FIRST AID TO THE INJURED

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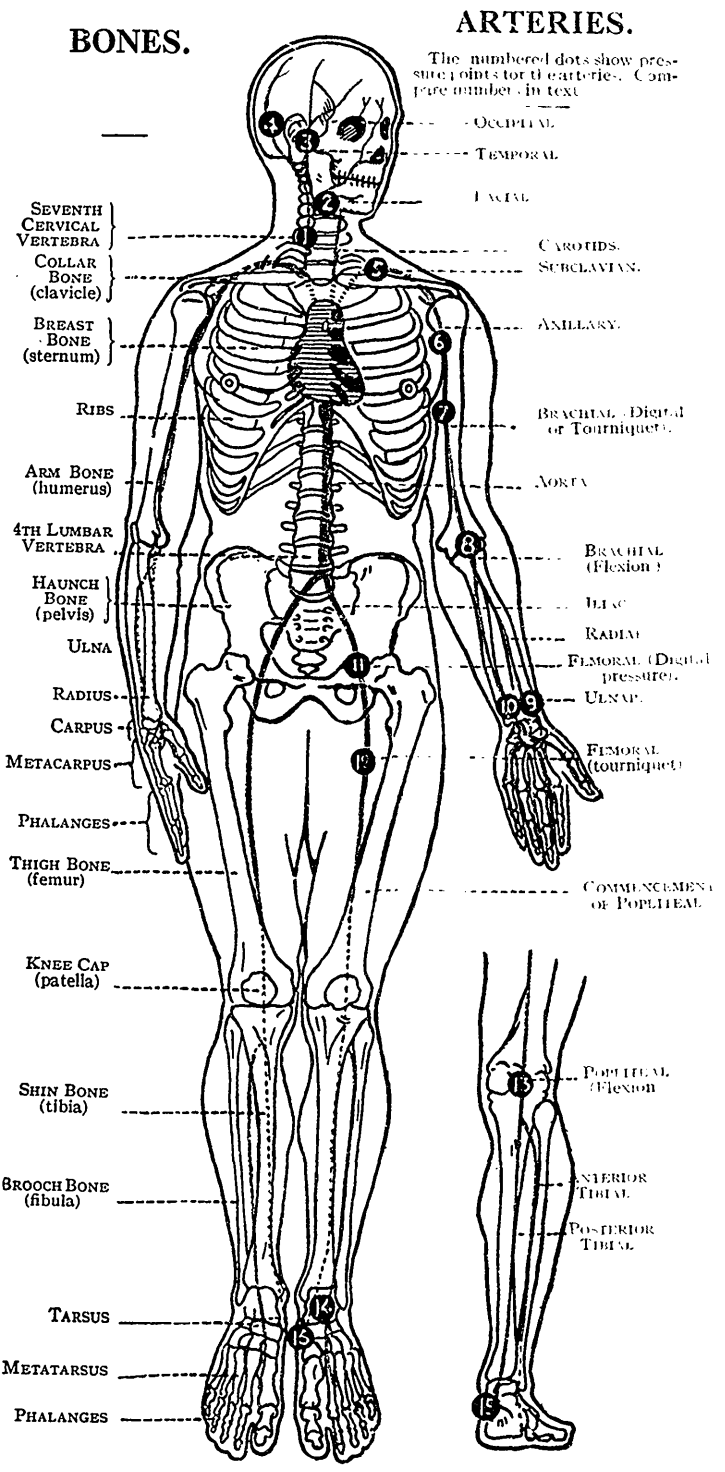
BONES.
ARTERIES.
The numbered dots show pressure points for the arteries. Compare number in text
Occipital
Temporal
Facial
Seventh Cervical Vertebra
Carotids.
Collar Bone (clavicle)
Subclavian.
Breast Bone (sternum)
Axillary.
Ribs
Brachial (Digital or Tourniquet).
Arm Bone (humerus)
Aorta
4th Lumbar Vertebra
Brachial (Flexion)
Haunch Bone (pelvis)
Iliac
Radial
Ulna
Femoral (Digital pressure).
Radius
Ulnar.
Carpus
Femoral (tourniquet)
Metacarpus
Phalanges
Thigh Bone (femur)
Commencement of Popliteal
Knee Cap (patella)
Popliteal (Flexion
Shin Bone (tibia)
Anterior Tibial
Brooch Bone (fibula)
Posterior Tibial
Tarsus
Metatarsus
Phalanges

FIRST AID TO THE INJURED

EXTRACTS FROM THE OFFICIAL TEXT BOOK OF THE ST. JOHN AMBULANCE ASSOCIATION, BY JAMES CANTLIE, M.A., F. R. C. S.

PREPARED BY THE CANADIAN BRANCH OF THE ASSOCIATION, OTTAWA, FOR THE USE OF CANADIAN TROOPS.

1915

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NOTE.

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First Aid to the Injured

CHAPTER I.

FRACTURES AND THEIR TREATMENT.

When a bone breaks a Fracture is said to occur.

Varieties of Fractures.

Fractures are classified according to the condition of the tissues adjacent to the bone as follows:—

1. Simple.—The bone is broken with but slight injury to the surrounding parts.

2. Compound.—The bone is broken and the skin and tissues are punctured or torn, thus allowing disease-producing germs to obtain entrance to the seat of fracture. The fractured ends may protrude through the skin, or (for example, when a bone is broken by a bullet) the wound may lead down to the fracture.

3. Complicated.—The bone is broken and in addition there is an injury to some internal organ (for example, the brain, spinal cord, lung,

etc.) or to some important blood-vessel or nerve.

A fracture may be compound or complicated as the immediate result of the injury; or a fracture, originally simple, may be converted into a compound or complicated fracture:—

(a) By careless movement on the part of the patient.

(b) By carelessness or ignorance on the part of one rendering first aid.

General Signs and Symptoms which may be Present.

(A fracture of the femur, humerus, or both bones of the forearm or leg, affords the most complete example.)

1. **Pain** at or near the seat of fracture.

2. **Loss of Power** in the limb.

3. **Swelling** about the seat of fracture. Swelling frequently renders it difficult to perceive other signs of fracture, and care must therefore be taken not to mistake a fracture for a less serious injury.

4. **Deformity** of the limb.—The limb assumes an unnatural position, and is mis-shapen at the seat of fracture. The contracting muscles may

cause the broken ends of the bone to override, thereby producing shortening.

5. Irregularity of the bone.—If the bone is close to the skin the fracture may be felt, and if compound it may be seen.

6. Unnatural Mobility.—Movement may be made out at the seat of fracture.

7. Crepitus, or bony grating, may be felt or heard when the broken ends move one upon the other.

The last two signs should only be sought by a doctor.

Apparatus for Treatment of Fractures.

Splints and bandages for First Aid frequently have to be improvised.

A Splint may be improvised from a broom handle, rifle, folded coat, piece of wood, cardboard, paper firmly folded, a rolled-up map, or, in fact, **anything that is firm and long enough to keep the joints immediately above and below the fractured bone at rest.**

When the above appliances are not available, the upper limb, if fractured, may be tied to the trunk, and in all cases a fractured lower limb should be bandaged to its fellow.

Bandages may be improvised from handkerchiefs, belts, straps, braces, neckties, or any piece of linen, calico, string or cord that comes to hand.

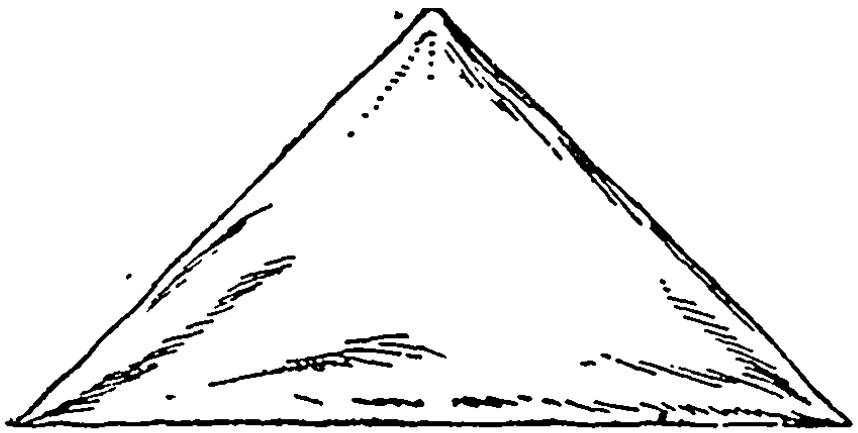

FIG. 8. Bandage spread out.

FIG. 9. Bandage once folded.

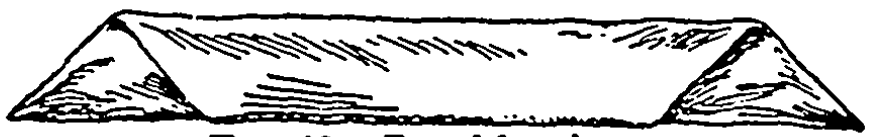

FIG. 10. Broad bandage.

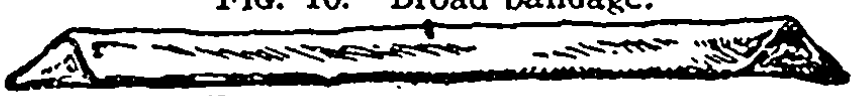

FIG. 11. Narrow bandage.

FIG. 12. The dotted lines show the folds of the medium bandage.

Triangular Bandages (Fig. 8) are made by cutting a piece of linen or calico about forty inches square diagonally into two pieces.

The broad bandage is made by bringing the point down to the base (Fig. 9), and then folding into two (Fig. 10).

The narrow bandage is made by folding the broad bandage once (Fig. 11).

The medium bandage is made by bringing the point down to the base, and then folding into three (Fig. 12). This bandage may be used instead of the broad or the narrow bandage when it is better suited to the proportions of the patient.

Large arm-sling (Fig. 13).—Spread out a bandage, put one end over the shoulder on the sound side, pass it round the neck so that it appears over the shoulder of the injured side, and let the other end hang down in front of the chest; carry the point behind the elbow of the injured limb, and bend the forearm over the middle of the bandage; then carry the second end up to the first and tie them; bring the point forward, and secure with two pins to the front of the bandage.

Small arm-sling (Fig. 14).—Place one end of a broad bandage over the shoulder on the

sound side, pass it round the neck so that it appears over the shoulder of the injured side; place the forearm over the middle of the band-

FIG. 13.

FIG. 14.

age; then bring the second end up to the first, and tie them. This sling is used in cases of fractured humerus, and occasionally when the large sling would be too conspicuous.

Slings may be improvised in many simple ways, such as pinning the sleeve to the clothing, turning up the tail of the coat, passing the hand inside the buttoned coat or waistcoat, etc.

Reef Knots (Fig. 15) are to be used. Avoid granny knots (Fig. 16).

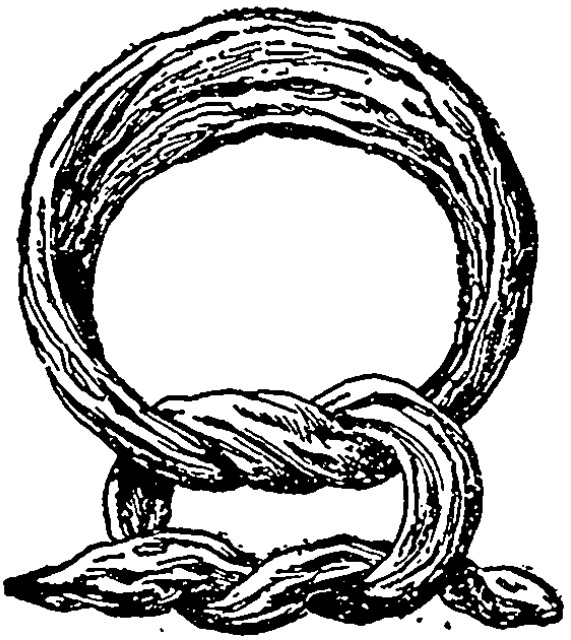

FIG. 15. Reef Knot.

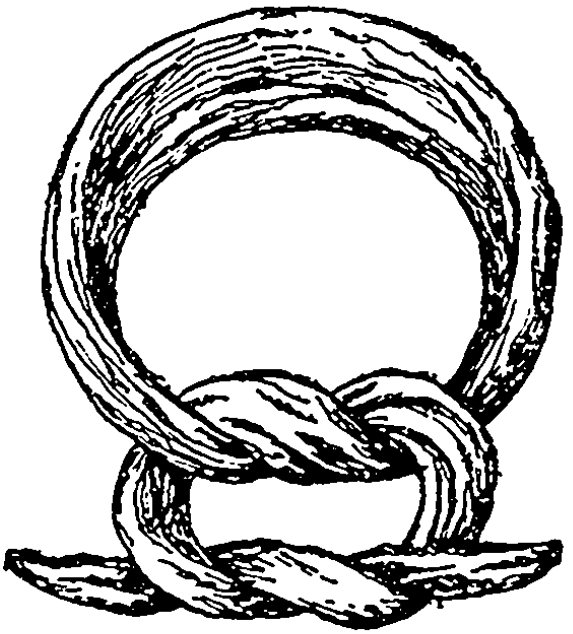

FIG. 16. Granny Knot.

GENERAL RULES TO BE OBSERVED IN THE TREATMENT OF FRACTURES.

The object of First Aid Treatment of Fractures is to guard against further mischief, and especially to prevent a simple fracture from becoming compound or complicated. To attain this end:—

1. Attend to the fracture on the spot. No attempt must be made to move the patient

until the limb has been rendered as immovable as possible by splints or other restraining apparatus.

2. Steady and support the injured limb at once, so that its further movement on the part of either the patient or the bystander is prevented.

3. Straighten the limb with great care, and if shortening is observed in the case of a fracture of a bone of the lower limb, pull upon the foot until the limb regains a more normal length. When the shape of the limb is improved, on no account let go until it is secured in position by splints, otherwise there is great danger of the fracture becoming compound or complicated.

4. Apply splints (when practicable) and bandages as follows:—

(a) The splints must be firm, and long enough to keep the joints immediately above and below the fractured bone at rest. They should, if practicable, be padded to fit accurately to the limb and be applied over the clothing.

(b) The bandages must be applied firmly, but not so tightly as to constrict the circulation of blood in the limb. When the patient is in the

recumbent position double the bandage over a splint to pass it under the trunk or lower limb. As a general rule:—

For the trunk the broad bandage should be used. Pass it once round the trunk and fasten it by tying the ends, or with two or three safety pins on the side opposite to the fracture, but if to secure a splint for a broken thigh, over the splint.

For the arm or forearm the narrow bandage should be used. Pass it twice round the limb, and tie the ends over the outer splint.

For the thigh or leg the narrow or medium bandage may be used. It is frequently convenient to double the bandage at the centre, pass it under the limb, bring the loop over the limb, pass both ends of the bandage through it in opposite directions, and tie them over the outer splint (Fig. 17).

In applying bandages near a fracture the upper one should be secured first.

5. When hæmorrhage accompanies a fracture it must be attended to first, and the wound covered by a clean dressing.

6. No attempt must be made to remove a patient suffering from a fracture of the

spine, pelvis, or thigh, except in a recumbent position, preferably upon a stretcher.

7. **In every case of fracture it is necessary to cover the patient to keep him warm,** and so lessen the effects of the SHOCK of the accident.

8. **In all doubtful cases,** treat as a fracture.

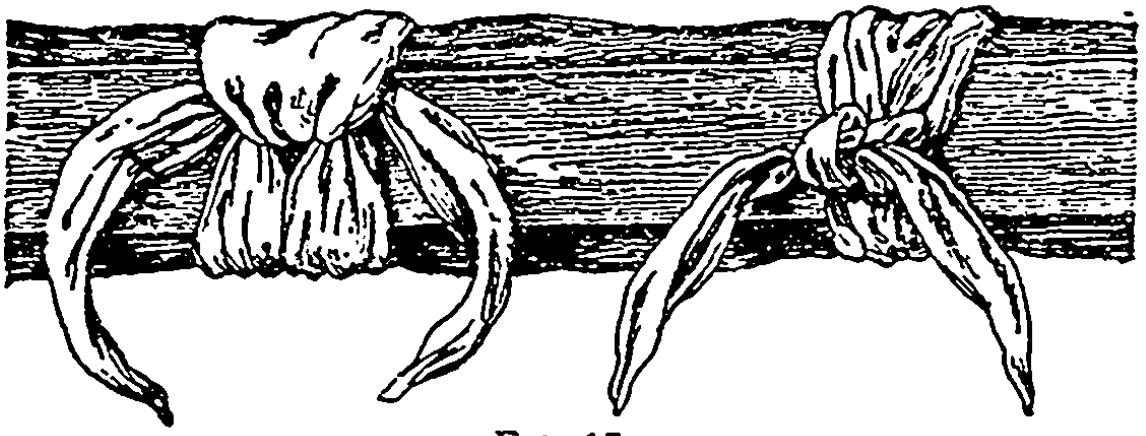

FIG. 17.

SPECIAL FRACTURES.

Fracture of the Cranium.—A fracture of the upper part is usually caused by direct violence—for example, a blow on the head. A fracture of the base is caused by indirect violence, through a fall on the head, a fall on the feet or lower part of the spine, or a severe blow on the lower jaw. **If the upper part is fractured,** the signs are swelling, irregularity, and frequently insensibility, either immediate or coming on

gradually. **If the base is fractured** insensibility may come on immediately, blood or a clear fluid may issue from the ear channel, blood may escape from the nose, or it may pass down to the stomach, whence it may be vomited; the fracture may involve the orbit, causing a blood-shot eye.

FIG. 18.

TREATMENT.

Injury to the brain is the great danger attending a fracture of the cranium. For treatment, see "Concussion and Compression of the Brain," p. 46 *et seq.*

Fracture of the lower Jaw. — Pain, loss of power (inability to speak and to move the jaw freely), irregularity of the teeth, crepitus and bleeding from the gum are the usual signs and symptoms.

TREATMENT.

1. Place the palm of the hand below the injured bone and press it gently against the upper jaw.

2. Apply the centre of a narrow bandage under the chin, carry one end over the head, cross the ends at the angle of the jaw, carry the long end across the chin, and tie the ends on the side (Fig. 18).

Fractured Ribs.—The ribs usually fractured are the sixth, seventh, eighth, and ninth, and generally the fracture is midway between the breast-bone and the spine. Evidence of the fracture is afforded by pain, especially on attempting to take a deep breath and by short and shallow breathing. If the lungs are injured, blood, frothy and bright red, may be coughed up and expectorated. If the liver or spleen is wounded, internal hæmorrhage may occur.

FIG. 19.

TREATMENT.

(a) When the fracture is not complicated by an injury to an internal organ:—

1. Apply two broad bandages round the

chest sufficiently firmly to afford comfort, with the centre of the first immediately above and that of the second immediately below the fracture. The lower bandage should overlap the upper to half its extent. The knots are to be tied rather to the front on the opposite side of the body. Another good plan is to apply a strong towel, folded about eight inches wide, tightly round the chest, securing it with three or four safety pins.

2. Place the arm on the injured side in large sling (Fig. 19).

(b) When an internal organ is injured:—

1. Do not apply bandages round the chest.

2. Lay the patient down, inclined a little towards the injured side.

3. Loosen the clothing, treat as for internal hæmorrhage.

4. Place the arm on the injured side in a large sling.

Fracture of the Breast-bone (sternum).—When this fracture can be felt or is suspected, undo all tight clothing, and keep the patient quiet, in an easy position until the arrival of a doctor.

Fracture of the Bones of the Upper Limb.

Fracture of the Collar-bone (clavicle).—The arm on the injured side is partially helpless, and the patient usually supports it at the elbow with his hand, and inclines his head towards the injured side. The fractured ends can generally be felt to overlap, the outer fragment being the lower.

Fig. 20.

Treatment.

1. Remove the coat, and as much more of the clothing as is expedient.
2. Place a pad about two inches thick and four inches across in the armpit.
3. Gently bend the forearm well up, keeping the shoulder as far back as practicable, and support it in a "St. John" sling, made as follows:—

(a) Lay an unfolded bandage across the chest over the injured limb with one end on the unin-

jured shoulder and the point beyond the elbow on the injured side (Fig. 20).

(b) Pass the lower end of the bandage under the injured limb, across the back, and tie the ends somewhat loosely in the hollow in front of the sound shoulder.

(c) Fold the point over the elbow of the injured limb and secure it by one or two pins (Figs. 21 and 22).

FIG. 21.

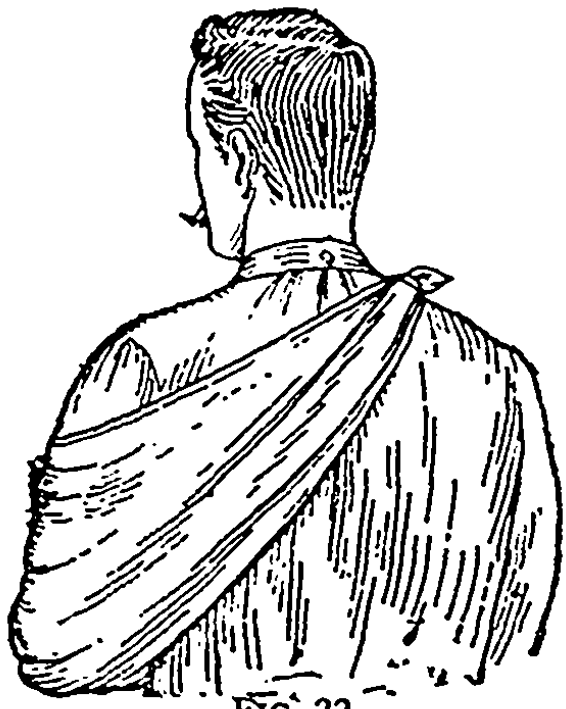

FIG. 22.
(Body bandage omitted to show details of Sling.)

4. Tightly secure the injured limb to the side by a broad bandage passed round the elbow and

trunk, so as to lever out the shoulder, the pad forming the fulcrum.

5. Now tighten the sling.

When both collar-bones are broken keep the shoulders back by narrow bandages tied round each arm, close to the shoulder, passed across the

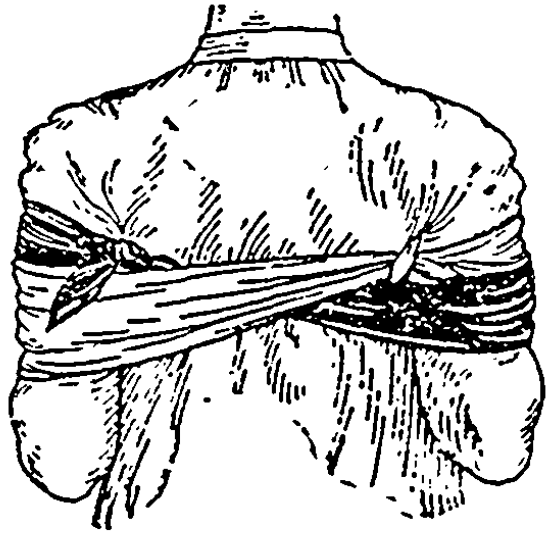

FIG. 23A.

FIG. 23B.

back, over the opposite arm and tied together in front. The forearms should be raised and supported by the bandages (Figs. 23A and 23B).

Fracture of the Shoulder-blade (scapula). —Apply the centre of a broad bandage in the armpit of the injured side, cross the ends over the uninjured shoulder and tie them under the armpit. Support the limb in a St. John sling (Fig. 24).

Fracture of the Arm (humerus).—The bone may be broken:— (a) Close up to the shoulder; (b) near the middle of the shaft; (c) close to the elbow.

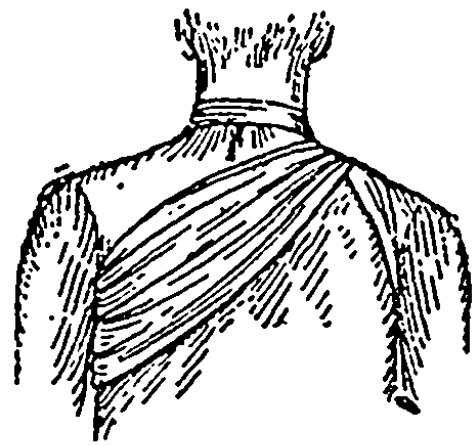

FIG. 24.

TREATMENT.

When the Fracture is close to the Shoulder:—

1. Apply a broad bandage with its centre above the middle of the arm round the limb and body, tying it on the opposite side.

2. Support the forearm by a small arm sling.

When the Fracture is near the Middle of the Shaft:—

1. Bend the forearm at a right angle to the arm.

2. Apply splints, reaching from the shoulder to the elbow on the outer and inner sides of the arm, and, if enough can be procured, to the front and back also. The front splint must on no account be so long as to press upon the blood-vessels at the elbow joint.

3. Secure the splints by bandages above and below the fracture. If splints are not available,

secure the arm to the side by two broad bandages.

FIG. 25.

4. Support the forearm by a small arm sling (Fig. 25).

Fracture of the Forearm.—When both bones (the radius and ulna) are broken, the general signs and symptoms of fracture are usually present. When one of the bones only is broken the signs and symptoms are as a rule pain, loss of power, swelling, and irregularity.

TREATMENT.

This is the same, whether the fracture is of one bone or of both.

1. Bend the forearm at right angles to the arm, keeping the thumb upwards, and the palm of the hand towards the body.

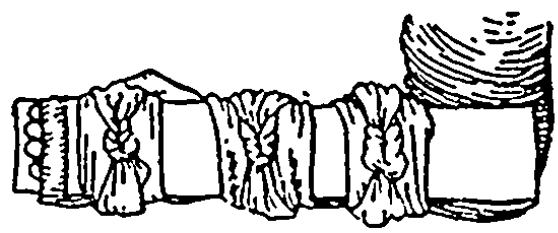

FIG. 27.

2. Apply broad splints on the inner and outer sides from the elbows to the fingers.

3. Apply bandages, embracing both splints, immediately above and below the fracture and round the hand (Fig. 27).

4. Apply a large arm-sling.

Fracture of the Bones of the Lower Limb.

Fracture of the Thigh-bone (femur).—The thigh bone may be broken at its neck, anywhere in the shaft, or close to the knee. It may be assumed that when, after an injury near the hip joint, the patient cannot, when lying on the back,

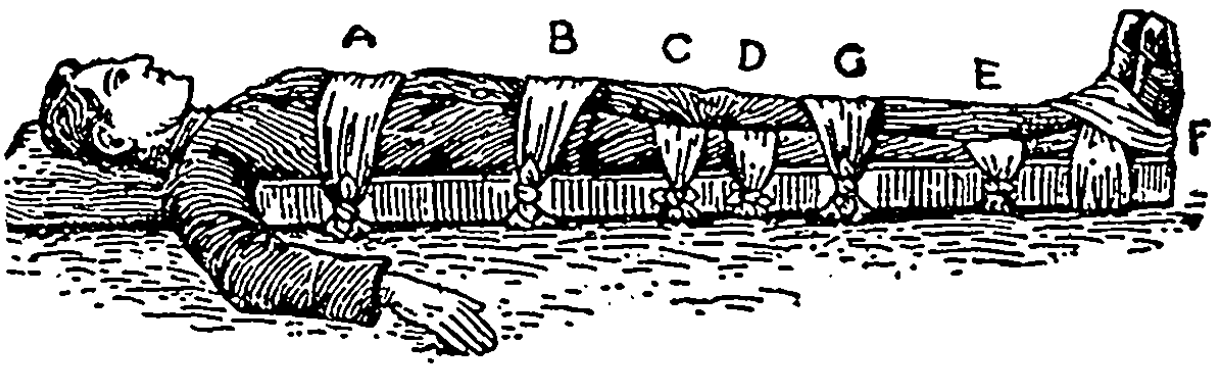

Fig. 29.

raise the heel from the ground, the bone is broken. All the general signs and symptoms of fracture are usually present and a prominent sign is the position of the foot, which, as a rule, lies on its outer side. Shortening may vary from one-half to three inches.

Treatment.

1. Steady the limb by holding the ankle and foot.

2. Gently draw down the foot and bring it into line with its fellow. When two or three assistants are at hand, it is one person's duty to hold the foot in position until the splints are secured.

3. Apply a splint on the outer side from the armpit to beyond the foot.

4. Apply a splint on the inner side from the top of the thigh (the fork) to the knee.

5. Secure the splints by bandages as follows:—(a) Round the chest just below the armpits, (b) round the pelvis on a level with the hip joints, (c) above the fracture, (d) below the fracture, (e) round the leg, (f) round both ankles and feet, and tied below the feet, (g) a broad bandage round both knees (Fig. 29).

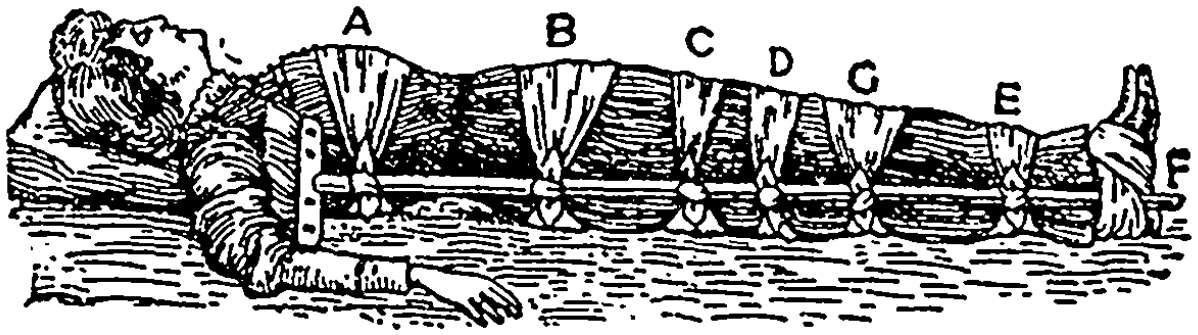

Fig. 30.

When single-handed, it is expedient, after extension of the limb, to tie the feet together, dispense with the inner splint, and pass the bandages round both limbs (Fig. 30).

Fracture of the Leg (tibia and fibula).—One or both of the bones may be broken. When both bones are broken all the general signs of fracture are usually present, but when one bone only is broken deformity is not always noticeable. A fracture of the fibula three or four inches above its lower end is frequently mistaken for a sprain and sometimes for a dislocation of the ankle.

TREATMENT.

1. Steady the limb by holding the ankle and foot.

2. Draw the foot into its natural position, and do not let go until the splints have been fixed.

3. Apply splints on the outer and inner sides of the leg, reaching from above the knee to beyond the foot. If only one splint is available place it on the outer side.

4. Secure the splints by bandages (a) above, (b) below the fracture, (c) immediately above the knee, (d) round both ankles, (e) a broad bandage round both knees (Fig. 33).

When single-handed, after extending the limb tie both feet together, dispense with the inner splint, and pass the bandages round both limbs

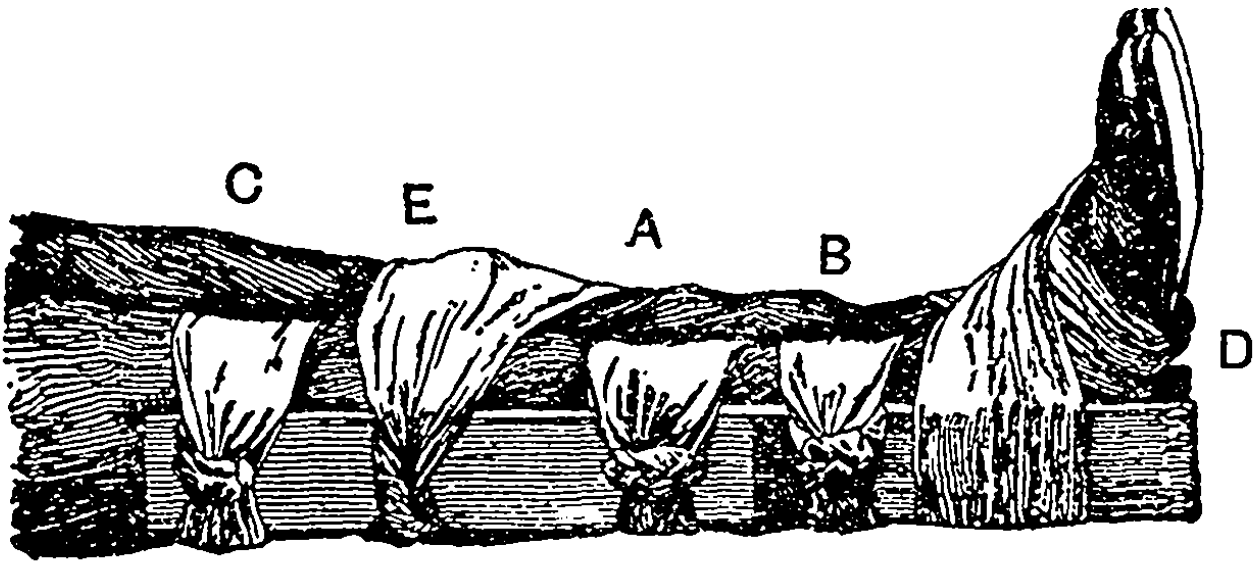

FIG. 33.

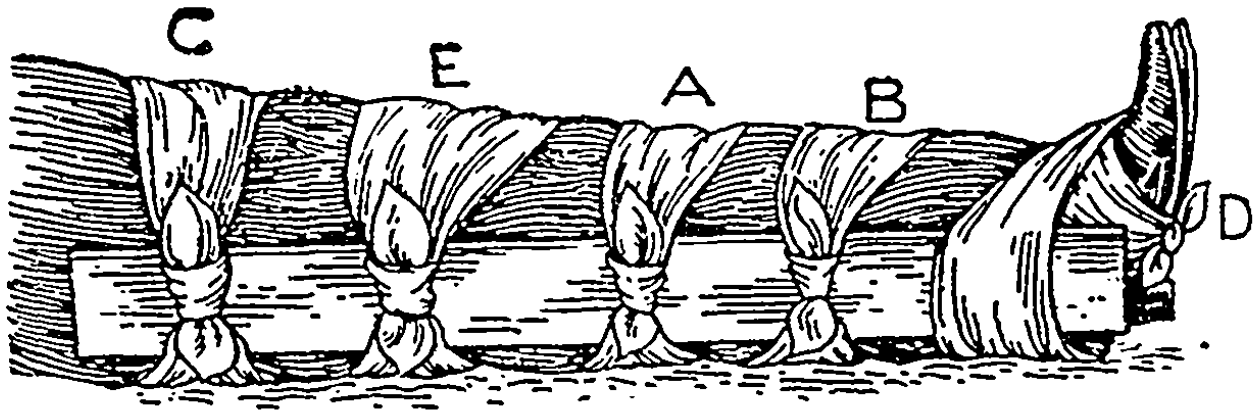

FIG. 34.

(Fig. 34). When no splint is available tying the legs, ankles and knees together is of great service.

CHAPTER II.

HÆMORRHAGES.

Hæmorrhage, or bleeding, is of three kinds:—
1. Arterial. 2. Venous. 3. Capillary.

Arterial Hæmorrhage.

1. Blood from an artery is scarlet.
2. If the wounded artery is near the skin the blood spurts out in jets corresponding to the pulsation of the heart.
3. The pressure point (see below) **is on the heart side of the wound.**

Arrest of Arterial Hæmorrhage.

Arterial hæmorrhage is, when practicable, to be arrested by pressure, position of the body, and elevation of the bleeding part.

Pressure may be:—

1. Digital, that is, applied with the thumb or fingers, and may be (a) on the wound; (b) at a spot called the pressure point. The pressure points are indicated by numbered dots on the frontispiece.

2. By a pad and bandage (tourniquet) (a) on the wound; (b) on the pressure point.

3. By flexion.

To apply a pad and bandage to the wound, place a piece of lint or linen or a clean handkerchief folded into a hard pad, on the bleeding point, and secure it by a bandage tightly tied round the injured part. To fold the handkerchief, bring the four corners to the centre, and repeat the process until a hard pad is formed. The smooth surface is placed on the wound, and, to prevent the pad from unfolding, the puckered surface may be stitched or fixed by a safety pin. A hard substance, such as a stone, may be enclosed in the centre of the pad.

A **tourniquet** may consist of **a pad** to be placed on the pressure point, **a strap, cord, or bandage** to encircle the limb and pad, and **a tightening arrangement,** such as a stick or other means of twisting the band to tighten it.

To improvise and apply a tourniquet:—

1. Apply a firm pad on the pressure point.
2. Encircle the limb by a narrow bandage with its centre over the pad.
3. Tie the ends of the bandage in a half knot on the opposite side to the pad.
4. Lay the twisting stick on the half knot, and over it tie a reef knot.

5. Twist the stick to tighten the bandage, thereby pressing the pad upon the artery, and arresting the flow of blood.

6. Lock the stick in position by the ends of the bandage already applied, or by another bandage passed round the stick and limb.

The pad of the tourniquet must be accurately placed upon the pressure point so as completely to compress the artery; otherwise arterial blood will be allowed to pass along the limb, and the veins, being compressed by the tourniquet, will not allow the blood to return through them to the heart, and the result will be dangerous swelling and congestion.

Should a suitable pad not be at hand, a knot may be made in the centre of the bandage, and when available, a stone, cork, etc., enclosed in it to give it firmness and bulk. See that the bulging and not the flat side of the knot is next the skin.

Flexion consists of the application of a pad on the pressure point at the knee or elbow joint, flexing the limb to make pressure, and securing the limb in the flexed position by a bandage crossed like the figure 8.

General Rules for Treatment of a Wound Accompanied by Arterial Hæmorrhage.

1. Stop bleeding.
2. Prevent injurious germs from getting into the wound.

To attain these ends:—

1. Place the patient in a suitable position, bearing in mind that the blood escapes with less force when the patient sits, and is still more checked when he lies down.

2. Elevate the bleeding part, as thereby less blood finds its way into it.

3. Expose the wound, removing whatever clothing is necessary.

4. Apply digital pressure.

(a) If the wound is small on the bleeding spot.

(b) If the wound is large on the pressure point next to the wound on the heart side. The nearest pressure point is chosen in order to avoid cutting off the circulation from as much of the part as possible, but sometimes it is necessary to apply pressure still nearer to the heart.

5. Remove foreign bodies, such as broken glass, bits of clothing, hair, etc., seen in the wound; do not search for foreign bodies you cannot see.

6. Cover the wound with a clean and firm absorbent dressing. A hard dry pad of boracic gauze or lint is to be preferred, but absorbent cotton wool, lint, or gauze, or a clean piece of linen will answer the purpose. Should any doubt be entertained as to the cleanliness of the dressing, a clean piece of unprinted paper, such as the inside of an envelope, should be placed next the wound before applying the pad.

7. Bandage tightly over the pad unless:

(a) Foreign bodies are suspected to be left unseen in the wound.

(b) There is danger of causing injury to a fracture.

In these cases a light dressing only should be applied.

8. Apply a pad and bandage or flexion on the pressure point, but only in the following cases:—

(a) As a temporary measure while the wound is being exposed, examined and covered.

(b) As a more permanent measure when bleeding cannot be stopped by the pad and bandage on the wound, or when the tight bandage has not been applied.

9. Afford support to the injured part.

When part of a limb has been torn off or the wound is lacerated (for example by the claw of an animal or by machinery) hæmorrhage frequently does not come on at once, but as there is a danger of severe hæmorrhage later, means for its arrest should be applied to the limb, but not tightened unless necessary.

Do not disturb a clot of blood formed over a wound.

No attempt should be made to cleanse a wound except with sterilized water (that is previously boiled and allowed to cool), and experience, especially in recent wars, has shown that those wounds which were provisionally treated with a dry dressing and subsequently dressed by a surgeon with proper appliances did best.

The Course of the Main Arteries, and the Arrest of Hæmorrhage.

(The numbers of the pressure points refer to those on the Frontispiece.)

The Axillary Artery, which is a continuation of the subclavian, keeps close to the shoulder joint, and can be felt pulsating when the fingers are deeply pressed into the armpit. Digital pressure is difficult to apply to this artery.

To apply a pad and bandage:—

1. Place a hard pad the size of a billiard ball in the armpit (pressure point 6).

2. Apply the centre of a narrow bandage on the pad; cross the bandage on the shoulder; pull the ends tight and tie them under the opposite armpit, taking care that the pad does not slip.

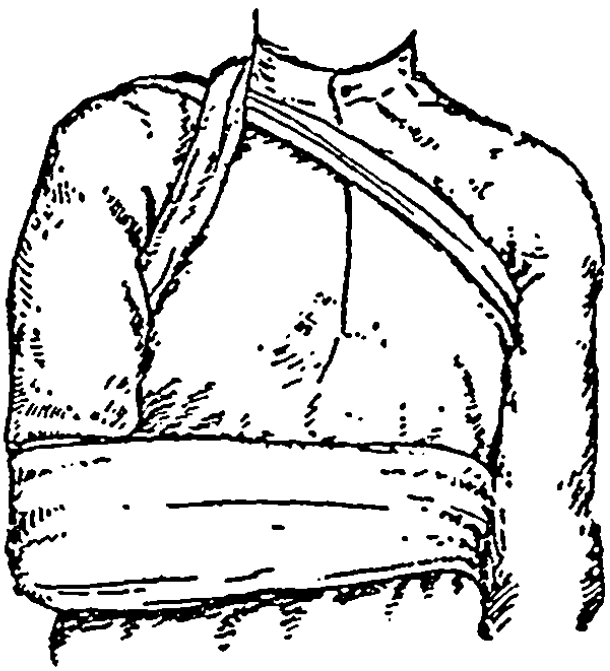

Fig. 45.

3. Flex the forearm and tie the limb tightly to the trunk with a broad bandage applied on a level with the elbow (Fig. 45).

The Brachial Artery is a continuation of the Axillary, and runs down the arm on the inner side of the biceps muscle, gradually passing forward until it reaches the middle of the front of the elbow. The inner seam of the coat sleeve above the elbow roughly indicates its course.

Digital or instrumental pressure may be applied at or near pressure point 7.

To apply digital pressure extend the limb at right angles to the body, palm of the hand upwards. Stand behind the limb, and pass the

FIG. 46.

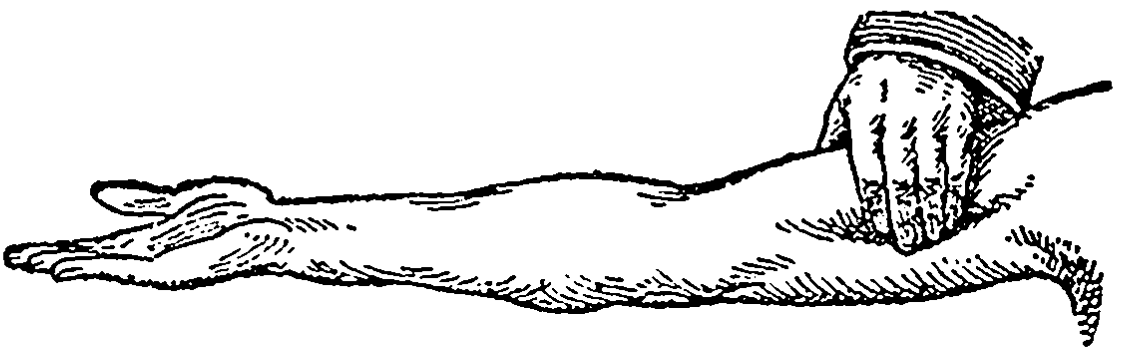

FIG. 47.

fingers under the back of the arm over the seam of the coat or the groove on the inside of the biceps muscle. Press the pulps (not the tips) on the artery (Fig. 46). Some prefer to pass the hand over the front of the muscle (Fig. 47). A slight turn of the hand outwards as it grasps the arm will better ensure compression of the artery.

The Brachial artery may be compressed at the elbow (pressure point 8) by flexion. The pad may be a folded handkerchief with a small stone

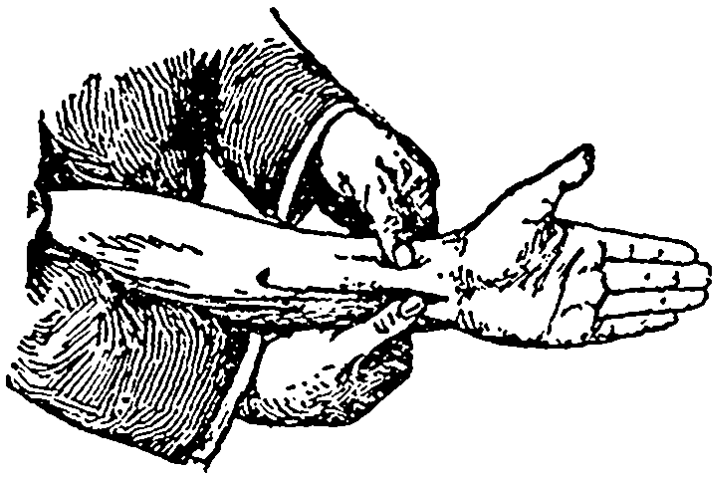

FIG. 49.

FIG. 48.

or a cork wrapped up in it, but when no pad is available the coat sleeve rolled or gathered up will serve instead (Fig. 48).

Just below the elbow the Brachial artery divides into the Radial and Ulnar arteries, which run along the front of the forearm on the outer and inner sides respectively The pressure points (9 and 10) are about one inch above the wrist and about half an inch from the outer and inner sides of the forearm, where the arteries may be

felt pulsating. Branches of these arteries join to form the Palmar Arches in the hand. The arteries run along on either side of the fingers to the tip.

Pressure may be applied to the Radial and Ulnar arteries at pressure points 9 and 10, by the thumbs (Fig. 49) or as follows:—

1. Cut the cork of a quart or pint bottle in two lengthwise.
2. Lay the rounded side of one half on the Radial, and of the other half on the Ulnar artery.
3. Secure them by a tight bandage.

To arrest hæmorrhage from the palm of the hand:—

1. Apply a firm pad, and make the patient grasp it firmly.
2. Spread out a triangular bandage, turn up the base about four inches, lay the back of the patient's hand on the centre of the bandage, fold the point over the knuckles and wrist, pass the two ends round the wrist, make the patient pull on the point of the bandage, cross the ends over the fingers twice and tie them as firmly as possible. Bring the point A down to the knuckles and fasten with a pin at B (Fig. 50).
3. Elevate the forearm and support it with a "St. John" sling.

Arterial hæmorrhage from the fingers may be arrested by applying a small pad on the wound, and securing it firmly with a strip of tape, linen or plaster.

Arteries of the Lower Limbs.

The Femoral Artery, a continuation of the Iliac, enters the thigh in the centre of the fold of the groin, where it may be felt pulsating immediately below the skin. The course of the artery may be indicated by a line drawn from the centre of the groin to the inner side of the back part of the knee. After traversing two-thirds of this line, the Femoral artery passes behind the thigh bone to the back of the knee joint as the Popliteal artery.

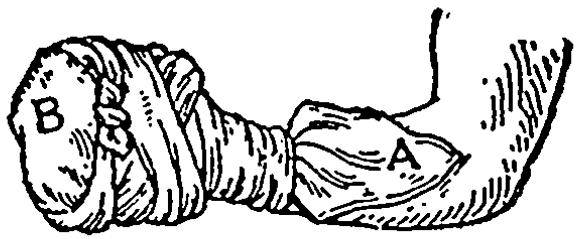

Fig. 50.

Digital pressure may be applied to the Femoral artery at the groin (pressure point 11) as follows:—

1. Lay the patient on his back.
2. Kneel beside the patient.
3. To find the groin, raise the foot high so as

to flex the thigh; the fold in the clothing at the top of the thigh will indicate the groin.

4. Place the thumbs one on the other upon the pressure point, grasping the thigh with the hands (Fig. 51).

5. Press firmly against the brim of the pelvis.

As there is immediate danger of death it is important not to waste time in removing the trousers.

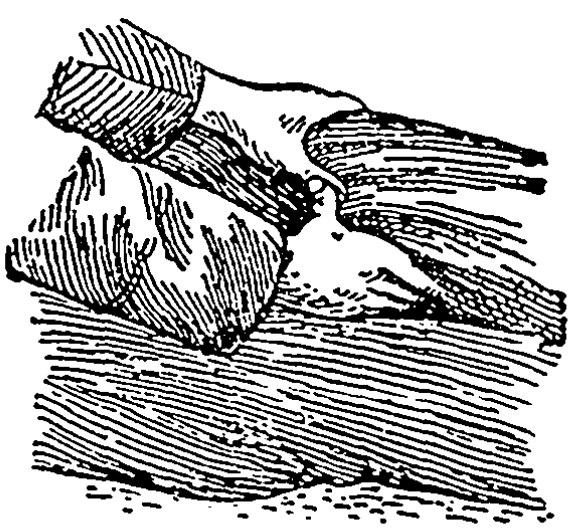

FIG. 51.

When the Femoral artery is wounded in the upper third of its course, pressure must be maintained at the groin. No really satisfactory tourniquet has been devised for compression at this point, and relays of assistants should be employed to keep up the pressure until the doctor arrives; each fresh assistant places his thumbs over those of his predecessor, who slips his away from beneath, and thus gushes of blood are prevented during the change.

Application of a tourniquet to the Femoral artery (pressure point 12):—

When practising compression of this artery, it is a good plan to draw a chalk line from the centre of the groin to the inner side of the back of the knee; place the pad of the tourniquet on this line as high up as the bandage can be applied.

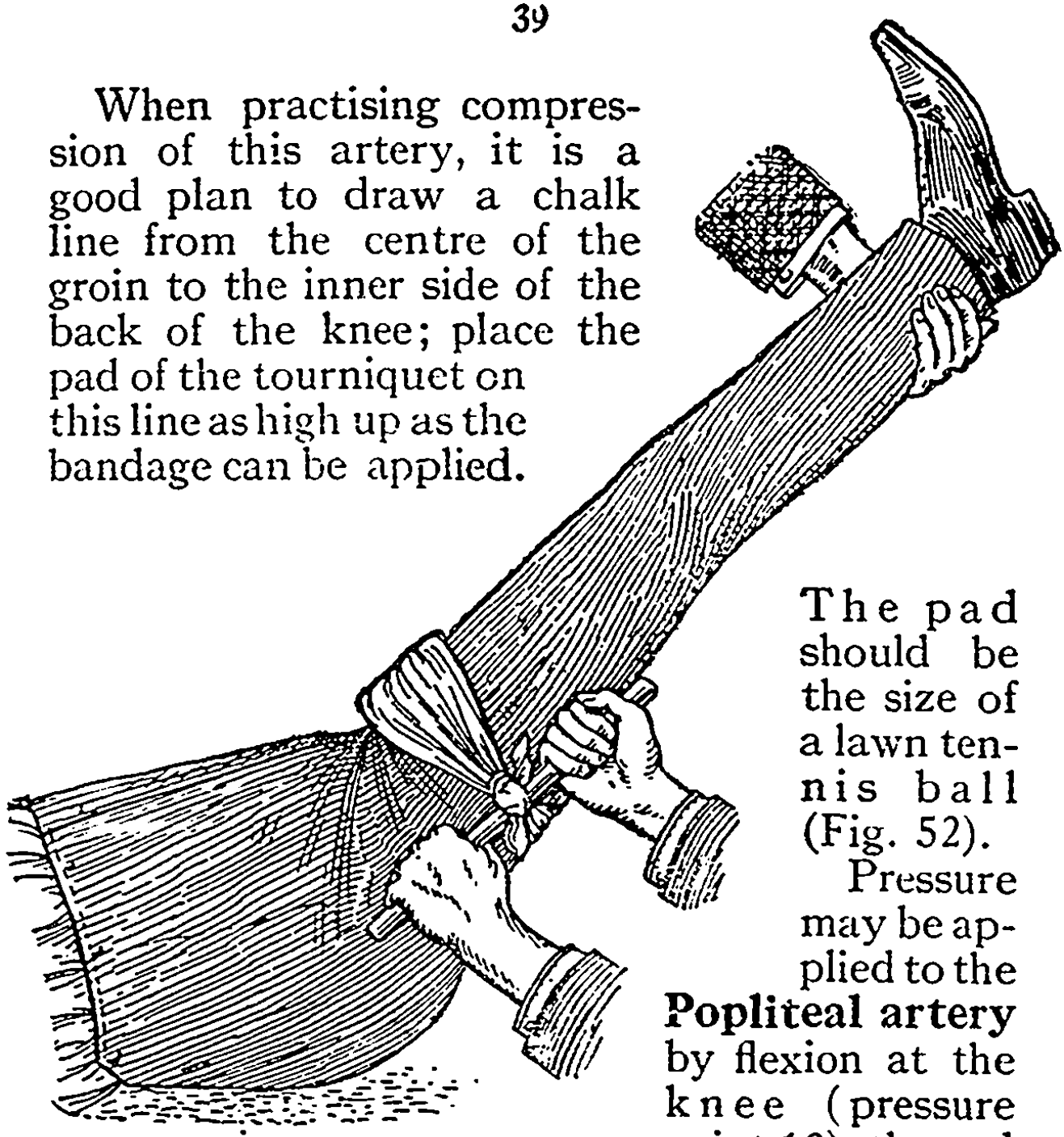

FIG. 52.

The pad should be the size of a lawn tennis ball (Fig. 52).

Pressure may be applied to the **Popliteal artery** by flexion at the knee (pressure point 13); the pad should be the size of a lawn tennis ball or if no pad is available the trouser leg may be rolled or gathered up to

serve instead. It is not necessary to take off the clothing (Fig. 53).

Just below and behind the knee joint the Popliteal artery divides into the Anterior (front) and Posterior (back) Tibial arteries.

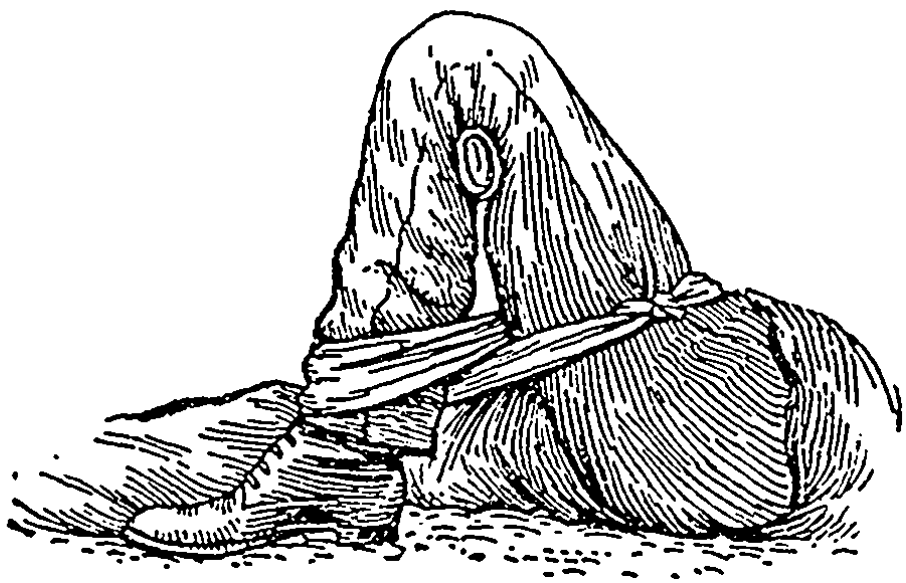

FIG. 53.

VENOUS HÆMORRHAGE.

1. Blood from a vein is dark red.

2. It flows in a slow continuous stream.

3. It issues from the side of the wound further from the heart.

General Rules for Treatment of a Wound Accompanied by Venous Hæmorrhage.

1. Place the patient in a suitable position, bearing in mind that the blood escapes with less force when the patient sits and is still more checked as he lies down.

2. Elevate the part, as thereby less blood finds its way into it.

3. Expose the wound, removing whatever clothing is necessary.

4. Remove any constrictions, such as the collar or garters, from the heart side of the wound.

5. Apply digital pressure on the wound until you can apply a pad and tight bandage. If that does not stop the bleeding, make pressure near the wound on the side away from the heart.

Hæmorrhage from the Nose (Nostrils).

1. Place the patient in a sitting position in a current of air, with the head thrown slightly back and the hands raised above the head.

2. Undo all tight clothing around the neck and chest.

3. Apply cold (a cold sponge or bunch of keys) over the nose and also the spine at the level of the collar; place the feet in hot water.

4. Cause the patient to keep the mouth open, and so avoid breathing through the nose.

Blood issuing from the mouth may come from the tongue, the gums, the socket of a tooth after extraction, the throat, the lungs, or the stomach.

Hæmorrhage from the Tongue, the Gums, the Socket of a Tooth, or the Throat.

1. Give cold water to hold in the mouth. If this is not successful give water as hot as can be borne to hold in the mouth.

2. If necessary make pressure on the carotid arteries.

3. If bleeding from the front part of the tongue is excessive compress the part by a piece of clean lint held between the finger and thumb.

4. If the bleeding is from the socket of a tooth, plug the socket with a piece of clean lint or cotton wool; over this place a small cork or other substance of suitable size, and instruct the patient to bite on it.

Hæmorrhage from the Lungs.

Blood from the lungs is coughed up and is scarlet and frothy in appearance.

Treat as for Internal Hæmorrhage.

Hæmorrhage from the Stomach.

Blood from the stomach is vomited; it is of a dark colour and has the appearance of coffee grounds; it may be mixed with food.

Treat as for Internal Hæmorrhage. Nothing is to be given by the mouth.

Blood issuing from the Ear Channel, which generally indicates a fracture of the base of the cranium, must be wiped away as it issues; no attempt is to be made to plug the ear.

CHAPTER III.

ARTIFICIAL RESPIRATION.

Professor Schafer's Method.

1. Make no attempt to loosen or remove clothing.

2. Lay the patient in a prone position (i.e., back upwards) with his head turned to one side, so as to keep his nose and mouth away from the ground. No pad is to be placed under the patient, nor need the tongue be drawn out, as it will fall naturally.

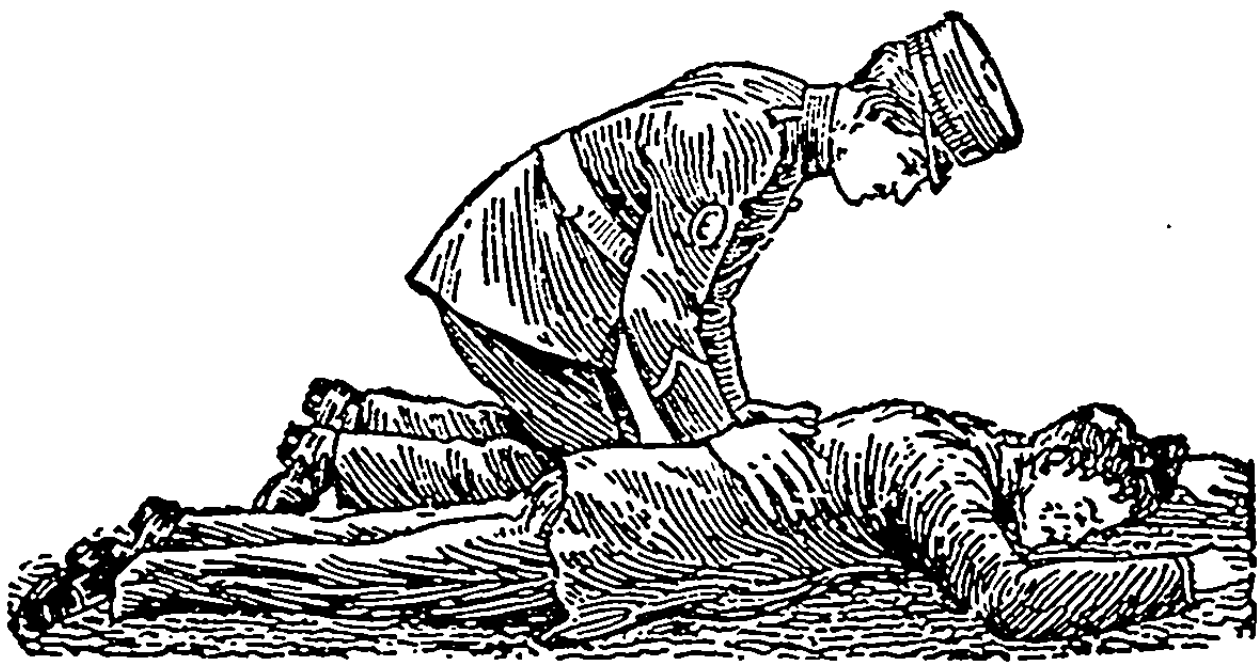

Fig. 56. Expiration.

3. Kneel at one side facing the patient's head, and place the palms of your hands on his loins, one at each side, the thumbs nearly touching one another in the small of the back, and the fingers extending over the lowest ribs. Leaning

FIG. 57. INSPIRATION.

your body forward, let its weight press straight downwards upon the loins and lower part of the back, thus compressing the abdomen against the ground and driving air out of the chest. This produces expiration (Fig. 56). Draw back your body somewhat more rapidly and relax the pressure, but do not remove your hands; this produces inspiration (Fig. 57).

4. Alternate these movements by a rhythmic swaying backwards and forwards of your body, twelve to fifteen times a minute, persevering until respiration is restored, or a doctor pronounces life to be extinct.

INSENSIBILITY.

Unconsciousness or Insensibility may arise as follows:—

Injury to the Head.—Concussion and Compression of the brain.

Disease of the Brain.—Apoplexy, Epilepsy, Hysteria.

Various Causes.—Shock, Fainting (Syncope), Collapse, Alcoholic and other poisoning, Sunstroke and Heat-stroke, Infantile Convulsions, Asphyxia.

GENERAL RULES FOR TREATMENT OF INSENSIBILITY.

1. If a person appears about to lose consciousness, prevent him from falling, and lay him gently down.

2. Arrest hæmorrhage when apparent; attending to minor injuries is less important than treating the unconscious state.

3. Lay the patient in the position in which breathing is most easy—usually this will be on the back, or inclined to one side. As a general rule raise the head and shoulders **slightly** when the face is flushed, and keep the head low when the face is pale.

4. Undo all tight clothing round the neck, chest and waist, unfastening the braces and top button of the trousers, the object being to relieve pressure on the air passages, lungs, heart and abdominal organs. Be sure that there is no obstruction to the air passages by the tongue or by a foreign body in the throat. The possibility of false teeth obstructing breathing must be considered.

5. Provide for a sufficiency of fresh air by keeping back a crowd.

6. When breathing cannot be discerned apply artificial respiration.

7. Obtain a doctor's help as soon as possible.

8. Unless unavoidable, never leave the patient until you have placed him in charge of a responsible person.

9. Give no food or fluids whatever by the mouth while the patient is insensible.

10. Should the spine or an important bone of the upper or of the lower limb be fractured, it must be steadied and maintained at rest as soon as possible. Should the unconsciousness be prolonged, the patient may be removed in a recumbent position to shelter, provided that the broken bone is adequately supported.

11. When the patient is in a state of convulsion, support his head, and after wrapping a piece of wood or any other hard material in a handkerchief, hold it in his mouth to prevent biting of the tongue. Do not forcibly restrain his limbs; prevent him from hurting himself by pulling him away from a source of danger, such as machinery, a wall, or fireplace; light pieces of furniture should be pushed out of the way.

12. On return to consciousness water may be given to drink. If the pulse is feeble give warm tea or coffee, provided hæmorrhage, either internal or external, is not present. A desire to sleep should be encouraged, except in cases of opium poisoning, a condition that may generally be recognized by the history of the case, and also by the pupils of the eyes (the black openings in the grey, blue or brown iris) being minutely contracted (pin-head pupils).

13. It must not be assumed that a person is insensible as the result of drink merely because the breath smells of alcohol; frequently when people are feeling ill they take or are given alcoholic stimulants, after which they become insensible, not from the drink; but from the cause that induced them to take it, for example, insensibility coming on, effects of poisoning, etc. Even if drink is believed to be the actual cause of insensibility, it must be borne in mind that the patient is in a very dangerous state and he must be treated for collapse by being covered up and kept warm.

SHOCK, FAINTING (SYNCOPE), COLLAPSE.

Signs and Symptoms.

The general condition of shock may be recognised by extreme pallor, a feeling of cold, clammy skin, feeble pulse, and shallow breathing accompanied, if hæmorrhage has been severe, by yawning and sighing. The term "collapse" signifies a very serious condition in which the life of the patient is in the greatest danger, the temperature of the body falls below the normal,

and one great object of treatment is to prevent it sinking to a point at which life is impossible. An attendant danger of the condition of collapse is the liability to sudden relapse after a temporary improvement, and the utmost care and watchfulness must therefore be exercised to maintain the heat of the body and to guard against failure of the heart and lungs.

Treatment.

1. Remove the cause by arresting hæmorrhage, attending to injuries, loosening all tight clothing especially about the chest and abdomen, using encouraging words, etc.

2. Lay the patient on the back, with the head low. Raise the lower limbs.

3. Provide for a free circulation of fresh air.

4. If hæmorrhage has been severe and the patient is collapsed, firmly bandage the limbs from the toes to the hips, and from the fingers to the armpits.

5. To stimulate the action of the heart, sal volatile and water may be given if the patient can swallow, or smelling salts may be held to the nostrils.

6. It is of the utmost importance to use every means of preventing a fall of temperature below the normal point. To accomplish this cover the patient with extra clothing, or by placing rugs or blankets over him. Apply warmth to the feet and to the pit of the stomach by hot cloths or hot flannels. (Test the heat of these with the elbow before applying them.) If the patient can swallow, give hot tea. It is well to add sugar, as it aids in raising the temperature of the body.

7. If breathing cannot be discerned, apply artificial respiration.

8. If want of nourishment has been the cause of fainting or collapse, give food sparingly at first.

ASPHYXIA.

When, owing to want of air, the blood is not supplied with oxygen the patient becomes insensible, and is said to be asphyxiated. This condition may be brought about as follows:—

1. Obstruction of the air passages.

(a) **By drowning.**

(b) **By pressure from outside:** Strangulation, hanging, smothering.

(c) **By a foreign body in the throat:** Choking.

(d) **By swelling of the tissues of the throat:** Inflammation, scald of the throat, poisoning by a corrosive.

2. Inhaling poisoning gases.

3. Pressure on the chest, as when crushed by sand or debris.

4. Nervous affections, as the result of narcotic and certain other poisons, collapse, electric shock, discharge of shells or bombs, or stroke by lightning.

General Treatment.

In all cases of Asphyxia attempts must be made to remove the patient from the cause. When this has been done **artificial respiration must be applied,** taking care that the air passages are not obstructed, and that there is abundance of fresh air.

Suffocation by Smoke or Gases.

1. Remove the patient into the fresh air.
2. Apply artificial respiration.

CHAPTER IV.

BANDAGING.

The Triangular Bandage has been described. It may be applied to keep a dressing on a wound, burn or scald of any part of the body, or for an injury of a joint.

For the scalp (Fig. 62). Fold a hem about 1½ inches deep along the base of a bandage; place the bandage on the head so that the hem lies on the forehead **close down to the eyebrows,** and the point hangs down at the back; carry the two ends round the head **above** the ears and tie them on the forehead; draw the point first downwards, and then turn it up and pin it on to the bandage on the top of the head.

FIG. 62.

For the Forehead, Side of the Head, Eye, Cheek, and for any part of the body that is

round (as the arm or thigh, etc.), the narrow bandage should be used, its centre being placed over the dressing, and the ends being carried round the head or limb, as the case may be, and tied over the wound.

FIG. 63.

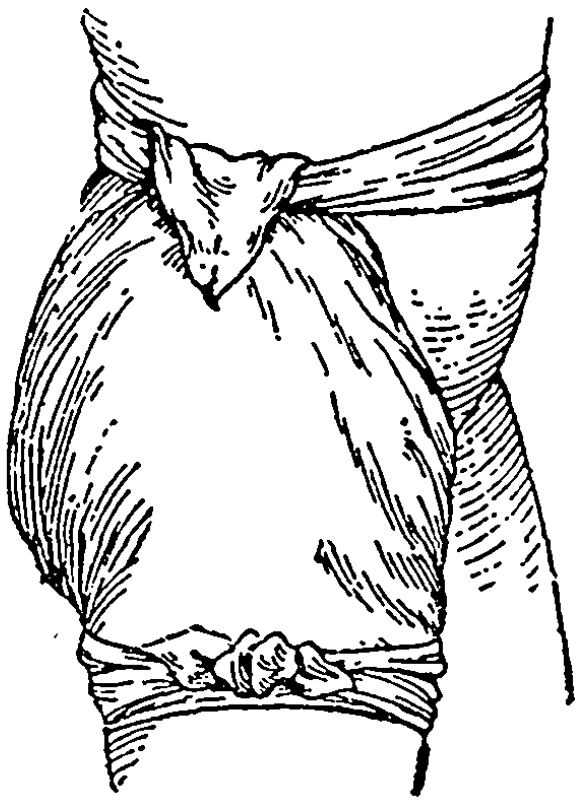

FIG. 64.

For the Shoulder (Fig. 63). Place the centre of a bandage on the shoulder, with the point running up the side of the neck; fold a hem along the base; carry the ends round the middle of the arm and tie them. Place one end of a broad

bandage over the point of the first bandage and sling the arm by carrying the other end over the sound shoulder and tying the ends at the side of the neck; turn down the point of the first bandage, draw it tight and pin it.

FIG. 65.

For the Hip (Fig. 64). Tie a narrow bandage round the body above the haunch bones, with

FIG. 66.

the knot on the injured side. Fold a hem according to the size of the patient along the base of a second bandage; place its centre over the dressing, carry the ends round the thigh and tie them; then carry the point up under the first

bandage, turn it down over the knot and pin it.

For the Hand when the fingers are extended (Fig. 65). Fold a hem along the base of a bandage; place the wrist on the hem with the fingers towards the point; then bring the point over the wrist, pass the ends round the wrist, cross and tie them; bring the point over the knot and pin it to the bandage on the hand.

For the Foot (Fig. 66). Place the foot on the centre of the bandage with the toes towards the

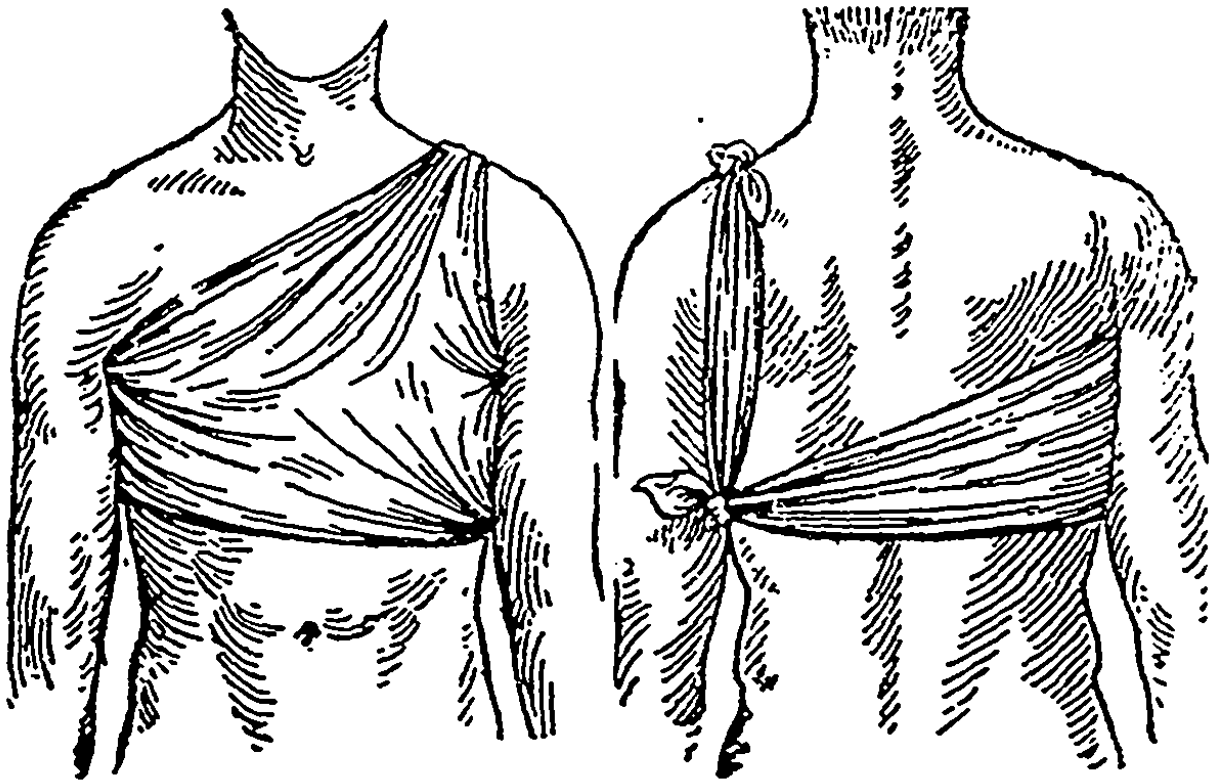

FIG. 67*a*. FIG. 67*b*.

point; draw up the point over the instep, pass the ends round the ankle and cross them in front; now pass the ends round the instep and tie them. Draw the point forward and pin it to the bandage on the instep.

For the Front of the Chest (Figs. 67a and 67b). Place the middle of the bandage over the dressing with the point over the shoulder on the same side; carry the ends round the waist and tie them; then draw the point over the shoulder and tie it to one of the ends.

FIG. 68.

For the Back. The bandage is applied as the foregoing, except that it is begun at the back.

For the Knee. Fold a narrow hem along the base of a bandage; lay the point on the thigh and the middle of the base just below the knee-

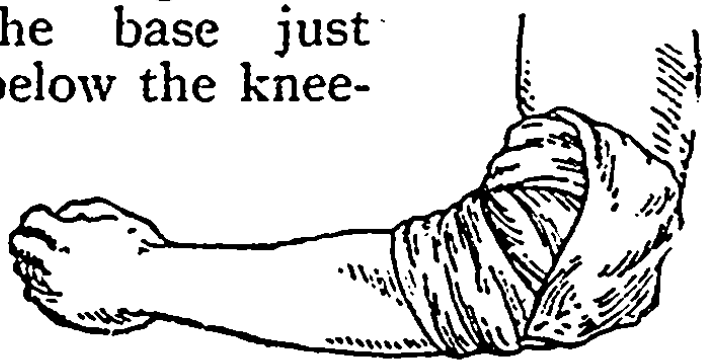

FIG. 69

cap; cross the ends first behind the knee, then over the thigh and tie them. Bring the point down and pin it to the base (Fig. 68).

For the Elbow. Fold a narrow hem along the base of a bandage; lay the point on the back of the arm and the middle of the base on the back of the forearm; cross the ends first in front of the elbow, then over the arm and tie them in front (Fig. 69).

For the Fingers and Toes wrap a strip of calico or linen round and round the part; split the free end, and secure it round the wrist or ankle.

CHAPTER V.

METHODS OF CARRYING.

The Four-Handed Seat.

This seat is used when the patient can assist the bearers and use his arms

1. Two bearers face each other behind the patient and grasp their left forearm with their

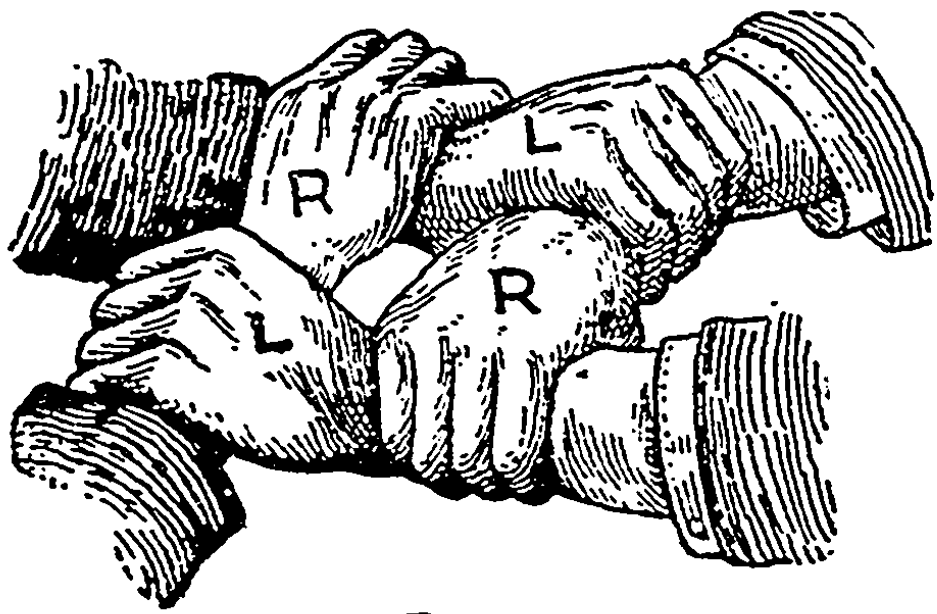

Fig. 70.

right hands and each other's right forearm with their left hands (Fig. 70), and stoop down.

2. The patient sits on the hands and places one arm round the neck of each bearer.

3. The bearers rise together and step off, the bearer on the right hand side of the patient with the right foot, and the left hand bearer with the left foot.

The Two-Handed Seat.

This seat may be used to carry a helpless patient.

1. Two bearers face each other and stoop, one on each side of the patient. Each bearer passes

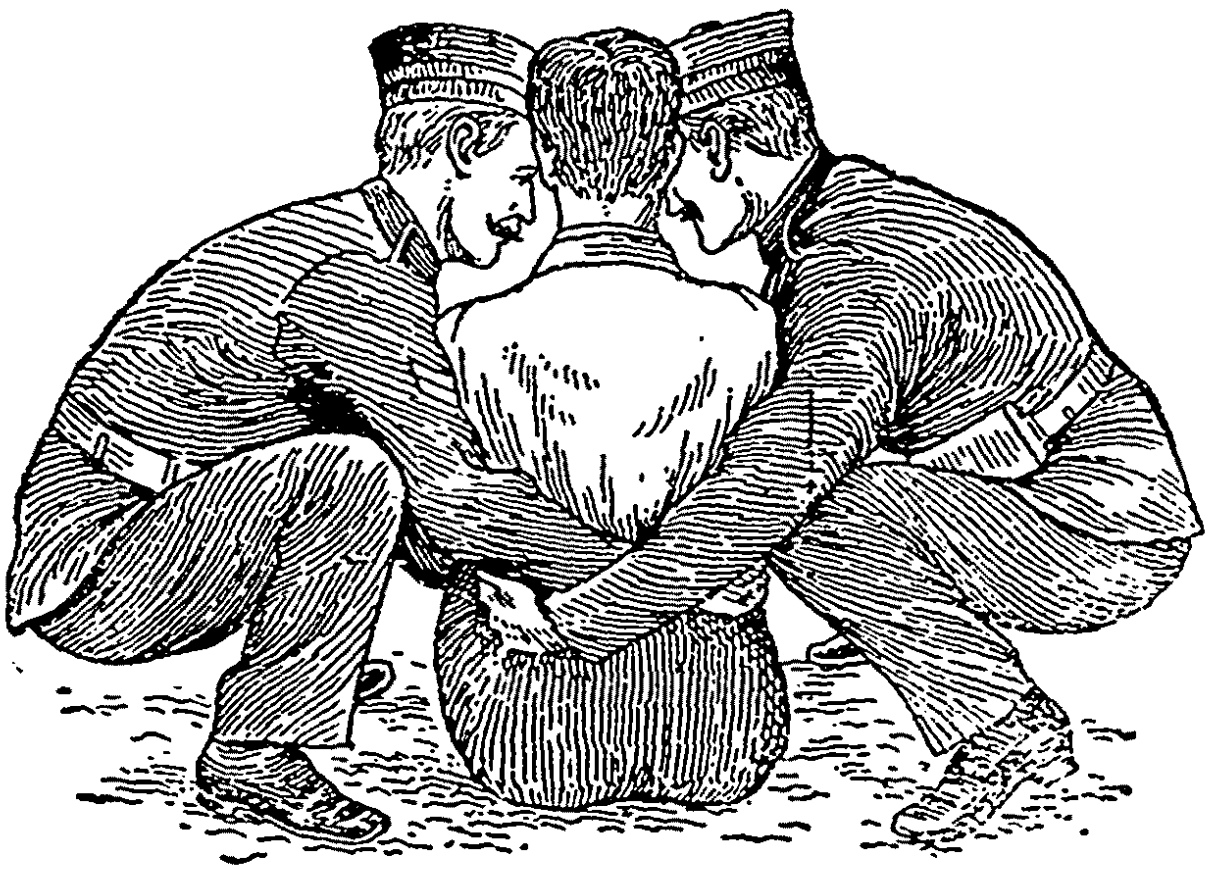

Fig. 71.

his forearm nearest to the patient's head under his back just below the shoulders, and, if possible, takes hold of his clothing. They slightly raise the patient's back, and then pass their other forearms under the middle of his thighs (Fig. 71), and clasp their hands by one of the

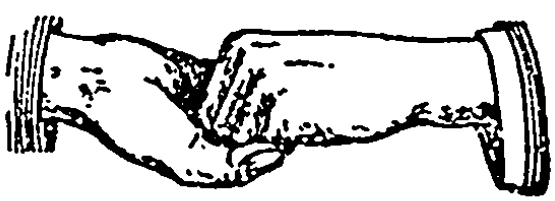

FIG. 72.

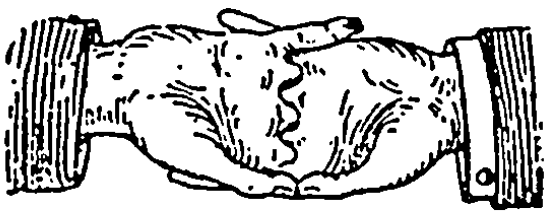

FIG. 73.

methods shown in Figs. 72 and 73. A handkerchief should be held in the hands if the first grip is used.

2. The bearers rise together and step off, the right-hand bearer with the right foot, and the left-hand bearer with the left foot (Fig. 74).

THE THREE-HANDED SEAT.

This seat is useful for carrying a patient and supporting either of his lower limbs, when he is able to use his upper limbs.

1. Two bearers face each other behind the patient. For supporting the left limb the bearer to the patient's right grasps his own left wrist

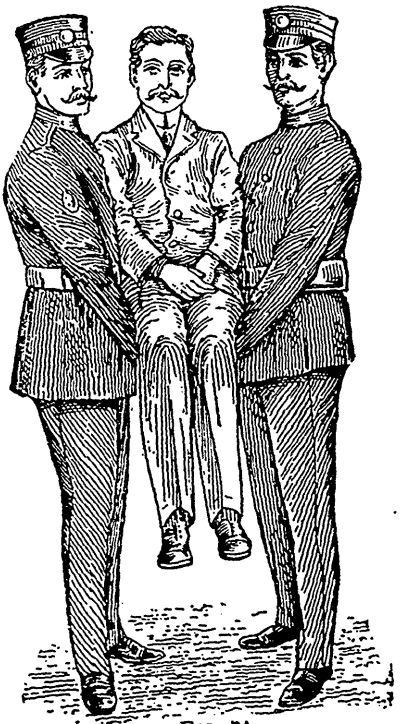

FIG. 74.

with his right hand, and the other bearer's right wrist with his left hand. The bearer to the left grasps the first bearer's right wrist with his right hand (Fig. 75). This leaves his left hand free to support the patient's left leg. For the patient's right lower limb follow the same directions, sub-

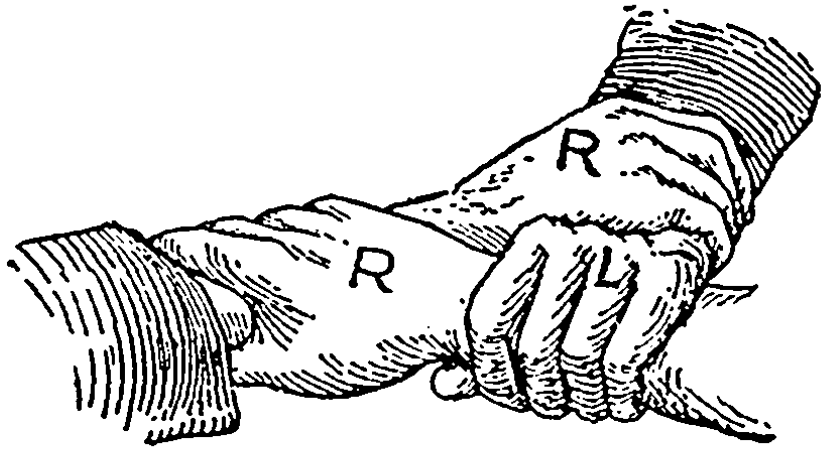

FIG. 75.

stituting "right" for "left" and "left" for "right." The bearers stoop down.

2. The patient places one arm round the neck of each bearer and sits on their hands.

3. The bearers rise together and step off, the right-hand bearer with the right foot, and the left-hand bearer with the left foot.

THE FIREMAN'S LIFT.

(To be attempted only by a strong man.)

Turn the patient face downwards; place your-

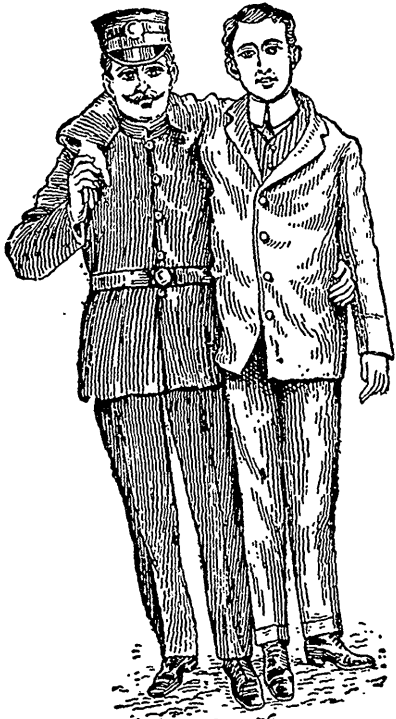

FIG. 76.

self at his head, stoop down, slightly raise his head and shoulders and take hold of him close under his arm-pits, locking your hands on his back. Raise his body and rest it on your left knee; shift your arms and, taking him round his waist, lift him until his head rests on your left shoulder. Throw his left arm over your head, stoop down and place your left arm between his thighs, letting his body fall across your shoulders. Rise to an upright position; hold the patient's left wrist with your left hand and leave your right hand free.

Assistance may be given to an injured person by supporting him in the manner shown in Fig. 76.

The plan of carrying the patient by the arms and legs with the face downwards, commonly called the "frogs' march," must never be used, as death may ensue from this treatment.

Improvised Stretchers.

A stretcher may be improvised as follows:—

1. Turn the sleeves of a coat inside out; pass two strong poles through them; button the coat. The patient sits on the back of the coat and rests

against the back of the front bearer (Fig. 78). If a longer stretcher is required two or three coats must be treated in the same manner. The

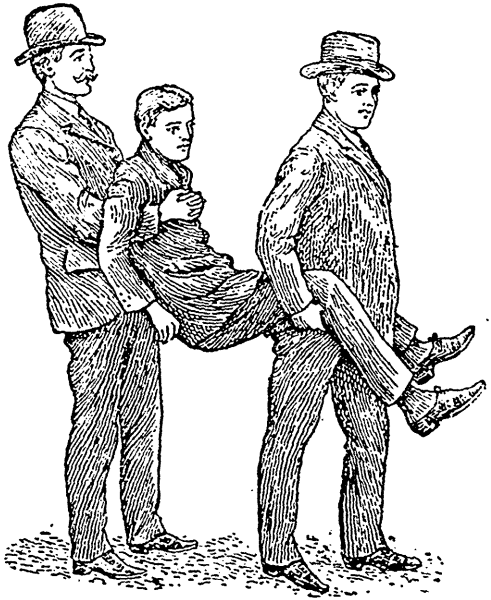

FIG. 77.

poles may be kept apart by strips of wood lashed to the poles at both ends of the bed formed by the coats (Fig. 79).

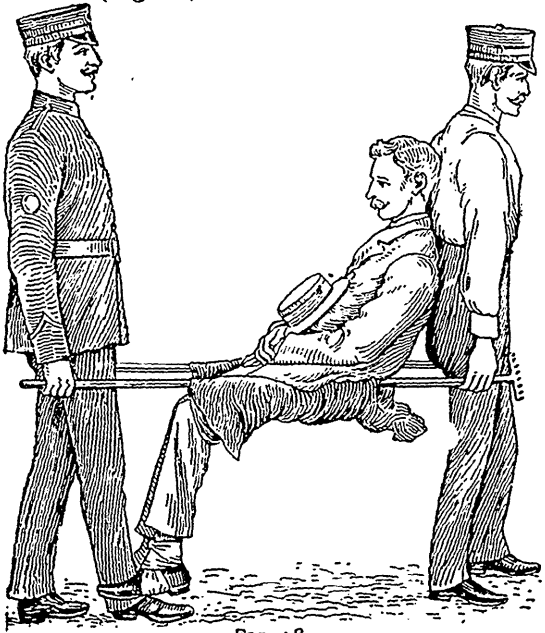

FIG. 78,

The Fore and Aft Method.

This plan of carrying is useful when space does not permit of a hand seat.

2. Make holes in the bottom corners of one or two sacks and pass stout poles through them.

Fig. 79.

3. Spread out a large piece of carpet, sacking, tarpaulin, or a strong blanket, and roll two stout poles up in the sides. Two bearers stand on each side and grasp the middle of the pole with one hand and near the end with the other. They walk sideways.

4. A hurdle, broad piece of wood or shutter may be used as a stretcher; some straw, hay or clothing should be placed on it, and covered with a piece of stout cloth or sacking; the latter is useful in taking the patient off the stretcher.

Always test an improvised stretcher before use.

Stretchers must be carried, and the patient placed on them, as laid down in the "Stretcher Exercises."

As a general rule carry the patient feet foremost.

The exceptions are:—

(a) When going up hill with a patient whose lower limbs are not injured.

(b) When going down hill with a patient whose lower limbs are injured.

Avoid lifting the stretcher over ditches or walls, but where these cannot be avoided the stretcher must be carr ed in the following ways:—

To Cross a Ditch.

In crossing a ditch, the stretcher should be lowered with its foot one pace from the edge of the ditch. Nos. 1 and 2 bearers then descend. The stretcher, with the patient upon it, is afterwards advanced, Nos. 1 and 2 in the ditch supporting the front end while its other end rests on the edge of the ground above. No. 3 now descends. All the Nos. now carry the stretcher to the opposite side, and the foot of the stretcher is made to rest on the edge of the ground, while the head is supported by No. 3 in the ditch. No. 1 climbs out, No. 2 remaining in the ditch to assist No. 3. The stretcher is lifted forward on the ground above, and rests there while Nos. 2 and 3 climb up.

To Cross a Wall.

The stretcher is lowered with the foot about one pace from the wall. Nos. 1 and 2 bearers then take hold of the foot of the stretcher, and No. 3 of the head; the stretcher is raised till the foot is placed on the wall. No. 1 then climbs over the wall and takes hold of the foot of the stretcher, while Nos. 2 and 3 support the head; the stretcher is then carried forward till the head rests on the wall, No. 1 supporting the foot. Nos. 2 and 3 then climb over the wall and take hold of the head of the stretcher, which is then slowly lifted off the wall on to the ground, and the bearers take their usual places.

To Load a Wagon.

The stretcher is lowered with the foot one pace from the end of the wagon. Nos. 1 and 2 take hold of the foot of the stretcher, No. 3 the head. The stretcher is then raised and carried forward till the front wheels rest on the floor of the wagon. No. 1 then jumps into the wagon, while No. 2 goes to the head of the stretcher and helps No. 3. The stretcher is then pushed slowly into the wagon. If the tailboard cannot be shut, the stretcher must be lashed firmly to the sides of the wagon.

To Unload a Wagon.

Nos. 2 and 3 take hold of the head of the stretcher, while No. 1 gets into the wagon; the stretcher is then gradually drawn out till the foot-wheels rest on the edge of the wagon. No. 1 jumps out of the wagon, and with No. 2 takes hold of the foot of the stretcher, No. 3 supporting the head. The stretcher is now gently drawn away one pace and lowered

With four bearers Nos. 1 and 2 would lift the foot of the stretcher, while Nos. 3 and 4 lift the head. This applies to crossing a ditch or wall, as well as to loading and unloading a wagon.