Dr. Finny's first aid: a note-book for ambulance students / W. E. . St. Lawrence Finny.

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A NOTE-BOOK

FOR

AMBULANCE STUDENTS.

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A NOTE-BOOK FOR AMBULANCE STUDENTS.

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FIRST AID.

The Object of Ambulance Lectures and Demonstrations is to teach how to :—

(1) **Render first aid** and transport in cases of accidents and sudden illness, **only until the doctor arrives.**

(2) **Prevent further injury** being done to the injured person by mismanagement.

(3) **Use whatever comes to hand** for splints, bandages, or stretchers instead of waiting for specially prepared surgical apparatus.

When attending an injured person the ambulance student should note as rapidly as possible three things, the **history,** the **symptoms,** and **physical signs,** and see how far they agree with one another.

The history is what the injured person or witnesses tell you of what has happened.

The symptoms are what the injured person tells you of how he feels ; *e.g.,* pain, loss of power.

The physical signs are the conditions of the injured person that you observe for yourself ; *e.g.,* the pulse, respiration, deformity.

To recognise and treat injuries it is necessary to know something :—(1) of the conditions of the human body in health, and (2) of the anatomy and physiology of the parts which may suffer from accidents. Only those parts subject to accidental injuries need be studied here.

CHAPTER I.

ANATOMY AND PHYSIOLOGY.

For Ambulance and First Aid purposes the body may be considered according to its regions and its systems, and afterwards it will be convenient to classify injuries and their treatment under these headings.

The Regions of the body are:—

The Head—consisting of the brain-case and face.

The Trunk—Thorax, or chest, containing the heart and lungs. Abdomen, or body, containing liver, kidneys, intestines, glands, and bladder.

The Limbs—the upper extremity: shoulder-blade, collar-bone, arm and hand. The lower extremity: leg and foot.

The Systems of the Body are:—

(I.) The Osseous, (II.) Ligamentous, (III.) Muscular, (IV.) Skin, (V.) Circulatory, (VI.) Respiratory, (VII.) Nervous, (VIII.) Digestive, (IX.) Urinary.

I.—THE OSSEOUS, OR BONY SYSTEM OR SKELETON, forms the framework.

Its uses are:—(1) To support the body; (2) to protect delicate organs; (3) to serve as levers for the muscles to act on.

The Bones combine greatest strength with the least weight, and are adapted to suit special requirements. In youth the ends of the long bones are joined on to the shaft of the bone by gristle, these growing ends of bone being called epiphises; in youth bones have most elasticity, in adults they are strongest, in old age they become most fragile.

The Bones of the Head (22 bones)

(1) Brain-case, 8 bones.
(2) Face, 14 bones.

Their uses are:—(1) To protect the greater and lesser brain and medulla; (2) to contain and protect the nerves of Special Sense, *e.g.*, smell, sight, hearing, taste.

The Bones of the Spinal Column (24 bones or vertebræ), 7 Cervical or neck, 12 Dorsal or back, 5 Lumbar or loin, and 9 false (sacrum and coccyx).

Between each vertebra lies an elastic pad of gristle or cartilage, which prevents jars, and gives flexibility and suppleness. The vertebræ are held together by ligaments, the two upper cervical vertebræ are called the atlas and the axis. The Spinal Cord is contained in the canal formed in the centre of the Spinal Column, the nerves to and from the body passing through openings between the vertebræ.

The Ribs (12 bones on each side) extend around the chest, from the spinal column behind, to meet the breast-bone or sternum in front, forming a cage to protect the heart and lungs.

The Pelvis, formed by the union of the haunch bones or ilia and the sacrum and coccyx, contains the bladder, forms a firm base for the human frame, and connects the legs with the body.

The Limbs—Upper and Lower, arms and legs:—

The upper consists of the shoulder blade or scapula, collar bone or clavicle, arm bone or humerus. Forearm composed of two bones, the radius and the ulna. The wrist, eight small bones; the fingers and thumb, 19 bones. The lower consists of the femur or thigh bone, the leg bones, the tibia and fibula, the patella or knee cap, the ankle bone or astragalus, the heel bone or os calcis. The foot 26 bones, forming a double arch.

II.—THE LIGAMENTOUS SYSTEM.

The bones of the body are everywhere united by firm fibrous bands which firmly hold the bones together, but at the same time allow of necessary movements by forming joints. **Joints are**:—(1) hinge joints, (2) ball and socket joints, (3) mixed joints, (4) fixed joints, *e.g.*, sacrum and skull. The ends of bones in moveable joints are covered with polished gristle, lubricated with a fluid called synovia.

III.—THE MUSCULAR SYSTEM.

The muscles form the flesh of the animal, and develop or waste in proportion as they are used. Their use is:—(1) to lift weights, (2) to maintain the figure erect, (3) to perform locomotion and prehension, and the involuntary movements of life, *e.g.*, heart beats. The muscles act by contraction, being controlled by nerves conveying impulses to them from the brain.

Muscles generally end in a tendon or sinew, *e.g.*, the hand or foot. They are classified as:—(1) voluntary or skeletal muscles, (2) involuntary muscles, *e.g.*, the heart and intestinal muscles.

The diaphragm, the chief muscle of respiration, divides the thorax from the abdomen, is involuntary.

IV.—THE SKIN is composed of two layers (1) epidermis or cuticle, (2) dermis or true skin. It covers and protects the body, and contains sweat glands and sebaceous glands, the hair, nails, small blood vessels, and nerves of touch and sensation embedded in it. Perspiration takes place through pores in the skin, and is a valuable automatic controller of the body temperature.

V.—THE CIRCULATORY SYSTEM consists of the heart, arteries, veins, capillaries and blood. **The heart** is a four-chambered double involuntary muscular pump, which by contracting and expanding maintains the flow of blood in the blood vessels. **Blood** is composed of a straw-coloured fluid, rendered red from the colour of the millions of flat bi-concave discs floating in it, called blood corpuscules. **The use of the Circulatory System is**—(1) to convey nutrition to the body, (2) to convey warmth to the body. An artery cut bleeds in jets, bright-red, arterial blood flowing away from the heart. A vein cut, the blood wells up, dark-red, venous blood flowing towards the heart. The "pulse" beats 72 per minute, can be felt wherever an artery lies on a bone: it indicates the force and regularity of the heart's beats.

The arteries convey the blood from the heart, their walls are largely elastic and muscular: they consist of a series of tubes, dividing and sub-dividing all through the body, until they become so small that they terminate in capillaries.

The right ventricle drives the blood into the **pulmonary artery** for the lungs.

The left ventricle drives the blood into the **aorta** for the body.

The arteries receive different names in different parts of the body: from the heart comes off the **aorta,** the largest artery. This is called the **thoracic aorta** in the chest, the **abdominal aorta** in the abdomen. From the arch of the thoracic aorta spring three large blood vessels to supply the head and upper limbs; they are (1) **the innominate** artery, which divides into the right common carotid, for the right side of the head; the right sub-clavian artery, for the right upper limb. (2) **The left common carotid,** to supply the left side of the head. (3) **The left sub-clavian** for the left upper limb.

The carotid arteries divide into (1) the internal, which goes into the brain, (2) the external which passes up the side of the neck to supply branches to the head and face, of which the **temporal** and **facial** arteries are important to remember.

The sub-clavian passes over the first rib and under the inner third of the collar bone to the armpit, where it is called the **axillary artery,** it then passes inside the arm where it is called the **brachial artery;** at the elbow this divides into the **radial** and **ulnar** arteries in the forearm. It is important to remember that in the palm branches of these two arteries meet and form superficial and deep arches, from which branches supply the fingers.

The abdominal aorta ends in two large vessels: the iliacs, which appear in the groin and thigh as the **femoral artery,** passing behind the knee it becomes the **popliteal artery,** which divides into the **anterior and posterior tibial arteries** in the leg. The anterior tibial supplies the front of the foot as the dorsalis pedis. The posterior tibial passes behind the inside of the ankle to the sole of the foot, where it divides into the external and internal plantar arteries to supply the foot and toes.

The veins have fibrous walls and valves inside them, the blood flows in them in a steady stream, towards the heart, and is darker in colour.

The course of the circulation of the blood is as follows:— Venous blood enters the right auricle from the veins, and is conveyed to the right ventricle of the heart.

The right ventricle contracts and drives the venous blood through the lungs for purification.

The purified or arterial blood is returned from the lungs to the left auricle, which sends it into the left ventricle.

The left ventricle contracts and drives the blood into the arteries and through the body to the capillaries.

The arteries sub-divide until they become very small and end in capillaries.

The capillaries convey the arterial blood to the tissues, and re-unite to convey the blood to the veins, which return the blood to the right auricle.

VI.—THE RESPIRATORY SYSTEM consists of the windpipe, the lungs, diaphragm, ribs and intercostal muscles. Respiration is carried on chiefly by the action of the diaphragm muscle, which by its contraction and flattening tends to form a vacuum

in the chest, causing the lungs to expand and draw in air: this action is aided by the intercostal muscles. Ordinary respiration takes place about 18 times a minute, or once to every four heart beats. The lungs are two elastic bags, termed the right and left lung: they fill the greater part of the thorax. The trachea or windpipe passes downwards from the larynx below the nose and mouth and divides into two branches, one to each lung. These branches sub-divide again and again, ending in air-cells, around which are capillaries containing blood from the pulmonary arteries. Here the air is brought into close contact with the blood corpuscles and yields up part of its oxygen to them, purifying the blood and changing its colour from dark venous to bright arterial red.

Inspired air, or atmosphere, contains about 79 parts of nitrogen and 21 parts of oxygen, with a trace of carbon dioxide gas in each 100 parts.

Expired air is saturated with moisture, and contains about 79 parts of nitrogen, 16 of oxygen, and about 4 parts of carbon dioxide, in 100 parts. A healthy adult breathes about 25,000 times in 24 hours, and requires 3,000 cubic feet of air per hour.

VII.—THE NERVOUS SYSTEM.

There are two systems of nerves: **the sympathetic,** controlling the involuntary muscles of the chest and abdomen; and **the cerebro spinal system,** consisting of the greater brain or cerebrum. The lesser brain or cerebellum, the pons and medulla oblongata, the spinal cord, the nerves of special sense, and the motor and sensory nerves.

The cerebro-spinal nervous system regulates and controls the body and all its movements. The brain is the seat of the will, the emotions, the intellect, and the senses; and messages or impressions are conveyed from and to the brain constantly from all parts of the body.

The cerebrum or brain receives and transmits impressions from and to the body, through nerves of the body conveying them to and from the spinal cord, and controls thus: messages of sensation pass from the nerves of touch in the skin, through the sensory nerves of the body to the spinal cord, and from there to the brain, where these sensations are interpreted. Then motor messages originate in the brain and pass down the spinal cord, through the motor body nerves to the muscles, and remove the limb from pain or danger.

The right side of the brain controls the left side of the body.

The left side of the brain controls the right side of the body.

The cerebellum or lesser brain co-ordinates movements, *e.g.*, allows us to walk without having to think about it.

The pons and medulla connect the brain and spinal cord.

The spinal cord transmits impressions between the brain and body, and controls certain forms of movements.

The nerves are divided into **nerves of special sense, nerves of motion,** and **nerves of sensation.**

The nerves of special sense are the nerves of (1) smell, (2) sight, (3) taste, (4) hearing, (5) touch.

VIII.—THE DIGESTIVE SYSTEM consists of the mouth, gullet, stomach, intestine, liver and pancreas. By it food is digested and absorbed by the body and the refuse excreted.

IX.—THE URINARY SYSTEM consists of the kidneys, ureters and bladder.

The kidneys eliminate a poison called urea, and other substances from the blood. These poisons are conveyed to the bladder by two tubes, called the ureters.

CHAPTER II.

INJURIES TO THE LIGAMENTOUS AND OSSEOUS SYSTEM.

SPRAINS, DISLOCATIONS, AND FRACTURES.

I.—SPRAIN.—Injury to or rupture of the ligaments which surround a joint, without dislocation of the bones.

Symptoms and signs—(1) pain, with loss of power; (2) can only occur at a joint, which swells and discolours; (3) no deformity at first, joint moveable, but painful; (4) absence of "crepitus."

Treatment: support the part without pressure, by bandages, in most comfortable position. Cold applications. Prevent further injury.

II.—**DISLOCATION.** — Rupture of the ligaments and displacement of the ends of the bone.

Usual signs and symptoms of dislocation—(1) occurs only at a joint; (2) limb becomes fixed instead of unduly moveable; (3) gentle pulling will not remove unusual appearance; (4) absence of crepitus.

Treatment of dislocations—(1) support in most comfortable positions with splints and bandages; (2) prevent further injury; (3) do not attempt to reduce it; (4) take to a medical man or hospital.

III.—FRACTURES are caused by **direct** or by **indirect** violence, and may be (1) **complete,** or (2) **incomplete** (termed "greenstick," occurs in children), (3) **impacted** (telescoped); and are classified as :—

Simple—the bone only is broken, and only at one place.

Compound—the bone and skin are both broken.

Comminuted—the bone is broken in more than one place.

Complicated—in addition to the bone, other organs are injured, *e.g.*, a joint, brain, lung.

Usual signs and symptoms of fracture—(1) loss of power of the limb; (2) pain and swelling at the seat of the injury; (3) unnatural movement at the seat of the injury; (4) deformity appearing suddenly; (5) deformity disappears on gentle pulling, but readily returns; (6) crepitus—the sensation of grating of broken bones, no crepitus in incomplete and impacted fractures; (7) the broken ends of the bone may be felt under the skin.

Treatment of ordinary fractures—(1) careful manipulation (a simple may become a compound fracture by unskilful manipulation); (2) do not needlessly expose the patient; (3) gently reduce the deformity and cleanse the skin; (4) put a pad next to the skin; (5) put in most comfortable position; (6) apply splints outside the pads; (7) apply no pressure directly over the fracture; (8) compare the injured with the sound limb; (9) secure the upper fragment first; (10) fix the joint above and the joint below the fracture by bandages and splints; (11) convey patient to a doctor or hospital.

No splints are applied to fractures of the skull, ribs, or collar bone, and scapula.

Splints—Use umbrellas, cycle pumps, straw bottle covers, billiard cues, broom handles, truncheons, box lids.

Bandages—See Chapter XI.

SPECIAL FRACTURES.

FRACTURES ABOUT THE HEAD AND FACE.

(1) **Fracture of the vault of skull**, caused by direct violence, serious owing to shock and brain injury. Cleanse the wound, apply cold, and capeline bandage; treat for shock.

(2) **Fracture of the base of the skull,** by direct or indirect violence; very serious. Signs: bleeding from nose and ears or mouth; apply cold, lay patient down, treat shock, don't plug ears.

(3) **Fracture of nose**—apply cold, pads and splints each side of nose; lay patient down, treat hæmorrhage.

(4) **Fracture of lower jaw**—fold triangular bandage narrow, apply to chin, cross at one ear, tie at opposite ear; stop bleeding.

Fracture of the spine—dangerous, because it injures spinal cord and paralyses the body below the seat of the fracture; usually immediately fatal when in the neck—Prevent movement, treat shock (see page 21).

Fracture of the scapula—Treatment: apply bandage in the armpit and tie it on opposite shoulder—Large arm sling.

Fracture of the clavicle or collar bone is caused by direct or indirect violence. Sign: patient supports the elbow in his hand. Treatment: raise the injured shoulder by a pad in the armpit, held in position by a narrow bandage tied on sound shoulder, then apply the Arm sling and a Retaining bandage. (See Chapter XI.)

Fracture of both collar bones—apply pads and keep the shoulder back by narrow bandages tied round each arm, passed behind and tied in front over the crossed wrists.

Fracture of the shaft of the humerus or arm bone—Treatment: apply splints outside, behind and in front, but **not inside** the arm; support in lesser arm sling.

Fracture of the neck of the humerus—Treatment: bind arm to the chest by broad bandage tied on the opposite side; apply lesser arm sling.

Fracture of fore arm—Treatment: apply splints back and front and support in larger arm sling and retaining bandage.

Fracture of the wrist (Colles' fracture)—the hand is spoon-shaped. Treatment: apply front splint from wrist to elbow, back splint from fingers to elbow, larger arm sling and retainer.

Fracture of the fingers—pasteboard splints, Lesser arm sling.

Fracture of the ribs—signs and symptoms: pain and difficulty in breathing or coughing. Treatment: apply two broad bandages to the injured side, one above and overlapping the other, tie ends wide apart on opposite side; lesser arm sling on injured side. If lung is injured, sign: blood coughed up. Treatment: apply lesser arm sling, no other bandage. Give ice to suck and swallow.

Fracture of pelvis (generally a complicated fracture)—treatment: apply a broad bandage round the hips; lay the patient flat.

Fracture of the thigh—(1) fracture of the neck of the femur, generally in aged people, and caused by indirect violence; (2) fracture of the shaft of the femur, generally by direct violence. Treatment: apply a long splint from armpit to foot, and an inside splint, both protected with pads and retained by bandages; tie both feet together. Women: splint and bandages go outside the dress; no inside splint.

Fracture of the patella or knee cap, caused by direct or by indirect violence. Treatment: pull down the upper fragment and retain by a narrow bandage, fix a back splint with bandages above and below, tie both feet together, remove on shutter.

Fracture of the leg—Treatment: apply splints inside and outside the leg, pads and bandages; tie both feet together.

Fracture of the foot—Treatment: apply well-padded splint to the sole of foot, fix with figure of eight bandage.

Process of repair of bone fractures.—When bones are broken, a substance called callus exudes around broken ends, gradually this substance hardens and unites the broken bone, and then becomes wholly or partially absorbed, leaving the bone as strong, if not stronger, than before.

CHAPTER III.

INJURIES TO THE SKIN AND MUSCULAR SYSTEM.

I.—SKIN.

Wounds are caused by breach of the skin and usually involve the muscles and tissues beneath it.

WOUNDS.

Wounds are classified as:—(1) incised; (2) punctured; (3) lacerated and contused; (4) poisoned; (5) gunshot.

Repair of wounds takes place either by primary union or first intention, or by secondary union or second intention.

Incised wounds are made with sharp instruments and bleed freely.

Punctured wounds are most dangerous, though the external wound is small, internal organs or large blood vessels may be injured. May be caused, *e.g.*, by a duelling rapier.

Lacerated wounds, generally caused by machinery, seldom bleed so much, as the blood vessels get torn and twisted, but are often followed by secondary bleeding.

Gunshot wounds vary with the distance from the explosion: (1) if near, the skin around may be burnt and blackened; (2) if from afar, the external opening may be small.

Poisoned wounds, even though small, are often followed by much inflammation, *e.g.*, stings of wasps and mosquitoes. Treatment: after extracting the sting, apply alkalies such as ammonia water, sal volatile, baking soda.

Snake bites introduce a dangerous poison into the blood. Treatment: (1) apply tight pressure around the injured limb, above the wound to prevent the venous blood carrying the poison through the body, rub in permanganate of potash.

(2) Encourage bleeding with hot water.

(3) Cauterise the wound with pure carbolic acid, or with caustic.

(4) Treat shock, apply artificial respiration, if required, page 18.

Bites of Dogs or Cats may be classified—

(1) If the animal is rabid (rabies is now stamped out in England). Treatment: as above. Take to doctor at once.

(2) If animal is healthy, poisonous substances lodged in the animal's teeth may enter the wound and poison it. Treatment: cleanse the wound with antiseptics. Take to doctor.

Abdominal wounds:—

(1) If the wound is tranverse, lay on one side, bend the knees.
(2) If the wound is upwards and downwards, lay patient out flat.
(3) If the intestines protrude, cover them with warm moist cloths, and keep them warm.

General treatment of wounds—(1) **arrest bleeding**; (2) **cleanse thoroughly** with antiseptics, or with water that has recently boiled, using cloths that have been boiled; (3) bring the edges together, retain them with sticking plaster and bandages; (4) treat shock if any; (5) arrest secondary bleeding.

FOREIGN BODIES IN THE EYE, EAR, OR NOSE.

Foreign bodies in eye—Treatment: a few drops of castor oil, pull apart the eye lids, remove with camel-hair brush. Use weak boracic lotion; do not rub the eye.

Foreign bodies in ear—turn the head one side, they may fall out, or if within sight, may be removed with the blunt end of a hair-pin, using care not to push the foreign body in further. Peas soon swell in moisture, and should not be syringed. If not within sight, take to a doctor at once.

Insects in the ear are removed by pouring in glycerine or oil, and afterwards turning the head well on the side.

Foreign bodies in the nose—Treatment: close the unaffected nostril, and blow the nose forcibly.

Fish-hooks in the skin cannot be withdrawn in consequence of the barb. Treatment: cut away the dressing around the shaft of the hook, and push it through.

Needle under the skin—keep the part at rest on a splint.

Bruises—blows on the skin may cause extensive bleeding underneath it without breaking the surface: this causes subsequent discolouration and swelling. Treatment: apply ice, or cold water bandages, cold stones, or cold metals.

Sunstroke or heat stroke—usually caused by exposure of the back of the unprotected head and neck to the sun's rays in summer. Heat stroke, by working in hot places, *e.g.*, stoke holes. Signs: faintness, collapse, sighing, irregular breathing, feeble pulse, high body temperature. Treatment: remove the person to a cool, shady place, apply cold douche to head, give internally sal volatile or strong coffee; lay the patient down.

Frost bite—usually affects extremities as ears, nose, fingers, producing discolouration and loss of sensation, and if prolonged, mortification. Treatment: (1) rub the part with snow gently until circulation and sensation are restored; (2) gradually bring the patient into warmer atmosphere; (3) give hot coffee or restoratives.

Burns and scalds—burns are due to dry heat, *e.g.*, flame; scalds are due to moist heat, *e.g.*, steam, hot water, molten metal. They are of three degrees of severity: (1) redness of the skin, (2) blistering, (3) charring.

Treatment for persons whose clothing is on fire:—

(1) **First lay them down flat** on the ground; (2) throw mats, rugs or coats over them, and roll them on the ground; (3) drench the parts with water; (4) extinguish petrol, motor spirit, with sand.

Treatment of burns or scalds: cut away the clothing with sharp scissors, dress with carron oil (linseed oil and lime water), exclude the air with strips of linen dipped in the oil, cover with cotton wool or flannel; treat shock.

The skin may also be burnt by corrosive chemicals:—

If the burn is caused by a corrosive acid, bathe it with weak alkaline solutions, *e.g.*, baking soda.

If the burn is caused by corrosive alkalies, bathe it with weak acid lotions, *e.g.*, vinegar and water.

If the burn is caused by quicklime, brush away any lime that remains before using water.

If a burn is caused by carbolic "acid," apply oil freely to the skin.

II.—MUSCULAR SYSTEM.

Strains and torn muscles are caused by great exertion, the muscle or its tendon may break. Signs: sudden pain with loss of power, may occur in back or limbs. Treatment: rest in most comfortable position, lying down. Apply hot bottles or poultices.

Hernia or rupture is the protrusion of the intestines through the abdominal muscular wall; it may occur at (1) the groin, (2) the umbilicus, (3) the scar of an abdominal wound. Treatment: lay the sufferer down, bend the knees, apply hot poultices; if the patient complains of pain, or is faint or vomits, send for medical aid at once.

To remove a tight finger ring—bandage the finger around tightly, with tape, from the nail to the ring, wet and soap the ring, unwind and slip the ring off.

CHAPTER IV.

INJURIES TO THE CIRCULATORY SYSTEM.

HÆMORRHAGE, or Bleeding may be—

(1) **Internal**—signs: fainting, pallor, feeble pulse, cold skin, sickness. Treatment: absolute rest, lying down, head low, loosen clothing, warmth to the feet and body. Give no alcoholic stimulants. Send a note to the doctor saying what is wrong.

(2) **External** or visible, which is therefore more readily observed and controlled. All bleeding requires prompt attention.

Hæmorrhage may be I. Arterial, II. Capillary, III. Venous.

I.—Arterial—the blood is bright red in colour; spurts in jets.
II.—Capillary—the blood oozes from several minute spots.
III.—Venous—the blood is dark purple, and wells up.

Treatment of Hæmorrhage—

(I.) **Raise the limb.**

(II.) **Bend the limb.**

(III.) **Apply cold,** ice, iced water, cold metals or stones.

(IV.) **Apply pressure,** which may be—

(a) **Digital** by the fingers.
(b) **Instrumental** (by a tourniquet, elastic band, or knotted handkerchief).
(c) **Direct** (on the bleeding spot).
(d) **Indirect** (on the artery leading to the spot).

Nature arrests hæmorrhage by—

(1) The formation of a clot, closing the blood vessel.
(2) Rupture of arteries, curling inwards of the arterial walls, and narrowing of the lumen of the vessel at the wound.
(3) Faintness reducing the force of the heart beats and pulse, and therefore reducing the force of the blood stream in the arteries.

Places where indirect pressure is applied to arrest arterial bleeding.

(1) **Carotid artery in the neck.** Pressure **inwards and backwards** in front of the centre of the sterno-mastoid muscle.

(2) **Facial artery.**—Centre of lower jaw, in front of the masseter muscle; or two fingers' breadths in front of the angle of the jaw.

(3) **Occipital artery.**—Two fingers' breadths behind ear.

(4) **Temporal artery.**—In front of the ear.

(5) **Sub-clavian artery.—Downwards** on to first rib, behind the inner end of the collar bone.

(6) **Axillary artery.**—Outwards and upwards against the head of the arm bone in the armpit.

(7) **Brachial artery.**—Pressure outwards from the inside of the centre of the arm.

(8) **Radial and ulnar arteries.**—Pressure at the wrist.

(9) **Femoral artery in the groin.**—Pressure downwards at a point two inches below the centre of a line drawn from the anterior crest of the ilium to the centre of the body.

(10) **Femoral artery in the thigh.**—Pressure outwards at the inner side of the lower end of the upper third of the thigh in a line drawn from the anterior crest of the ilium to the inside of the knee.

(11) **Popliteal artery.**—Behind the knee, bend the joint, pad, and bandage.

(12) **Anterior tibial.**—On the front of the ankle, for the dorsum of the foot.

(13) **Posterior tibial.**—Inner side of ankle for sole of the foot.

For bleeding from the sole of the foot.—Take three wine-bottle corks, put one behind inner side of the ankle, one behind outer ankle, and one in front of the ankle, and bind them all on tightly with a bandage folded narrow.

Bleeding from the hand.—In the palm the arteries unite to form the palmar arch, so pressure on both radial and ulnar arteries may be necessary to stop bleeding here.

Nose bleeding.—Raise the head, loosen the collar, apply cold to the back of the neck and the bridge of the nose.

Bleeding from the lung.—Lay the patient down, give fresh air, loosen clothing, give ice to suck; lying on the injured side if the broken rib penetrates the lung. In all cases of bleeding which cannot be immediately stopped by first aid methods, send at once for a doctor, sending a note to explain what is wrong, or convey the patient carefully on a shutter or hurdle to the doctor.

Venous bleeding, *e.g.*, varicose veins of the leg.—Raise the limb, remove constrictions on the heart side of the wound; apply pressure directly on, and above and below the wound.

CHAPTER V.

INJURIES TO THE RESPIRATORY SYSTEM.

DROWNING AND SUFFOCATION.

The respiratory system consists of the windpipe, bronchial tubes, lungs, diaphragm, and respiratory muscles. Healthy respiration takes place 18 times per minute.

Suffocation may be due to obstruction to respiration outside or inside the chest.

I.—Obstruction outside the air passages.
Pressure on the ribs (in a crowd), pressure on the windpipe (strangling), pressure on the nose and mouth (smothering).

II.—Obstruction inside the air passages:
Food, coins, false teeth, fishbones or diphtheritic membrane in the windpipe, gas, vapours, or water in the lungs (drowning).

Hanging.—First raise the body, then cut the rope, and start artificial respiration at once; don't wait for a policeman.

Strangulation and **Smothering.**—Remove the band constricting the throat, or the obstruction to the nose and mouth, air passages, and apply artificial respiration.

Choking.—Pass the finger down the throat and hook up the obstruction (or, failing that, push it down into the stomach), thump on the back, induce vomiting.

Suffocation by gas or smoke.—Remove the person into the fresh air, start artificial respiration. When entering a room full of coal gas, extinguish any burning light outside the door before opening it, and never strike a light if you can smell escaped gas.
When entering a room full of smoke or fumes, crawl in on the hands and knees, having covered the nose and mouth well with a damp handkerchief.

Drowning.—Insensibility may be due to:
(1) Fainting. (2) Suffocation.

Rules for persons unable to swim, when in danger of drowning:
(1) Keep the head back. (2) Keep the lungs inflated. (3) Keep the hands to the sides.

Treatment of persons apparently drowned.—Clear the mouth of weeds and froth, pull the tongue forward.

1. **Restore respiration first.**
2. **Restore circulation second.**

I.—Restore Respiration :—

(1) Remove clothing, lay body flat, face downwards, forehead resting on forearm.

(2) Pull tongue forward, apply smelling salts, stimulate the skin.

(3) If the respiration does not recommence start artificial respiration by Professor Schäfer's method, Dr. Sylvester's method, Dr. Marshall Hall's method, or by Dr. Laborde's method.

II.—Restore Circulation :—

Rub the hands and feet, warmth to the body and feet, hot blankets, give brandy, strong coffee, sal volatile, mustard leaf to the chest.

ARTIFICIAL RESPIRATION.

Continue artificial respiration in all cases vigorously for at least half an hour, or until a doctor says it is useless. Don't take advice from the crowd. Remember respiration has been restored after ten or fifteen minutes' immersion in water.

Professor Schäfer's method.—Lay the patient **face downwards,** arms extended, face on one side, use no pad, kneel beside or astride of the patient, place the hands extended over his lower ribs on each side of his back, press forcibly downwards and forwards, pause, relax, keeping the hands in position; repeat these movements about 15 times a minute, until respiration is restored.

Dr. Marshall Hall's method.—Lay the patient **face downwards,** pad under his chest, rest his forehead on his flexed arm, steady his feet, pull the other arm upwards and backwards; pause, push the arm down on the ribs; repeat these movements.

Dr. Sylvester's method.—Lay the patient **on his back,** steady the feet, extend both arms upwards above his head; pause, push both arms downwards and upwards against the ribs; continue these movements.

Dr. Laborde's method.—Lay the patient **on his side or his back,** depress his lower jaw, pull his tongue in and out. (Used when ribs are broken.)

CHAPTER VI.

INJURIES TO THE NERVOUS SYSTEM.

Injuries to the brain cause unconsciousness.

Injuries to the spinal cord produce paralysis.

INSENSIBILITY.

The following conditions may produce insensibility :—

(1) **Excess of blood to the brain :** as in apoplexy, congestion, inflammation.

(2) **Insufficiency of blood to the brain :** fainting. Shock.

(3) **Injury to or disease of the brain :** concussion, compression, electric shock, epilepsy, hysteria.

(4) **Poisons to the brain** (conveyed by the blood) : drunkenness, narcotic poisoning, nephritis.

Apoplexy.—Onset sudden, insensibility more or less complete, respiration snoring, face red, mouth drawn to one side, one side of the body paralysed, **pupils unequal.**

Treatment : loosen clothing, lay body flat, raise the head, keep quiet, put ice or cold water to the head, hot bottles to the feet. **Do not give any stimulants by the mouth.**

Fainting and shock.—Onset generally rapid, face pale, lips livid, respiration shallow.

Treatment : loosen clothing, lay body flat, head low, apply smelling salts, rub hands and feet and apply hot bottles to them, give fresh air.

Concussion.—Onset rapid, follows injury to head, face pale, respiration feeble, insensible, but can be roused generally, **pupils contracted.**

Treatment : lay flat, remove tight clothing, cold to the head, warmth to the feet. Remember, fatal **Secondary unconsciousness** may follow even brief insensibility.

Compression.—Onset less rapid, follows an injury to the head. Face may be drawn to one side, respiration snoring, insensible, cannot be roused. One side of the body paralysed ; **pupils unequal.**

Treatment : lay flat, raise the head. Cold to the head. Loosen clothing. Do not give any stimulants by the mouth.

Epilepsy.—Onset rapid, often preceded by a cry, insensibility complete, **pupils equal generally dilated.** Arms, legs, and face convulsed. Lasts only a few minutes. Patient remains confused and generally goes to sleep.

Treatment: prevent him hurting himself, place something soft between his teeth. Allow him to sleep.

Hysteria.—Symptoms variable, general excitability.

Treatment: remove to a quiet place. Firmness without harshness.

Drunkenness.—Insensible more or less, respiration feeble, body temperature lowered, both sides of body equally helpless, **pupils dilated.**

Treatment: keep warm, give emetics, turning patient on the side.

Remember that unconscious people who smell of drink, are not necessarily drunk. They may have felt ill, and have taken spirits before they fell down.

Opium and Morphia poisoning.—(Opium is in laudanum, paregoric, chlorodyne, and most cough mixtures). Signs: sleepiness, faintness and **contracted pupils.**

General treatment for insensible persons:—

I.—Obtain history of the case, and note particulars of position and persons.

II.—Observe presence or absence of the smell of drink.

III.—Remove tight clothing, give fresh air, do not expose patient to cold, prevent further injury.

IV.—Raise the head if it is flushed, lower the head if it is pale.

V.—Place the patient on left side to assist, right to resist, vomiting.

VI.—Place the patient on the face if respiration is feeble.

VII.—Note the condition of the respiration.

VIII.—Note the condition of the pulse.

IX.—Note the condition of the pupils.

X.—Ascertain cause of insensibility before giving spirits.

XI.—Examine the head for wounds or injuries.

Convulsions.—Occur usually in infancy, the limbs and face twitch violently. Treatment: place the infant in a warm bath for twenty minutes, adding warmer water as the bath cools, surround with a blanket, cold sponges to the head, afterwards wrap in a blanket, with hot water bottles in bed.

Convulsions are caused by :—

(1) Infants : teething, indigestion, beginning of fevers.
(2) Adults : kidney disease, strychnine poisoning, epilepsy.

Treatment : see above and below.

Shock.—A partial suspension of the vital functions. Signs : faintness, shallow breathing, pallor, cold skin, feeble pulse, vomiting, collapse, and often unconsciousness.

Treatment : apply heat externally, give stimulants internally.

Electric shock.—May be caused by (1) lightning, (2) contact with an exposed electric wire, or electric machinery. Signs and symptoms : the patient is seized with a sudden muscular spasm, and is unable to release his hold of the electrically charged machine, his hands may thus be badly burnt.

Treatment : instantly remove the injured person from electric contact, at the same time carefully protect the rescuer from receiving an electric shock (1) by insulating the rescuer ; (2) by insulating his hands.

N.B.—Dry earthy, or dry woollen materials are non-conductors, but metals and moisture conduct electricity.

(1) The rescuer stands on dry glass, dry china, dry bricks, jam pots, dry clothing, dry hay, or a dry india rubber mat.
(2) The rescuer protects his hands with india rubber gloves, india rubber tobacco pouch, or cap, dry newspapers, or a dry coat.
(3) The rescuer pulls the injured person away with his hands, or an umbrella handle, but remember many umbrellas have metal handles, and so are dangerous.

Apply artificial respiration, give restoratives, cold water to the face ; treat the burns.

The following conditions produce paralysis :—

Severance or Injury of the Spinal Cord, caused by fracture-dislocation of the spinal vertebræ involving the spinal cord, produces paralysis, with loss of sensation and motion below the injury.

In the Cervical region generally instantly fatal.

In the Dorsal region, paralysis below the injury, except of the Diaphragm muscle. Treatment : lay flat, absolute rest, keep warm.

Severance of the body nerves produces loss of (1) motion, (2) sensation, in the limb below the injury. Treatment : wrap up the limb, protect it from heat or cold.

CHAPTER VII.

INJURIES THROUGH THE DIGESTIVE SYSTEM.

Inflammation of the throat and gullet :—

Cause : swallowing boiling liquids, *e.g.*, children drink from the spout of a kettle, or persons drinking corrosive liquids, or by stings from wasps or bees, swallowed in fruit.

Treatment : quantities of fresh butter, or sweet olive oil over the burnt surface, give barley water to drink. Apply sponges or flannels wrung out of hot water outside the neck, or hot linseed meal poultice ; put the patient in bed and arrange a steam kettle and tent.

Foreign bodies in the stomach (swallowed buttons, coins, etc.) :—

Treatment : give porridge, boiled rice, flour and milk, bread and milk, gruel, and then make the patient sick by putting the fingers down the throat.

POISONS.

Poisons may enter the circulation :—

(1) Hypodermically, by hypodermic syringe, or by stings of plants or insects, or bites of animals.

(2) By absorption from the stomach or intestines, when swallowed.

Poisons are classified as :—

(I.) Corrosives. (II.) Irritants. (III.) Narcotics. (IV.) Convulsants.

I. and II. injure the mouth and stomach first, and are afterwards absorbed into the circulation as poisons ; III. and IV. produce their chief effects after absorption into the blood from the stomach and intestines.

I. Corrosives.—The caustic acids, *e.g.*, nitric and sulphuric. The caustic alkalies, *e.g.*, caustic potash, or soda, ammonia.

Signs : these burn and discolour the mouth and throat, leaving an intense acrid taste, burning pain from the mouth downwards, and sickness ; symptoms instantaneous.

Treatment : **do not give emetics** of any kind, give oil freely, white of egg, flour and milk, **for acids give alkalies,** *e.g.*, magnesia carbonate, baking soda, chalk or lime from the ceiling, with milk. **For alkalies give acids,** *e.g.*, vinegar, lemon juice, tartaric acid. **For carbolic " acid,"** give milk and Epsom salts mixed, or else give oil.

II. Irritants.—Arsenic, antimony, bluestone (sulphate of copper), phosphorus, sugar of lead.

Signs: no staining of the mouth, burning pain in the stomach begins after the poison is swallowed, vomiting, purging and faintness.

Treatment: first prevent their doing further injury by giving gruel, white of egg, porridge, oil (except in phosphorus poisoning). Then get rid of the poison by emetics, or by putting the finger down the throat.

III. Narcotics.—Belladonna, chloral, hyoscine, tobacco, morphia and opium (opium is contained in chlorodyne, laudanum, paregoric, and most patent cough mixtures and "soothing syrups"); alcohol, in beer and spirits.

Signs: there is a preliminary stage of excitement, more or less prolonged in alcohol and opium; short in tobacco and belladonna; and hardly noticeable in chloral; followed by a stage of drowsiness, passing into unconsciousness and death.

Treatment: give emetics. Keep the patient awake, give strong coffee, sal volatile, smelling salts, artificial respiration, hit with wet towel.

IV. Convulsants.—Strychnine (in "vermin killer"), nux vomica, aconite, hemlock.

Signs: bitter taste, painful muscular twitchings begin in the neck, and affect the whole body, increasing to convulsions.

Treatment: give oil or fresh butter, hot milk or gruel, followed by an emetic, protect from cold and noise, artificial respiration.

In all cases of poisoning send at once for a doctor, say what has happened, carefully preserve all vomited and suspected matter for medical inspection and analysis.

Treatment of unknown poisons:—

I.—**If the poison does not stain or burn the mouth: Prevent further injury** by giving olive oil, cod liver oil, cream and flour, beat-up egg, very strong tea. **Produce vomiting,** two teaspoonfuls of salt, or mustard, in a glass of warm water; tickle throat with feathers.

II.—**If the poison stains or burns the mouth,** give butter, olive oil, cod liver oil, or glycerine. **Do not make the patient vomit.**

III.—If the poison causes drowsiness, strong coffee keep awake. If choking, hot poultices to the neck. If collapse, artificial respiration.

CHAPTER VIII.

INJURIES TO THE URINARY SYSTEM.

These injuries are generally associated with other severe injuries, *e.g.*, fracture of the pelvis, crushed ribs.

The kidneys may be injured with fracture of the lower ribs, or by direct wounds, *e.g.*, a stab or bullet.

Signs: passage of blood in the water, pain, collapse.

Treatment: rest on the back, quiet, hot poultices.

The bladder, usually injured when the pelvis fractures.

Signs: inability to pass water following severe crush of pelvis, *e.g.*, railway accident; collapse.

Treatment: rest on the back, bend the legs, hot poultices; treat shock.

CHAPTER IX.

STRETCHERS AND TRANSPORT OF THE INJURED.

Ladders, shutters or hurdles may be improvised as stretchers, and covered with rugs, coats, sacks or hay.

IMPROVISED STRETCHERS.

(1) **Rifle stretcher.**—Spread out a blanket, lay two unloaded rifles parallel, and pointing in the same direction, on it. Fold the ends over, carry the side of the blanket over one rifle to the other, and do the same with the opposite side, forming a stretcher with three thicknesses of blanket under the patient.

(2) **Pole stretcher.**—Take two long poles, lay them parallel on an outspread blanket, roll the sides of the blanket round the poles until they are about two feet apart, and tie them.

(3) **Coat stretcher.**—Button two coats down the front, turn the sleeves inside out, and push the poles down the arm-holes.

METHODS OF CARRYING.

(1) **By a single bearer.**—The bearer puts his shoulder under the injured person's armpit, and his arm round his waist, then pulls the injured man's arm over his shoulder, and holds his hand to steady him.

(2) **Pick-a-back.**—The bearer carries the injured on his back, holding his legs.

(3) **The fireman's lift.**—The bearer kneels and turns the injured face downwards, passes his hands between the injured's arms and chest, clasping them on his back. The bearer then raises the injured's head and chest on to his knee, and then clasps his hands behind the injured's waist and rises, lifting the injured to the upright position. The bearer then stoops and passes his right hand between the injured's thighs and grasps a leg, passes his neck beneath the injured's body, and balancing his body on his shoulders, rises, hoisting the injured on his shoulders.

REMOVAL BY TWO BEARERS WITHOUT A STRETCHER.

The two-handed seat (for the helpless).—The bearers stand on each side of the injured, facing each other, and each pass an arm around his chest at the armpits, raise him, and then passing their

other arms under his knees, they rise and carry him, seated on their clasped hands, with his arms around their necks, if possible.

The three-handed seat (for the partly helpless).—One bearer grasps his own left wrist with his right hand; the other bearer grasps these hands with one hand, forming a seat, placing his disengaged hand on the first bearer's shoulder. The injured sits in this seat and puts his arms round their necks.

The four-handed seat (for injured who can help themselves).—Each bearer grasps his left wrist with his right hand, and the other bearer's right wrist with his left hand.

REMOVAL BY TWO BEARERS WITH A STRETCHER.

The injured lying flat, the stretcher is placed, its foot at his head, in a line. The bearers stand in front of each other, and bend, pass their hands under the injured, lift him and move him forward on to the stretcher.

REMOVAL BY THREE BEARERS WITH A STRETCHER.

The bearers are numbered 1, 2, 3.

The stretcher is placed close on one side of the injured.

The bearers stand on his opposite side.

The bearers pass their hands under the injured, and altogether raise him as high as their knees, pause, and then lower him on to the stretcher.

Next 1 and 2 take hold of the ends of the stretcher, 3 guarding the injured from the side, and march.

At the destination, the injured is lifted off the stretcher by bearers 1 and 2 on one side, and 3 on the opposite, passing their hands under him, and then they take side steps until they clear the stretcher and are over the prepared bed.

REMOVAL BY FOUR BEARERS WITH A STRETCHER.

The bearers are numbered 1, 2, 3, 4.

The stretcher is placed parallel with the injured—2 feet from him.

Bearer 4 gives the orders. Bearer 3 is the tallest.

Bearers 1, 2 and 3 stand on one side of the injured.

Bearer 4 stands on the other—all facing inwards.

The bearers all pass their hands under the injured, raise him, and pause, resting him on the knees of 1, 2 and 3. Then 4 places the stretcher under the injured and he is lowered on to it, 4 helping from his side.

1 and 3 then hold the ends of the stretcher, raise it and march, 2 and 4 remaining on each side of the injured.

The marching being with short 20-inch steps and bent knees.

CHAPTER X.

PREPARATION FOR RECEIVING THE INJURED.

Selecting the room.—Choose the patient's own room if it is one easily reached, on the ground floor, with wide door and passage. Good light but convenient workable blinds and curtains. Clear all passages, remove useless furniture.

The bed.—A single one (3ft. or 3½ft. by 6½ft.) with hair mattress, should stand free from the wall, both its sides accessible, with hot-water bottles (screw-stoppered beer bottles in stockings), and blankets ready. A couch to undress the injured should be in readiness, also two chairs to rest a stretcher on. Remove loose mats from the passages and room.

The draw-sheet should be prepared thus: fold a sheet into four, lay it across the bed, roll one side, tuck in the other.

A fracture bed is made by passing wooden planks under the mattress from head to foot.

A cradle may be extemporised by a bandbox, or a corkscrew passed through the blankets, the point then protected by a cork; the handle is raised by a string from the ceiling, and with it, the blankets.

Temperature: Light a fire for ventilation, keep the room at 60° Fahr.

The windows should be open at the top, and have blinds.

Sand bags: Prepare stocking-shaped bags full of sand for fractures.

Removing the clothes:—

From arms: Remove from **the uninjured arm first.**

Trousers: Slit down the outer seam, if necessary.

Boots: Unlace and slit the back seam.

Shirt: Cut down the front.

In burns, cut the clothing with sharp scissors.

Have in readiness plenty of boiling water, and cold water that has recently boiled, cotton wool, olive oil, blankets and sheets, boracic acid, or boracic lotion, carbolic lotion (1 in 40), sticking plaster, linseed meal, and mustard in a tin; sal volatile; scissors.

CHAPTER XI.

ESMARCH'S TRIANGULAR BANDAGE.

[Students are advised to obtain one of these bandages, with diagrams printed on it, and the excellent paper of directions for its use, price sixpence, from St. John Ambulance Association, St. John's Gate, Clerkenwell.]

Esmarch's triangular bandages are made by cutting diagonally into two pieces, calico 40 inches square, thus making two bandages. The longest side is then called the **base.** The angle opposite the base is called the **point.** The two other angles are called the **extremities.** The **sides** lie between the **point** and the **extremities.**

The triangular bandage may be used, either—
(1) **folded,** or (2) **unfolded.**

(1) The **folded** may be used, either as a—
(a) **Broad bandage** made by carrying the point to the centre of the base, and then folding it again; or as a
(b) **Narrow bandage** made by folding the broad bandage once more.

The folded bandage is used for—

Fixing splints: pass the bandage around the limb once or twice, and tie on the outside, on the splint, in a reef knot, above and below, but not over the fracture.

Side of the head: put the centre over the dressed wound, fold around the head, and tie over the wound.

Lower jaw: embed the point of the chin in the centre of the bandage, carry the extremities upwards and backwards behind the head, cross at one ear, and carry the extremities around the head level with the forehead, and tie at the opposite ear.

Wound of temple: apply the centre of the bandage on the uninjured temple, carry the extremities round each side, cross them on the pad over the wound, then carry them, one over the head, the other under the jaw; tie on the sound temple.

Fracture of the neck of the humerus: apply the centre of the bandage on the injured part, carry the ends round the body, tie on the ribs, on the uninjured side, and apply the lesser arm sling, having flexed the arm (see Chapter II.).

Retaining bandage: flex the arm, apply the bandage around the body and the injured arm, just above the elbow, but below the wrist; tie on the opposite side; used with the Arm slings.

Fracture of the ribs: (see Chapter II.).

Fracture of the knee cap: (see Chapter II.).

Wound of the palm of the hand: put a pad in the hand over the wound, clasp the fingers around it, apply the centre of the bandage behind the fingers, and bind around; tie in front, at the wrist.

Hæmorrhage in leg or arm: apply a bandage loosely around the bleeding limb, put a pad or cork on the artery leading to the wound (see Chapter V.), insert a stick under the bandage, and twist until the bandage tightens enough to stop the bleeding.

Lesser arm sling: put the bandage in front of the chest, one extremity over the shoulder **on the injured side,** until it appears on the sound side, raise the injured arm, and bring up the other end of the bandage outside the arm and supporting it, carry it to the shoulder on the sound side, and tie there.

2. **Unfolded bandage** is used for—

Top of head, or **capeline bandage:** fold the base of the bandage about two inches, put the centre of the base on the centre of the forehead, carry the bandage over the head, the point hanging down behind, carry the extremities round the head just above the ears, cross them, and tie well down behind, enclosing point.

St. John's sling: bend the forearm, spread the bandage in front of the chest, outside the bent arm, the point in front of and beyond the elbow, carry one extremity over the shoulder **on the uninjured side,** and the other under the elbow, then up, enclosing the elbow, and across the back, and tie the point and two extremities behind the shoulder.

Larger arm sling: spread the bandage on the chest, with the point between the body and the elbow, bend the arm, carry one extremity over the shoulder **on the uninjured side,** and round the neck, until it appears on the injured side, lift the other extremity and tie both extremities above and behind the shoulder.

Fractured collar bone: enclose a pad in a narrow bandage, put the pad under the armpit on the injured side, carry the extremities across the chest and tie on the opposite shoulder;

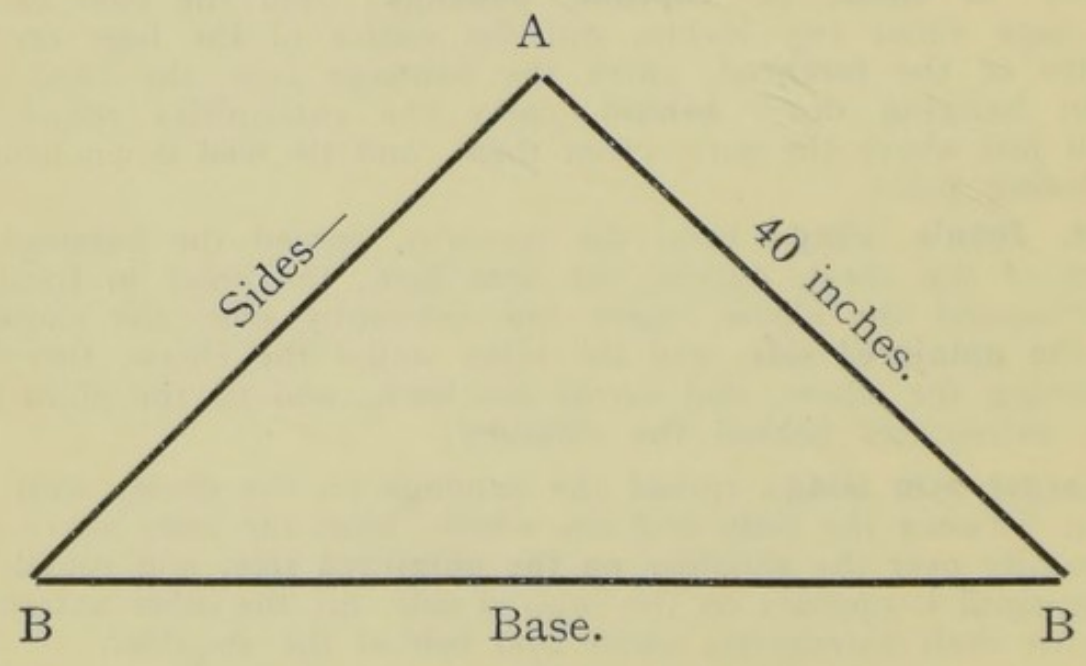
spread another bandage on the chest, point to the elbow, carry one extremity **over the uninjured** shoulder until it appears on the injured side, raise the arm bending the elbow, carry the other extremity upwards, outside the arm, and **under the armpit on the injured side,** and tie it to the other extremity behind. (This obviates pressure on the broken collar bone.)

Shoulder: spread the bandage with its centre on the injured shoulder, point upwards, fold the base, cross the extremities around the arm, and knot outside it; apply the Lesser arm sling, folding the point under it at the neck.

Hip joint: pass a narrow bandage around the waist and tie in front, spread a bandage point upwards over the injured hip, carry the extremities around the thigh and tie on the outside, tuck the point under the narrow waist bandage.

Chest: place the centre of the bandage on the chest, with the point upwards and over one shoulder, carry the extremities around the waist, and tie them, at the same time tie the point to one of the extremities.

Hand or Foot: place the hand or foot on the centre of the bandage—fingers or toes towards the point, carry the point backwards to the wrist or ankle, carry the extremities round the joint, and tie.



ESMARCH'S TRIANGULAR BANDAGE.

A—Point. B—Extremities.

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