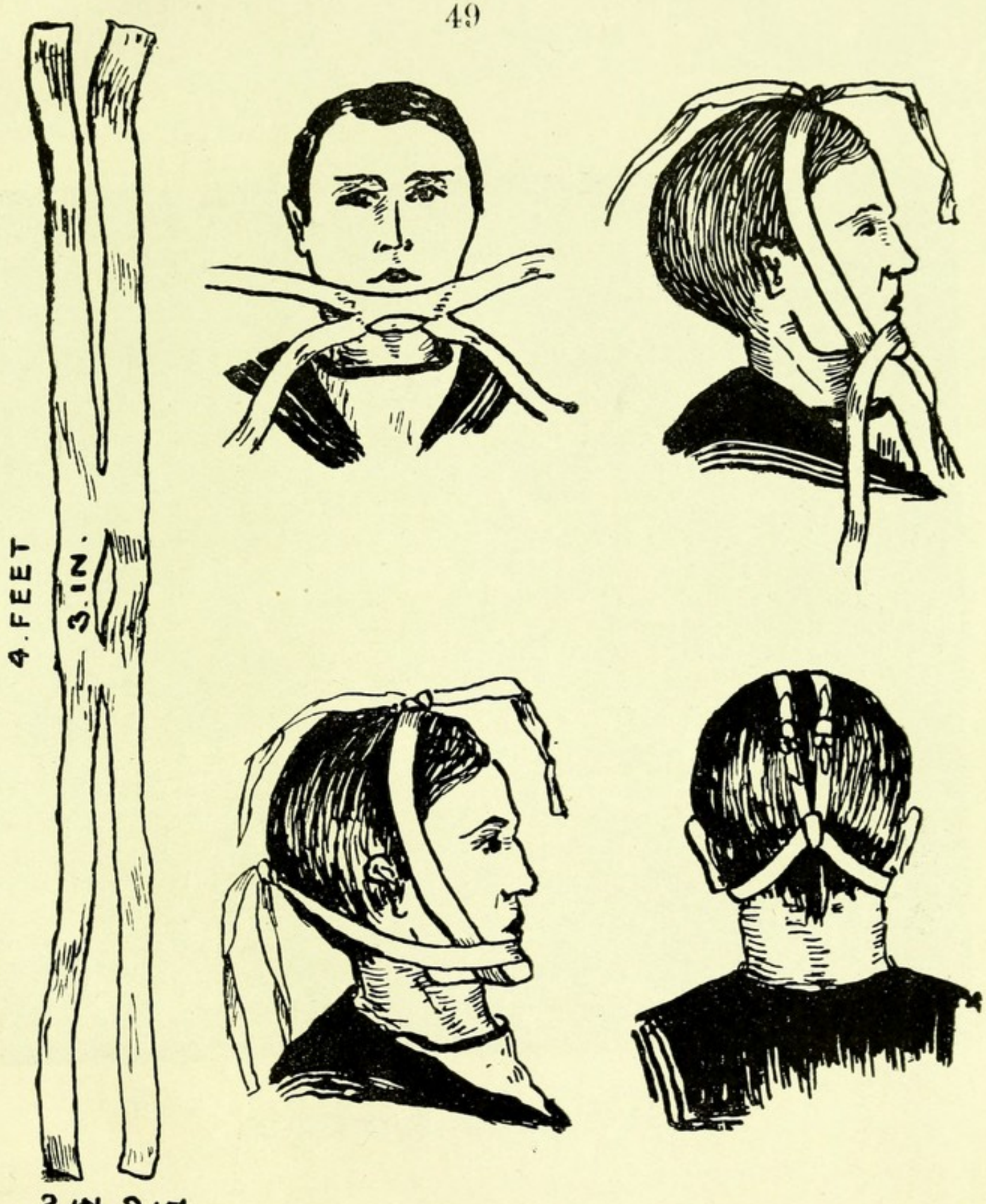
The treatment for a broken collar-bone is various. If the patient be laid flat on his back on a hard flat board and kept as still as possible, the shoulder will fall back into place, and this is sometimes very good treatment; but the best for you to apply in First Aid is what is known as the "Three Handkerchief Method." Take three triangular bandages and fold them so as to make broad bandages; tie one loosely round each shoulder with the knot just behind the shoulder (*see* illustrations). Then, while you put your knee against the patient's backbone, you firmly pull both his shoulders backwards and an assistant ties the four ends of the two handkerchiefs together. The third folded handkerchief is then used for lifting the shoulder by pressing the elbow upwards. This is done by placing the hand of the injured side on the opposite shoulder, placing the centre of the bandage on the point of the elbow of the injured side and taking it obliquely across the front and back of the chest to the sound shoulder, where it is tied, while an assistant presses the elbow well up, and forward. To make a more *permanent* job of it, it is well to fold a handkerchief into a pad about

the size of your fist and put it into the armpit of the injured side and, after applying the three bandages, take one more and use it for binding the arm to the side, passing it around the body and arm just above the level of the elbow (*see* illustrations).

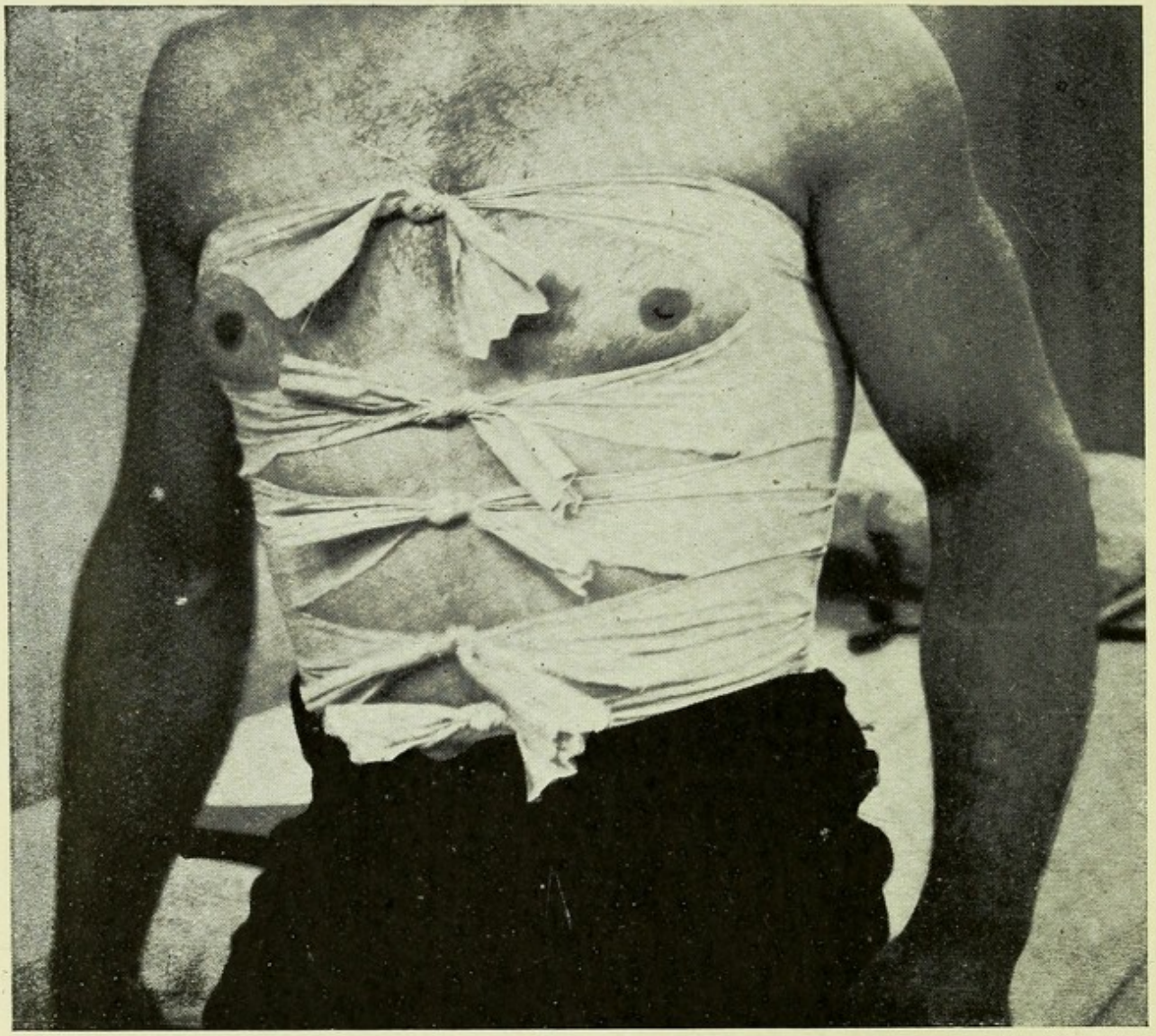
(12) FRACTURED LOWER JAW.

A broken lower jaw is another case for special treatment. This bone is usually broken about midway between the point of the chin and the angle of the jaw on one or both sides. A swing-hit at boxing often does it. For First Aid you simply tie the mouth shut so that the teeth of the lower jaw are pressed against the teeth of the upper jaw, thus using the latter as a splint. The best way to do this is with the four-tail bandage.

Take a piece of strong, unbleached calico (or similar material) 4 inches broad and 4 feet long. Make a slit in the centre for the point of the chin to just come through ; tear each end into two nearly up to the central slit, you thus have four ends (*see* illustration). Then apply it



FOUR-TAILED BANDAGE FOR BROKEN LOWER JAW



MANY-TAILED BANDAGE.

as follows:—Put the point of the chin through the central slit. Take the *lower* two ends and carry them vertically up the sides of the face and tie them tightly well in front of the highest part of the head; then take the *upper* two ends and carry them horizontally round to the back of the head and tie them well below the most prominent part of the back of the head. Then tie the two ends from the back to the two ends from the top, an assistant at the same time firmly pressing the lower jaw up to the upper jaw (*see* illustrations).

(13) FRACTURED RIBS.

This is one of those accidents in which you will often have much uncertainty as to whether there is a fracture or not. Fractured ribs are often overlooked. Therefore, whenever a patient has had an injury of the chest followed by a severe stabbing pain whenever he takes a deep breath, you should treat him as if his ribs were broken. The best First Aid treatment in these cases is to tie a broad binder, like a jack-towel, tightly round the body where the pain is, so that

the patient cannot breathe deeply. This usually instantaneously relieves him. A good form of binder to use is the " many-tailed bandage."

(14) THE MANY-TAILED BANDAGE.

This bandage may be described simply as a square or oblong piece of calico of suitable size torn at the sides into tails about 1 inch broad (varying according to size of the bandage). It is applied to the body or limbs so that the untorn part nearly envelopes the part and then the tails are tied or pinned together, beginning with the lowest ones. It is exceedingly simple and very efficient and is easily made and applied. It will do for any part of the body or limbs. The illustration shows it applied to a case of wound of the chest.

(15) FRACTURED SPINE.

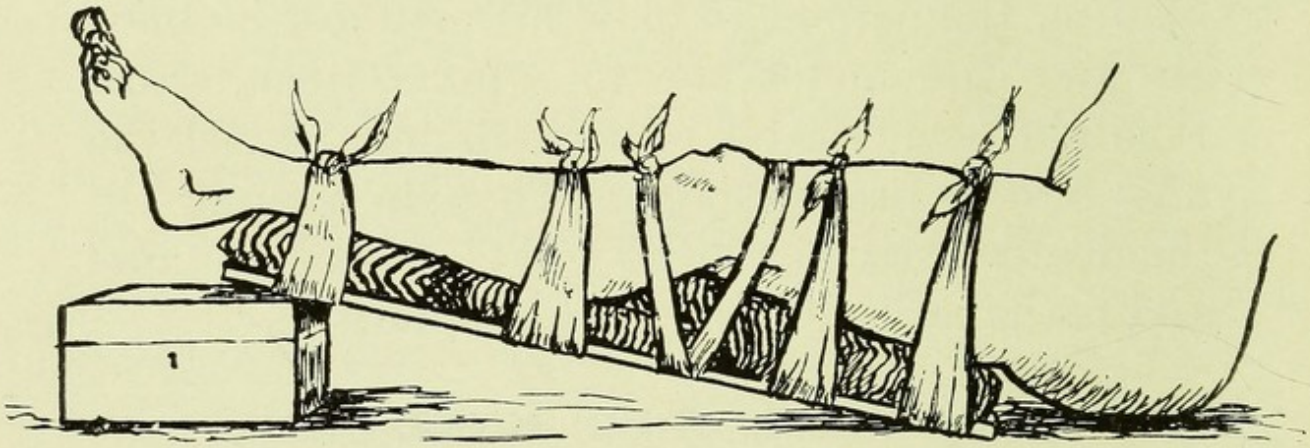
This accident has already been alluded to (*see* page 23). If such an injury be even suspected, it is your duty to do everything in your power to prevent the backbone from being moved. Sandbags round the head, neck, and body are good for this purpose.

(16) BROKEN NOSE.

A broken nose is often produced by a blow in boxing or fighting. The bones or the gristle or both may be broken. The pieces are generally displaced and the lining membrane of the nose is torn. There are, therefore, disfigurement and free bleeding. First Aid consists in strictly forbidding the patient to blow his nose lest he blow air and dirt under the torn lining membrane. It might be advisable to try to gently mould the nose into its proper shape. Then do nothing till the doctor arrives, and he will clean out the nose and perhaps apply some sort of splints.

(17) FRACTURED KNEE-CAP.

This accident is usually caused by a sudden action of the powerful muscles on the front of the thigh as when a person feels himself falling and makes a great effort to recover himself. That mischievous school-boy trick of rapping a person unexpectedly behind the knee when he is standing upright, has often caused a broken knee-cap. The bone is snapped straight across and a gap can be felt between the fragments. Every movement of the thigh is apt to tear the



TREATMENT FOR BROKEN KNEE-CAP.

parts more apart, so First Aid should be prompt. The lameness following this accident often lasts a lifetime and may be much diminished by well-directed First Aid. The limb must be kept straight and the heel supported on a pillow, while the patient should partially sit up so as to slack away his thigh muscles. A broad splint should be applied to the back of the limb extending from just below the buttock to just above the heel. It must be very well padded and one or two soft pillows will serve this purpose very well. The splint is secured to the limb in the usual way and a folded triangular bandage is then laid across the front of the thigh just above the upper fragment of the knee-cap, brought round to the back of the splint, crossed and then brought forward and tied just below the lower fragment while an assistant tries to bring the fragments together (*see* illustration). If an icebag be procurable, it should be laid on the knee to limit the swelling.

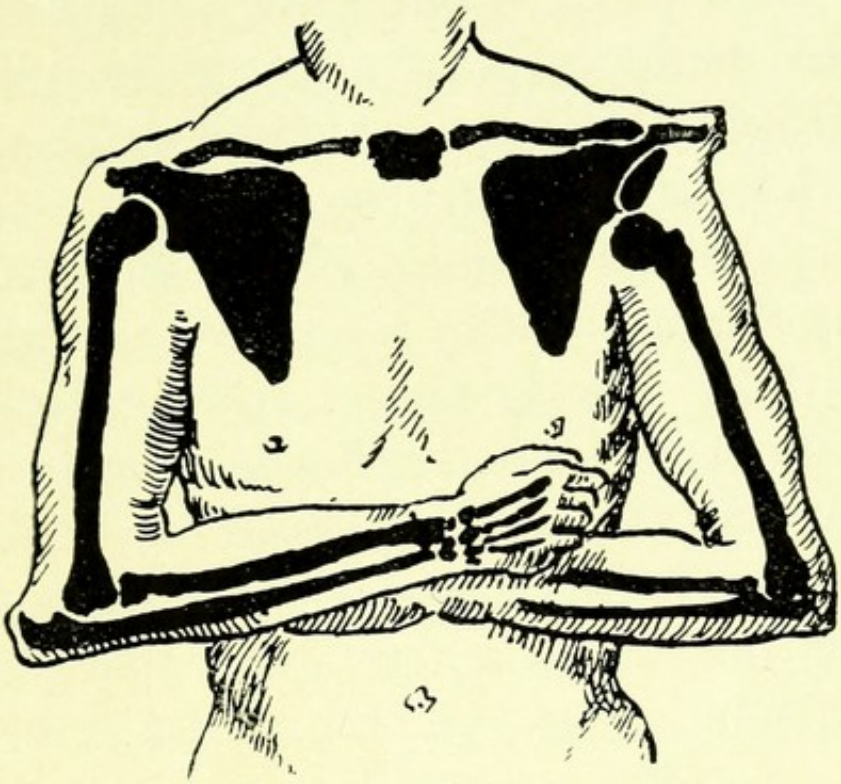
(18) DISLOCATIONS.

It is almost impossible for anyone except a doctor to distinguish between a dislocation and

a fracture. Remember that the two accidents may happen at the same time. A dislocation is the slipping of a bone out of its socket, and the pain is usually great and the joint cannot be moved. The shoulder is the commonest joint to be dislocated. The diagram illustrates dislocations of the shoulder and elbow. The most important thing is to get a doctor as soon as possible, because the longer the bone is out the more difficult it is to get it in again. While waiting for the doctor, just fix the injured part as you would a fracture, only choose the position which is most comfortable to the patient. On no account try to put the bone in yourself, as you may do great damage, and only a doctor can reduce a dislocation safely.

(19) BRUISES.

A bruise or contusion is due to an injury causing bleeding underneath the skin. The colour of a bruise is due to the blood which has collected there. The First Aid treatment of a bruise is to stop the bleeding and therefore consists in keeping the part elevated and at rest, a



DISLOCATIONS.

Right Elbow. Left Shoulder.

splint often being necessary for this purpose. An ice-bag, if available, should also be applied, or a cloth wetted with spirit and water, laid on the part and left uncovered so that evaporation can take place. In a few days when the blood has clotted, it can be made to clear away more quickly by gentle rubbing of the part with clean hands, soreness of the skin being prevented by using some lubricant, such as Fuller's earth, or a little clean olive oil. Some slight bruises, such as a black eye, are best left entirely alone. Severe bruises, as when a man passes blood in his urine after a severe kidney punch at boxing, should be attended to by a doctor. The stiffness which follows a bruise is largely due to the amount of bleeding and is therefore much lessened by well-directed First Aid.

(20) SPRAINS AND STRAINS.

These common accidents are due to tearing of the muscles, joints, &c., and may be very complicated and caused in a variety of ways. They are always accompanied by deep bleeding into the parts and are often followed by much dis-

abling. In fact it is truly said that a bad sprain takes longer to get well than a broken bone. The First Aid treatment is much the same as that given for bruises, namely, rest of the part, a splint being usually necessary. It is of the utmost importance that the patient shall not attempt to move the part or bear his weight on it. It is not uncommon to find an ignorant person trying to "walk off" a sprained ankle. Gentle rubbing should be begun at the end of the first day, the part being fixed on the splint again after each rubbing.

A special form of strain is a "rupture" or "hernia." This usually consists of a piece of the bowel being forced out of the belly under the skin towards the testicle, and some people are specially liable to it. Sudden straining of the belly may cause it and the patient feels a pain about his groin and may notice a lump there. He should report this to the doctor at once as it may be very serious; besides a Hurt Certificate can only be granted if the accident be reported at once. First Aid for a rupture consists in laying the man down on his back,

bending the knee on the affected side, and then gently and steadily pressing the whole swelling upwards. The piece of bowel will be felt to slip back with a gurgle and you should then apply a pad to the part to prevent the rupture returning. If you are unsuccessful, no violence should be used, but the man should be placed in a hot bath and then gentle pressure again tried. If a doctor can be obtained within a few hours no First Aid treatment should be attempted as it is always rather dangerous in unskilled hands.

In conclusion, the following hints are useful in the treatment of sprains and bruises and even fractures :—

(*a*) When the injury is recent, the parts should be rested and wrapped in a thick layer of cotton-wool and bandaged. All bandaging should be done from below up, *i.e.*, from the foot towards the groin and from the hand towards the shoulder, and it should not be tight.

(*b*) When the injury is old and the parts are stiff, gentle rubbing should be em-

ployed. The rubbing of a limb should always be upwards, *i.e.*, towards the body. The rubbing should be gentle and should be continued for five or ten minutes, rather than rough and of short duration.

(*c*) "Every kind of pain is best borne lying down."

SECOND LECTURE.

(1) CIRCULATION OF THE BLOOD.

To understand bleeding, you must know something of the circulation of the blood. The blood is a red fluid. It takes nourishment to every part of the body and brings back used-up stuff, just as the tug brings coal-lighters to a ship and tows away the ash-boat. It also distributes heat throughout the body very similarly to the heating of a house by hot-water pipes. The blood travels round the body in tubes or pipes as fresh water is taken round a ship in pipes. These tubes are called "blood-vessels."

(2) HEART.

The blood is driven through the blood-vessels by the heart, which is nothing more than a pump. The best way to think of the heart is as of a hollow indiarubber ball about the size of

your fist. If you take a hollow rubber ball with a little hole in it and squeeze it, the air in the ball is forced out through the hole. If now you hold the ball under water and let it expand, it will fill with water which enters by the little hole. Then if you take the ball out and squeeze it, a jet of water will spurt out of the hole. You have probably all done this when you were little boys. Well, the heart sucks blood into its cavity and then forces it out again in something like the same manner. The heart beats about seventy times a minute, and at each beat blood is driven along the blood-vessels. Then, as the heart expands again, other blood runs into it, ready to be driven on at the next beat. The machinery of the heart is really rather complicated, but it is quite sufficient for you to know that it is a double pump, half of which receives pure blood from the lungs and drives it all round the body, and the other half receives the blood back from the body, full of impurities, and then drives it into the lungs to be purified again. It may interest you to know that in the lifetime of a centenarian the heart beats over three thousand million times.

(3) BLOOD-VESSELS.

The blood-vessels are of three different kinds and some description of them is necessary, even if the subject seems rather uninteresting. Each of these three different kinds of blood-vessels has a special way of its own of bleeding when it is cut, and it is that you shall understand these three different kinds of bleeding that you must learn about the three different kinds of blood-vessels. The blood, as it leaves the heart, is carried along an elastic tube called an *artery*. This artery divides into branches, and the branches divide again and again until there are thousands of little arteries, just as a trunk of a tree divides and subdivides till there are thousands of little twigs. Then all these small arteries are continued into a network of minute, thin-walled blood-vessels, so minute that you require a powerful microscope to see them, as they are only about one two-thousandth ($\frac{1}{2000}$) of an inch in diameter. These minute blood-vessels are called the *capillaries*, and are found in every living part of the body, and it is through their thin walls that nourishment is given off from the blood to the different parts,

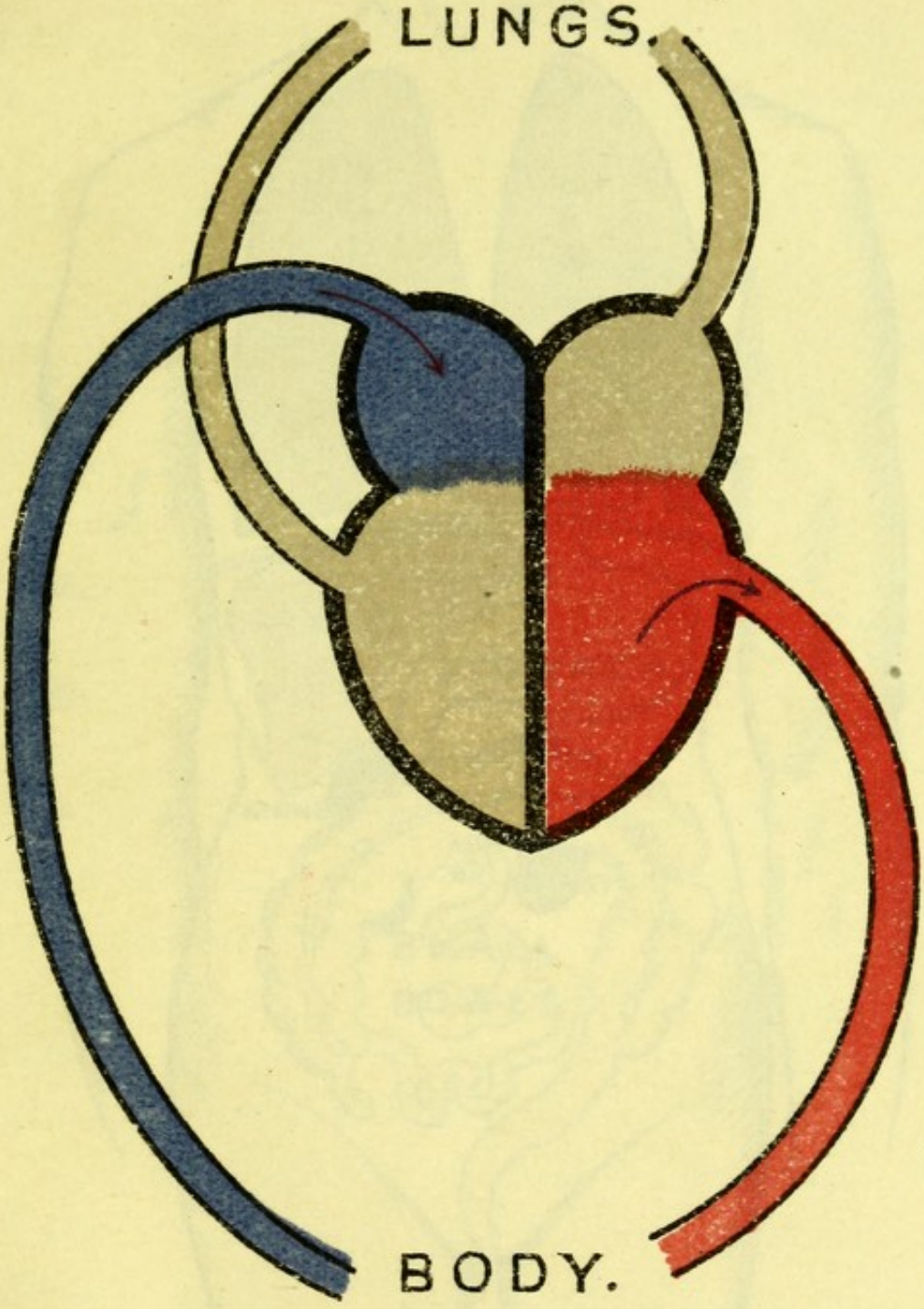
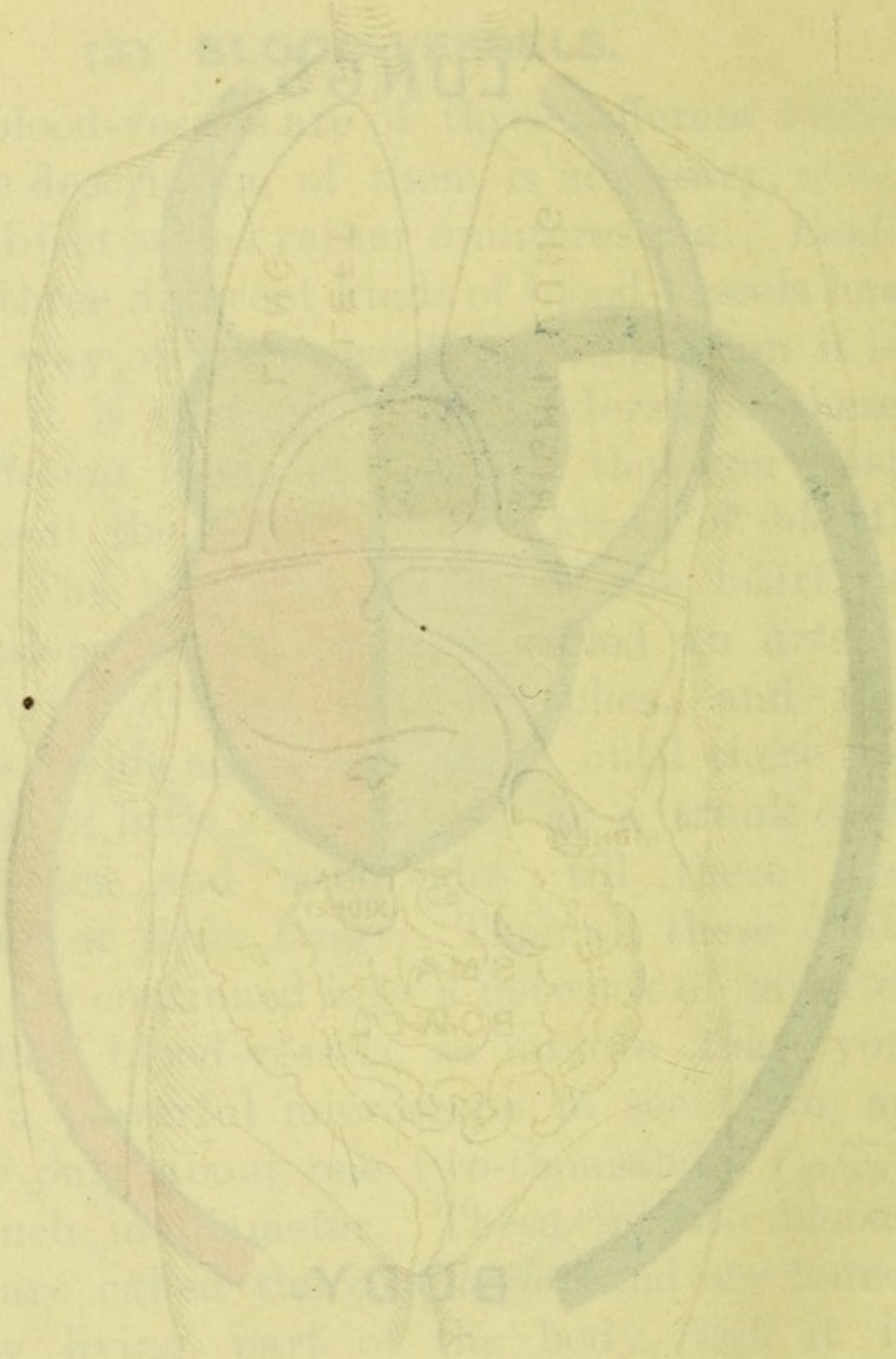


DIAGRAM OF CIRCULATION OF THE BLOOD.

Malby & Sons, Lith.



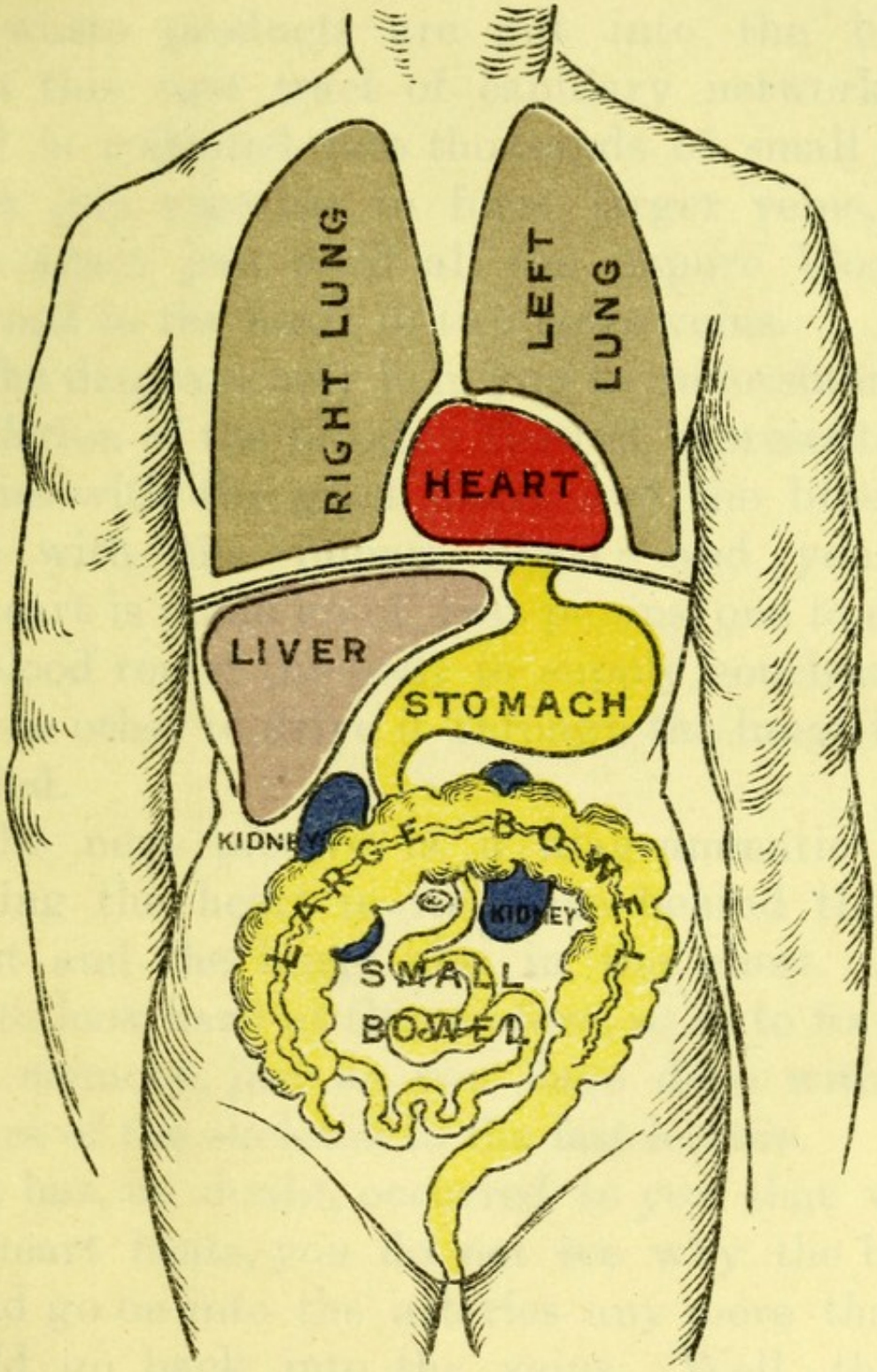
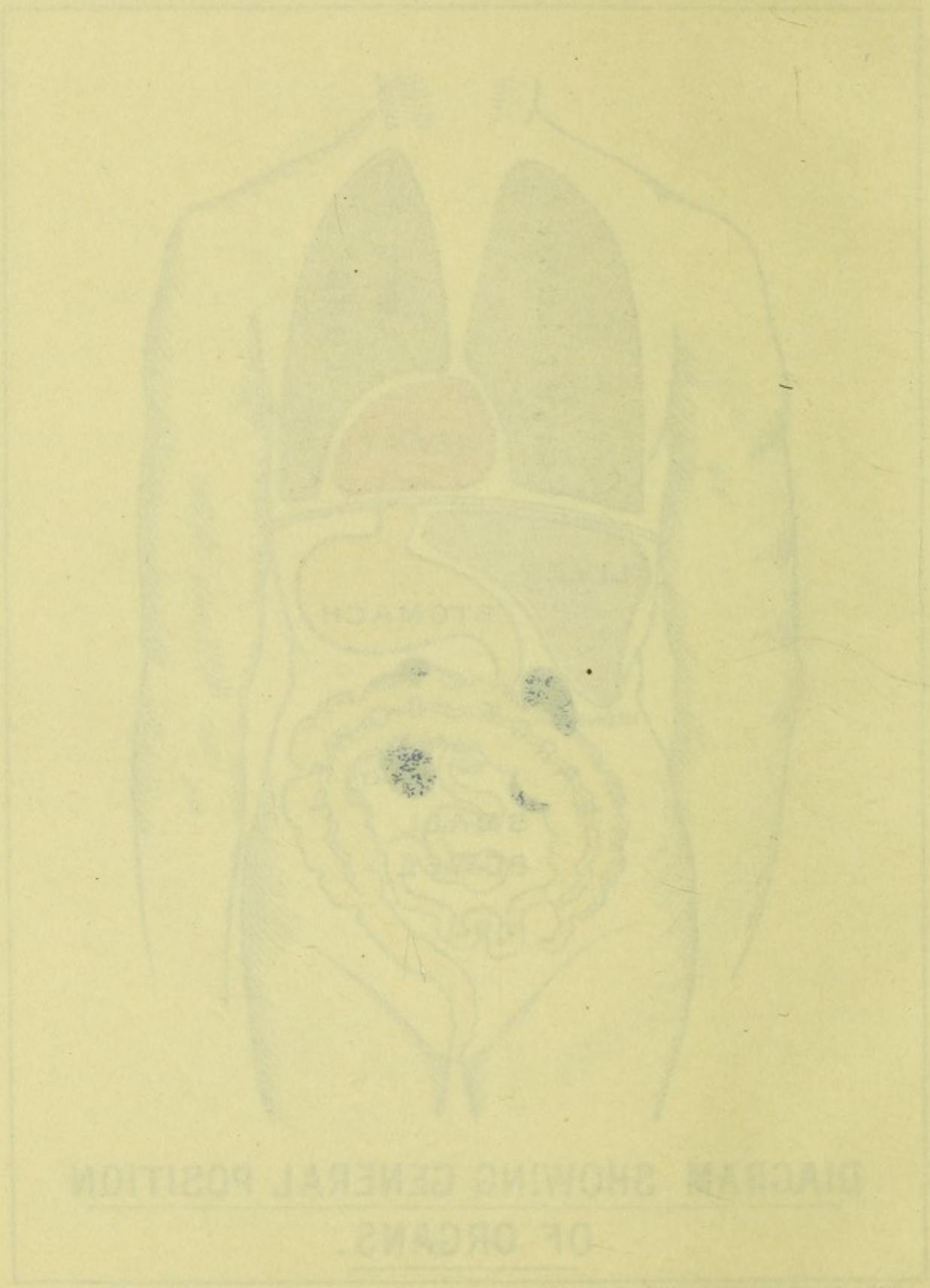


DIAGRAM SHOWING GENERAL POSITION OF ORGANS.

Malby & Sons, Lith.

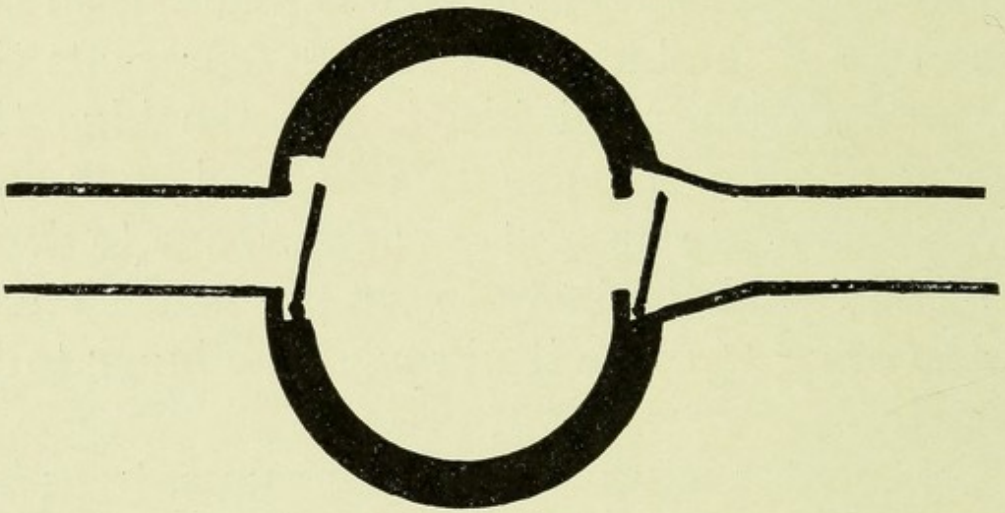


and waste products are put into the blood. From this vast tract of capillary network the blood is collected into thousands of small *veins* which join together to form larger veins, and these again join until all the impure blood is returned to the heart in two large veins.

The diagram may help you to understand the circulation of the blood. The red represents the arteries with the good blood, and the blue the veins with the impure blood; and you see the heart is made up of two pumps, one to drive the blood round the body to supply nourishment and the other to drive it through the lungs to be purified.

The next picture is a diagrammatic plan showing the heart in its place behind the left breast and the lungs also in the chest. It is well to look hard at this picture, so as to fix it in your memory, just as you have done with the picture of the skeleton in the last lecture.

It has, no doubt, occurred to you that when the heart beats, you do not see why the blood should go on into the arteries any more than it should go back into the veins. Well, this is arranged for by non-return valves. Some of



NON-RETURN VALVES.

you who have worked with engines will know what is meant by non-return valves. They are like doors which fit the doorways at the openings of the blood-vessels into the heart, and these doors are only capable of opening in one direction, so that, when blood is forced against them by the heart beat, some will open and some will shut, and that, when the beat is finished and the heart is expanding again, the blood cannot run back into it again from the arteries, because the door will shut, and only the blood from the veins will be let in. An illustration of a non-return valve is here given.

The arteries, veins, and capillaries are all rather different in character.

An *artery* is a thick-walled, rather hard tube, which remains gaping open when it is cut across, very much as one of those wire-cored garden hose-pipes will do.

A *vein* is a thin-walled, soft, flabby tube, as large or larger than its companion artery. It collapses when it is empty, just as a canvas fire-hose does.

A *capillary* is a microscopic tube which you can never see with the naked eye, but you must

understand that they are in millions all over the body. Wherever bleeding can occur there you will find capillaries.

(4) DIFFERENT KINDS OF BLEEDING.

Now, the bleeding which occurs from these three different kinds of blood-vessels is very important to understand and very important to be able to distinguish.

The most important, as it is the most dangerous, kind of bleeding is *arterial* bleeding—that is, the bleeding from an artery.

You recognise arterial bleeding by the fact that it comes in *spurts*. It also is usually more severe than venous or capillary bleeding, and the blood from an artery is usually "redder red" than the blood from a vein. You must not, however, expect to be always able to notice this difference of colour. If you look into a deep, clean-cut wound and wipe the blood away, you will very likely see one, or perhaps several spots where there is a regular throbbing or spurting of the flow of blood, and at these spots the blood looks a lighter red. At these spots arterial bleeding is taking place, and, if it is not

stopped, the patient may rapidly bleed to death. If a large artery be cut, such as the main artery in one of the limbs, the patient can bleed to death in a few minutes. Luckily, arterial bleeding is the rarest form, and you must not think that you are going to see it in every wound.

On the other hand, *capillary* bleeding is the commonest form. In fact, whenever there is a wound, there is capillary bleeding. If you scratch yourself, so as to just draw blood, the bleeding comes from capillaries. You might describe capillary bleeding as the "common, everyday, domestic bleeding." It is of little importance and usually stops soon and naturally. As arterial bleeding is recognised by its character of spurting, so capillary bleeding may be said to be characterised by *oozing*. This oozing, if over a sufficiently large area, may amount to quite a large amount of blood, and must not be taken too lightly, although, of course, not as seriously as arterial bleeding.

The third kind of bleeding is *venous*. This is not quite so serious as arterial, but is much graver than capillary bleeding. The blood *wells*

out, and is usually dark purplish-red in colour. If the vein be a large one, the bleeding is most alarming, but, as a vein is a thin-walled tube, the bleeding can usually be stopped fairly easily by well-directed pressure.

The most dangerous veins to be wounded are the large ones near the chest, such as the main vein in the arm-pit or the jugular vein in the neck. The reason of this is, that the bellows movements of the chest may suck air into the cut veins and so cause death by bubbles in the heart.

You now know the chief features of the three different kinds of bleeding; the *spurting arterial*, the *welling venous*, and the *oozing capillary*. All these often occur together, and often you will not be able to tell which is which. But the throbbing spurting of light-coloured blood is the one to look for and to take special care about.

(5) FIRST AID IN CASE OF ARTERIAL BLEEDING.

To stop arterial bleeding is, after all, the main point of this lecture; everyone should

therefore give his best and undivided attention to the following paragraph.

A short story may help to impress on you the importance of remembering this lecture. A few years ago, while the military authorities were carrying out some sort of gunnery practice at a certain port, a bullet accidently passed over a fishing-smack and hit the fisherman in the thigh. The main artery of the lower limb was cut clean through and he *bled to death.* The only other person in the smack was a boy. Now, if either the fisherman or the boy had read this lecture and understood it, that man's life could almost certainly have been saved. Either he himself or the boy could have applied "First Aid." If arterial bleeding be suspected, you must act rapidly and you must keep your head. Remove the clothing. Hold the wound open in a good light. The wound may be full of blood-clot, looking like a quivering mass of blackberry jelly. Scoop this out with your fingers, rapidly wipe away the blood, and if there be broken glass in the wound a hurried attempt may be made to remove it. You will now see the cut artery or its whereabouts. Then, before you

think of anything else, *press your finger on the bleeding spot.* This will stop any more blood being lost for the time being, and the patient's life is saved. You now have time to look round and make arrangements for some other method of pressing on the artery, for in a few minutes your finger will be tired. Again you must be reminded to keep your head. Be prompt and cool, and you can always save the patient from bleeding to death. This form of death is graphically described by Sir Eric Erichsen in the following words: "The patient falls down in "a state of syncope (*i.e.*, fainting), with a pale, "cold surface and lividity about the lips and "eyes, gasps a few times, sighs, is very restless, "and suffers convulsive movements of the limbs "before he expires."

(6) WATCHWORD OF SECOND LECTURE.

The first thing to do in arterial bleeding is summed up in the watchword of the second lecture: "*In arterial bleeding, press your finger on the bleeding spot.*"

It may be urged that if your finger be dirty you are endangering the patient by, perhaps,

poisoning the wound. You must take this risk. Better to poison the wound than let him die. You may be squeamish of hurting the patient, for arteries are peculiarly sensitive. But again, you must think only of averting death.

(7) A LACERATED ARTERY OFTEN DOES NOT BLEED.

The wall of an artery is made in such a manner that, if it be torn roughly across, it shreds out and tangles up in such a way that it blocks the opening of the torn vessel. For this reason there is generally no arterial bleeding in severe lacerated wounds as when a limb is torn from the body as occasionally happens in accidents with machinery.

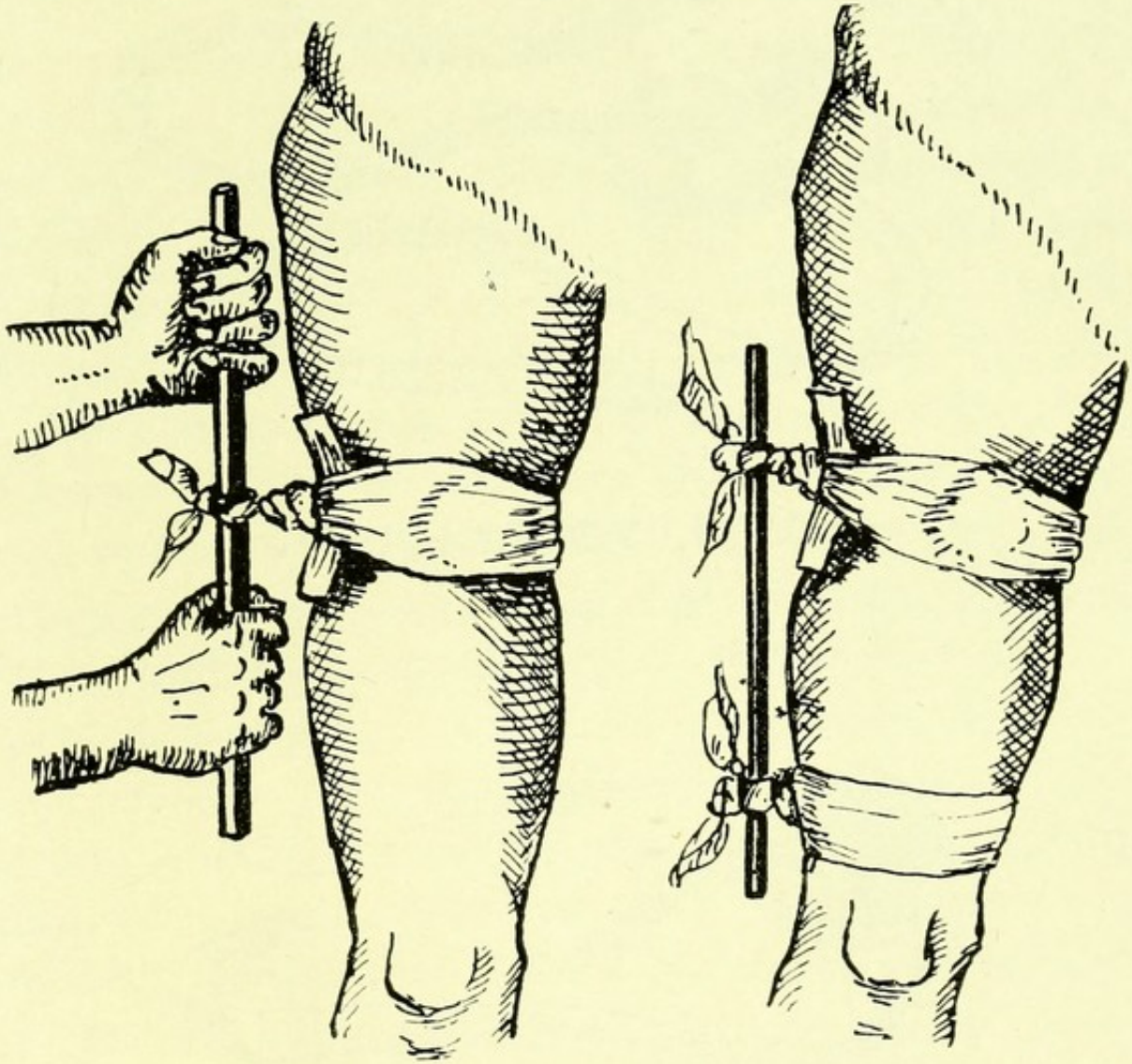
(8) TOURNIQUETS.

Having taken the first step, you must now make arrangements for putting something on the limb to cause pressure on the main artery. This is called indirect pressure in contradistinction to the direct pressure of the finger on the bleeding spot. The usual thing to suggest for

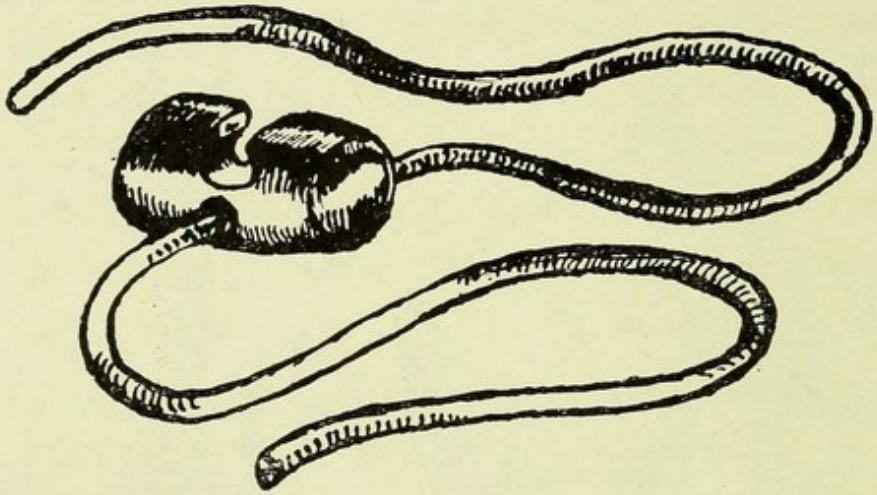
this indirect pressure is a strong handkerchief rolled up into a broad band and tied round the limb close to the body and screwed up with some sort of stick. The stick should be tied into the knot, a piece of card should be placed under the knot, so as to prevent nipping the skin, the stick should be twisted till the bleeding stops and then fixed by tying a second handkerchief round it and the limb. Most of you will recognise in this the Spanish windlass of nautical language (*see* illustrations).

If you have no handkerchief, use a strong strip of clothing, a necktie, a belt, a pair of braces or even a piece of cord or rope, but remember that you may cause mortification in this way, because, if you screw up the Spanish windlass tight enough to stop the arterial bleeding, you will also completely stop the circulation. The patient would lose his limb, yet, of course, this even would be better than letting him lose his life.

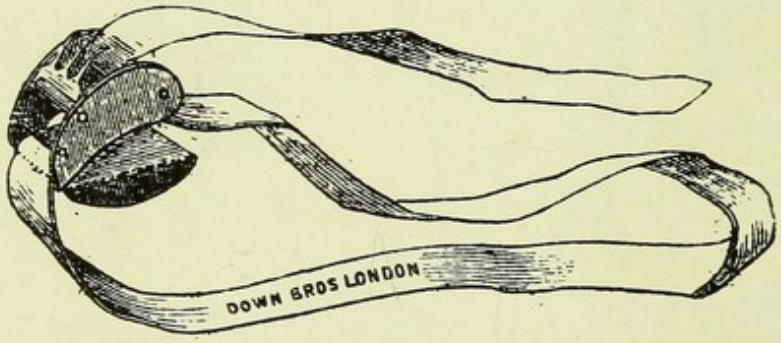
But a better plan is to apply a pad on the line of the main artery and then tie your band around this pad. This causes special pressure on



SPANISH WINDLASS.



NAVAL TOURNIQUET.



A GOOD SIMPLE TOURNIQUET.

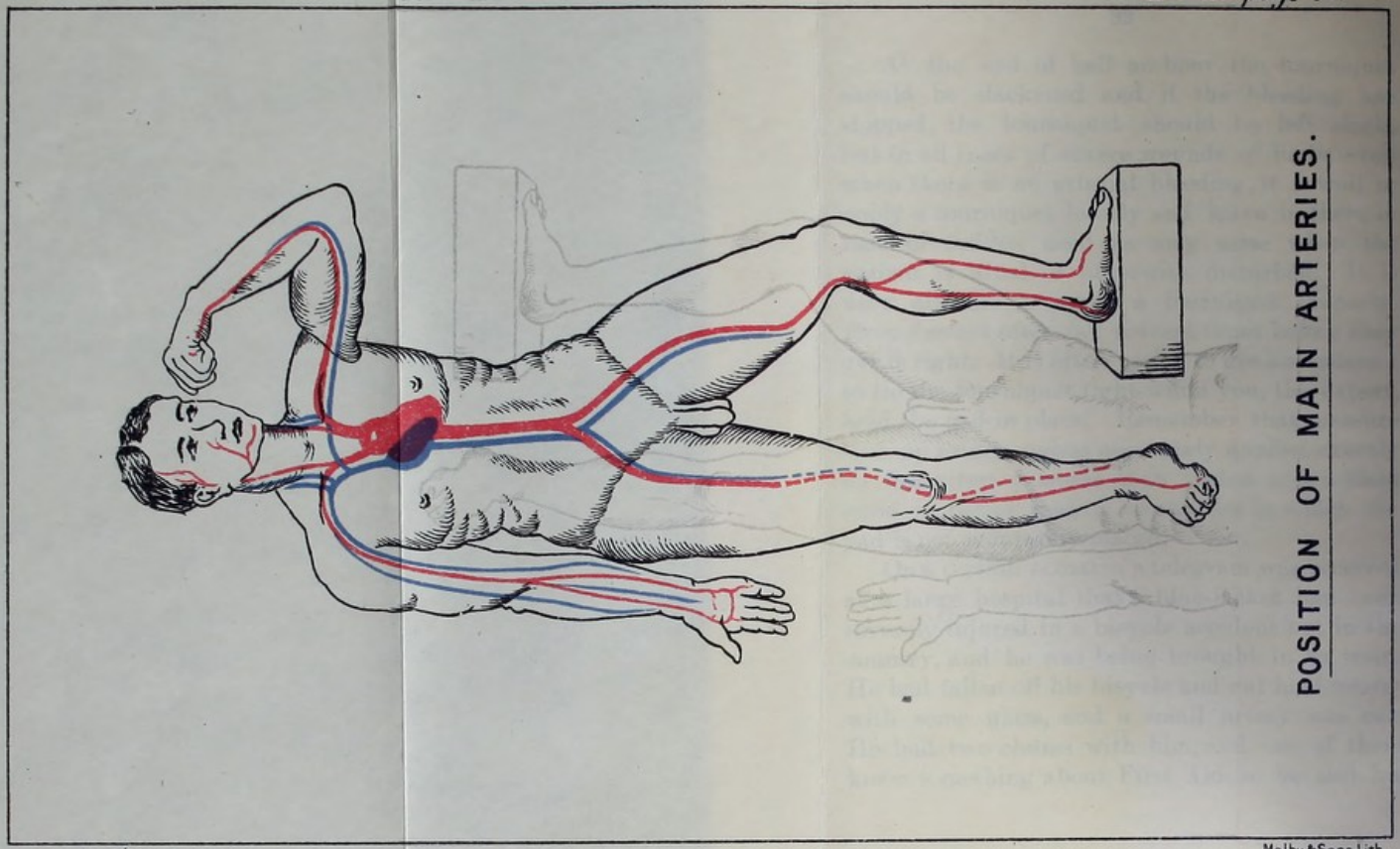
the main trunk of the artery, and so will stop the arterial bleeding, and yet will not entirely stop the circulation. Such a band with a pad is called a *tourniquet* and various kinds are made by instrument makers. The one used nowadays in the Navy consists of an indiarubber cord and a vulcanite pad. This pad may be found too small for some large limbs. It is well in such cases to place a second pad underneath it and a rolled-up bandage serves the purpose very well. On the back of the pad is a slot, and the rubber cord is secured by jamming it into this slot. In action you will always find one of these in each First Aid haversack. It is wise for you to practise using it. The accompanying illustration shows you the naval tourniquet. The second illustration is of a simple and very useful kind of First Aid tourniquet. It consists of a webbing strap and buckle and the pad is attached under the buckle. You can also make your own tourniquet by taking a stout band of canvas or other material and putting a pad in the middle of it. The pad may be simply a knot or a piece of cork, a potato, a pebble, a rolled-up bandage, &c.

At the end of half an hour the tourniquet should be slackened and if the bleeding has stopped, the tourniquet should be left slack, but in all cases of severe wounds of limbs even when there is no arterial bleeding, it is well to apply a tourniquet loosely and leave it there in case of sudden need as may arise when the patient is lifted or otherwise disturbed. It is very difficult to apply a tourniquet properly. Even doctors often fail several times before they get it right. It is often useful to get an assistant to tie the tourniquet tight while you, the expert, hold the pad in place. Remember that pressure over an artery, unless accurately applied exactly on the artery is worse than useless and a plain band is better than a tourniquet in which the pad is not accurately placed.

On a certain occasion a telegram was received at a large hospital that a blue-jacket had been severely injured in a bicycle accident out in the country, and he was being brought in by train. He had fallen off his bicycle and cut his forearm with some glass, and a small artery was cut. He had two chums with him, and one of them knew something about First Aid, so he tied his

POSITION OF MAIN ARTERIES.

To face page 83.



POSITION OF MAIN ARTERIES.

3395. 20442/290. 10000. 12. 14.

Malby & Sons, Lith.

silk handkerchief round the limb and they carried the patient to a farm. The farmer said he was a bit of a doctor, so he applied a bandage and took him in a cart to the station, where the station-master applied another tourniquet, the guard in the train applied another, the porter another, and a policeman applied another. Anyhow, by the time the patient arrived in hospital he was lashed up like a mummy, but the artery was still bleeding away merrily. Now this illustrates two points. One is that it is well to watch carefully the wound as you apply the tourniquet, and be quite sure that you have stopped the bleeding, and the other point is that you should stay with the patient until he is in the doctor's hands, because your tourniquet may slip and require re-applying.

There are certain recognised spots where it is easiest to apply a pad to three of the main arteries, namely, the main artery of the upper limb, the main artery of the lower limb, and the artery of the temple. In applying pressure to an artery, whether with your fingers or with a pad, it is very important to press the artery against the underlying bone. Obviously it would

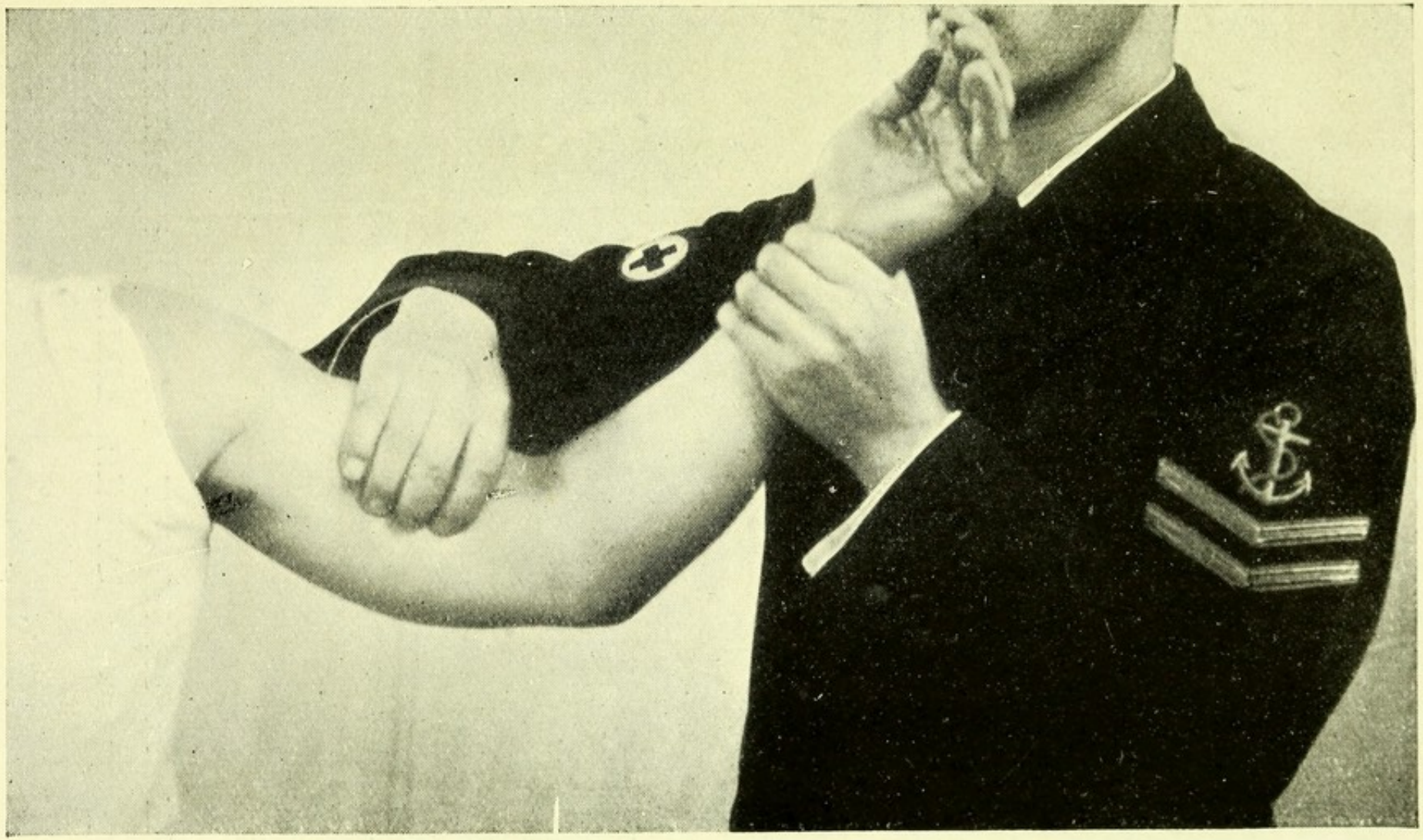
be no good to try to compress it against soft flesh.

(9) BLEEDING FROM UPPER LIMB.

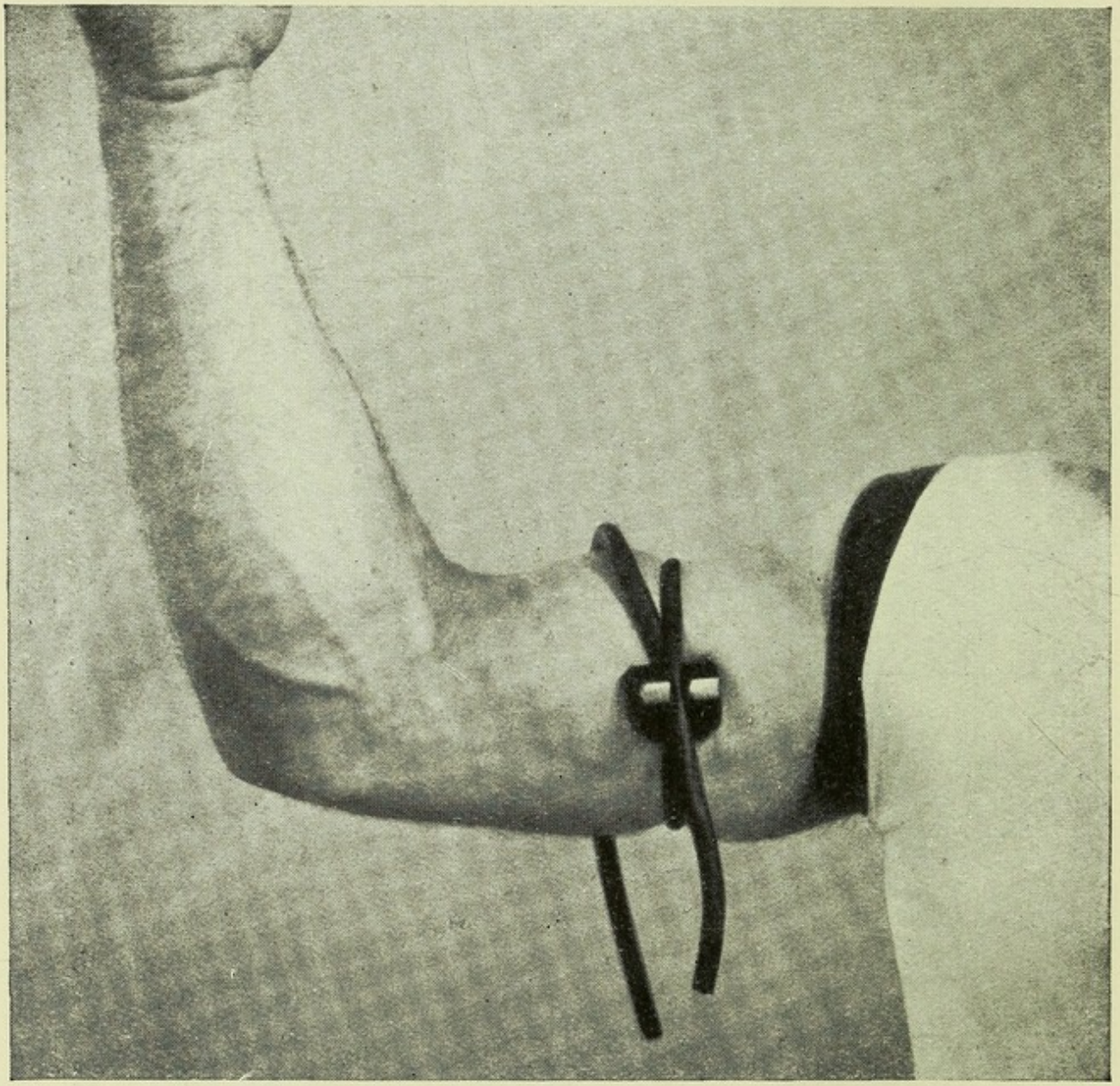
In bleeding from the *upper limb* you should apply the pad as follows:—Strip the limb and notice the belly of the "biceps" muscle (*see* illustration). You all know the biceps muscle, it is the one that the strong man exhibits when he wants to show how strong he is. Well, if you let the limb hang down with the palm of the hand forwards, you will observe that a slight groove, or tendency to a groove, can be felt on either side of the belly of the biceps. The position of the main artery of the upper limb is in the inner groove, and you will feel the artery throbbing there. It is here that you apply the pad of the tourniquet, and you must frequently practise doing so. You can always tell when the pad is in the right place, as it will stop the pulse at the wrist (*see* illustration).

(10) BLEEDING FROM LOWER LIMB.

The picture facing page 83 shows you the main arteries of the body. In bleeding from the lower

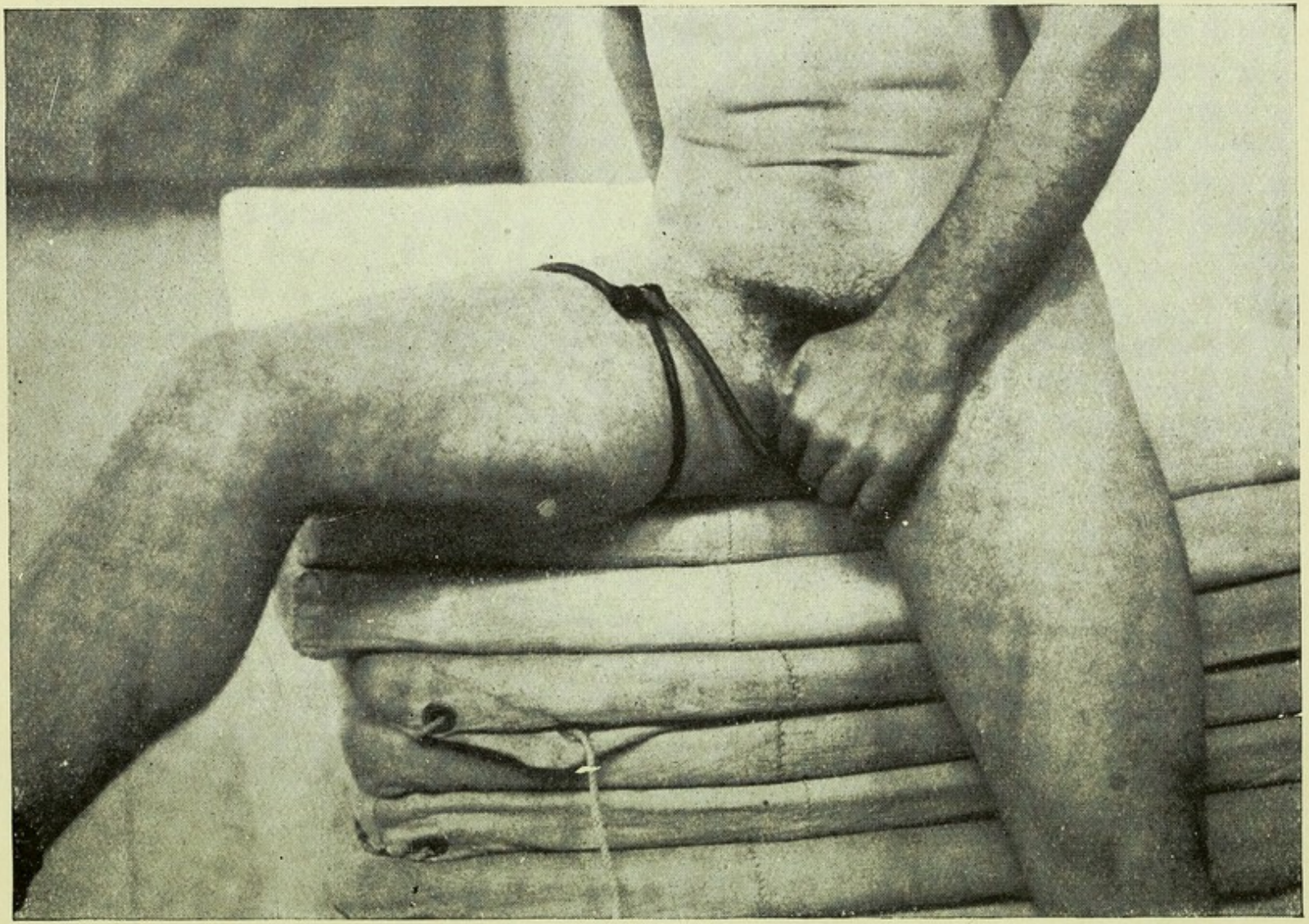


FINGER PRESSURE ON MAIN ARTERY OF UPPER LIMB.



NAVAL TOURNIQUET ON MAIN ARTERY OF UPPER LIMB.

THUMBS PRESSING ON MAIN ARTERY OF LOWER LIMB.



NAVAL TOURNIQUET ON MAIN ARTERY OF LOWER LIMB.

limb it is more difficult to find the main artery than is the case in the upper limb; lay the patient down on his back; slightly bend the hip joint and the knee joint and lay the knee on its outer side (*see* illustration). Then press the tips of your fingers deeply into a spot just below the groove of the groin, and just (about half an inch) to the inner side of the middle of the groin, until you feel the artery throbbing. In a big muscular man it is difficult to press your fingers in deeply enough to feel the artery, but you must keep on applying the pad of the tourniquet till you get the right place, and you will know when you are right by the fact that the arterial bleeding immediately ceases.

(11) BLEEDING FROM SCALP.

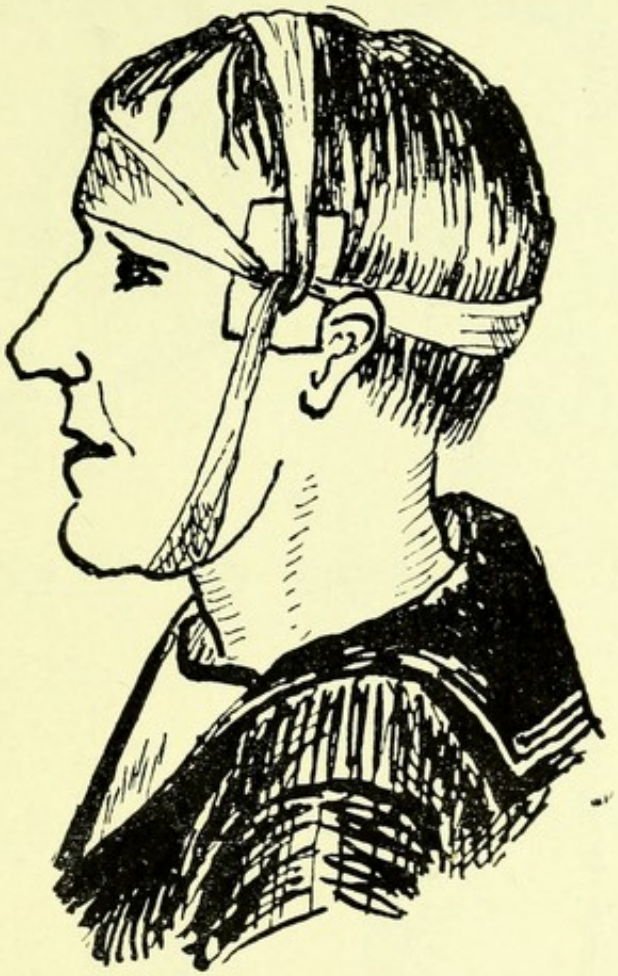
The artery of the temple you can feel, and often see running up the temple from just in front of the ear. It spreads out in branches on the scalp, and it can easily be compressed as the bony skull lies just beneath it. You apply a pad on the trunk of the artery, and you take a triangular bandage folded into a narrow bandage.

Put the centre of it on the opposite temple, and bring it round the head horizontally. Cross the ends over the pad, then take them round the head vertically, and tie them where you originally began. You thus have the cross of the bandage over the pad (*see* illustration).

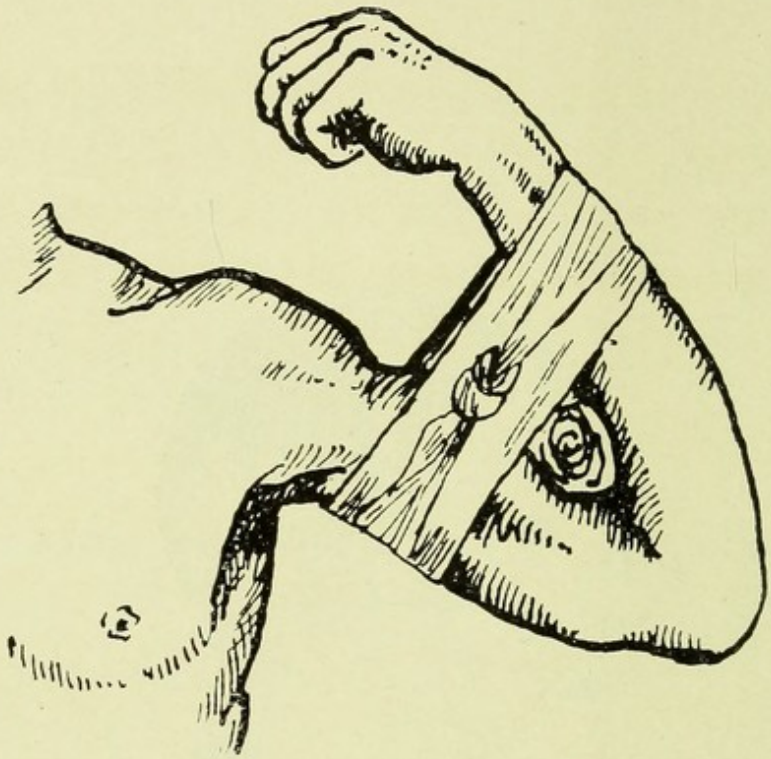
(12) OTHER METHODS OF STOPPING BLEEDING.

Besides pressure on the artery from the tourniquet, there are other methods. For instance, bleeding from an artery below the elbow may usually be checked by putting a pad in the bend of the elbow, and then tying tightly the forearm to the upper arm. Similarly with bleeding below the knee (*see* illustrations).

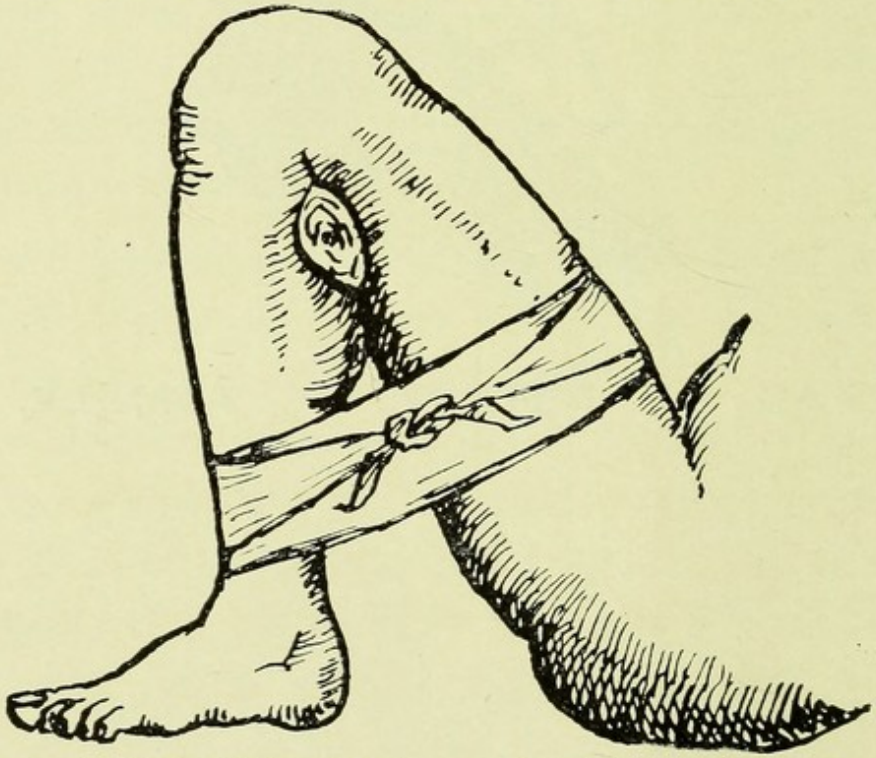
In some places you cannot apply a tourniquet, such as on the large artery on either side of the neck or the artery below the collar-bone. These must be compressed by feeling for their throbbing in the situations you see in the picture facing page 83, and then pressing the tips of the fingers (or a padded handle of a big key), deeply at these spots. This is very difficult to do for any



PAD ON ARTERY OF TEMPLE.



PAD IN BEND OF ELBOW.



PAD IN BEND OF KNEE.

length of time, so you must get the doctor as quickly as you can.

(13) BLEEDING FROM PALM OF HAND.

There is an artery in the palm of the hand that is sometimes cut, as when a bottle bursts when you are opening it. A tourniquet applied to the main artery of the upper limb will be a good way to deal with this injury; or a pad may be put in the bend of the elbow as just described; but another way is to place a clean pad in the palm of the hand, close the fist, and then tightly bind it up with a bandage so as to cause direct pressure on the palm.

(14) FIRST AID IN CASE OF VENOUS BLEEDING.

So much, then, for stopping arterial bleeding. Venous bleeding is much more easily arrested. A clean pad of surgical dressing placed on the bleeding wound, and the whole firmly bound up and elevated, will always stop venous or capillary bleeding. On no account put messy things in the wound like cobwebs, &c. They do no good, and

may be most dangerous by causing blood-poisoning. Remember direct pressure is the proper way to stop venous bleeding. An example of this may occur after extraction of teeth. A patient had two very decayed teeth extracted and this was followed by severe venous bleeding from the sockets, which went on for twenty-four hours. The patient was alarmed and consulted a doctor, who cleared out the blood clot, put a pad of lint where the teeth had been and then tied the mouth tightly shut with a four-tailed bandage so that the teeth in the opposite jaw pressed firmly on the pads of lint. The patient remained like this for two or three hours, and then when the pads were gently removed all bleeding had stopped.

(15) FIRST AID IN CASE OF CAPILLARY BLEEDING.

Capillary bleeding will stop naturally, as a rule, by the blood clotting and forming a scab. In order to help the blood to clot it is important to copy nature's methods (*see* General Rules of First Aid in cases of Bleeding on page 97). Do not wash or wipe the blood away, just let it run where it likes and it will soon clot and dry. It

is useful to remember that if a hand or foot be allowed to hang down it will turn red in colour, and if lifted high in the air it will turn pale. Try this with your two hands; lift one over your head and let the other hang down while you count a hundred, and then compare their colour. The redness is due to blood, and, if you want to help nature in stopping capillary bleeding, you should, in addition to other treatment, elevate the part.

(16) FIRST AID IN BLEEDING FROM THE NOSE.

Bleeding from the nose may be due to various causes. It always follows any injury to the nose, but in some people it may happen on other occasions as, for example, whenever they have a headache or feel a "rush of blood" to the head as when their bowels are not properly open. It usually soon stops of its own accord or with the following simple domestic remedies. If in spite of these it persists, a doctor must be called in, as the more serious methods of arresting bleeding from the nose are dangerous in unskilled hands. The First Aid treatment consists in keeping the

patient quiet, removing the collar, and letting him sit with his head thrown slightly back and his arms raised above his head. Then pinch the nose tightly, apply cold to the forehead, root of the nose and nape of the neck, and put the feet in as hot water as can be borne.

You must prevent him from hanging his head down and he must not blow his nose for at least two hours after the bleeding has stopped.

(17) FIRST AID IN COUGHING BLOOD.

Blood may be coughed up from the lungs or it may have trickled into the wind-pipe from the mouth or throat. The patient is always very alarmed, but you must reassure him. Even the worst bleeding of this kind usually stops sooner or later. First Aid consists in applying the rules for internal bleeding (*see* page 97) such as putting the patient to bed in a cool, dark, perfectly quiet room with plenty of fresh air and giving him ice to suck. All excitement and flurry must be avoided, the patient must not be allowed to speak and, of course, no alcohol must be given.

You should keep all the blood that has been spat up as the doctor must see it when he arrives.

(18) FIRST AID IN VOMITING BLOOD.

Blood which is vomited generally does not look like blood. Its usual appearance is very much like that of coffee-grounds. The First Aid treatment for this is the same as that for coughing up blood and all forms of internal bleeding (*see* pages 97 and 98). No food should be given. The patient may swallow small pieces of ice. All the vomit must be kept for the doctor's inspection.

(19) INTERNAL BLEEDING AND GENERAL RULES OF FIRST AID IN ALL CASES OF BLEEDING.

When anyone has lost much blood, nature makes him fall down fainting, where he lies very still, with his heart beating very feebly.

Now you should copy this by laying the patient down and leaving him very quiet. You should do this in all forms of bleeding in addition to any other treatment. Do not try to bring him to by splashing him with cold water or using any of the other silly household remedies. Above all *do not give alcohol.* Probably nine hundred and ninety-nine out of a thousand of the ordinary lay public have a profound and

deep-rooted conviction that, in all sorts and conditions of accidents, the great panacea is "a nice drop of brandy." Well, you may take it as a general rule that, in First Aid, alcohol should *never* be given in any form whatever. It may be useful for washing a foul wound, but never give it internally. In the present case, namely, a patient fainting from loss of blood, you must see that if you stir up his heart with alcohol, you will have blood pumped all the quicker to the bleeding spot, and you may be hurrying the patient to his grave.

Remember, also, that a patient may be bleeding internally and you may not know anything about it, except that he goes very pale and faints. In this case, just as in the case of bleeding from a wound, the treatment is to lay the patient down and avoid exciting the heart.

In speaking of internal bleeding, the following story is instructive. A medical officer was called to a merchant ship where a big negro had stabbed two men in the back. The knife used was a long dagger, and in both cases it had gone right into the chest and there was severe internal bleeding. Both the patients were lying down

moaning, and the merchant skipper was flitting about around them, wringing his hands and behaving in a very excited manner. He had to be removed, and the wounded men were kept as quiet as possible, their wounds were dressed, and they were given morphia to soothe them to sleep. The bleeding continued, and it looked as if they would both bleed to death, but at last, just at the critical moment, it stopped, and they slept peacefully, and both men eventually recovered. This illustrates to you the importance of avoiding all excitement.

You must remember the importance of calling in a doctor as soon as ever you can, because however clever you may be, and however carefully you may remember these lectures, it is still possible that your treatment may be doing harm instead of good, and, at all events, is only a temporary measure.

When sending for a doctor, you should acquaint him with the nature of the case.

THIRD LECTURE.

(1) GERMS.

In order that you shall understand how it is that one wound will heal up well and quickly, while another wound will fester, with all the serious consequences of inflammation, formation of "matter," and perhaps blood-poisoning, you should begin by knowing something about germs.

Germs (otherwise microbes, micro-organisms or bacteria) are minute living vegetables of various shapes and sizes, and so small that they can only be seen with a powerful microscope. Roughly they may be said to vary from $\frac{1}{50000}$ to $\frac{1}{500}$ of an inch in length. You, therefore, cannot possibly see them with your naked eye.

Germs, the worst enemy of mankind, are probably the cause of every disease.

As before said, a germ is a living thing belonging to the vegetable kingdom and may be considered to be similar to mildew and poisonous fungi which like to grow in dark, damp, unhealthy

places. Germs are destroyed by sunlight and cleanliness. If not checked, they multiply extremely rapidly and one germ can become sixteen million in one day if given favourable conditions.

Germs are to be found everywhere. Even in the cleanest places germs may be discovered, but the dirtier a place is, the more germs will it contain.

So-called clean, cold water is swarming with living germs, unless it has been thoroughly boiled and kept covered up afterwards. You can, therefore, readily understand that, in First Aid, it is often much better to leave a wound quite dry than to improperly wash it with unboiled water.

(2) HOW GERMS GET INTO A WOUND.

It is most important for you to know that in every wound however small and apparently unimportant, germs are near and ready to enter. They lie in the skin and hair around the wound, they swarm in the clothes, and they are to be found in thousands on everyone's fingers. In fact they are often introduced by the fingers and "cleaning materials" of the person who

dresses the wound. Much better would it be if the wound were left absolutely alone, unwashed and uncovered, than that a dirty-fingered friend should wash it with a dirty sponge and dirty water, and then apply a dirty handkerchief; and yet how often do we see all this done by some person who has not been taught First Aid properly. A sponge is about the dirtiest thing that can be used and should be strictly forbidden. Many a person, after being shaved, has had a small wound of the face poisoned by the sponge used by the ignorant barber. Wounds if left exposed, as sometimes happens in warfare, may have germs introduced into them by flies. The germ of that dreaded disease, lock-jaw, is very apt to enter wounds received in action. You probably have also seen the terrible suffering inflicted on cattle when flies attack any wounds they may have received. The flies carry all manner of dirt, and germs are in all dirt.

(3) WATCHWORD OF THIRD LECTURE.

The watchword of the third lecture is: "*It is "better to leave a wound alone than to introduce "germs into it by improper dressing.*"

(4) FESTERING OF A WOUND AND HOW TO PREVENT IT.

If a wound goes wrong, that is, if it festers—becomes red and painful, and "matter" forms—this is always due to germs getting into the wound. If you can keep germs out of a wound, it will heal rapidly, and without any pain or discomfort.

The difference between the progress of a healthy wound and an unhealthy wound must be known to all of you. The former is practically painless and the patient soon returns to duty healthy and happy. The latter, on the other hand, is very painful and makes the patient feel generally unwell and unhappy. He drags on for weeks on the sick list. It is, therefore, very desirable to aim at the prevention of festering in all wounds. If this could be done, the number of days' sickness would be enormously reduced, and the strength of the Navy would be proportionately increased. Therefore, for your own comfort and for the good of the Navy you should take proper precautions with every wound, however small, and you should never hesitate to apply to the

doctor for a proper dressing, however apparently trivial your wound may be. Of late this subject has received much attention in large factories and workshops. The men and the employers recognise the saving of time and money that can be effected by the clean healing of wounds, and with this object many firms have introduced lectures on First Aid and readily available First Aid dressings. Many wounds heal properly in spite of no precautions being taken. This is due to the fact that in our blood there exist little living bodies which kill germs, and if only the army of germs that invades the body is not too large, our blood can win the day, but this army may at once become too powerful, if we do not take the cleanly precautions mentioned.

Other conditions may help the germs to win the day; for instance, in feeble patients such as alcoholic or very old people, or people run down by privations of war, or bad climates, the resisting power is reduced. So also in wounds with much bruising and tearing, as those produced by splinters in a naval action, the healing power is weakened and the germs more easily can work

their wicked way. The bruising of a wound is a great cause of lowering its vitality, and for this reason it is very bad for you to squeeze a wound that has matter in it. Many a time a pimple or a boil is made to increase and last much longer by the bad habit of squeezing them. A bruised or torn wound, therefore, requires greater cleanliness and care than a clean-cut wound.

If a wound fester, the matter may become shut in by a scab, and what is known as an abscess forms. The signs of this are redness around the scab, pain, throbbing, and much tenderness to touch. A doctor should be at once consulted so that he can let out the matter and prevent it spreading and blood-poisoning setting in.

(5) ANTISEPTICS OR GERM-KILLERS.

The gratitude of the world is due to Lord Lister, that famous surgeon who introduced the antiseptic method of treating wounds. Before his day surgical operations were followed by terrible suffering from festering of the operation wound. Nowadays a surgical operation is usually absolutely painless from start to finish. All this is due to the exclusion or destruction of germs.

Germs may be prevented from getting into a wound by cleaning every part before the wound is made, as is done when a surgical operation is performed. On these occasions, the patient's skin is most carefully prepared, the instruments, sponges, and dressings are all boiled for half an hour, and the surgeon's and nurses' hands are cleaned in a most thorough manner, and are often then covered with thin indiarubber gloves which also have been boiled for half an hour.

Germs may be prevented from growing in an accidental wound. To do this the part is thoroughly washed with soap and hot water, and then washed with certain chemicals called "antiseptics" which kill germs. A great variety of antiseptics are used by doctors, but in First Aid only a few simple ones should be known.

Alcohol (neat whiskey or brandy or spirits of wine or methylated spirit) is a splendid antiseptic, and is nearly always available. It is used, in the form of palm wine, for wounds by the negro dwarfs in the forests of Central Africa, and even as long ago as in the biblical days it was recognised that the pouring in of wine was a good treatment for wounds.

Boric or boracic acid is also an easily procurable antiseptic, very suitable for First Aid. It is best used as a white powder, rather like salt to look at. You should all make yourselves acquainted with it. It is not poisonous, and it is cheap (about $4\frac{1}{2}d.$ a pound), and it has the power of preventing germs from growing. For this reason it is used in foreign countries for adding to milk and butter, or rubbing on meat, to prevent them going bad.

Tar is antiseptic, and this fact has been unconsciously discovered by sailors when they dress their "sea-cuts" with a piece of tarred spun-yarn.

Iodine may be mentioned, as it is so convenient and effectual. It should be painted in the wound and on all the surrounding skin. It is much used nowadays for painting the skin of a part before a surgical operation. It soaks well in and kills all the germs which are snugly stowed away in the pores of the skin.

All antiseptics make the wounds smart when they are first applied, but the smarting passes off.

(6) FIRST AID FOR WOUNDS.

This may be summed up in the one word "cleanliness."

Ordinary domestic cleanliness (soap and hot water) is very good, but, in the case of wounds, it should be followed by washing with some chemical for killing germs, and the best one in First Aid is alcohol, as it is nearly always available.

After a thorough washing with soap and hot water (do not be afraid of letting the soap get into the wound), rub the wound well with clean cotton-wool soaked in spirits of wine or neat brandy. Then apply some clean dressing, such as a piece of new linen which has just been boiled.

Remember that the water with which you wash the wound, the cotton-wool or piece of linen with which you wipe the wound, and the dressing with which you dress the wound, should all be boiled for half an hour if you wish to be sure that all the germs in them are killed.

Baking will do almost as well as boiling, and a piece of clean blotting-paper which has been

baked just short of scorching will make a fairly efficient First Aid dressing for a wound.

About the worst thing you can put on a wound is sticking-plaster, because it is swarming in all sorts of dirt which it so easily picks up. It should never be put on a naked wound, but it may be useful to take the place of a bandage in holding a splint or a dressing on the part. The main object in the dressing of a wound is to protect it from the entry of germs. Unless proper means be at hand, you should just let the wound dry, further dirt being prevented from entering by covering with some clean protection such as boric acid powder, and, in the case of a finger, a finger stall.

Always keep the wound as dry as possible, as germs will not grow if there is no moisture. You should be most careful to handle the dressing and the wound as little as possible, as your fingers are sure to be surgically unclean. If the dressing become displaced or dirty, another one must be applied.

Veterinary surgeons frequently use Friar's Balsam for wounds of animals, and *you* might

find it useful as a First Aid dressing for dirty wounds. It is a sort of varnish which contains germ-killing materials, and it generally does very well for animals, but it smarts a good deal when first put on.

A bread-poultice is the worst thing for an open wound, as its warmth, dirt, and moisture foster the growth of germs.

(7) PREVENTION OF FESTERING WOUNDS IN NAVAL BATTLES.

In the battle of Yalu, the Japanese ship "Matsushima" was very seriously damaged, and more than quarter of her complement were killed or injured. She was at sea five days in bad weather struggling into port, and during that time the wounded men were laid out in the ward-room and cabins, and their wounds were dressed as well as circumstances would permit; but practically all those wounds went wrong. Inflammation and blood-poisoning set in with all the attendant horrible suffering, and a great number of those brave fellows lost their lives.

Suzuki, that splendid Japanese naval doctor, and many others, set themselves to work to try

to find out if such conditions could not be averted in future naval engagements. They found that the chief cause of the wounds going wrong was poisoning, from pieces of clothing being carried into the wounds by the missiles. Most clothing, especially if old and dirty, is swarming with germs. You have perhaps all seen the way a Stilton cheese is ripened. Pieces are scooped out from a very ripe old cheese and are buried deeply in the new cheeses, and from these pieces the ripening spreads. That ripening is due to the growth of germs, and the poisoning of the wounds by the ripe old pieces of clothing is a very similar process.

Having recognised this, it was obvious that either the carrying in of pieces of clothing should be prevented, or the clothes should be so clean that they would not poison wounds if pieces *were* carried in.

In the days of Nelson, men fought nearly naked, but to-day this would be very unwise, as the danger from burns would be thereby increased. Therefore, the Japanese brought out an order that, before going into action, everyone

should take a bath and thoroughly clean himself, and should put on clean clothes. The result of this order was perfectly miraculous, as could be seen in the Russo-Japanese War. Many of the Japanese crews were wounded, but their wounds did remarkably well. Such a lesson as this is of such intense interest to all of you that it is worth your while to take it seriously to heart.

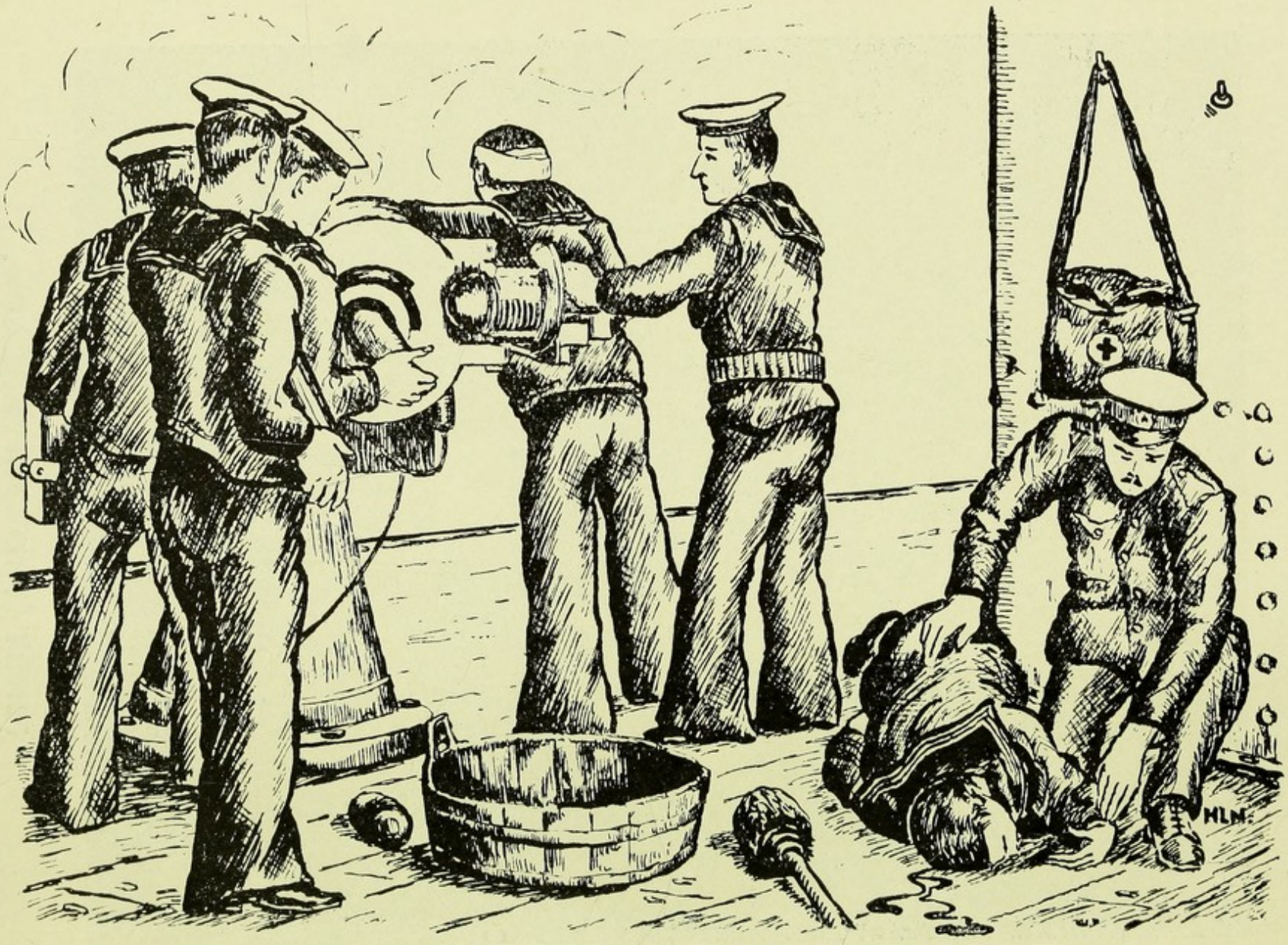
And now as to the important precaution which you must all take, if you can possibly get an opportunity, before going into action.

Scrub your bodies most thoroughly in a hot bath with plenty of soap and perhaps some Izal (a germ-killing fluid which you can get from the sick-bay), and then wear the cleanest and newest woollen clothes you can obtain, and cover as much of your skin as possible. It has even been suggested that special flannel war-clothing should be served out to everyone before going into action, and that it should be disinfected before issue.

(8) WOUNDED IN ACTION.

Before a ship goes into action, each man should have a bath if possible and put on

FIRST AID HAVERSACK.



GUN'S CREW IN ACTION.

freshly-washed underclothing, his newest and cleanest blue-serge suit, his boots, and his silk handkerchief, the latter being a useful substitute for a bandage, if necessary. The main medical stores will be struck down into protected store-rooms.

The haversacks will be filled with First Aid dressings for wounds and burns, a certain number of tourniquets and splints, and, possibly, a large dredger of boric acid being also put into the haversacks.

Haversacks and water-bottles (filled with water, cold tea, or coffee) will be distributed to all places where men are stationed.

As far as practicable a bandsman or such other man, specially trained in First Aid, will be stationed with each haversack. The special hammocks and stretchers (*see* pages 139–154) will be distributed to certain pre-arranged parts of the ship.

In a modern ship practically everyone will be behind some sort of armour, and the experience gained in the Russo-Japanese War has proved that it is worse than useless to attempt

to move the wounded from behind this armour during the action. When this was attempted, both the wounded man and the ambulance party were nearly always all killed. Therefore, it will be wiser for the wounded man to receive First Aid where he is, and, being made as comfortable as possible without hindering the work of the other men, he shall await the moment when the action is over or a lull occurs, and then he will be removed to the doctors, who will be able to attend to him more carefully.

The application of splints and tourniquets has already been taught you, and it is now necessary for you to learn about the First Aid dressing.

A new naval First Aid dressing for wounds has lately been issued.

It consists of a pad of antiseptic gauze, coloured a pale mauve, a folded piece of antiseptic wool of the same colour, and a white bandage. The gauze is sewn into the middle of the bandage, so that it is less likely to slip out of place. The bandage is rolled up to the centre. The whole is wrapped in a piece of macintosh

so as to protect it from soiling, and on this macintosh wrapper is the following label with directions for use :—

NAVY MEDICAL SERVICE.

Open packet by pulling tongues apart.
Apply in following order to the wound :—

1st. The wool pad.
2nd. The gauze and bandage.
3rd. Waterproof.
4th. Fasten lightly with bandage.

If two wounds, put the wool pad on one, the gauze pad on the other, and divide the bandage.

January 1908.

Cuxson, Gerrard & Co., Birmingham and Oldbury.

The packet is then enclosed in a small linen bag, on the outside of which are printed the following directions :—

NAVY MEDICAL SERVICE.

Open bag by pulling out the long threads.
Open inside packet by pulling tongues apart.

Apply in following order to the wound :—

1st. The wool pad.

2nd. The gauze and bandage.

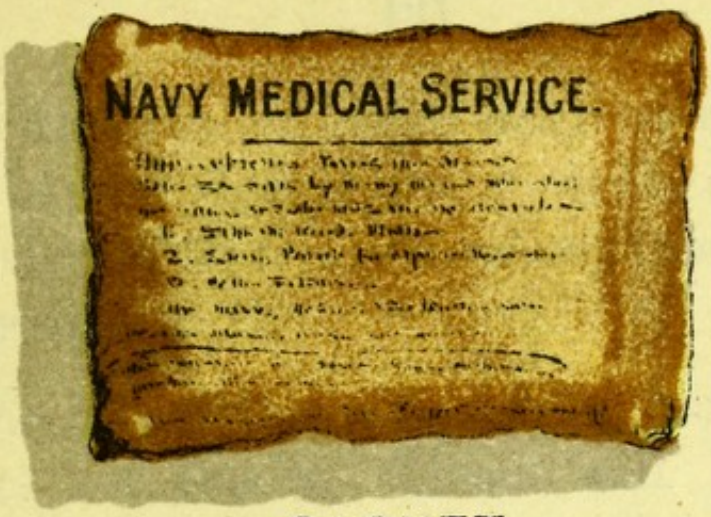
3rd. Waterproof.

4th. Fasten lightly with bandage.

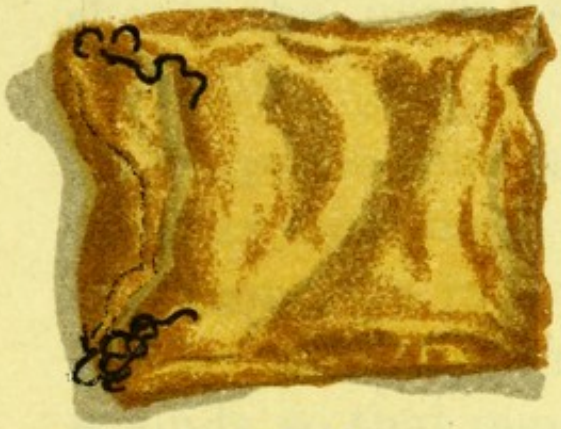
If two wounds put the wool pad on one, the gauze pad on the other, and divide the bandage.

Many medical men would advise the omission of the macintosh in dressing a wound, as it tends to prevent the drying which is so essential for stopping the growth of germs.

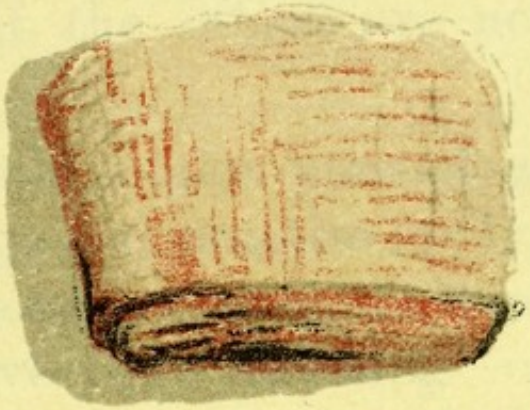
As many of the wounds in a naval action will be of considerable size, it is probable that several of these dressings will be necessary for one wound. In the Army the wounds received are chiefly those caused by rifle bullets and are consequently small but deep and only a small dressing is necessary, whereas in the Navy the wounds are mostly caused by pieces of shell and splinters of iron and wood. Such wounds are usually large, shallow, and accompanied by much bruising and tearing. They require large dressings and much cleanliness as they are particularly susceptible to the attacks of germs as mentioned on page 104.



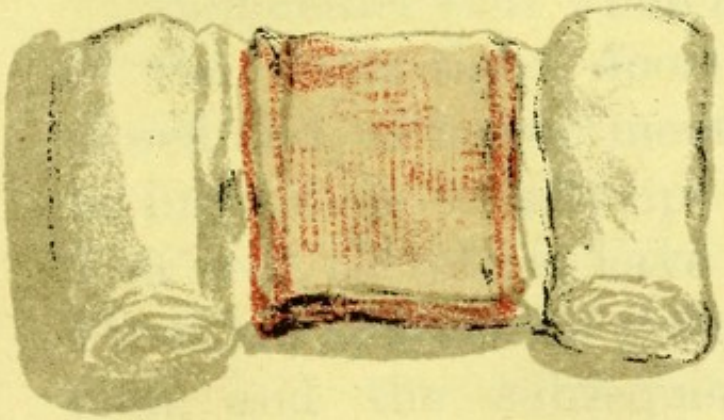
PACKET.



BAG.



WOOL PAD.



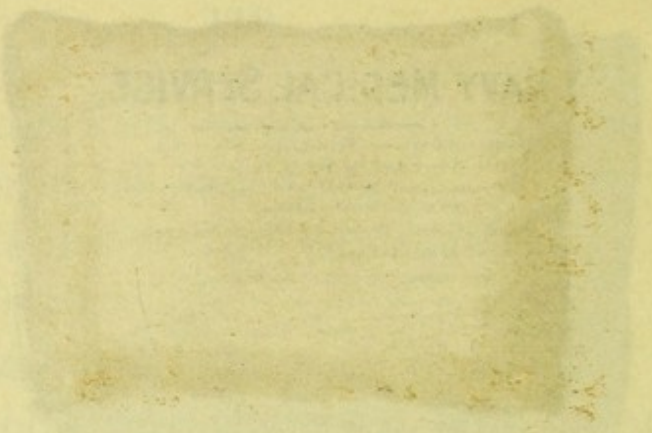
GAUZE PAD & BANDAGE.

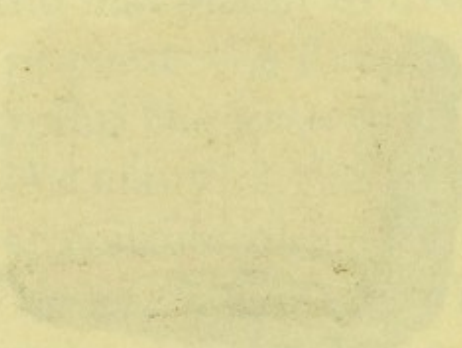
WATERPROOF.

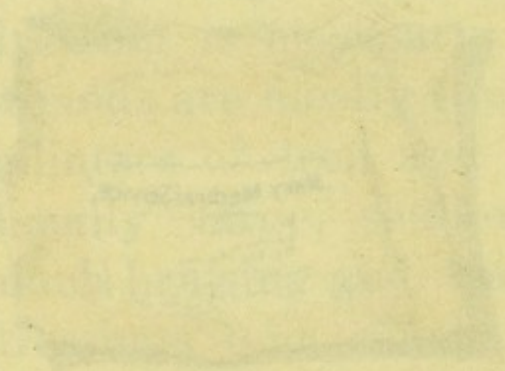
NAVAL WOUND DRESSING.

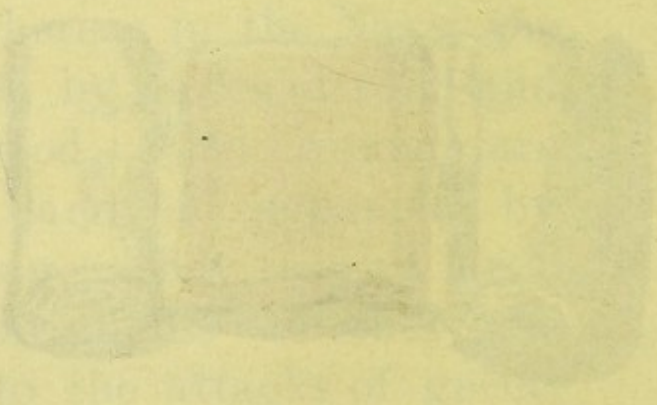
3395. 20442/290. 10,000. 12. 14.

Malby & Sons, Lith.









If a dredger of boric acid or other dusting powder be included in the contents of the haversack, it should be freely used as already described in paragraph 5.

In the haversack will also be found First Aid dressings for burns. These will be described later, but it might be here mentioned that they are excellent for dressings for wounds and should be used as such if the others are not available.

In peace-time you should make yourselves familiar with these dressings and practise applying them. In fact, in some navies they are used in the sick-bay in the everyday dressing of wounds, so that men shall often see them properly applied.

Remember that when a ship is in action most of the water-tight doors and hatches will be closed and, as before mentioned, it will probably be imprudent to attempt to move the wounded. You will, therefore, have to depend largely on First Aid applied by yourself or the ambulance man, and the subsequent healthy healing of your wounds will in great measure depend on

the efficiency of the first dressing. Different arrangements, however, will be made in different ships, according to the construction, and it may be possible for a wounded man to be moved from impeding the remainder of the gun's crew. Mantlets and other screens will be rigged, and these have been found to afford good protection from flying splinters.

Though perhaps ten out of every hundred men may be wounded, many of these will only be slight wounds, and the men will eagerly return to help their comrades to win the day.

(9) SPECIAL TREATMENT OF CERTAIN WOUNDS.

Penetrating wounds of the belly may be very serious, or may heal up with no ill consequences. The difference will largely depend on whether the stomach and bowels are full at the time. It was found in the Boer War that if the man's stomach was empty when he was wounded, he did very well. You should think of this, and if possible you should empty your bladder and bowels before going into action and not eat a large meal. If you receive a wound of the belly

you are sure to suffer from severe thirst. All wounded men are thirsty. But you must use your self-control and avoid drinking if your stomach be wounded. A short story will illustrate this. After a certain engagement in the South African War, two men found themselves lying close together, both having received bullet wounds of the belly. One of these men belonged to the Royal Army Medical Corps and knew of the danger of drinking anything after such a wound. He explained this to the other man, but the latter had not the self-control to resist emptying his water-bottle. Consequently he drank and he died. The R.A.M.C. man did not drink and he made a rapid recovery.

Penetrating wounds of the chest require sealing up with a First Aid dressing at once to prevent air being sucked in. Otherwise they require no special treatment unless there be severe internal bleeding, or coughing up of blood, both of which conditions have already been dealt with in the last lecture.

Wounds of the head will probably be accompanied by stunning, and this subject will be dealt with in the next lecture.

(10) SHOCK.

All severe wounds will be complicated with "shock."

"Shock" also is always present in cases of severe burns or scalds.

It is a curious condition of the nervous system, a sort of borderland of death, and a merciful provision of nature by which a person who is badly burnt or severely injured lies quite still, with pale face, and dulled senses. He often has fits of shivering. He can talk and appears quite conscious, but he feels no pain.

When this condition is present, you may be sure that the patient is hovering on the brink of the grave, and, unless steps be taken to combat the shock, death will soon ensue. As an example of shock the following story is a good illustration :—

At a large London hospital, one Saturday night, a gin-sodden old woman brought her little daughter to the casualty ward. A lamp had fallen over the child and set its flannelette

night-gown on fire. One side of its body and one upper limb were charred to a cinder, but the child lay quietly in its mother's arms, and with its unburnt hand it held an orange to its mouth and was placidly sucking it. That child was suffering from profound shock, and in twenty minutes it was dead, in spite of every human aid.

To combat shock, the patient should be kept warm with hot bottles and blankets. He should be put to bed with his head low. No attempt should be made to deal with the injuries at first. A doctor should be called, and he will give morphia or perhaps some sort of stimulant, such as beef-tea or alcohol. Morphia is the essential part of opium and is one of the most useful drugs in the world, but it is very poisonous, and can therefore only be given by a doctor.

It is, however, such a powerful agent for preventing death from shock that it has been suggested that in each haversack there should be a box of morphia lozenges and that every severely-wounded man should be immediately given one of these lozenges.

(11) BURNS AND SCALDS.

For all practical purposes in First Aid, burns and scalds may be looked upon as identical, so the following remarks apply equally to both conditions. *The seriousness of a burn depends upon its area much more than upon its depth.* It is very important to remember this. It is much less dangerous to life to have your whole arm burnt to a cinder than to have half the total surface of your skin just blistered. The great surgeon, Erichsen, writes: "It is generally "believed that recovery cannot take place if "one-third of the surface of the body be "affected."

Therefore, in a lecture on burns one should borrow from the philosophy of Punch, and say, "Don't get burnt more than you can help."

The best protection against burns is to cover as much of yourself as possible with woollen clothing. If you have to rescue someone from a fire, cover yourself up in a wet blanket before rushing into the flames. Woollen material is very non-inflammable, whereas cotton material burns readily. Nearly every day one reads in

the paper of some poor child being burnt to death, and nearly always the child's clothes were made of flannelette, that most dangerously inflammable cotton fabric, which, unluckily, is much used by the poor because it is so cheap. If you want to be convinced of the comparative non-inflammability of woollen material, take a piece of your blue serge or flannel and a piece of duck and set each alight; the former will scorch very slowly and with great difficulty, whereas the latter will burst into a flame at once.

(12) PROTECTION FROM BURNS IN NAVAL BATTLES.

So important are the above facts that many authorities are strongly in favour of protecting men from burns by covering as much of their skin as possible with clean flannel clothing before going into action, even giving them flannel masks and perhaps flannel gloves or mittens. It will be a long time, however, before such precautions will be adopted by some men, because a fool would sooner expose himself to fire than to ridicule; but you, who have heard the argu-

ments in favour of such precautions, will on your own initiative follow, as closely as you can, this advice.

It has been said that in naval actions nearly a quarter of the injuries are due to burns and scalds. You can therefore see the importance of taking these preventive measures.

(13) FIRST AID FOR A PERSON ON FIRE.

If you have to deal with a person who is on fire, make him lie down at once, for flames ascend, and the most important parts to protect are the head and neck. Then smother the flames by rolling the patient in a hearth rug, wet blanket, or any such thing that may be handy. Prevent the patient running out into the open air. A woman is so often terrified when her dress catches fire that she completely loses her head and rushes out into the street for help. The draught thus caused and the fresh air make the fire burn all the fiercer.

"In covering a burning person with a blanket, &c., stand at the patient's head, hold

down with your foot one edge of the blanket and throw the blanket away from yourself and towards the feet of the patient. The flames are thus swept away from the rescuer and from the face of the burning person."

(14) HOW TO ACT IN A BOILER EXPLOSION.

Anyone of you may be some day in a boiler explosion. Especially do these remarks now appeal to the engine-room department. The advice of those who have been in these appalling accidents may be summed up as follows:— Firstly, lie flat down on your face, as steam ascends, and so the safest place is on the floor. Secondly, protect your breathing apparatus by putting some cloth over your nose and mouth to act as a respirator. Remember also that the white steam you see is not so dangerous as the invisible steam. Boiler accidents are often very local in their effect, and many men have miraculous escapes. In the explosion in H.M.S. "Blake" in 1903 there were 21 men injured, amongst whom were many of the rescuers. The floor was flooded with boiling water, so that the advice of lying down could not be followed.

(15) FIRST AID IN BURNS AND SCALDS.

Burns and scalds received in action should be dressed with the special First Aid dressing now supplied. It consists of a pad of lint, impregnated with picric acid, a piece of macintosh, and two bandages with safety pins. *Picric acid* is the most satisfactory dressing for burns and scalds as it can be left on for many days without being changed, and this is a very important consideration in these cases because removing the dressings is very painful and harmful to the patient.

On the outside of this packet is attached a label with the following instructions:—

FIRST AID.

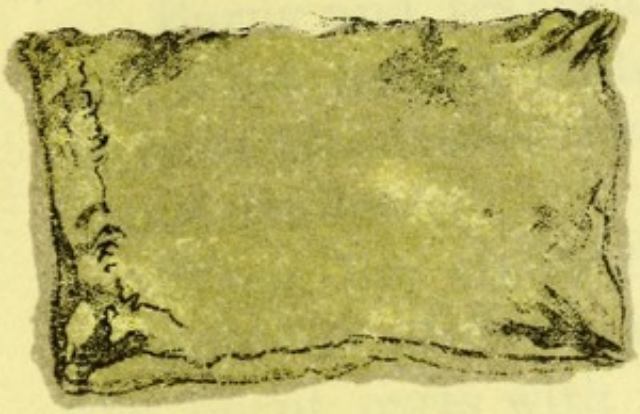
PICRIC ACID DRESSING,

For burns, scalds, &c.

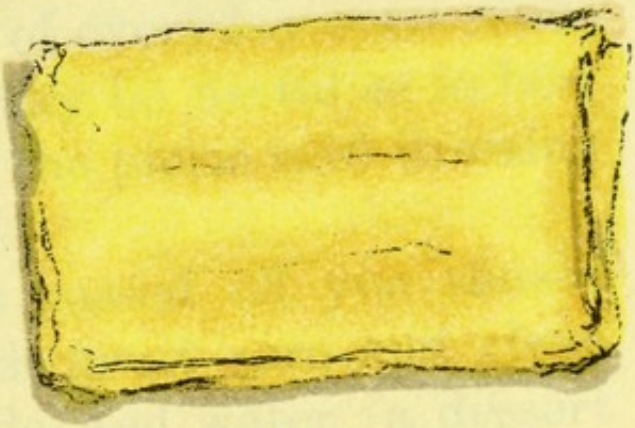
Directions.

Pull the loose thread to open the package. Wet the lint with water, but do *not* wring or squeeze it. Open out the pad to cover injury, and if very extensive use more than one pad.

PACKET.

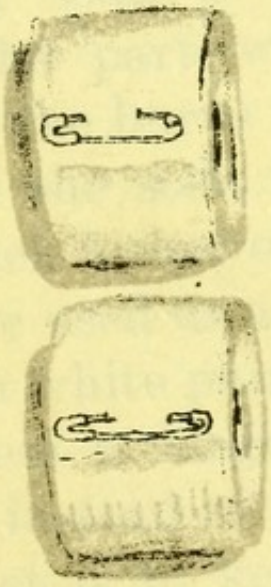


BAG.



LINT.

WATERPROOF.



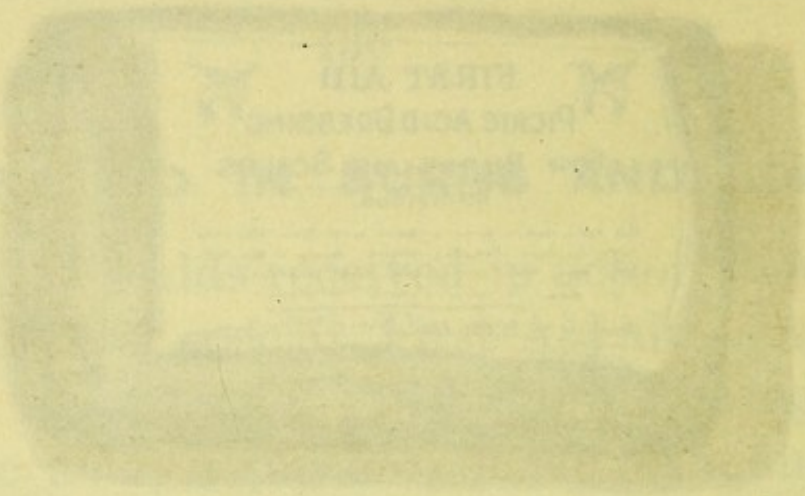
BANDAGES.

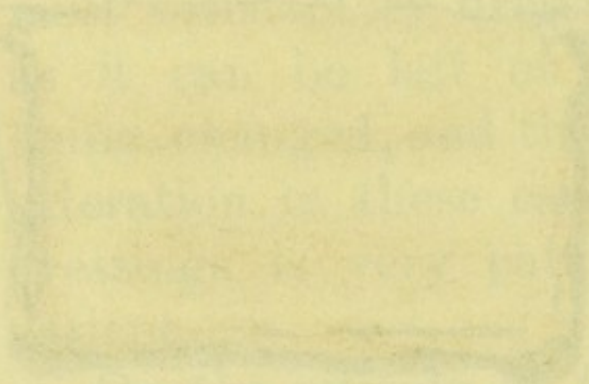
△ BANDAGE.

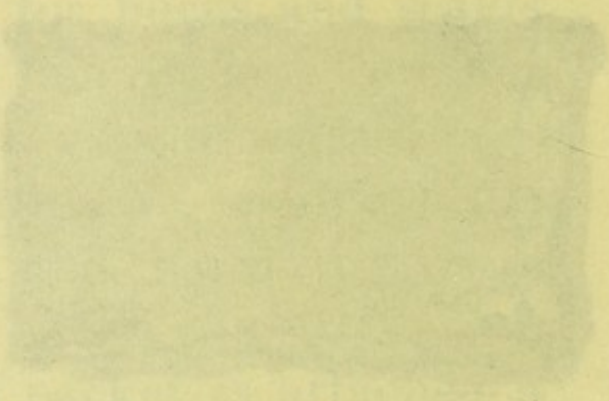
NAVAL BURN DRESSING.

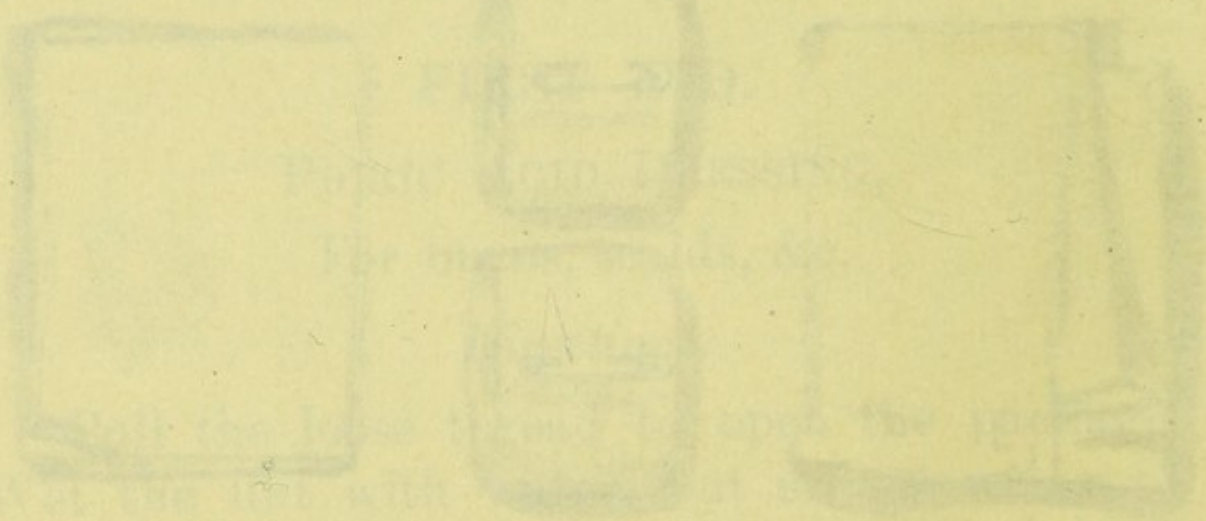
Malby & Sons, Lith.

3395. 20442/290. 10000. 12. 14.









Cover well with waterproof tissue to prevent evaporation, and secure in position by means of bandages and safety pins.

N.B.—See that the pad is not allowed to dry during application to injury.

Manufactured by The Liverpool Lint Co., Mark Street Mills, Liverpool.

Burns and scalds are of everyday occurrence and a few homely hints may be useful as to how to treat these cases when the picric acid dressing is not available.

When the shock has passed off you should remove the clothing with great care and clean the burnt parts with soda and water (a dessert spoonful of baking soda in a basinful of hot water), or clean the part with soap and hot water. Then dress the burns with lint soaked in a strong solution of the soda and water or cover the parts with a thick lather of good soap.

Pipe clay may be used as a First Aid dressing for burns, and even white paint may serve. You should always dress a large burn with small overlapping pieces instead of with one big piece.

The main object is to keep the parts clean (the act of burning has probably killed all the

germs at first) and exclude the air. Exposure of burns to the air undoubtedly increases the shock. Flour is often suggested and Carron oil is the most popular and about the worst dressing for burns. The following quotation is from one of the greatest authorities on surgery:—"Carron " oil, for example (a mixture of linseed oil and " lime-water), is a filthy application and is " responsible for a great deal of the mortality " after burns; the use of poultices or water " dressings and dusting with flour are equally " bad."

(16) FIRST AID IN VITRIOL BURNS.

You may have heard of vitriol throwing. It is a horribly cruel crime, more common abroad than in England, and generally committed by a jealous woman on some faithless man. The burns from vitriol cause hideous scars, as the acid (vitriol is the commercial name for sulphuric acid) eats into the flesh unless its action is neutralized by some alkali. For this purpose the best thing to use is washing-soda or lime-water. Soak the part in it as quickly as ever you can.

A few years ago a Chinese labourer, discharged from Hong Kong dockyard, threw vitriol in the face of one of the English foremen. The burns were terrible and might have been much lessened if the victim had had the presence of mind to at once dip his face into plenty of water so as to weaken the action of the acid. This should always be done while waiting for the washing-soda or other remedy.

(17) ELECTRIC SHOCK.

This is an accident which is every day becoming more possible in the Navy with the extensive use of electricity. Little need be said about it. A man touches a "live" wire. He has a sudden spasm with severe pain and he cannot let go. The rescuer in dragging him away from the wire may receive a shock himself unless he wear an insulating material on his hands such as indiarubber or thick *dry* woollen gloves. A tobacco pouch or a macintosh may be used for this purpose, or the rescuer may spring in the air and, while in the air touching nothing, he should grab at the patient, but he

must let go before he returns to the ground. The patient, being rescued, must then be treated as for shock (*see* paragraph 10).

(18) HOW TO CARRY THE WOUNDED.

The Japanese found that no apparatus was, as a rule, so useful on board ship as simple man-handling of the wounded. The exact method of carrying the man will depend on such circumstances as to how badly he is hurt, what part is wounded, how much assistance is available, and what sort of places he is to be removed from and to. The accompanying illustrations will remind you of many methods of carrying a wounded man by hand.

One method, the fireman's lift, is especially useful when you have to carry a man by yourself and require the use of your right hand for holding on to a ladder or for defending yourself and the patient. The illustrations must be studied while you read the following directions:—Roll the patient on to his face. Stand at his head and lift him, as best you can, into a kneeling position; you are now facing him. Stoop down and

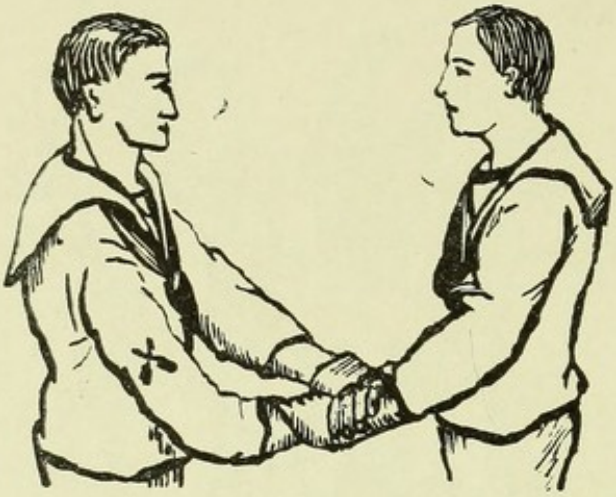
ORDINARY MAN-HANDLING.

STRAP SEAT.

FORE AND AFT CARRY.

MAN-HANDLING DOWN A HATCHWAY.

CARRYING THE WOUNDED.



FOUR-HANDED SEAT.

THREE-HANDED SEAT.

PICK-A-BACK WITH STRAP.

PICK-A-BACK.

CARRYING THE WOUNDED.

put your head under his left arm. Then put your left arm through his crutch and seize his left hand. Steady yourself, and then stand upright, at the same time shifting his weight, so that he lies, well balanced, across the back of your shoulders.

Many forms of stretchers, hammocks, sleighs, sliding-boards, canvas belly bands, canvas chairs, rope slings, cots, &c. have been devised and are used in various navies; but by far the simplest and best are the two which are about to supersede all others in our Navy, viz.:—the Neil Robertson stretcher and the bamboo and canvas stretcher.

The illustrations give a good idea of them and their uses and will help you to understand the following descriptions.

THE NEIL ROBERTSON STRETCHER.

The Neil Robertson stretcher has been devised with the object of supplying a simple apparatus for safely moving the wounded out of difficult places, inaccessible to the ordinary stretcher with stiff poles.

Its object is to envelope the wounded man in a protecting but somewhat flexible case so that he fills up as little room as possible and can be slightly bent in turning corners as when being hoisted up the ash-hoist from the stokehold.

The man is wrapped up like a mummy and can be hoisted vertically or carried horizontally. The apparatus is simple, light, and cheap, and will prove of great value not only on board ship but also in all places where an injured person has to be extricated from a cramped place.

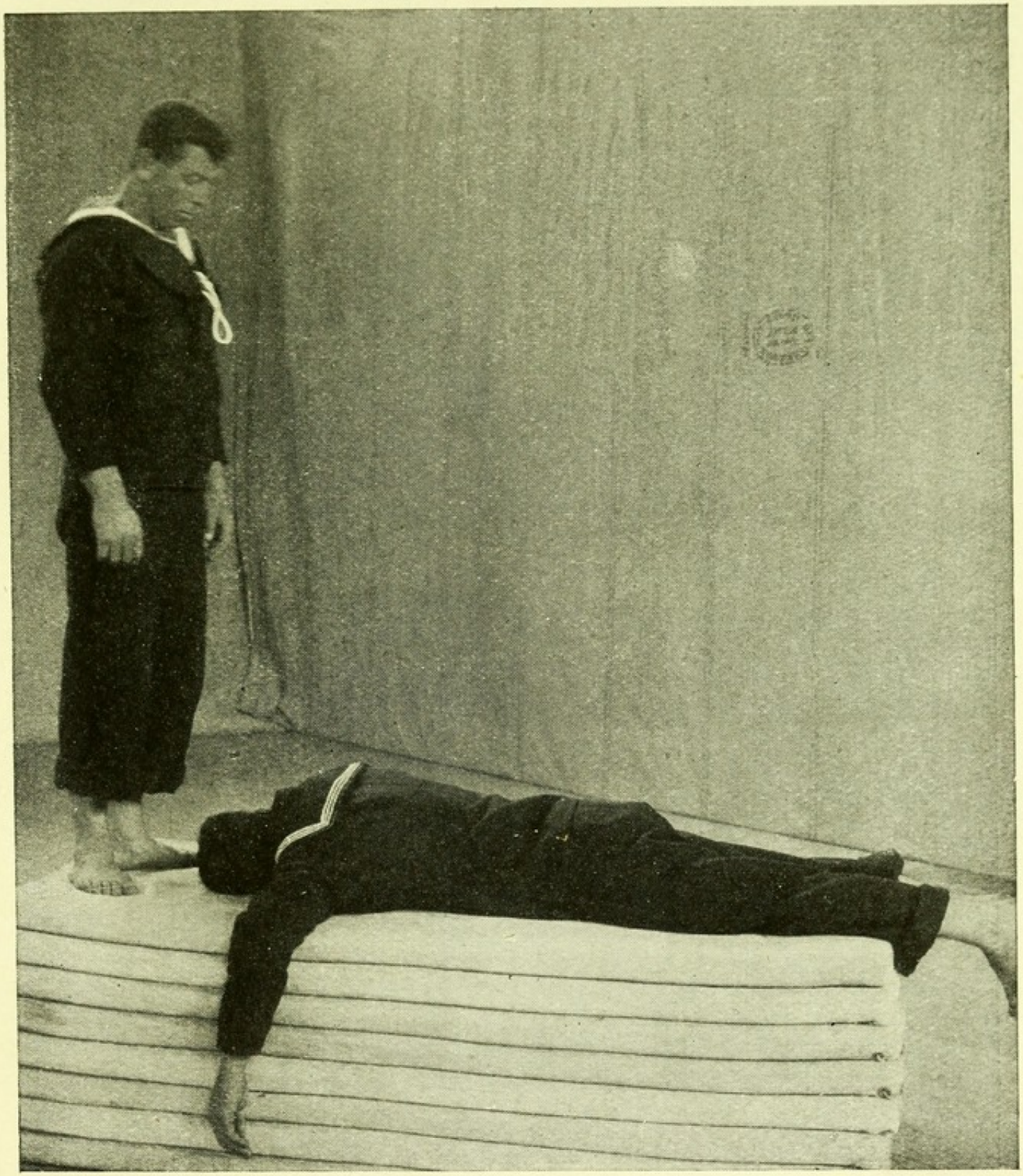
The stretcher is made of stout canvas 65 inches long, cut in such a shape (*see* diagram) that there are—

(*a*) a portion for the head and neck 17 inches long and 12 inches broad;

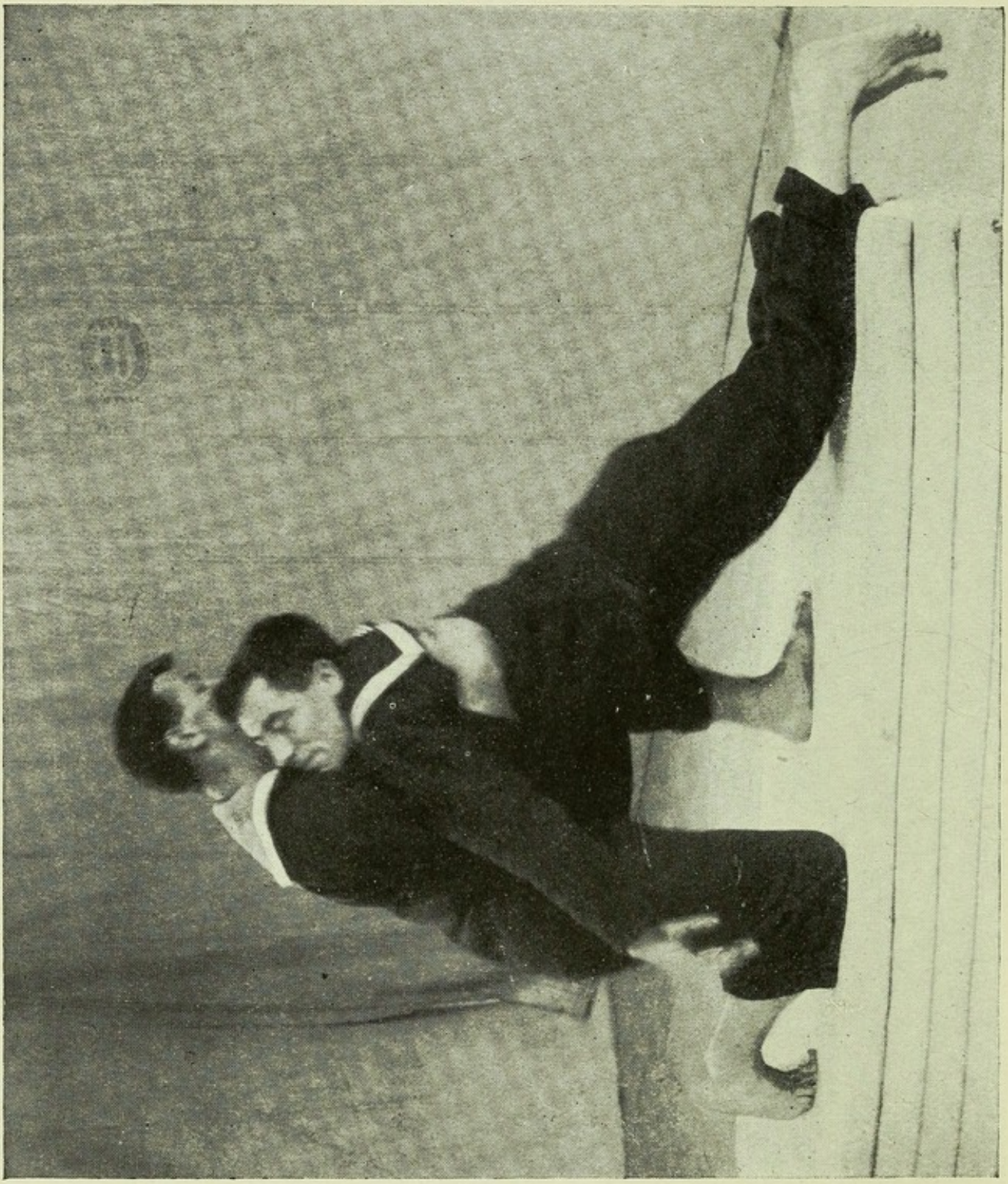
(*b*) a portion for the chest 14 inches long and 42 inches broad;

(*c*) a portion for the small of the back $6\frac{1}{2}$ inches long and 14 inches broad;

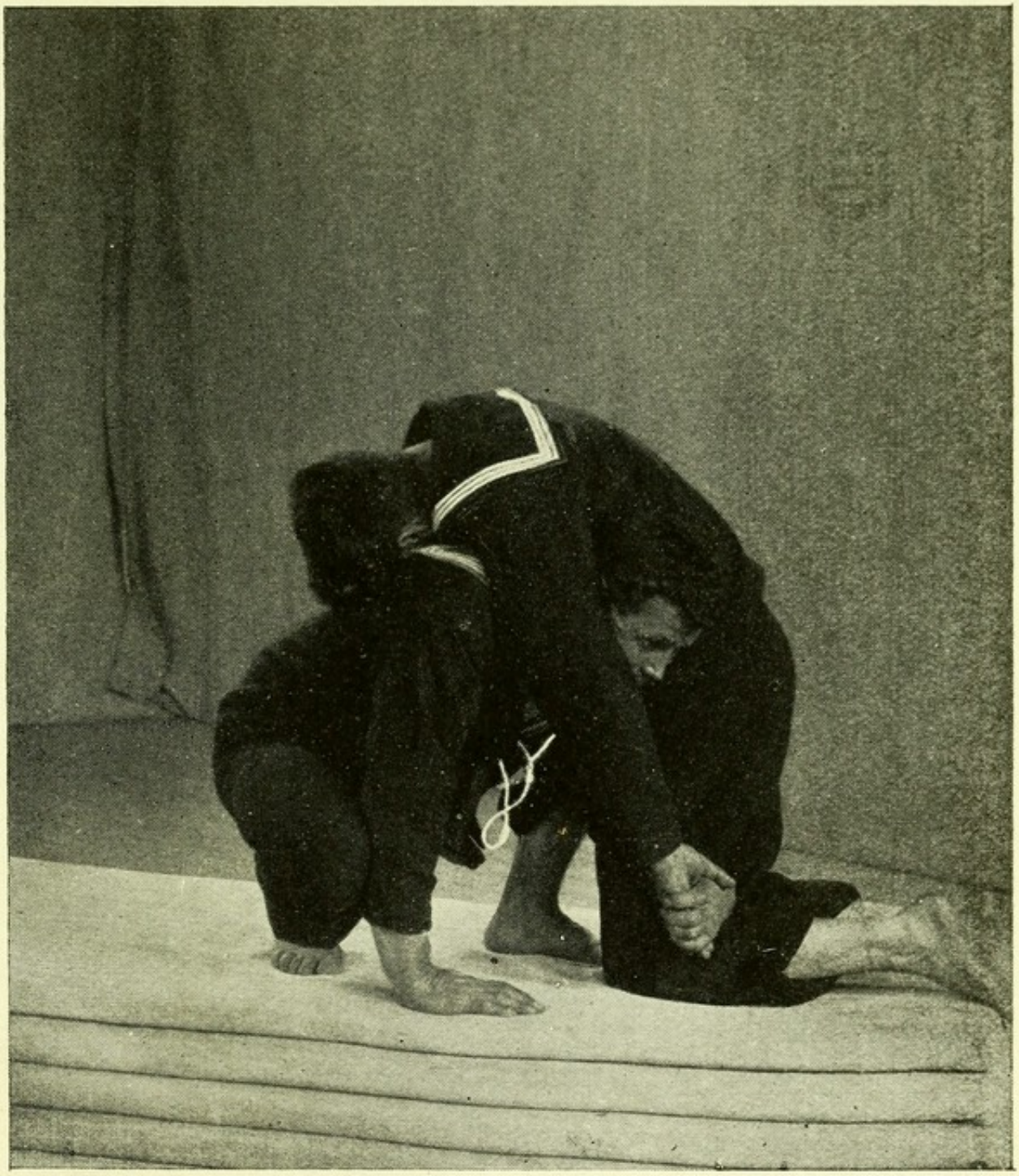
(*d*) a portion for the hips and lower limbs $27\frac{1}{2}$ inches long and at the upper end 38 inches broad and at the lower end 25 inches broad.



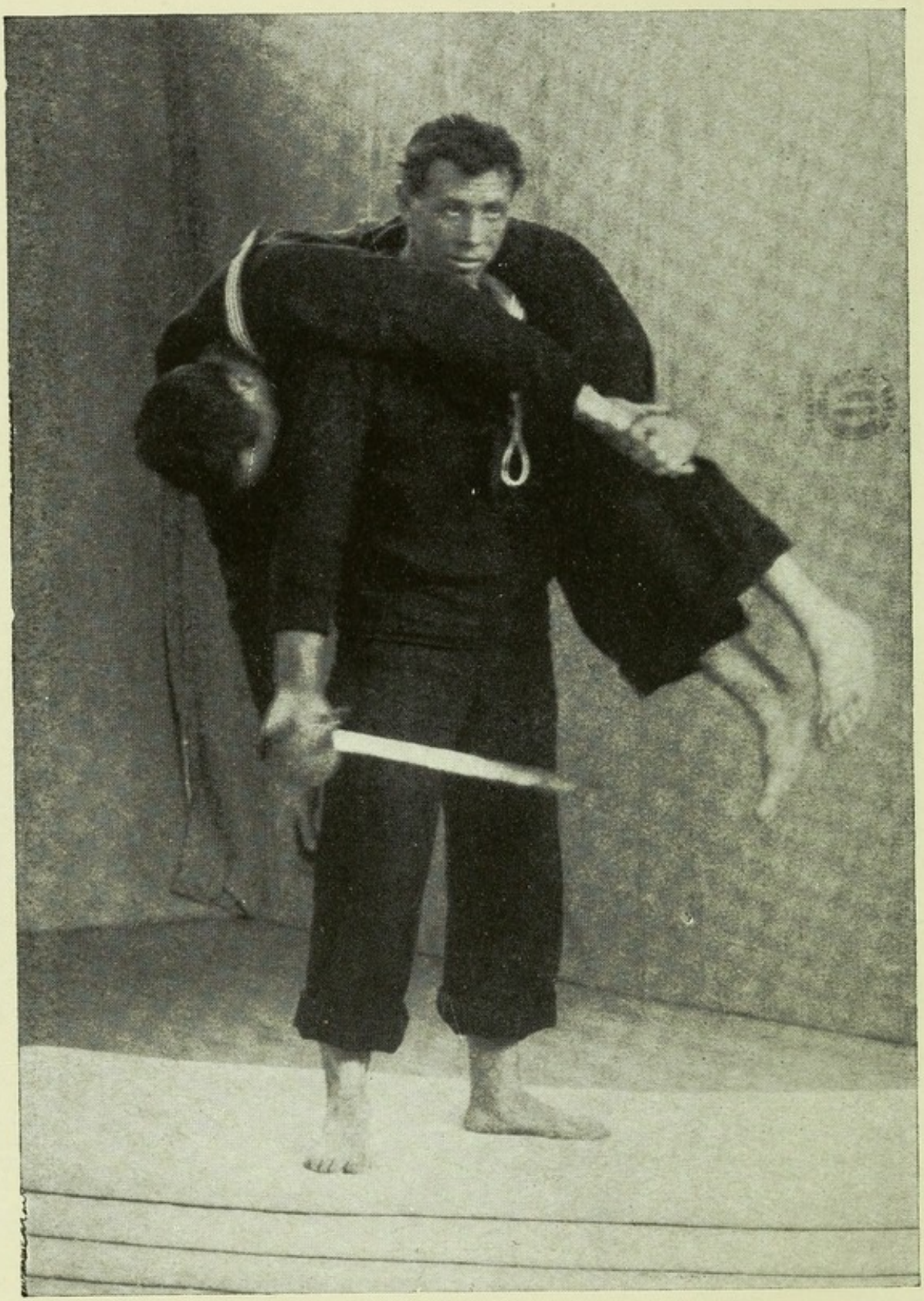
FIREMAN'S LIFT. I.



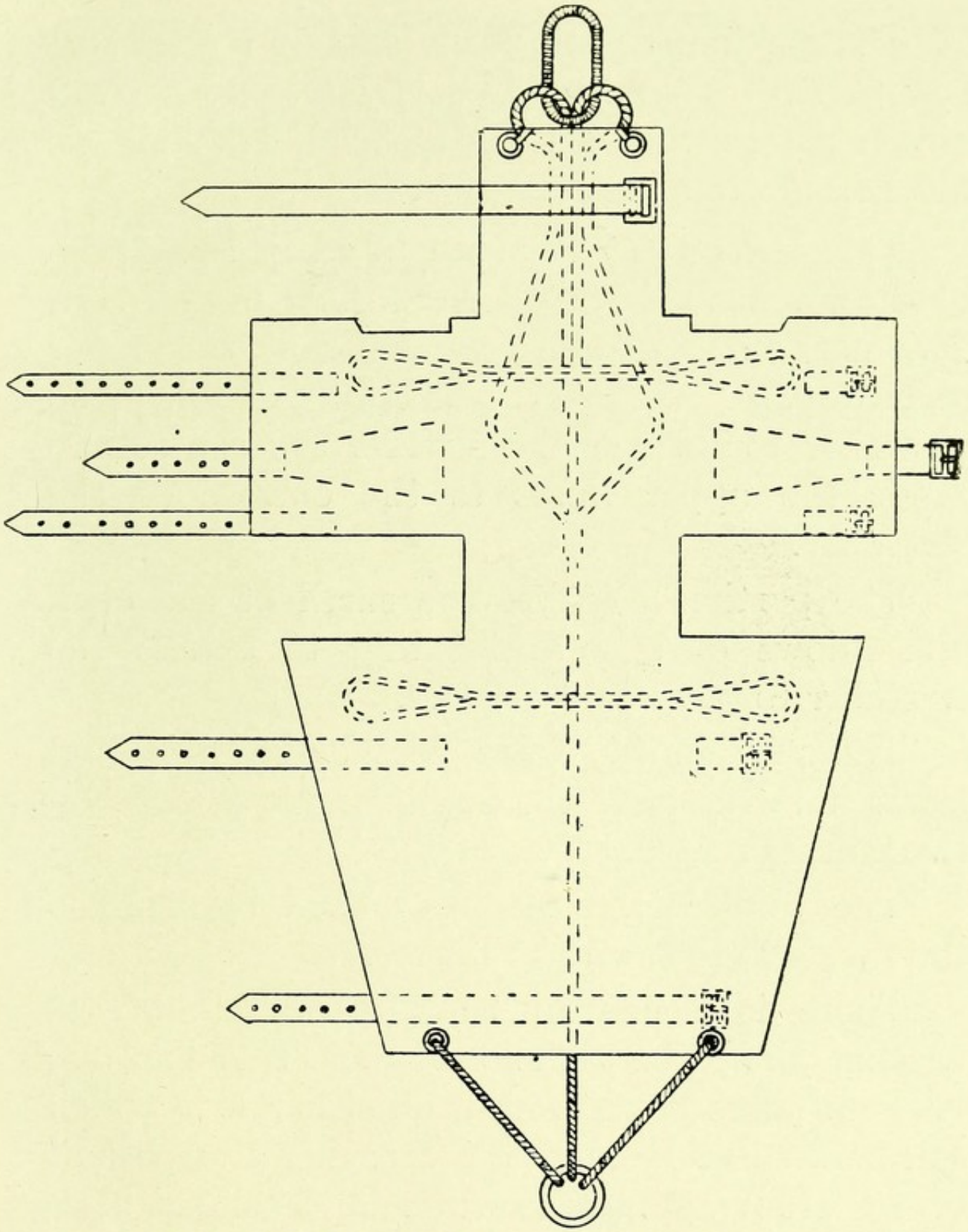
FIREMAN'S LIFT. II.



FIREMAN'S LIFT. III.



FIREMAN'S LIFT. IV.



NEIL ROBERTSON STRETCHER.

The portion (*a*) takes the head and neck and the patient is secured to it by a canvas strap which passes round the forehead, keeping his head from drooping forwards.

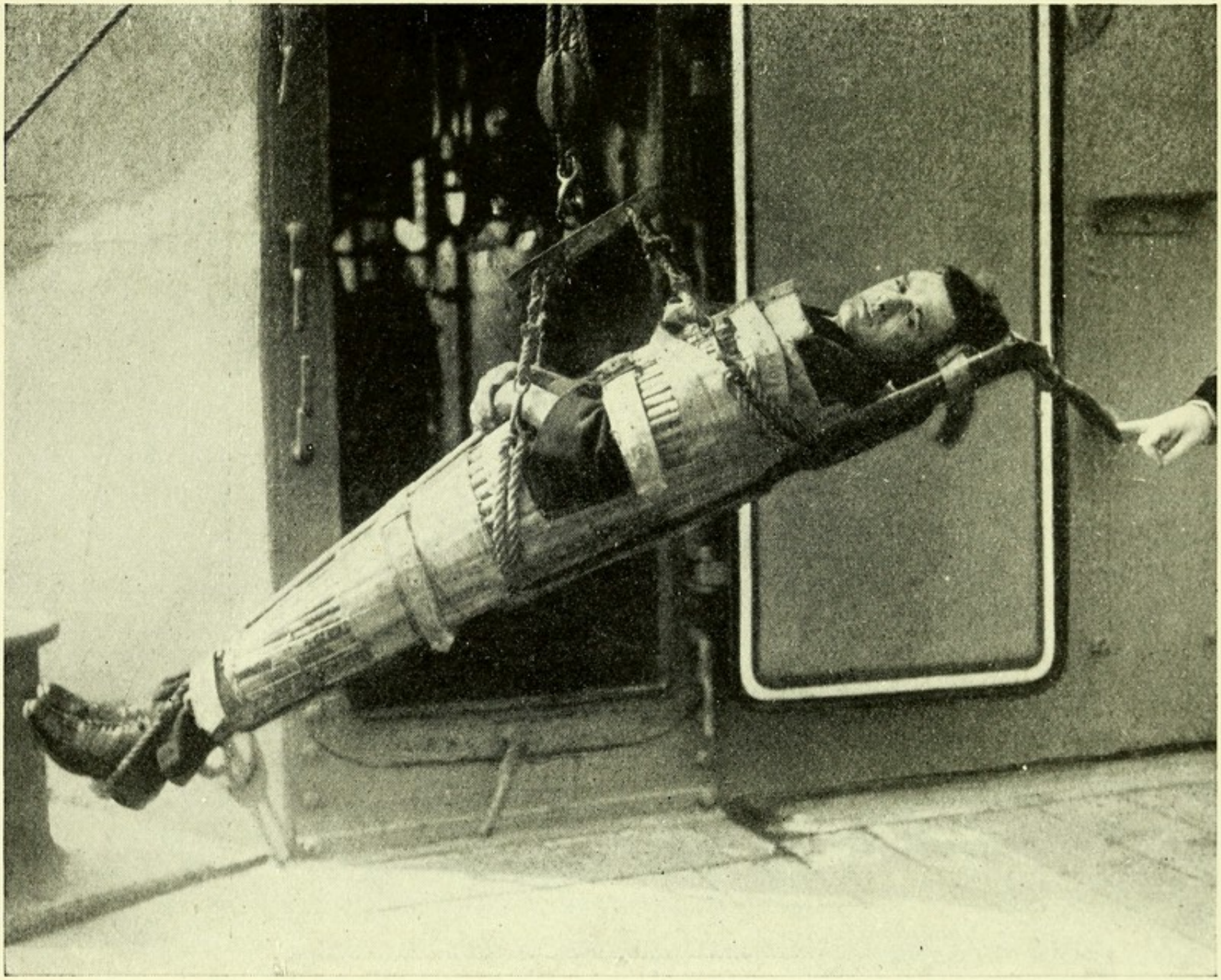
The portion (*b*) is made to wrap round the chest, notches being cut where the arm-pits rest. This portion has three canvas straps, the upper and lower of which are used for fastening the stretcher round the chest while the centre one binds the upper limbs to the outside of the stretcher.

The portion (*c*) takes the small of the back and allows of enough bending to enable the stretcher to get round corners.

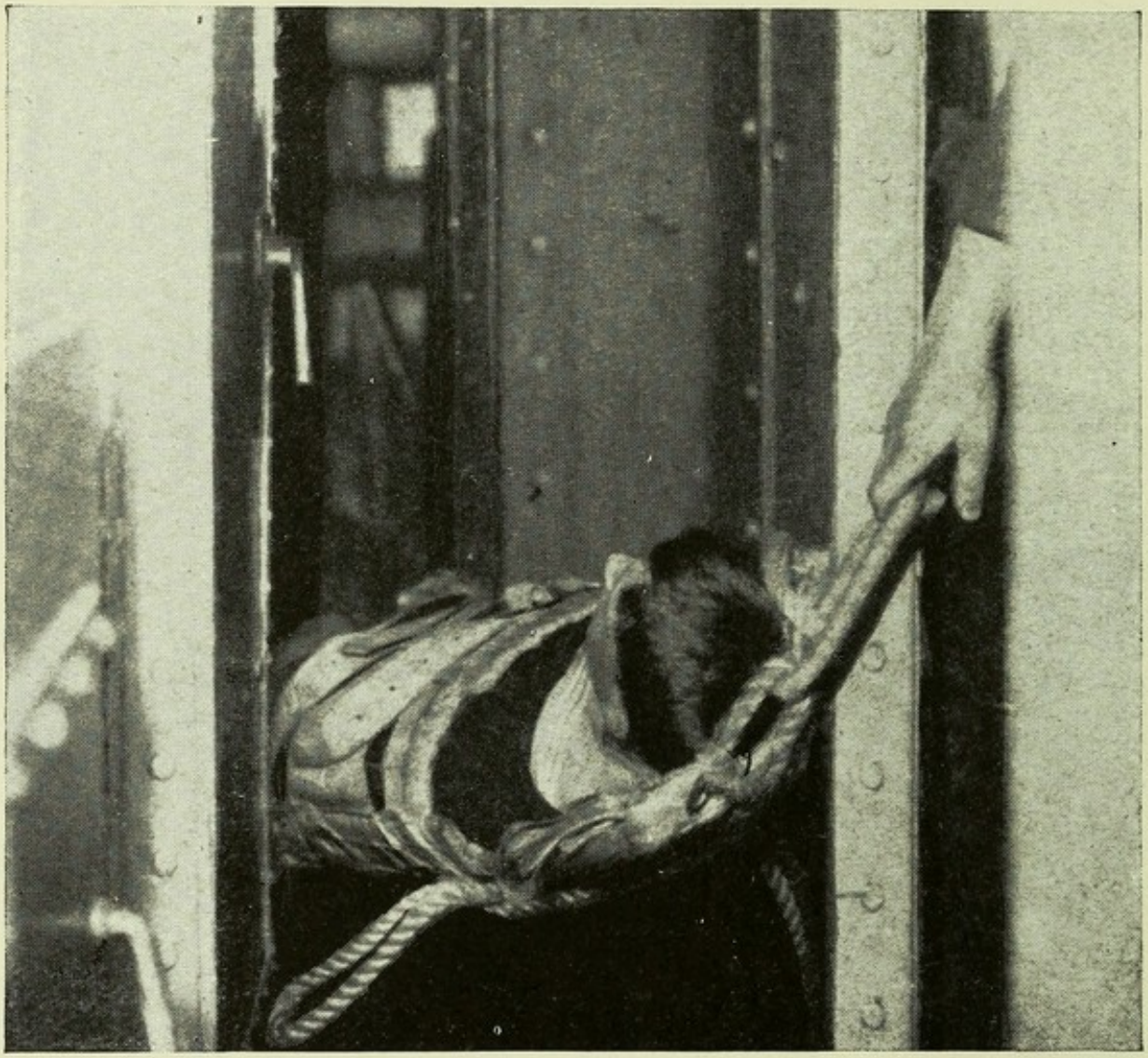
The portion (*d*) folds round the hips and lower limbs down to the ankles and is secured by two canvas straps.

The whole stretcher is stiffened by bamboo slats which are sewn to the canvas.

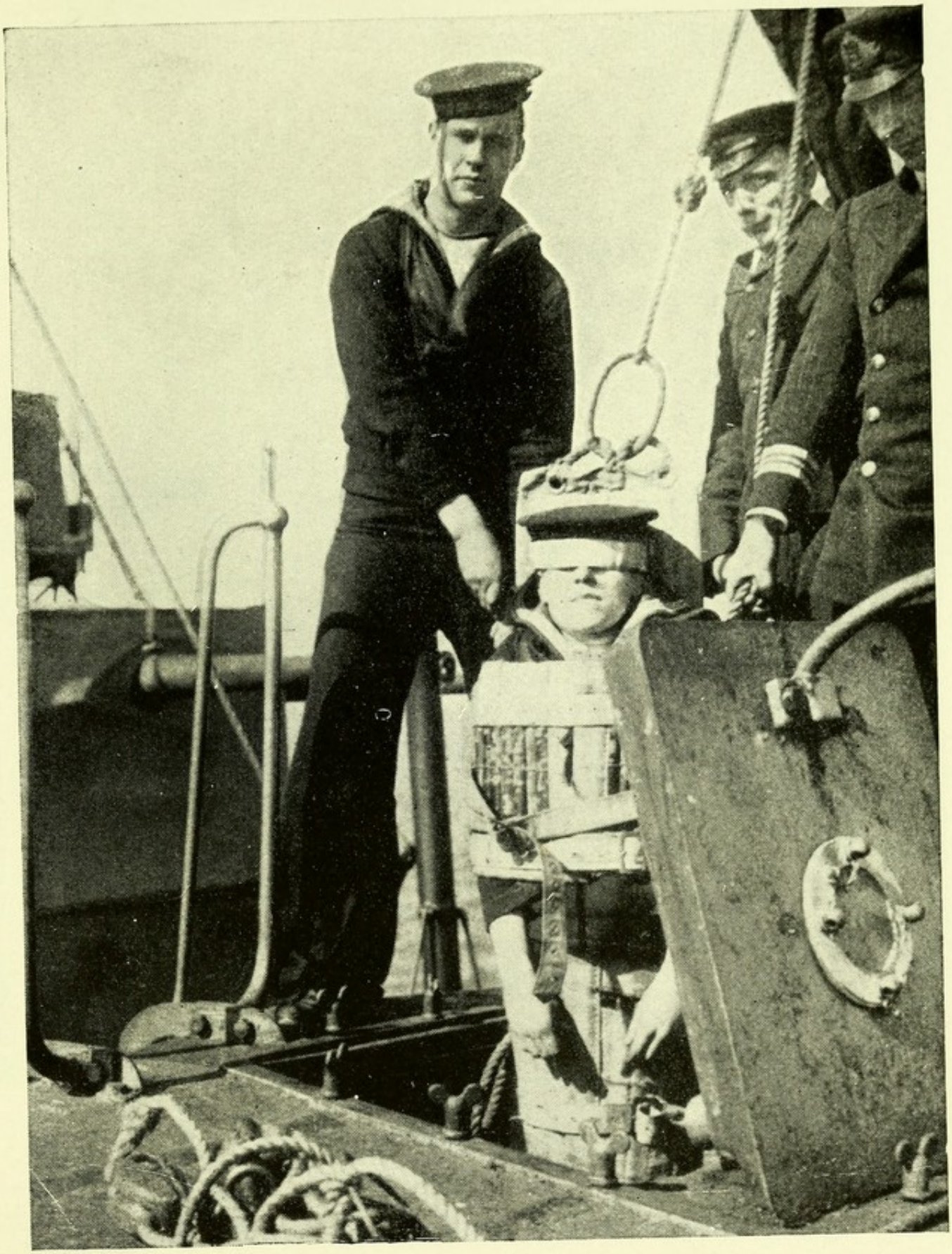
There is a central backbone of stout rope passing along the under surface. This has two beckets passing out from it on either side which can be used as handles for carrying the patient or for securing tackles when he is slung hori-



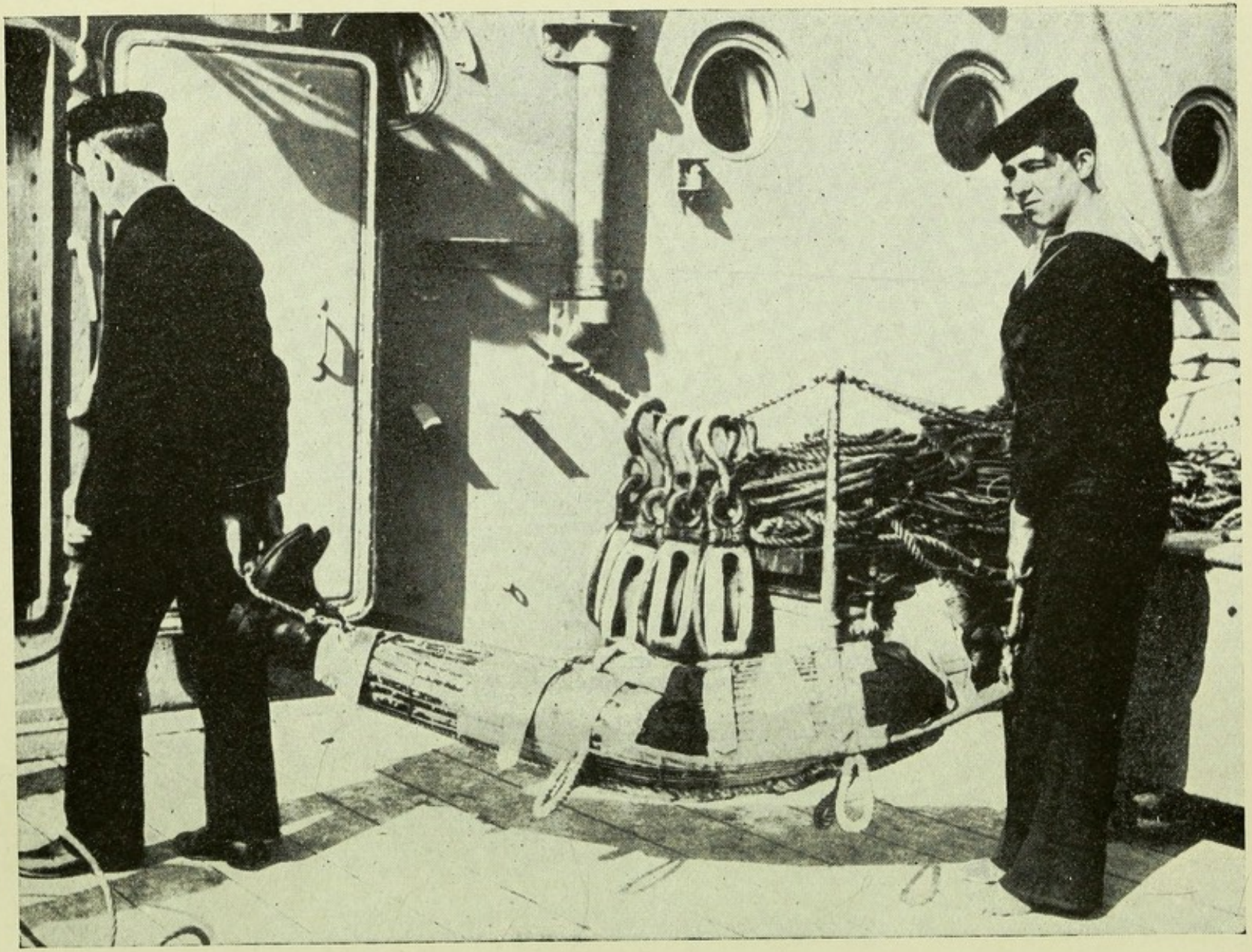
NEIL ROBERTSON STRETCHER IN STOKE HOLDS.



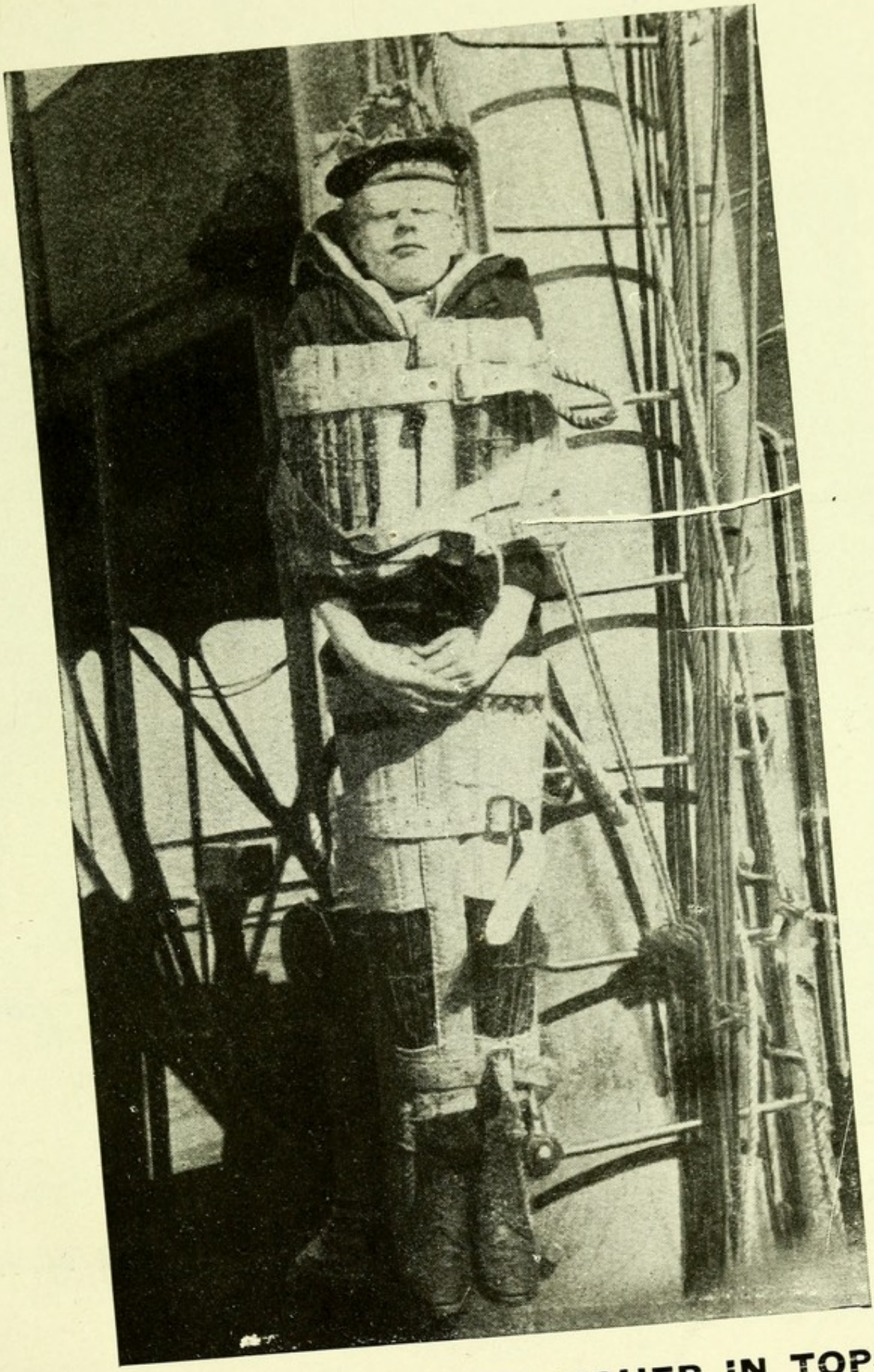
NEIL ROBERTSON STRETCHER IN STOKE HOLDS.



NEIL ROBERTSON STRETCHER IN TURRET.

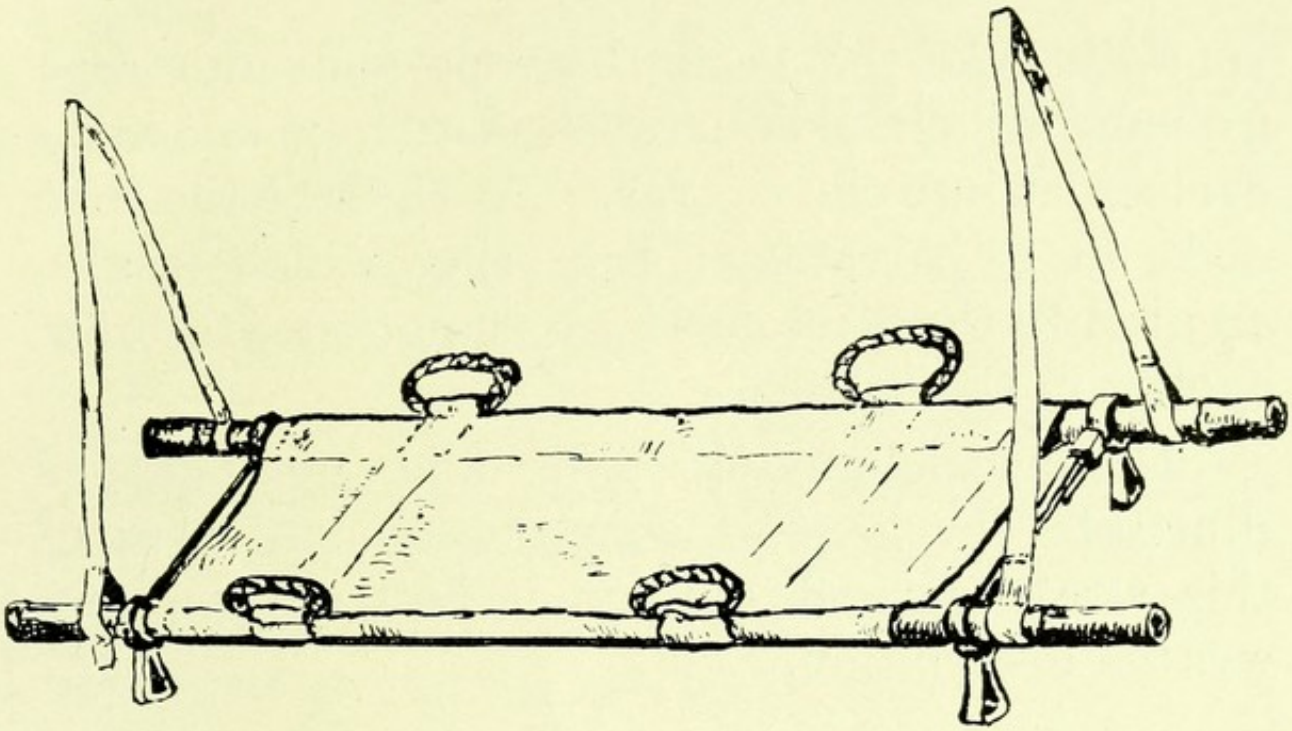


NEIL ROBERTSON STRETCHER ON DECK.

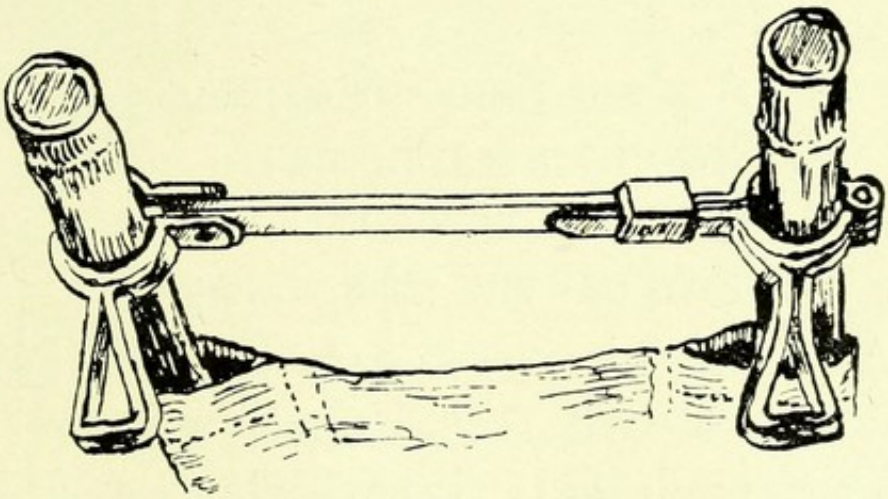


NEIL ROBERTSON STRETCHER IN TOPS.

NEIL ROBERTSON STRETCHER IN CONNING TOWER.



STRETCHER.



SPREADER.

BAMBOO AND CANVAS STRETCHER.

zontally. At the head the rope ends in a rope grommet which takes extra security from two brass eyelets let into the canvas. At the foot the rope ends in a galvanized iron ring which is also secured to the stretcher by a span going to brass eyelets in the canvas.

The accompanying plan and photographs illustrate the general construction and uses of this stretcher and explain it better than any written description.

BAMBOO AND CANVAS STRETCHER.

The bamboo and canvas stretcher consists of—

A. A stout piece of canvas.
B. Two bamboo poles.
C. Two iron spreaders.
D. Two canvas sling-straps.

A. A stout piece of canvas about six feet long by about two feet broad, with a hollow seam along each side in which the poles are rove.

On either side, about eighteen inches from each end, are securely attached rope grommets

which may be used for extra bearers or as attachments for bandages securing the patient to the stretcher.

B. The bamboo poles are each about eight feet long and about two inches in diameter.

C. Each spreader consists of a strip of galvanized iron, one inch broad and quarter of an inch thick. It is permanently fixed to one pole, a swivel joint allowing it to lie alongside its pole when the stretcher is stowed.

When in use, however, the spreader is used to spread the poles apart, being fastened to the opposite pole by an easily-applied hinged loop.

To each spreader are fixed little iron legs (about three inches long) made of a doubled piece of the same kind of iron strip as the spreader.

It is important to note that each pole has only one of the spreaders *permanently* attached to it. Thus the poles can be withdrawn from the canvas when this latter requires to be scrubbed and disinfected or stowed.

D. The simple canvas strap, two inches broad and five feet long, is looped round the handles so

that the stretcher-bearer can take some of the weight on his shoulders.

One end of each strap is permanently fixed to its pole so that it shall not be lost.

When the stretcher is dismantled for stowing, the strap should be used for holding the spreader snugly alongside its pole, the poles should be stowed overhead and the canvas should be rolled up and stored as clean hammocks are.

Practice during peace-time is extremely important. After an action is over probably all hands will be employed in moving the wounded and the more efficiently you do the work the less suffering will you cause.

(19) PREPARATION OF ROOM, BED, &c. FOR WOUNDED.

In civil life and occasionally in Service life, you may have to make preparations for receiving the wounded. The following short rules for preparing a room for this purpose may be useful :—

(*a*) Choose a room that can be easily reached, *e.g.*, the ground floor of a house.

(*b*) Choose a room with plenty of light and air and efficient means of heating.

(*c*) Remove all unnecessary furniture and have a care that there are no mats or other obstacles over which the stretcher-bearers may trip.

(*d*) Two chairs should be in readiness on which the stretcher may be rested.

(*e*) A narrow simple bed with a good hard mattress is best, and it should have space on either side of it so as to allow of easy nursing.

(*f*) The bedding should be clean.

(*g*) Hot-water bottles, *e.g.*, ginger-beer bottles filled with hot water and put inside a stocking, or a brick warmed in the oven and then wrapped in flannel, should be put in the bed.

(*h*) Plenty of hot water should be ready, and basins, soap, towels, and several clean buckets.

FOURTH LECTURE.

NOTE.—In the concluding lecture it is necessary to deal with a great variety of subjects which could not be included in the previous lectures. It must therefore be difficult for you to follow, unless you are very attentive.

(1) FIRST AID TO THE APPARENTLY DROWNED.

When a person drowns, or nearly drowns, he usually has a great struggle. His natural instinct of self-preservation makes him shout for help and throw his arms out to clutch something to prevent him from sinking. He usually becomes terror-stricken and loses his head, often contributing largely to his death. As most of you know, the great thing to make you float is to submerge as much of yourself as possible, just leaving your nose and mouth out for breathing. The back of the head should be pushed well under water and the chin raised.

The arms are a great weight if held out of the water, and that is why a person at once sinks if he throws his arms out of the water. The mouth should be opened to breathe when it is well clear of the water, and then kept shut. If you try calling out you are almost sure to get a mouthful of water, which frightens you all the more, and embarrasses your breathing. Therefore in helping a drowning man you should try to keep him calm and reassured.

But we must now imagine that he has had no help nor advice; he has struggled, shouted, clutched, and sunk, and has gone through those stages of awful terror, drowsy, tired indifference (in which his life's panorama is said to appear before his uninterested mental eyes), and finally unconsciousness. He is then apparently dead, and yet, if he be taken out of the water and artificial respiration be properly performed, he will return to life even if he has been under water for a quarter of an hour. (This seems a long time, but longer periods than this have been recorded, especially in the French medical papers.) It is possible that the drowning man

may rise to the surface unnoticed and so get a gasp of air during these cases of recovery after incredibly long submersion.

As the circumstances of the case are often uncertain as to time, you should perform artificial respiration in any case where the body is taken out of the water within a few hours of the accident or when it is perfectly fresh.

You will find all the onlookers are very excited, and all giving advice at once. You must take charge of the situation. Send one person for a doctor, another for hot blankets, another for brandy, tell off another to keep the crowd back, and choose another to help you in performing artificial respiration.

You must first clear the mouth, throat, and nose of any obstruction, by putting two of your fingers well into his throat and sweeping out any mud, sand, seaweed, &c. which the patient may have taken into his mouth in his final death struggles. It is also essential to empty the lungs of the water and froth as much as you can as otherwise the movements of artificial respiration

will only churn the bubbles of air and water backwards and forwards in the pipes without any air getting into the lungs proper.

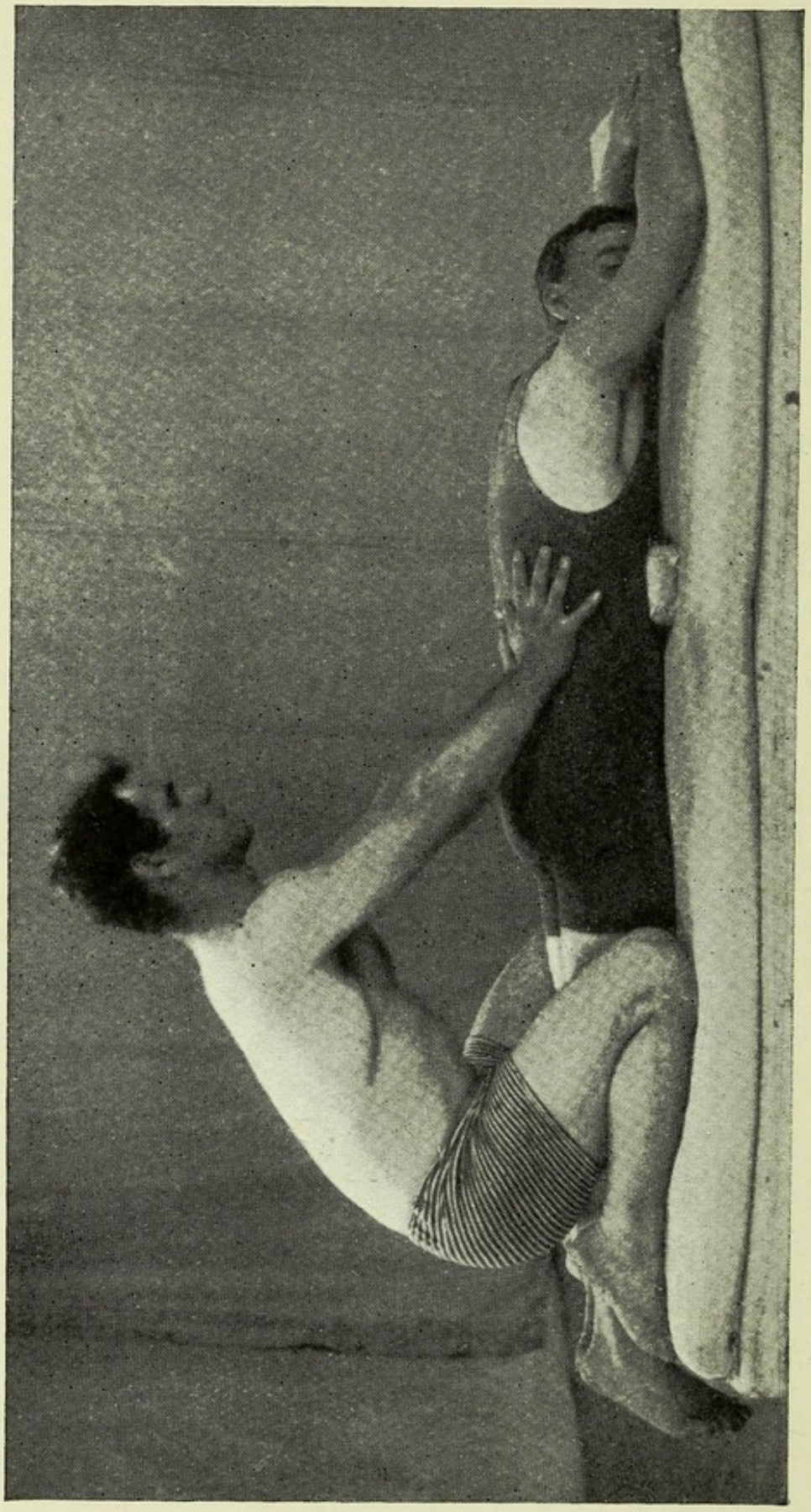
There have been many ways of doing artificial respiration, and no doubt many of you have learnt some of the old-fashioned methods. Perhaps some of you have tried them and found how easy they were to talk about and how difficult they were to perform, especially for the two or three hours which may be necessary.

(2) WATCHWORD OF FOURTH LECTURE.

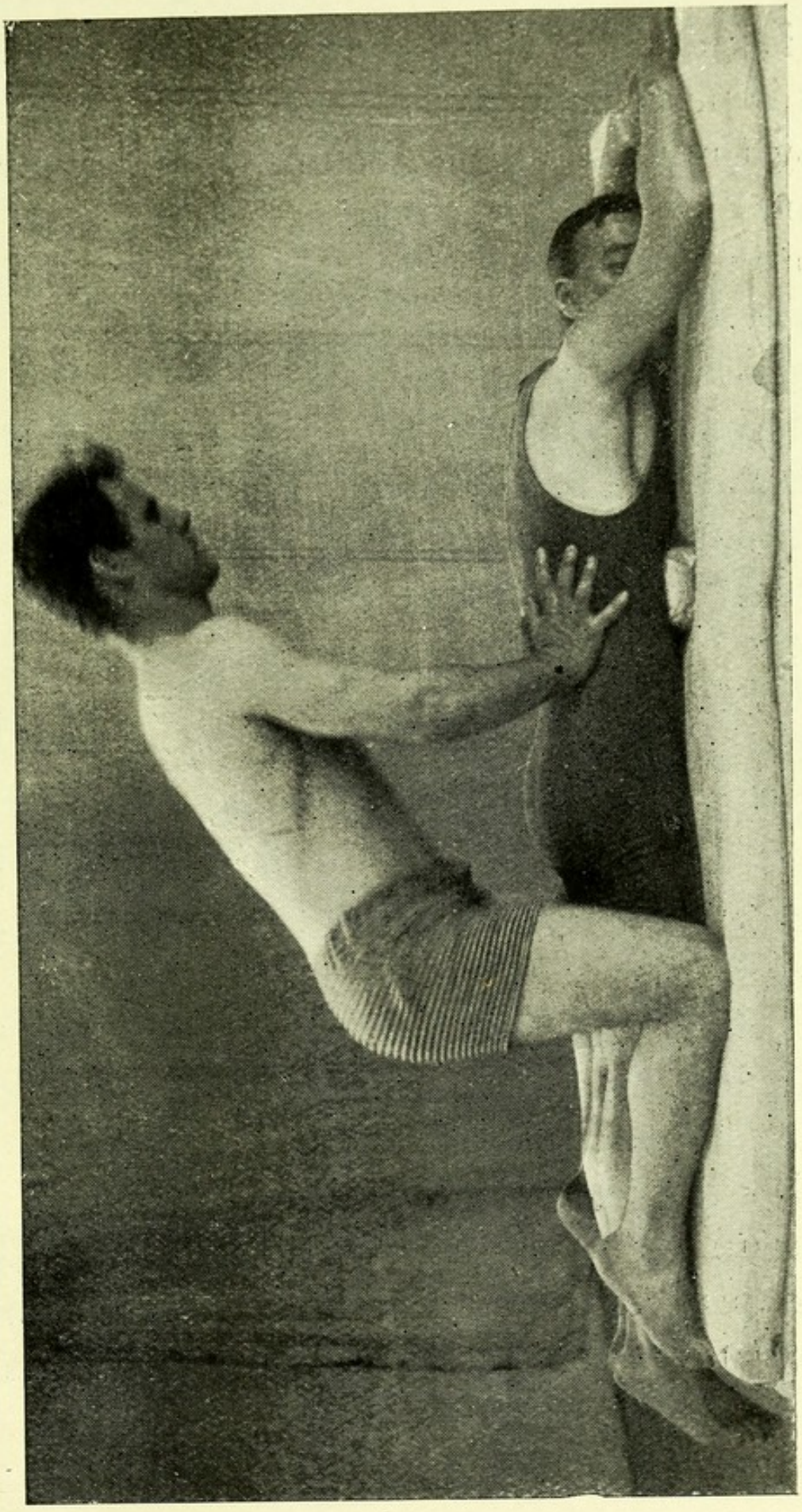
Whatever method you may employ, promptness of action is all-important, so the best watchword for this lecture is as follows:—"*In "dealing with an apparently drowned person, act "very promptly, and do not lose your head or "give up hope.*"

(3) ARTIFICIAL RESPIRATION.

The latest method is that introduced by Professor Schäfer, and it is so simple and so efficient that it has superseded all others.



ARTIFICIAL RESPIRATION.



ARTIFICIAL RESPIRATION.

It is known as the "Prone-Pressure Method," and it is performed as follows :—

Lay the man on the ground, face downwards.

Turn his head on one side.

No time shall be lost by removing or loosening clothes.

Begin artificial respiration at once.

Tell one of the bystanders to prepare some sort of pad like a folded coat and slip it in under the patient's body just above his waist; but do not wait for this. You will probably have performed several movements of respiration before the pad is ready and have thus gained all-valuable time.

Kneel by the patient's side or across his body facing his head.

Spread your hands out flat on his back at his lowest ribs.

Press gradually and slowly for about three seconds by leaning forward on to your hands. Use no violence.

Relax the pressure by falling back into your original upright kneeling position for two seconds.

The process of artificial respiration consists in repeating this swaying action backwards and

forwards about twelve to fifteen times a minute. (*See* illustrations and compare the slope of the operator's thigh in the two positions.)

(4) "FIRST AID" IN ALL CASES OF UNCONSCIOUSNESS.

Although you may be told in books various signs and symptoms by which you will be able to distinguish the different cases of unconsciousness, these signs and symptoms may be very indefinite; and, besides, a person may be found unconscious from several causes in combination, as, for example, when a man gets dead-drunk, falls down, strikes his head and is stunned.

Therefore, it is well for you to have a definite set of simple rules to be applied in all cases of unconsciousness.

The general rules of First Aid to an unconscious person may be summed up as:—

(a) *Send for a doctor and remain by the patient till the doctor arrives.*

(b) *Lay the patient down flat on his back, turn his head on one side and then disturb him as little as possible.*

(c) *Loosen the clothes on the neck, chest and belly so that he can breathe easily.*

(d) *Keep the crowd back, so that he may get plenty of fresh air.*

(e) *Give no alcohol; in fact give no food or drink of any kind.*

(f) *Put a hot water-bottle, well wrapped in flannel, at the patient's feet and keep him warmly but not heavily covered.*

(5) DRUNKENNESS.

Unconsciousness may be due to drink. You have all probably seen a man dead-drunk. Remember that a man in such a condition is not a fit object for rough handling or practical jokes. Such a man is suffering from dangerous poisoning and may die. The proper treatment for him is to make him sick by tickling the back of his throat with a feather or giving him mustard and water (a dessertspoonful of mustard to half a pint of warm water) or other emetic. Then, when he is sick, see that he does not draw any of the vomit into his wind-pipe. It is best to lay him on his side and allow him to sleep off

the effects of his debauch. Be careful that he does not catch cold. A drunken man may very readily contract pneumonia, a disease which is very fatal in drunkards.

(6) STUNNING.

Unconsciousness may be due to stunning. The medical name for this is "concussion." The cause is a blow on the head, and it would be suspected if a wound or a large bruise were seen on the head, and the patient lay unconscious. The First Aid treatment is simply that laid down in the six general rules (*see* page 165).

(7) STROKE.

Apoplexy is another cause of unconsciousness. A small blood-vessel bursts in the brain, and causes the patient to fall down absolutely suddenly. Apoplexy usually occurs in old men, and it is then due to some sudden extra forcible beat of the heart, arising from excitement or drink, causing one of the diseased old blood-vessels to give way in the brain. The chief

special signs would be sudden attack in an elderly person, complete unconsciousness, with deep snoring breathing, and perhaps his face twitches or the mouth is drawn to one side. The First Aid treatment again consists in the before-mentioned general rules, and especially must you avoid alcohol. In these cases the head and shoulders should be raised on a pillow.

(8) FAINTING.

Fainting is a common cause of unconsciousness. It is due to the heart working so feebly that not enough blood is pumped up to the brain. It may be caused by loss of blood, as mentioned in the second lecture, but most usually it is caused through the mind acting on the heart, as when a person faints on seeing blood. Frequently men faint during First Aid lectures when the description of some "medical horror" is a little too vivid. Such fainting may occur in the strongest and bravest of men, and in no way can it be considered a thing to be ashamed of. But fainting may be due to bodily causes. A certain well-known old professor of medicine

used to say that there were three reasons why a woman faints in church on a Sunday afternoon, namely, the stuffy air of the church, the large Sunday dinner, and the tight Sunday stays. This will help you to remember some causes of embarrassment of the heart's action.

The patient turns pale in the face, especially in the lips, and he breaks out into a sweat, sways about for a moment, and then falls. The First Aid treatment consists in lowering the head as low as possible. If the patient be sitting, it may be more convenient to make him put his head between his knees. If he be lying down, remove his pillows. Then loosen the clothing about the neck, chest, and belly, and allow plenty of fresh air. It is better to avoid such remedies as splashing with cold water and inhaling smelling-salts. Lowering of the head is always quite sufficient until the doctor arrives.

(9) CONVULSIONS.

An epileptic fit or convulsion is another cause of unconsciousness. This distressing disease is the "falling sickness" of the ancients. The

patient falls to the ground regardless of his surroundings, and usually his limbs are thrown about in terrible convulsions—a most unnerving sight to all onlookers. The treatment is simple. Apply the main rules, already stated, and prevent any injury by gently guiding the limbs as they are thrown about, so that they are not beaten against neighbouring objects. Do not use force, nor try to hold the patient still; this sometimes only makes the convulsions worse. The fit passes off naturally in about two minutes, and when the doctor arrives he will give the patient some medicine to prevent any more fits occurring.

Occasionally a man may be only shamming, or the fit may be a hysterical attack, as sometimes occurs in people who are under the influence of drink; but no one but a doctor can distinguish between these, so First Aid must be the same in all cases of convulsions.

(10) SUFFOCATION.

This condition of unconsciousness is caused by want of fresh air, and may be brought about

in a variety of ways, as, for example, drowning, hanging, choking, and the breathing-in of poisonous gases such as smoke, the fumes of charcoal or coke, the gases in wells, caves, coal-bunkers, and sewers, and the leakage of gasolene in submarines.

The patient's face is swollen and of a dusky purplish hue. He breathes heavily, perhaps has convulsive movements, and he may be delirious.

First Aid consists in removing the cause and at once performing artificial respiration in the fresh air.

In rescuing a person from any place containing poisonous gases you should tie a rope round your waist, leaving the end in charge of some reliable person, take several deep breaths of fresh air, cover your nose and mouth with a wet handkerchief, dash in and grab the patient, and dash out again with him. If you cannot get hold of him at once, you must not wait in there. Come out and take several deep breaths of fresh air while some one else goes in, and then you are ready to have another try.

Do not take a light with you, as the gas may be explosive.

(11) CAISSON DISEASE.

In the Diving Manual, on page 61, there is a chapter entitled "First Aid to the Diver in case of Accident." Most of this subject has been dealt with in various parts of these lectures, but caisson disease requires mention.

This is a condition caused by a diver coming up too quickly from greater depths than six fathoms, and his symptoms are due to bubbles of gas forming in his spinal cord and elsewhere.

(As he goes down, he is subjected to more and more pressure, and the air has to be forced to him with greater and greater pressure. The air becomes dissolved in his blood in much the same manner as gas is dissolved in water in making a bottle of soda-water. If now he comes up too quickly, the air is freed from his blood rather in the same way as when the cork is pulled out of the bottle of soda-water. Bubbles then form in the spinal cord, &c., and the symptoms of caisson disease come on.)

These symptoms may be (1) dizziness, shortness of breath, sometimes pain in the stomach and a feeling of distress, blueness of the lips and unconsciousness, or (2) pain in the stomach followed by "pins and needles" in the arms or legs, inability to pass water, and then loss of power in the arms or legs, or (3) the mildest symptoms of caisson disease are the "screws" or "bends." These are pains about the joints, coming on half to two hours after leaving the water, and generally passing off in time.

The First Aid for caisson disease is to immediately report any of the above symptoms, so that the proper treatment can be immediately applied in "recompression," either by being sent down again with another diver in attendance, or being put into a proper recompression chamber.

Prevention being better than cure, the following rules are good for intending divers:—

1. Do not go in for diving if you are fat.
2. Do not dive unless you are feeling quite well. Report any ill-health to the medical officer who examines you.

3. Go down as quickly as possible, but come up strictly according to the rules in the Diving Manual.
4. Report at once to the medical officer any symptoms of caisson disease.

(12) SUNSTROKE AND HEAT-STROKE.

Sunstroke may occur to any of you, especially in the tropics. To avoid sunstroke you must cover your head and backbone with some material that will prevent the dangerous rays acting on your brain and spinal cord. It has been discovered that the red and orange-coloured materials, as used by photographers, are best for shutting out these rays. No doubt all tropical hats and helmets will soon be lined with a ruby-red lining. You should also know that, in the tropics, it is very necessary to avoid alcohol, especially beer and other malt liquors.

Heat-stroke is very similar to sunstroke except that it is caused by other kinds of heat than that of the sun.

If a person gets a sunstroke or heat-stroke he generally complains of a fearful headache, feels very tired, and finally falls down.

The best First Aid is to strip him and cover him with a wet sheet. As the water evaporates the patient will be cooled.

(13) FROST-BITE.

This occurs after exposure to great cold, especially in intemperate or underfed persons. The parts affected are generally the ears, nose, fingers, and toes. They are bluish at first and then waxy yellow. The patient feels no pain, and is generally not aware of his condition.

The First Aid treatment consists in the *gradual* restoration of the circulation of the part by gentle rubbing with warm hands. It is dangerous to warm the part too suddenly.

(14) POISONING.

Elaborate details are of no use, because you would certainly forget them at the critical moment.

You should simply learn off by heart the following general rules laid down by the St. John's Ambulance Association :—

"1. *When a person has swallowed a poison and threatens to go to sleep. Keep him awake.*

"2. *When there are no stains about the mouth, give an emetic (mustard and water), also milk, eggs, oils (except in phosphorous poisoning), and end up with strong tea.*

"3. *When there are stains about the mouth, give milk, eggs, and oils, but no emetic.*"

Perhaps you will remember these broad facts if a few words of explanation be added.

A. If a person, after taking a poison, is drowsy and wants to sleep, that poison was probably opium or its most important constituent, morphia. The danger of allowing the person to sleep is that he will probably never wake again. For this reason you make him walk about, give him black coffee to drink, and flick him with towels if he tries to lie down.

B. If there are stains about the mouth of the poisoned person, the poison was probably some burning fluid like vitriol or "caustic." If you make this person vomit, the fluid, as it is vomited, would burn all the way up and would make still worse the burns which it caused when it was swallowed. Besides, the burnt stomach walls might give way in the straining which

accompanies vomiting. It is better, then, to make the patient swallow some antidote which will stop the burning action and prevent any more harm being done.

If the poison is "acid," such as vitriol, give the patient large quantities of water to which has been added lime or washing soda.

If the poison is "alkali," such as caustic soda, give the patient large quantities of water and vinegar (a pint of water to a pint of vinegar).

(15) CHOKING.

Fish bones, false teeth, food being rapidly swallowed, food being vomited, coins or other foreign bodies held in the mouth may accidentally "stick in the throat," perhaps partially blocking the wind-pipe and causing spasms and all the distressing sensations of choking.

It is a curious fact that wherever the foreign body be lying, the patient nearly always seems to feel it as though it were somewhere near his "Adam's apple."

The First Aid for choking is:—Lay the patient on his face, or hang him up by the heels, pat his back sufficiently suddenly and forcibly to make him cough, and put your finger down his throat to try to hook out the foreign body. This last remedy may make him vomit, and this is one of the best ways of treating choking.

A fish bone may often be seen sticking in the tonsil, and can be removed with the finger. If this fails the patient should eat plenty of soft bread, which will surround the fish bone and prevent it doing harm until it is dissolved in the stomach.

(16) FISH-HOOK IN FINGER.

The barb of a fish-hook prevents it being withdrawn except with much tearing and pain. The proper treatment is to push the point and barb on out through the skin and break it off. The hook then can be withdrawn without trouble.

(17) DOG-BITE.

The best First Aid is to at once stop the circulation in the part, suck the wound and

then wash it thoroughly to its deepest parts with soap and hot water. Then treat as for an ordinary wound.

(18) SNAKE-BITE.

Snake-bite is not of frequent occurrence in England, but on foreign stations it is always to be thought of.

Again you should stop the circulation of the part (it is usually a toe or a finger, and a tight band is easily applied round such a part), suck the poison out, wash the wound thoroughly and rub crystals of permanganate of potash (you all know it, as it is served out from the carpenter's stores for the w.c.'s; it makes water turn a brilliant purple) into the deepest parts of the wound. With snake-bite there is often much shock, so treat this with warm clothes and hot bottles, and lay the patient down. Perhaps in this case, and in this case only, you may be justified in giving a little brandy, but you know that on every other occasion alcohol is not to be used as a First Aid remedy.

(19) THE CARE OF THE EARS.

Gun-deafness is of two varieties, one temporary, the other permanent and incurable. The latter is such a terrible affliction that you must take precautions against it. Any gun may cause it, and there are certain positions around the gun which are most dangerous. It may come on suddenly after one explosion, or it may be of gradual onset, becoming worse and worse after every exposure to gun-blast.

The proper precaution is to block the outer part of the ear with a large plug of cotton-wool or wool and moulding clay or special patent plugs. All plugs must be put in lightly. At the moment that the gun is fired you should keep your mouth open.

If wax collect in the ears, or if foreign bodies get into the ears you should not attempt to treat yourself. You should go to the doctor at once, otherwise inflammation may set in. He will syringe the ears in the proper manner.

(20) THE CARE OF THE EYES.

If a foreign body, such as a cinder, fly, piece of dust, metal filing, patent fuel dust, &c. gets

into your eye, do not rub it, do not allow a clumsy-fingered person to touch it, do not allow any instrument, such as a needle, pin, or knife to be used.

Put your face into a basin of clean warm water and open the eye several times under water. If this is not effectual, then let some gentle-fingered person remove the foreign body by laying a small pointed piece of clean blotting-paper on it. If this fails, go to a doctor as soon as possible.

After the foreign body has been removed, put one drop of clean castor oil in the eye.

The eyes of the guns' crews are often much inflamed in battle by the smoke and dust.

Clean warm water, with some boric acid added, should be used if possible for washing the eyes.

(21) INABILITY TO PASS WATER.

It is unnecessary for you to know the various causes of this condition.

Suffice it to say that it requires urgent relief.

The First Aid treatment for it is:—Sit the

patient in as hot a bath as he can bear. Cover him with a blanket. Tell him to try to pass his water in the bath. Send for a doctor.

(22) DOMESTIC WEIGHTS AND MEASURES.

One teaspoon	- -	about 1 drachm.
„ dessertspoon	- -	„ 2 drachms.
„ tablespoon	- -	„ $\frac{1}{2}$ ounce.
„ sherry wineglass	-	„ $2\frac{1}{2}$ ounces.
„ tumbler	- -	„ $\frac{1}{2}$ pint.
„ pint	- - -	20 ounces.

Avoirdupois.

A five-shilling piece	weighs about	1	ounce
„ half-crown	„ „	$\frac{1}{2}$	„
„ florin	„ „	$\frac{2}{5}$	„
„ shilling	„ „	$\frac{1}{5}$	„
„ sixpence	„ „	$\frac{1}{10}$	„
„ threepenny piece	„ „	$\frac{1}{20}$	„
„ penny	„ „	$\frac{1}{3}$	„
„ halfpenny	„ „	$\frac{1}{5}$	„
„ farthing	„ „	$\frac{1}{10}$	„

The diameter of a penny is about $\frac{1}{10}$ foot.
„ „ halfpenny is about 1 inch.
Five pennies measure six inches across.

INDEX.

A.

B.

C.

G.

H.

I.

J.

K.

L.

M.

N.

O.

P.

R.

S.

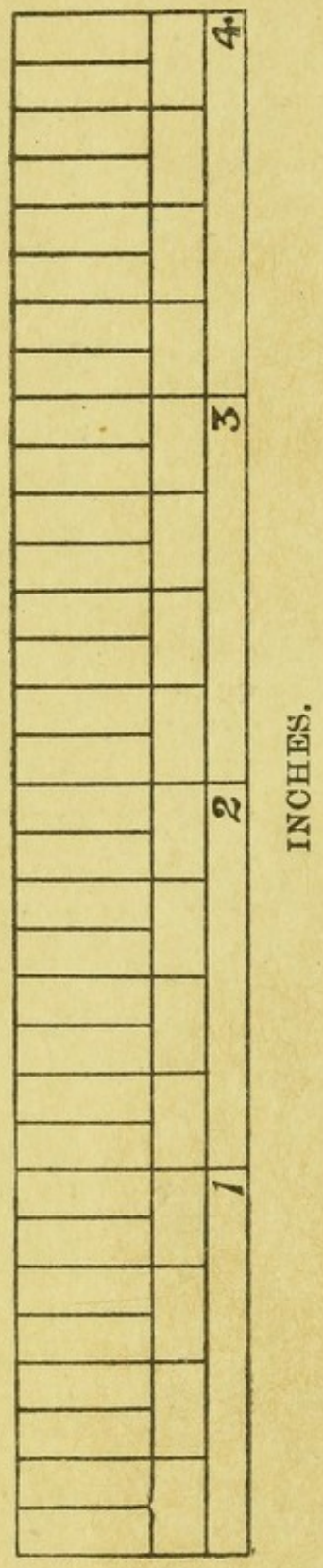
T.

U.

V.

W.

EMERGENCIES.



EMERGENCIES.