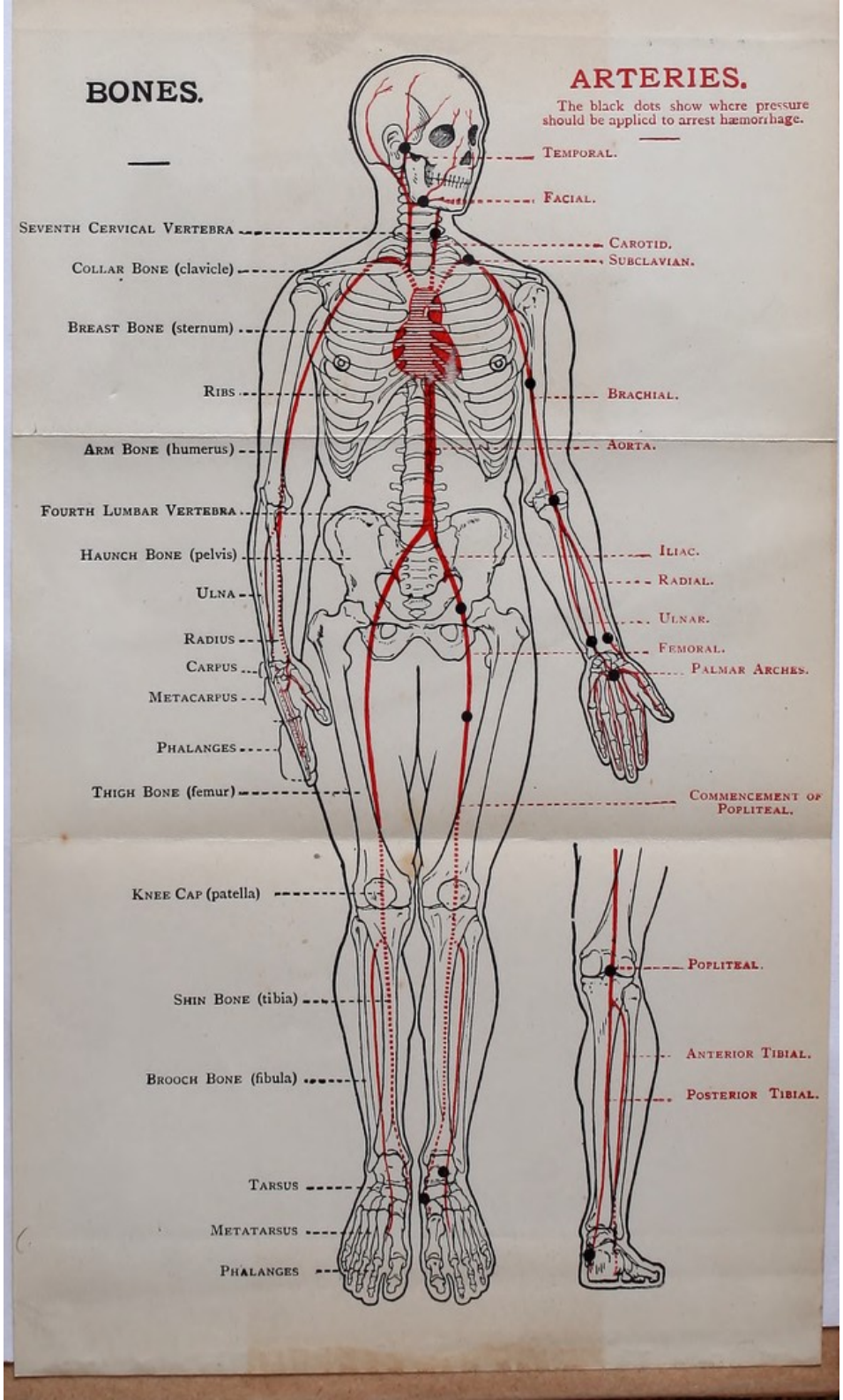
First aid to the injured : arranged according to the revised syllabus of the First Aid Course of the St. John Ambulance Association / by James Cantlie.

FIRST AID TO THE INJURED.


BONES.
ARTERIES.
The black dots show where pressure should be applied to arrest hæmorrhage.
Temporal.
Facial.
Seventh Cervical Vertebra
Carotid.
Collar Bone (clavicle)
Subclavian.
Breast Bone (sternum)
Ribs
Brachial.
Arm Bone (humerus)
Aorta.
Fourth Lumbar Vertebra
Haunch Bone (pelvis)
Iliac.
Radial.
Ulna
Ulnar.
Radius
Femoral.
Carpus
Palmar Arches.
Metacarpus
Phalanges
Thigh Bone (femur)
Commencement of Popliteal.
Knee Cap (patella)
Popliteal.
Shin Bone (tibia)
Anterior Tibial.
Brooch Bone (fibula)
Posterior Tibial.
Tarsus
Metatarsus
Phalanges

FIRST AID TO THE INJURED:

ARRANGED ACCORDING TO THE REVISED SYLLABUS OF THE FIRST AID COURSE

OF THE

ST. JOHN AMBULANCE ASSOCIATION,

BY

JAMES CANTLIE, M.A., M.B., F.R.C.S.,

Honorary Associate of the Order of St. John.

Honorary Life Member of, and Lecturer and Examiner to, the Association.

WITH A

CHAPTER ON STRETCHER TRANSPORT,

By Sir JOHN FURLEY, *Knight of Justice of the Order of St. John.*

Also a CHAPTER (being the Fifth Lecture for Females only), by E. MACDOWEL COSGRAVE, M.D., F.R.C.P.I., *Knight of Grace of the Order of St. John, Honorary Life Member of, and Lecturer and Examiner to, the Association.*

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FIRST AID TO THE INJURED.

SYLLABUS OF INSTRUCTION.

First Lecture.

A. Preliminary remarks, Objects of Instruction, &c.

B. A brief description of the Human Skeleton, Bones, Joints, and the Muscular System.

C. Signs, symptoms and treatment of Fractures, Dislocations, Sprains, and Strains.

D. The Triangular Bandage and its application.

Second Lecture.

A. The Heart and Blood Vessels. The Circulation of the Blood.

B. The general direction of the Main Arteries, indicating the points where the circulation may be arrested by digital pressure, or by the application of the tourniquet, or by other means.

C. The difference between Arterial, Venous, and Capillary Bleeding, and the various extemporary means of arresting it.

D. The Triangular Bandage and its application.

Third Lecture.

A. A brief description of the Nervous System.

B. First Aid to persons suffering from shock or collapse after injury, injury to the brain, collapse from drink, epilepsy, fainting and hysteria.

C. First Aid in cases of Burns or Scalds, injury by Vitriol Throwing, Wounds, Bites of Animals, Stings of Insects.

D. What to do when the dress catches fire.

E. The Triangular Bandage and its application.

Fourth Lecture.

A. A brief description of the Organs and Mechanism of Respiration.

B. The immediate treatment of the apparently drowned or otherwise suffocated. Artificial Respiration, Treatment for Choking.

C. First Aid to those poisoned.

D. The immediate First Aid treatment of injuries to the Internal Organs, and to those suffering from Internal Hæmorrhage.

E. Foreign Bodies in the Eye, Ear, and Nose.

Fifth Lecture (for males only).

A. Improvised methods of lifting and carrying the sick or injured.

B. Methods of lifting and carrying the sick or injured on stretchers.

C. The conveyance of such by rail or in country carts.

Fifth Lecture (for females only).

A. Preparation for reception of Accident Cases.

B. Means of Lifting and Carrying.

C. Preparation of Bed.

D. Removing the Clothes.

E. Preparations for Surgeon.

NOTE I.—The subject of poisons should be treated in a general manner. The common poisons classified, and only their general symptoms and effects taught.

To get rid of the poison is the only treatment which can be safely practised by non-professional persons; the administration of antidotes is the *medical man's* duty.

NOTE II.—The last half hour of each lecture should be devoted to practical work, such as the application of bandages and splints, lifting and carrying wounded on stretchers.

NOTE III.—There should be an interval of a week between each lecture. A Candidate for examination must attend *at least* four out of the five lectures.

NOTE IV.—Male classes must pass in that system of stretcher exercise most suitable for the locality.

NOTE V.—As little time as possible is to be spent on instruction in anatomical and physiological details. Lecturers and Examiners are particularly requested to remember that it is "First Aid" that has to be taught and tested, and not anatomy and physiology.

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Chapter I.

Chapter II.

Chapter VII.

Chapter VIII.

Chapter IX.

Chapter X.

Chapter XI.

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PREFACE.

At the request of the Central Executive Committee, I have written this manual as the official handbook of the St. John Ambulance Association.

The strides made in the teaching of "First Aid," and the requirements of the St. John Ambulance Brigade, have necessitated an enlargement of previous works on the subject published by the Association.

I have endeavoured to include only as much anatomical and physiological detail as is absolutely necessary to enable students to grasp intelligently the principles of treatment.

The greater part of the directions for the application of the triangular bandage and for lifting and carrying patients, is adapted almost verbatim from the work of the late Surgeon-Major Shepherd, as re-written by Dr. Robert Bruce.

I wish to express my thanks to Colonel C. Bowdler, Drs. J. Brown, C. Childs, M. Coates, W. Collingridge, J. R. Crease, G. H. Darwin, and H. A. Latimer, who have, as a sub-committee of the Association, assisted me in my work.

JAMES CANTLIE.

June, 1901.

INTRODUCTION.

THE St. John Ambulance Association has completed the twenty-fourth year of its existence. During the period since the Association began its work, hundreds of thousands of men and women have been taught at the classes of the Association how to help their injured neighbours. In every country where civilization has penetrated does the teaching of the Association find a ready audience. All ranks of society testify to the usefulness of the instruction given. The followers of no religious or political creed cavil at its aims and ideals. Jew and Gentile, Christian and Mahomedan, Brahmin and Buddhist, accept its tenets, and appreciate the benefits it confers.

Under the auspices of the St. John Ambulance Association, "First Aid" has developed into a distinct branch of surgery, necessitating a special training. Neither in our medical schools nor in our hospitals is "First Aid" specially taught, and it is to the initiative of the St. John Ambulance Association that both the public and the medical profession are indebted for having developed and taught this important department of general surgery.

The instruction begins and ends with "First Aid," and the subject is taught thoroughly and exhaustively. The duty of the ambulance pupil ends where the doctor's commences, and there ought to be no overlapping or clashing of duty or interests. No more liberal or useful instruction has ever been given to the public, and the work of the St. John Ambulance Association must continue whilst charity remains to us, and sympathy for suffering humanity endures.

FIRST AID TO THE INJURED.

Chapter I.

EXPLANATORY.

By "**First Aid**" is meant that form of skilled assistance which persons trained in ambulance work can afford instantaneously to the sick or injured.

"First Aid to the Injured" is a branch of practical surgery demanding special training and education.

The principal aim and object of the St. John Ambulance Association is to teach in simple language how to help a sick or injured person until the services of a doctor are obtained.

A further and important branch of ambulance work is the carriage of sick or injured persons by stretcher, by ambulance wagon, by rail, or by improvised means of transport.

Before proceeding to give in detail the various steps to be taken in the event of accident or sudden illness, it is necessary to know something of the structure of the body (elementary anatomy), and the functions of some of the more important organs and systems (elementary physiology). A short description of necessary anatomical and physiological points of importance are therefore given as the several subjects

are discussed in detail. It is essential to remember when studying anatomy that the human body is supposed to be standing erect, with the palms of the hands directed forwards and the thumbs outwards, or away from the body. The "middle line" of the body is a line drawn vertically from the top of the head to a point between the feet.

THE SKELETON.

The human body is moulded upon a bony framework which serves: (1) To give shape and firmness to the body; (2) to afford attachment to the muscles; and (3) to protect the more vital organs in the skull, in the chest, and in the abdomen.

The bones of a dried skeleton represent only the earthy matter of the bones—the bone salts; the animal matter of the living bone—the bone tissue—amounting to one-third of the whole, has disappeared. When one of the long bones of the limbs, such as the thigh bone, is sawn from end to end, it is seen to consist of dense, *compact* material, covering a more open, honey-combed looking tissue, the *cancellous* material of bone. The compact tissue is thickest in the middle or shaft of the bone, the cancellous at either end. The centre of the bone is hollow, but it is occupied during life by marrow.

The Back Bone, Spine, or Vertebral Column.

The **Vertebral Column.**—Each segment of which the spine is composed is termed a Vertebra. A Vertebra consists (1) of a central body or mass; (2) of processes, two of which join behind to form

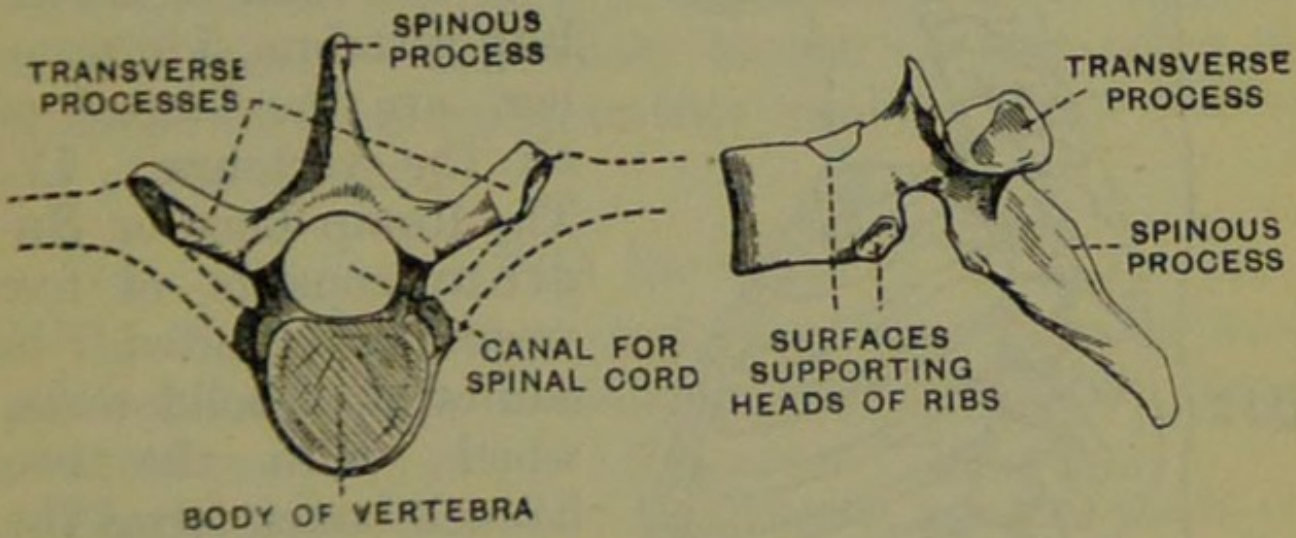
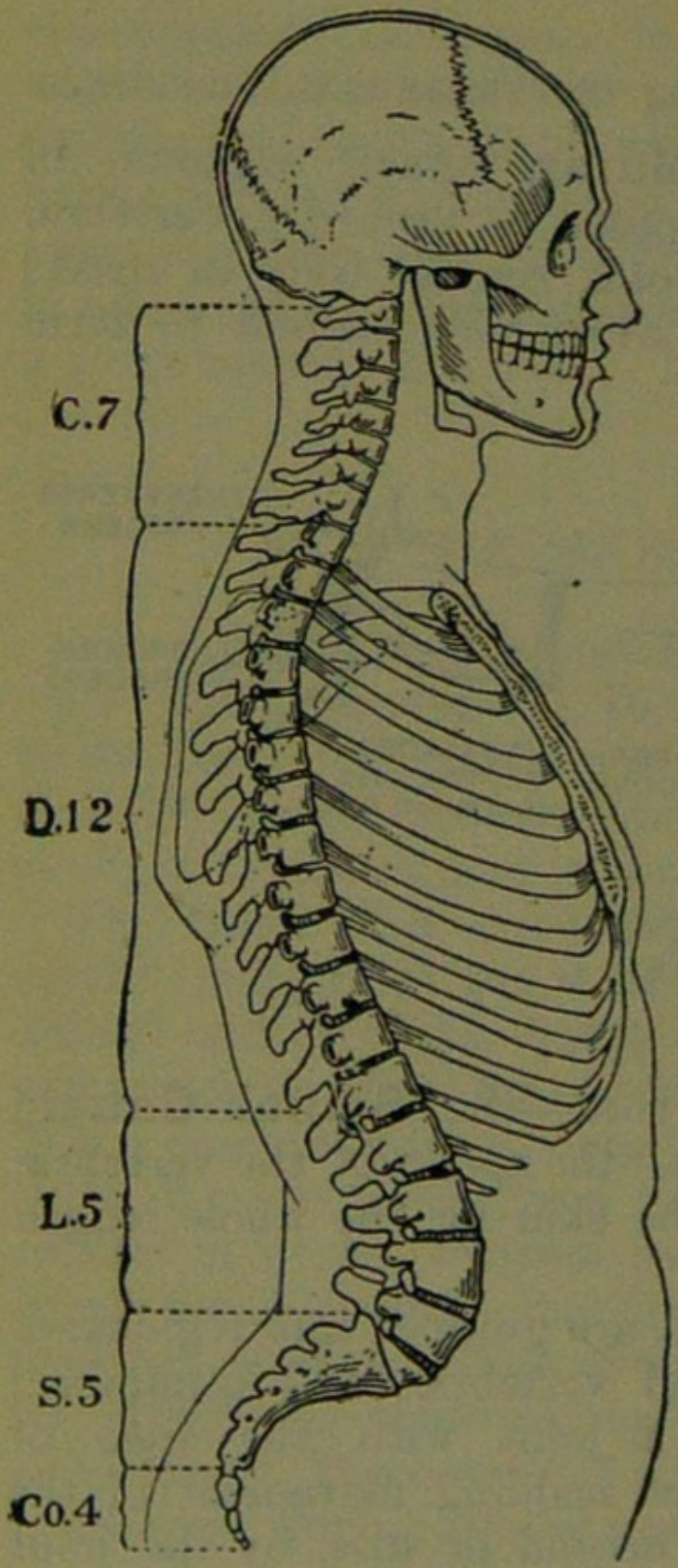


Fig. 1.

a canal for the spinal cord—the **Spinal Canal;** behind, bony projections—the spines of the vertebræ—can be felt beneath the skin for the whole length of the back.

The vertebræ, 33 in all, are grouped into regions:—I. The Neck or **Cervical** vertebræ are 7 in number; the first or *atlas* forms a joint with the base of the skull, at which the nodding movement of the head takes place; the second or *axis*, by the joint



between it and the atlas, allows of the side to side movements of the head. II. The Back or **Dorsal** vertebræ, 12 in number, have the 12 pairs of ribs attached on either side. III. The Loin or **Lumbar** vertebræ, 5 in number, are the largest of all the vertebræ. IV. The Rump Bone or **Sacrum** consists of five vertebræ, united in adults as a solid mass, which, with the two haunch bones, forms the pelvis. V. The Tail Bone or **Coccyx** consists of four vertebræ which are

---

FIG. 2.

SKULL AND VERTEBRAL COLUMN,

Showing left ribs and portion of breast-bone. The right ribs are removed.

joined together to form a single group. The vertebræ in each region are known by numbers, counting downwards—1st, 2nd, 3rd, etc.

Between the bodies of the vertebræ thick pieces of gristle or cartilage are interposed (*intervertebral discs*), which, whilst they bind the bones together, allow of free movement to the column as a whole, and serve to break the shock of any sudden force applied to the spine. The whole length of the spine is strapped together by ligaments reaching from end to end of the column.

The Skull.

The bones of the skull are arranged in two groups, those of the brain case, or cranium, and those of the face.

The boundaries of the **Cranium** are the vault or dome, the rounded portion forming the top of the head; the front or brow; the back of the head, where the greatest extent of brain exists, and where, therefore, the cranium is widest and deepest; the sides or temples, where the openings into the ear passages are seen, and to which the ear is attached. The base of the cranium is hidden from view by the bones of the face and the vertebral column; in it are numerous perforations for the passage of the blood vessels going to and from the brain; through the largest openin the brain and spinal cord are continuous.

The bones of the **Face**, with the exception of the lower jaw, are firmly jointed together, so that movement between them is impossible.

The cavities of the nose and of the eye socket (orbit) are formed by the bones of the cranium and face conjointly.

The mouth cavity is formed between the upper and lower jaws, the palate being the bony roof of the mouth, which separates it from the nasal cavity above.

The Ribs.

The **Ribs** consist of twelve pairs of curved bones extending from the vertebral column behind to the front of the body, and are known by numbers, 1st, 2nd, 3rd, etc., commencing from above. They form joints with the dorsal vertebræ, and their movement resembles that of the handle of a bucket. The ribs are not, however, bony throughout their entire length. At a short distance from the breast-bone the bony material ends, and gristle (*cartilage*) takes its place. The upper seven pairs, named the *true* ribs, are attached by their cartilages to the breast-bone; the lower five pairs are termed the *false* ribs, as their cartilages fall short of the middle line. Of the false ribs the 11th and 12th pairs are termed the floating or winged ribs, as their ends are free in front. The

ribs enclose the chest, and serve to protect the lungs, heart, liver, stomach, spleen, &c. (see Thorax and Abdomen).

The Breast-bone.

The **Breast-bone** (*sternum*) is a dagger-shaped bone with the point below, just over the pit of the stomach; it supports the inner ends of the collar-bones above, and the seven true ribs are connected with it on either side.

The Upper Extremities.

The **Shoulder** bones are the collar-bone (*clavicle*) and the shoulder-blade (*scapula*), and they together constitute an imperfect girdle—the shoulder girdle.

The **Collar-bone** can be felt beneath the skin at the lower and front part of the neck as a narrow curved rod of bone, about the thickness of a finger. Its inner end rests on the upper part of the breast-bone; the outer end joins with the shoulder-blade at the top of the shoulder; at either end a joint exists. The collar-bone is endowed with extra elasticity, owing to its being possessed of a double curve, the inner two-thirds of the bone being curved forwards and the outer third backwards. This is necessary in order to resist the strain thrown on the bone by falls on the hand, elbow, or shoulder.

The **Shoulder-blade**, flat and triangular in out-

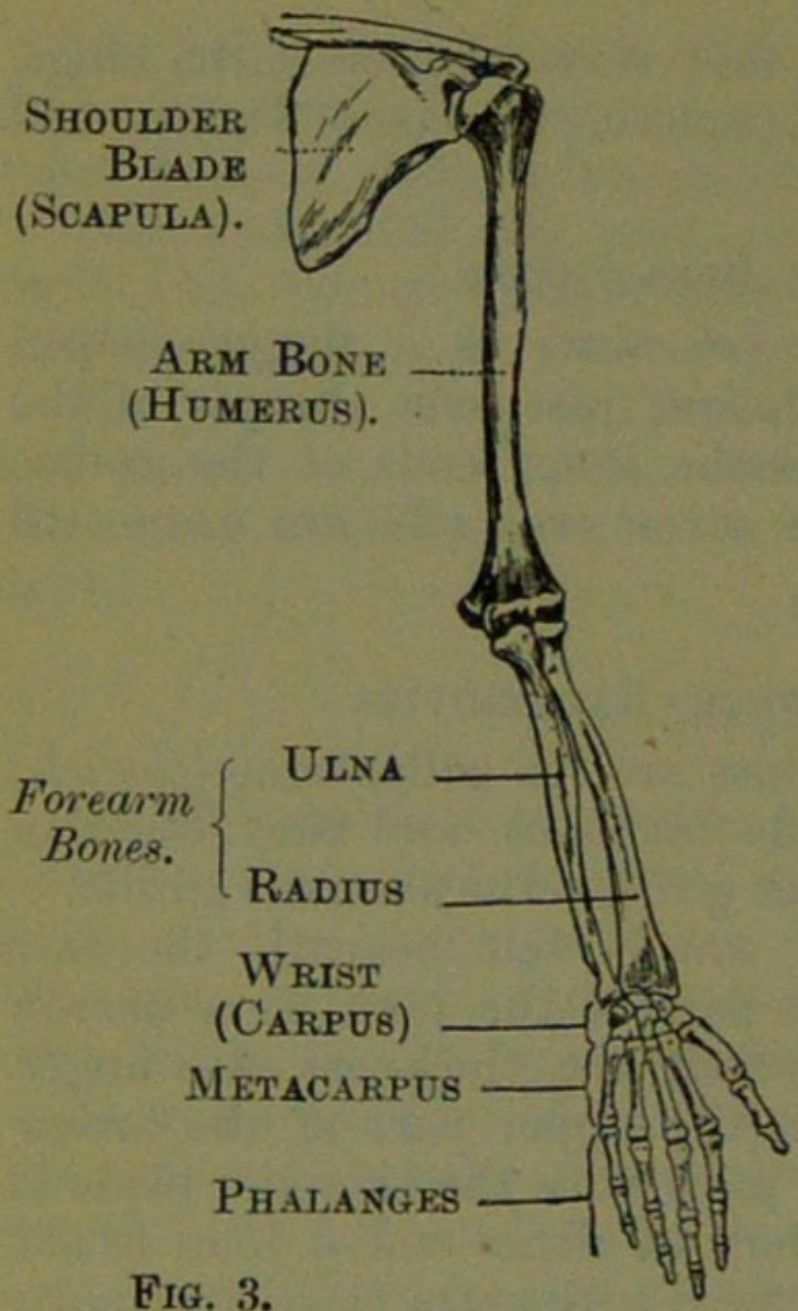


Fig. 3.
Bones of the right Upper Extremity.

line, lies at the back of the chest. A large process of this bone at the top of the shoulder, joins with the collar-bone, to give squareness and prominence to the shoulder, and protects the shoulder joint immediately beneath it. A shallow surface on the outer angle of the shoulder-blade forms the socket of the shoulder joint.

The **bone of the arm** (*humerus*), is rounded in the centre of its shaft and expands above and below to take part in the formation of the shoulder and elbow joints respectively. The upper end presents a rounded head where it rests on the shallow surface formed to receive it by the shoulder-blade; the lower end is shaped to fit the two bones of the forearm at the elbow joint.

In the **Forearm** are two bones, the **Radius** on the outer, or thumb side, and the **Ulna** on the inner, or little finger side. Both bones reach from the elbow to the wrist, and they change their relative position with every turn of the hand.

The **Hand** is composed of: (1) the bones of the wrist or *carpus*, eight in number, arranged in two rows of four; (2) the *metacarpus* (the framework of the palm), presenting five bones, which form the knuckles and support the bones of the fingers; (3) the *phalanges* or finger bones, three in each finger, and two in the thumb.

The Pelvis and Lower Extremities.

The **Pelvis**.—The large basin-like mass of bone attached to the lower part of the spine is composed of three bones, the two haunch bones and the sacrum (or rump bone). The haunch bones meet (at the *pubes*) in the middle line in front, only a small piece of gristle intervening, but, behind, the sacrum is placed between them. The pelvis serves to support the abdomen and its contents, to protect the organs within the pelvic cavity, to give attachment on its outer surface to the muscles of the hip and thigh, and presents the deep socket for the head of the thigh bone—the hip joint.

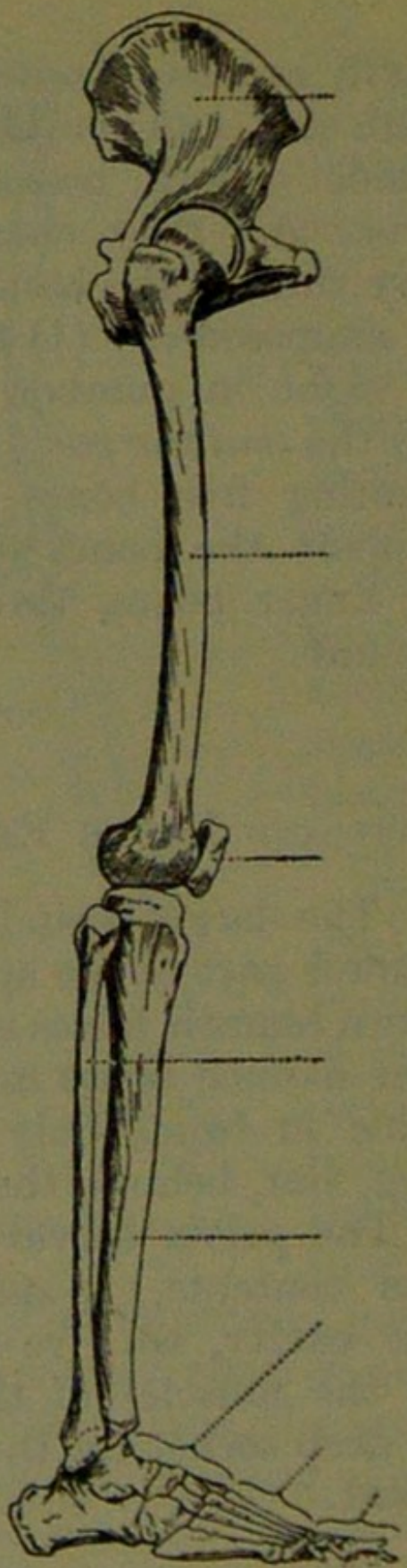


Fig. 4.
The bones of the right Lower Extremity.

The **Thigh bone** (*femur*) reaches from the hip to the knee joint. The shaft of the bone is stout, rounded, and arched forwards. The upper end presents a rounded head, supported on a neck which projects inwards at an angle from the shaft of the bone to fit into the socket of the hip joint. The lower end expands to form two projections at the knee joint.

The **Knee Cap** (*patella*) is a thick triangular piece of bone with its base upwards lying in front of the knee joint and the lower end of the thigh bone. It can be felt immediately beneath the skin.

The **bones of the leg** are the Shin bone (*tibia*) and the Brooch bone (*fibula.*) The **Shin bone** (*tibia*) is triangular in shape. It extends from the knee to the ankle, into both of which joints it enters and plays an important part. The sharp edge or *shin* can be felt immediately beneath the skin of the front of the leg; at the inner side of the ankle a stout piece of bone projects downwards from the tibia. The **Brooch bone** (*fibula*) lies parallel to, and on the outer side of, the tibia. This bone does not enter into the formation of the knee joint, but its lower end forms the outer boundary of the ankle joint.

The **Foot.**—(1) The group of irregular bones at the instep constitutes the *tarsus.* There are seven bones in the tarsus, of which the largest is the heel bone, and the uppermost (the ankle bone) forms the lower part

of the ankle joint. (2) The five long bones in front of the tarsus constitute the *metatarsus*, and each bone supports a toe. (3) Each toe, except the big toe, possesses three bones, named the 1st, 2nd, and 3rd *phalanges*. The big toe has two phalanges only.

JOINTS.

A **Joint** is formed at the junction of two or more bones. In joints such as the hip, knee, elbow, etc., the surfaces of the bones are covered by gristle or

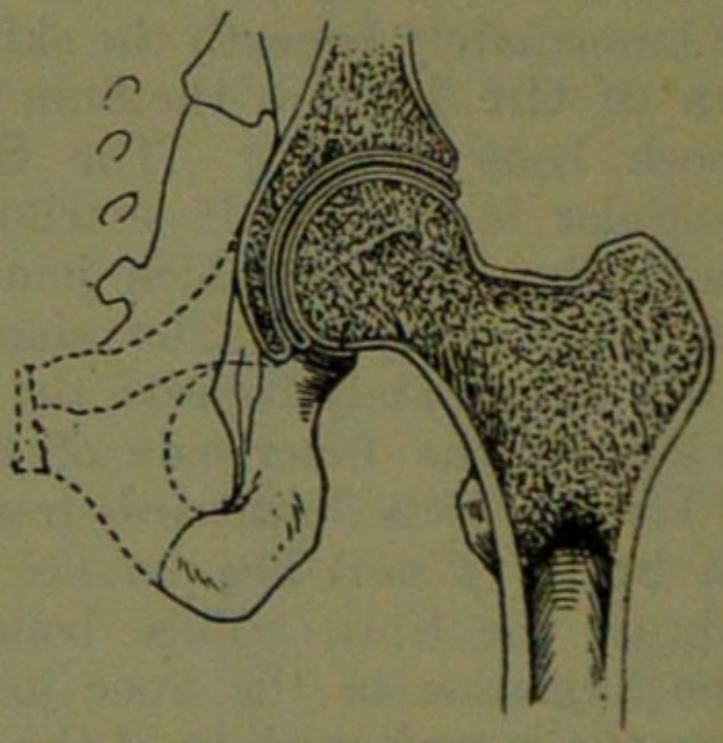


FIG. 5.—THE HIP JOINT.
Section of a Ball and Socket Joint.

cartilage, a hard, dense, semi-translucent covering which lessens friction and the violence and shock of

a fall. Lubricating the joint is a clear, rather sticky or syrupy fluid, the "joint oil," or *synovia*, enclosed within a *capsule*. Tying the bones firmly together, but yet allowing of movement, are a number of bands or *ligaments*. Bones, cartilage, synovia, capsule, and ligaments are therefore the component parts of the limb joints.

To explain the formation of limb joints, the following examples are given :—

1. The **Shoulder**, a ball-and-socket joint, consists of a shallow saucer-like surface on the outer angle of the shoulder-blade (scapula), and of the rounded head of the arm-bone (humerus). Owing to the shallowness of the shoulder-blade surface, the round end of the arm-bone is very prone to escape from its socket (dislocate).

2. The **Elbow**, a hinge joint, is composed of the arm-bone above, and of the two fore-arm bones below (the radius and ulna). The upper end of the ulna forms a stout projection behind—the tip of the elbow —which serves to embrace the arm-bone and maintain the bones of the elbow joint in position.

THE MUSCLES.

All the movements of the body are due to muscular action. Popularly the muscles are termed "the flesh," and many believe that flesh and muscle are different tissues. The erroneous belief comes about

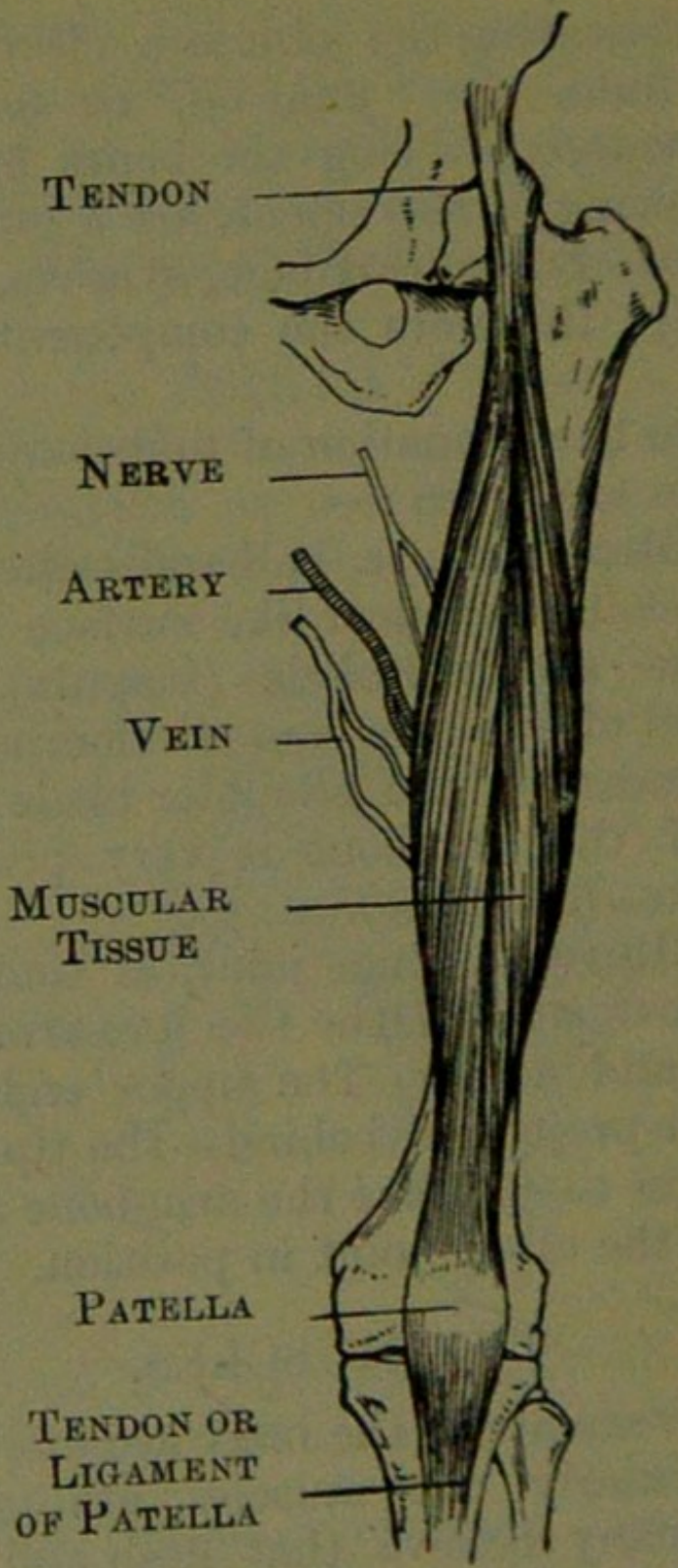


Fig. 6.—*Diagram showing Muscle of Thigh with Artery, Vein and Nerve.*

in this way. When an animal, such as an ox, is tied up and fed liberally, the muscles become soft and charged with fat, and form palatable and nutritious food; on the other hand, when an animal, such as a horse, uses its muscles for severe work, they become hard and tough and unsuitable for food. Both are, however, muscle or flesh under different conditions.

The muscles of the body are classified into two groups, the *voluntary* and the *involuntary muscles.*

The **Voluntary muscles** are composed of muscular fibres; they constitute the main bulk of muscles met with in the limbs, the head and neck, and the surface of the trunk. These muscles are attached to the bones, and as they pass from one bone to another they cross a joint, and being endowed with the power of contraction and relaxation, cause the movements of the body. As a muscle crosses a joint, it loses its red, fleshy appearance and becomes a tendon (leader). To understand better the anatomy of the muscle, take as an example the rectus muscle of the thigh. The rectus arises from the pelvis, passes over the hip-joint as tendon, becomes fleshy (muscular) in the middle of the thigh, and finally crosses the knee-joint as tendon to reach the tibia. Blood vessels traverse and supply the muscles, and the nerves entering the muscles bring them under the direct control of the brain and spinal cord.

The **Involuntary muscles** are composed of

muscle cells arranged to form extensive layers; they are met with in the walls of the stomach and intestines, in the air passages, and in most of the internal organs and blood vessels, also in a special form in the heart. The involuntary muscles are not under the influence of the will, but continue their work during the hours of sleep; they are supplied by a separate set of nerves (see Nervous System).

FRACTURES AND THEIR TREATMENT.

By a **Fracture** is meant a broken bone.

Causes of Fracture.

A bone may be broken by :—

1. **Direct Violence.** When from a severe blow, impact of a bullet, or crush of a wheel, etc., a bone breaks at the spot where the force is applied, the fracture is termed direct.

2. **Indirect Violence.** When the bone breaks at some distance from the seat of injury, the fracture is termed indirect. Alighting on the feet and fracturing the thigh-bone or the bones of the leg, or falling on the hand and breaking the radius or the collar-bone, are familiar examples.

3. **Muscular Action.** The knee cap and the arm bone (*humerus*) are occasionally broken by a violent contraction of the muscles attached to them.

Varieties of Fractures.

1. **Simple.** The bone is broken in two, with but slight injury to surrounding parts.

2. **Complicated.** The bone is broken and other important adjacent structures injured either by the

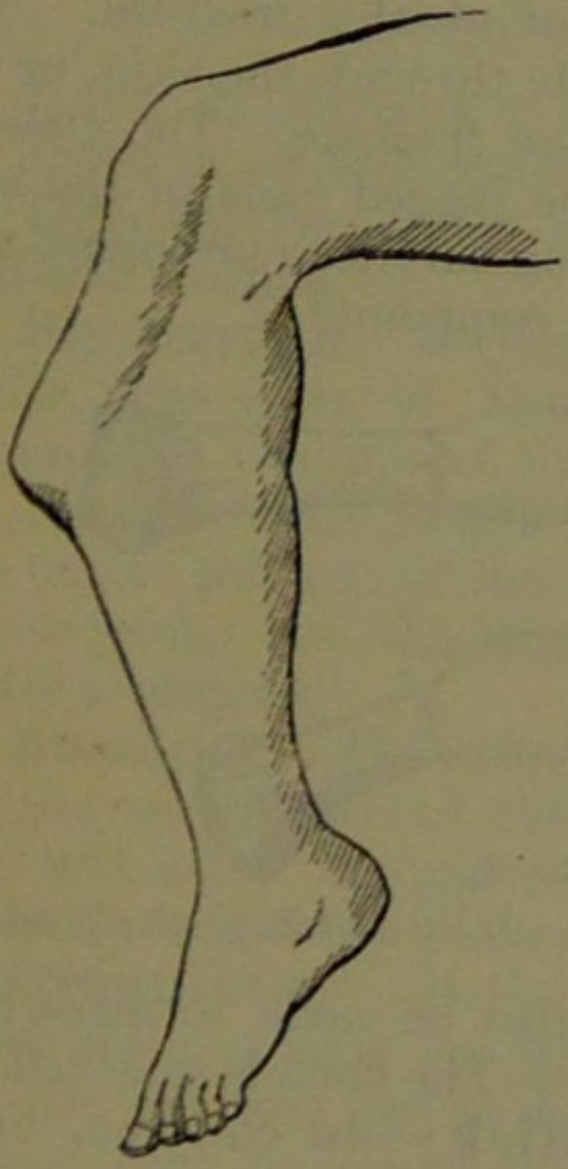


Fig. 7.
Diagram of Simple Fracture of Leg.

Fig. 8.
Diagram of Compound Fracture of Leg, with bone protruding.

violence which caused the fracture, or by the sharp ends of the bone wounding a blood vessel, nerve, or any of the organs within the skull, chest, or abdomen.

3. **Compound.** The bone is broken, and the skin and tissues punctured or torn, allowing the air to communicate with the seat of the fracture. The fractured ends may protrude through the skin, or the wound may lead down to the fracture. The violence that broke the bone, or the jagged ends of the bone themselves, especially during careless movement, may cause a fracture to become compound.

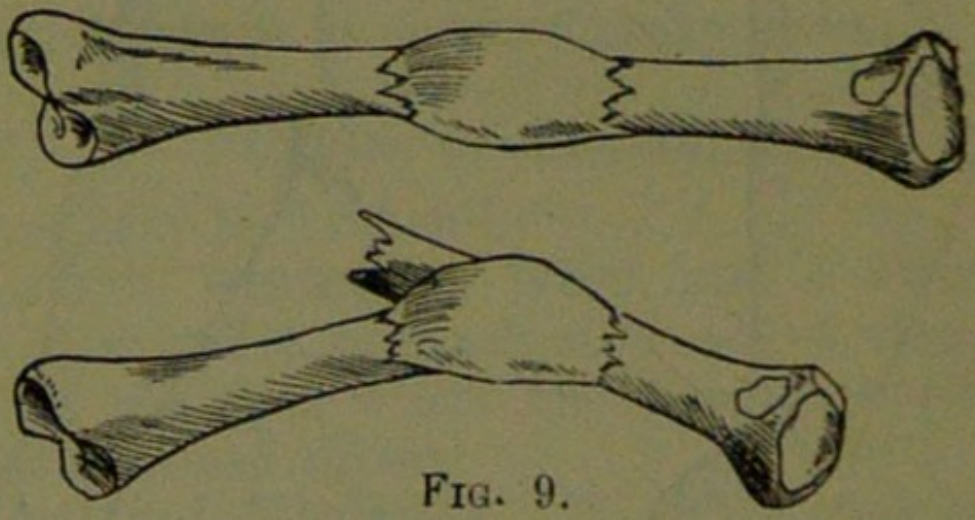


FIG. 9.

Showing Fractured Bone properly and improperly set.

Passing reference may also be made to three more varieties. **Comminuted**:—The bone is smashed into several pieces. **Green-stick**:—In children, owing to the softer state of the bony tissues, a bone may bend and crack without breaking completely across. **Impacted**:—When, instead of overriding, the broken

ends of a bone are driven the one into the other, the fracture is said to be impacted. Several of the usual signs and symptoms of fracture mentioned below are absent in green-stick and impacted fractures.

Signs and Symptoms of Fracture.

1. **Loss of Power** in the limb.
2. **Pain** at or near the seat of fracture.
3. **Deformity.** The injured limb lies in an unnatural position.
4. **Shortening.** Owing to the contraction of the muscles, the ends of the bone override, causing shortening of the injured limb.
5. **Unnatural Mobility.** Movement may be made out at the seat of the break in the bone instead of at a joint, but this sign should be sought for only by a surgeon.
6. **Swelling.** The overriding ends of the broken bone, the contraction of the muscles and effusion of blood, will cause the parts around the seat of the fracture to increase in bulk.
7. **Irregularity.** If the fractured bone is close beneath the skin as in the case of the jaw, collar-bone, shin-bone, etc., the gap in the bone or the ends of the fragments may be felt by the finger.
8. **Crepitus** or bony grating may be felt or heard when the broken ends move one upon the other. This sign should only be sought for by a surgeon.

Apparatus for Treatment of Fractures.

Splints and Bandages are the apparatus by which broken bones are to be treated. In hospitals splints and bandages, appropriate to every variety of fracture are at hand, but for "First Aid" treatment they frequently have to be improvised.

Splints may be improvised from walking sticks, umbrellas, billiard cues, broom or brush handles, a policeman's truncheon, a musket, a bayonet or a sword in its scabbard, a folded coat, any piece of wood, firmly folded newspaper or any other paper, 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.*

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

Esmarch's Triangular Bandages (Fig. 10) are made by cutting a piece of linen or calico about forty inches square into two pieces crossways. The bandage may be used either as a broad or narrow bandage.

The **broad** is made by spreading the bandage out, then bringing the point down to the lower border (Fig. 11), and then folding into two (Fig. 12).

The **narrow** is made by folding the broad bandage again in two (Fig. 13).

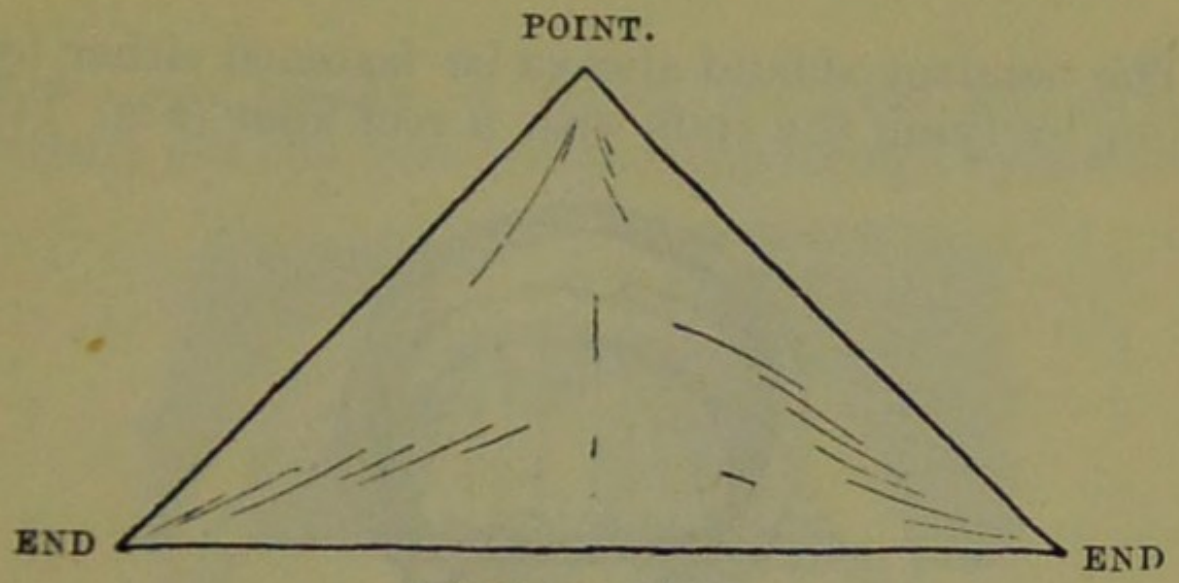


FIG. 10. Bandage spread out.

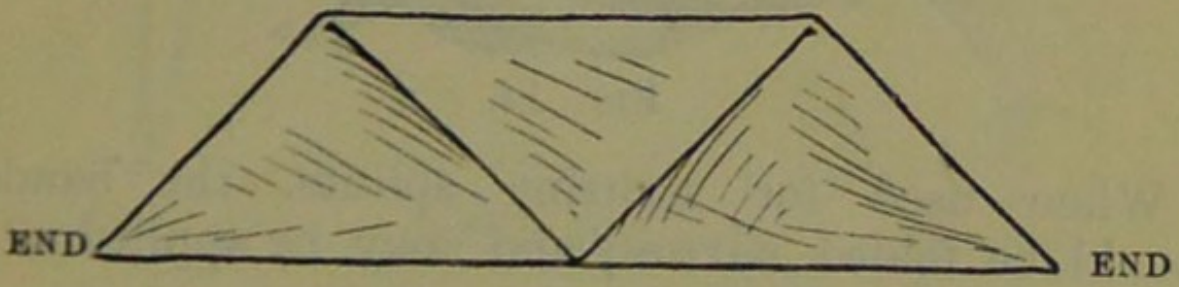


FIG. 11. Bandage once folded.

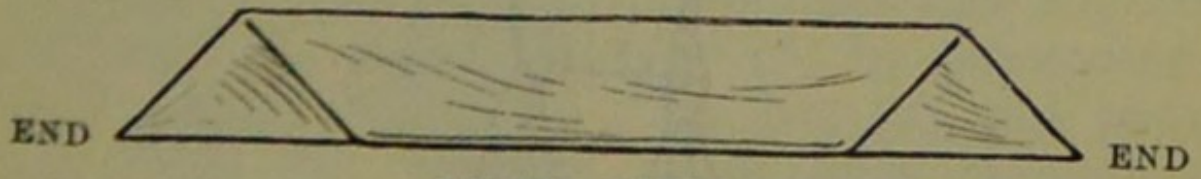


FIG. 12. Broad Bandage.

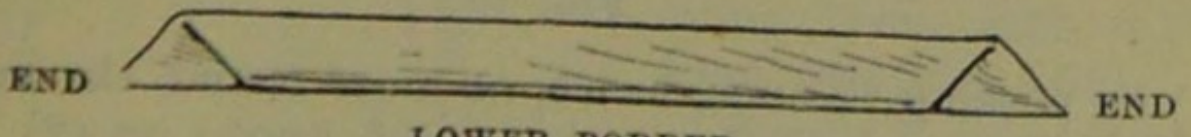


FIG. 13. Narrow Bandage.

The bandage should always be fastened either by a pin or by tying the ends with a reef knot (Fig. 14).

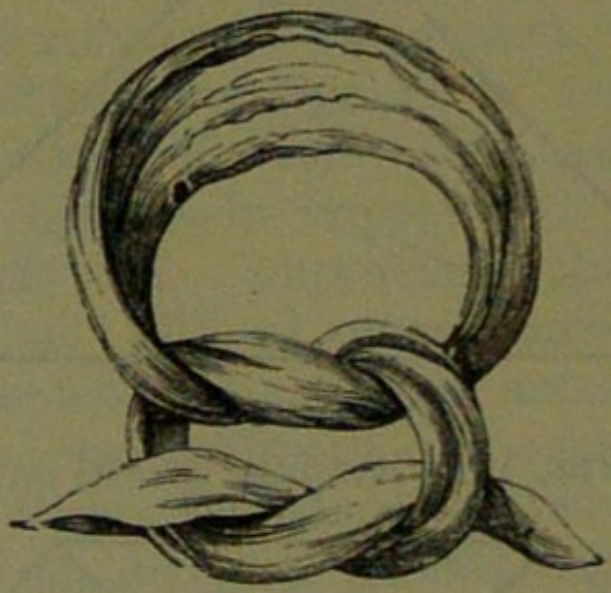


Fig. 14.

When used for securing splints, the bandage should be folded narrow, and may be applied either

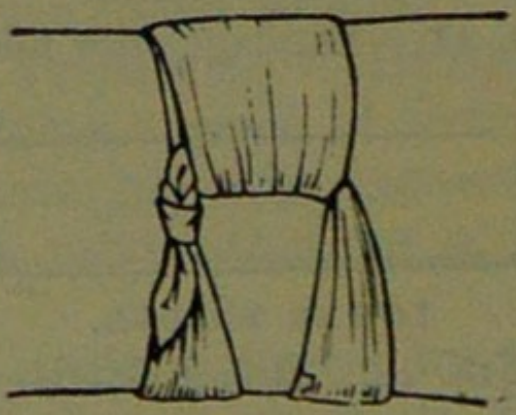


Fig. 15.

(1) by passing it once, twice, or more round the limb and splint and tying with a reef knot; or (2) by

doubling it, passing it round the limb and splint, inserting *one* end through the loop formed by doubling

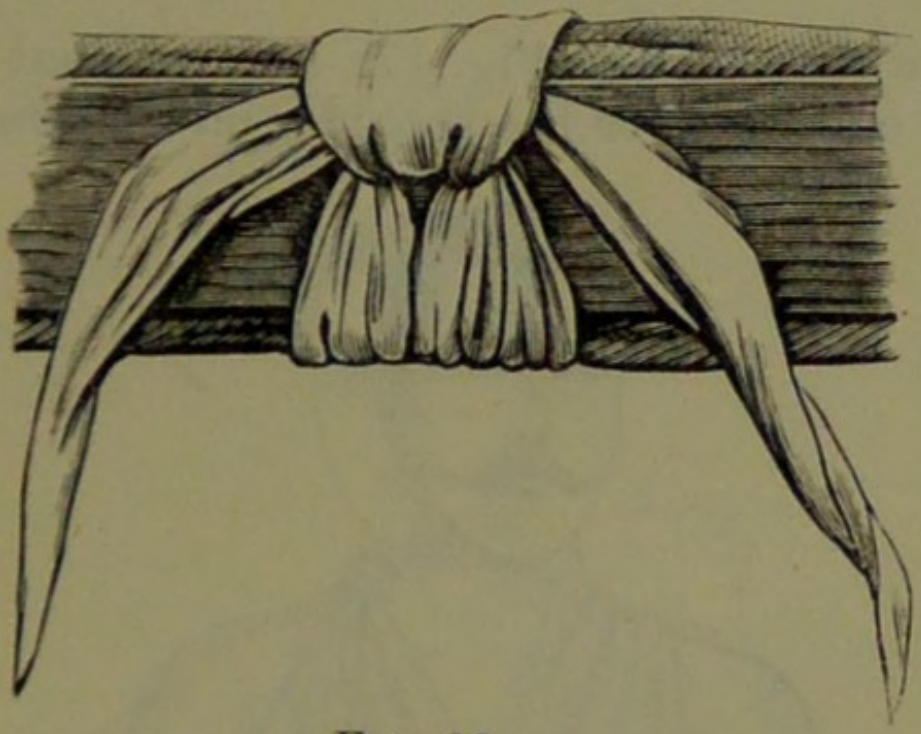


FIG. 16A.

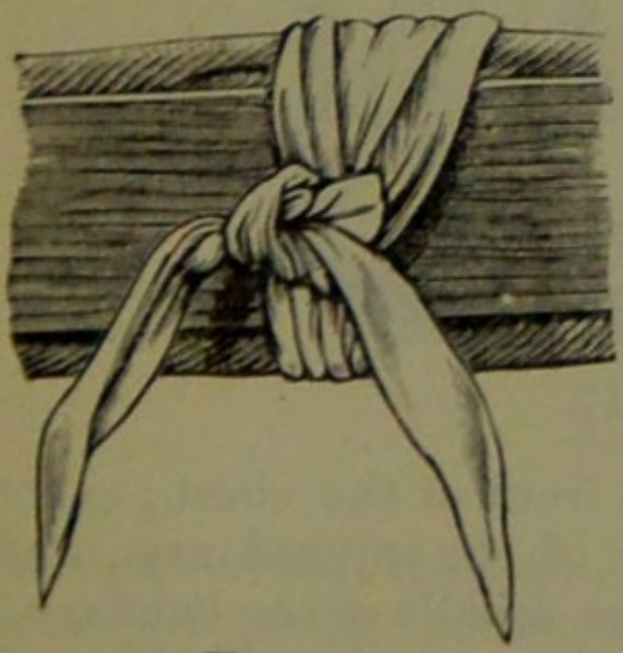


FIG. 16B.

the bandage and tying it to the free end with a reef knot (see Fig. 15); or (3) by proceeding as in No. (2), but passing *both* ends through the loop in opposite directions (see Fig. 16A), and tying them with a reef knot (see Fig. 16B).

Knots should always, where possible, be tied

over a splint, so that they may not press upon soft structures to do them injury.

Large arm-sling (Fig. 17).—Spread out a bandage, put one end over the shoulder on the sound side,

Fig. 17.

let the other hang down in front of the chest; carry the point behind the elbow of the injured arm, and bend the arm forward over the middle of the bandage; then carry the second end over the shoulder of

the injured side, and tie to the other end; bring the point forward, and pin to the front of the bandage.

Small arm-sling (Fig. 18).—Fold the bandage

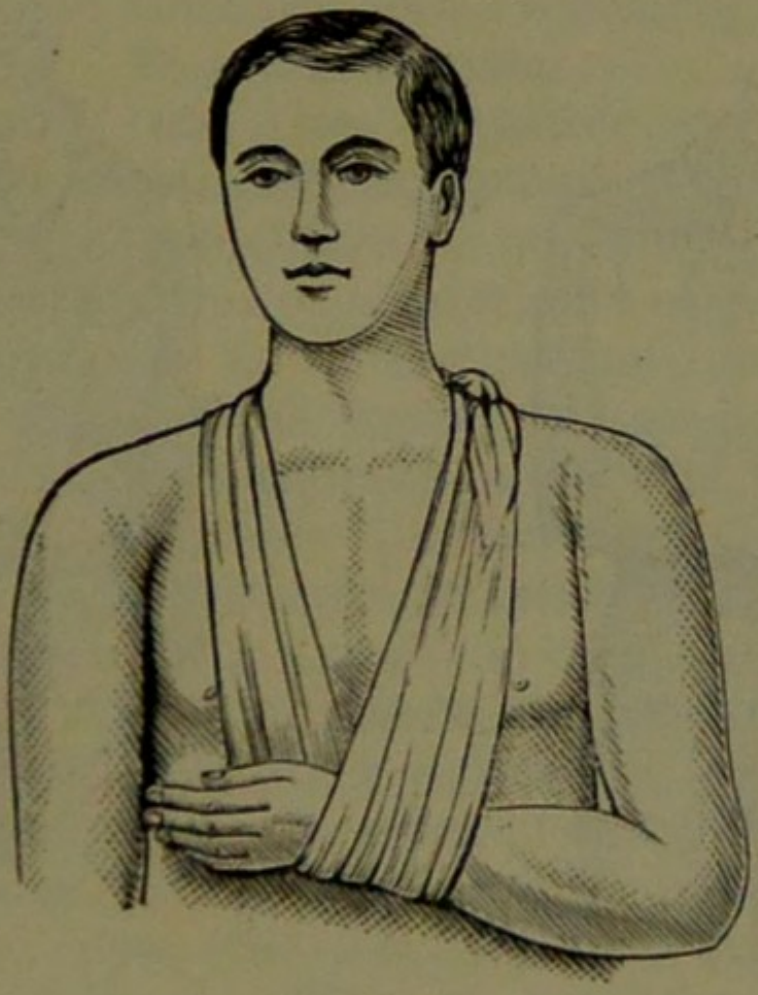


Fig. 18.

into the broad bandage; then place one end over the shoulder on the sound side; cross the forearm over the middle of the bandage hanging down the chest;

then bring the other end over the shoulder on the injured side, and tie at the side of the neck.

Slings may be extemporised by turning up the tail of the coat and pinning it on the shoulder

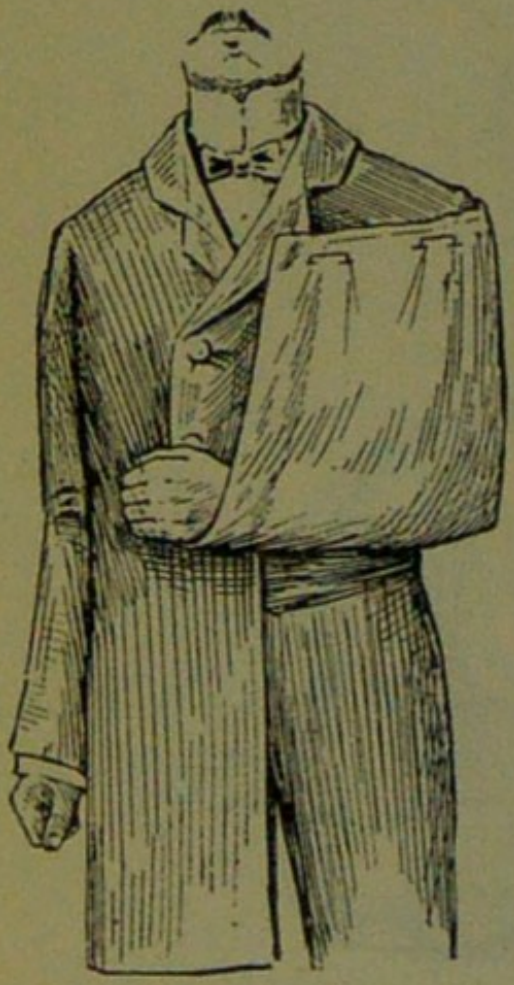


Fig. 19.

Fig. 20.

(Fig. 19), or, if the seam of the sleeve has been slit up, by resting the arm in the strip of cloth so formed, and pinning as shown in Fig. 20.

General Rules to be observed in the Treatment of Fracture.

The object of first aid treatment of fractures is to guard against further mischief, and especially to prevent a simple fracture from becoming complicated or compound. To attain this end :—

1. **Attend to the fracture on the spot where the accident occurred.** No matter how crowded the thoroughfare, or how short the distance to a more convenient or comfortable place, no attempt must be made to move the patient until the bone has been rendered as immovable as possible by a splint or other restraining apparatus, keeping the joints above and below the fractured bone at rest. With this great principle established, the treatment of special fractures is a question of detail.

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

3. When a bone of the lower extremity is broken gently pull upon the foot until the limb regains a more normal shape. When the position of the limb is improved, on no account let go of the limb until it is secured in position by splints, otherwise the muscles will be allowed to contract, and the rough ends of the broken bone may penetrate the skin, pierce a blood-vessel, or do further damage. It is not

well to attempt extension (*i.e.*, stretching) in case of a fracture of the upper limb. This should be left to the surgeon.

4. **When the fracture is compound** and further complicated by severe hæmorrhage, **arrest the hæmorrhage** before further steps are taken. In all cases of compound fracture, apply clean dressings to the wound.

5. **Apply splints and bandages** to secure the limb in position, and to prevent movement whilst the patient is being carried to his home, to a hospital, or to temporary shelter.

6. In every case of fracture, it is necessary to **keep the patient warm**, so as to lessen the effects of the SHOCK of the accident; this is done by placing a cloak, shawl, or coat over the patient until he reaches shelter.

SPECIAL FRACTURES.

Fracture of the Spine.—When the backbone is broken in any part, there is great danger of the spinal cord or the nerves within the spinal canal being injured, thereby causing complete or partial paralysis of the parts below the seat of injury. When the fracture occurs above the 4th cervical (neck) vertebra, death is instantaneous. When the spine is broken below the 4th cervical vertebra the patient may live some time, or may recover with or

without complete or partial paralysis. The principal sign of fracture of the spine is therefore inability of movement everywhere below the seat of fracture.

Treatment.—Prevent all movement on the part of the patient. If a doctor is within call, keep the patient quiet until he arrives. If the services of a doctor cannot be obtained within reasonable time, pass a blanket, sheet, stout plaid, piece of sail or canvas, etc., beneath the patient. Do not roll the patient over in doing so, but pass the blanket or sheet, etc., carefully first beneath the head, then behind the body and lower extremities (or, if more convenient, begin by passing it from the feet upwards) as he lies on his back. Poles are then to be rolled in the blanket one on each side. The patient may now be lifted by four persons, two on either side, grasping the poles (each person using both hands), laid on a stretcher or shutter, and carried to shelter. No further treatment is called for until the doctor arrives, except to give the patient water, tea, etc., if he is conscious.

Fracture of the Skull.—Fractures of the cranium are dangerous in proportion to the extent of the injury to the brain contained within its boundaries. Usually there are symptoms of injury to the brain (see Compression and Concussion, pages 111-113).

Fractures of the vault are less dangerous than fractures of the base of the cranium. When any part

of the vault is fractured and a scalp wound reveals the injured bone, the fracture may be seen or felt; this may or may not be associated with evidence of brain injury.

When the base of the cranium is fractured, blood or clear fluid may issue from the ear; or the blood may escape from the nose, or may pass down to the stomach whence it may be vomited. The fracture may involve the orbit, when blood will escape into the sockets of one or both eyes. When the fracture is far back, there may be indications of a bruise at the back of the head.

Treatment.—Arrest any hæmorrhage from a blood-vessel in the scalp (see pages 83 and 84). Place the patient in an easy position to breathe; undo all tight clothing; carry the patient indoors or under shelter; apply a clean handkerchief, a piece of lint or linen dipped in cold water, or, if available, an ice-bag, to the head. Do not give anything by the mouth if the patient is insensible, and get a doctor speedily.

Fracture of the Lower Jaw.—There are the usual signs of fracture, with inability to speak or move the jaw freely, irregularity of the teeth and bleeding from the gums.

Treatment.—Place the palm of the hand below the injured bone, press it gently upwards against the upper jaw, and maintain it in that position by a narrow triangular (or handkerchief) bandage. To

FIG. 21.

apply the bandage, place the centre below the chin, carry the ends up the side of the head, crossing them just above one ear, and pass the ends round the head, tying them on the side of the head opposite to the crossing (Fig. 21). Another method is to tie the ends on the top of the head, and pass a second bandage in front of the chin, fasten the ends at the back of the neck, and tie all four ends on the crown of the head.

Fractured Ribs.—The ribs usually fractured are those occupying a central position in the chest, namely, the 6th, 7th, 8th and 9th. The higher and the lower pairs are seldom fractured. A rib may be broken by a direct blow or by a squeeze or crush. It may be broken in any part of its course, but it is usually fractured halfway between the breast-bone and the back-bone. The danger of a broken rib varies with the amount of injury to the lung. Practically, wherever a rib is to be felt there is lung beneath; therefore any force which tends to drive the ends of the broken bone inwards may tear the lung.

Signs and Symptoms.—When a rib is broken the patient complains of a severe pain, on attempting to take a deep breath; the breathing is short and shallow, and crepitus may be felt on placing the hand over the injured part. Should the rib penetrate the lung blood may be coughed up and expectorated. Blood coming from a torn lung is coughed up, it is of a bright red colour, and presents a frothy appearance.

Treatment.—When the lung is not injured apply two broad bandages firmly round the chest, with the centre of one bandage immediately above, and the centre of the second bandage immediately below the seat of fracture. The bandages are to be placed so that the lower overlaps the upper to half its extent. They are to be tied on the opposite side of the body with the knot rather to the front of the body, and tight enough to give the patient support and comfort in breathing.

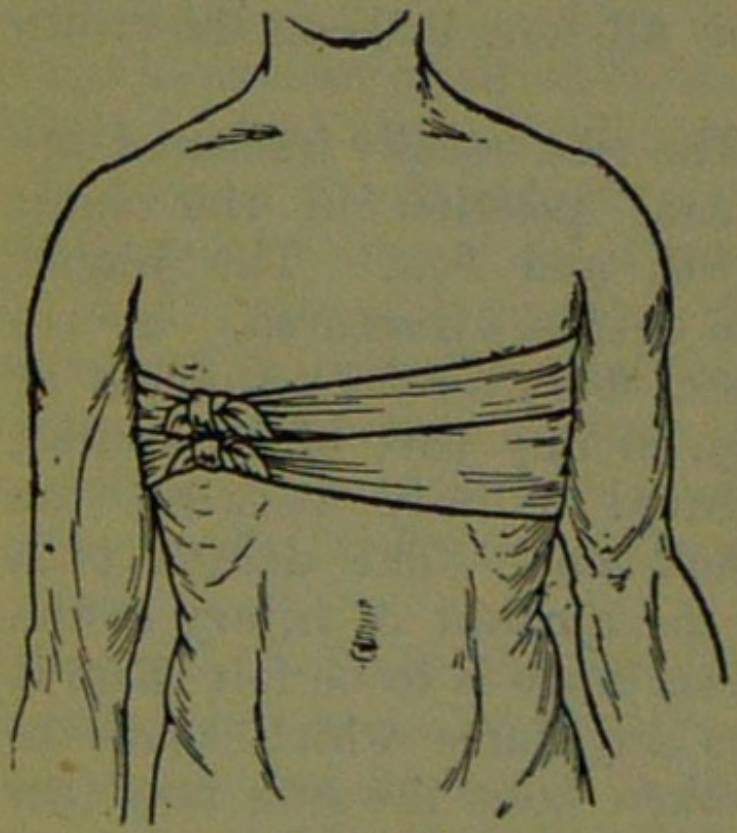


Fig. 22.

When no bandages are procurable, tightening the waistcoat by pinning the back or securing it otherwise is a good plan. *When the ribs are broken, causing injury to, and it may be hæmorrhage from, the lung,* do not place a bandage round the body, but lay the patient down, inclined a little towards the injured side, in order to give more play to the sound lung; loosen the clothing, give ice to suck, and place an ice-bag on the chest over the broken rib. A bandage round the chest might tend to drive the broken bone further into the lung. A large sling to support the arm of the injured side is advisable in either case.

Fracture of the Breast-bone (*sternum*).—When this accident is suspected, or when by passing the fingers over the breast-bone the fracture can be actually felt, the *treatment* to be followed is, to undo all tight clothing, to place the patient in as easy a position as possible until a doctor arrives, and to avoid rough handling or sudden movement.

Fracture of the Bones of the Upper Extremity.

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. When the finger is passed along the injured bone the

fractured ends can generally be felt to overlap, the outer fragment having dropped below the level of the inner one. The other signs and symptoms of fracture are mostly present.

Treatment.—Remove the coat with great care,

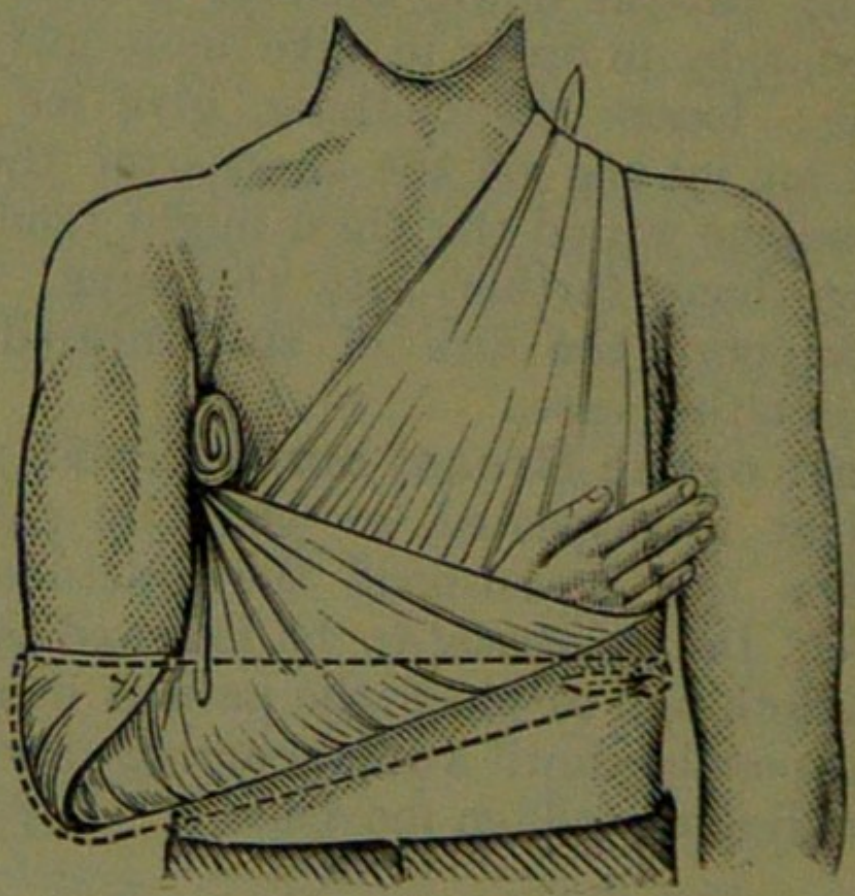


Fig. 23.

beginning with the sound side and supporting the injured limb during the removal of the sleeve therefrom; also take off as much more of the clothing as is expedient. Place a pad about the size of a Bath bun in the armpit of the injured

side. Gently bend the forearm well up, and support in a large arm sling. Instead of applying the

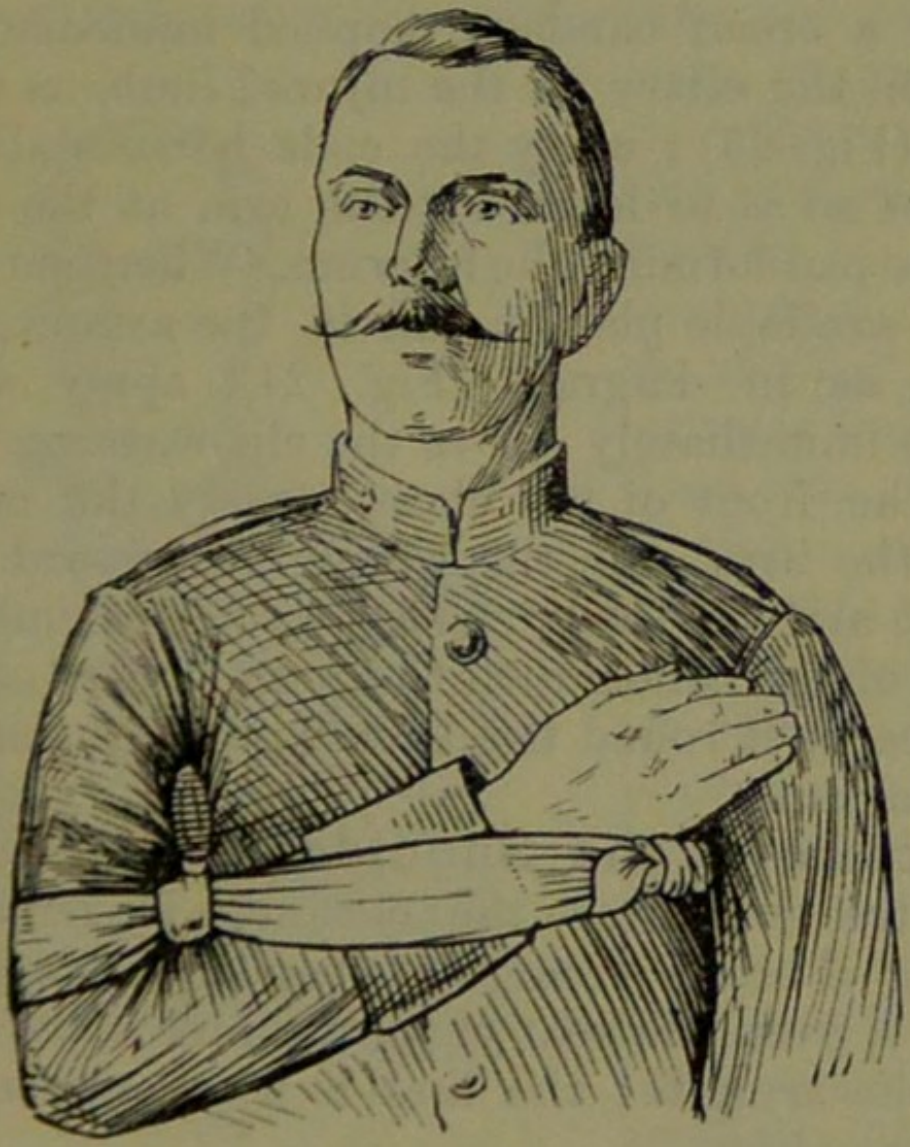


FIG. 24.

large arm sling in the usual method, it is advisable to pass the end, that in the ordinary way would go over the fractured bone, beneath the armpit of the injured

side, and tie the ends behind (Fig. 23); by this plan the broken bone is not pressed upon by the bandage. Finally, tightly secure the limb to the side of the body by a broad bandage, applied immediately over and upon the elbow of the injured limb, as shown in outline (Fig. 23); carry the ends horizontally round the chest so as to lever out the arm at the shoulder joint, the pad forming the fulcrum. When one bandage only is available place a pad in the armpit, flex the forearm as in diagram (Fig. 24), apply a narrow bandage immediately above the elbow, bring one end across the front of the chest; carry the other end behind the arm, and then bring it forward between the limb and the body; pass it so as to embrace the portion of the bandage on the front of the chest, and finally carry it round the back; pull tight and tie off as in diagram.

Fracture of the Shoulder-blade (*scapula*) is to be treated, after the clothing is removed, by applying a broad triangular bandage firmly round the body, over the seat of injury, and therefore close up to the armpits; the limb is then supported by a large arm sling.

Fracture of the Arm (*humerus*).—The bone may be broken close up to the shoulder, in the middle of its shaft, or in the immediate neighbourhood of the elbow joint. The usual signs and symptoms are present.

Treatment.—When the Humerus is fractured at its upper end close to the shoulder joint:—Apply a broad bandage with its centre above the middle of the arm, and carry the ends round the arm and body, tying them on the opposite side; support the forearm by a *small* arm sling. *When the shaft of the Humerus* is broken:—Bend the forearm at right angles to the arm; apply four splints of wood or folded newspapers, covers of books, etc., to reach from shoulder to elbow, to the front, back, outer, and inner sides of the arm (Fig. 25). The splint in front (over the biceps muscle) must on no account be so long as to press upon the fold of the elbow joint, otherwise the blood-vessels are in danger of being compressed. The straw cover of a wine bottle cut to a proper

Fig. 25.

length forms an excellent splint for the front of the arm. In case of difficulty in procuring splints, it will be sufficient to place them on the outer and inner sides only. Secure the splints by two bandages, one above, and the other below the seat of fracture. In case no splints are available, secure the arm with two broad bandages to the side. Support the forearm by a *small* arm sling. *Fractures in the neighbourhood of the elbow joint* are to be treated by an angular splint (Fig. 26) made as follows: — Take two pieces of thin flat wood, one long enough to reach from the armpit to just below the elbow, the other long enough to reach from above the elbow to the finger tips; tie them together so as to form a right angle, and apply the angular splint so formed, on either the outer or inner side of the flexed limb. Secure by narrow bandages above and below the seat of fracture, and support by a *small* arm sling.

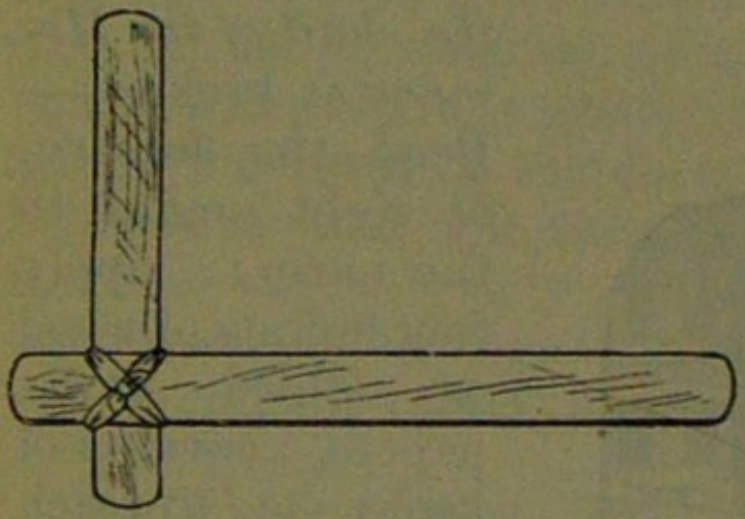


Fig. 26.

Fracture of the Forearm. *Signs and Symptoms. — When both bones (the Radius and Ulna)*

are broken, the usual signs and symptoms of fracture are present; *when one of the two bones only is broken* the signs are modified, but the limb will lose power, a deformity will be found at the seat of fracture, and acute pain when movement is attempted.

A fracture of the Ulna alone usually occurs at the upper end of the bone, in the neighbourhood of the elbow. The tip of the elbow behind is formed by the ulna, and a fall upon that process of bone is apt to break it off.

The Radius is frequently fractured immediately above the wrist, the result of a fall on the hand. This fracture is usually impacted and the signs of fracture are consequently modified, but the deformity, the acute pain on movement, and the powerlessness of the hand are sufficiently strong proof that the bone is broken.

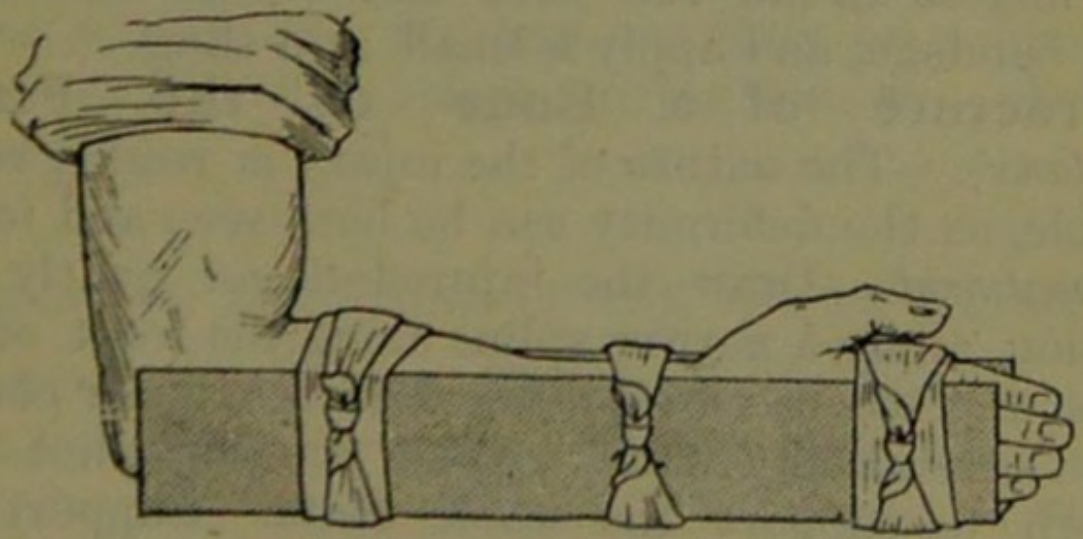


Fig. 27.

Treatment.—The treatment is the same whether the fracture is of one or both of the bones. Bend the forearm at right angles to the arm, keeping the thumb upwards and the palm of the hand towards the body; apply two broad splints while the forearm is maintained in the bent position, one along the inner, the other along the outer side of the limb. The inner splint should be long enough to reach from just beyond the elbow to the fingers, and the outer from the elbow to the back of the hand. Secure the splints by bandages, one above, and another below the seat of fracture, and a third to fix the hand in position (Fig. 27). Finally, support the limb by a large arm sling.

Metacarpus.—One or more of the metacarpal bones may be broken by direct or indirect violence. When a metacarpal bone is fractured, place a round pad, such as a tennis ball, in the palm of the hand, bend the fingers round the ball, and secure the whole by a bandage, and apply a small arm sling.

Fracture of a Bone of the Finger (*phalanx*).—The nature of the injury is readily recognizable, as the deformity can be both seen and felt.

Treatment.—Draw the injured finger gently into position, apply a narrow splint along the front of the finger, and secure it by a piece of linen, tape, or plaster. When several fingers are injured apply a splint large enough to support the whole hand. Support the hand and forearm by a large arm sling.

Fracture of the Pelvis.—*Signs and Symptoms.*—When, after severe injury in the neighbourhood of the haunch bone, there is no sign of injury to the lower extremity, but the patient is unable to stand, or walk, or even to move the lower limbs, without great difficulty and pain, a fracture of the pelvis may be assumed to have occurred. Deformity, crepitus, etc., cannot usually be made out. The blood-vessels and organs, more especially the bladder, within the pelvis, are in great danger of being wounded.

Treatment.—Lay the patient in whatever position is found to give greatest ease. Bind a broad bandage round the hips tight enough to support the part, but not so tight as to press the broken bone further inwards towards the cavity of the pelvis, and thereby cause more damage to the internal organs. Flex or straighten the lower limbs according as the patient wishes, and lay him carefully on a blanket, shutter, or stretcher before moving him to a place of shelter.

Fracture of the Bones of the Lower Extremity.

Fracture of the Thigh bone (*femur*)—The thigh bone may be broken at the neck (the upper end); anywhere in the length of its shaft; or at the lower end close to the knee. Fracture of the neck

of the thigh bone is very apt to occur in old people, and from very slight injury. A severe bruise of the hip is apt to be mistaken for a fracture. It may be taken as a safe guide, however, that when, after an injury in the neighbourhood of the hip joint the injured person can, whilst lying on the back, raise the heel off the ground, the bone is not broken ; but if the heel cannot be raised it is safe to assume that the bone is broken. Fracture of the lower end of the thigh bone is apt to involve the knee in the injury, with serious detriment to the joint.

Signs and Symptoms.—The usual signs of fracture. The foot of the injured limb will lie in some abnormal position, usually on its outer side. The shortening on the injured side may vary from one-half to three inches.

Treatment.—(1) Steady the injured limb by holding the foot. (2) Gently draw down the foot of the injured side, and bring it into line with the foot of the sound limb. When two or three assistants are at hand, it is one person's duty to attend to the foot, holding it in position and not letting go until the splints and bandages are applied. (3) Apply a splint on the outer side of the broken limb, long enough to reach from the armpit to beyond the foot. A broom handle, a musket (butt end in armpit), a school map rolled up, a couple of billiard cues tied together, or any piece of wood cut to length

may be used as a splint. (4) Apply a splint on the inside of the broken thigh, long enough to reach from the inside of the top of the thigh (the fork) to the knee. (5) Secure the splints in position by bandages. Pass one round the chest just below the armpits; another round the pelvis; a third and fourth bandage, embracing both splints, are placed on the thigh, one above and the other below the seat of fracture; a fifth bandage round the leg; a sixth is to be passed behind both ankles, the ends crossed

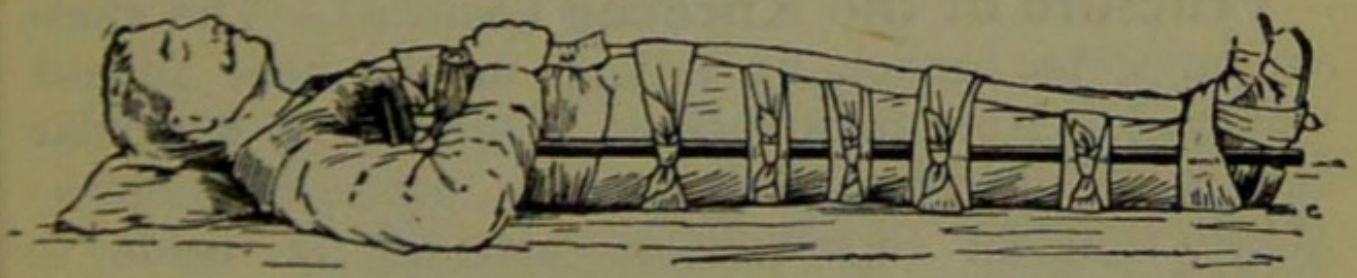


Fig. 28.

over the front of the feet, embracing the splint, and tied off below the feet. Finally, apply a seventh bandage round both knees. Do not apply a bandage over the abdomen, as it might cause the patient to vomit, and, moreover, would not keep the splint firm. (6) Treat shock by keeping the patient warm. *When a person is single-handed*, it is expedient, after extension of the limb, to tie the feet together by a handkerchief or brace, to prevent the bones from again overlapping; and under these circumstances, as well as when the

patient is a woman, it is well to pass all the limb bandages round both limbs, dispensing with the inside splint (Fig. 29).

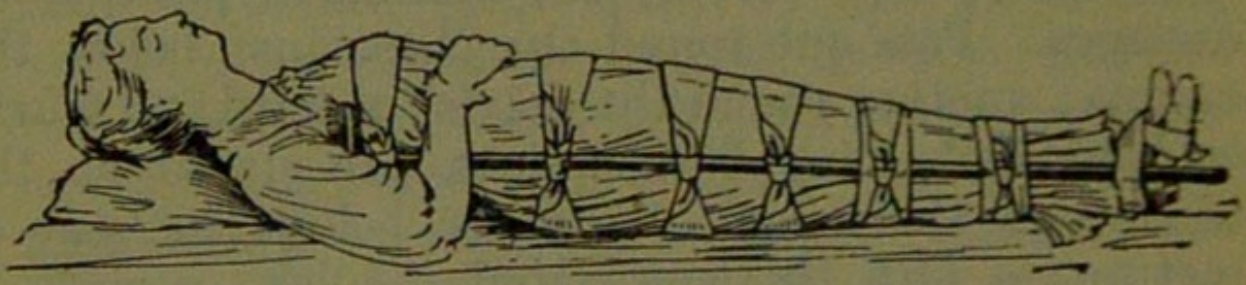


FIG. 29.

Fracture of the Kneecap (*patella*).—The kneecap may be broken by falling on the knee (direct violence). More frequently it is broken by muscular action, an accident which may arise as follows: When the foot slips and an attempt is made to prevent a fall, the muscles in the front of the thigh act with such force in the attempt to maintain the balance that the kneecap may be snapped in two.

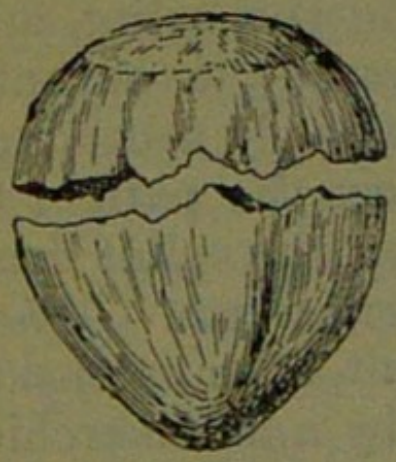


FIG. 30. FRACTURE OF KNEE-CAP.

Signs and Symptoms. — The limb will be quite helpless; a gap may be felt between the broken ends of the kneecap; the knee joint will speedily swell.

Treatment. — Straighten the limb. Apply a splint along the back of the limb, reaching from the hip

to beyond the heel: apply a narrow bandage with its centre placed immediately above the broken kneecap, cross the ends behind over the splint, and tie off in front below the broken bone. To ensure firmness a second bandage may be applied in a similar way to the first, but commenced below, and tied above the broken bone. The splint is to

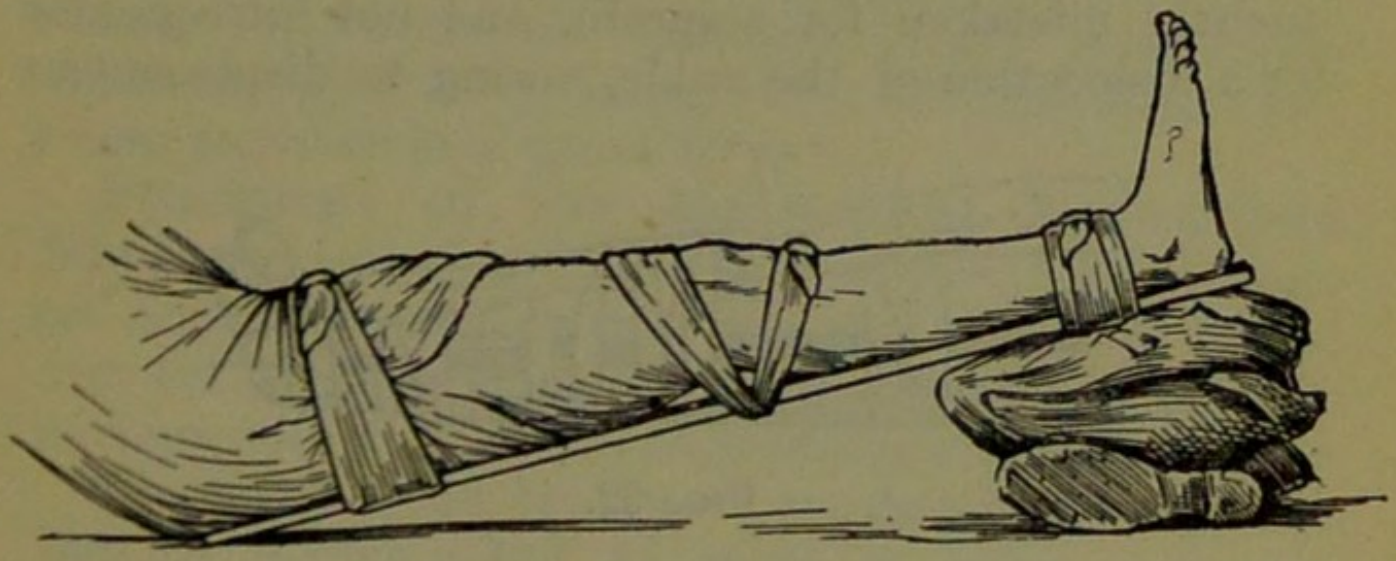


Fig. 31.

be further secured by bandages round the thigh and leg. The foot is then to be raised well off the ground, and supported by a pillow, roll of clothing, etc.; or if none of these can be had, by resting the foot of the injured limb on the top of the foot of the sound limb. The patient's body is to be well raised and supported. An ice-bag or cold-water dressing should be applied on the front of the injured kneecap as soon as possible.

Fracture of the Leg (*tibia* and *fibula*).—Both bones may be broken at the same time; or either may be broken alone.

Signs and Symptoms.—The usual signs and symptoms are present: pain, deformity, immobility, crepitus, etc. The tibia is so close to the skin that the fractured ends can generally be readily felt. A fracture of the fibula three or four inches above its lower end is frequently mistaken for a sprain, and not infrequently for a dislocation of the ankle, owing to displacement

Fig. 32.

of the foot being the most prominent sign. When one bone only is broken there will be no marked shortening.

Treatment.—(1) Steady the limb by holding the foot of the injured side. (2) Draw the foot of the injured side level with the foot of the sound limb, with the toes pointing upwards, and do not let go until the splints have been fixed. (3) Apply splints to the leg, one on the outside, another on the inside. The splints should be long enough to reach from above the knee to beyond the foot, so that the knee and ankle joints

are kept at rest. If only one splint is available, place it on the outer side. (4) Secure the splints by bandages placed one above and another below the seat of fracture. A third bandage is to be applied immediately above the knee, and a fourth and fifth round both ankles and knees as in the case of the thigh. *When single-handed*, after extending the limb, tie the feet together, dispense with the inside splint, and carry all bandages round both limbs. When no splint is available, tying the legs, ankles and knees together is of great service.

Fractures of the Metatarsal Bones and Phalanges (crushed foot).—Fractures of these bones are commonly caused by the passage of a heavy weight over the foot. The accident is recognised by pain on movement of the foot or toes, swelling and loss of power.

Treatment.—The treatment consists in the application of a flat splint of wood or other material, such as a book or piece of cardboard to the sole of the foot.

DISLOCATIONS.

A dislocation is the displacement of one or more of the bones entering into the formation of a joint.

The joints most frequently dislocated are those of the shoulder, the elbow, the thumb, the fingers, and the lower jaw. The joints of the lower extremity are but seldom dislocated.

Signs and Symptoms of Dislocation.

(1) **Unnatural position** of the limb.
(2) **Pain** of a severe sickening character.
(3) **Deformity** in the neighbourhood of the injured joint.
(4) **Fixity of the joint.** Unlike a fracture, the limb cannot be moved at the joint by either the patient or the bystander.
(5) **Swelling and numbness** of the parts below the seat of dislocation.
(6) **Absence of the crepitus** characteristic of ordinary fracture.

Treatment of Dislocations.

No attempt should be made by anyone except a doctor to reduce a dislocation. The following treatment, however, pending the arrival of the doctor, should be carried out:—

When the Accident occurs out of doors.—(1) In the case of dislocation of the shoulder, support the upper extremity in whatever position gives most ease by a large arm sling; prevent all jolting of the limb by tying a bandage round the limb and body or by pinning the sling to the clothing. When no means of applying a sling are at hand, fasten or pin the coat

sleeve to the clothing. (2) When the elbow is dislocated, tie or fasten the upper extremity to the side of the body in the most comfortable position possible. (3) When any joint of the lower extremity is dislocated, place the limb in the easiest position possible and carry the patient on a stretcher to house or home.

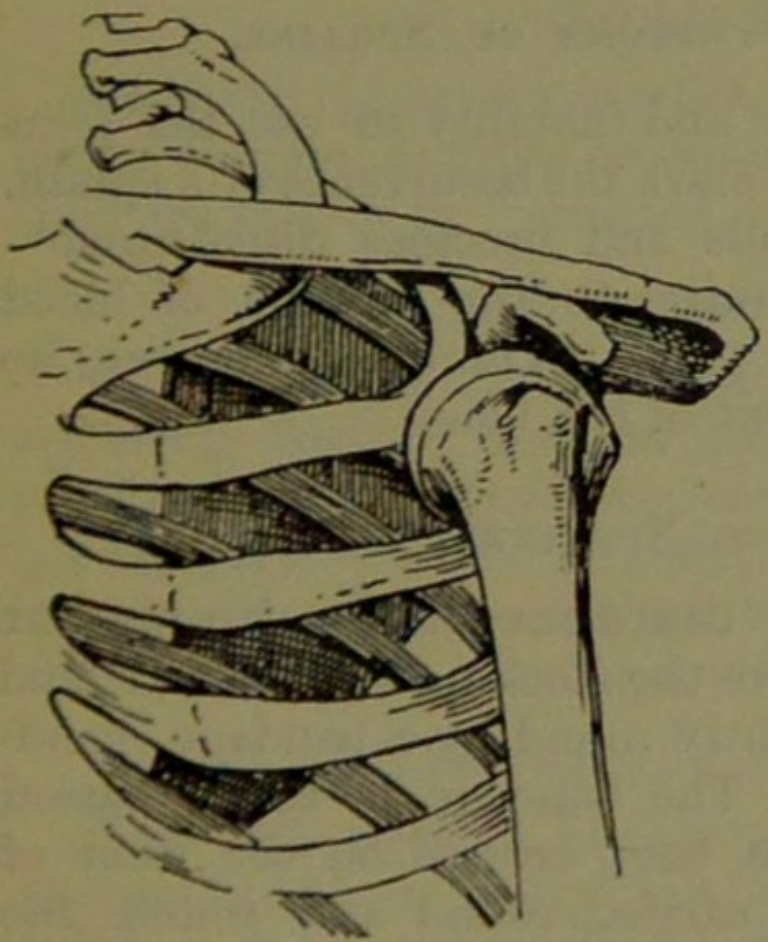


Fig. 33.
One Form of Dislocated Shoulder.

When the patient is indoors.—(1) Remove the clothing from the injured joint and limb. (2) Place the patient on a couch or bed. (3) Rest the limb on cushions or pillows in the position which affords most comfort. (4) Apply cold (ice, or towels wrung out of cold water) to the dislocated joint. (5) When cold ceases to give comfort apply warmth (flannels or towels wrung out of hot water). (6) When the shock is severe keep the patient warm by appropriate remedies. (See Shock).

SPRAINS.

When by a sudden wrench or twist the ligaments and the parts around a joint are stretched and torn, the joint is said to be sprained. "Going over" the ankle is one of the commonest examples of an accident of this kind.

Signs and Symptoms of Sprains.

Sudden severe pain and inability to use the joint after a twist or wrench mark the occurrence of a sprain. Quickly the part swells and becomes discoloured—"black and blue"—owing to the effusion of blood into and around the joint. There is, however, no fracture or displacement of the bones.

Treatment of Sprained Ankle.

When at some distance from house or home.—Do not remove the stocking or boot, but bind the foot and ankle tightly round by a bandage (handkerchief, strap, etc.). The bandage is to be passed below the waist of the boot, crossed on the front of the ankle, and then carried round and round the ankle, where it is firmly tied. Wet the bandage either before or after application; it is thereby tightened. **After reaching shelter**, lay the patient down, remove, without dragging, the boot and stocking, cutting both if necessary; place the injured

part in as comfortable a position as possible, apply ice or cold-water dressings to the joint as long as they relieve pain, and when they cease to give relief apply hot fomentations or a bran poultice.

When other joints are sprained they require much the same immediate treatment as when they are dislocated.

STRAINS.

When during severe exertion, as lifting and pulling heavy weights, muscles or tendons are over stretched, they are said to be "strained."

Signs and Symptoms of Strains.

When a part is strained a sudden sharp pain occurs, rendering further exertion painful, difficult, or impossible. If the strain has occurred in the back, the patient may be unable to stand upright or take a deep breath without pain. When in a limb, the strained muscle may swell, causing severe cramp-like pains.

Treatment of Strains.

Place the patient in as comfortable a position as possible, and apply hot applications (hot-water bottles, hot fomentations) when the pain is very severe.

A so-called strain in the groin (rupture, or hernia), is an injury of a totally different nature (see page 164).

Chapter II.

THE ORGANS OF CIRCULATION.

The organs concerned in the circulation of the blood are the **Heart**, the **Arteries**, the **Veins**, and the **Capillaries.** Three **systems** or groups of blood-vessels are met with in the body :—

(I.) **The General** (*or systemic*) **circulation** includes the circulation of the blood through the heart and all the blood-vessels of the limbs and trunk, except those of the lungs and liver.

(II.) **The Lung** (*or pulmonary*) **circulation** is carried on by the pulmonary artery and veins.

(III.) **The Liver** (*or portal*) **circulation.** A large vein (the portal) carries blood from the stomach, the intestines, the spleen and pancreas to the liver.

The Heart is situated in the chest behind the breast-bone and rib cartilages, between the lungs and immediately above the diaphragm; the heart lies obliquely with a quarter of its bulk to the right, and the remaining three-quarters to the left of the middle line of the body. The beat of the heart may be felt just below and to the inner side of the left nipple. The heart has four cavities, two on either side of a central partition (septum). The two upper cavities are named the **right and left auricles**, the

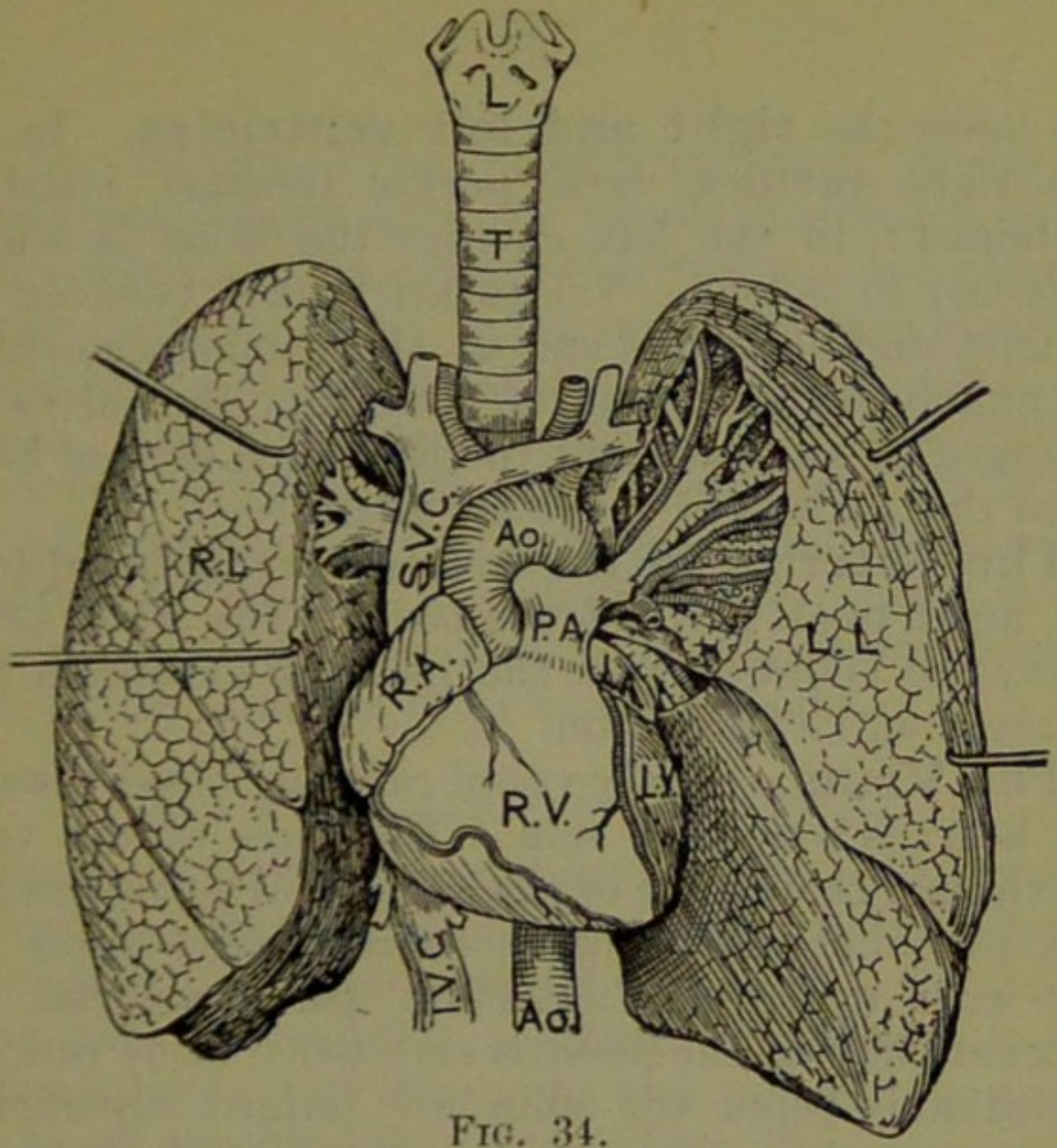


FIG. 34.

L. Larynx (voice box); T. Trachea (wind-pipe); R.L. Right Lung; L.L. Left Lung (the lungs are drawn back to expose the heart and blood vessels); R.A. Right Auricle; L.A. Left Auricle; R.V. Right Ventricle; L.V. Left Ventricle; P.A. Pulmonary Artery; Ao. Ao. Aorta: S.V.C. Superior vena cava (the large vein carrying blood from the upper part of the body to the heart); I.V.C. Inferior vena cava (the large vein carrying blood from the lower part of the body to the heart). The four pulmonary veins cannot be shown in the diagram.

two lower the **right and left ventricles.** In the two right cavities dark purple (*venous*) blood is contained; in the left cavities the blood is scarlet (*arterial*) in colour. Valves are placed between the auricles and ventricles and at the commencement of the pulmonary artery and of the aorta; the valves are arranged so as to prevent the backward flow of blood when the cavities of the heart dilate.

The Arteries are the vessels carrying blood from the heart to all parts of the body. The walls of an artery are endowed with the power of expansion and contraction, *i.e.*, pulsation.

The Veins.—Every vessel carrying blood towards the heart is termed a vein. The walls of the veins are thinner than those of the arteries of corresponding size. In the limb veins, more especially, *valves* are met with at frequent intervals, placed so that the backward flow of the blood is arrested. Veins running immediately below the skin are termed superficial; those met with amongst the tissues and organs of the body are termed deep veins. The deep veins, for the most part, accompany the arteries.

The Capillaries are vessels of microscopic dimensions; they possess walls of such extreme delicacy that the fluids and gases of the blood and body gain entrance and exit through them. In this manner the nourishment and maintenance of the tissues and organs of the body are provided for.

The Blood.—The colour of blood varies in appearance according to the vessels in which it flows. In the arteries (of the general circulation) the blood is scarlet—*arterial blood;* in the veins it is dark purple—*venous blood;* in the capillaries it is of a light red colour. The difference in colour is caused by the presence of oxygen in the arterial and capillary blood, and the presence of carbonic acid (and diminished quantity of oxygen) in venous blood. Only in the lung or pulmonary system do the arteries contain dark purple, and the veins scarlet blood.

The Circulation of the Blood.

The veins (except the pulmonary) from all parts of the body collect into two large vessels, which discharge the venous blood into the right auricle of the heart. From the right auricle the blood is driven into the right ventricle, and hence by the pulmonary artery the blood reaches the lungs, where it is changed to a scarlet colour—"purified"—by contact with the air. From the lungs the blood is returned by the four pulmonary veins to the left auricle. From the left auricle the blood passes to the left ventricle, and finally leaves the heart by the main artery of the body (*the aorta*).

The aorta is the great central blood vessel from which the main arteries proceed to all parts of the trunk and limbs. The arteries are named accord-

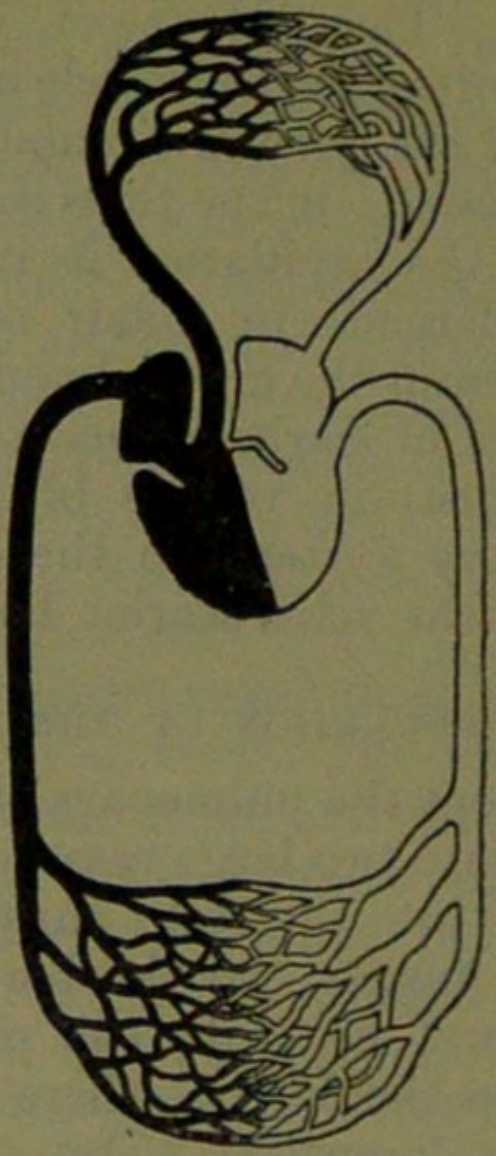


FIG. 35.

DIAGRAM OF THE CIRCULATION OF THE BLOOD.

Explanation. In the middle of the diagram is the heart with its four chambers. Above the heart is shown the lung (pulmonary) circulation. The lower part represents the general (systemic) circulation. Vessels containing impure (venous) blood are shown black, while those containing pure (arterial) blood are shown white. The connecting vessels represent the capillaries.

ing to the region of the body which they occupy: thus they are called femoral, brachial, carotid, etc., according as they are met with in the thigh, arm, or neck. The main arteries give off branches, and these in turn still smaller branches as their destination is reached. Finally, the small arteries end in capillaries, where the oxygen in the blood is given up to the cells and tissues of the body. The capillaries now receive the carbonic acid and other waste products from the cells and tissues, and the blood becomes of a dark purple (venous) colour. The capillaries pass this blood on to the veins, which convey it towards the heart, getting larger and larger as they proceed by being joined by neighbouring veins, until they finally reach the heart as the two large vessels entering the right auricle.

The heart contracts in adults at an average rate of seventy-two times a minute, but the rate varies, increasing as the position is changed from the lying to the sitting or to the standing position. About two ounces (a wine-glass full) of blood are discharged into the aorta at every contraction of the left ventricle, and the blood is sent into the arteries in jets or waves, causing the **pulse**, which may be felt along the course of all the main arteries wherever the finger can be placed on an artery as it passes over a bone. In the veins no pulse is to be found, as the heart wave is expended during the passage of the

blood through the capillaries and reduced to a regular and even flow.

HÆMORRHAGE.

Hæmorrhage or bleeding signifies the escape of blood from an injured or diseased blood-vessel.

Arterial Hæmorrhage.—Blood from an artery (1) is scarlet in colour; (2) escapes in spurts or jets corresponding to the pulsation of the heart; and (3) flows from the side of the wound nearest the heart. It is, however, chiefly when the wounded artery is close below the skin, as in the hand, foot, temple, etc., that the blood may be seen to escape in jets. When the artery is deep seated, as in the leg, the blood may well up from the bottom of the wound without marked signs of pulsation. The quantity of blood lost varies with the size of the artery wounded. When the aorta, or one of the large arteries at the root of the neck is wounded, death is instantaneous; when the main arteries of the thigh, armpit, neck, etc., are wounded, death will occur in a few moments unless the flow is stopped. Pressure applied to medium sized arteries, as those of the leg or forearm, within a few minutes of being wounded, will save life; hæmorrhage from smaller arteries may cause serious loss of strength unless the flow is speedily arrested.

Venous Hæmorrhage.—When a vein is cut the blood (1) is of a dark colour; (2) it flows in a slow,

continuous stream; (3) it issues from the side of the wound furthest from the heart. Wounds of veins of the limbs are somewhat less dangerous than in the case of arteries of corresponding size.

Capillary Hæmorrhage.—Blood flowing from capillaries, as from a slight wound of the skin: (1) is light-red in colour; (2) flows briskly in a continuous stream; (3) wells up from all points of the cut surface.

General Principles of the Arrest of Arterial Hæmorrhage.

The principles of treatment to be followed in the event of bleeding from a large artery are: 1st, to apply **direct pressure on the bleeding point**; and 2nd, if direct pressure is unsuccessful or impossible, to apply **pressure on the main trunk of the artery between the wound and the heart as close to the wound as possible.** The closer to the wound the artery is compressed, the less will be the damage to the limb.

The means employed in the temporary arrest of hæmorrhage are digital and instrumental compression and flexion of the limb. Laying the patient down and elevating the limb will lessen the force with which the blood escapes.

I. **Digital compression** is the application of the thumb or fingers either on the bleeding point

itself—*direct compression*—or on the trunk of the main artery leading to the wound—*indirect compression.*

II. **Instrumental compression** may also be applied by the direct and indirect methods. (*a*) *Direct instrumental compression* may be carried out by applying a handkerchief, piece of lint or linen folded into a small, hard pad, and placed on the bleeding point, where it is secured by a bandage firmly tied round the part. *To fold the handkerchief as a pad*, proceed as follows:—Lay the handkerchief out on a flat surface; bring the four corners to the centre of the handkerchief; again bring the corners to the centre, and continue folding the corners towards the centre until the handkerchief becomes a hard pad. The round, smooth surface is placed on the skin over the artery, and to prevent the pad unfolding, the puckered surface may be fixed by a safety pin, or stitched with a needle and thread, if such appliances are at hand. A hard substance such as a stone, cork, nut, marble, etc., may, if necessary, be enclosed in the centre of the pad. Should occasion permit, a *graduated compress* may be made and applied as follows: Place a small folded piece of linen or lint, or cotton, upon the bleeding point; over this place a second and larger piece of the same material; a third and a fourth or more pads, each larger than its predecessor are superimposed, until a regular cone is formed, with its point or apex resting on the wound, and its base

pressed down by a tightly applied bandage. (*b*) *Indirect instrumental compression* consists in stopping the flow of blood through the main artery by a tourniquet. A **tourniquet** is an instrument whereby pressure can be made on the trunk of an artery so as to stop the flow of blood through it. A tourniquet may consist of a *pad* to be placed on the trunk of an artery, a *strap* or *bandage* applied so as to encircle the limb and pad, and a *buckle*, *screw*, or *twisting apparatus* (such as a stick) whereby to tighten the strap or bandage. The three principal tourniquets are the improvised, the field, and the screw tourniquets. Tourniquets are seldom applied except to the brachial and femoral arteries. An **improvised tourniquet** is made and applied as follows :—On the trunk of the main artery, say the femoral or the brachial, apply a firmly folded pad, about the size of a tennis ball cut in two for the thigh, and of a walnut for the arm; over this pad place the centre of a narrow triangular (or other) bandage, and tie the ends on the side of the limb opposite to the pad. After the half-knot of the bandage is made, place a stick, pencil, walking-stick, poker, policeman's truncheon, or some such instrument, upon it, and then complete the knot, adding yet another half-knot for security. The "stick" is now to be twisted, when the bandage will be tightened, and the pad pressed firmly upon the trunk of the artery with sufficient

force to arrest the flow of blood. Should a suitable pad not be at hand, a knot may be made in the centre

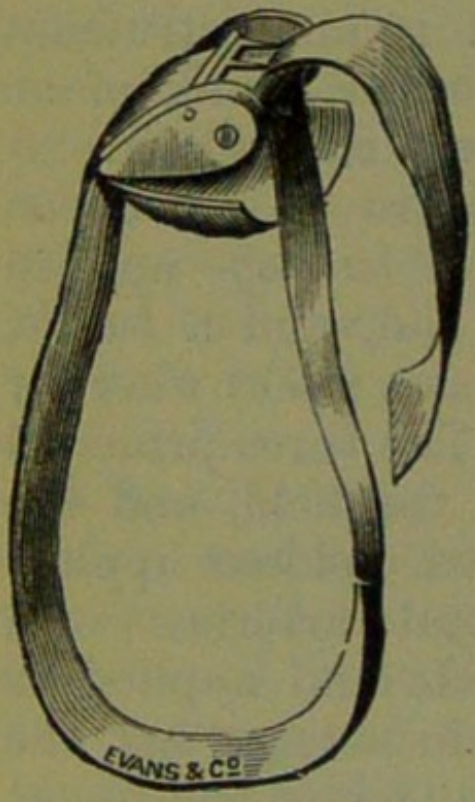


FIG. 36.
FIELD TOURNIQUET.

FIG. 37.
SCREW TOURNIQUET.

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. The "stick" is finally "locked" in position by the ends of the bandage used for the tourniquet, or by another bandage passed round the limb and made to enclose and fix the stick.

The **field tourniquet** consists of a pad and strap. The pad is placed on the course of the artery

and fixed there by the strap, which is pulled tight and buckled off. The **screw tourniquet** (by some considered obsolete) acts on the same principle, the strap, however, being tightened by a screw apparatus. An **elastic bandage** passed round the limb immediately above the seat of an arterial hæmorrhage and pulled tight will arrest bleeding. The simplest prepared form of this bandage is a strip of elastic webbing twenty-five or thirty inches long and two inches wide, with a piece of tape sewn at each end. An elastic brace or belt will, however, answer the purpose. It is not advisable to use a cord or elastic bandage unless no other apparatus can be had, as the pressure of the cord cuts off all circulation in the limb.

III. **Flexion of the Limb.**—The arteries at the back of the knee and the front of the bend of the elbow may be compressed by placing a pad upon the trunk of the main artery at the knee or elbow, and, after fully flexing the limb, securing the limb in a flexed position by a bandage.

Dress the wound. After the hæmorrhage has been arrested by the indirect method, the wound must be covered over by a clean dressing. (See Wounds.) In all cases, especially when the patient has to be moved some distance, the injured limb or part should be raised, if possible, and maintained at rest by splints and bandages, if need be.

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

(See frontispiece).

The Aorta is the main artery of the body. Commencing at the left ventricle, it forms an arch behind the upper part of the breast bone. From the arch are given off the large trunks which carry the blood to either side of the head and neck and to the upper extremities. The aorta passes down on the left of the spine to just below the navel, where it ends by dividing into two large branches (the iliacs) which convey the blood to the organs in the pelvis, and to the lower extremities.

Arteries of the Head and Neck.

The **Common Carotid Arteries** run up the neck one on either side of the windpipe, and on a level with "Adam's apple," just below the angle of the lower jaw, divide into the internal and external carotids. The **Internal Carotid** passes up deeply in the neck, and entering the cranium just internal to the ear supplies the brain with blood. The **External Carotid** artery gives off branches to the tongue, the throat, the face, the nose, the temple and the scalp.

Wounds of the Carotid Arteries and their Branches

When a Carotid artery is wounded, as in the case of cut throat, apply digital compression by placing the thumb on the artery by the side of the windpipe, either on the wound or between it and the heart, pressing backwards against the backbone. Pressure must be maintained by the thumb (by relays of assistants if necessary), until the doctor arrives; no other method being applicable in this situation. Bleeding from the **Temple** is readily arrested by the thumb on the wound, or by placing a firm pad on the wound, and making pressure by a bandage applied as follows :—Apply a small pad on the bleeding point, then place the centre of a narrow triangular bandage on the opposite side of the head to the wound, carry the bandage horizontally round the head just above the level of the eyebrows make a twist over the pad, pass the ends

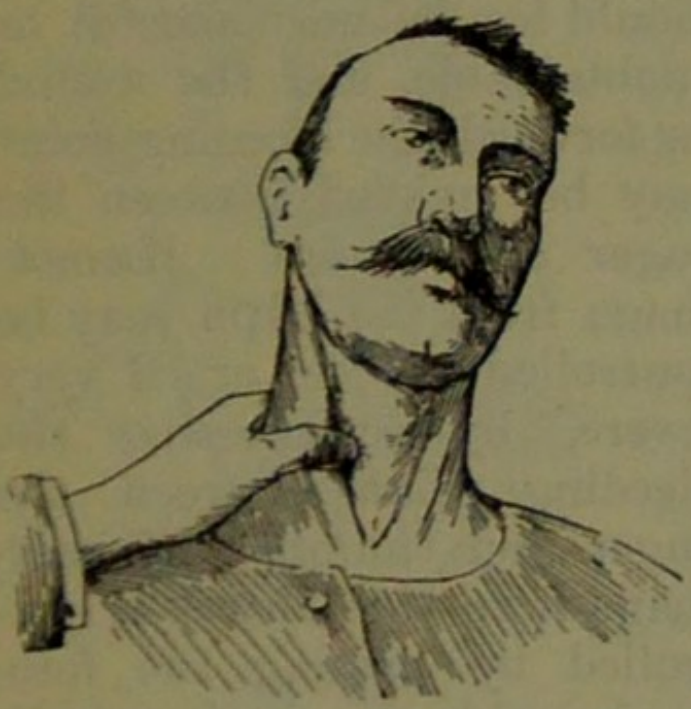


Fig. 38.

round the head again, or carry one end over the top of the head and the other under the chin, and tie firmly (Fig. 39). Hæmorrhage from the **Forehead**, or from any part of the **Scalp**, can be arrested on the same principle. Hæmorrhage from the **Tongue** is usually controlled by sucking ice; should ice be unsuccessful or unobtainable, and the wound far forward, the bleeding point may be grasped between the finger and thumb. Hæmorrhage from the **Lips** may be controlled by ice, or, if very severe, by compressing the bleeding point between the finger and thumb. Hæmorrhage from the **Cheek** is controlled by passing the forefinger inside the cheek and the thumb outside, and compressing firmly either *on* the wound *or below* it, *i.e.* between the wound and the heart. The trunk of the **Facial Artery** may be compressed on the edge of the lower jaw, about an inch and a-half in front of the angle. When the bleeding is from the **Tonsil, Palate, or the inside of the Throat**, give ice to suck; if the hæmorrhage is severe it may be necessary to

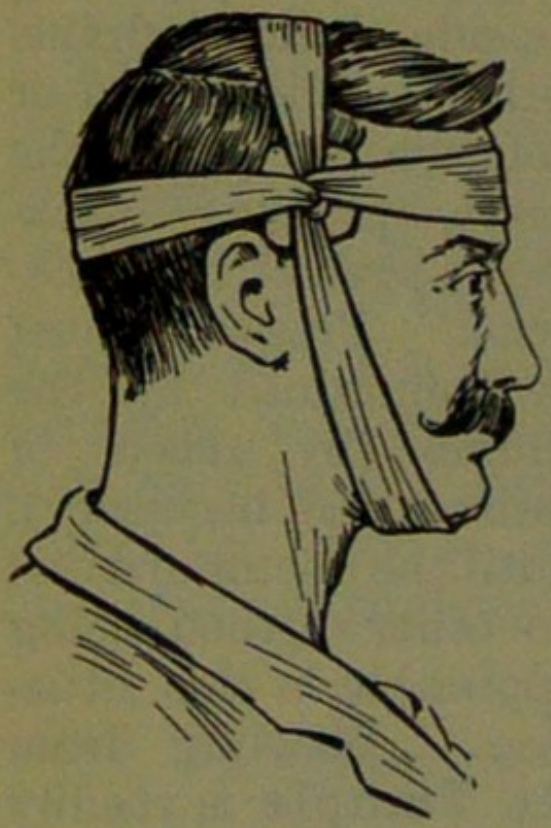


Fig. 39.

compress the carotid in the neck. Hæmorrhage from the **Nose** is treated as follows:—Seat the patient on a chair with the head slightly thrown back; undo all tight clothing round the chest and neck; raise the hands above the head; apply cold (ice, a cold sponge, or a bunch of keys) over the spine at the level of the collar; keep the patient in a current of fresh air, and on no account allow him to hang his head forward over a basin; place the feet in hot water. 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. When the external part of the ear itself is wounded and bleeds freely, grasp the bleeding point between the finger and thumb.

Fig. 40.
Arrest of Hæmorrhage from Forehead.

Arteries of the Upper Extremities.

The Subclavian artery passes from behind the inner end of the collar-bone across the first rib

to gain the armpit (*axilla*). In the armpit **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. **The Brachial artery** is a continuation of the axillary, and runs down the arm on the inner side of the biceps muscle, gradually passing forwards until it gains the middle of the front of the elbow. The inner seam of the coat sleeve above the elbow roughly indicates its course. Just below the elbow the brachial artery divides into the radial and ulnar arteries. **The Radial artery** runs along the outer side of the front of the forearm; its course may be indicated by a line drawn from the middle of the bend of the elbow in front to the root of the ball of the thumb. About one inch above the wrist, and one-half inch from the outer (thumb or radial) side of the forearm, where the radial artery lies upon the radius, the pulse is to be felt. The radial artery, at the wrist, turns backwards above the root of the thumb to the back of the hand, and passes forward between the metacarpal bones of the thumb and forefinger to reach the palm of the hand. **The Ulnar artery** runs along the front of the forearm, corresponding to a line drawn from the centre of the front of the elbow to the root of the ball of the little finger. In the hand the branches of the radial and ulnar arteries

combine to form the superficial and deep Palmar arches. **The superficial Palmar arch** is near the surface of the palm, and corresponds to the line that runs along the inner side of the ball of the thumb. **The deep Palmar arch** is slightly nearer the wrist, but lies deeply on the bones. In the fingers, the arteries run along either side of the fingers to the tip, where they unite.

Arrest of Arterial Hæmorrhage in the Upper Limbs.

When a Digital (finger) artery is wounded place the thumb on the bleeding point and compress the part firmly; subsequently, apply a small pad on the wound, and bandage with a piece of tape, strip of linen, or a strip of plaster, round the finger and pad. **When the Palmar Arch is wounded**, place the left thumb firmly on the bleeding point, leaving the right hand free to apply a pad and bandage. Apply a firm pad (a folded handkerchief), or better still, a graduated compress on the bleeding point, make the patient grasp the pad firmly, and apply a bandage as follows:—Spread out a triangular bandage, turn up the lower border 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 (see Fig. 41). Finally, bend the forearm well up and support with a large arm-sling.

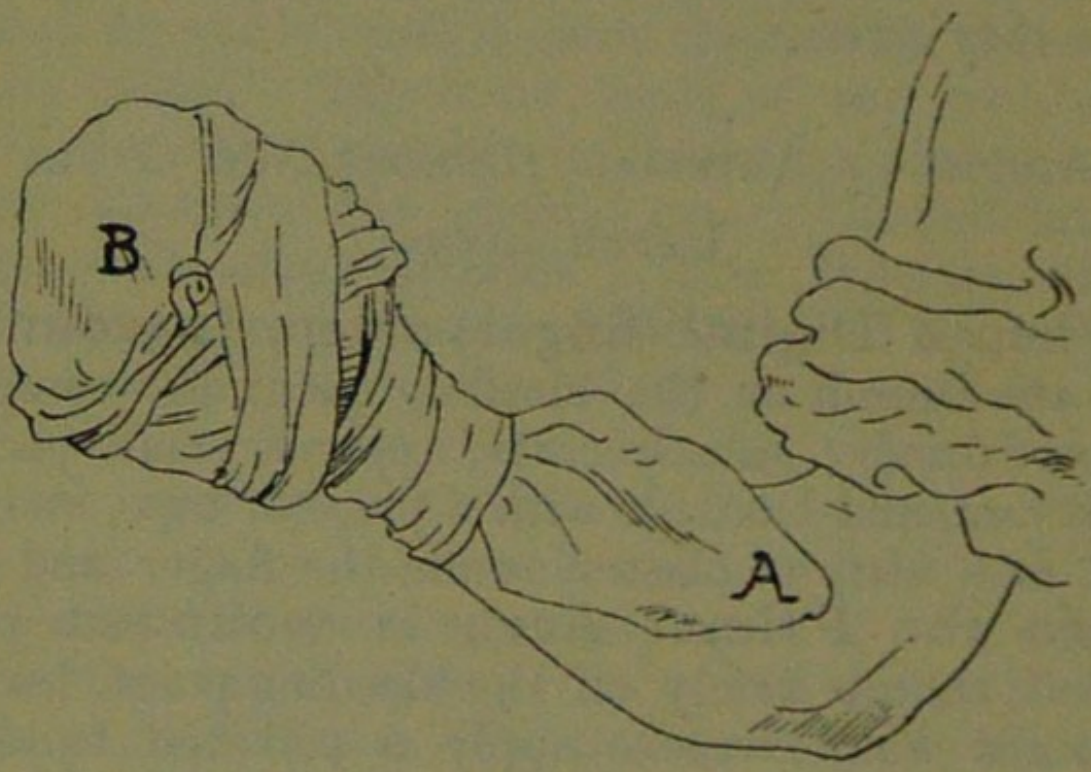


Fig. 41.

The Radial and Ulnar arteries may be compressed by placing the thumbs on the arteries one inch above the wrist (Fig. 42). This may be necessary when the wound in the palm is too large to be covered by the thumb : instead of the thumbs, the cork of a pint or quart bottle may be cut in two

lengthwise, and one half laid on the radial, and the other on the ulnar artery a little above the wrist; place the rounded sides of the cut cork next the skin and secure them by a tight bandage. See also next paragraph.

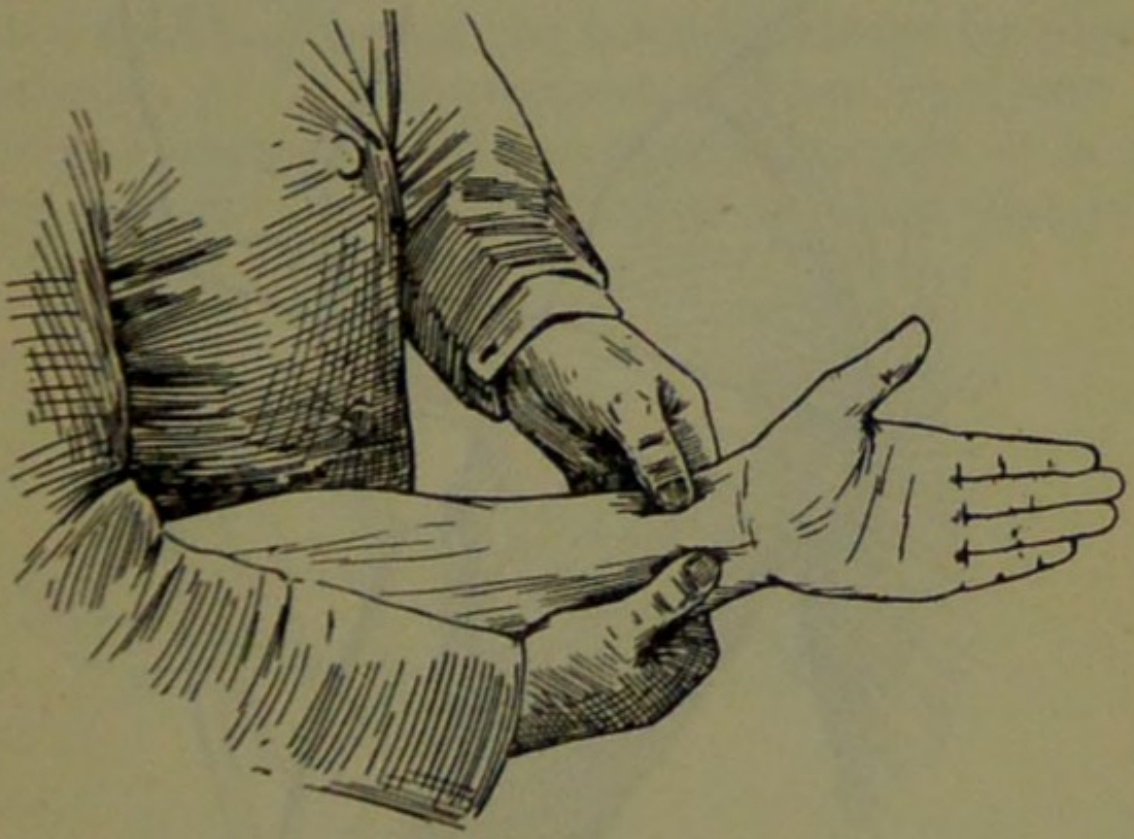


FIG. 42.

Hæmorrhage from a wound of the Radial or Ulnar artery in the front of the forearm may be arrested by a pad placed in front of the middle of the elbow, the forearm being firmly flexed on the arm, and maintained in the flexed position by a bandage. The pad may be made of a folded handkerchief with a

small stone or cork wrapped up in it ; but when no pad is available the coat sleeve rolled or gathered up as far

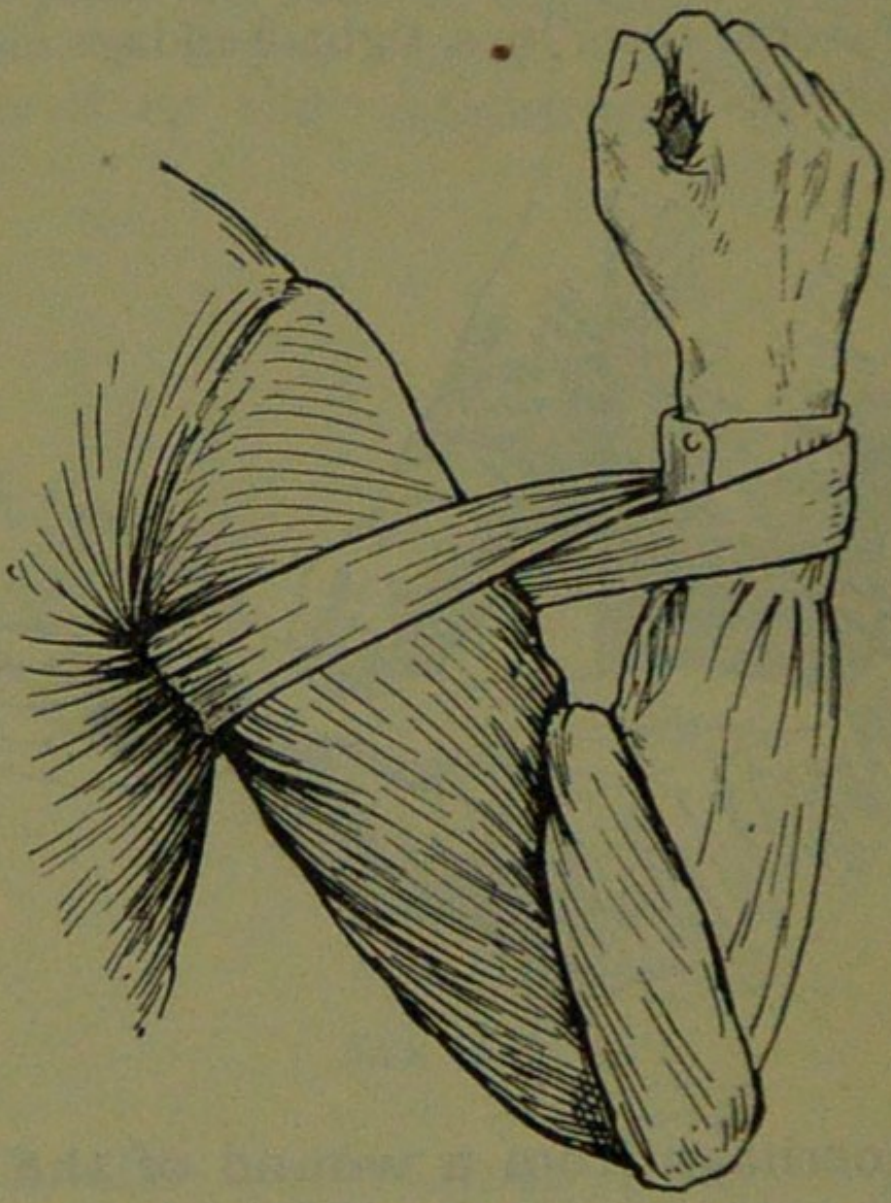


FIG. 43.

as the elbow will serve as a pad. Bend the forearm upon the arm and tie a narrow-fold bandage round the wrist and then round the upper part of the arm,

crossing the ends between the forearm and arm so as to better prevent the bandage slipping off. Finally, tie the limb to the side by a bandage encircling the limb and the trunk.

Hæmorrhage from the hand, forearm, bend of elbow, or lower part of the arm may be arrested by compressing the brachial artery by digital compression or by a tourniquet. When applying an improvised tourniquet to the brachial artery, it is not always necessary to use the stick; the best plan is to

Fig. 44.

tie a half-knot and pull the bandage tight; if the bleeding stops, complete the reef knot, but if it does not stop use the stick, as described on page 79.

To apply digital compression to the Brachial artery.—Extend the arm at right angles to the body, palm of the hand upwards. Stand behind the limb, grasp the arm, the thumb on the outside of the limb, and pass the fingers under the back

of the arm until the seam of the coat, or the groove on the inside of the muscle (biceps) is reached. Press the pulps (not the tips) of the fingers firmly on the course of the artery (see Fig. 44). Some prefer to grasp the arm from above the muscle, but if this course is adopted, great care must be taken to press the artery against the bone,

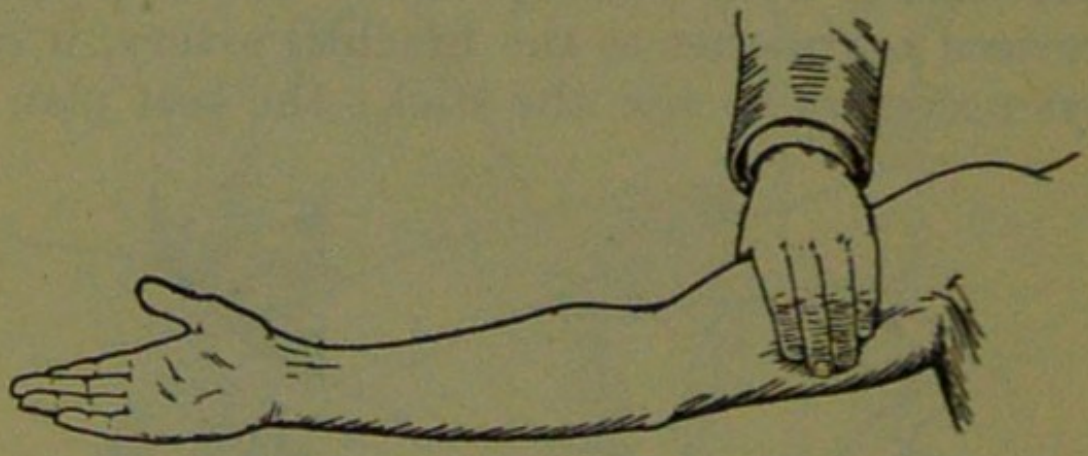


Fig. 45.

and not against the biceps muscle. A slight turn of the hand outwards as it grasps the arm will better ensure compression of the artery. In practice feel the pulse with the free hand during attempts at compression of the brachial, to ascertain if the flow of blood along the artery is stopped.

Hæmorrhage from the armpit or arm may be arrested by compression of the axillary artery. Roll up a hard pad the size of a billiard ball in a triangular bandage; place the pad in the armpit; cross the bandage on the shoulder, pull the ends tight, and tie

off under the opposite armpit, taking care that neither the pad nor bandage has slipped. Secure the injured arm to the patient's side, as shown in Fig. 46.

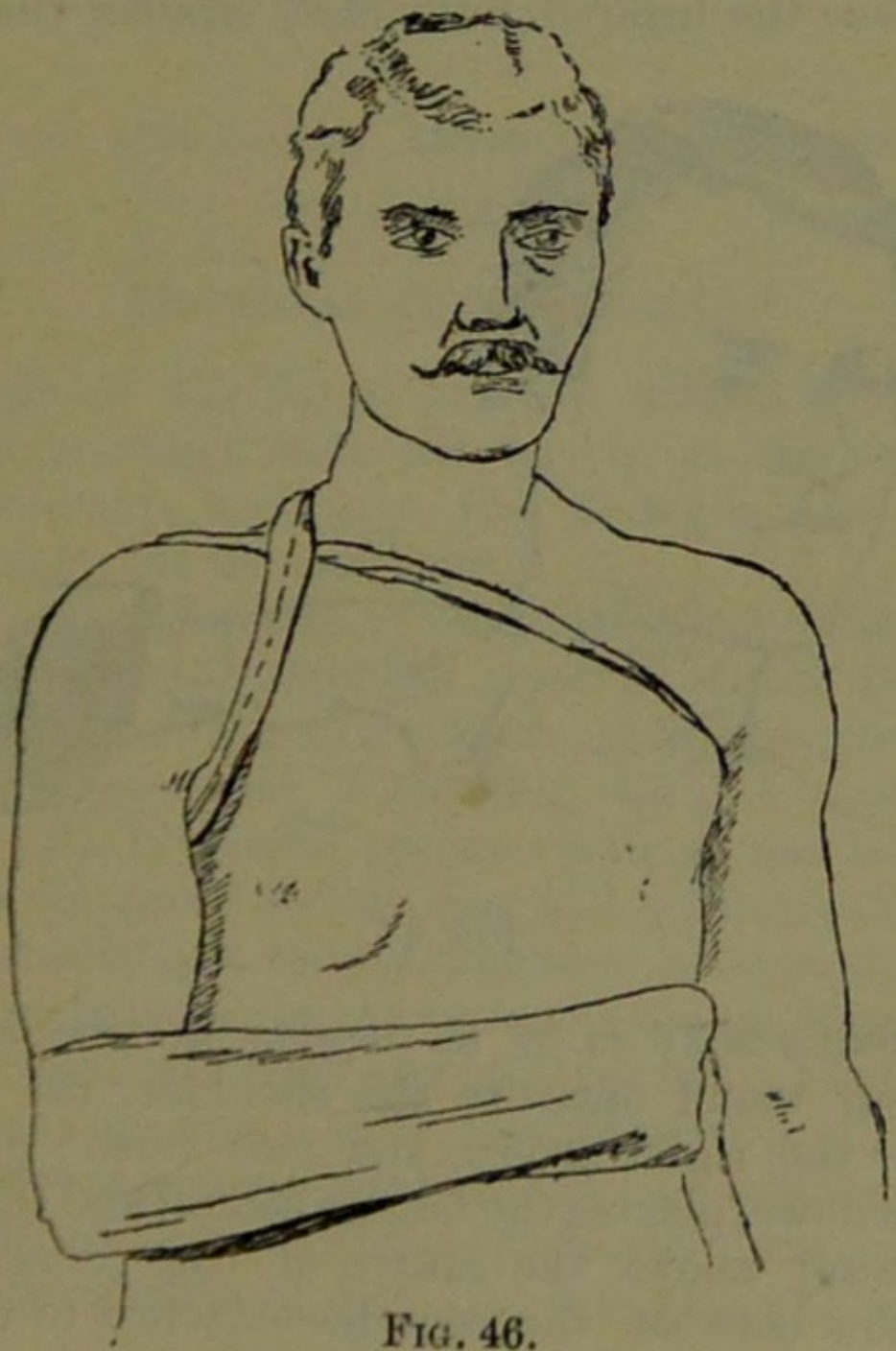


Fig. 46.

Digital compression of the Subclavian artery may be made when the wound in the main artery is high up in the arm or in the armpit. Proceed as follows:—Bare the neck to below the collar bone, place the injured limb close against the side of

FIG. 47.

the patient's body so as to depress the shoulder, and take your stand opposite the shoulder, use the left hand for the right artery, and vice versa; grasp the neck low down, placing the fingers behind and the thumb immediately above the centre of the collar-bone in the hollow between the muscles attached to the bone

(the bird's nest); compress firmly, pressing the thumb deeply downwards and backwards against the first rib, which is beneath the clavicle at this spot. In practice the pulse may be felt at the same time to ascertain if the flow is stopped. (Fig. 47.)

Wounds of the Large Arteries within the Chest or Abdomen:

(Internal Hæmorrhage.)

Wounds of the large arteries within the trunk cause hæmorrhage into the cavity of the chest or of the abdomen, and give rise to signs and symptoms of internal hæmorrhage.

Signs and Symptoms of Internal Hæmorrhage are:—A rapid loss of strength; pallor of the face and lips; coldness of the extremities, giddiness and faintness, more especially when the upright position is assumed; the breathing becomes hurried and laboured, and is accompanied by yawning and sighing; the pulse fails gradually and may altogether disappear at the wrist; the patient throws his arms about, tugs at the clothing round the neck and calls for air. Finally, the patient may become totally unconscious.

Treatment of Internal Hæmorrhage.—Keep the patient flat; undo all tight clothing round the neck; provide for free circulation of air; fan the patient; sprinkle

cold water on the face; apply smelling salts to the nostrils; give ice to suck or cold water to drink. Raise the feet a foot or two from the ground, and bandage the limbs firmly from the feet to the hips and from the hands to the shoulders. *Avoid stimulants* in all cases of hæmorrhage, at all events until bleeding has been controlled.

The Course of the Arteries in the Lower Extremities.

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 back part of the inner side of the knee. The artery occupies only the upper two-thirds of this line, as at the lower part of the thigh the femoral artery passes to the back of the knee joint under the name of the popliteal.

The Popliteal artery—the artery of the *ham*—occupies the centre of the space at the back of the knee (*the ham.*) It is placed deeply between the projections of bone at the lower end of the femur, and is further protected by the muscles and tendons around the ham. Just below and behind the

knee joint the popliteal artery divides into the anterior (front) and posterior (back) tibial arteries.

The Posterior Tibial artery passes down the centre of the back of the leg to the inner side of the ankle, where, between the heel and the lower end of the Tibia, it enters the sole of the foot as the **Plantar arteries.** In the upper part of the leg the posterior tibial artery is deeply placed beneath the muscles of the calf, but towards the ankle it comes nearer the surface, and can be felt pulsating in the hollow on the inner side of the ankle. In the sole of the foot the Plantar arteries run forwards amongst the muscles to supply the foot and the toes.

The Anterior Tibial artery comes from the popliteal and at once passes forwards between the leg bones. The artery runs down the front of the leg, deeply placed amongst the muscles, to the front of the ankle. A line drawn from the front of the upper end (head) of the fibula to the centre of the front of the ankle indicates the course of the artery.

The Dorsal artery of the foot is the continuation of the anterior tibial artery ; it passes along a line drawn from the middle of the front of the ankle to the interval between the metatarsal bones of the big toe and the next, where it passes downwards to the sole of the foot, to form an arch with the arteries of the sole.

Arrest of Arterial Hæmorrhage in the Lower Extremities.

1. **When the arteries in the Sole or Back of the Foot are wounded,** remove the boot and stocking; apply the left thumb firmly on the bleeding point; and, with the right hand, prepare and place a pad on the wound and bandage tightly.

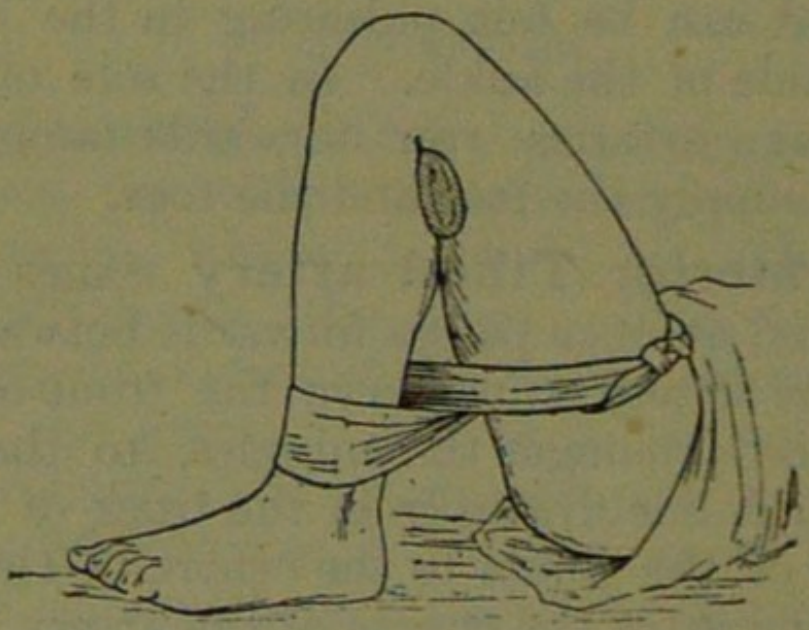


Fig. 48.

2. **When the arteries of the Ham or of the Leg are wounded, or when a pad is insufficient to arrest hæmorrhage from the foot or ankle,** place a pad the size of an orange behind the knee of the injured limb; flex the leg upon

the thigh until the heel almost touches the buttock; secure the limb in the flexed position by passing a narrow bandage (or a strap) round the leg immediately above the ankle; cross the ends between the leg and thigh, and, carrying them round the limb close to the top of the thigh, tie them off firmly. When no pad is to be had, roll up the trouser leg as far as the knee, and flex the leg on that as a pad. It is not necessary to take off the clothing to compress the popliteal artery by a pad and flexion. Except at the lower third of the leg, it is seldom possible by direct pressure on the bleeding point to arrest hæmorrhage from the arteries of the leg.

3. When the femoral artery in the lower half of its course is wounded, and when a pad and flexion fail to control hæmorrhage from the popliteal or tibial arteries, apply digital compression to the femoral artery at the groin, until a tourniquet can be applied.

To apply Digital Compression to the Femoral artery at the Groin.—Supposing it is the right femoral that is to be compressed, proceed as follows:—Lay the patient down flat on the back; stand or kneel as convenient on the left side of the patient's body; to find the groin, raise the foot high so as to flex the thigh on the body (the fold in the clothing at the top of the thigh will indicate the groin); pass the fingers of the right hand over the outer side of the right hip just below the edge of

the front part of the haunch bone, and lay the fleshy part of the thumb flat on the centre of the groin. Pass the fingers of the left hand to the inner side of the right thigh close up to the fork, and lay the left thumb on the top of the right thumb already in position over the artery. Press firmly

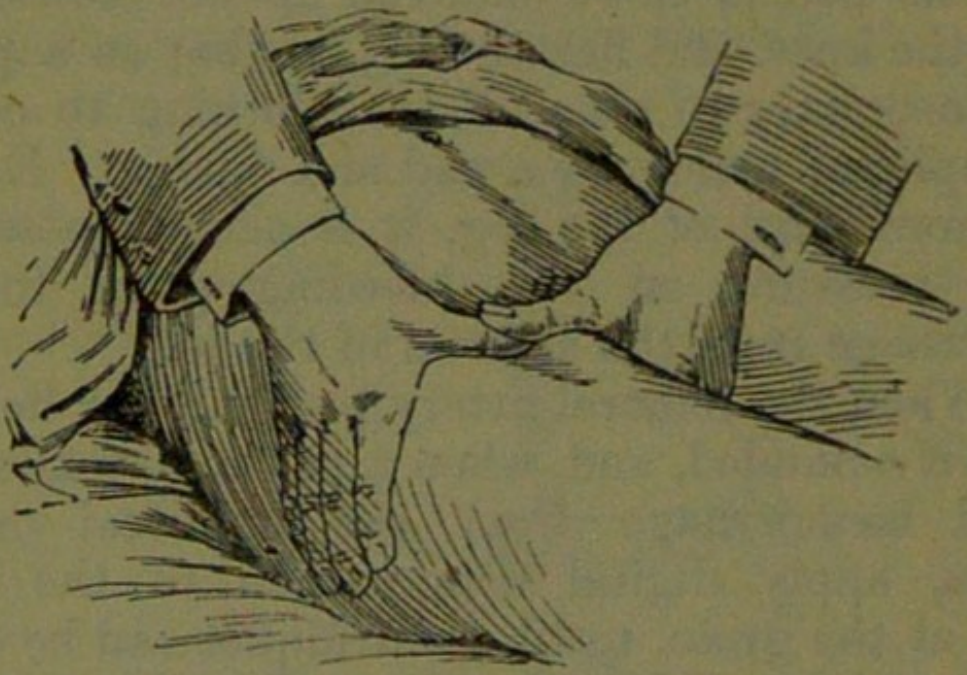


FIG. 49.

backwards against the brim of the pelvis, when the flow of blood will be completely arrested. As death is imminent in hæmorrhage from so large arteries, it is important not to waste time removing the clothing; the femoral artery at the groin can in men be compressed as a temporary measure over the clothing.

To apply a Tourniquet to the Femoral artery.—In practice it is a good plan to mark the

course of the artery by drawing a chalk line from the centre of the groin to the back part of the inner side of the knee; the artery can be compressed by a tourniquet at any point on the middle third of the line thus indicated or a little higher. An improvised, a field, or a screw tourniquet may be used. The pad of the improvised tourniquet should be as large as half an orange; a narrow-fold bandage is to be placed with its centre over the pad, and the knot tied on the outside of the thigh; the "stick" is to be placed between the "halves" of the knot, so as to avoid injuring the skin when it is twisted. Finally, the "stick" is to be "locked," and the limb put in a splint or tied to its fellow.

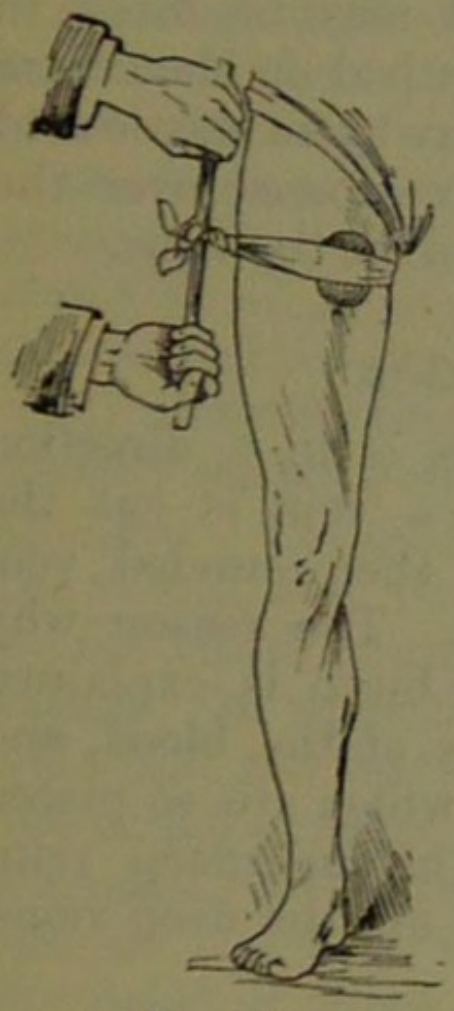


Fig. 50.

4. **When the artery is wounded in the upper third** of the thigh the femoral artery must be compressed by the thumbs at the groin, instead of applying a tourniquet. Relays of assistants must be employed to keep up the pressure until the doctor arrives, the fresh assistant applying his thumbs on those of the

previous assistant, who carefully slips his thumbs from beneath, so as to prevent gushes of blood during the changes. When assistants are few, or a doctor not to be had, an attempt may be made to arrest the hæmorrhage by placing a pad on the centre of the groin, and maintaining pressure by an elastic cord passed from the back of the thigh, crossed over the pad, and the ends fastened behind over the loins.

Venous Hæmorrhage.

The current of blood in the veins is in a direction towards the heart, therefore, when a vein is cut the blood will issue from the end of the wounded vein furthest removed from the heart. The reason why the end nearer the heart does not bleed is explained partly by the direction of the flow of the blood, and partly by the valves in the vein, which are so placed as to prevent a backward flow. The superficial veins are more apt to be wounded than are the deep veins.

Treatment of Venous Hæmorrhage.

(1) **Lay the patient down**, the head resting on a low support or pillow.

(2) Should it be a vein in one of the extremities that is bleeding, **elevate the limb.**

(3) **Undo the clothing** and expose the bleeding part.

(4) **Apply direct pressure on the wound** by the thumb, and maintain the pressure subsequently by a pad and bandage.

(5) Should direct pressure prove insufficient, **apply pad and bandage on the trunk of the vein,** on the side of wound furthest from the heart.

Varicose Veins.—The veins of the legs are specially apt to become varicose. When the varicose vein is examined, it will be seen not only to be dilated and tortuous, but bead-like (*varicose*) projections occur along its course. A vein becomes varicose from various causes, such as long standing, tight garters, etc., etc. The first effect is to throw extra work upon the valves, and the bead-like projections are caused by the blood accumulating in the pockets behind the valves. In time, the channel of the vein becomes so wide that the valves can no longer span the vessel. When one of these dilated veins, say, in the leg, is wounded or bursts, blood flows from the lower end of the cut vein, but from the end nearer the heart it flows in much larger amount, owing to the imperfect state of the valves in the veins.

Treatment.—When hæmorrhage occurs from a varicose vein in the leg the treatment is to—

(1) **Lay the patient flat,** the head resting on a low support or pillow.

(2) **Elevate the limb,** raising it high, at a right angle to the body if necessary.

(3) **Remove the clothing** so as to expose the bleeding part.

(4) **Apply direct pressure on the wound** by the thumb, and subsequently by a pad and bandage.

(5) **Apply bandages** from both *above* and *below* the wound should the direct pressure prove insufficient.

Treatment of Capillary Hæmorrhage

(See also Treatment of Wounds, page 124.)

To arrest hæmorrhage from capillaries, a slight degree of pressure suffices. Pressure may be applied instantaneously by the thumb, and maintained subsequently by a pad or pledget of linen or lint. Pressure may also be exercised by applying a piece of strapping (plaster) to the wound over a pad. Any medicament which aids in the arrest of hæmorrhage is termed a **Styptic.** Cold, as cold air or ice, arrests hæmorrhage by contracting the blood vessels. Water as hot as can be borne, by causing the blood to clot, may check capillary hæmorrhage.

Such remedies as fine strands of wool, or cotton wool, coarse blotting paper, etc., etc., have, if clean, something to recommend them. Collodion applied on a fine web of cotton wool is an efficient styptic.

Chapter III.

THE NERVOUS SYSTEM.

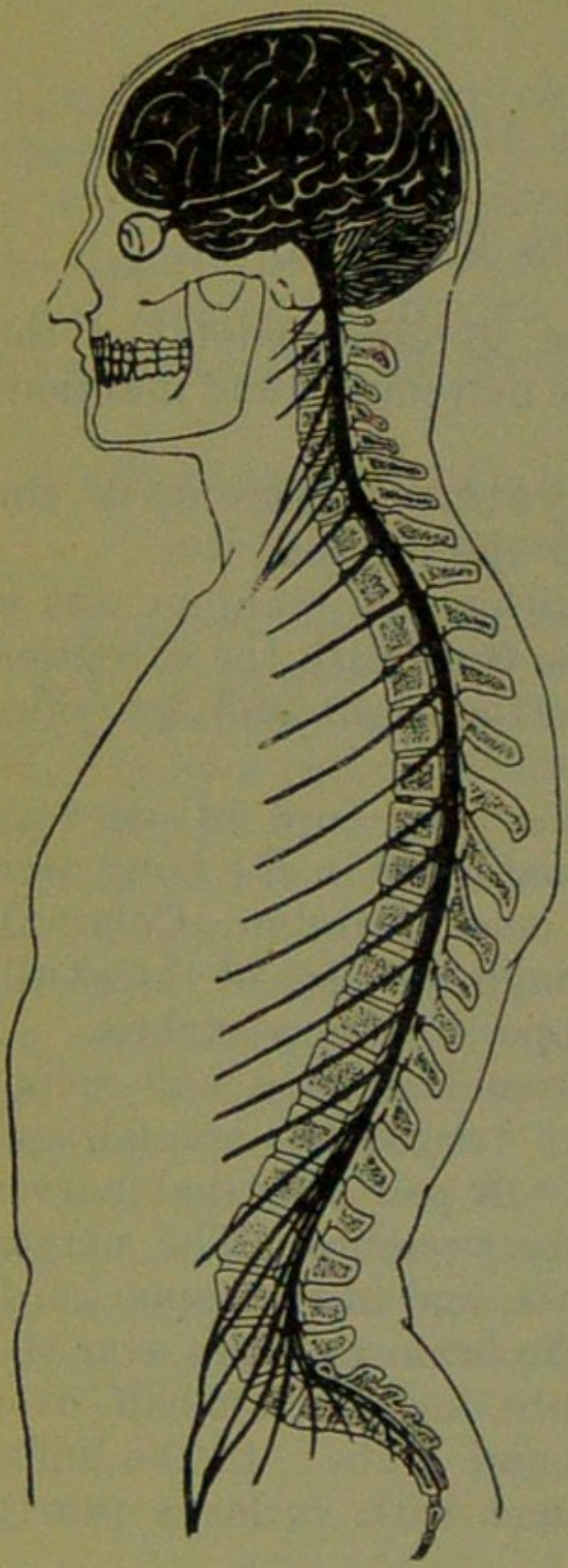
Two systems of nerves, the Cerebro-spinal and the Sympathetic, preside over the movements and functions of the body.

The Cerebro-Spinal system is made up of the Brain, the Spinal Cord, and the Nerves.

The **Brain** is situated within the cranium, and is divided in the middle line, so that, with the exception of a few connecting bands, the right and left sides are separate.

The **Spinal Cord** is the long cord of nervous matter lying within the spinal canal in the bony arch formed by the vertebræ (see Vertebral Column). It leaves the brain case through the base of the skull, and reaches as low as the upper lumbar vertebræ.

The Nerves proceed from the brain and spinal cord in pairs, the former are termed the cranial, and the latter the spinal nerves. A pair of spinal nerves emerges between each of the vertebræ. The nerves cross the brain about its base, and in the spinal cord, so that the right half of the brain presides over the left half of the body and limbs, and the left half over the right side of the body and limbs. In the limbs and trunk the nerves are met with as large pearly



white trunks, and can be traced to the muscles and skin.

To illustrate the course and functions of nerves, the following object lesson will suffice :—When the skin of, say the foot, is tickled or injured, the sensation travels by one set of nerves up the lower limb to the spinal cord, and thence to the brain. These nerves, because they carry the sensation from the skin to the brain, are named the *sensory* nerves. The brain now decides what is to be done with the foot that is injured or tickled. It sends its message down the spinal cord and out

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FIG. 51.

Diagram showing the brain and the spinal cord, with the nerves of the left side of the body.

by another set of nerves to the muscles of the lower limb, and the part is moved away, rubbed, scratched, etc., etc. The nerves performing this function are the *motor* nerves, because they go to the muscles, which bring about the necessary movements. Motor nerves and sensory nerves travel together in the same trunks. One of the best known nerves is the sciatic nerve (hence the term sciatica), which runs down the back of the thigh, and dividing into branches supplies the muscles and skin of the lower limb.

The Sympathetic System of nerves consists of a double chain of nerves and small nervous masses (termed *ganglia*) on either side of the front of the spinal column. The chain extends from the base of the skull to the coccyx. The nerves of the sympathetic system send branches to all the organs of the chest and abdomen. It is this system that controls the involuntary muscles of the body ; it regulates all our vital functions as well as adjusts the supply of blood to the secreting and excreting organs. The sympathetic system differs from the cerebo-spinal system, inasmuch as it acts during sleep, and knows no prolonged rest.

INSENSIBILITY.

Unconsciousness or insensibility arises when the functions of the brain are in abeyance, either directly from injury or disease of the brain itself, or

indirectly from disturbance of the action of the lungs or heart.

GENERAL TREATMENT OF INSENSIBILITY.

WHEN A PERSON IS FOUND IN A STATE OF INSENSIBILITY:

1. **Arrest hæmorrhage**, if present.
2. **Lay the person on the back**, or in the position in which breathing is most easy.
3. **Undo all tight clothing** round the neck, chest, and waist, unfastening the braces and top button of the trousers in men, and the corsets in women.
4. Provide for a sufficiency of **fresh air** by keeping the crowd away if in the street, or by opening the doors and windows if the accident has occurred indoors.
5. **Obtain a doctor's help** at once; as a general rule, until he arrives, keep the head low if the face is pale, and raise it somewhat if the face is flushed.
6. Never leave the patient until you have placed him in charge of a responsible person.

N.B. Give no food or fluids (neither stimulants, tea, water, nor medicines) by the mouth while the patient is insensible.

THEN PROCEED TO EXAMINE THE PERSON AS INDICATED BELOW, TO LEARN THE NATURE OF THE INSENSIBILITY:—

1. Feel if the pulse beats at the wrist (radial artery), at the temple (temporal artery), or in the neck (carotid artery). The pulse may be absent, or

it may be unnaturally slow, quick, or feeble ; it may miss a beat occasionally (intermittent pulse) ; or, the pulse may beat quickly and slowly alternately (irregular pulse). All these conditions indicate some serious mischief when associated with insensibility.

2. If the pulse cannot be felt place the hand over the heart, or apply the ear to the chest, to ascertain if the heart beats.

3. Observe if the person breathes, and note the odour of the breath. The breathing may be slow, laboured, and accompanied by loud snoring and puffing of the cheeks during expiration (*stertorous breathing*).

4. Examine the scalp, temples and back of the head for injury ; the ears and the nose for signs of hæmorrhage ; and the mouth for blood, froth, stains by acids, etc., and for foreign bodies.

5. Raise the eyelids, and examine the state of the pupils.

The pupils are the dark round spots in the centre of the blue, brown, or grey iris. Under ordinary conditions in shaded light the pupils dilate, in bright light they contract to small dimensions. In several diseased conditions the pupils are altered, they may be *both widely dilated*, or *both minutely contracted*, or, on the other hand, they may be unequal or irregular—that is, *one may be large and the other small*. Every one of such altered conditions denotes a serious state. The

pupils are said to be *fixed* when in either a shaded or a bright light no alteration takes place in their size.

6. Examine the body and extremities for signs of fractures, dislocations, wounds—the neck for signs of strangulation or hanging—and compare the two sides of the body as to limpness or helplessness.

7. Notice the temperature of the skin, whether it be natural, hot, or cold. The quickest way of doing this is to place the back of the hand on the naked chest of the patient.

Shock (sometimes leading to Collapse from Injury).

After every accident of any severity the patient suffers from shock. It is not so much a mental condition that results, as one dependent upon the physical consequences of injury.

Signs and Symptoms.—The patient complains of feeling cold and may actually shiver with cold. The face is pale, the skin is cold and clammy, the pulse is weak, the breathing is scarcely perceptible, and the temperature of the body, if taken by a thermometer, will be found to be below the normal (98·4). In very severe injuries such as extensive burns, broken bones, lacerated wounds, or severe crush with deep-seated injuries, the temperature may fall to 94 degrees or even lower ;

in such cases recovery is rendered doubtful. The patient meantime may remains conscious, but appears dazed. In some cases of shock the patient may keep quite quiet, but in other cases a marked, unreasonable restlessness prevails. The patient may become delirious owing to severe pain, loss of blood, or mental disturbance, or may collapse from extreme loss of blood, or the severity of the shock.

Treatment.—Prevent the temperature falling by covering the patient up with a coat, shawl, blanket, or anything at hand. As soon as possible get the patient under cover in a warm room, or in bed, and promote warmth by hot flannels, hot bottles to the feet and abdomen, and, if the patient is not unconscious, give warm drinks, tea, hot milk, etc. When applying hot bottles see that they are wrapped up in a piece of flannel or cloth of some kind to prevent possible injury to the skin.

Concussion of the Brain.

When the cranium is struck a severe blow, or injured during a fall, the brain may be concussed—that is, the person may be stunned. There may be no wound of the scalp or injury to the bone, but the brain is so shaken that for the time being it is functionless or paralysed.

Signs and Symptoms.—Insensibility, a feeble pulse, shallow breathing, the pupils fixed, and generally

equal in size. History of a fall or a severe blow may be obtained; or injury to the head may be evidenced by wounds, bruises, &c.

Treatment.—Treat the patient as directed for Insensibility; attending to the position of the patient, loosening the clothing, and seeing to the admission of fresh air, without anything being given by the mouth. The patient in slight cases recovers consciousness in a few minutes, but in severe cases he may remain insensible for one hour or more. Vomiting usually occurs as the patient is coming round. Send at once for a doctor.

Compression of the Brain.

When from a fall or blow the cranium is fractured, and a piece of bone driven inwards, the brain may be compressed. On the other hand, the broken bone may injure a blood-vessel within the cranium, and compression may result from pressure of blood on the brain. In the former case the insensibility will come on immediately; in the latter, after some minutes, possibly 15 or 20, that is, when the blood has accumulated in sufficient quantity to exercise pressure on the brain.

Signs and Symptoms.—Insensibility; evidence of a wound of the scalp; the fracture of a cranial bone may be felt; a slow, full pulse; stertorous breathing;

unequal pupils, becoming fixed when the pressure is severe. In injuries to the brain symptoms of concussion may first prevail, succeeded by symptoms of compression.

Treatment.—(1) General treatment for insensibility (placing the patient in an easy position to breathe, undoing tight clothing, and securing a sufficiency of fresh air). (2) Raise the head slightly. (3) Apply ice or cold-water cloths to the head. (4) Do not attempt to rouse the patient or to give anything by the mouth. (5) When conveyed to shelter, to his home, or to a hospital, leave him undisturbed until the doctor arrives.

Apoplexy.

When a diseased blood-vessel gives way within the cranium the brain is compressed and its tissue partly destroyed by the blood which escapes. When the quantity of blood is large the symptoms develop so rapidly that the condition is termed an apoplectic fit or seizure.

Signs and Symptoms.—Insensibility, a full, slow pulse, stertorous breathing, unequal (one large and one small) and fixed pupils, a flushed face, a hot skin (the temperature of the body is usually markedly raised), and the limbs of one side of the body limp, while, on the other, the normal rigidity may be retained—are the indications of a severe apoplectic

attack. The age of the patient is a help in recognising the condition, as it is usually elderly people who are seized.

Treatment.—(1) General treatment for insensibility (loosen the clothing round neck, chest, and abdomen ; provide for a free draught of air). (2) Lay the patient on the back with the head slightly raised. (3) Get a doctor at once. (4) Apply cold to the head, either by an ice-bag or by cloths wrung out of cold water. (5) Keep the feet warm by hot water bottles, mustard leaves, or a mustard plaster. N.B.—Prevent anything being given by the mouth. Take care that the skin is not injured by the hot-water bottles ; they ought to be tested by feeling them with the back of the hand, and then wrapped in flannel, etc., before placing them against the skin.

Collapse from Drink.

Physical collapse from drink is generally witnessed in very poor persons, upon whom, from want of nourishment, insufficient clothing, etc., drink (it may be even a small quantity) has an undue effect. It is seldom that drunkards become physically collapsed—their mental powers may be paralysed, but the circulation of the blood retains its power.

Signs and Symptoms.—Insensibility may be complete or partial, the patient being either capable of being roused, or totally unconscious. The pulse is

feeble or completely absent at the wrist; the breathing is slow, and perhaps slightly stertorous; the breath smells of drink; the pupils are dilated, equal, and respond to light; the face is pale, and the surface of the skin cold and clammy.

N.B.—It must not be assumed that a person has collapsed from drink merely because the breath smells of drink; frequently, when people are feeling ill, they take or are given stimulants, after which they may become insensible, not from the drink but from the cause which induced them to take it, *e.g.*, apoplexy coming on, effects of poisoning., etc., etc.

Treatment.—(1) General treatment for insensibility (loosen clothing, provide free circulation of air, and place in position in which breathing is possible). (2) Keep the patient warm by covering him over or taking him indoors, and applying hot-water bottles and friction to the surface, more especially to the limbs. (3) When the patient can be roused give warm tea or coffee. (4) When the pulse is restored give an emetic of a dessert-spoonful of mustard in a tumblerful of luke-warm water. (5) When the emetic has effected its purpose, support the patient's strength by giving tea, beef tea, brandy in small quantity, or by any of the prepared foods, soups, or essences.

The apoplectic state and collapse from drink are not unfrequently mistaken the one for the other.

The more prominent means of distinguishing them are as follows :—

1. In apoplexy the patient is usually getting on in years ; collapse from drink may occur in a person of any age.

2. The absence of the smell of drink would indicate apoplexy.

3. Pupils generally unequal and fixed in apoplexy ; equal and responding to light in collapse from drink.

4. The pulse at the wrist in apoplexy is usually strong and full ; in collapse from drink it is feeble or altogether absent.

5. The features in apoplexy are usually congested and suffused ; in collapse from drink they are pale and pinched.

6. Should means of ascertaining the temperature be at hand, it will be found in apoplexy considerably above, and in collapse from drink considerably below the normal (98.4).

Epilepsy.

This disease is frequently termed the "falling sickness." It occurs in persons of almost any age, but most frequently it is seen in young adults. It is a common form of "fit," and as it occurs with but little if any warning, the seizure may take place by night or day, at home, in the

streets, at public meetings, in a public conveyance—in fact, anywhere. Owing to its sudden development the patient may incur serious danger, especially when the attack comes on near a fire, machinery, a steep bank or precipice, or where traffic is great.

Signs and Symptoms.—Sometimes with, but generally without, a scream the patient falls to the ground, insensible. The muscles of the body are in a state of spasm, so that the features are distorted, the hands are tightly clenched with the thumbs inwards. Very quickly, the rigid spasm by which all these parts have been fixed is exchanged for a state of convulsions, during which the face, limbs and body are violently contorted. The eyes may squint, the pupils are equal, dilated, and fixed. The face at first pale, becomes dusky, and froth frequently appears at the mouth and occasionally at the nostrils. The tongue is apt to be bitten, and when it is the froth from the mouth may be tinged with blood.

The duration of an epileptic fit is uncertain ; it may continue for but a minute or two, or for five to fifteen minutes. When the fit ceases the patient may recover completely, may fall into a deep sleep, or may have a succession of similar fits.

Treatment. —(1) General treatment for insensibility (loosen clothing, allow free circulation of air, attend to position). (2) Prevent the patient from hurting himself as he falls and after he has fallen. (3) During

the fit drag him away from a wall, heavy piece of furniture, or other source of danger not easily moved; push lighter furniture out of the way. (4) Kneel down beside the patient and support his head. (5) Wrap a piece of wood or any hard material (handle of pocket knife, indiarubber, pencil, etc.) in a handkerchief, and hold it between the teeth to prevent the tongue being bitten. N.B. The movement of the limbs must be restrained but not altogether prevented or completely checked, as during the spasms the muscles might be torn. Give nothing by the mouth. (6) After the fit see that the patient is cared for by friends or conveyed to shelter, and allowed to rest and sleep.

Fainting (Syncope).

Cause.—A close or crowded room, tight clothing, fright, sudden bad news, fatigue, want of food, loss of blood, heart failure, etc.

Signs and Symptoms.—Pallor, a feeling of giddiness, a feeble pulse, shallow breathing, blurred vision, followed by insensibility more or less complete.

Treatment.—(1) General treatment of insensibility (loosen clothing, provide circulation of air, attend to position). (2) Lay the patient down flat on the floor, on a couch, or on the ground, or, if possible, as when the patient is on a form, let the head drop over the edge of the form a little below the level of the body. (3) Raise the feet a little. Get as much air to play

on the patient as possible by creating a draught, by fanning, etc. (4) Smelling salts held to the nostril will aid recovery. (5) When sensibility is restored remove the patient into the open air, but should recovery be delayed for several minutes after the flat position has been assumed, the patient must be carried whilst yet insensible to the open air.

Note.—If bleeding is the cause of the faint, arrest the hæmorrhage before treating the insensibility. If the patient is suffering from want of nourishment, give food sparingly at first.

Hysterical Fits (Hysteria).

Signs and Symptoms.—The patient, usually a young girl, in consequence of some mental excitement, suddenly loses command of her feelings and actions, she subsides on a couch or in some comfortable position, and commences throwing herself about, grinding her teeth, clenching her fists, shaking her hair loose, now clutching at anything or anyone near her, crying, kicking, or laughing. The eyeballs may be turned upwards and the eyelids opened and shut rapidly. At times a froth may appear at the lips and several other irregular symptoms develop. The patient is not completely insensible in hysteria.

Treatment.—Speak firmly to the patient; threaten her with a cold water douche, and, if she persists in her "fit," sprinkle her with cold water. Medical treatment

is necessary to cure the patient of the condition of mind and body which gives rise to the tendency to hysterical attacks.

Sunstroke.

Heat Stroke and Heat Apoplexy are terms also applied to this condition. "Sunstroke" is usually applied to that form of the ailment which comes on suddenly whilst exposed to great heat; and "heat-stroke" is the term used when the symptoms appear after the sun has set, in consequence of exposure to severe heat during the day.

Signs and Symptoms.—Whilst exposed to great heat, as in the engine-room or stoke-hole on board steamers, especially in the tropics, or during a march whilst heavily burdened in very hot weather, persons so situated may develop a sudden sickness, a feeling of faintness, giddiness, and difficulty in breathing. The patient complains of thirst, the skin becomes dry and burning, the face congested, the pulse quick and bounding. Finally, insensibility may result, with stertorous breathing, followed by collapse.

Treatment.—Undo all tight clothing; remove the patient to a cool, shady spot—if on board ship, between decks; if in the open, to the shade; if near a house, carry him indoors and darken the room. Strip the patient to the waist, procure as free a circulation of

air as possible by fanning vigorously, by opening the door and windows if in the house, or placing in a draughty place if on board ship. Keep the patient lying down, but with the head and shoulders well raised on a pillow or folded coat. Pour cold water on the head, neck and body, jugful after jugful, until consciousness returns. An ice-bag to the head and spine or cold water applications should be continued for some hours. The patient may have cold water to drink when conscious, but no stimulant.

Electric Shock.

Through contact with an electric wire or other electric medium, the shock may be so severe as to cause insensibility.

Treatment.—(1) General treatment for insensibility (loosen clothing, procure free circulation of air, and place in reclining position). (2) Dip a towel in cold water, and attempt to rouse the patient by sharply flicking the face and chest. (3) Commence artificial respiration if other measures fail to restore animation. The person assisting the patient must be careful not to touch him whilst in contact with the electricity unless his own hands are protected, otherwise he will receive the shock himself. The hands must be covered by some insulating material, such as India-rubber gloves, or a piece of mackintosh coat or sheet-

ing; an indiarubber tobacco pouch or pouches would serve to protect the hands in an emergency.

Effects of Lightning.

A person struck by lightning is usually more or less completely deprived of consciousness for the moment. This insensibility sometimes lasts for a considerable time. If there are burns, they must be treated in the usual way. Exhaustion is generally present in a marked degree. Artificial respiration is the sheet anchor of treatment, and should always be tried, even if the person seems in a moribund condition.

Convulsions in Children.

Teething or stomach troubles are the commonest causes of convulsions in infants.

Signs and Symptoms.—One spasm of the muscles of the limbs and trunk, lividity of the face, insensibility, occasionally squinting, suspended respirations, and frequently froth at the mouth.

Treatment.—Put the child in a warm bath about the normal temperature of the body (98 degrees Fahr.), so that the water reaches as high as the middle of the trunk; and place a sponge dipped in cold water on the top of the head.

Chapter IV.

WOUNDS AND INJURIES OF THE SKIN.

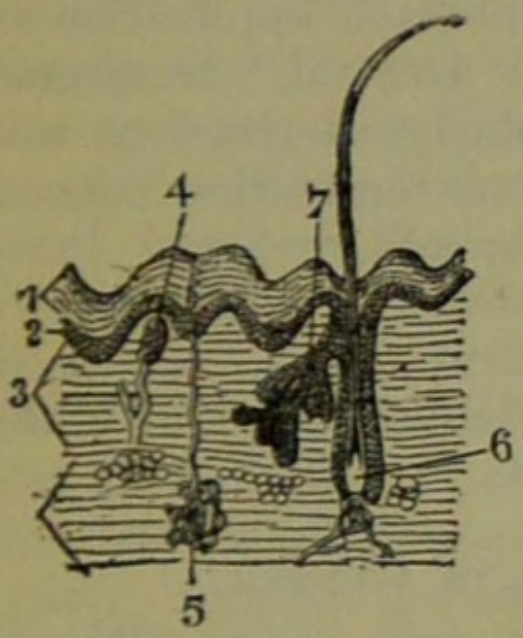

Fig. 52.

Magnified Section of Skin :—
1 and 2, Scarf Skin,
3, True Skin,
4, End of Nerve,
5, Sweat Gland and Duct,
6, Root of Hair,
7, Oil (Hair) Gland.

The **Skin** serves as a protective covering to the body, as a gland for the excretion of perspiration, and as a means of regulating the heat of the body. The scarf skin is composed of hard, horny cells; the true skin beneath is rich in blood vessels, and contains the roots of the hair, the oil and sweat glands and nerves.

Bruises.

A blow anywhere on the surface of the body may cause extensive hæmorrhage below the skin, without the skin being wounded. A "black eye" is an injury of this nature.

Signs and Symptoms.—The injured part is at first reddened by the blow, but the colour quickly assumes a dusky hue and then becomes purple, and afterwards almost black. In a few days the colour appears of a

lighter tint, and after gradually passing through purple and violet shades, it changes to a greenish colour and then to a yellow tinge before the normal colour of the skin is attained.

Treatment.—Beyond the immediate application of ice or cold-water dressings, no "first aid" treatment is required. The virtue popularly ascribed to raw meat applied to a black eye has no foundation beyond the fact that the piece of meat is cold.

Wounds.

A surface wound may be defined as an injury involving an opening in the skin.

Treatment of Wounds in General.

Be sure that your Hands are quite Clean.

1. **Arrest Hæmorrhage** at once when the source can be ascertained. When internal hæmorrhage is suspected the measures to be adopted are :—Rest, free circulation of air, loosening clothing, and free use of ice to suck ; an ice-bag may also be applied externally in the neighbourhood of the wound.

2. **Cleanse and Dress the Wound** —(A.) *When out-of-doors* it is but seldom that appropriate means of cleaning a wound are at hand. (*a*) If no water is at hand, and but one *clean* handkerchief is to be had, wipe the wound, if it is dirty, with a corner of the handkerchief, then fold the handkerchief and tie it over the

wound. If the handkerchief is *soiled* apply a piece of clean (unprinted) paper, as the inside of an envelope, on the wound, and tie a handkerchief, necktie, or brace over it. (*b*) If *clean* water is near by, and the wound is dirty, but not otherwise, wash the wound freely, dip (or wash if necessary) the handkerchief in the water and apply over the wound.

(B.) *When in-doors cleanse the wound* with water that has been boiled and allowed to cool. To the water might be added, in the following proportions, if at hand, a few crystals of permanganate of potash to a half tumbler of water; boracic-acid (a teaspoonful of the powder to a half-tumblerful of water); or any of the disinfectant lotions in common use. The parts *around* the wound are to be cleansed by washing with soap and water. When the part has been dried, absolute cleanliness will be ensured by mopping the skin around the wound with spirits of wine or with whisky. *Dress the wound.*—The wound may now be dressed by one of the following methods: —(*a*) A piece of dry lint, linen, or calico of several thicknesses, and bandaged. (*b*) The dressing may be soaked in water, boiled and cooled, or in any of the antiseptic lotions, or in Friars balsam. (*c*) Cotton wool, lint, or gauze (medicated) may be applied, wet or dry, next the wound, instead of the above dressing, or applied over the dressing. (*d*) Antiseptic powder, such as boracic acid, may be dusted

over the wound, and then covered with lint or cotton wool and bandaged. N.B.—Carbolic acid, although valuable as an antiseptic, on account of many accidents having occurred in recent years through its misapplication is not a safe lotion to be kept in the home as a dressing for wounds. Vessels containing carbolic acid lotion should not be left about.

The cleanliness of dressings of lint, cotton wool, or gauze can be guaranteed only after they have been subjected to great heat. This can be accomplished by placing the quantity to be used in a closed tin in a hot oven for half an hour. It is advisable not to touch clean dressings with the hand, but with clean forceps, pincers, sugar tongs, &c.

When the blood has crusted over a wound do not disturb it unless the wound is known to be dirty.

3. **Rest.** The wounded part, when dressed, should be kept quiet by splints, slings, or by rest in bed.

Wounds and their Special Treatment.

The treatment of wounds in general applies to these wounds :—

Incised Wounds.—When the skin is cut by a knife, a piece of glass, or other sharp instrument, the wound is termed incised. The edges are clean cut and the wound gapes.

The edges of a large incised wound may be held together, after it has been cleansed, by narrow strips

of adhesive plaster laid across the wound with a slight interval between each strip.

Punctured Wounds.—The wound caused by the stab of a knife, dagger, bayonet, etc., is termed punctured. The wound is usually small, rounded, or jagged, and the edges driven inwards by the weapon. The danger arising from the injury depends upon the situation of the wound, or the depth to which the instrument has penetrated.

Punctured wounds must not be probed. Foreign bodies in wounds, when hidden from view, are not to be searched for by probing, they are to be left till the doctor arrives. (See also Internal Hæmorrhage.)

Lacerated Wounds.—When a part of the body is torn off by machinery, by the bite or claw of an animal, by an artillery shell, etc., a lacerated wound results. The parts are torn unequally, so that the surface of the wound presents a very uneven and ragged appearance.

Lacerated wounds seldom bleed much, but when part of a limb has been torn off, say by machinery, a tourniquet is to be applied loosely round the limb above the wound, ready to be twisted tight should actual hæmorrhage come on.

Contused Wounds.—When from the blow of a blunt instrument, such as a stick, truncheon, etc., the skin is broken and the parts around severely bruised, the wound is said to be contused. The edges

of the wound are uneven and driven inwards ; the hæmorrhage is usually insignificant, a few drops of blood merely trickling from the wound.

Treat as a wound and a bruise.

Gunshot Wounds.—When a person is "peppered" at some distance with small shot from a sporting gun, so that the shot has time to spread, the wounds may be wide apart. Every shot causes a small painful wound, from which a little blood oozes, and speedily gets hardened into a scab. Unless the "shot" has penetrated the chest or abdomen, or wounded the eye or a joint, there is little danger from the injury. The wound from a rifle bullet will show one or two wounds, according as the bullet remains in or leaves the body, forming the apertures of entrance and exit.

Gunshot wounds are to be covered over by lint gauze, or cotton wool (medicated), if either is to be had, or if not, by some other clean dressing. When the surface of the body has been "peppered" by a number of small shots, do not attempt to remove them, but wrap the parts wounded (a whole limb it may be) in a sheet or towel wrung out of hot or cold water, whichever is the more comfortable.

Poisoned Wounds.—Wounds may be poisoned at the time of the injury, or may become so afterwards by the nature of the discharges. Under this heading might be included the bites of animals, the stings of

insects, the poisoned wounds caused by native weapons purposely poisoned by some drug, etc.; these will be considered in detail later. When wounds become poisoned by dirt, neglect, insanitary surroundings, etc., they are said to be "septic." The word septic means putrid, and antiseptic materials and substances are those that prevent a wound becoming putrid or septic: with the treatment of these conditions "first aid" has little to do, but all that is possible to prevent a wound becoming septic when it is first seen should be attempted.

For treatment, see Bites, Stings, &c.

When a joint is wounded, say by a bullet or other foreign body, or by a stab, the part is to be wrapped up in cotton wool and the limb put in a splint.

When a needle breaks off after penetrating the skin and disappears, take the patient to a doctor at once. If the wound is near a joint keep the joint at rest on a splint. When a fish hook is imbedded in the skin, do not attempt to withdraw it by retraction—that is, by the way it went in—but cut off the "dressing" of the hook, so that only the metal is left, and then force the point through the skin, making the hook to travel onwards until it can be withdrawn.

Frost Bite.

During exposure to severe cold, parts of the body, usually the feet, fingers, nose, or ears, lose sensation,

and become first waxy white, and then congested and of a purple appearance. Sensation being lost in the part, it is often only by the bystanders drawing attention to the alteration in colour of the ear, nose, etc., that the frost-bitten person is made aware of the fact.

Treatment.—Do not bring the patient into a warm room until by friction by the hand, or by rubbing with soft snow, the sensation and circulation in the frost-bitten parts are restored. Neglect of this precaution may lead to death of the tissues affected. When circulation is restored the patient ought to be kept in a room at a temperature at 60 deg. Fahr.

Burns and Scalds.

A burn is caused by dry heat, such as flames, hot metals, etc.; a scald is caused by moist heat, such as boiling water, hot oil, tar, etc.

Signs and Symptoms.—The effect of heat on the body may be a mere reddening of the skin; if more severe it may cause blebs or "blisters" to form. When the burn is very severe, the deeper tissues of the limbs or trunk may be charred and blackened. The clothing may adhere to the burned skin, rendering it impossible to separate them. The immediate danger to life is SHOCK, caused by the extent of injury to the skin; the more remote dangers are exhaustion, severe reactionary inflammation, deformity from scars, etc.

Treatment.—(1) **The clothing over the injured part must be carefully removed.** If stuck to the skin, the adherent clothing must be cut around with scissors and left to come away subsequently. If the foot is scalded, the boot must be carefully removed, undoing the lace and cutting the leather down to the toe of the boot, so that the boot may fall off, instead of being pulled off; the stocking must also be cut all along, so that it falls away from the scalded part. It is the duty of the bystanders to prepare the dressing while the clothing is being removed.

(2) **Immediately cover up the wound from the air.** (*a*) When the skin is merely reddened the air may be excluded by dusting it with flour, whiting, powdered chalk, &c. The part is then to be covered by a thick layer of cotton wool, lightly bandaged and maintained in the most comfortable position possible. (*b*) When blisters are formed, or when the surface is charred, soak or smear pieces of lint or linen, with olive, salad, linseed, almond, or cod-liver oils, or with vaseline, lanoline, or cold cream. Carron oil, a favourite remedy, is made by mixing equal parts of linseed oil and lime water; olive oil may be used instead of the linseed oil. When the burnt surface is extensive, do not cover the part with one large sheet of lint, but with strips about the breadth of the hand; this is advisable,

as, during subsequent dressings, one strip can be removed at a time and a fresh dressing applied, before the adjacent strip is taken off. The shock to the system is thereby less than would be the case were the whole of the burnt surface laid bare to the air by removal of all the dressing at one time. When covered by the oily dressing, envelop the part in cotton wool, or if that cannot be obtained, with a piece of flannel. When the face is burnt, cut a "mask" for the face out of lint or linen, leaving holes for the eyes, the nose, and the mouth. Dip the mask in the oil or vaseline, apply it to the face, and cover over with cotton wool, leaving apertures for the eyes, nose, and mouth. When the hand or foot is burnt or scalded, and warm water—that is, water at the temperature of the body (98·4)—is at hand, place the injured limb in the water until suitable dressings can be got; and if a dessert-spoonful of baking soda (bicarbonate of soda) be added to a basin-full of the warm water, a soothing alkaline lotion is prepared. Do not prick the blebs or blisters; leave that to the doctor to do if he thinks it right.

(3) **Treat Shock.**—The severe shock, which accompanies every burn of any size, must be dealt with by applying warmth to the surface of the body generally, and by giving warm drinks. (See Shock.) Be very apprehensive of the danger of even slight burns of the neck.

When a Woman's Dress catches fire, proceed as follows :—Lay the person flat on the floor at once. Place her so that the flames are uppermost; that is to say, if the front of the dress is on fire, lay her on her back, and if the back of the dress is on fire, place her face downwards. The reason for this position is readily understood when it is remembered that flames ascend vertically; so that if the upright position is assumed, the flames will quickly ascend and envelop the body, neck, and face; or if the person is thrown down with the flames undermost, they will, if unextinguished, pass over and burn the limbs and set fire to the rest of the dress. As soon as the person is placed flat, smother the flames with anything at hand, such as a rug, coat, blanket, table cover, etc. If made wet so much the better. A woman rendering assistance, should hold a rug or blanket in front of herself when approaching the flames. If a woman's dress catch fire when no one is by, she should lie flat, flames uppermost, smother the flames with anything handy, as a table-cover, mat, &c. and call for assistance; on no account should she rush into the open air.

Vitriol Throwing.

Vitriol is frequently used as a weapon for deadly injury. If it is dashed in the face it is a very serious matter. If it touches the eye it would generally

mean loss of sight; whatever part of the skin is touched by the acid is furrowed and burnt.

Treatment.—Carefully wash all the vitriol possible from the skin, by squeezing a sponge dipped in tepid water, to which some washing or baking soda has been added, allowing the water to run gently over the injured part, then treat as an ordinary burn.

Bites of Animals.

Hydrophobia is caused by the bite of an animal suffering from rabies. Several animals, such as dogs, cats, foxes, wolves, deer, &c., become rabid. The poison is contained in the animal's saliva, and may be conveyed on the teeth beneath the skin and thus into the blood of human beings. When the bite is through the clothing there is less danger of hydrophobia, as the saliva is wiped off the teeth by the clothing. It is therefore by way of the exposed parts (the hands and face) that the poison usually enters the body.

Treatment.—In case of a bite by a dog or other animal, do not lose time in the attempt to ascertain whether the animal has or has not rabies, but proceed immediately as follows:—(1) Prevent the venous blood from carrying the poison through the body by immediately placing a constriction between the wound and the heart. Suppose, for example, a finger is bitten, it

should be encircled above the seat of the bite (that is, on the side of the wound nearest the heart) with the fore-finger and thumb. As soon as possible place a ligature (that is, a string, a piece of tape, a strip of handkerchief, etc.) tightly round the root of the finger; do not cease to compress with the finger and thumb until the ligature has been applied. (2) Suck the wound vigorously, provided that your lips are sound, spitting out the saliva; or (3) wash in water (warm water by preference, as it encourages bleeding). (4) As soon as possible the wound should be burned by a fluid caustic, such as caustic potash, pure carbolic acid, nitric acid, or if these are not at hand, by a red-hot wire, fusee, etc. It is not sufficient to apply a solid caustic, such as lunar caustic, to the wound; it does not reach any deeper than the skin, and the poison is at the bottom of the wound. To ensure the caustic reaching the bottom of the wound apply it on a sharpened piece of wood, such as a wooden match cut to a point. (5) Dress the wound, and when it is in the upper extremity sling the arm. (6) Treat shock, if it occurs.

Snake Bite.

The poison of the snake is conveyed from the poison gland along a channel in the serpent's fangs, so that when a snake bites the secretion is conveyed

beneath the skin along the hollow in the fang, and thus gains direct entrance to the blood.

Signs and Symptoms.—Within a few minutes after being bitten the part will swell and feel stiff; the patient becomes pale and faint; and if the serpent is one of the highly venomous species the train of symptoms will be as follows: hurried breathing, quick pulse, mental excitement, convulsions, and insensibility.

Treatment.—Tie a ligature (a string, leather strap, strip of handkerchief, brace, etc.) at once between the wound and the heart, so as to obstruct the veins leading from the seat of the bite. Two or three such ligatures may be applied at intervals up the limb and tightly twisted (tourniquet). Apply a fluid caustic, such as caustic potash, pure carbolic acid, or any strong acid on a pointed piece of wood, burning deeply so as to destroy the poison at the bottom of the wound. When the caustic has been thoroughly applied, but not till then, the ligatures may be removed. Sucking the wound is not without danger, but if no caustic is at hand sucking must be employed, the saliva being immediately spat out, and the mouth washed out with water or spirits and water, and the wound may be burned with a fusee or in any other available manner. Shock is to be treated in the usual way, and spirit of sal volatile (a teaspoonful in a wineglass of water), or spirits (whisky or brandy), are to be freely administered.

Bees, Wasps, Centipedes, Scorpions, Tarantulas, Spiders, Jelly-Fish, Harvest-Bugs, etc., may each give rise to severe symptoms, attended by actual danger to life in some instances. Remove the sting by squeezing the part, or by pressure with the barrel of a key when that is possible; mop the part freely with liquid ammonia, spirits of wine, or brandy, whisky, etc.; if these are not at hand, the application of the blue-bag, or strong solutions of carbonate of soda or potash, will relieve pain; a paste of bi-carbonate of soda and spirit of sal volatile is an efficient application. The patient's strength must be supported by the free administration of alcohol or sal volatile. As the harvest-bug buries itself beneath the skin, it is necessary to have the insect removed by a doctor.

Chapter V.

THE RESPIRATORY SYSTEM.

The air reaches the lungs by way of the nostrils (or the mouth), the pharynx, the larynx, the trachea, and the bronchial tubes.

The Pharynx is the space at the back of the throat and nose, partly seen behind the tonsil when the mouth is opened widely; the pharynx gives passage to food and air.

The Larynx (the voice-box, Adam's apple) is situated on the top of the wind-pipe in the middle line of the neck; it is composed of cartilage (gristle) and contains the vocal cords and the muscles concerned in the production of the voice.

The Trachea, or windpipe, is composed of strips of cartilage bound together by elastic and fibrous tissues, so as to form an open tube; it extends from the larynx to two inches below the top of the breast-bone, where it divides into the right and left bronchial tubes. Each bronchus when it enters the lung divides into small and still smaller tubes, until the ultimate recesses of the lung—the air cells or air spaces—are reached.

The Lungs, Right and Left, occupy the greater part of the thorax; they lie immediately within the ribs, and practically wherever a rib is felt whether front,

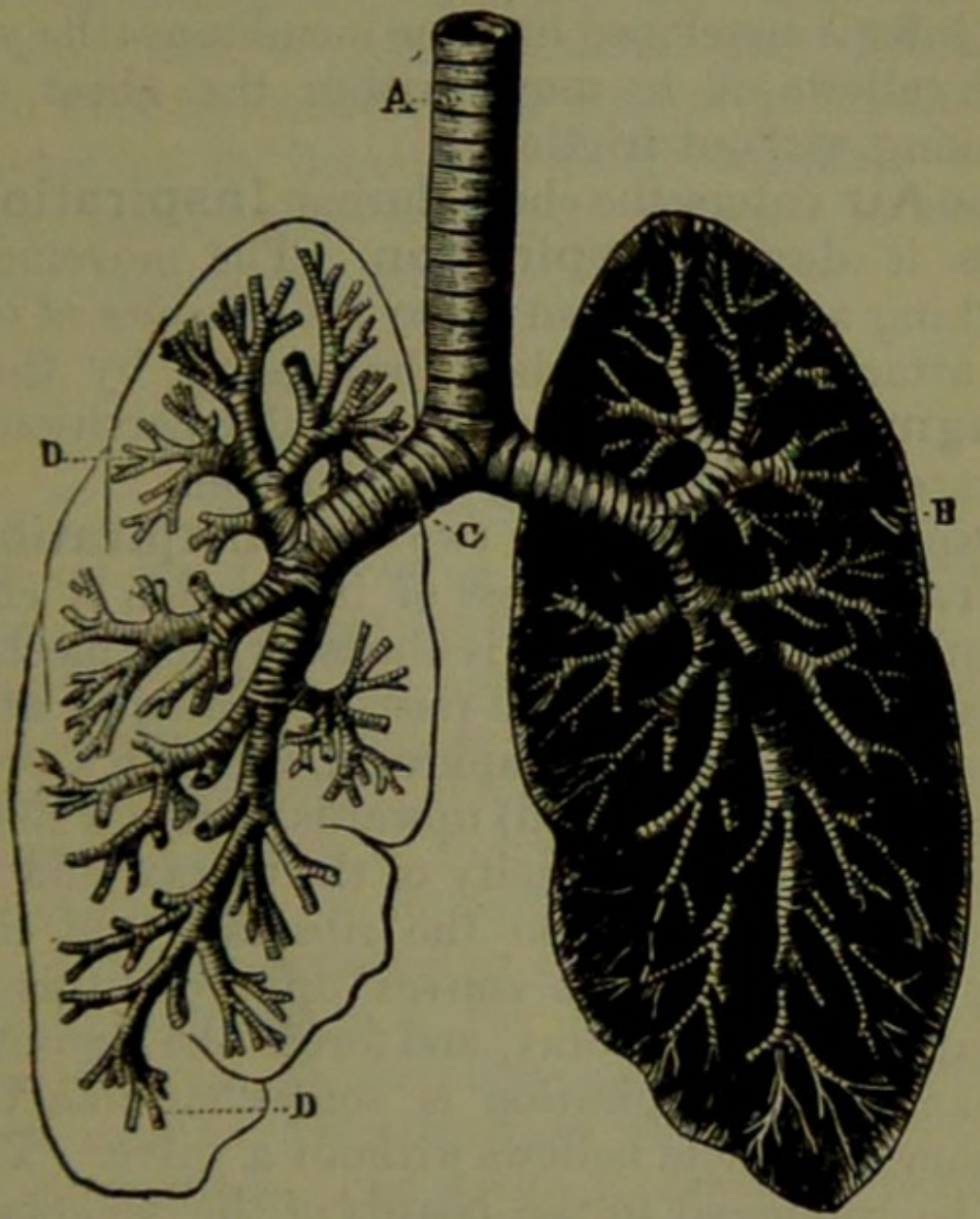

FIG. 53. THE LUNGS AND BRONCHIAL TUBES.

A. Trachea, or Wind-pipe. B. Left Bronchus. C. Right Bronchus. D. Smaller Bronchial Tubes.

back or sides, there is a portion of the lung beneath. Each lung is enveloped in a fine membrane (the *pleura*), which allows it to move within the chest during breathing without friction.

The **Air** enters the chest during **Inspiration**, and leaves it during **Expiration**. The movements of breathing are caused partly by the muscles of respiration attached to the chest, but chiefly by the **Diaphragm**, the large movable muscular partition which separates the thorax from the abdomen.

Respiration consists of two acts, **inspiration** and **expiration**. The process of inspiration is chiefly a muscular act; expiration is almost wholly mechanical. In inspiration the ribs are raised by muscles attached to them; and also the diaphragm, which in a quiescent state is convex (or curved) upwards, becomes flattened, thus increasing the capacity of the thorax, and the air flows in. In expiration the ribs fall, and the diaphragm again becomes convex upwards; this lessens the capacity of the thorax, and forces the air out. The mechanism of respiration is somewhat like that of ordinary household bellows without a valve. The ribs may be compared to the boards of the bellows, while the diaphragm corresponds to the leather, the air passages being equivalent to the nozzle. There is this difference between natural respiration and the bellows: the boards of the bellows can be brought close together, and all, or nearly all, the air forced out, while

the walls of the thorax, when as close as possible, still enclose a considerable quantity of air, which cannot be forced out; this is called residual air. Fifteen to eighteen breaths are taken per minute in health.

Obstruction to breathing, when complete causes asphyxia, examples of which are afforded in cases of drowning, suffocation, choking, etc.

Artificial Respiration.

Dr. Sylvester's Method.

Rule I.—*Adjust the patient's position.*—Place the patient on his back on a flat surface, inclined if possible from the feet upwards. Remove all tight clothing from about the neck and chest, and bare the front of the body as far as the pit of the stomach; unfasten the braces and the top button of trousers in men, and the corsets in women. Raise and support the shoulders on a small firm cushion or folded article of dress placed under the shoulder-blades.

Rule II.—*Maintain a free entrance of air into the windpipe.**—Cleanse the lips and nostrils; open and wipe the mouth; draw forward the patient's tongue as far as possible, and keep it forward either by getting some one to hold it with a handkerchief or piece of cloth, or by passing a narrow, slightly twisted strip of handkerchief, a string, or tape, over the tongue,

* See also drowning, pages 146 and 147.

as far back as the angles of the mouth will allow; bring the ends under the lower jaw and tie them securely. The ends may be again fastened on the top of the head to prevent slipping. An elastic band may be used instead of the strip of handkerchief, etc.

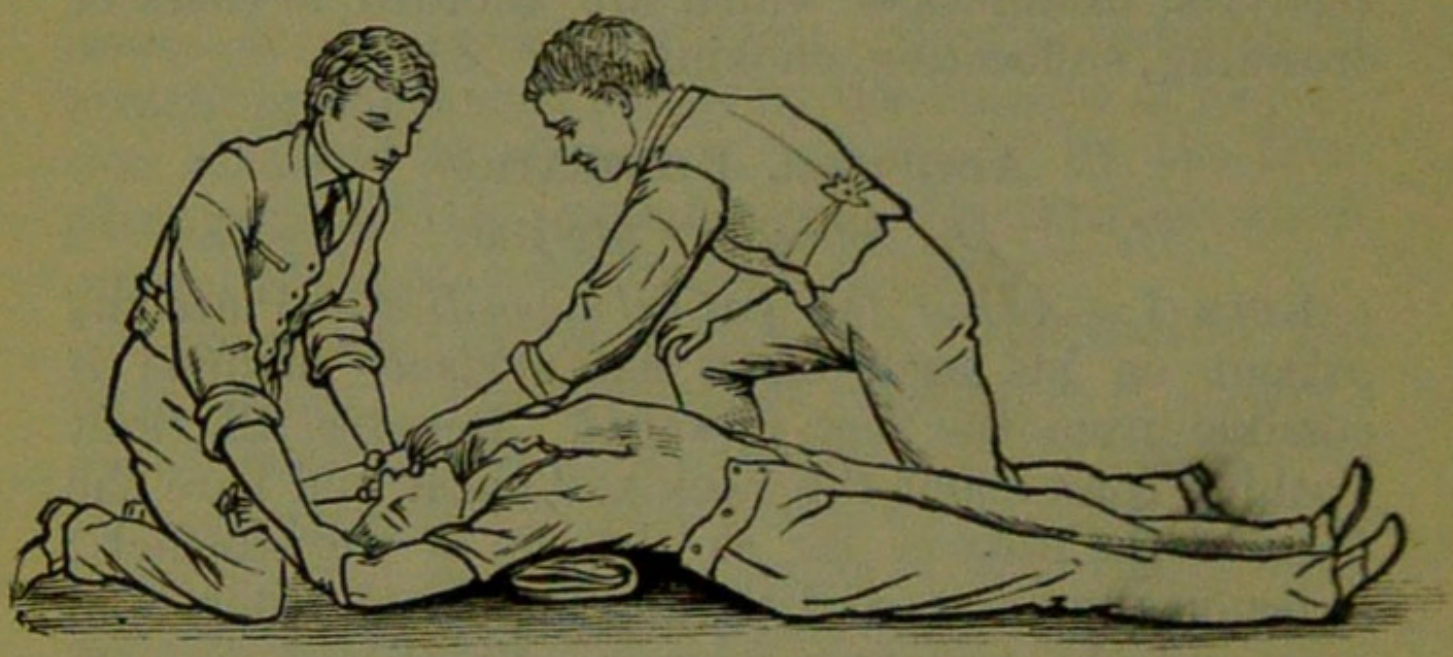

Fig. 54. Inspiration.

Rule III.—*Imitate the movements of breathing.*

First: *Induce inspiration.*—Kneel at a convenient distance behind the patient's head, grasp the patient's forearms just below the elbow; draw the arms upwards, outwards, and towards you, with a sweeping movement, making the elbows almost touch the ground on either side of the patient's head, or crossing the forearms over the top of the head. By

this means the cavity of the chest is enlarged, and air is drawn into the lungs.

Secondly: *Induce expiration.*—Bring the patient's flexed arms slowly forward, downwards and inwards, press the arms and elbows firmly against the body with the elbows some four or five inches from the breast bone (see Fig. 55). By this means air is expelled from the lungs.

Fig. 55. EXPIRATION.

Thirdly: Repeat these movements, alternately, deliberately, and perseveringly at the rate of about fifteen times a minute. Continue until spontaneous breathing is established, or until a doctor arrives. When spontaneous breathing commences, regulate the artificial respiration to correspond with the natural

effort. Hopes of restoring the patient may be entertained even after two hours' time.

Rule IV.—*Excite respiration.*—Whilst the above measures are being taken, other useful steps may be employed, such as applying smelling salts or snuff to the nostrils, and dashing hot and cold water alternately over the head and neck.

Rule V.—*Induce circulation* and warmth after natural breathing has been restored. Wrap the patient in dry blankets or other covering, and rub the limbs energetically towards the heart. Promote warmth by hot flannels, hot-water bottles, or hot bricks (wrapped in flannel) applied to the feet, to the limbs and body. When the power of swallowing has returned give sips of hot water, tea or coffee, or of wine, brandy and water, etc. The patient should be kept in bed and encouraged to go to sleep. Large poultices or fomentations applied to the front and back of the chest will serve to assist breathing.

Watch the patient carefully for some time, to see that the breathing does not fail; should any signs of failure appear, at once begin artificial respiration.

Howard's Method.—This method is especially applicable to cases when the patient's arm is broken. Deal with the clothing and tongue, etc., as described under the Sylvester method.

Turn the patient on the back. Place a roll of clothing beneath the body, so as to raise the region of

the stomach above the level of any other part of the body. Kneel beside or astride the patient's hips, and with the balls of the thumbs resting on either side of the pit of the stomach, let the fingers fall into the groove between the short (false) ribs, so as to afford the best grasp of the waist. Now, using the knees as a pivot, throw all your weight forward on your hands, and at the same time squeeze the waist between them as if you wished to force everything in the chest upward toward the mouth; deepen the pressure while you can count slowly 1, 2, 3; then *suddenly* let go with a final push, which springs you back to your first kneeling position. Remain erect on your knees while you can count 1, 2, 3. Then repeat the same motions as before, at a rate gradually increased from 4 or 5 to 15 times in a minute, and continue the movements with regularity. Induce circulation and warmth in the manner described under Rule V., Sylvester's method.

When a sufficient number of assistants are present, Howard's and Sylvester's methods may be combined, the pressure on the pit of the stomach (Howard's method) being made at the same time as the pressure on the ribs (Sylvester's method).

When from any cause, as fractured ribs, neither of the above methods can be carried out, *Laborde's method* of artificial respiration should be tried. It is especially useful in suffocated children. It is carried

out as follows :—The patient is placed on his back ; the mouth cleared ; the tongue is seized—using a handkerchief or something to prevent it slipping from the fingers—the lower jaw depressed ; the tongue is pulled forward and held for two seconds in that position, then allowed to recede into the mouth. These movements should be repeated about fifteen times a minute. After treatment is the same as in Sylvester's and Howard's methods.

To Restore the Apparently Drowned.

Persons completely immersed in water for even ten or fifteen minutes have been restored by artificial means. If, therefore, the body is recovered within a reasonable time, absence of signs of life is not to deter immediate attempts to restore animation.

Drowning persons attempt to breathe whilst submerged, and, in consequence, water is inhaled into their air passages and they become asphyxiated and insensible. The first thing to do when the body is recovered is to get rid of the water and froth obstructing the air passages, and then to artificially restore breathing. This is best accomplished by loosening the clothing and opening the mouth, and clearing both it and the back of the throat. The patient should then be turned face downwards, with a pad below the chest and with the forehead upon the right forearm. Whilst in this position apply pressure by the hands to the

patient's back over the lower ribs, and keep the pressure up for three seconds. Turn the patient on the right side, maintaining that position also for three seconds.

Repeat these movements alternately, as long as froth and water issue from the mouth. These operations in themselves tend to promote respiration, but it is usual, when the air passages are clear of froth and water, to adopt Sylvester's or one of the other methods of artificial respiration already described. While performing these operations send someone to the nearest house to procure blankets and dry clothing, hot-water bottles, etc., and to fetch a doctor.

Strangulation.

Owing to constriction of the windpipe by a cord, a rope, or tightened necktie, etc., round the neck, the breathing may be arrested and asphyxia caused.

Treatment.—Cut the constricting band and commence artificial respiration.

Choking.

When a foreign body, as a coin or piece of meat obstructs the air passage, suffocation may ensue.

Treatment.—Open the mouth, forcibly if need be; pass the forefinger right to the back of the throat and attempt to dislodge the obstructing body; if vomiting results from this step so much the better. If unsuccessful, thump the back hard between the shoulders whilst the head is bent forward. When the foreign

body is removed, but breathing is suspended, commence artificial respiration.

Hanging.

Grasp the lower limbs and raise the body to take the tension off the rope. Cut the rope, free the neck, and commence artificial respiration.

Suffocation by Smoke or Gases.

Remove the patient into the fresh air, loosen clothes, and flip the bare chest with a towel, wet with cold water, for 15 seconds. If this fails to restore breathing, apply artificial respiration. Before entering a building full of smoke, tie a handkerchief, wet, if possible, round the head, covering the nose and mouth. It is well to move slowly, keeping low, or even crawling, whilst in a room full of smoke in search of a suffocated person. Every opportunity of letting in fresh air by opening doors or windows should be seized.

Suffocation by Swallowing Very Hot Water.

This accident not infrequently occurs to children attempting to drink from the spout of a kettle.

Treatment.—Apply a sponge or flannel (or other) cloth, wrung out of very hot water, to the front of the neck, from the chin to the top of the breast-bone, and set the patient before the fire. Give ice to suck if it can be had, or if not, cold water. Olive or salad oil, a dessert-spoonful at a time, will soothe the scalded throat and tend to ease the pain.

Chapter VI.

POISONS AND POISONING.

When a person has taken poison, the sudden onset of symptoms, their appearance soon after having taken food or drink, or after having swallowed some substance inadvertently, may be the first intimation of the danger. When taken with suicidal intent the patient may or may not conceal the fact that poison has been swallowed. The nature of the poison may be known to the patient and declared; may be known to the patient and concealed; or may be ascertained by finding the bottle, box, plant, powder, etc., whence the poison was obtained; or the nature of the poison may be unknown.

Summary of Simple Directions for the Treatment of Poisoning.

Send for a doctor at once, stating what has occurred.

When the nature of the poison is not known and the patient is not insensible, give:—

1. **Milk.**—It is safe to give copious draughts of milk. Milk, when swallowed, clots or coagulates, and the poison may be thereby enclosed in the milk clot, and the whole got rid of by an emetic. Cream and flour beaten up together may be given as well as or instead of the milk.

2. **Eggs.**—Beat up a couple of raw eggs with milk or water. The raw egg sets or coagulates in the stomach, and as in the case of milk may include the poison in the clot.

3. **Oils.**—Give several spoonfuls of olive, salad, or linseed oil. Any vegetable or animal oil, such as that in which sardines are preserved or cod-liver oil, may be given. Mineral oils are not suitable. The oil soothes the surface already injured by the poison, and protects the uninjured parts of the stomach or gullet. Oil is not to be given when phosphorus is the cause of the poisoning.

4. **Tea.**—Strong tea (a handful thrown into the kettle and boiled) acts as a neutralizer of many poisons and is always safe.

5. **An Emetic.**—Give an emetic, *except when it is seen that the lips and mouth are stained or burned (by acids or alkalies)*. The emetic may be :—(*a*) a dessert-spoonful of mustard in a tumblerful of luke-warm water ; (*b*) a tablespoonful of salt in a tumblerful of luke-warm water ; (*c*) for a young child, a teaspoonful of ipecacuanha wine, repeated twice at intervals of 15 minutes, may be given instead ; (*d*) the finger or a feather passed to the back of the throat and moved about may serve to unload the stomach. The emetic may be given first, or after one or more of the above remedies have been administered.

6. **Treat for Shock** when it occurs.

When the nature of the poison is known :—

Treat the patient on the general lines laid down when the poison is not known. If an acid is known to have been swallowed, give an alkali at once ; and should an alkali have been the poison, give an acid.

In all cases, any vomited matter and food, or other substance suspected of being the poison, should be preserved.

BROAD FACTS WORTHY OF REMEMBRANCE.

When a person has swallowed a poison and threatens to go to sleep, keep him awake.

When he seems going off into a fit, dash cold water on his head, face, and neck.

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

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

POISONS ARRANGED ACCORDING TO THEIR ACTION.

Narcotics.

Opium, or one of the substances derived from it, such as Morphia, or some one of its preparations, such as Laudanum, or Paregoric, or some of the popular remedies, such as Chlorodyne, syrup of poppies, and various soothing syrups and cordials, all possess the poisonous narcotic properties associated with the name of opium.

Symptoms.—Tendency to go to sleep, which continues to increase until sleep becomes deep and breathing stertorous. Finally, it may be impossible to rouse the patient, and death is imminent. The pupils are contracted to the utmost extent (pin-point pupils); they do not respond to light. The face is pale, the skin clammy, and a smell like that of poppyheads may be detected in the breath.

Treatment.—Give an emetic and keep the patient awake. Never give an emetic when the patient is insensible. Keep the patient awake by walking him about, slapping his face and neck or chest with a wet towel, and by giving strong black coffee to drink. Slapping the soles of the feet with a slipper may be tried when other means of rousing fail. Employ artificial respiration if the breathing has ceased.

Inebriants.

Alcohol is the chief representative of this class; it is seldom active treatment is required except in cases of collapse from drink (see page 114).

Deliriants.

Strychnine, a poison used for killing dogs, cats, vermin, etc.; Prussic Acid, sometimes used for the same purpose; Belladonna, either as a drug, or as the berries, etc., of the deadly nightshade plant; Digitalis, either as a drug or as the leaves of the fox-glove plant; Henbane, Hemlock, and several varieties of plants, as fungi (often mistaken for mushrooms), laburnum seeds, monkshood, etc., are rank poison.

Symptoms.—Each of these poisons has its own symptoms. Convulsions and several nervous symptoms appear early in most, and are the most prominent evidence of this kind of poison having been taken.

Treatment.—Administer an emetic, if poison is known to have been taken, before convulsions or insensibility come on. When the patient is delirious, but capable of swallowing, give a tablespoonful of animal charcoal in a half teacupful of water. When delirium or convulsions set in, dash jugful after jugful of cold water over the patient; give strong tea or coffee, and, should insensibility and cessation of

respiration threaten, apply artificial respiration. Smelling salts held to the nostrils, slapping with a wet towel, brandy or sal volatile will help to stimulate and support the patient until the dangerous period is over.

Corrosives.

Acids and Alkalies are the chief examples of this class of poisons.

Acids.—The acids most commonly taken as poisons are, Oxalic (the salts of lemon, salts of sorrel); Carbolic; Sulphuric (oil of vitriol); Nitric (aqua fortis); Hydrochloric or Muriatic (spirit of salt).

Symptoms.—Burning pains in the mouth, throat, and stomach; acid taste; staining of the lips and mouth of a white, yellow, or dark-brown colour; retching and vomiting; shock; exhaustion and collapse, or suffocation. When the poison is carbolic acid the smell of the breath helps to disclose the fact.

Treatment.—First wash the mouth out freely with lime water or other alkaline mixture, such as chalk, whiting, magnesia, or wall plaster, in water, milk, or olive oil, and afterwards let the patient sip some of it. Demulcent drinks such as barley water, milk, etc., may be given subsequently, and eggs beaten up with water or milk. Treat shock.

Alkalies.—Caustic Potash, Caustic Soda, Quick Lime, and strong Ammonia are the principal examples

of alkaline corrosives. They cause symptoms resembling those set up by acids, and it is only by seeing the bottle label that unskilled persons can be sure of distinguishing between acid and alkaline poisons.

Treatment.—Wash the mouth out with an acid mixture, as lemon juice or vinegar, diluted with an equal quantity of water. Afterwards give milk, olive, salad, linseed, or cod liver oil, or eggs beaten up in water or milk. Treat shock.

Do not give an emetic when the lips and mouth are seen to be stained by a corrosive fluid, whether acid or alkaline, as vomiting is likely to further injure the corroded surfaces of the stomach, etc.

Irritants (Metallic Poisons).

Several of the metallic irritants are also corrosives. The chief substances contained in this group are :—Arsenic (Fowler's solution); Mercury (corrosive sublimate); Antimony, (butter of antimony, tartar emetic); Lead (sugar of lead); Copper (verdigris); Silver (lunar caustic); Phosphorus (rat poison, matches).

Symptoms.—A burning pain in the throat and at the pit of the stomach; a metallic taste in the mouth; retching and vomiting and great dread and alarm. The appearance of the vomit, such as the

green colour in poisoning by copper, and the fact that phosphorus glows in the dark, may assist in determining the poison taken.

Treatment.—Assist the vomiting by giving an emetic. After or before it has acted give a couple of eggs beaten up in water or milk, or if they are not at hand give plain milk, strong tea, and except in the case of phosphorus, olive or salad oil.

Especially after poisoning by metallic irritants is it necessary to counteract by prompt treatment the depressing influences of shock.

General Note.

Many poisons have a double action, and technically might be grouped under more than one of the headings given. The rule in dealing with a poison of this complex nature is to note the train of symptoms, and to treat the patient, as the symptoms arise, according to the general directions given on pages 149 to 151.

Chapter VII.

INJURIES OF SPECIAL ORGANS.

The Eye.

The eyelids move upon the eyeball, moistening and cleansing the surface; and when closed the eyelids prevent foreign bodies injuring the eyeball. A mucous membrane covers the inside of the eyelids and the surface of the globe of the eye, and it is on this membrane that foreign bodies collect.

Foreign Body in the Eye.

Treatment.—Prevent the patient rubbing the eye, tying a child's hands down if necessary. Pull down the lower eyelid, when, if the foreign body is seen, it can be readily removed with a camel's hair brush, or the corner of a handkerchief twirled up and wetted.

When the foreign body is beneath the upper eyelid:—(1) Grasp the upper eyelid between the finger and thumb and lift it forward from off the eyeball; then push up the lower eyelid beneath the upper, and let go. The hair of the lower lid brushes the inner surface of the upper lid and may dislodge the body. Should a single manipulation not be successful, repeat it two or three times if necessary. If the foreign body is not dislodged, call the services of a doctor as

soon as possible. (2) *When, however, skilled help cannot be had*, as on board ship, or elsewhere, proceed as follows to examine the inside of the upper eyelid :— Seat the patient so as to face the light ; stand behind the patient, steadying the head against the chest ; place a tooth-pick, wooden match, knitting needle, or any narrow, firm rod, on the upper lid of the injured eye half an inch above the edge, pressing it backwards as far as possible. Now seize the upper-lid eyelashes between the finger and thumb, and pull them upwards over the rod. The eyelid will be everted, and the foreign body, if it is there, can be readily seen and removed. (3) When a piece of steel is embedded in the eyeball, drop a little olive or castor oil on the eyeball after pulling down the lower eyelid, close the lids, apply a soft pad of cotton wool on the lid, and secure by a bandage tied sufficiently firmly to keep the eyeball steady, and take the patient to a doctor.

Foreign Body in the Ear Passage.

When a doctor can be had, even within twenty-four hours, never attempt to treat a patient with a foreign body in the ear. A pea in the ear is a serious accident, and any attempts at removal may lead to fatal consequences. If the patient, a child especially, cannot be induced to keep the fingers from the ear tie the hands down, or cover up the ears by tying a handkerchief round the head and over the ears. If

an insect is in the ear-passage, fill the ear with olive oil, when the insect will float, and may be removed. Never syringe or probe the ear.

Foreign Body in the Nose.

Induce the patient to blow the nose violently ; give a pinch of snuff or pepper to the unaffected nostril so as to induce sneezing. Sniffing up water or syringing out the nostril with water may effect dislodgement. There is no immediate danger from a foreign body, say a shirt button, in the nose.

The Chest (Thorax).

The thorax is bounded in front by the breast-bone (sternum), and the rib cartilages ; behind by the vertebral column (the 12 dorsal vertebræ), and on either side by the ribs. Above, the thorax is bounded by the structures at the root of the neck, and below, by the diaphragm (midriff), the movable muscular partition which separates the chest and abdomen.

The Organs of the Chest (Thorax).

The heart and lungs occupy the chest. The position and structure of the **Heart** is described with the organs of the circulation (see page 70).

Wounds of the heart are usually instantaneously fatal.

The **Lungs** occupy the chest—front, back, and

sides. They are described under the Respiratory system (see page 138).

Wounds of the Lung.

When a rib is broken, and the ends driven inwards, the pleura and lung are apt to be torn. These organs may also be injured by stab with a knife, stiletto, or bayonet penetrating between the ribs. A rifle bullet may traverse the chest, wounding the lung in its passage.

Signs and Symptoms.—Difficulty of breathing, symptoms of collapse, faintness, spitting of blood (red and frothy), usually indicate injury to the lung. Air may escape beneath the skin or into the cavity of the chest. Internal hæmorrhage may result, the blood accumulating in the cavity of the chest, causing pallor, slowness of breath, blurred vision, feeble pulse, sighing, yawning, delirium, and faintness, going on to unconsciousness.

Treatment.—Lay the patient down with the head low, give ice to suck, apply ice over the injured part, keep the room cool by free ventilation, turn the patient towards the injured side. Do not tie a bandage round the chest when the lung is injured by a broken rib, as there is danger of the rough ends of the fracture causing further damage to the lung. Should the injury be accompanied by a surface wound, apply clean dressings, &c.

The Abdomen.

The abdomen is bounded above by the diaphragm (midriff), below by the bones of the pelvis, behind by the vertebral column (the lumbar vertebræ), and in front and at the sides by the muscular walls of the abdomen.

Wounds of the front wall of the abdomen may be either vertical or transverse. When the cavity of the abdomen is opened, the intestines or other organs may protrude through the wound.

Treatment.—(1) When the wound of the front wall of the abdomen is vertical, lay the patient down flat with the lower extremities straight; cover the wound over by a pad of dry lint, or linen, and place a bandage round the body fairly tight. (2) When the wound is transverse, bend the knees so as to relax the tissues of the wall of the abdomen, and raise the shoulders to allow of the edges of the wound coming together; apply a pad and bandage. (3) When the intestines or other organs protrude through the wound in the abdominal wall, bend the knees, raise the shoulders, and apply lint, a towel, or a clean sponge wrapped up in soft linen, wrung out of warm water, and keep the part warm until the doctor arrives.

Every wound that injures the stomach, liver, spleen, intestines, or pancreas, must traverse the abdomen. Blood or the contents of the stomach or intestines

will therefore escape into the abdominal cavity, causing symptoms of internal hæmorrhage.

The Organs of the Abdomen.

The Stomach lies immediately beneath the "pit of the stomach" just below the breast-bone.

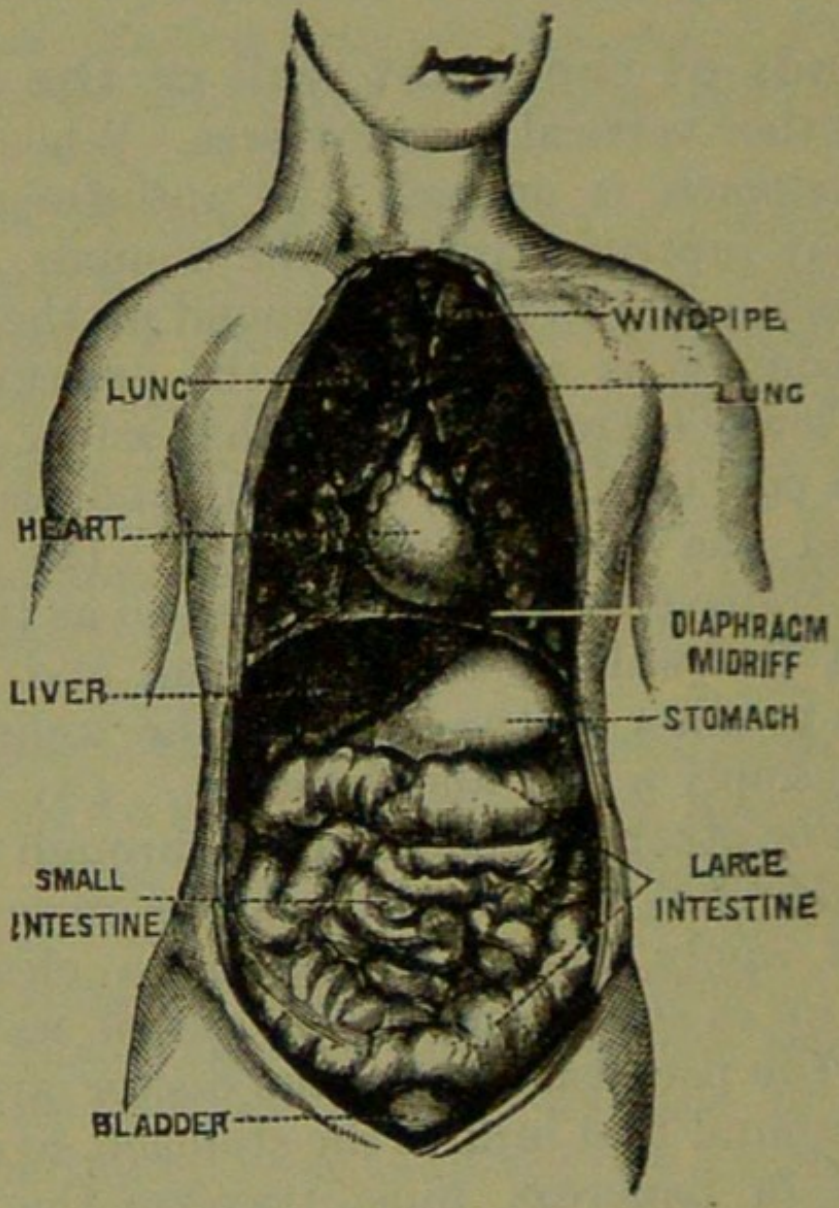

Fig. 56.

Injuries of the stomach are attended by extreme collapse, and sometimes by retching, and vomiting, of dark blood like coffee grounds.

Treatment.—Lay the patient down on his back, apply an ice-bag over the pit of the stomach. Nothing should be given by the mouth.

The Liver lies in the upper part of the abdomen, where it is mostly covered by the right lower ribs.

Injuries of the liver may be caused by a blow over the organ, by fractured ribs penetrating it, or by the stab of a sharp weapon, or by a bullet. The great danger of a wound of the liver is hæmorrhage, the blood escaping into the cavity of the abdomen. The injury is attended by pain and swelling in the region of the liver, and by the signs and symptoms of internal hæmorrhage.

Treatment.—Lay the patient down, give ice to suck, apply ice over the region of the liver, turn the patient towards the right side.

The Spleen lies beneath the ribs at the upper part of the left side of the abdomen.

The causes of injury and the dangers are similar to those of the liver, and the treatment is similar, only that the patient should be turned towards the left side. Injuries of the spleen are usually speedily fatal.

Injuries of the Intestines cause symptoms of collapse, and internal hæmorrhage may occur, or the contents may escape into the cavity of the abdomen.

Treatment.—Keep the patient lying down and as quiet as possible. Apply a large pad of flannel or cotton wool to the abdomen, kept in place by a towel applied fairly tightly round the abdomen and pinned in three or four places. Give nothing by the mouth.

The Kidneys lie at the back in the region of the loin. They may be injured when the lowest ribs (the 11th and 12th) are fractured by a crush, blow, or by a bullet or some sharp weapon. Blood would escape with the urine, and there would be pain and perhaps swelling over the injured kidney.

The Bladder lies in the pelvis, and may be wounded by a fracture of some of the pelvic bones. The signs and symptoms would be either inability to pass water, or if a little is passed it is tinged with blood.

Treatment.—When either the kidney or bladder is wounded, keep the patient quiet until the doctor arrives, and meantime apply hot fomentations over the painful or injured part.

Rupture (*hernia*) consists of a protrusion of an internal organ, usually the bowel, through the wall of the abdomen. It most frequently occurs at the groin. Should a sudden swelling, accompanied by pain and sickness, take place, send for a doctor instantly, and meanwhile put the patient in an easy position, and place ice or cold water applications on the affected part.

Chapter VIII.

BANDAGING.

Esmarch's Triangular Bandage has been described in Chapter I. It may be applied to any part of the body.

For the scalp (Fig 57).—Fold a hem about 1½ inches deep along the lower border, place the

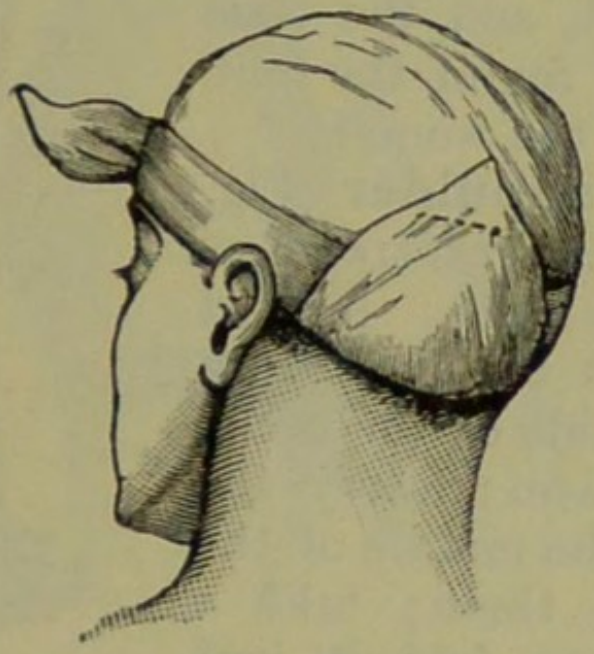

Fig. 57.

bandage on the head so that the hem lies on the forehead and the point hangs down at the back; then carry the two ends round the head above the ears cross them at the back, and bring them forward and tie on the forehead; then draw the point downwards, and turn it up and pin it on to the top of the head.

In applying this bandage, care must be taken to put the hem close down to the eyebrows, to carry the ends *above*, *not over*, the ears, and to tie them close down to the eyebrows, and not high up on the forehead.

For the forehead, side of head, eye, cheek, and for any part of the body which is round (as the arm or thigh, &c.), the narrow bandage must be used, its centre being placed on the wound, and the ends being carried round the limb and tied over the wound.

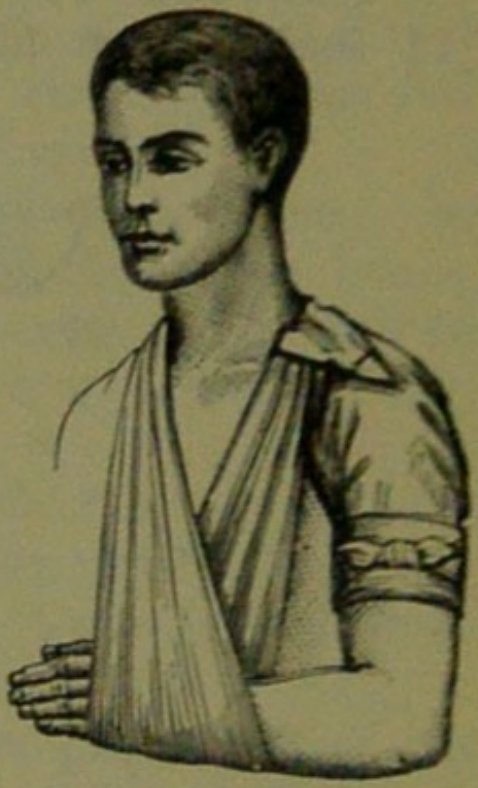

Fig. 58.

For the shoulder (Fig. 58).—Place the centre of a bandage on the injured shoulder, with the point running up the side of the neck; turn up a hem; carry the ends round the middle of the arm and tie them; take a second bandage, fold it into a broad bandage, place one end over the point of the first bandage, sling the arm by carrying the other end of the bandage over the sound shoulder, and tying at the side of the neck; bring the point of the first bandage under that part of the sling resting on the injured shoulder, draw it tight, turn it down, and pin it.

For the hip (Fig. 59).—Tie a narrow bandage round the body above the haunch-bones, tying the knot on the same side as the injury; take another bandage, turn up a hem according to the size of the

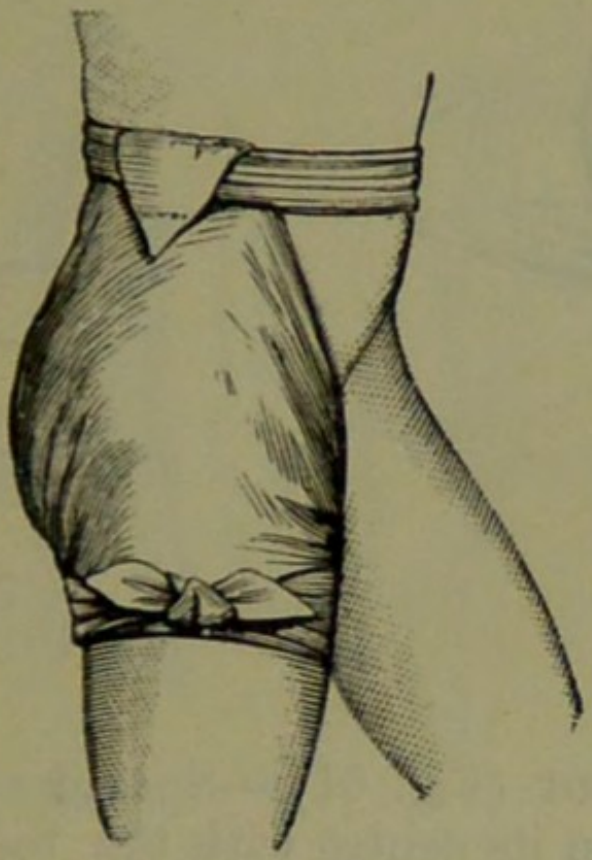

FIG. 59.

patient, place its centre on the wound, carry the ends round the thigh, and tie them; then carry the point up under the waistband, turn it down over the knot, and pin it.

For the hand (Fig. 60).—Spread out a bandage, place the wrist on the border with the fingers towards

the point; then bring the point over the wrist, pass the two ends over the wrist, cross, and tie them.

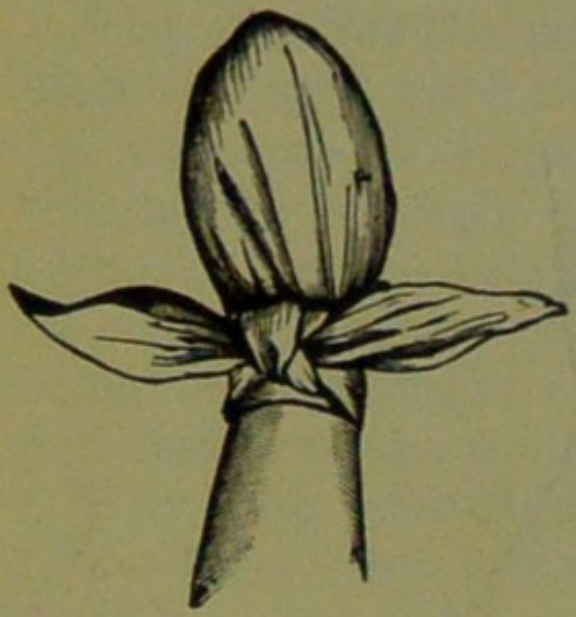

Fig. 60.

Fig. 61.

For the foot (Fig. 61).—Spread out a bandage, place the foot on its centre with the toe towards the point, draw up the point over the instep, bring the two ends forward, cross, and tie them either on the sole (if to keep a splint on) or round the ankle.

For the chest (Figs. 62 and 63).—Place the middle of the bandage on the injured side, with the point over the shoulder; carry the two ends round the waist and tie them; then draw the point over the shoulder and tie to one of the ends.

For the back.—The bandage is applied as above, but beginning by placing the bandage on the back.

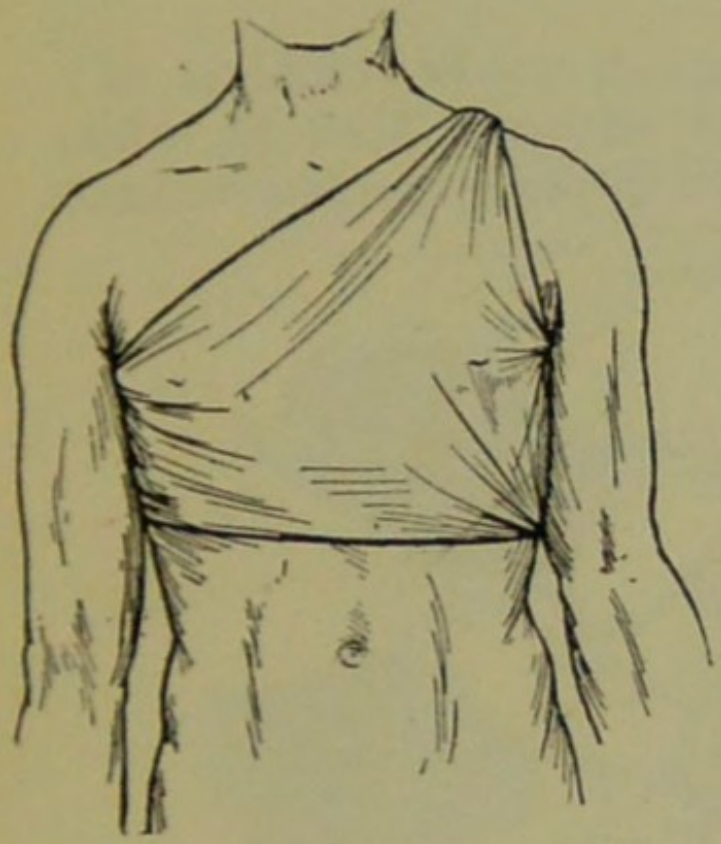

FIG. 62.

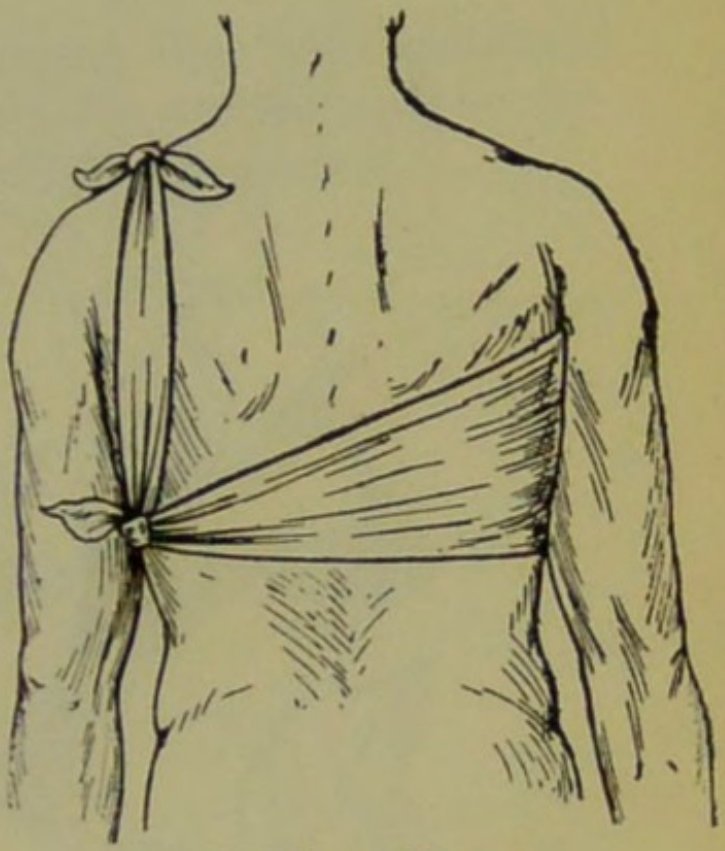

FIG. 63.

For the knee.—Spread out a bandage, fold a narrow hem on the lower border; lay the point on the thigh and the middle of the lower border just below the knee-cap, cross the ends first behind the knee, then over the thigh, again under the knee, and tie in front below the knee-cap. Bring the point (A) down to (B) (see Fig. 64), and fasten with a safety pin. If the

bandage is not large enough to be brought the second time below the knee, tie it on the thigh.

FIG 64.

For the elbow.—This is similar to that for the knee, the point and middle of the lower border being placed on the back of the arm and forearm respectively.

Chapter IX.

CARRYING PATIENTS.

In accidents where the patient has been rendered unable to walk alone, he may be carried by the by-standers making either of the following seats :—

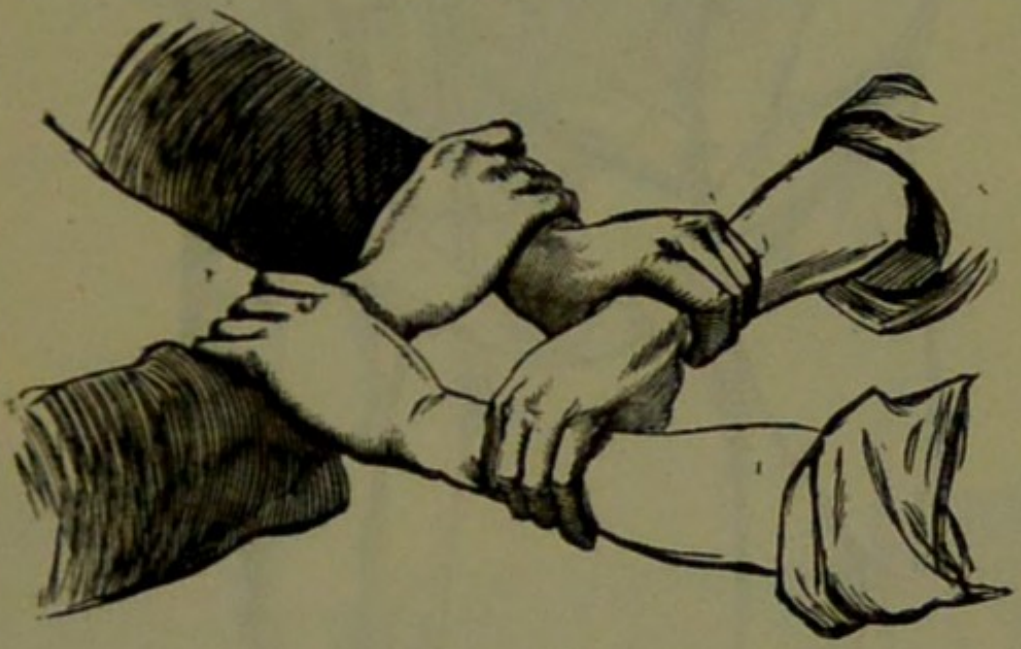

Fig. 65.

(1) **The four-handed seat** is made by two persons grasping their left wrists with their right hands, then grasping each other's right wrist with their left hands (as Fig. 65).

After the hands are clasped together, the bearers stoop down behind the patient, who sits on the

FIG. 66

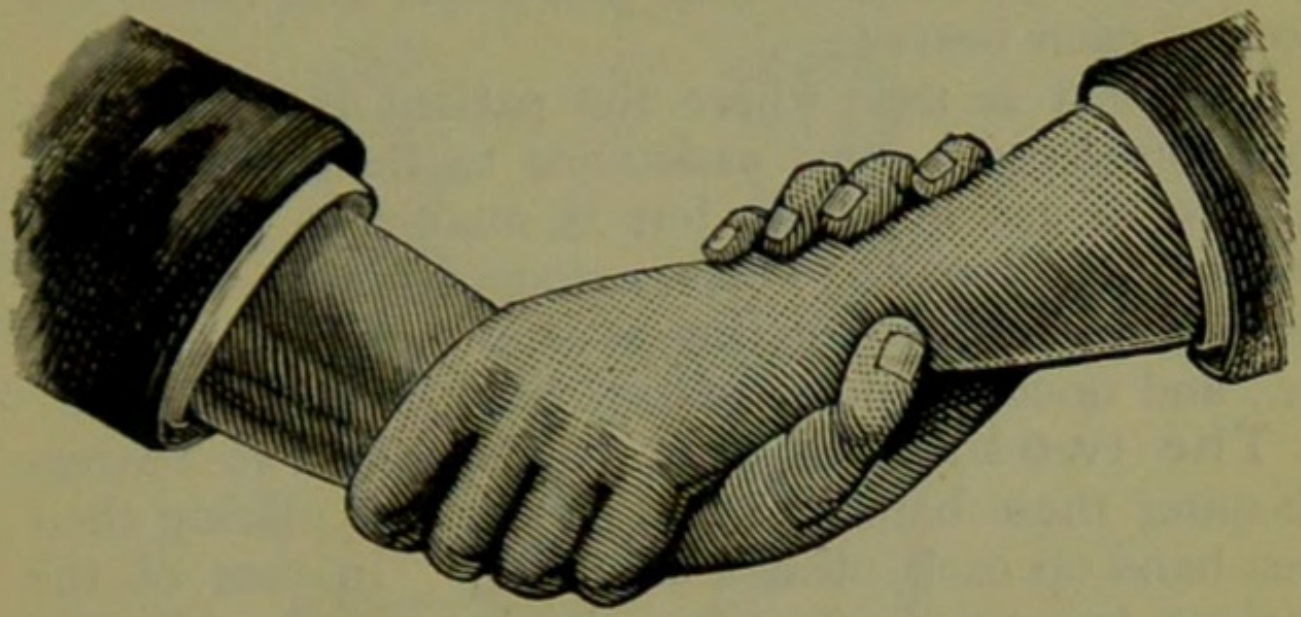

FIG. 67.

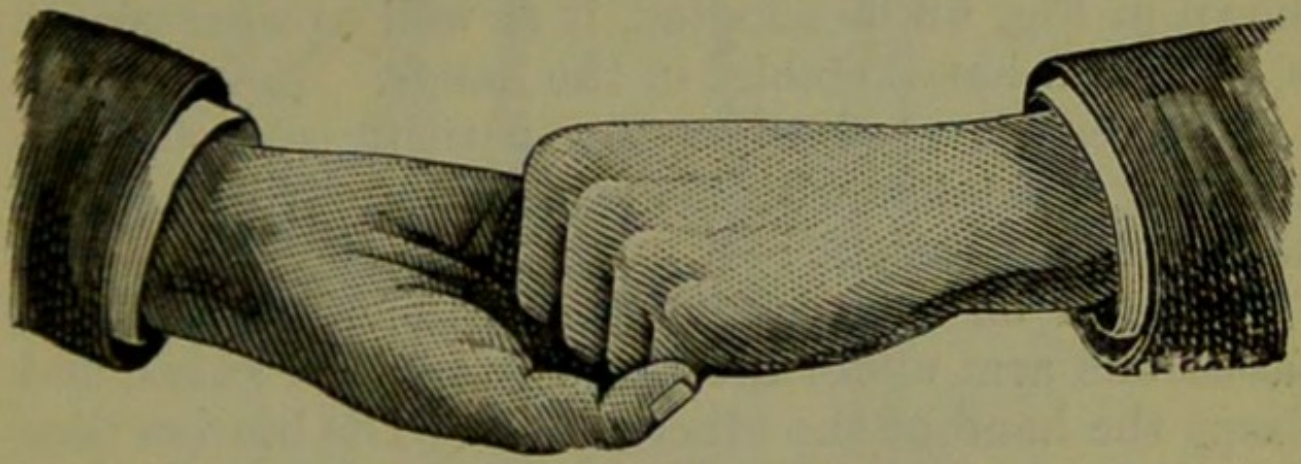

FIG. 68

hands, and at the same time places one arm round the neck of each bearer.

This seat is used where the patient is sufficiently conscious to give some assistance to the bearers and is able to use his arms, but is unable to walk. To lower the patient the bearers stoop down or kneel on one knee, gently place the patient on a chair or bed, &c., and unclasp and withdraw their hands.

The two-handed seat is made by two bearers clasping their hands as in Fig. 66, and placing their free hand on each other's shoulder. In case of the patient being a short person the bearers should place their hand on each other's hip (as shown in the figure), instead of on the shoulder.

Instead of the grip shown in Fig. 66, either of those shown in Figs. 67 and 68 may be used. If that shown in Fig. 68 be adopted, it is well to wear gloves or to hold a handkerchief in the hands.

This seat is used when the patient is unable to give any assistance with his arms, and may be used to lift a helpless patient :—

A bearer on each side of the patient stoops down, passes one arm under his thighs, near the knees, and clasps the hand of the other bearer. The bearers then pass their arms round the back of the patient and grasp each other's shoulder (or hip). To lower the patient the bearers should stoop down or kneel on one knee. When the lower part of the patient's body is resting upon the

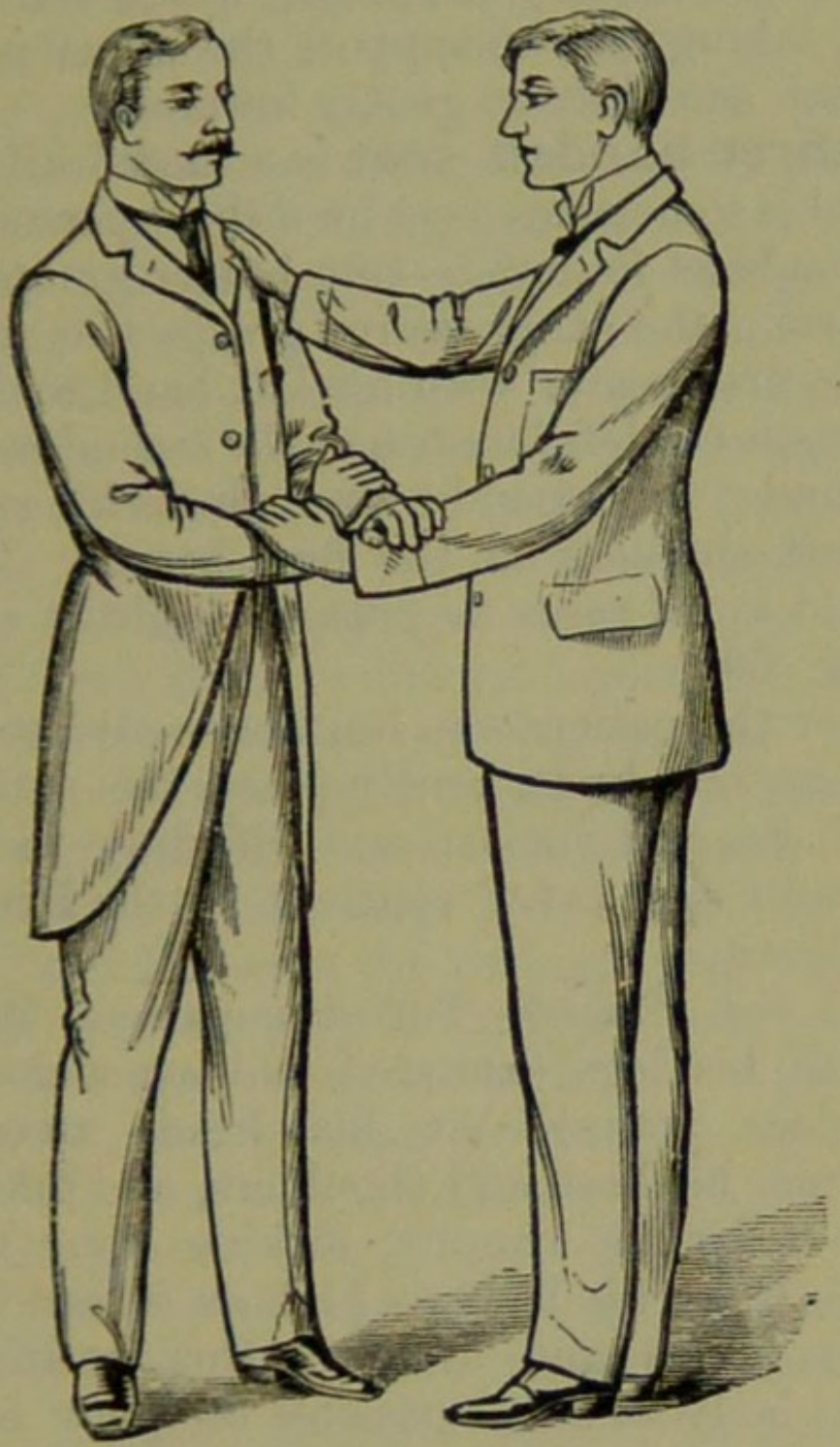

FIG. 69.

bed, or place where it is desired to place him, the bearers should unclasp the hands which are under his buttocks, taking care to support the upper part of the body, which can then be gently lowered.

The three-handed seat is a modification of the above, and is sometimes used for a short person or child.

It is made as follows:—One bearer grasps his own left forearm; the other bearer grasps the right forearm of the first bearer with his left hand, and the first bearer grasps the left forearm of the second bearer with his left hand; the second bearer places his right hand on the left shoulder of the first bearer. The forearm should in all cases be grasped slightly above the wrist (Fig. 69).

To lower the patient the bearers should stoop down or kneel on one knee, gently place the patient on a chair, bed, &c., and unclasp and withdraw their hands.

One bearer may carry a patient by the **Fireman's lift** as follows:—

To Lift the Patient—Turn the patient face downwards with his legs extended and arms close to his sides; place yourself at his head, stoop down, slightly raise his head and shoulders, and take hold of him close under his armpits, locking your hands on his back. Raise his body as high as it can be lifted with your hands and arms in this position; then resting his body as far as possible on your left knee, shift your arms and take him round his waist, lock

your hands and lift him to an almost upright position with his head resting on your left shoulder, your left thigh supporting as much of his weight as possible. Holding the patient in this position with your left arm, grasp his left wrist with your right hand, throw his left arm over your head, and at the same time drop yourself into a stooping position; let go of the patient with your left arm, which then place between his thighs. The patient's body will now fall across your shoulders, and you should now rise to an upright position, and balance it carefully. Transfer the patient's left wrist to your left hand, and so leave your right hand free for steadying yourself when carrying the patient downstairs, or down a ladder (See Fig. 70).

To Lower the Patient.—Transfer the patient's left wrist to your right hand, take your left arm from between his thighs and place it round them, bringing them to the right-hand side of your body. Sink down upon your right knee, let the patient's legs rest on the ground while you support his body on your left thigh, place your left arm round his right shoulder, let go of his left wrist, and putting your right arm underneath his left arm and round his back, place him gently on the ground (Fig. 71).

N.B.—Those bearers who prefer to carry the weight of the patient on the right shoulder should read "left" for "right" and *vice versâ* throughout the above instructions.

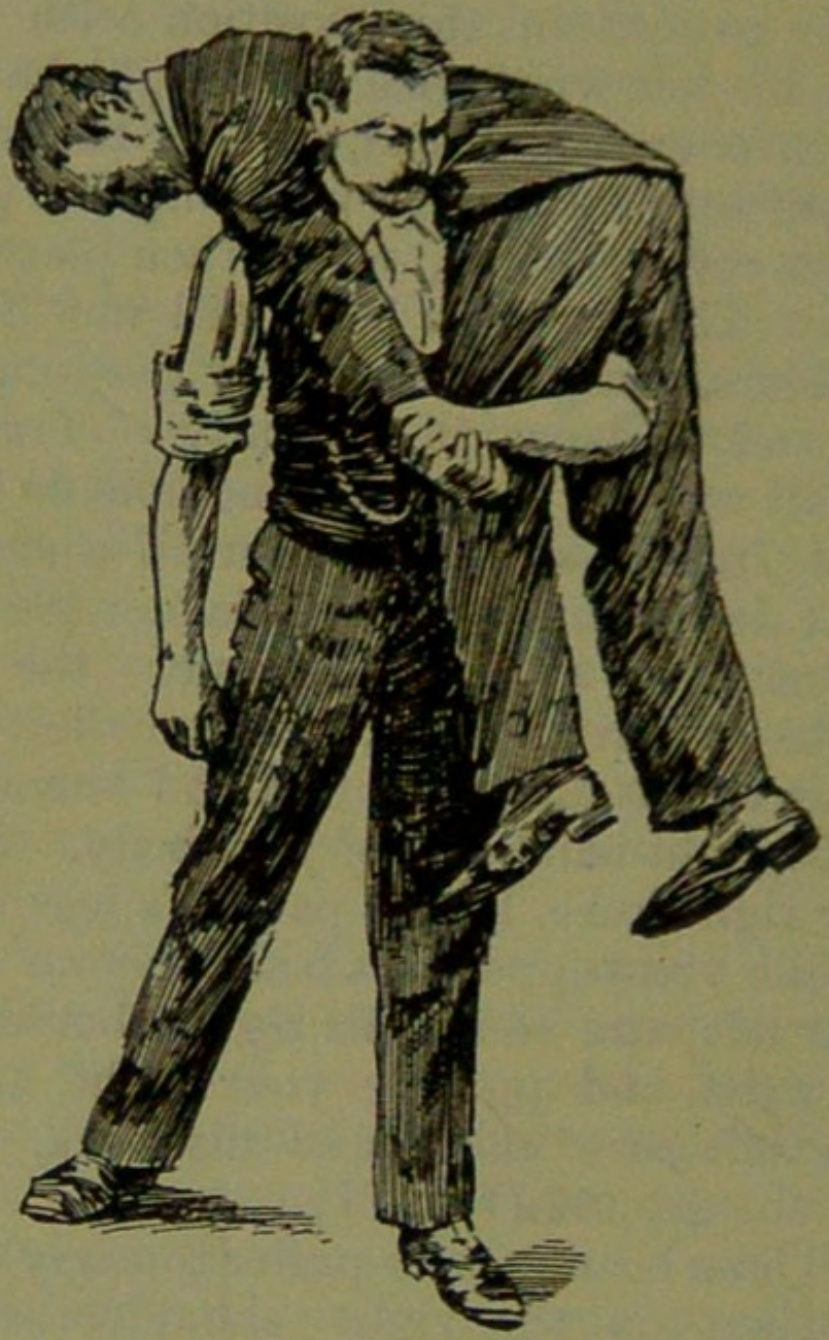

FIG. 70.

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.

FIG. 71.

Where a proper stretcher cannot be obtained, a temporary one may be made in either of the following ways :—

(1) The sleeves of a coat may be turned inside ; two stout poles are then passed through them, and the coat buttoned. This makes a good seat. (Fig. 72.) The patient sits on it, and rests against the back of the first bearer.

If a longer stretcher is required, two coats must be treated in the same way. (Fig. 73.)

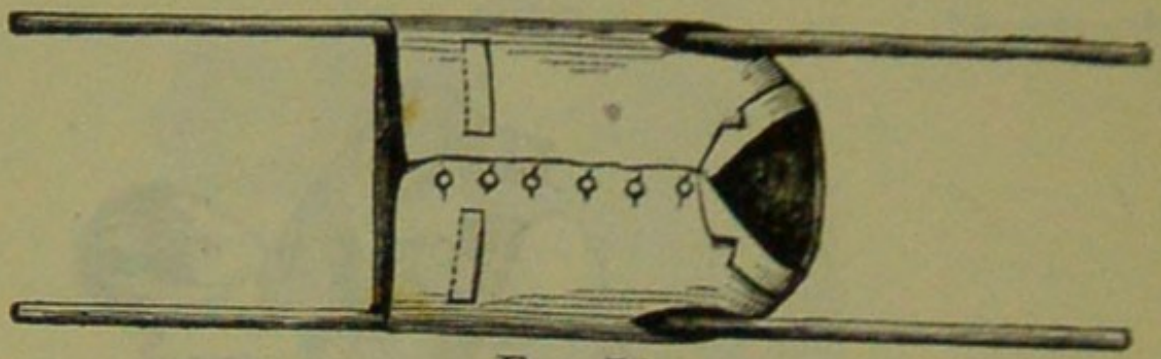

FIG. 72.

FIG. 73.

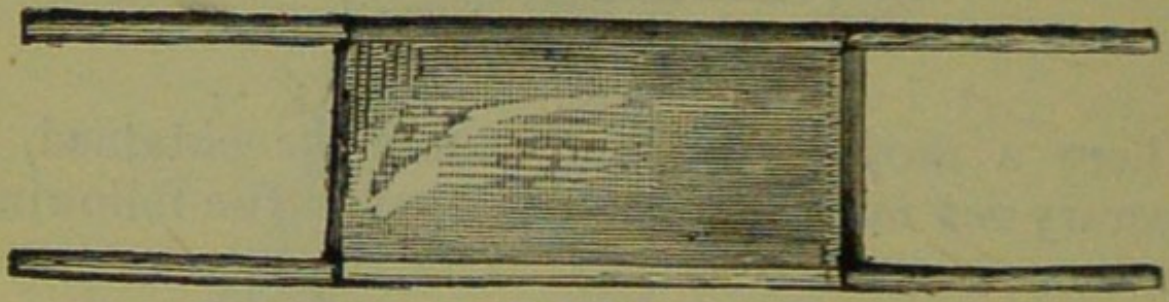

FIG. 74.

(2.) A sack may be taken ; a hole is made in each corner of the bottom, and two poles passed through the sack and out of the holes. (Fig. 74.)

(3.) A large piece of carpet, sacking, tarpaulin, or a blanket may be spread out, and two stout poles rolled up in the sides.

Two bearers then stand on each side. They grasp the middle of the pole with one hand, and near the end with the other. To carry the patient they must walk sideways.

(4.) A hurdle, broad piece of wood, or shutter may be employed as a stretcher; but if either of them is used, some straw, hay, or clothing should be placed on it, and then a piece of stout cloth or sacking; the sacking is useful in taking the patient off the stretcher when he arrives at the bed-side.

Always test a temporary stretcher before placing the patient on it.

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

Never allow stretchers to be carried on the bearers' shoulders.

Always carry patient feet foremost, except when going up a hill. In cases of fractured thigh or fractured leg, if the patient has to be carried down-hill carry the stretcher head first.

In carrying a patient on a stretcher care should be taken to avoid lifting the stretcher over ditches or walls, but where these cannot be avoided the stretcher must be carried in the following ways:—

To Cross a Ditch.

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

To Cross a Wall.

The stretcher is lowered with the foot about one pace from the wall. Nos. 2 and 3 bearers then take hold of the foot of the stretcher and No. 1 of the head; the stretcher is raised till the foot is placed on the wall. No. 2 then jumps over the wall and takes hold of the foot of the stretcher while Nos. 1 and 3 support the

---

* These numbers are explained later in the detailed Stretcher Exercises.

head; the stretcher is then carried forward till the head rests on the wall, No. 2 supporting the foot. Nos. 1 and 3 then jump 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. 2 and 3 take hold of the foot of the stretcher, No. 1 the head. The stretcher is then raised and carried forward till the front wheels rest on the floor of the wagon. No. 2 then jumps into the wagon, while No. 3 goes to the head of the stretcher and helps No. 1. The stretcher is then pushed slowly into the wagon. If the tail-board cannot be shut, the stretcher must be lashed firmly to the sides of the wagon.

To Unload a Wagon.

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

then gently drawn away one pace from the wagon ; and lowered. The bearers then fall in in their usual places.

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

Chapter X.

STRETCHER TRANSPORT.

BY SIR JOHN FURLEY.

Formerly the instruction given to the classes of the St. John Ambulance Association, on the removal of sick and injured persons by stretchers or improvised methods of transport, has been founded on rules laid down in Professor Longmore's "Treatise on the Transport of Sick and Wounded."

But it has been amply proved that rules necessary for drilled and disciplined bodies of men, such as the Royal Army Medical Corps, are not applicable to those who undergo a brief training to enable them to give first aid in the accidents of civil life. In the majority of cases in which a certificated pupil is called upon to act, he has to look for assistance from men who have had no such instruction as he possesses, whereas every member of a military bearer company is drilled to work with others, and when three or four of such men have been numbered off, each knows what is expected of him.

The regular drill required for a bearer company in the army is therefore not the best for a class of pupils of this Association, except in the case of a corps which may be called on to act with a military body.

On a parade ground or in a military hospital there

is generally plenty of space, and one system of lifting and carrying invalids can be adopted, but the accidents which happen in civil life make it necessary that much should be left to the intelligence and experience of those who have to render first aid. For instance, when a patient has to be placed on a stretcher in a cottage, in a factory crowded with machinery, or in the tortuous passages of a mine, it would be quite impossible to follow the directions given in the "Manual of Exercise for Stretcher Bearers and Bearer Companies," but the stretcher must be put at the side of the patient or in any other position possible, and the bearers must act accordingly, under the direction of one of their party.

On this subject Professor Longmore has said: "The military rules were framed for service in the open air, where there is, of course, plenty of space, but all such rules must be modified according to circumstances.

"It is well, I think, to teach the system which is thought to be best, and at the same time to prepare persons for doing that which is next best, when what may be best under other conditions ceases to be applicable."

For purposes of drill, numbering the bearers will be found useful; whenever three or four men thus instructed find themselves in a position to work together, they will act with less hesitation, less

liability to accident, and with more speed ; but it must be repeated that in nearly all ordinary accidents, an efficient bearer will have to select his assistants without previous notice, and give them his directions as briefly and clearly as he can. The most important point is to understand the *principles* which have dictated the rules laid down in the Exercises. It is not pretended that these Stretcher Exercises will be found equal to every circumstance that may arise. For instance, the placing of a stretcher in a road-cart or railway carriage must depend on the shape of the vehicle, and perhaps on the width of a door. It would occupy too much space, and then, perhaps, the directions would be found inadequate, were attempts made to suggest plans for all cases. It has been found by experience that those who take the trouble to attend the lectures and qualify themselves for the certificate are fully able to meet exceptional difficulties as they arise. Instructors and pupils may, however, be reminded that, whenever necessary, the stretcher issued by the Association may be lessened in width without inconvenience to a patient upon it.

The "Furley" Stretchers (Model 1899) are of three patterns, viz., "Ordinary," "Telescopic-handled," and "Police." In general principle they are alike, the component parts being designated the poles, handles, jointed traverse bars, foot-wheels, bed, pillow sack, and slings.

The Ordinary Stretcher (Fig. 75), is 7 feet 9 inches in length, and 1 foot 10 inches wide. The bed is 6 feet in length, and the handles 10½ inches. The foot-wheels raise the stretcher 4½ inches from the ground. At the head of the stretcher is a canvas overlay (the pillow sack) which can be filled with straw, hay, clothing, etc., to form a pillow. The jointed traverse

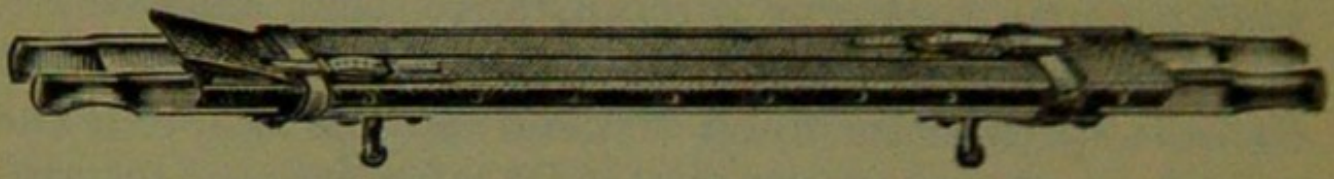

FIG. 75.—ORDINARY STRETCHER STAND.

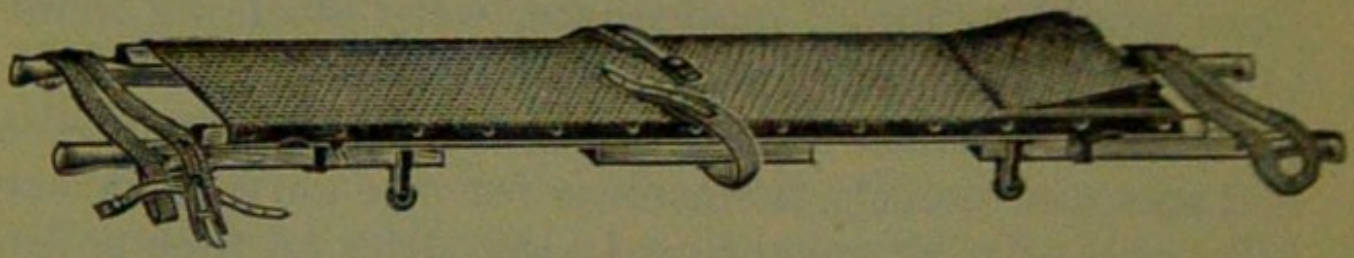

FIG. 76.—TELESCOPIC-HANDLED STRETCHER—OPEN.

bars are provided with joints, so arranged as to guard against the possibility of the bearers catching their fingers in them when opening or closing the stretcher. The poles are rounded on the top, and have an inside bevel to add to the comfort of the patient and prevent cutting the canvas. The Telescopic-handled pattern (Fig. 76) is very similar, but is so arranged that the handles can be slid underneath the poles, thus reducing

the length to 6 feet, the length of the bed being 5 feet 8 inches. This arrangement is of great value when working in confined spaces, or when a patient has to be taken up or down a narrow staircase with sharp turns. The Police stretcher is similar to the Ordinary pattern, but is more strongly made, and has, in addition, straps for securing a refractory patient.

When closed, the poles of the stretcher lie close together, the traverse bars being bent inwards, the canvas bed neatly folded on the top of the poles and held in position by the slings which are laid along the canvas, and secured by a strap placed transversely at the end of each sling being passed through the large loop of the other, round the poles and bed, and then buckled.

In closing a stretcher care should be taken to raise the centre of the canvas when pushing in the traverse bar, as it is otherwise liable to get caught in the joint of the traverse bar.

To prepare, or open, a stretcher, unbuckle the transverse straps of each sling; remove the slings from the stretcher; separate the poles; take hold of each traverse bar and draw it forward. The slings will then be folded to half their length, one being laid neatly over the handles at each end of the stretcher.

As a general rule, the stretcher will be prepared by No. 1 bearer in Exercises I. and III.; by Nos. 1 and 2 in Exercise II.; and by No. 2 in Exercise IV. These

bearers will, however, if required, assist the other bearers in attending to the patient's injuries.

Note.—The various movements detailed in the following Exercises should be carried out steadily, the bearers working in unison, hurrying being carefully avoided, and every attention being paid to the bearer whose duty it is to give the words of command.

STRETCHER EXERCISES REVISED, 1897.

EXERCISE No. I.

For Three Bearers.

1. The Instructor selects the bearers and numbers them—1, 2, 3, at his discretion. Should one man be taller and stronger than the others, he should be styled No. 1, as he will have to bear the heavier part of the burden.*

All orders will be given by No. 3, who will look after the injured part of the patient's body or limbs, to see that no bandages or splints become displaced, and also that No. 2 bearer, in lifting or carrying the stretcher, does not touch the patient's feet.

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* Bearers should, however, be taught to take any of the positions named in the following Exercises, whether that of No. 1, 2, 3, or 4 bearer.

2. "**Place the Stretcher.**"

No. 1 taking the head of the stretcher, and No. 2 the foot, place it in a line with the patient's body, the foot of the stretcher being close to his head.

3. "**Fall In.**" At this order,

No. 1 places himself at the patient's right side;
No. 2 at his left side, and both bearers face each other;
No. 3 takes position on the injured side, in a line with the patient's knees.

4. "**Ready.**"

Nos. 1 and 2 now each sink down on one knee and grasp each other's hands under the shoulders and thighs of the patient, whilst No. 3 also kneels and places his hands underneath the lower limbs, always taking care, in case of a fracture, to have one hand on each side of the seat of injury.

5. "**Lift.**"

All three bearers rise together to their feet, keeping the patient in a horizontal position.

6. "**March.**"

All take short side-paces, carrying the patient over the stretcher until his head is immediately above the pillow.

7. "**Halt.**"

All three bearers remain steady.

8. "**Lower.**"

The bearers stoop down, gently place the patient on the stretcher, disengage their hands, and then stand up.

9. "**Fall In.**" On this order being given,

No. 1 places himself at the head of the stretcher with his face towards the patient, No. 2 at the foot with his back to the patient, and No. 3 places himself at the side of the patient.

10. "**Ready.**"

Nos. 1 and 2 place the slings (if used) over their shoulders, stoop down, and slip the loops of the slings on to the handles of the stretcher, which they then grasp.

As soon as all is right the word is given—

11. "**Lift.**"

At this word, Nos. 1 and 2 bearers raise the stretcher steadily together and stand up.

No. 3 will now adjust the slings on the shoulders of Nos. 1 and 2, taking care that each is well below the level of the collar, and lies accurately in the hollow of the shoulder in front. He will also lengthen or shorten the slings, having regard to the patient's injuries and the relative heights of the bearers.

12. "**March.**" On this word being given,

Nos. 1 and 3 step off with the left foot, and No. 2 with the right. The step should be a short one of

twenty inches, and taken with bent knees. There should be no spring from the fore part of the foot.

13. "Halt."

The destination being reached, on the word "Halt," the bearers remain steady in position.

14. "Lower."

At this order the bearers place the stretcher gently on the ground, slip the loops of the slings off the handles of the stretcher, remove the slings from the shoulders, and then stand up; care being taken to let the patient's feet reach the ground before his head.

15. "Unload Stretcher—Ready."

The bearers prepare to take the patient off the stretcher, as at Orders 3 and 4.

16. "Lift."

The bearers raise the patient, as at Order 5, and carry him by short side steps, clear of the stretcher, to the vehicle, bed, or other place to which it has been arranged to convey him.

17. "Lower."

The patient is carefully lowered.

EXERCISE No. II.

For Four Bearers.

1. Number the bearers—1, 2, 3, 4.
   All orders will be given by No. 4.

2. **"Fall In."**

At the words "Fall in," Nos. 1, 2, and 3 take position on one side of and facing the patient. No. 1 places himself at the patient's shoulder, No. 2 near the middle of the body, No. 3 near the patient's feet. At the same time No. 4 places the stretcher on the ground by the other side of the patient, about two paces away from him, and then takes position opposite to and facing No. 2.

3. **"Ready."**

The bearers kneel down on the right knee if they are on the left side of the patient, on the left knee if they are on the right side of the patient. They then proceed to take hold of the patient:—No 1 passes one of his arms beneath the patient's shoulder-blades and the other across his body and under the opposite armpit, except when the patient's injuries make this impracticable, in which case both arms should be placed under the patient's shoulders; No. 2 passes both arms under the middle of his body, one above, the other below the buttocks; and No. 3 passing both

arms under the lower extremities, taking care, in the case of fracture, to place one arm on each side of the broken bone, so as to steady it. No. 4 locks his hands with No. 2 under the patient's body. If the patient be able to help, he should clasp his hands round the neck of No. 1.

4. "Lift."

On the word "Lift," the bearers raise the patient gently and rest him on the knees of Nos. 1, 2, and 3 bearers; as soon as he is securely rested, No. 4 disengages hands with No. 2, runs round by the head of the stretcher and places it under the patient, close to the other bearers' feet, being careful that the pillow is immediately under the patient's head; he then kneels down and locks his hands with those of No. 2.

5. "Lower."

The bearers place the patient on the stretcher, disengage their hands, and then stand up.

6. "Stand to Stretcher."

No 1 goes to the head of the stretcher, with his face towards the patient; No. 2 to the foot, with his back to the patient; Nos. 3 and 4 remain on each side of the stretcher, No. 3 placing himself opposite No. 4.

7. "Ready."

Nos. 1 and 2 place the slings (if used) over their shoulders, stoop down, and slip the loops of the slings on to the handles of the stretcher, which they then grasp.

As soon as all is right the word is given—

8. "Lift."

At this word, Nos. 1 and 2 bearers raise the stretcher steadily together and stand up.

Note.—Nos. 3 and 4 will now adjust the slings on the shoulders of Nos. 1 and 2, taking care that each is well below the level of the collar and lies accurately in the hollow of the shoulder in front. They will also lengthen or shorten the slings, having regard to the patient's injuries and the relative heights of the bearers.

9. "March."

The bearers move off:—Nos. 1, 3, and 4 stepping off with their left foot, and No. 2 with his right foot. The step should be a short one of twenty inches, and taken with bent knees. There should be no spring from the fore part of the foot.

10. "Halt."

The destination being reached, on the word "Halt" being given, the bearers remain steady in position.

11. "Lower."

At this order the bearers place the stretcher gently on the ground, slip the loops of the slings off the handles of the stretcher, remove the slings from the shoulders, and then stand up; care being taken to let the patient's feet reach the ground before his head.

12. "Unload Stretcher—Ready."

The bearers prepare to take the patient off the stretcher, as at Orders 2 and 3.

13. "Lift."

The bearers raise the patient as at Order 4; No. 4, in this case, disengages hands from No. 2, removes the stretcher, and resumes his former position. If necessary, the bearers will then steadily rise together, and carefully carry the patient to the vehicle, bed, or other place to which it has been arranged to convey him.

14. "Lower."

The patient is carefully lowered.

EXERCISE No. III.

WHEN ONLY THREE BEARERS ARE AVAILABLE AND THE STRETCHER CANNOT BE PLACED AS IN EXERCISE I.

1. The Instructor numbers the bearers—1, 2, 3.
All orders will be given by No. 3.

2. "**Place Stretcher.**"

No. 1 bearer places the stretcher on the ground by the side of the patient, and as close to him as practicable.

3. "**Fall In.**"

The three bearers take the same positions on one side of the patient, as laid down in Exercise No. II.

4. "**Ready.**"

Nos. 1, 2, and 3 kneel down, placing themselves as close to the patient as they conveniently can, and then take hold of him as directed in Exercise No. II.

5. "**Lift.**"

Nos. 1, 2, and 3 raise the patient as directed in Exercise No. II., and then move in a kneeling position up to the stretcher.

6. "**Lower.**"

The bearers bend forward, carefully lower the patient on to the stretcher, and disengage hands.

7. "Stand to Stretcher."

At this direction all the bearers stand up; No. 1 goes to the head of the stretcher, No. 2 to the foot, and No. 3 remains in position at the side of the stretcher.

8. "Ready."

Nos. 1 and 2 place the slings (if used) over their shoulders, stoop down, and slip the loops of the slings on to the handles of the stretcher, which they then grasp.

As soon as all is right the word is given—

9. "Lift."

Nos. 1 and 2 bearers raise the stretcher steadily together and stand up.

No. 3 will now adjust the slings on the shoulders of Nos. 1 and 2, taking care that each is well below the level of the collar, and lies accurately in the hollow of the shoulder in front. He will also lengthen or shorten the slings, having regard to the patient's injuries and the relative heights of the bearers.

10. "March."

Nos. 1 and 3 step off with the left foot, and No. 2 with the right. The step should be a short one of twenty inches, and taken with bent knees. There should be no spring from the fore part of the foot.

11. "**Halt.**"

The destination being reached, on the word "Halt," the bearers remain steady in position.

12. "**Lower.**"

At this order the bearers place the stretcher gently on the ground, slip the loops of the slings off the handles of the stretcher, remove the slings from the shoulders, and then stand up; care being taken to let the patient's feet reach the ground before his head.

13. "**Unload Stretcher—Ready.**"

No. 1 places himself at the patient's right side.

No. 2 at his left side, and both bearers face each other.

No. 3 takes position on the injured side, in a line with the patient's knees.

Nos. 1 and 2 now each sink down on one knee and grasp each other's hands under the shoulders and thighs of the patient, whilst No. 3 also kneels and places his hands underneath the lower limbs, always taking care, in case of a fracture, to have one hand on each side of the seat of injury.

14. "**Lift.**"

The bearers raise the patient, as at Order 5, and carry him by short side steps, clear of the stretcher,

to the vehicle, bed, or other place to which it has been arranged to convey him.

15. "**Lower.**"

The patient is carefully lowered.

EXERCISE No. IV.

For use in Mines and Narrow Cuttings, where Two Men only can be Engaged.

Necessary First Aid having been given, Nos. 1 and 2 will carefully place the stretcher in a line with the injured man's body, the foot of the stretcher being, if possible,* close to his head.

No. 1 will give the word "**Ready**," when both get into position as follows:—

No. 1 places his feet one on each side of the patient between his body and arms, the toe of each foot as near the armpits as possible, standing over the man. He then stoops down and passes his hands between

---

* It is not advisable to be too particular as to the head or foot of a stretcher in a mine, as it would probably be quite impossible to reverse it, and it is always competent for the bearers to lower the pillow.

the sides of the chest and the arms underneath the shoulders, and locks the fingers.

If the patient's arms be uninjured he may put them round the neck of No. 1, and by this means greatly assist him in lifting.

No. 2 at the same time places his right foot between the calves of the injured man's legs, as close to the knees as possible, and his left foot at the injured man's right side, close to the crest of the hip;* he then stoops down and passes his arms round the outside of the patient's thighs at the lowest part, and locks his fingers behind just at the bend of the knees.

When both are ready, No. 1 will give the order "**Lift and move forward.**" The patient is then to be slowly lifted just sufficiently to allow his body to clear the stretcher. Both bearers will slowly and gradually move forward, No. 1 by very short steps, and No. 2 by bending his body forward over his left thigh, by which means he exercises a pushing movement which very greatly assists No. 1. No. 2, when he has bent his body forward as much as he can without moving his feet, advances his right foot to his left, then again advances his left foot, and bends his body forward. This movement is to be repeated until the patient is laid on the stretcher.

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* When the patient's legs are in splints and tied together, the feet of No. 2 must necessarily be placed outside.

The bearers will then act in the ordinary manner as far as the nature of the locality will permit.

The Ashford Litter (Fig. 77) is made up of either of the Furley stretchers mentioned on page 187, a

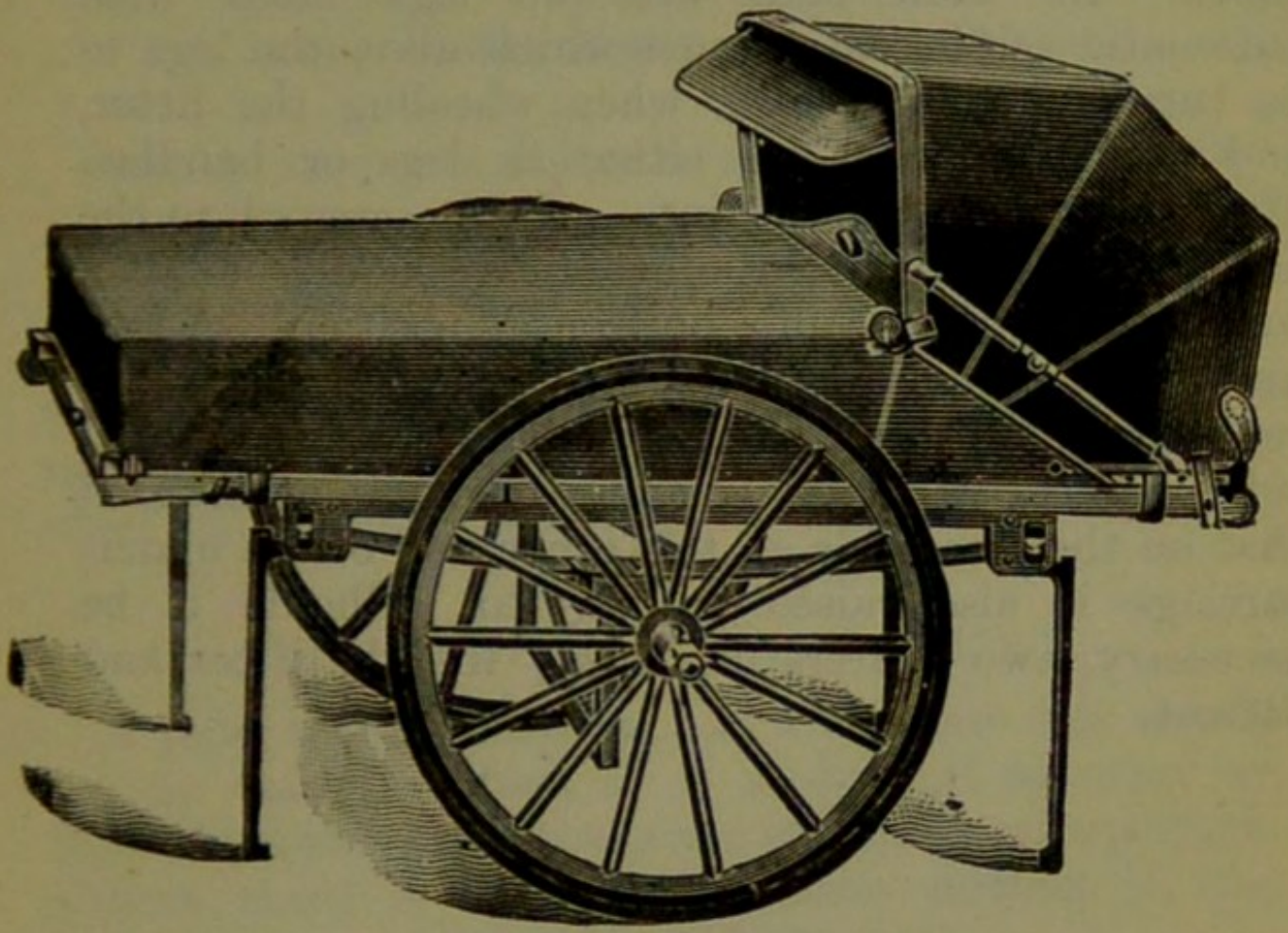

FIG. 77.

wheeled under-carriage and a waterproof hood and apron, or, if preferred, a light wet-resisting canvas cover. The stretcher is kept in position on the under-

carriage by the foot-wheels, which fit into slots in the sides of the under-carriage, and it can be removed at pleasure. The under-carriage is fitted with a cranked axle, which allows the bearers to pass with the stretcher between the wheels instead of lifting it over them. At both ends are two legs fitted with automatic self-locking hinges which allow the legs to be turned up as handles when wheeling the litter, and securely lock them either as legs or handles. The hood and apron fit into sockets screwed to the stretcher. In wheeling the litter, care should be taken to keep the patient in a horizontal position. A new and further improved pattern under-carriage has recently been introduced, having the two legs on each side coupled, so that when one is raised or lowered that on the same side at the other end of the under-carriage is also raised or lowered. Should it be necessary, two bearers can easily lift the litter and patient.

Chapter XI.

(*Being the Fifth Lecture for Females only, in accordance with Syllabus* 58.)

BY E. MACDOWEL COSGRAVE, M.D., F.R.C.P.I.

Preparation for Reception of Accident Cases.

When news of an accident comes, preparations should at once be made so as to have everything ready before the injured person is brought in. Of course the preparations needful will vary according to the nature and extent of the injury, but the following are the chief things which may have to be done.

Choice and Preparation of Room.

A room must be chosen. In a bad case this should be one easily reached, as it is difficult to carry an injured person through narrow passages and up-stairs. Unless there is some such reason against it, the injured person's own room is best.

The way to the room must be cleared, projecting furniture and loose mats in the hall or in lobbies should be removed. If the injured person is carried on a door or shutter, or even on a stretcher, a couple of strong kitchen chairs should be placed ready to

support it, wherever the bearers would be likely to require rest.

Useless furniture should be removed from the bedroom. The bed should be drawn out from the wall so that both sides can be approached, and the clothes turned back to one side to their full length. A hot bottle should be got ready. If there is much collapse several hot bottles and hot blankets may be required; cover the hot bottles with flannel.

If the injury is very severe, if mud-stained clothes have to be removed, or if extensive dressings have to be applied, it may be necessary to have another bed, a couch, or a table placed near the bed to lay the sufferer on in the first instance. This should be so arranged that soiling may do no harm; old sheets, waterproof materials, thin oilcloths, or even newspaper, may be used as a protection.

Lifting and Carrying.

If present at the place where the accident occurred, it will be necessary to see that the patient is carefully lifted after proper "First Aid" has been rendered.

The following rules should be remembered:—Select the proper number of persons to assist, and do not let them lift the patient until they thoroughly understand how they are to do it.

For ordinary cases, where the injured person has to be lifted a very short distance, three helpers are sufficient. Two (who should be as far as possible of equal height) are to bear the weight, the third is to support and take charge of the injured part. This is best done by a person who has been through a "First Aid" course.

If the injured person is insensible, another helper should support his head.

The lifters, one at each side, should kneel on one knee, and pass their hands under the patient's back at the lower part of the shoulder-blades, and under the hips, clasping each his right hand in the other's left. The injured patient should, if practicable, place his arms round the necks of the bearers.

The third helper should attend to the seat of injury; if this is a fractured limb, he should support it by placing the palms of his hands under the limb, one above and one below the seat of the injury, grasping it firmly but avoiding unnecessary pressure.

The helpers should remain thus until the order "Lift" is given, and then they should all lift slowly and steadily, avoiding jars, attempts to change position of hands, etc.

If the injured person is to be placed on a stretcher or shutter, this should be previously placed with the bottom end at his head; the bearers should then move, one at each side of it, until the patient is over

it. The word "Lower" should then be given, and the injured person should then be slowly lowered. A pillow or folded-up coat should be ready, and as the sufferer is lowered, this should be placed under his head.*

Means of Carrying.

Besides a stretcher, and substitutes such as a gate, a shutter, or a door, other means of carrying can be improvised.

In slight injuries, where the injured person is unable to walk, two bearers can carry him by forming a four-handed, three-handed, or two-handed seat.

A four-handed seat is formed as described on page 171.

A three-handed seat is made as described on page 176.

The two-handed seat is made as described on page 174.

A single helper can lift by supporting with one arm the two knees, and with the other the back. The arms must be passed well under before commencing to lift.

A single helper can give support by putting his right arm round the waist, grasping the right hips and placing the injured person's left arm round his own neck, holding the left hand with his own left hand.

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* Full directions are given in Chapter X.

A capital stretcher can be improvised out of a strong sheet and two broom handles or other short poles. Each side of the sheet is wound up on a broom handle until there is just room for a person to lie between. This requires four bearers, two at each side, to prevent the sheet slipping.

Carrying up Stairs.

In carrying a stretcher up stairs the head should go first, and an extra helper should assist at the lower end, so as to raise it and keep the stretcher nearly horizontal.

The two, three, or four-handed seat may be used for carrying up stairs; or a strong chair, the patient being carried up backwards. In the latter case one helper should walk after the chair and help to support it, and to prevent the injured person slipping out.

Lifting into Bed.

If the bed is narrow and there is room the stretcher should be placed on the floor with the head close to the foot of the bed. The injured person should then be lifted over the foot and placed on the bed. If the bed is too wide to admit of this, the stretcher should be placed beside it, and two helpers should stand at the far side of the stretcher. One helper passes one

arm beneath the shoulders and one beneath the middle of the back, the other helper placing his under the lower part of the back and under the knees. The injured person is then lifted, another helper pulls away the stretcher, and after a single step forward the burden is placed on the bed.

Preparation of Bed.

A firm mattress, not a feather bed, should be selected. If there is much injury, or if dressings have to be applied, a draw-sheet ought to be placed on the bed. It should be of four or more thicknesses, extend across the bed, and reach from the middle of the patient's back to the knees. A piece of water-proof sheeting or of thin oil-cloth should be placed under the draw-sheet. As the draw-sheet becomes soiled, the soiled portion should be rolled up and a clean part drawn smoothly under the patient.

In fracture of the leg or thigh, sprained ankle, and some other cases, a "cradle" should be improvised. The use of a "cradle" is to support the bed-clothes and keep them from pressing on the limb. Band-boxes, three-legged stools, and similar articles may be used. A corkscrew passed through the bed-clothes with its point guarded by a cork, and tied by string to the bed or a nail in the wall, will relieve the pressure of the bed-clothes effectually.

Removing the Clothes.

In taking clothes off an injured person a few rules should be borne in mind.

In serious cases it is much better to sacrifice the clothes than to run any risk of increasing the injury.

In removing a coat, etc., in a case of fractured arm, the uninjured arm should be drawn out first.

In putting on anything the injured arm should be put in first.

In burns and scalds nothing should ever be dragged off. A *sharp* pair of scissors should be used, and everything not adhering should be cut away. If anything adheres it should be left until medical aid can be obtained. The clothing adhering may, with advantage, be soaked with oil. To remove the trousers from a severely injured limb, the *outside* seam should be ripped up.

Preparations for Surgeon.

As soon as the injured person has been attended to preparation should be made for the surgeon's visit.

The preparations needful will depend upon the nature of the case. The following hints may be of use :—

A fire in the room will generally be of service, even in summer. There should be plenty of water, both hot and cold, also several basins, plenty of clean towels and soap. There should be something to empty water into; a foot-bath does well. The basins should be placed on a table, covered with a clean white cloth; a large towel makes a suitable cloth; the towels, folded up, should be placed on the same table, and the hot and cold water should be within easy reach. The foot-bath should be under the table or close at hand.

In the case of a burn, cotton wadding, soft cloths, old linen, oil, flour, bread, and bicarbonate of soda (baking soda) should be ready, and materials should be torn up for bandages. If a chemist's shop is within reach, carron oil and plenty of cotton wool should be sent for.

In the case of hæmorrhage, sponges, plenty of water, and at least two basins should be ready.

In the case of a person rescued from drowning the sheets should be taken off the bed, plenty of blankets should be heated before the fire, and several hot bottles should be ready.

If poultices are likely to be required, boiling water, linseed-meal, mustard, a loaf of stale bread, a small basin, a large spoon, sweet oil, and tow, flannel or handkerchiefs may be required.

For fomentation, have boiling water, flannel, a kitchen roller, and two sticks, or a large towel.

When summoning a medical man to an accident always let him know what kind of case he is required to treat, so that he may bring whatever is needful. By this means valuable time may be saved.

INDEX.

St. John Ambulance Association.

GENERAL PRICE LIST.

INTRODUCTION.

This Price List, which is subject to revision from time to time, has been compiled with a view to assist members of the Association and others in the purchase of the necessary equipment for corps and divisions of the St. John Ambulance Brigade, ambulance stations, classes, and first aid and nursing work generally.

A complete and reliable Ambulance Equipment is an actual necessity, and experience has proved that employers of labour and others interested in the district readily subscribe for the purchase of such appliances. Collecting cards, stating the purposes for which subscriptions are required, will be supplied gratuitously on application to the Head Office of the Association, where also any information with regard to its work can be obtained.

Stores of the value of 10s. or upwards will be sent carriage paid to any part of the United Kingdom.

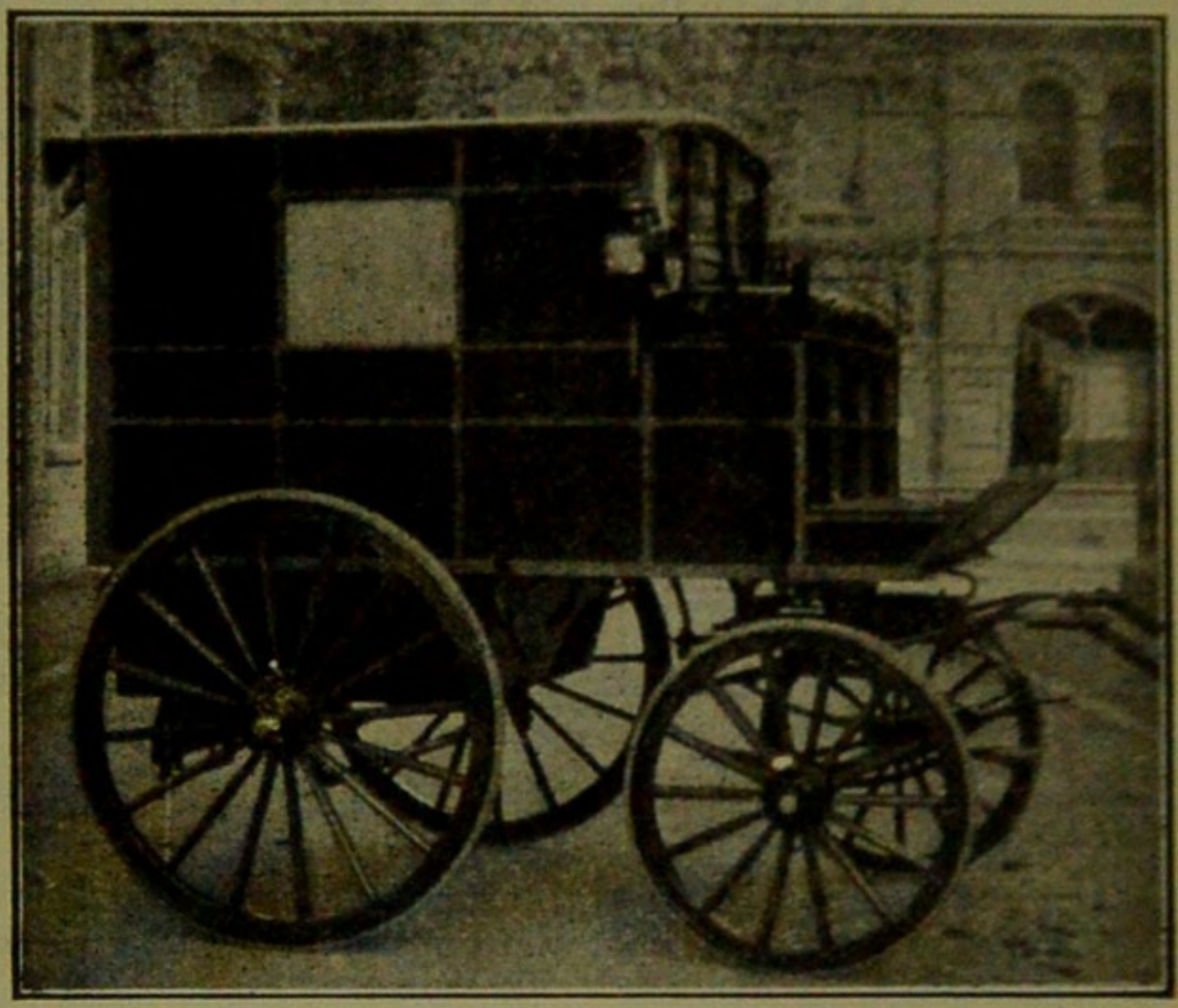
Owing to the great and continuing advance in prices it is impossible to guarantee that the quotations herein can be adhered to.

Quotations will be furnished for Articles relating to Ambulance Nursing and Hygiene, not mentioned in this list.

Orders and correspondence should be addressed to the St. John Ambulance Association, St. John's Gate, Clerkenwell, London, E.C.

Remittances should be made payable to the St. John Ambulance Association and crossed "London and Westminster Bank, Lothbury."

HORSE AMBULANCE CARRIAGES AND WAGONS.

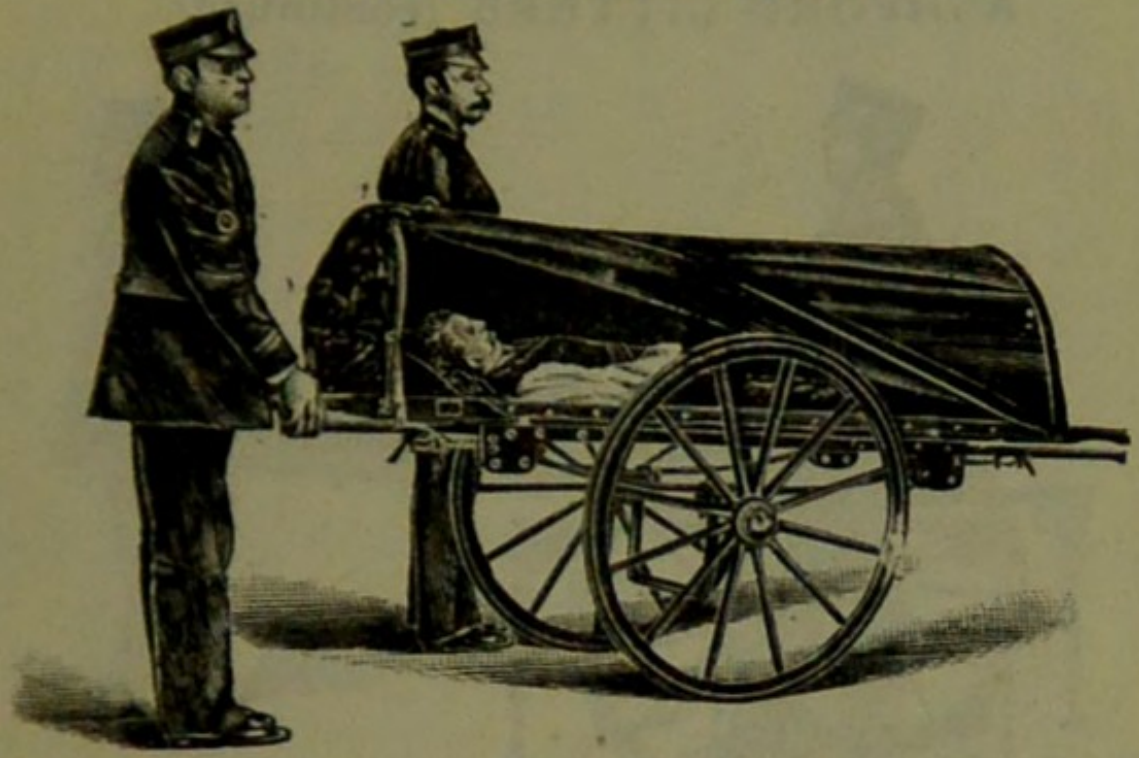


The St. John Ambulance Association Carriages and Wagons are now so universally adopted that but little description is needed.

The price of these varies, according to size and fittings, from £50 for the lightest and simplest form to £150 for an elegant private omnibus, which is fitted for the use of an invalid or for the ordinary purposes of a family at home or abroad.

Particulars, estimates, and list of places supplied will be sent on application.

ASHFORD LITTERS.

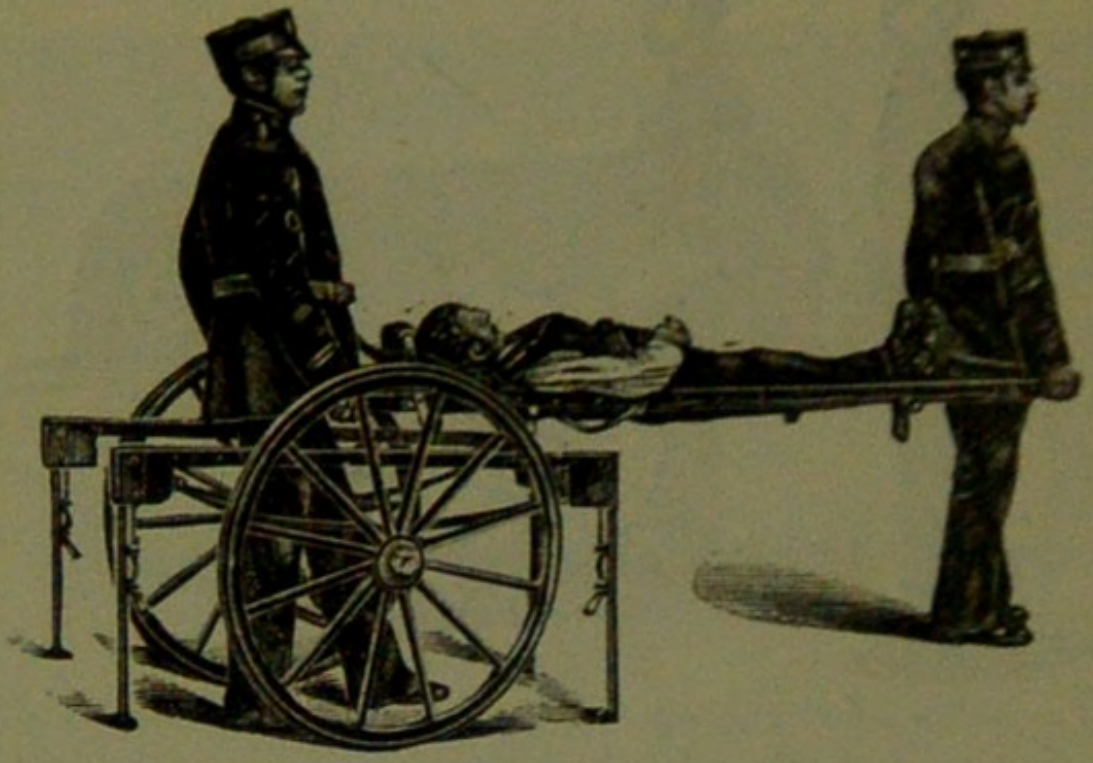


The "Ashford" Litter consists of a two-wheeled under-carriage fitted with elliptical springs, and either of the "Furley" stretchers, with a cover so arranged on a jointed frame that it can be folded up inside the stretcher, or with a hood and apron (*see page* 6). The under-carriage having a cranked axle, the bearers can pass between the wheels with the stretcher, and thus avoid lifting it over them. When travelling, the legs of the under-carriage are raised, and thus form the handles by which to propel it. Should it be necessary to pass over rough ground, two bearers can easily lift the litter and patient.

The improvements in the "Ashford" Litter (1899 models) include all those in the stretchers mentioned on page 7, and relate also to the mechanism of the combined legs and handles, which can now, by one movement only, be instantaneously raised or lowered, and fixed with absolute security in the proper position. The appearance of the litter is enhanced, and all fouling of the stretcher with the handles of the under-carriage is avoided.

For Prices see page 5.

ASHFORD LITTERS (continued).



A new and further improved pattern under-carriage has recently been introduced, having the two legs on each side coupled, so that when one is raised or lowered that on the same side at the other end of the under-carriage is also raised or lowered. This pattern is recommended with confidence, as the coupling is found to materially simplify the handling of a litter, owing to the fact that it gives to one man complete control of the four legs from either end. The mechanism is unavoidably somewhat more elaborate than in the ordinary pattern, but with reasonable care it is not likely to get out of order.

The extra cost is £1 10s. 0d. per litter.

PRICES OF THE IMPROVED ASHFORD LITTER, 1899 MODEL, Without New Coupling Arrangement.

	With Iron Tyres to Wheels.			With India-rubber Tyres to Wheels.		
	Without Cover or Hood and Apron.	With Cover.	With Hood and Apron.	Without Cover or Hood and Apron.	With Cover.	With Hood and Apron.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Under-carriage (no Stretcher)...	8 10 0	9 5 0	11 0 0	11 15 0	12 10 0	14 5 0
Litter complete, with Ordinary Stretcher*	—	11 2 6	12 17 6	—	14 7 6	16 2 6
Litter complete, with Telescopic-handled Stretcher†	—	11 10 0	13 5 0	—	14 15 0	16 10 0
Litter complete, with Police Stretcher‡	—	12 2 6	13 17 6	—	15 7 6	17 2 6

* Prices quoted for Litter with Ordinary Stretcher include Wide Webbing Slings, but no Chest Strap. Leather instead of Webbing Slings, 5s. 6d. extra. Chest Strap, 1s. 6d. extra. If supplied without any Slings, 4s. allowed.

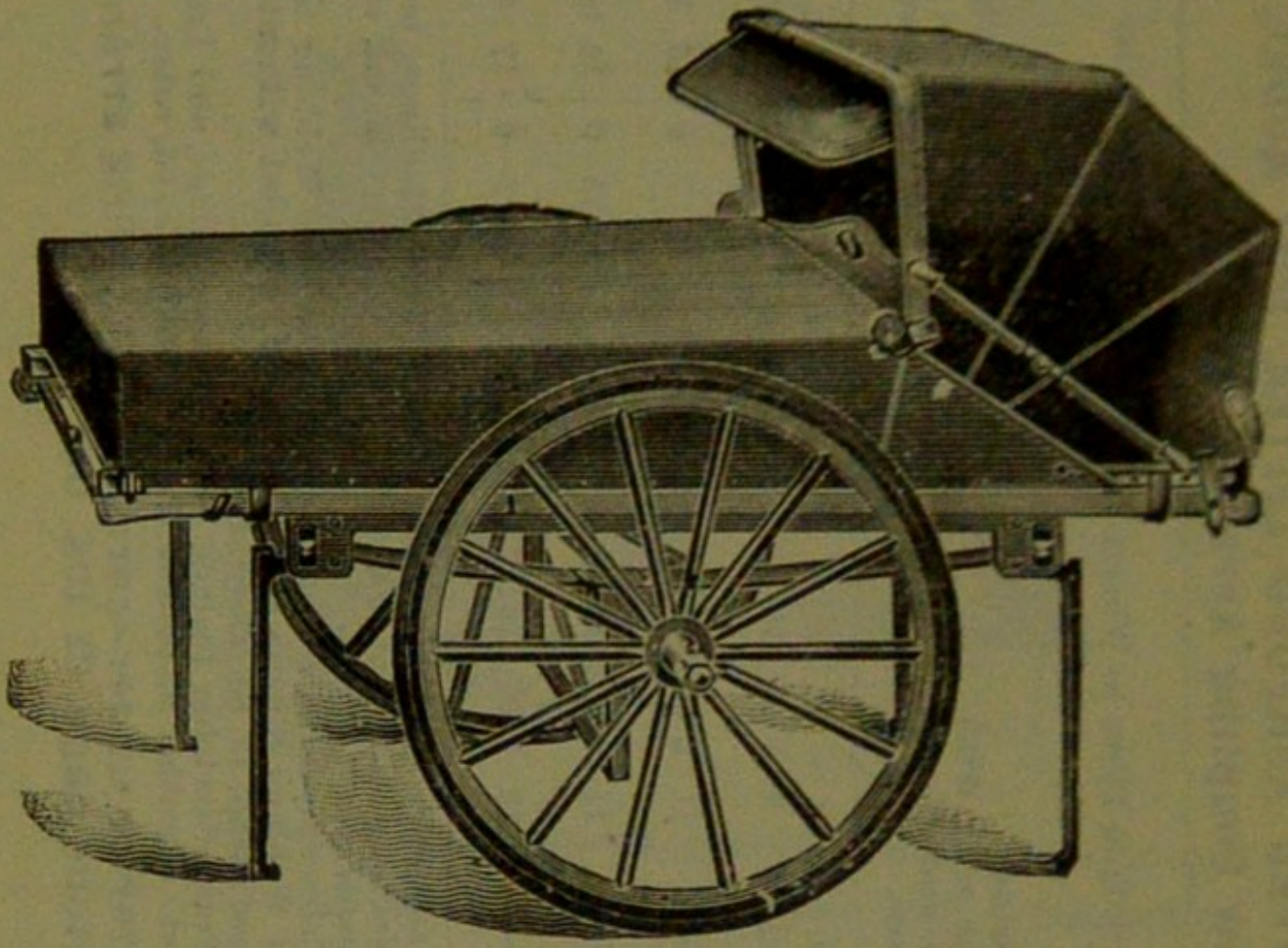
† Prices quoted for Litter with Telescopic-handled Stretcher include Wide Webbing Slings and Chest Strap. Leather instead of Webbing Slings, 5s. 6d. extra. If supplied without any Slings, 4s. allowed, and if without Chest Strap, 1s. 6d. allowed.

‡ Prices quoted for Litter with Police Stretcher include Wide Webbing Slings, and Leather Straps for securing a refractory patient. Leather instead of Webbing Slings, 5s. 6d. extra.

Extra to any pattern litter or under-carriage. Coupling arrangement as described on previous page £1 10s. 0d.

PRICE LIST.

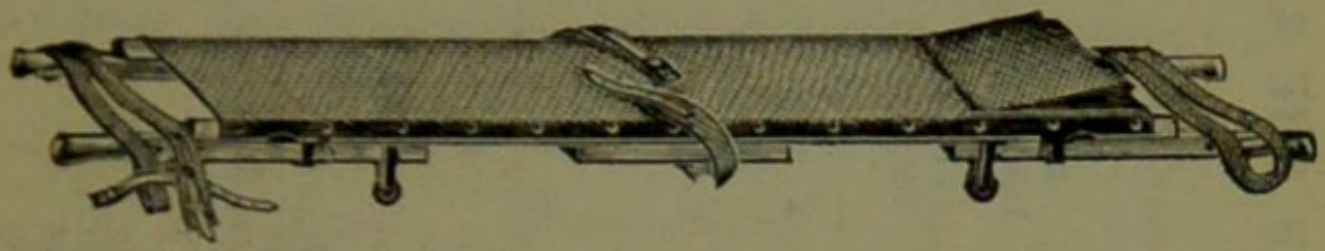
SPECIAL HOOD AND APRON.



The Hood and Apron illustrated above have been introduced to take the place of the cover sometimes supplied as part of the "Ashford" Litter, and afford much greater comfort to the patient. The material of which they are made has been specially selected on account of its strength and waterproof qualities. They can be fitted to any "Furley" Stretcher or "Ashford" Litter. Complete extra sets of sockets and studs can be supplied at a nominal cost.

PRICE.	£	s.	d.
Hood and Apron, complete	2	10	0
Extra Sockets and Studs, per set	0	1	6
Waterproof Sheet (washable) to be laid on the stretcher bed	0	10	6

"FURLEY" STRETCHERS WITH THE LATEST IMPROVEMENTS. 1899 MODELS.



TELESCOPIC-HANDLED STRETCHER—OPEN.

ORDINARY STRETCHER—CLOSED.

The improvements in all patterns of the "Furley" Stretcher, 1899 Model, are numerous. The comfort to the patient is increased; the stretcher is stronger, more rigid, and lighter, it folds up more closely, and its handles are more comfortable to hold, and afford greater protection to the hands of the bearers in passing through narrow doorways or passages. Should it be necessary to reduce the width of a loaded stretcher in order, for example, to carry it into a railway carriage, this can be done, either when it is resting on the ground or supported by the bearers, without trouble and without the slightest jar to the patient. The price of the stretchers is lowered. All minor points have been most carefully considered, and the stretchers are confidently recommended as thoroughly efficient in every way.

These stretchers are adapted for use alone or as part of the "Ashford" Litter, and the cover, hood and apron, army rug, and special rug with air cushion and waterproof sheet, described in this list, are suitable for use with them.

PRICES OF THE "FURLEY" STRETCHERS, WITH THE LATEST IMPROVEMENTS (1899 MODELS).

N.B.—The prices of the Standard Models are shown in heavy type.

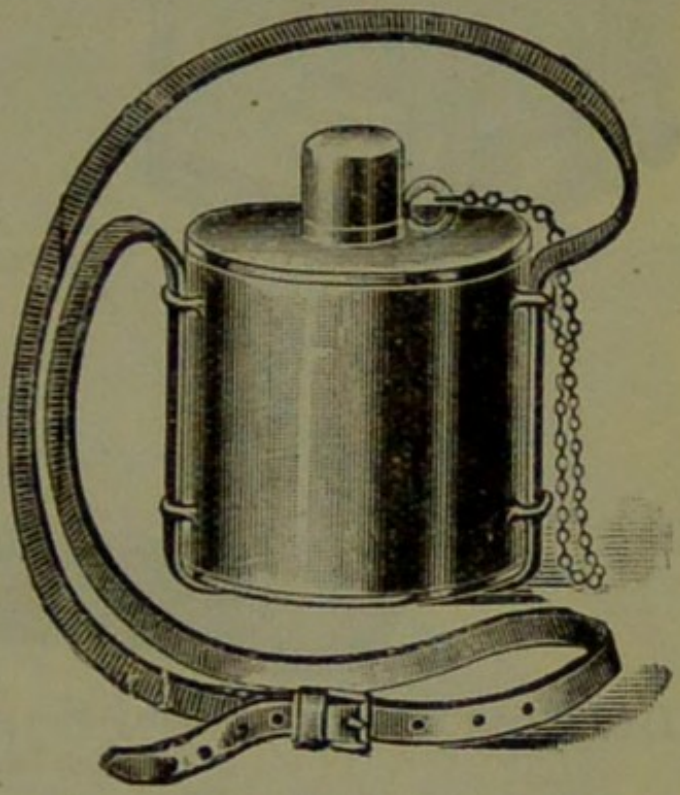
	Without Slings or Chest Strap.	With Wide Webbing Slings (no Chest Strap).	With Wide Webbing Slings and Chest Strap.	With Leather Slings (no Chest Strap).	With Leather Slings and Webbing Chest Strap.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Ordinary Stretcher, for General and Brigade use, taking the place of both the old ordinary and military patterns	1 13 6	**1 17 6**	1 19 0	2 3 0	2 4 6
Telescopic-handled Stretcher, for working in confined spaces.	1 19 6	2 3 6	**2 5 0**	2 9 0	2 10 6

	£	s.	d.
Police Stretcher, very strong, with Ash Poles, and provided with Leather Straps to secure a refractory patient—			
Complete, with Wide Webbing Slings	**2**	**17**	**6**
,, ,, Leather Slings	3	3	0
Slings, Wide Webbing ... ... per pair	0	4	0
Do. Leather ... ... per pair	0	9	6
(Or if purchased with the Stretcher instead of Webbing Slings, 5/6 extra).			
Cover for Stretcher	0	15	0
Superior Hood and Apron (*see illustration, page 6*)	2	10	0
Spare Bed for Stretcher	0	8	6
Army Rug, to cover patient on Stretcher	0	6	6
Superior Rug, fitted with Air Cushion, for use on Stretcher, or when travelling	1	5	0

"LOWMOOR JACKET."

For use in mines, ships' holds, &c., to secure a patient on a stretcher (see illustration), which can then be placed in an upright position. Price £1 5s.

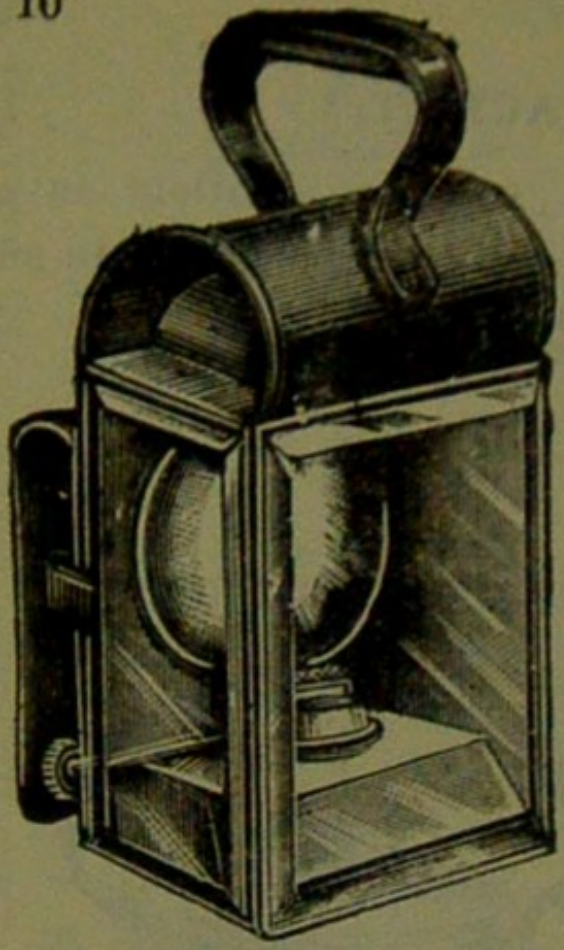
WATER BOTTLE.



Copper tinned, with carrying strap.

Price 6s. 6d.

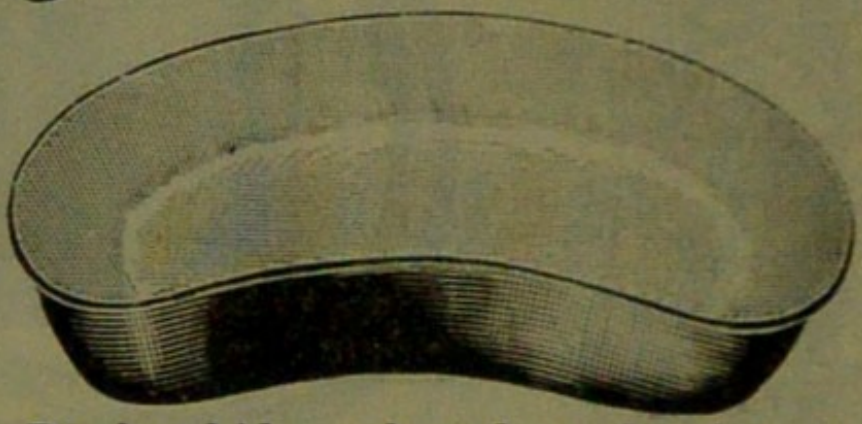
Enamelled Iron Water Bottle, Cloth covered, with Strap. Price 6s. 6d.



LAMP.

This is fitted with a socket by which to fix it to the Ashford Litter, or it can be conveniently carried by hand, or attached to a belt or the clothing.

Price complete, 5s. 6d.

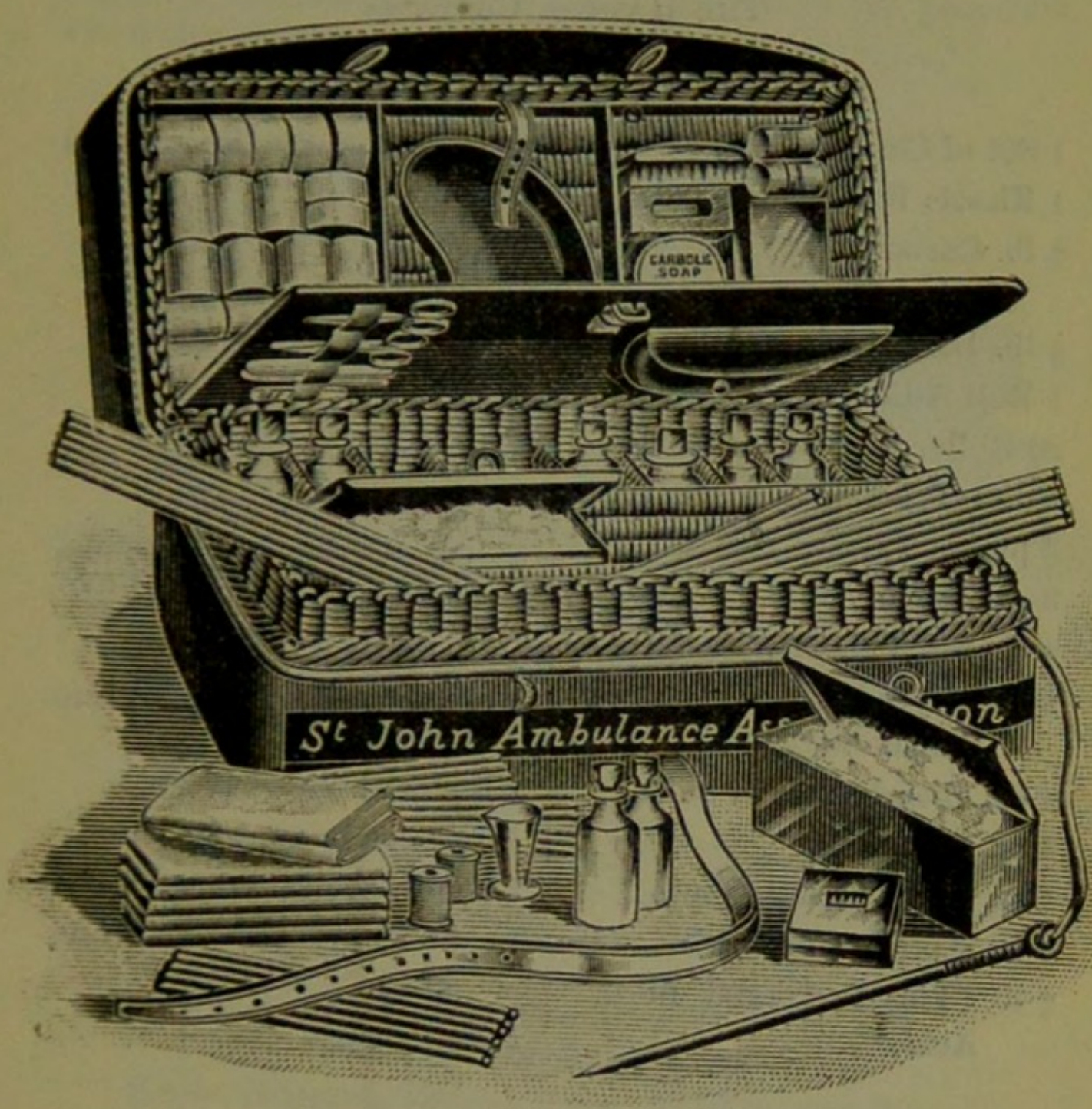


Dressing Basin, kidney-shaped, made of enamelled iron. Price 1s. 3d.

Knife, with Strong Blade ... each 9d. ; per doz. 8s.
Pair of Scissors... ... ... each 1s. ; per doz. 10s.

Carrying Sheet for carrying patients up and down stairs or otherwise about a house. Designed by J. C. Derham, Esq., Blackpool, and Mrs. Alfred Paine, Bedford. The sheet is fitted with rope handles and detachable bamboo poles, and may be placed on a stretcher without disturbing the patient. Price complete, 15s.

LARGE HAMPER FOR AMBULANCE STATION AND RAILWAY PURPOSES.



For contents, see next page

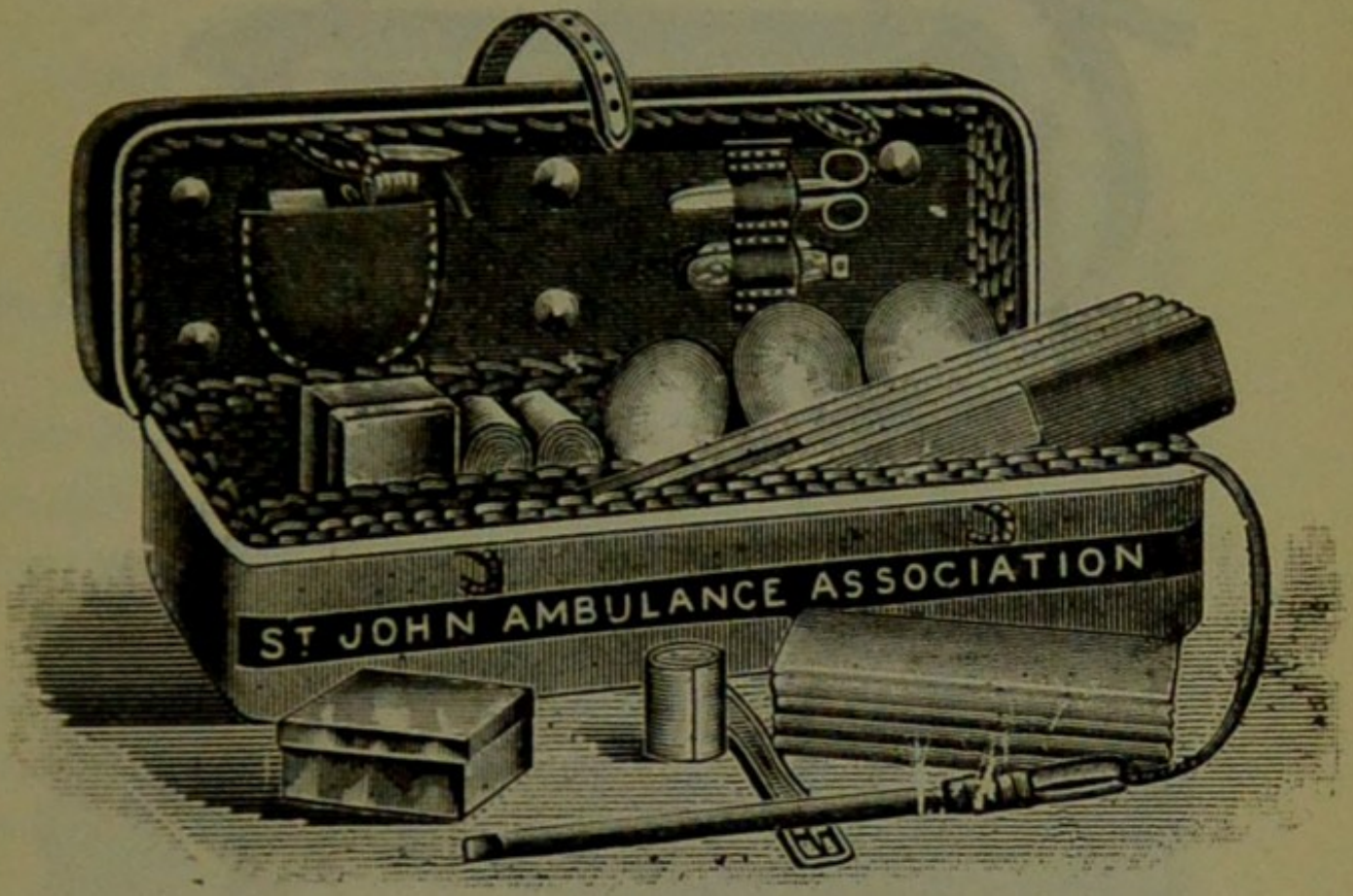
The Hamper Contains

1 Set of Cane Splints.
1 Elastic Band Tourniquet.
½ lb. Carbolic Cotton Wool
½ lb. Boric Lint
(In Tin Cases.)
1 Roll Adhesive Plaster.
20 Roller Bandages, assorted.
1 doz. Triangular Bandages.
3 pieces Tape.
8 oz. Brandy.
4 oz. Sal Volatile.
8 oz. Glycerine and Absolute Phenol 50 %.
4 oz. Bicarbonate of Soda.
4 oz. Olive Oil.
4 oz. Spirit Ether Comp.
8 oz. Spirit Vin. Rect.
¼ lb. Tin Powdered Boric Acid.
4 oz. Tincture Eucalyptus B.P.C.
1 pair Péan's Forceps.
1 pair Scissors.
1 Knife.
12 Surgeon's Needles.
1 packet each Safety and Plain Pins.
½ oz. Carbolised Chinese Twist.
½ oz. Silkworm Gut.
1 reel each Black and White Sewing Thread.
1 Kidney-shaped Basin.
1 Stopper Loosener.
1 Graduated Measure.
1 cake 20 per cent. Carbolic Soap.
1 Nail Brush.

Price complete, £4 4s.

SMALL AMBULANCE HAMPER.

With Waterproof Cover and Strap, for use in factories, collieries, stations, and large works, as well as for parochial and domestic use.



CONTAINING

1 Set Splints. 1 Elastic Tourniquet. 3 Tampons, for washing wounds. 2 Packets Lint. 4 Roller Bandages (wide and narrow). 4 Triangular Bandages.

Cotton Wool ... ...
Boric Wool ... ... } In Tin Cases.

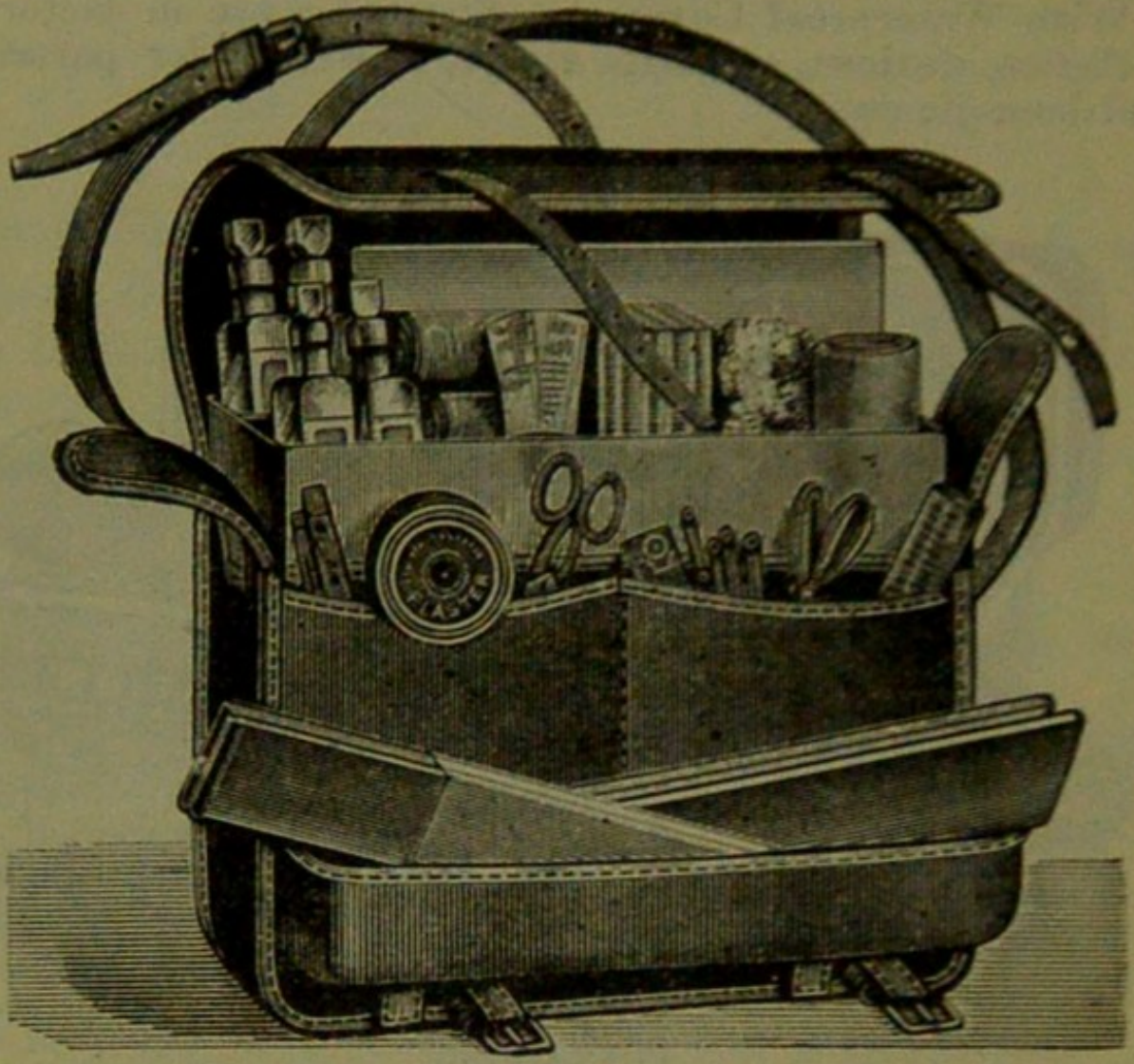
Spool of Adhesive Plaster.

Knife, Scissors, Thread, Tape, Needles, and Pins.

Weight, complete, 6½ lbs.

Length, 1 ft. 6 in. Depth, 5 in. Width, 7 in. Price, £1 11s. 6d.

SURGICAL HAVRESAC.



IMPROVED PATTERN, fitted with a tin so arranged that any article can be taken out without disturbing the rest of the contents.

Contents: 1 Set of Splints, 6 Triangular Bandages, 6 Roller Bandages, wide and narrow, Cotton Wool, Boric Lint, in tin cases; 1 Roll Adhesive Plaster, 1 pair Scissors, 1 Knife, 2 oz. Olive Oil, 2 oz. Tinct. Eucalyptus B.P.C., 2 oz. Sal Volatile, 2 oz. Spirits Ether Comp., 1 Graduated Glass Measure, 1 Elastic Band Tourniquet: Pins, Needles, and Thread.

Price £1 11s. 6d.

NURSING SISTERS' CHATELAINE OR POCKET CASE.

BEST MOROCCO LEATHER.

CONTAINING

Pair Scissors (round or sharp point).

Pair Nail Scissors.

Pocket Knife, pearl handle.

Pair Bow Dressing Forceps, nickel-plated.

Clinical Thermometer.

Spatula, Electro-plated.

Silver Probe (with eye or sharp point).

Grooved Director, with Scoop, Electro-plated.

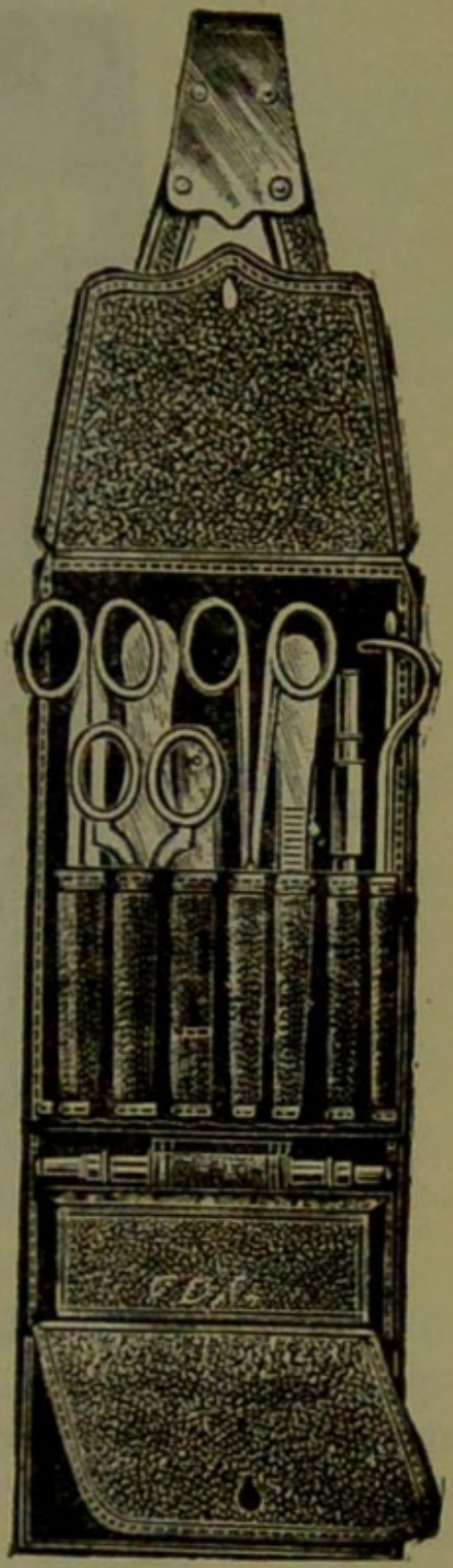
2 packets of Needles.

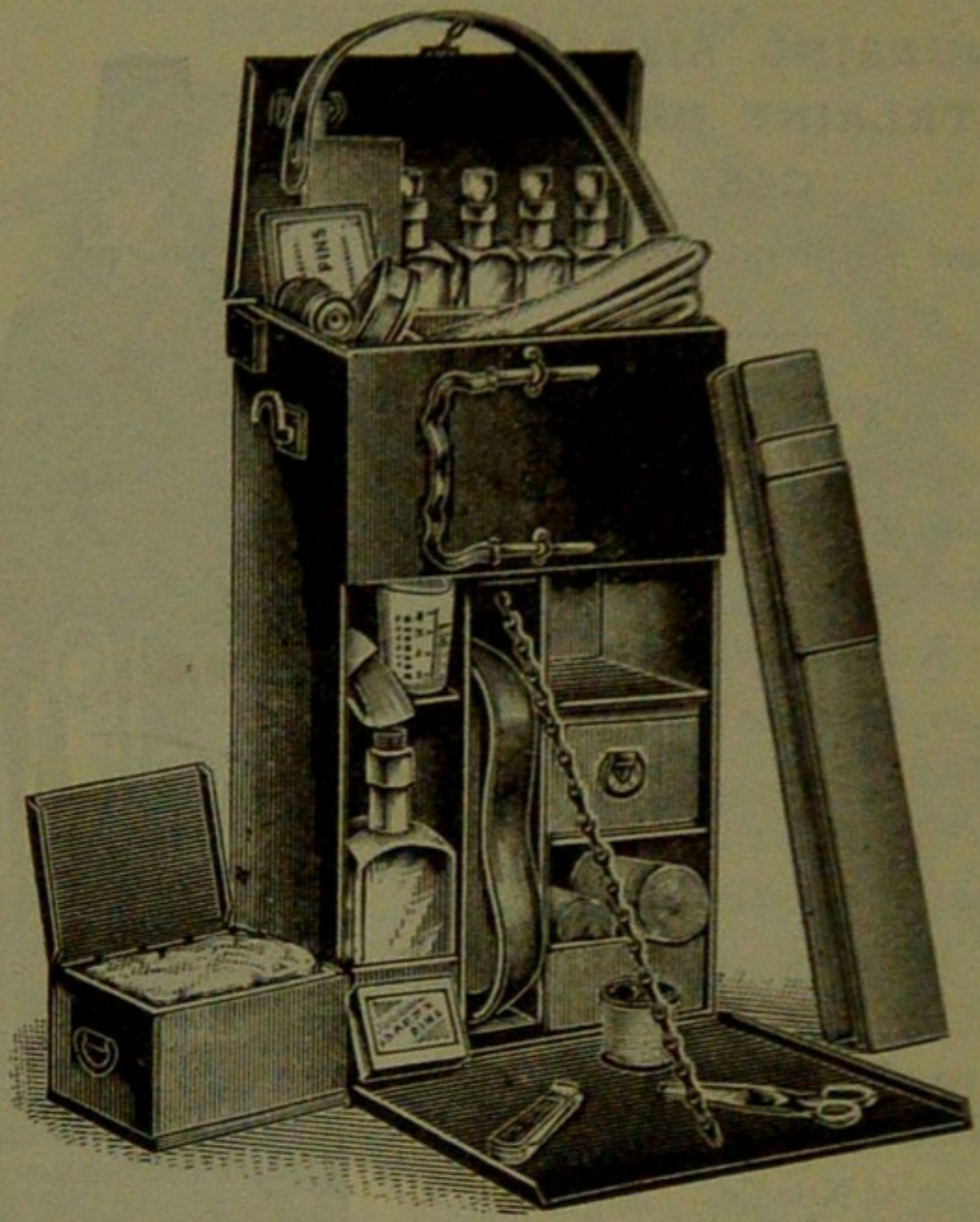
1 packet of Safety Pins.

Lead Pencil.

Price complete, 27s. 6d.

Name Stamped on Wallet.





FIRST AID BOX FOR LITTER OR AMBULANCE STATION.

This is primarily designed to be placed on the Ashford Litter (1899 Model), but it is further adapted to be hung up on a wall. A detachable leather handle is also fitted for carrying purposes.

For contents see next page.

Contents of First Aid Box.

(Illustrated on previous page).

1 Set of Wooden Splints; 1 Elastic Band Tourniquet; Carbolic Wool, Boric Lint, in tin cases; 1 Roll Adhesive Plaster; 12 Roller Bandages, assorted; 6 Triangular Bandages; 3 Pieces of Tape; 1 Pair Scissors; 1 Knife; 1 Kidney-shaped Basin; 1 Graduated Measure; 2 oz. Olive Oil; 2 oz. Tinct. Eucalyptus B.P.C.; 2 oz. Sal Volatile; 2 oz. Spirits Ether Comp.; 8 oz. Carron Oil; Pins, Safety Pins, Needles, Thread.

Price Complete, £2 10s. 0d.

---

	s.	d.
Tourniquet, Elastic	1	6
Tourniquet Braces (serve as Braces or Tourniquet)	2	6
Splints, Wooden, per set, 2s. 6d.; Cane, per set	7	6
Tow for Splint Padding ... ... per lb.	0	6
First Field Dressing (Army Regulation Pattern), Price ... ... each	0	9
Jaconette, 44 inches wide ... ... per yard	2	3
Carbolised, or Styptic, Tow ... ... per lb.	0	9
Waterproof Lint (in case to hang on wall) ...	2	6

SAFETY PINS.

All fasten or unfasten on either side.

Facile No. 2 or 3 ... ... per doz.	0	2
Duchess Duplex, No. 2 ... ... ,,	0	2
,, Assorted ... ... ,,	0	3
Special Blanket Safety Pins, 3-in. ... ... ,,	1	0
,, ,, ,, ,, 3½-in. ... ... ,,	1	6

Bath Thermometer. 2s. 3d.

Clinical Thermometer, 2s. and 2s. 6d.; with Magnifying Lens, 3s. 6d.; extra rapid, will record a patient's temperature in one minute, 5s. Kew Certificates, 1s. 3d. each extra.

Ambulance Station Plate. Enamelled Iron. 3s. 6d. each.

Stretcher Depot Plate. Enamelled Iron. 3s. 6d. each.

Nursing Chart. Designed by Miss Inderwick. 1d. each; by post, 2d.; per dozen, 9d.

Temperature Chart. 1d. each; by post, 2d.; per dozen, 9d.

Nursing and Temperature Charts, in sets, to record the nursing of a case for a fortnight, 3d.; by post, 4d.

Registers. Class Attendance and Certificate (two to set), 6s. Case Report, 1s. Brigade Muster Roll, 2s.

Large Physiological Diagrams. For Lecturers' use. Comprising: The Human Skeleton; the Muscular, Arterial and Venous Systems; the Heart and Circulation of the Blood; Simple Fracture; Compound Fracture; Dislocations.

Price, per set of six, 15s.; these may be hired for a course of "First Aid" lectures, given under the auspices of the Association, for a fee of 5s., or with the addition of Splints, Tourniquet, and Plain Triangular Bandages, for a fee of 10s.

Boxes of Stationery for the use of Class Secretaries and others connected with the Association, containing twelve sheets of high-class paper, suitably headed, and twelve envelopes bearing the device of the Association. Price 6d.; by post, 9d. Twice that quantity, price 1s.; by post, 1s. 3d.

Medallions, issued in accordance with special regulations, for which see leaflet No. 62, to be had on application. Bronze, 2s.; Silver, 7s. 6d.; Gold, £2 10s.; including engraving name and number on back. Morocco velvet-lined case, 2s.

Small Anatomical Diagram. Showing the human skeleton, main arteries, and points where pressure should be applied to arrest bleeding. 2d.; by post, 3d.

Aide Memoire. On cardboard, in linen-lined envelope, for the pocket. By the late Surgeon-Major P. Shepherd. Containing useful hints for First Aid to the Injured. 3d.; by post, 4d.

General Notes on First Aid to be rendered in Cases of Poisoning. By Milnes Hey, M.A., M.R.C.S., L.R.C.P. Price, 2d.: by post, 3d.

TEXT BOOKS, &c.

"First Aid to the Injured." By James Cantlie, M.B., F.R.C.S. The authorised text book of the First Aid Course. 1s.; by post, 1s. 2d.

"First Aid to the Injured." By the late Surgeon-Major Peter Shepherd. Revised by Robert Bruce, M.R.C.S. 1s.; by post 1s. 1d.; if not out of print.
Can also be obtained in Welsh at the same price.

"Hints and Helps for Home Nursing and Hygiene." By E. MacDowell Cosgrave, M.D., illustrated, with chapter on the application of the roller bandage, by R. J. Collie, M.D. The authorised Text-book for the Nursing Course. 1s.; by post, 1s. 2d.

TEXT BOOKS, &c.—*continued.*

"HOME HYGIENE." By John F. J. Sykes, D.Sc. (Public Health), M.D., &c. Illustrated. The authorised Text book for the Home Hygiene Course. 1s.; by post, 1s. 2d.

CATECHISM ON HOME NURSING (based on Dr. Cosgrave's Text-book). By J. Brown, L.R.C.P., and J. M. Carvell, M.R.C.S. Price 6d.; by post, 7d.

"QUESTIONS AND ANSWERS UPON AMBULANCE WORK." By John W. Martin, M.D., of Sheffield, and John Martin, F.R.C.S.Ed., of Huddersfield. 1s.; by post, 1s. 1d.

"QUESTIONS AND ANSWERS UPON NURSING." By John W. Martin, M.D. 1s. 6d.; by post, 1s. 8d.

"FIRST AID TO THE INJURED (Six Ambulance Lectures)." By Professor Frederich Esmarch. Translated from the German by H.R.H. Princess Christian. 2s.; by post, 2s. 2d.

"ELEMENTARY BANDAGING AND SURGICAL DRESSING." By Walter Pye, F.R.C.S. 2s.; by post, 2s. 2d.

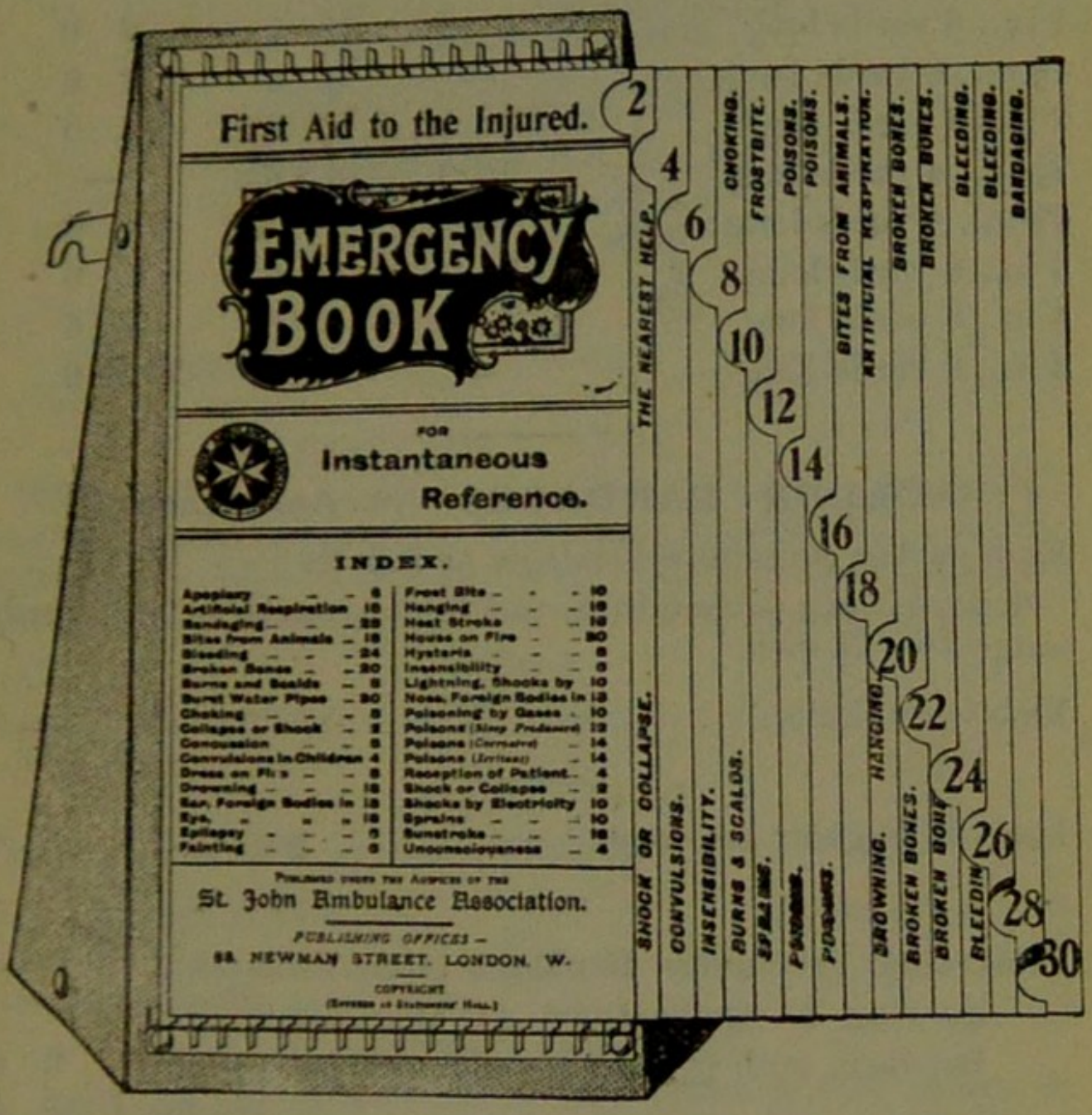
DR. G. H. DARWIN'S "FIRST AIDS," being a card to hang up, giving treatment of various accidents. 2d.; by post, 5d.

"HOW TO ACT WHEN CLOTHING TAKES FIRE." By J. E. H. Mackinlay, M.R.C.S. Unmounted, 2d.; by post, 3d. Mounted on card and varnished, 4d.; by post, packed, 7d.

"SPECIMEN EXAMINATION PAPERS, First Aid and Nursing Course." 3d.; by post, 4d.

"EMERGENCY BOOK," for instantaneous reference, giving concise instructions, to hang on wall. Size about one foot square.

Price 2s. 6d., by post 3s.



ROLLER BANDAGES.

	Open Wove Grey	Fine Grey Calico, or Superior White Open Wove.	Best Quality White, with Woven Edges.
	s. d.	s. d.	s. d.
¾ in., 6 yards long, per doz.	—	—	1 9
1 in., 6 yards long ,,	0 9	1 0	2 0
1½ in., 6 yards long ,,	—	1 6	2 6
2 in., 6 yards long ,,	1 3	1 6	3 0
2½ in., 4 yards long ,,	1 3	1 6	—
2½ in., 6 yards long ,,	—	—	3 6
3 in., 6 yards long ,,	2 0	2 6	4 0
4 in., 6 yards long ,,	—	3 6	4 6
6 in., 6 yards long ,,	—	4 6	7 6

ROLLER BANDAGES (in Assortment).

Each packet contains 6 bandages as follows :—

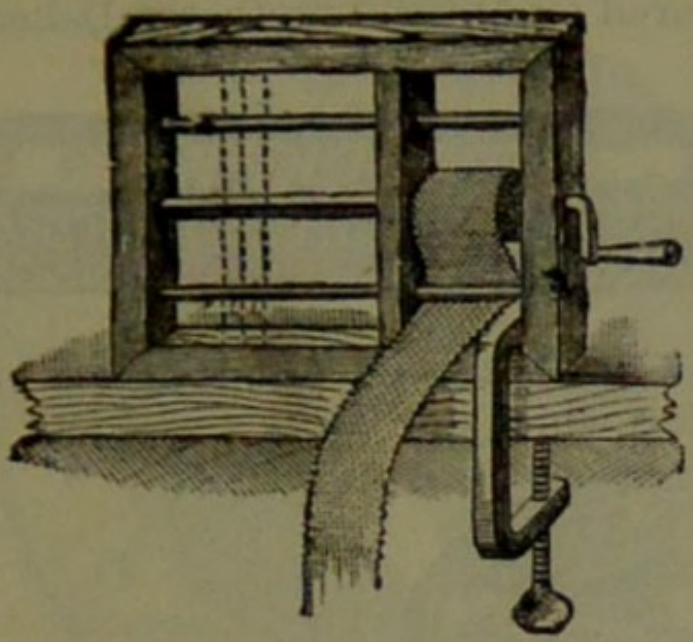
6 yards long—one 6-inch, two 3-inch, one 1-inch ; 4 yards long—two 2½ inch.

		s.	d.
Fine Grey Calico	per packet	1	0

Plain Triangular Bandages	per doz.	4	6

Illustrated Triangular Bandages (after Esmarch), showing 14 applications of the Triangular Bandage, with printed instructions ...	each	0	6
,, ,, ,, ,, ...	per doz.	4	6

ROLLER BANDAGE MACHINE.



Designed by Dr. A. C. Tunstall. Price 2s. 6d.

COTTON WOOL.

White absorbent, good, 1 oz. packet, 2d. ; 2 oz. packet, 3d.; 4 oz. packet, 4d. ; ½ lb., 7d. ; 1 lb., 1s. ; superior, 1 lb., 1s. 6d. ANTISEPTIC—Boracic, per lb., 1s. 6d.; Carbolic, per lb., 1s. 8d.; Alembroth, per lb., 1s. 6d. ; Double Cyanide, per lb., 2s. 6d.

LINT.

Good quality, 1 lb. packet, 2s.; Boracic, 1 lb. packet, 1s. 6d.; 4 oz. packet, 6d.

GAUZES.

These are supplied in 6 yard lengths, width about 36 inches.

		s.	d.
Unmedicated White	per length	0	9
Alembroth	,, ,,	0	10
Double Cyanide	,, ,,	1	0

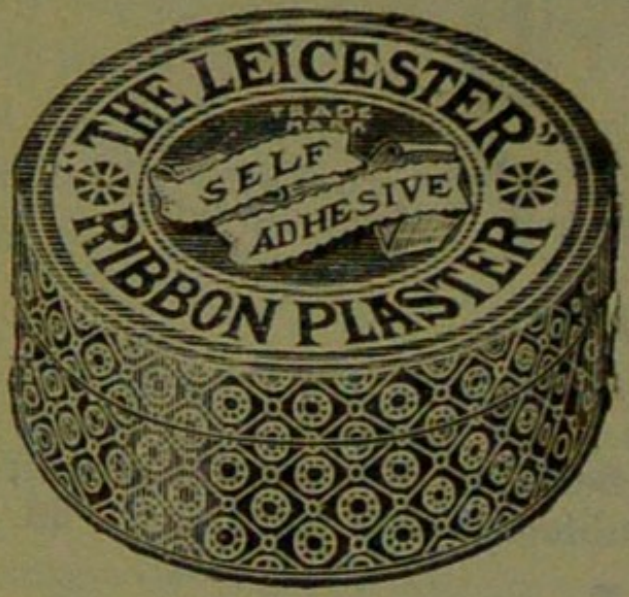
GAUZE TISSUE.

A layer of absorbent cotton wool between two sheets of gauze, good quality, per lb. 1s. 6d. ; Superior, per lb. 2s.

PLASTERS.

Manufactured by Messrs. A. De St. Dalmas & Co.

	s.	d.
Leicester Adhesive Plaster on Cambric, in tins of ½ yard, 6 inches wide	0	6



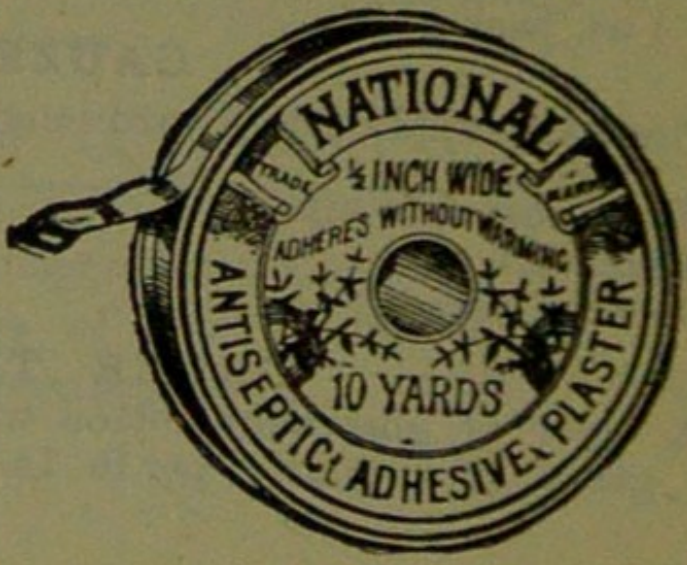
The Leicester Adhesive Ribbons, in tin boxes, 6 yards long.

½ inch wide ... 6d.

1 inch wide ... 8d.

National Rubber Adhesive Plaster (Antiseptic) on spools.

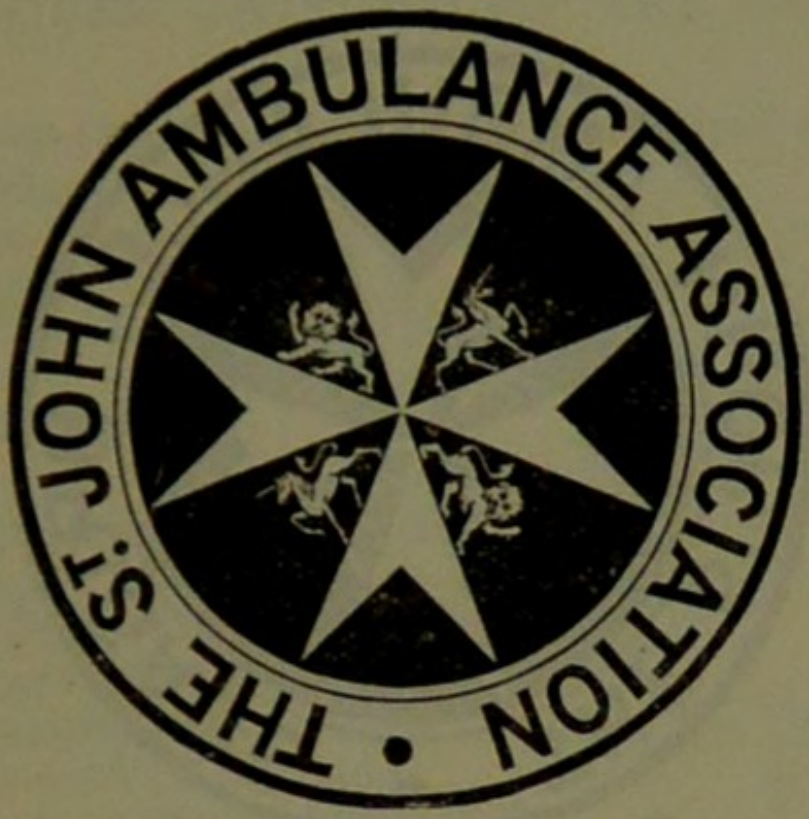
	5 yds.	10 yds.
½ inch wide	9d.	1s.
1 ,, ,,	1s.	1s. 6d.
2 ,, ,,	1s. 9d.	2s. 3d.



Ditto in tin ⅜ inch wide, 3 yards long, 3d.

Court Plaster (tricolour) per case of 3 pieces, Small Size, 5d. Larger, 9d.

BADGES.



No. 1.

Arm Badges, with the device issued under the authority of the Central Executive Committee, having been first approved by H.R.H. the Grand Prior as the sole official and recognised Badges of the Association and Brigade.

N.B.—The design is protected, and must be obtained direct from the Central Office.

No. 1, for the use of individual certificated pupils—	s.	d.
In German Silver	0	9
Small size ditto	0	7½
In Electro-plate	2	0
Small size ditto	1	6
In Cloth and Silk	0	9
In Cloth and Silver (Registered Number, 3,522)...	2	0
In Cloth and Worsted	0	6
Small Celluloid Badge for button hole, arm, or as brooch	0	2
White Satin Armlet, with woven Badge	0	7½

N.B.—These Badges are not to be worn as decorations.

BADGES.

No. 2.

No. 2, for Members of the St. John Ambulance Brigade not wearing uniform, having the name of the Corps or Division annexed on a label, only issued in quantities—

In German Silver, first doz., £1 ; subsequent dozs., 12s.

In Electro-plate, first doz., £1 12s.; subsequent dozs. £1 4s.

In Cloth and Silk, per doz., 12s.

In Cloth and Silver, per doz., £1 10s.

BADGES AUTHORISED AS PART OF THE RECOGNISED UNIFORM OF THE BRIGADE.

	s.	d.
Officers.		
Collar Badges (Registered Number, 3,524) per pair	3	0
Supernumerary Officers.		
Cap Badge (Registered Number, 3,520) ... each	6	0
Arm Badge (,, ,, 3,523) ... ,,	2	0
Fatigue Cap Badge for Officers and Sergeants (Registered Number, 3,558)	3	9
Pouch Badge for ditto (,, ,, 3,657)	2	6
Privates.		
Cap Badge (Registered Number, 3,521) ... each	2	3
Arm Badge (,, ,, 3,542) ... ,,	2	3
Overcoat Badge (,, ,, 1,582) ... ,,	0	6
Lady Officers of Nursing Divisions.		
Superintendent's Cloak Badge (Reg. No. 3,658)	4	6
Superintendent's Arm Badge (,, 3,659)	3	9
Other Nursing Officer's Cloak Badge (,, 3,555)	4	0
Other Nursing Officer's Arm Badge (,, 3,656)	3	3
Nursing Sister.		
Arm Badge (Registered Number, 3,522)	2	0
Cloak Badge (,, ,, 3,521)	2	3
Pin-cushion Badge	0	3½
Special quotations for large quantities.		
Honorary Surgeon's Silver Wire Cross (pattern B)	0	8
Superintendent's Silver Wire Star (pattern A) ...	0	8
Medallion Badge (pattern D)...	0	1
Nursing Badge (pattern E)	0	8
Satin Badge for Nursing Sister's Pin-cushion ...	0	3½

OFFICER'S and SERGEANT'S WHISTLE AND CHAIN.

PRICE 2s.

BUTTONS FOR THE UNIFORM OF THE ST. JOHN AMBULANCE BRIGADE.

Issued only for the use of Officers and Members of Corps and Divisions wearing the prescribed uniform.

		s.	d.
Electro-plate, large	per doz.	4	0
,, ,, small	,,	2	0
Black Horn, large	,,	0	6
,, ,, small	,,	0	4

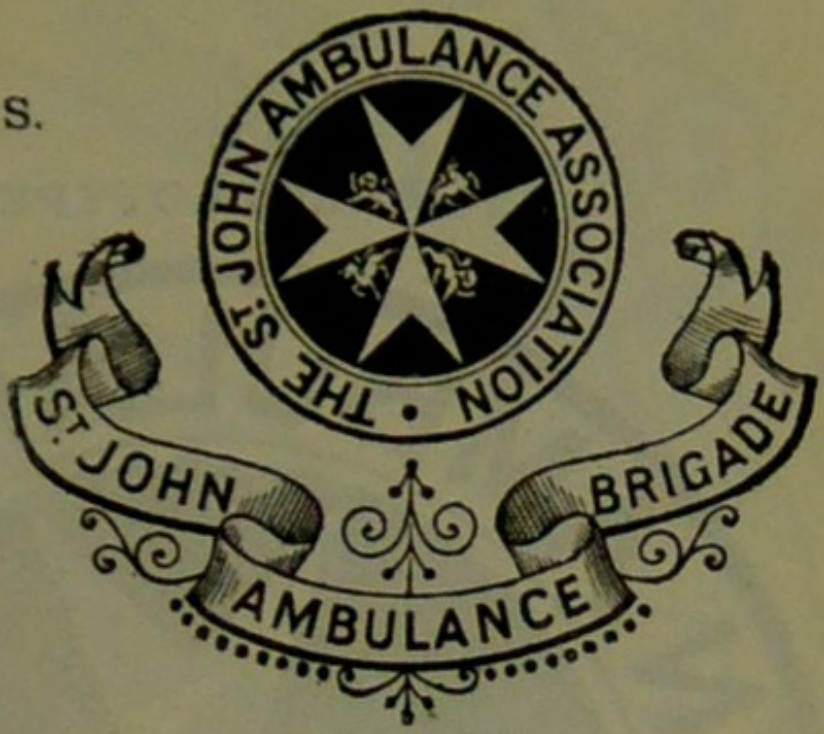
ELECTROTYPES OF THE ST. JOHN AMBULANCE DEVICE.

	Series A for Association use.		Series B for Brigade use.	
	s.	d.	s.	d.
No. 1. For Cards, Tickets, &c.	1	0	1	0
,, 2. For Note Paper, Small Circulars, &c.	1	0	1	3
,, 3. For Quarto and Foolscap Letter-paper, Circulars, &c.	1	0	1	3
,, 4. For Small Posters	1	6	—	
,, 5. For Large Posters	1	9	3	0
Complete Series	5	3	5	6

Prints of the above electrotypes, with the exception of No. 4, which is shown on page 25, appear on the following pages.

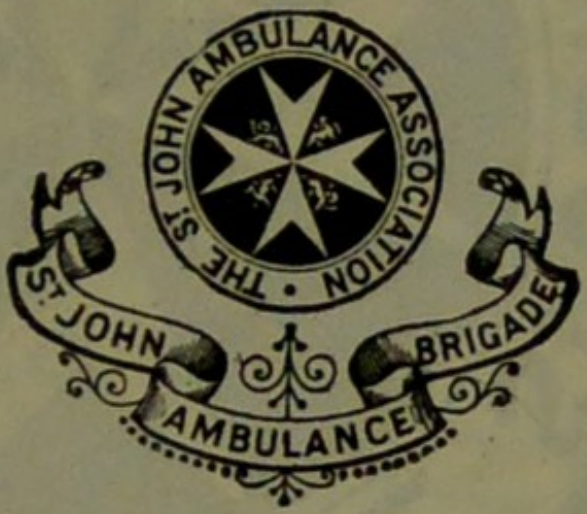
ELECTROTYPES.

No. 1 A.



No. 3 F.

No. 2 A.



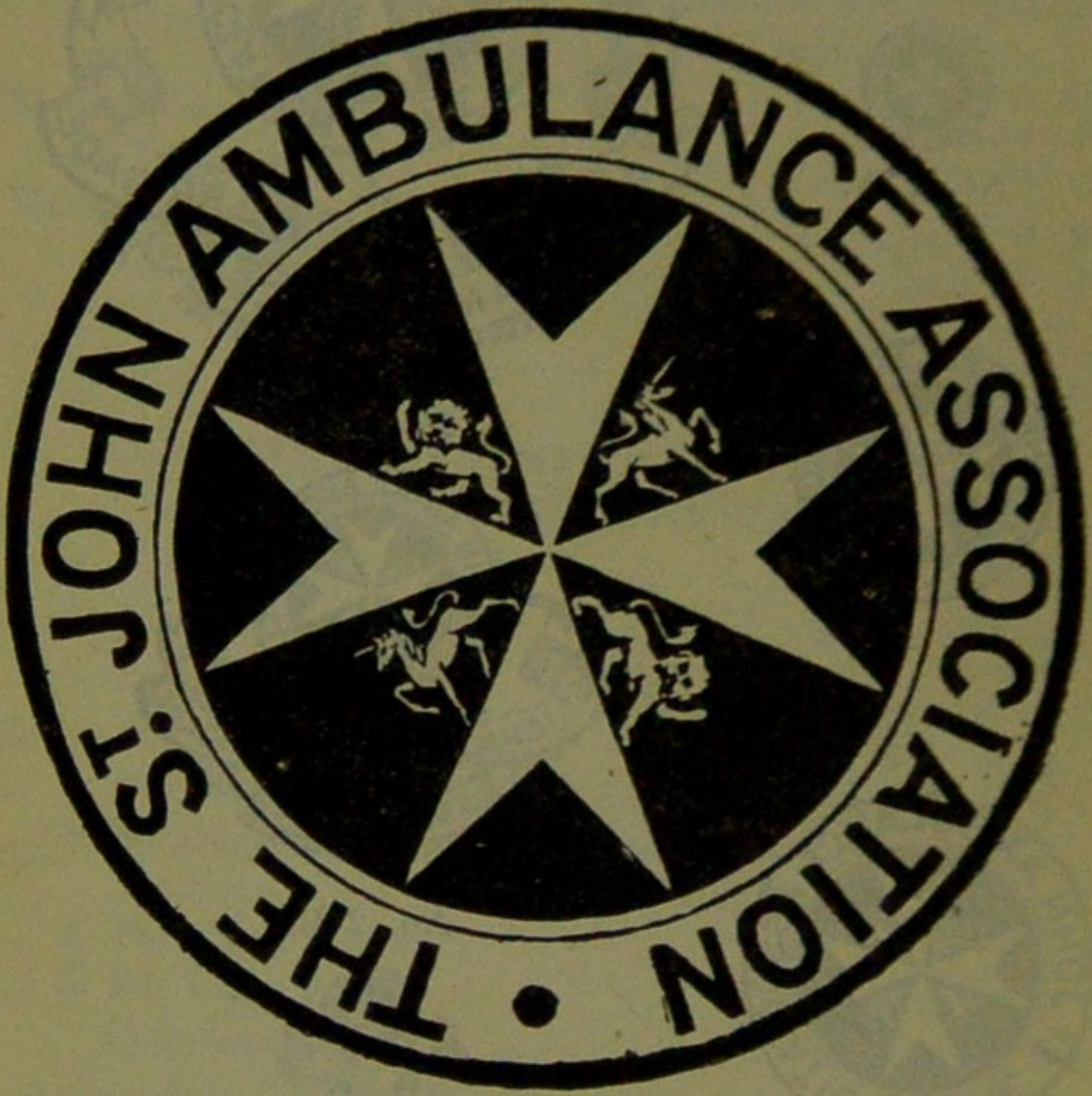
No. 2 B.

No. 3 A.

No. 1 B.

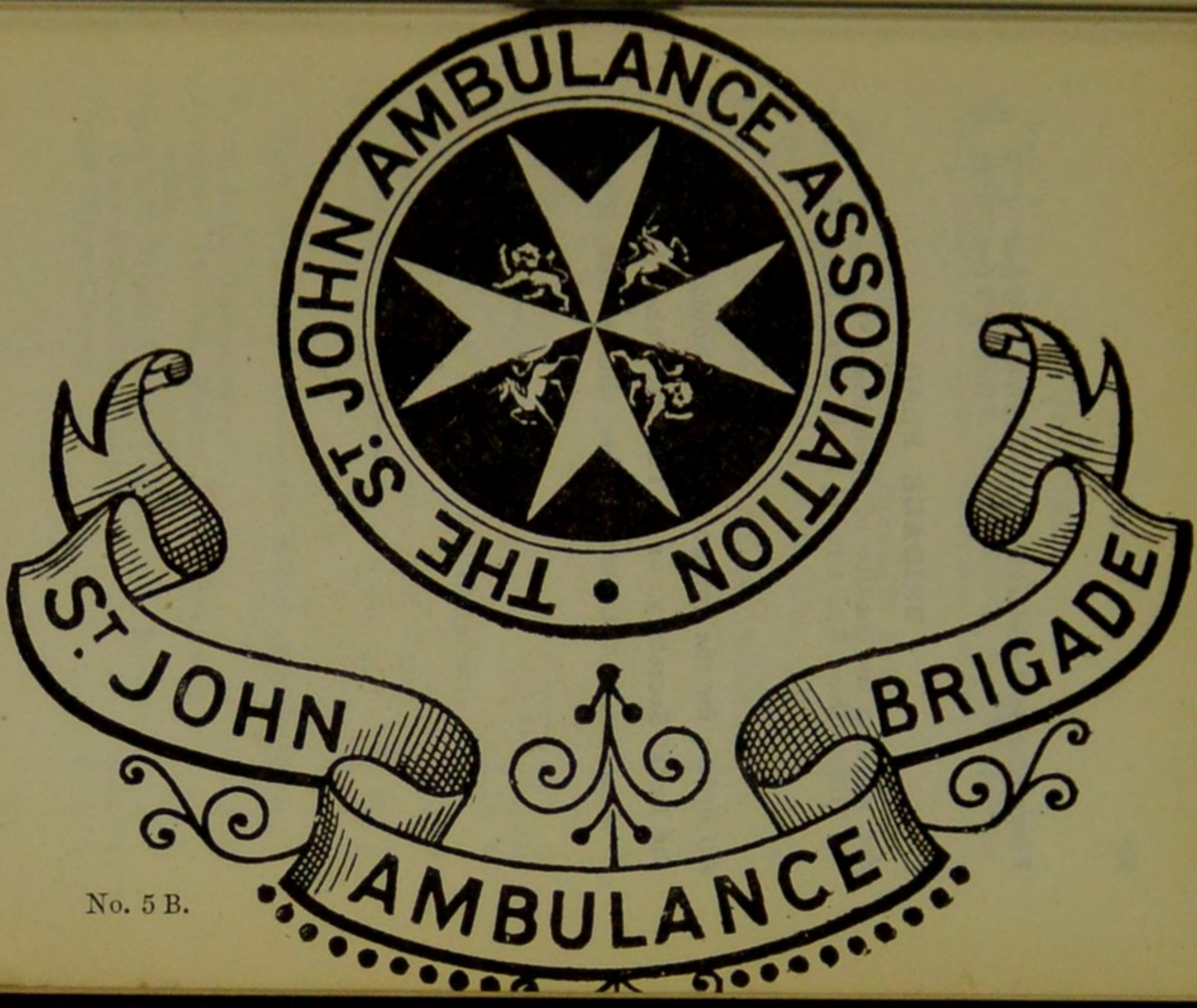
For prices see page 28.

ELECTROTYPES.



No. 5 A.

For price see page 28.


THE ST JOHN AMBULANCE ASSOCIATION
ST JOHN AMBULANCE BRIGADE
AMBULANCE

No. 5 B.

	£	s.	d.
Flags bearing Association device—12 feet by 6 feet	1	7	6
,, ,, ,, 5 feet by 3 feet	0	12	6

BRIGADE FLAG

For marking the position of Ambulance Stations at Fetes, Exhibitions, &c., 4 ft. 1½ in. by 3 ft. Price 12s.

All orders for the foregoing Stores should be given to the Local Secretary, or to The St. John Ambulance Association, St. John's Gate, Clerkenwell, E.C.

UNIFORMS.

These may be obtained direct from Messrs. Hebbert & Co., 35, Bethnal Green Road, E. Telephone No. 909 London Wall; Telegraphic Address, "Otherwise, London."

Chief Surgeon and Honorary Surgeon.

	£	s.	d.
Tunic (Badges extra)	4	4	0
Trousers: Two-inch Mohair Braid down side seams	1	5	0
Cross-belt and Pouch: Black, Morocco, Silver embroidered (Badge extra)	3	7	6
Forage Cap and Cover	1	9	6

Chief Supt. and other Chief Officers.

	£	s.	d.
Tunic (Badges extra)	4	4	0
Patrol Jacket (Badges extra)	3	3	0
Fatigue Jacket (Badges extra)	2	10	6
Trousers: Two-inch Mohair Braid down side seams	1	5	0
Cross-belt, White Patent Leather and Pouch Black Morocco (Badge extra)	0	14	6
Forage Cap and Cover	1	5	6

Supt. of Division and other Ambulance Officers.

	£	s.	d.
Patrol Jacket (Badges extra)	2	6	6
Trousers: Two-inch Mohair Braid down side seams	1	5	0
Cross-belt, White Patent Leather and Pouch Black Morocco (Badge extra)	0	14	6
Forage Cap and Cover	1	5	6

Mess Dress for Officer.

	£	s.	d.
Jacket (Badges extra)...	3	3	6
Vest	1	8	6
Field Cap (Badge extra)	0	10	0

Sergeant.

Tunic, Black Melton (Badge extra)	1	1	0
Chevron, 3 bars	0	2	6
Trousers, Black Melton	0	11	6
Forage Cap (Badge extra)	0	3	4
Cover	0	0	6½
Waist-belt and Pouch	0	6	10

Officers' Gloves (per pair)	0	4	6
Officers' Leggings (per pair)...	0	6	0

Corporal.

Chevron, 2 bars	0	1	8

Corporal and Rank and File.

Patrol Jacket, Black Tartan (Badge extra) ...	0	11	0
Trousers, Black Tartan	0	9	0
Forage Cap (Badge extra)	0	3	4
Cover for Cap	0	0	6½
Waist-belt and Pouch	0	6	10
Field Cap (Badge extra)	0	2	0
Great Coat (Badge extra)	0	13	6
Gloves (per pair)	0	0	8
Leggings (per pair)	0	3	3

Cyclists—Superintendent.

	£	s.	d.
Patrol Jacket (Badges extra)...	2	10	0
Cap (Badge extra)	0	9	6
Breeches: Grey Serge...	0	12	0
Shoulder Belt	0	10	6
Gloves	0	4	6
Gaiters	0	4	3

Cyclists—Rank and File.

Jacket (Badge extra)	0	19	6
Cap (Badge extra)	0	2	0
Breeches: Grey serge	0	12	0
Shoulder Belt	0	10	6
Gloves (per pair)	0	4	6
Gaiters (per pair)	0	4	3

All Badges to be obtained by the Corps or Division from St. John's Gate.

If the Corps or Division is out of London, measurements to be supplied to contractors free of charge.

Carriage out of London extra.

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