FIRST AID IN ACCIDENTS.

BY

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WITH A FOREWORD BY

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M.D., C.S.I., K.H.P., D.SC.,

Price Re. One.

FIRST EDITION.

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TO

H. E. LORD PENTLAND, G.C.I.E.,

Governor of Madras,

President, St. John Ambulance Association,
South Indian Provincial Centre.

FOREWORD.

My friend, Dr. U. Rama Rau, has asked me to write a foreword to this small book of Notes on First Aid to the Injured, and I gladly do so.

He has, since the outbreak of war last August, been the means of instructing some 400 persons in First Aid, using as his text-book the Indian Manual of First Aid published by the St. John Ambulance Association. In compiling his lectures he had to prepare notes on the curriculum prescribed by the above Association, and these form the basis of the book. It will, therefore, be realised that this little book is to be used, not as a substitute for, but as a commentary on, and enlargement of, the official publication. As such,

I trust, it will have a large circulation in South India, not only as a help to Ambulance teachers and pupils, but also because the profits are to be handed over to the St. John Ambulance Association, and to assist the Madras Ambulance Corps.

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OOTACAMUND,
16*th June*, 1915.

PREFACE.

At a gathering of the members of the various branches of the medical profession held in September last at the Government House, Madras, H. E. Lord Pentland suggested that medical men might train up men and women in Ambulance and Nursing work as a knowledge of First Aid will be useful in peace as well as in war. Following up the suggestion of His Excellency, I started classes in First Aid for as many as 5 batches of students and others numbering over 400 in all. In arranging for a regular course of instruction, I had to consult various books and prepare notes to suit the curriculum laid down by the St. John Ambulance Association.

I have now put these notes together in the form of this small booklet in the hope that it may be of some use not only to Ambulance

students but also to the large number of pupils who attend the Lectures at the Police, Railway Ambulance Brigade, Volunteer Guards and other Ambulance Classes.

I also venture to think that this booklet may serve as a good guide to the members of the public who may be anxious to acquaint themselves with the theory and practice of "First Aid in Accidents," and thereby do what they can even though to a small extent to relieve human suffering.

My acknowledgments are due to Mr. U. L. Narayana Rau, Medical Practitioner, for his many useful suggestions and for the trouble he has taken in passing the proofs for the Press.

This being my first attempt, I need hardly say that I shall gladly welcome all suggestions for the improvement of the book.

U. RAMA RAU.

FIRST AID TO THE INJURED.

Syllabus of Instruction.

First Lecture.

A. Principles of First Aid.

B. A brief description of the human skeleton and of the muscles.

C. Fractures:—Causes, varieties, signs and symptoms.

D. The triangular bandage and its application.

Second Lecture.

A. Treatment of fractures (continued). Details of treatment.

B. Dislocations, Sprains, Strains:—Signs, symptoms and treatment.

C. The heart and blood vessels. The circulation of the blood.

D. Hæmorrhage and wounds. General rules for treatment.

E. The triangular bandage and its application.

Third Lecture.

A. Hæmorrhage and wounds (continued). Details of treatment.

B. Internal Hæmorrhage :—Signs, symptoms and arrest.

C. Hæmorrhage, from special regions :— Signs, symptoms and arrest.

D. Bruises, burns and scalds, bites and stings, frost-bite.

E. Foreign bodies in the eye, nose and ear.

F. The triangular bandage and its application.

Fourth Lecture.

A. The nervous system.

B. The organs and mechanism of respiration :— Artificial respiration.

C. Insensibility.

D. Poisoning.

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.

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INTRODUCTION.

The fate of an injured person depends on the acts of the person in whose hands he may first fall. Many precious lives are lost every year, which might have been saved by prompt aid, had any one been near-by able to render First-Aid.

First-Aid is the emergency treatment of accidents and cases of sudden illness, rendered by persons specially trained and the making use of materials at hand pending the arrival of a Doctor. There is a proverb which says that "A little knowledge is a dangerous thing." All rules have exceptions, and another proverb says that "Exception proves the rule." The great exception to the above rule is that of a little knowledge of First-Aid. A very little knowledge may in time save terrible injury, terrible agony, and even life itself. In the matter of accidents and mishaps

such as those that cause bleeding, burns, broken bones, and danger to life through drowning, poisoning or by snake-bite, it is ignorance that is the dangerous thing. Ignorance of what to do in such cases till the arrival of the Doctor has caused the loss of thousands of lives that might have been easily saved. A little knowledge of the principles and practice of First-Aid has saved thousands of lives that would otherwise have been lost. The desire to help a fellow-creature when injured, exists in most of us; but people shrink from giving aid because they do not know what to do and are afraid of doing more harm than good.

As some knowledge of the structure and functions of the human body is absolutely necessary to learn First-Aid in detail, I have dealt with the subject briefly in the opening chapter.

CHAPTER I.

Structure of the Body.

The human body is divided into (1) *The Head*, (2) *The Trunk and* (3) *The Limbs. The head* includes the face and a bony box called the cranium which encloses the brain. *The trunk* envelops the heart and the lungs (which form the organs of the chest), the stomach, the liver, the spleen, the pancreas, the intestines, the bladder, the kidneys, etc. (which form the organs of the abdomen.)

The limbs are arranged in two pairs—the arms and the legs.

The body is made up of several organs, each one having certain functions to perform. The following are the systems of which it is composed :—

i. The Bony System. ii. The Muscular System. iii. The Digestive System. iv. The Circulatory System. v. The Respiratory System and vi. the Nervous System.

(i) THE BONY SYSTEM :—The bony system consists of a large number of bones, about 200 in number, which constitute the skeleton (framework of the human body) and which support and protect the softer structures of the body. The bones are connected together in such a manner as to form joints and are held together firmly at these joints by strong white fibrous bands called *ligaments*. In some parts of the body where an elastic and yielding

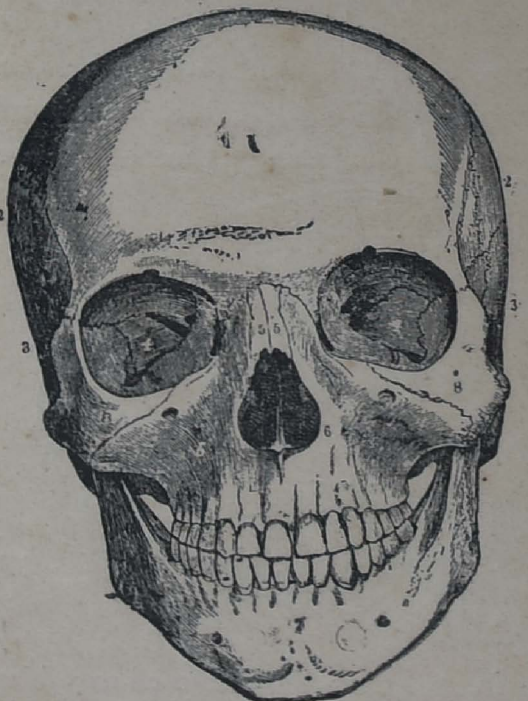
substance is required, cartilage takes the place of bone, as in the more prominent part of the nose. The skeleton consists of the following parts :—

(*a*) THE HEAD OR SKULL.

The skull is a strong box composed of eight bones forming a complete and safe protection for the brain and other smaller but important organs. The bones composing the skull are

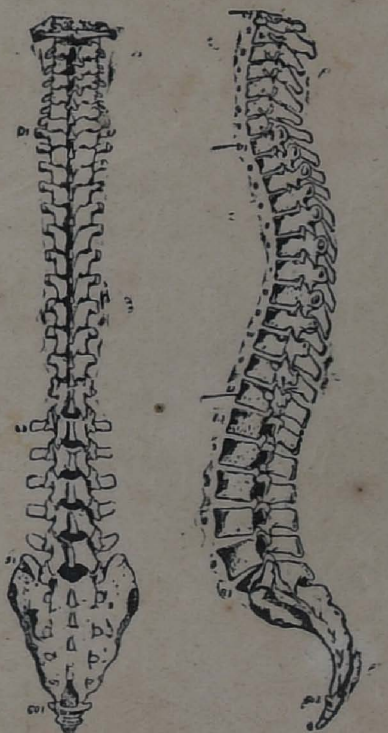
tough and elastic, so that the force of any blow

falling on them is broken or greatly diminished. The base of the skull, which is at the level of the eyes and the openings of the ears, rests on the top of the spine. The face is made up of several small bones closely interlocking with one another with the exception of the lower jaw which is freely movable. These facial bones serve as a protection to the eyes, nose and mouth.



(*b*) THE TRUNK.

The backbone or vertebral column is composed of 24 separate, small bones, each of which is called a vertebra, and one large bone at the lower end called the *sacrum*. The vertebrae are placed one above the other, so that the bodies of the vertebrae form a column called the *vertebral column*. The bodies of the vertebrae are held together by a cementing substance called "*gristle*". This acts as a buffer or spring, preventing shocks and also



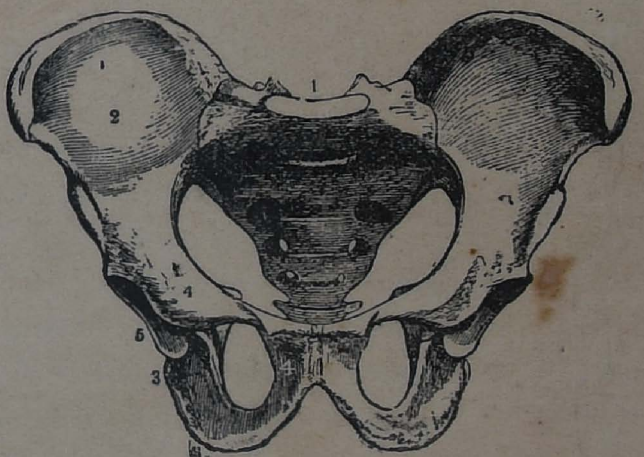
allows the spinal column as a whole to be bent and twisted. The upper seven vertebrae which go to form the neck are called the *cervical vertebrae.* The next twelve are in the back and are called the *dorsal vertebrae.* They carry ribs. The remaining five are called the *lumbar or loin vertebrae.*

THE RIBS.

The ribs, 12 pairs in all, are long curved bones, attached behind to the dorsal vertebrae and in front to a small flat-bone called the sternum or breast-bone. This crate-like cavity is called the chest.

THE PELVIS.

The pelvis is situated at the lowest part of the trunk and is formed by two large thick irregular shaped bones—the hip bones—which are joined



together in front, but are separated behind by the sacrum. The pelvis protects the bladder, etc. and supports the weight of the upper body. It also provides deep sockets for the thigh bone—

the hip joints. As it contains important organs fracture of this bone is serious.

(*c*) THE BONES OF THE LIMBS.

(i) *Upper limbs :—*

The collar bones or clavicle may be easily felt beneath the skin at the root of the neck. They are joined to the breast-bone at their inner ends. At their outer ends, they are joined to the tip of the shoulder blade. The fracture of these bones is common.

The shoulder blades :—These are two flat bones lying on each side of the upper part of the back of the chest. The shoulder blades behind and the collar bones in front together form the shoulders. The shoulder blades have sockets in which the upper ends of the arm bones rest.

The arm bone or humerus is a strong bone which reaches from the shoulder to the elbow. Below the elbow there are two bones in the fore-arm—the one on the thumb-side is called the *radius* and the one on the little finger-side is called the *ulna*. In the wrist and hand are very small bones so arranged that great freedom of movement is possible. The hand is composed of (i) the bones of the wrist or carpus eight in number, (ii) the metacarpus or the framework of the palm five in number, (iii) the finger-bones or phalanges fourteen in number.

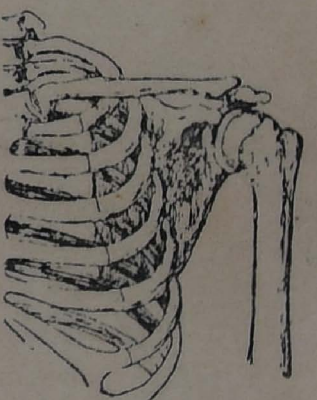
(ii) *Lower limbs :—*

The thigh bones or femurs are the largest bones in the body. They are fitted above into the sockets in the sides of the pelvis bones, and each rests below on the *shin-bone or tibia.* The tibia is the principal bone of the leg and can be easily felt in front of the skin. On the outer side of the tibia is a long thin bone called the *fibula.* In front of the knee is the *patella* or the kneecap. The ankle and foot contain numerous small bones. These are firmly bound together but allow a certain small amount of movement between each; this gives elasticity in walking. The bones of the foot

are arranged in a double arch. One curve of the arch is from heel to the great toe and the other is from one side of the foot to the other. These double arches act somewhat like the springs of a carriage.

JOINTS.

A joint is the place where two bones meet.

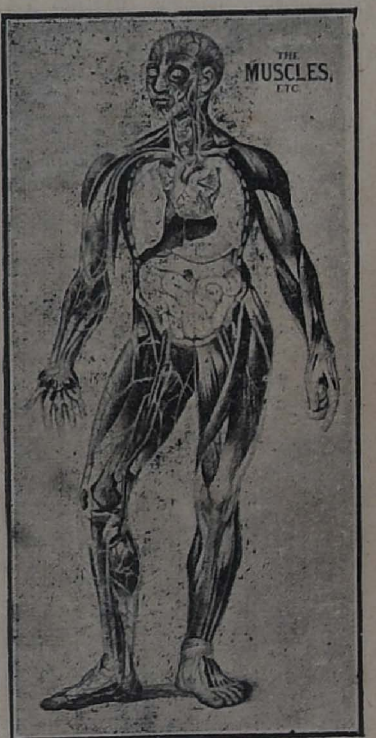


Movable joints are of two kinds: (1) Hinge joints as in the knee, in which the movement can only

take place in one direction, *viz.*, to and fro; (2) the ball and socket joint as in the hip and the shoulder wherein the movement is allowed in all direction, *i.e.*, to and fro, side to side, and round and round.

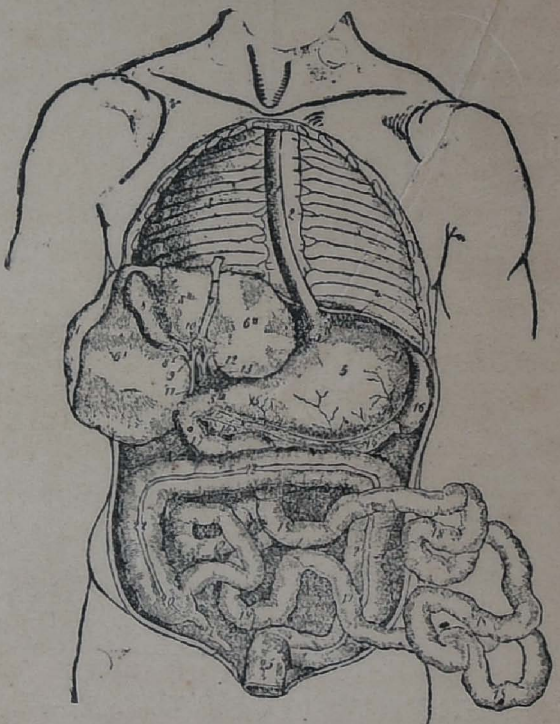
ii. THE MUSCULAR SYSTEM:— The various movements of the body and limbs are carried out by means of the muscles. Muscles are of two kinds: voluntary and involuntary. The voluntary muscles are moved by the will of the individual.

They are attached by their ends to bones, with generally a joint intervening. Involuntary muscles are those which are not under the control of the will but will go on acting independently. These are found chiefly in the blood vessels, stomach, intestines and other internal organs.



iii. THE DIGESTIVE SYSTEM:—To maintain the proper working of all the functions of

the body food must be taken. The digestive system consists of the food passage and the various



organs which prepare the digestive fluids.

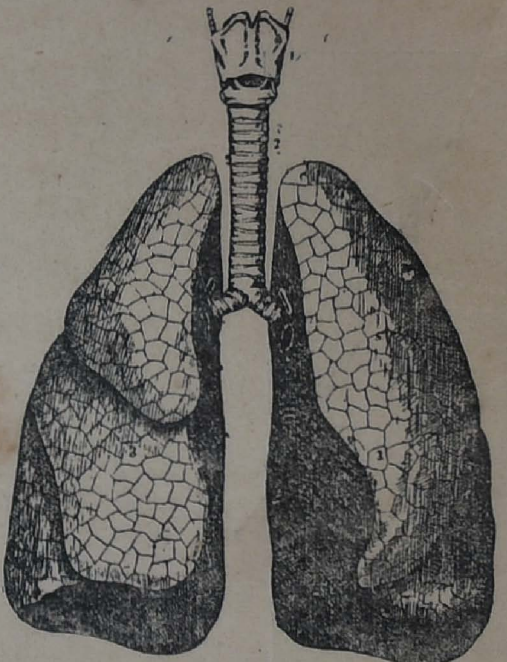
The food passage consists of the mouth, pharynx, gullet, stomach and intestines. Food, when it is taken into the mouth, is mixed with the first of the digestive juices—the saliva. It then passes on into the pharynx. The pharynx is the cavity situated behind the mouth with which it is continuous. The gullet is a tube about 10 inches long connecting the pharynx with the stomach—a large pouch-like organ which serves to contain the food while the gastric juice is acting upon it. After the food leaves the stomach, it passes on to the bowels where it meets with the bile, pancreatic and intestinal juices. By these various juices the food is thoroughly digested and is absorbed, by special vessels called the lacteals, into the blood for distribution to the different parts of the body. The body is thus supplied with suitable elements to compensate the waste which has been going on.

iv. THE CIRCULATORY SYSTEM :—The circulatory system or the blood system consists of the heart and blood vessels. The heart is a hollow muscular organ, about the size of a closed hand, and is situated in the chest behind the breast-bone, and extends a little to the left of this bone. It serves as a kind of force-pump to distribute the blood to all parts of the body.

The blood vessels consist of arteries, veins and capillaries. The arteries convey blood *from*

the heart; and they divide and subdivide into smaller and smaller branches till, at last, they form very minute vessels called capillaries. The capillaries unite, forming small veins; and by the junction of these, larger and larger vessels are formed which, at last, discharge their contents into the heart. Veins, therefore, are vessels which bring blood to the heart, and capillaries are the minute blood vessels which connect the small arteries and the veins together.

v. THE RESPIRATORY SYSTEM:—The



respiratory system consists principally of the larynx or voice-box, trachea or windpipe, and the lungs. The trachea is a tube extending from the larynx to the upper part of the chest. The lungs are spongy organs and contain a very large num-

ber of small air cavities and are richly supplied with blood vessels. It is in the lungs that the blood is purified by being brought into contact with the air we breathe in.

vi. THE NERVOUS SYSTEM:—The nervous system consists of (1) the cerebro-spinal system made up of the brain and the spinal chord together with the numerous nerves which proceed from these organs to almost all parts of the body, and (2) the

sympathetic system consisting of a large number of small masses of nerve substance (ganglia) and the nerves connecting them and radiating from them. The cerebro-spinal system supplies all the voluntary muscles, while the sympathetic system supplies the involuntary muscles.

CHAPTER II.

Bandages and Slings.

THE TRIANGULAR BANDAGE:—First-aid men must utilise anything that comes handy. So they must learn to improvise bandages and must not become dependant upon the triangular bandage. Pocket handkerchiefs can always be made to take the place of triangular bandages, or a square piece of soft, unbleached calico from 36 to 40 inches square, folded or divided diagonally, from corner to corner, can well be utilised. For the purpose of description the triangular bandage is divided into a point, two ends, a lower border and two side borders. Of the three borders, the longest is called the lower border. Of the three corners, the upper one opposite to the lower

border, is called the point, and the remaining corners the ends.

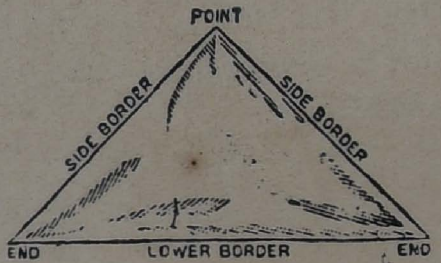
The triangular bandage is used in four different ways :—

1. THE OPEN-BANDAGE :—When the whole cloth unfolded is used.

2. THE BROAD-FOLD BANDAGE :—This is made by bringing the point down to the middle of the lower border, and then folding it once again, in the opposite direction.

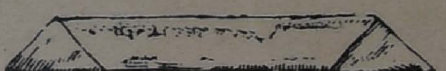
3. THE NARROW-FOLD BANDAGE :—This is made by folding the broad-fold bandage once again lengthwise.

4. THE MEDIUM-FOLD BANDAGE :—This is made by bringing the point down to the middle of the lower border, and then by folding the upper-third over the middle-third and folding this again over the lower-third.

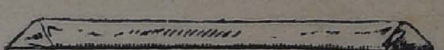


OPEN BANDAGE.

BANDAGE ONCE FOLDED.



BROAD-FOLD BANDAGE.



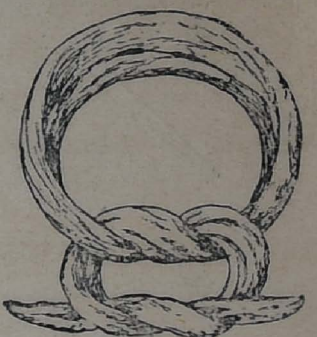
NARROW-FOLD BANDAGE.

The bandage is fastened either with a safety-pin

or by being tied with a reef-knot, but not tying it with a granny-knot, which is liable to slip and hard to undo.

HOW TO TIE A REEF-KNOT :—Take one end of the bandage in each hand, pass the end in

REEF-KNOT.



GRANNY-KNOT.

the right hand over the end in the left, and tie once, *i.e.*, a half knot. It will be observed that the end which was in the right hand is now in the left hand and *vice versa*. Now pass the end that is in the left hand over that which is in the right and tie once again. This completes the knot.

THE LARGE ARM-SLING :—Spread out the triangular bandage. Place one end over the shoulder on the uninjured side ; place the point between the elbow and the chest on the injured side ; bend the elbow until the hand is slightly higher than the elbow ; carry the second end up over the shoulder on the injured side, and tie the two ends with a reef-knot together at the side of the neck. Then fold the point over the elbow and fasten with a pin.

THE SMALL ARM-SLING :—Take a broad-fold bandage. Place one end over the shoulder on the uninjured side. The other end will hang down in front between the chest and the injured arm. Bend the injured arm, so that the hand is slightly higher than the elbow. Carry the second end up, so that the bandage passes round the wrist and over the opposite shoulder. Tie the two ends together with a reef-knot, at the side of neck.

LARGE ARM-SLING. SMALL ARM-SLING.

IMPROVISED SLINGS :—For the small-arm sling, pin the cuff of the sleeve to the breast of the coat or bodice, or to the front of the shirt. For the large arm-sling, pin the cuff and the middle of the sleeve to the breast of the coat or bodice.

Or, take three handkerchiefs and pass one round the wrist, one round the middle of the arm, the

third one round the fore-arm near the elbow, and pin the two ends of each to the breast of the coat or bodice.

THE HEAD BANDAGE :—Spread the triangular bandage out. Fold the longest border into a hem about an inch deep. Place the centre of this hem over the middle of the forehead, immediately over the eyebrows. Carry the point over the head and allow it to cover the nape of the neck. Take the two ends and carry them back along the sides of the head, immediately above the ears. Cross them at a point below the most prominent part of the back of the head, then carry them forward and tie them in front. Place one hand gently over the

crown, and, with the other hand, pull out all the folds and fullness, by the point which hangs behind. This will cause the bandage to lie very closely to the head. Then the point is folded up over the crossed ends, and fastened with a safety-pin to the top of the head.

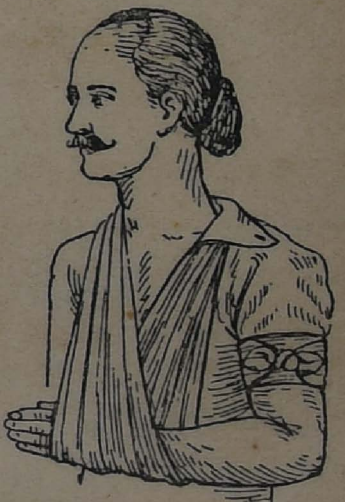
ANOTHER METHOD OF BANDAGING THE SCALP IS AS FOLLOWS :—Take a large pocket handkerchief. Place it over the patient's head. Then tie a piece of string, or necktie, firmly round the head just above the eyes and ears and well below the prominent back part of the head. Take hold of the four corners of the handkerchief and pull them well down. Then turn them up and pin them together on the top of the head.

For wounds of the head, put the centre of the narrow-bandage over the wound, and cross on the opposite side and tie over the wound.

THE JAW BANDAGE:—Get two narrow-f triangular bandages. Tie one horizontally ro the jaw, fastening it at the back of the head, and tie the other vertically round the jaw, passing it beneath the chin and fasten off at the top of the head. Lastly, tie the two ends of the first bandage to those of the second.

If two triangular bandages are not availa the jaw can be bandaged with one narrow- bandage, by placing the centre of the banc below the chin, carrying it over the head crossing just in front of, and below, the ear, bringing the long end over the front of the c and then tying it off.

THE SHOULDER BANDAGE :—Spread out triangular bandage. Fold up a three-inch hem ng the lower border and ce the point of the dage against the side the neck. Place the ldle of the hem over centre of the outside the arm, about three hes below the shoulder nt. Carry the ends nd the arm, crossing



n on the outside, and tying them with a -knot on the outside. Now take another d-fold bandage and apply it as a small arm g. Bring the point of the first bandage under arm sling, fold it back on itself, and pin it ver the shoulder.

THE ELBOW BANDAGE:—Spread out a bandage. Fold up a four-inch hem and place the point over the lower part of the back of the arm, and the middle of the lower border of the bandage on the

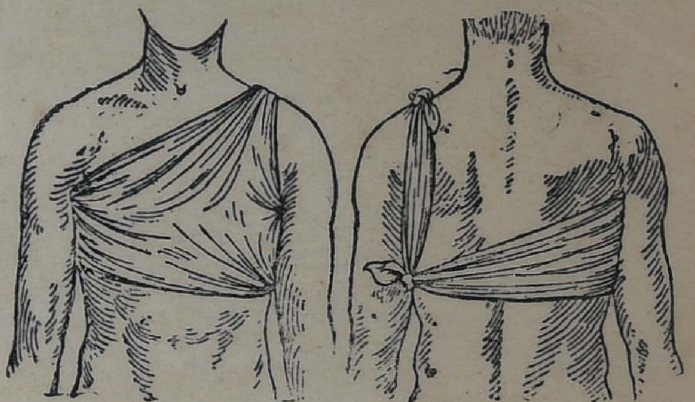
fore-arm, at the back and just below the elbow. Bend the elbow. Carry the ends round the upper part of the fore-arm, cross them in front, carry the ends up in a figure-of-eight through the lower part of the arm, round which they are passed twice, and tie at the back over the point. Tighten the bandage by drawing on the point. Then turn round the point and pin.

THE HAND BANDAGE:—Spread out the bandage. Turn up the two-inch hem. Place the hands, palm downwards, on the bandage, with the

wrist over the middle of the hem and with the fingers towards the point. Turn the point over the back of the hand, so that the bandage lies on the hand, cross the ends and bring them

once, or twice, round the wrist. Fasten with a reef-knot, and turn round and pin the point.

CHEST AND BACK BANDAGE:—Spread out a bandage, so that the middle lies over the dressing

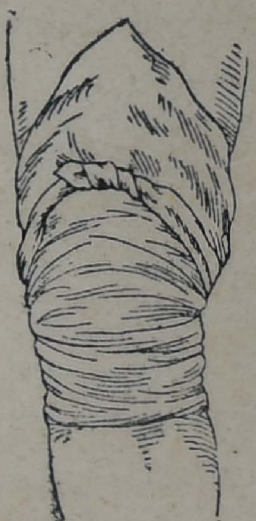


with the point over the shoulder of the injured side. Carry the ends round the body, and tie at the back on the injured side. Draw the point over the injured shoulder and tie to the long end.

THE HIP BANDAGE :—Take a narrow-fold bandage, tie it tightly round the waist and fasten

it with a reef-knot on the uninjured side. Take another bandage and turn up a hem two or three inches deep. Place the centre of the hem on the outside of the upper part of the thigh. Carry the ends round the thigh, and fasten with a reef-knot on the outside. Carry the point upwards, passing it under the narrow-fold bandage and then turning it down, pin it.

THE KNEE BANDAGE:—Take an open bandage and turn up a four inch hem. Place the point over the front of the lower part of the thigh about four inches above the knee-cap, place the centre



of the hem over the front of the upper part of the leg, carry the ends round to the back of the knee, cross them, and carry them up in a figure-of-eight to the lower part of the thigh round which they are passed. Fasten with a reef-knot over the front of the thigh above the knee. Turn the point down over the knot and pin.

THE FOOT BANDAGE :—Spread out a bandage. Turn up an inch hem. Place the foot on the centre of the bandage about two inches in front of the hem with the toes towards the point. Draw the point over the foot to the front of the ankle, (or instep), carry the two ends, cross them over the instep and carry them behind the ankle. Cross again, and bring them to the front of the ankle and tie them. Then turn the point forward and pin to the fold of the bandage in front of the ankle.

To keep dressing on wounds.—Take a narrow-fold bandage. Place the centre over the wound and carry the ends round the limb, body or head as the case may be, and fasten it off over the wound with a reef-knot.

CHAPTER III.

Hæmorrhage.

THREE VARIETIES.

There are few accidents more alarming than those attended by profuse bleeding. Treatment must be prompt and certain. Lack of the necessary but easily acquired skill, or delay in applying it, may lead to the patient's death.

Bleeding is divided into three varieties: (1) arterial, (2) venous, (3) capillary.

1. ARTERIAL bleeding is known by the blood being of a bright red colour, and by its coming out in spurts, or jerky jets, with some force.

2. VENOUS bleeding is characterized by the blood being of a dark purple colour, and by its welling out in a continual, steady stream, with much less force.

3. CAPILLARY bleeding may be either bright red, or dark red, in colour and is recognised by the blood simply oozing out.

Loss of blood produces weakness and anæmia (bloodlessness), fainting, and, in extreme cases, death.

Blood always tends to congeal or clot in a wound. This is one of Nature's ways of stopping bleeding. Therefore, the wound should be kept at rest and the clot must not, on any account, be disturbed.

GENERAL TREATMENT OF EXTERNAL HÆMORRHAGE:—It is important to remember that all external hæmorrhage can be stopped by firm pressure. The first thing to do in all cases of hæmorrhage is to put the finger on the bleeding point in the wound, care being taken to see that the hands are clean. But, if the hæmorrhage is severe, time must not be lost in doing this. The main artery is to be compressed only when pressure at the wound fails, and also in those cases in which the bone is

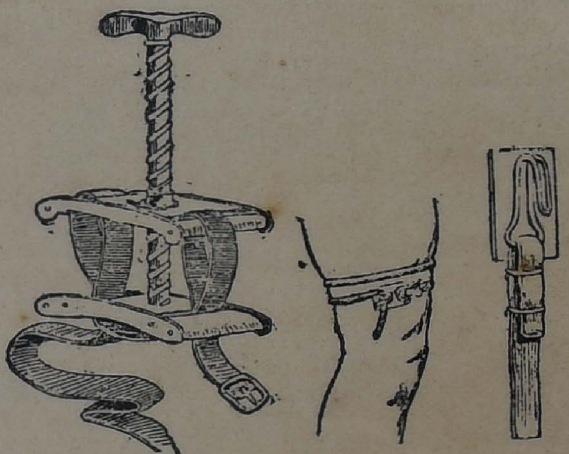
shattered, or when the wound is caused by broken glass, some of which is still embedded in the wound.

The general rules to be observed in stopping bleeding are :—(1) Elevate the wounded part, as this diminishes the amount of blood in the part. (2) Apply pressure, either directly to the bleeding point with the fingers, or with a piece of clean dry cloth pressed into the wound ; or when this fails to stop the bleeding, or when the limb is shattered, compress the main artery, supplying the part, either with the fingers or with a *tourniquet.* (3) Remove all tight clothing. This relieves congestion and so lessens the amount of blood in the part. (4) Keep the part at rest. (5) Apply cold water, or iced water, over the wound which causes the arteries to contract.

N.B.—Penetrating wounds of the abdomen and chest, and compound fractures of the skull,

should not be washed until the Doctor arrives. (6) Never give stimulants, as these cause the heart to act more strongly and to drive more blood to the part.

TOURNIQUETS.—These are contrivances for arresting hæmorrhage by pressure on the main artery. As "First Aid" requires the use of the best means at hand, substitutes may be made of (1) handkerchiefs, (2) braces, (3) neckties, (4) belts, (5) pieces of rope, etc., and are used as follows:—Take a handkerchief, tie a knot in the middle, place the knot over the artery to be compressed, pass the handkerchief round the limb, tie



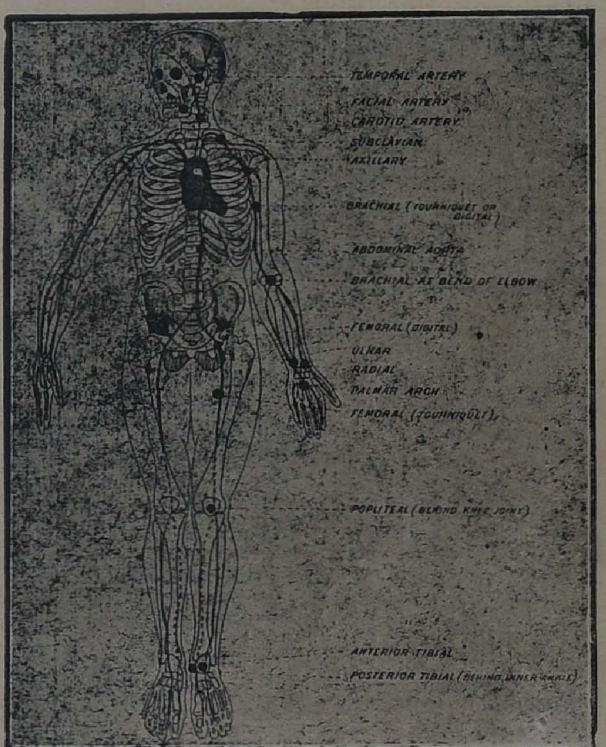
once ; next place a stick against the knot and tie it in ; now twist the stick round and round until the whole limb is compressed, and, with it, the artery. Stop twisting as soon as the bleeding ceases. Fix the stick by tying a second bandage round it and the limb. A small piece of card should be placed under the knot to prevent the skin being nipped. At the end of half an hour,

relax the tourniquet, slightly, by untwisting it ; if the bleeding does not re-start, leave the tourniquet slack, but do not remove it entirely ; should the bleeding commence again, at once tighten the tourniquet.

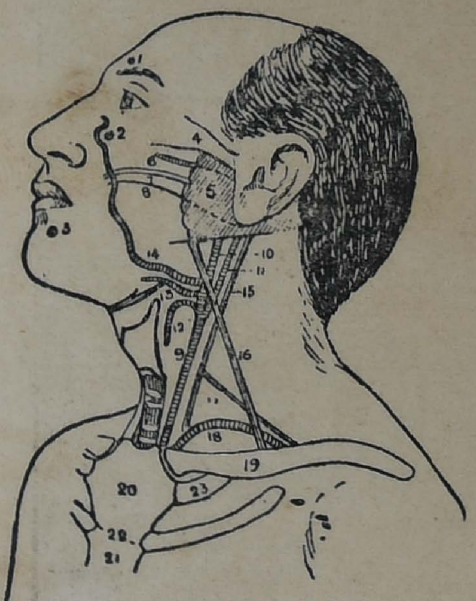
N.B.—Tourniquets must not be left on indefinitely, otherwise the circulation will be stopped and serious injury may follow. If the knot is not *immediately* over the artery, the tourniquet is worse than useless.

An elastic bandage or enema rubber tubing passed tightly round the limb, immediately above the seat of arterial hæmorrhage, will arrest bleeding. If other apparatus can be had, it is not advisable to use an elastic cord or bandage, as it cuts off all circulation in the limb.

POINTS WHERE ARTERIES MAY BE COMPRESSED:—It is necessary, in order to be



able to treat bleeding successfully, to know the position of the main blood-vessels. Pressure over an artery, unless accurately applied exactly on the artery, is useless. Starting with the head and neck, there is one main artery running up to the head on each side of the neck called the "*carotid*." The course of this "*carotid*" is easily marked out by drawing



COURSE OF CAROTID ARTERY.

an imaginary straight line from the point, where the collar bone joins the breast bone, to a point midway between the angle of the jaw and the lower part of the lobe of the ear. This artery may be compressed by standing by the side of the patient, and by placing the last joint of the thumb an inch and a half above the joint between the sternum and the clavicle and pressing it, backwards and inwards, against the spine. The head should be inclined slightly towards the injured side.

COMPRESSION OF CAROTID.

COMPRESSION OF THE TEMPORAL ARTERY:—The temporal artery may be felt

beating half an inch in front of the ear. It is easily compressed against the bone which is immediately beneath it. If pressure has to be maintained for a long time, a pad and a bandage must be used. Make a small firm pad of handkerchief and press it into the wound. Fold a narrow-folded triangular bandage, place the centre on the other side of the head, bring one end across the forehead, and the other well below the occipital bone, round to the pad above the ear. Twist the ends

over the pad, take one end under the chin, and the other across the top of the head, and fix on the opposite side.

COMPRESSION OF THE OCCIPITAL ARTERY:—Running upwards and backwards, two fingers' breadth behind the back of the ear is the *occipital* artery. To compress this, pressure must be applied about two inches behind the ear where it can be felt beating. If the pressure has to be maintained for a long time, apply pad and bandage as described for the temporal artery.

THE FACIAL ARTERY:—May be felt

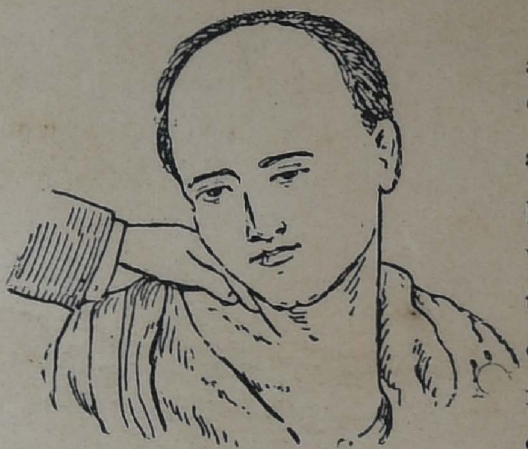
pulsating at a point midway between the chin and the angle of the jaw. It supplies blood to the chin, lips, cheek and the outside of the nose. To stop bleeding from the above places, put pressure on the point referred to above or grasp the lips, or cheek, on both sides of the wound by the finger inside, and the thumb outside the mouth, or *vice versa*.

HÆMORRHAGE FROM THE FOREHEAD OR ANYWHERE IN THE SCALP.

This may be stopped by applying a small firm pad on the bleeding point, and by securing it by a narrow bandage with its centre laid on the pad. The ends should be carried round the head and tied tightly over the pad.

If a wound of the forehead or scalp is associated with a fracture, the best plan is to apply a ring pad around the seat of injury.

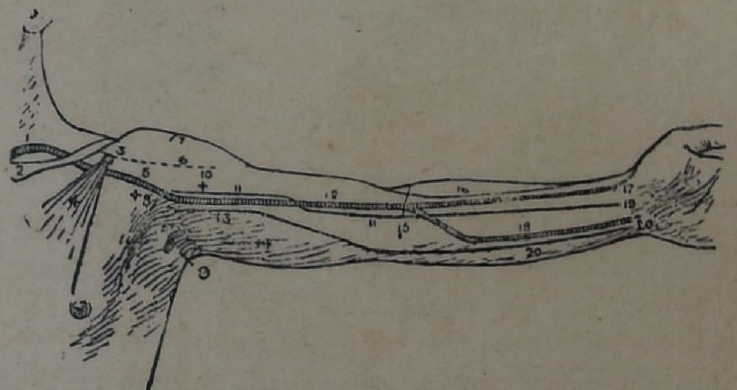
COMPRESSION OF THE SUB-CLAVIAN ARTERY.—Starting from the same point, as the



"carotid", is another artery "the subclavian," which passes outwards beneath the collar bone, crossing the first rib and dipping down into the arm-pit. To compress this artery, press the thumb well down, behind the middle of the collar-bone, on to the first rib, standing behind the patient. Considerable pressure must be applied. When compressing the right side of the patient, use the left hand and *vice versa*. The

head should be bent towards the side so as to relax the skin, and the arm should be kept close to the side, so as to lower the shoulder. Do not apply pad and bandage.

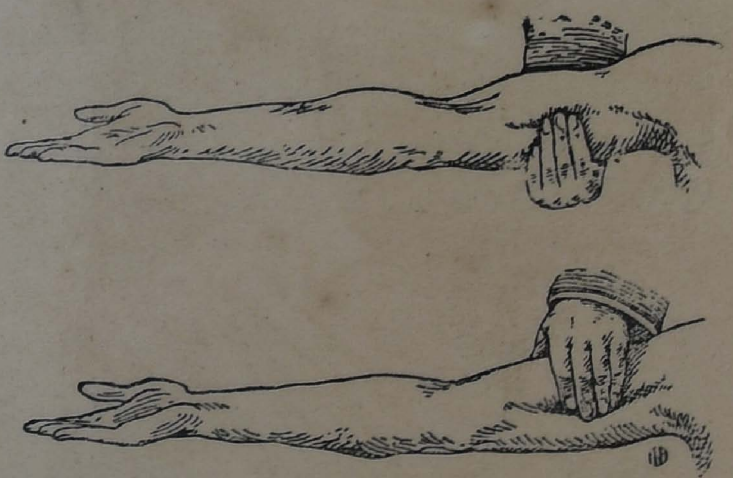
COMPRESSION OF THE AXILLARY ARTERY.—In the arm-pit, the sub-clavian



artery changes its name and is called the "*axillary*". To compress this artery, raise the arm, stand behind the patient and press the tips of all the fingers firmly outwards in the middle of

the arm-pit against the arm-bone. Place a pad in the arm-pit and keep it in position with a narrow bandage, crossed over the shoulder, and knotted off under the opposite arm-pit. Apply large arm sling.

COMPRESSION OF THE BRACHIAL ARTERY.—The axillary artery leaves the arm-



pit and passes down, along the inner side of the large muscle of the arm known as the "biceps." Here again it changes its name and is called the "brachial" artery. To compress this artery, stand behind the patient, grasp the arm, press-

ing the tips of fingers over the middle of the artery on the groove on the inside of the biceps, and press back against the arm-bone. Place a firm pad over the line of the brachial artery and keep it in position with a narrow bandage. Place the fore-arm in a large sling.

This artery may also be compressed at the elbow by flexion, and by applying pad and bandage, as shown in the accompanying figure.

COMPRESSION OF THE RADIAL AND ULNAR ARTERIES:—About an inch below the bend of the elbow, the brachial artery divides into two; one, called the *radial*, passes down the outside of the

fore-arm to the base of the thumb—near the wrist it is quite close to the skin and can be felt beating and can be easily compressed against the underlying bone; the other, called the *ulnar*, runs down inside the fore-arm to the base of the little finger. In the palm of the hand these arteries join each other, forming an arch, (the Palmar arch) from which small branches pass down each side of the fingers.

COMPRESSION OF THE FEMORAL ARTERY.—The main artery of the lower limb,

"the femoral," enters the thigh half an inch on the inner side of the middle of the fold of the groin, where it is close to the skin and can be felt beating. The course of the artery may be indicated by a line drawn from the point stated above, to the inner side of the back part of the knee. The "femoral" can be compressed by bending the thigh, so as to find the fold of the groin and applying the thumb over the middle of the fold of the groin, and pressing it directly backwards. Lower down, it can be compressed against ths femur by applying a

tourniquet at a point, two or three inches below the groin, in the direction of a straight line drawn from the middle of the groin to the inner side of the knee.

COMPRESSION OF THE POPLITEAL ARTERY.—When the artery of the thigh reaches the back of the thigh bone it is called the "popliteal," and may be compressed by pressure applied directly forward on the bone, the knee being first bent to relax the skin; pressure may also be applied to the "popliteal" artery by flexion at the knee. The pad should be of the size of

a lawn-tennis ball, or, if no pad is available, the trouser leg may be rolled or gathered up to serve instead, or a felt cap may be folded and used as a pad. Pressure may also be applied on this artery by applying a pad behind the knee and flexing the knee and securing it in that position by a bandage.

COMPRESSION OF THE TIBIAL ARTERIES.—Just below, and behind, the knee-joint, the "popliteal" artery divides into "anterior" and "posterior" tibial arteries. *The anterior tibial*, piercing the muscles and coming forward between the bones of the leg, runs down the front of the leg to the middle of the *instep*, where it can be felt beating, and then passes along the upper surface of the foot, and again piercing the muscles, first above the bases of the great and second toes, enters the sole of the foot.

The posterior tibial passes down beneath the muscle at the back of the leg to the back of the inner ankle, where it can be felt beating, and then entering the sole, joins the end of the "anterior tibial". The anterior tibial and posterior tibial can be compressed at the points where they can be felt beating, *viz.*, the former, in the middle of the front of the instep and, the latter, just behind the inner ankle.

TREATMENT OF SPECIAL HÆMORRHAGES

HÆMORRHAGE FROM THE SCALP AND FACE.—The bleeding is generally arterial. Stop the bleeding by putting the finger on the bleeding point. If water be at hand, bathe the part with clean, cold water; better, if available, iced water. Press a piece of clean dry linen into the wound. Apply a pad of linen over this, and fix it with a bandage, or clean handkerchief. If the blood is

coming from a scalp wound over a compound fracture, pressure on the bleeding point might cause the fragments of the broken bone to be driven into the brain. So, compress the artery at a little distance from the wound. If the bleeding be profuse, compress the temporal, or occipital artery, or both. Even if this fails, tie a narrow bandage, necktie or dhotie, tightly round the head in a horizontal direction, across the forehead, backward above the ears, and tie below the prominent part of the back of the head, or the "Ring Pad" may be used.

BLEEDING FROM THE SOCKET OF AN EXTRACTED TOOTH.—The mouth should be washed with alum and cold water: if available, iced water. If this fails, the socket should be plugged with a piece of cotton wool, and over this place a large plug of cotton wool and the patient told to bite it firmly.

BLEEDING FROM THE LIPS.—Compress both sides of the wound with the thumbs and fore-fingers, fingers inside and thumbs outside the lips.

HÆMORRHAGE FROM A WOUNDED NECK.—If bleeding be severe, indicating a wound of a large artery, compress the carotid with the fingers and keep the pressure up until medical assistance is obtained. Bend the head forward and fix with a bandage as follows :—

Take a large triangular bandage, place the centre of the lower border over the top of the head, the point of the bandage to hang down the back of the head, bring the two ends of the bandage downwards in front of the shoulders, and then backwards under the arm-pit, and tie them together at the back of the shoulders.

BLEEDING FROM THE ARM-PIT.—Put one or more fingers on the bleeding point, next, get a clean dry piece of cloth, wrap it up into a firm pad and press this into the wound. Fix it, by placing the centre of a triangular bandage over the pad, crossing it on the shoulder, pulling tight, and tying off under the opposite shoulder. Take a broad folded bandage, bring the lower edge to the point of the elbow and tie tightly around the chest.

BLEEDING FROM THE ARM.—Stop the bleeding at once with the finger, press a piece of clean dry linen into the wound and apply a pad over the wound, and fix with a bandage or handkerchief. If that fails, the brachial artery must be compressed.

BLEEDING FROM THE FORE-ARM.—Treat as above, compressing the brachial artery if necessary.

BLEEDING AT THE WRIST.—Wounds at the wrist are often due to broken glass. The broken pieces of glass should be at once removed. If complete removal cannot be assured, no pressure must be applied directly, as this would drive the pieces of glass deeper into the wound. If the bleeding be severe, it must be controlled by compressing the brachial artery. If no glass be present, treat as above.

BLEEDING IN THE PALM.—Place a firm pad in the palm, and place the fingers over it tightly. Hold the fist, the palm downwards, and apply a folded bandage a little wider than the knuckles to the hand firmly.

N.B.—In all wounds of the upper extremity, the arm should be placed in the large arm-sling, after applying the dressing.

BLEEDING FROM THE THIGH.—Treat as you would do for bleeding from the arm. If the bleeding starts again, the femoral artery must be compressed either with the fingers or with the tourniquet.

BLEEDING FROM THE HAM.—Treat as above, bending the knee and compressing the femoral artery, if necessary.

BLEEDING FROM THE LEG.—Treat as above. Compress popliteal or femoral artery, if necessary.

BLEEDING FROM A WOUND OF THE FOOT.—If the patient is wearing a boot, cut the boot off at the back seam or the side elastic. Do not pull it off. Treat as above. Compress the tibial, popliteal, or femoral artery if necessary.

VARICOSE VEIN.—By varicose vein is meant a permanent dilatation of the veins, with thickening of their walls, due to obstruction to the return

of blood from the veins. The valves of the veins being rendered useless, the blood runs down from the veins. In bleeding from this cause make the patient lie down. Remove constrictions such as garters. Stop the bleeding by pressure and apply pad over the bleeding point, and fasten with a bandage. The leg must be kept raised.

BLEEDING FROM THE WOUNDS OF THE CHEST AND ABDOMEN.—These are very serious. Treat with pressure and pads. Keep the patient in a lying posture and keep him absolutely quiet until the arrival of the Doctor. If removal be necessary, it must be done on a stretcher.

CAPILLARY HÆMORRHAGE.—The blood is red and it flows, or oozes, in a continuous stream. A slight amount of pressure will suffice to stop capillary bleeding.

INTERNAL BLEEDING:—This name is applied to all bleeding that takes place inside the body. It

is nearly always arterial. Internal hæmorrhage may be divided into:—(*a*) blood spitting, or bleeding into the lungs from which the blood is coughed up, (*b*) blood vomiting, or bleeding into the stomach from which blood is vomited, (*c*) bleeding from the nose, (*d*) bleeding into the brain (apoplexy), (*e*) bleeding on to the surface of the brain between it and the skull (compression).

SYMPTOMS OF INTERNAL BLEEDING:—(1) Giddiness, (2) faintness, (3) restlessness, (4) pallor of the face and the lips, (5) quick pulse and (6) hurried breathing accompanied by yawning. If the bleeding be profuse, the patient may become unconscious, in which case the patient should be kept lying down with the legs well raised.

BLEEDING INTO THE LUNGS.—The blood is bright, red and frothy, being mixed with air from the lungs. In this case loosen all tight clothing about the neck, lay the patient down with the

head and shoulders slightly raised on a pillow, give ice to suck and apply ice to the top of the chest. Do not give any stimulants. Await the Doctor's arrival.

BLEEDING FROM THE STOMACH.—The blood is dark in colour, often mixed with food. Sometimes it looks like coffee-grounds.

The treatment is the same as for bleeding into the lungs, omiting the application of ice to the top of the chest, and applying ice to the pit of the stomach.

BLEEDING FROM THE NOSE.—Let the patient sit down with his head erect. Do not let him stoop down. Loosen all tight clothing about the neck. Raise the patient's hands over his head and keep them there. Apply ice, or a towel wet with cold water, to the root of the nose and the nape of the neck, and between the shoulder

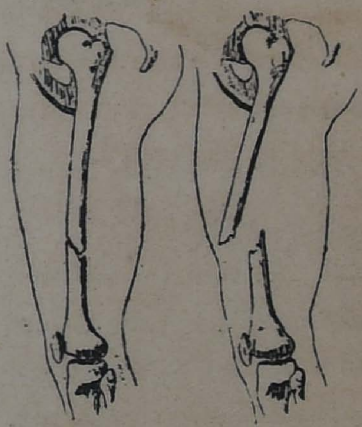
blades. If the bleeding still continues syringe the nostril out with iced water, pinching the lower half of the nose. The nose should not be blown for some hours after the bleeding has stopped.

BLEEDING FROM THE TONGUE AND THE GUMS.—Give the patient ice to suck or cold water to hold in the mouth. If this is not successful, give water as hot as can be borne to hold in the mouth.

CHAPTER IV.

Fractures.

Bones are hard, but brittle and break like glass, or procelain, by outward force (blow, fall, jump, etc.) When a bone is broken, it is called a *fracture*. Fractures are caused either by (1) external violence or (2) by muscular action. *The external violence* is said to be *direct* when the break is at the spot where the violence is applied, *e.g.*, a cart wheel passing over a leg; or *indirect* in which case the fracture occurs at a distance from the seat of injury, *e.g.*, a fall on

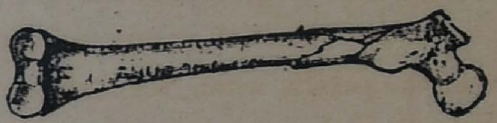


the elbow sometimes causes a fracture of the collar bone. *Fracture by muscular* action rarely occurs, except in the case of the patella when, for instance, a man loses his balance and in trying to recover the upright position, throws a great strain on the muscles of the front of the thigh, which cause the patella to snap across.

FRACTURES are divided into :—

(i) SIMPLE FRACTURE.—Here the bone is broken into two pieces.

(ii) COMPOUND FRACTURE.—In this, in addition to the broken bone, the skin and the soft tissues between it and the bone are wounded, so that there is direct communication between the external air, and the seat of the fracture, as when one of the broken ends protrudes through the skin.



Compound fractures are more dangerous than simple ones, because poison may be absorbed by the wound from the clothing, or germs which are always present in the air may enter and cause inflammation, and formation of pus.

(iii) COMPLICATED FRACTURE:—Here the fracture is complicated by some other injury; *e.g.*, a fracture of the skull bones may be complicated by injury to the brain, or fracture of the ribs by injury to the lungs.

(iv) COMMINUTED FRACTURE:—Here, the broken bone is crushed, or broken, into a number of pieces.

(v) GREEN-STICK FRACTURE:—Here, the bone is not completely broken through but is cracked or bent. This variety only occurs in children whose bones are less brittle and break with difficulty.

(vi) IMPACTED FRACTURE:—Here, one of the broken ends is forcibly driven into and fixed in the other.

THE SIGNS AND SYMPTOMS OF FRACTURE ARE:—

(i) PAIN AND SWELLING.

(ii) LOSS OF POWER IN THE INJURED PART.

(iii) DEFORMITY, *i.e.*, change of shape compared with the sound, opposite part.

(iv) ALTERATION IN LENGTH generally, which invariably takes the direction of shortening.

(v) MOVEMENT IN AN UNNATURAL PLACE, *i.e.*, between two joints. This, however, does not occur in impacted fractures, nor in that in which broken bone is fixed by another bone, *e g.*, in cases of fractured radius without fracture of the ulna.

(vi) CREPITUS:—This is a grating noise and feeling caused by the two rough ends of the broken bone rubbing together. First aid men and women must never try to elicit this sign.

The examination, in a case of suspected fracture, must be carried out with great care and gentleness so as to prevent the sharp edges of a broken bone tearing the surrounding parts. If this happens, simple fracture will be converted into compound, or complicated, fracture. The first thing to be done is, gently to pass your hand over the injured part to see, and feel, if there is any deformity, comparing it with the same part on the opposite side of the body. Next, measure the part and see if there is any shortening present, and no further examination need be made and the case may be treated as a fracture. Crepitus cannot be elicited in cases where the bones are impacted, where there lies a piece of tissue or flesh between the broken fragments or when one of the two bones is broken as in the fore-arm and in the leg.

TREATMENT OF A FRACTURE.—First of all it is necessary to know how a fracture heals. New bone substance (callus) is formed at the broken ends of the bone, and knits them together. This new substance is, at first soft, but gradually hardens into bone, in the course of two to six weeks. If, during this time, the broken ends of the bone have remained perfectly quiet in their proper position, the bone joins. In treating a

case of fracture, therefore, the broken ends of the bone should be brought into their proper position, by pulling and manipulation, and measures should be taken to keep the ends of the bone fixed in their right position, till the fracture has healed. The first aid treatment of fracture, therefore, consists in so fixing the parts, that no further injury can take place by the sharp ends of the bones tearing the neighbouring parts. This is accomplished by means of splints, (made of wood, tin, card-board, etc.) which keep the limb extended and which are secured by bandages. This will render the joints above, and below, the injured parts incapable of movement. Whenever splints are not available, the following may be used as temporary splints :—(1) Walking sticks, (2) umbrellas, (3) guns, (4) folded newspapers, (5) stout card-boards, (6) corrugated packing paper, (7) straw coverings from wine bottles, (8) stockings filled with sand or earth, (9) bicycle pumps,

(10) Indian shoes, etc. To fix the parts, if bandages are not ready at hand, the following may be used as temporary ones, *viz.*, (1) handkerchiefs, (2) folded dhoties, (3) belts, (4) neckties, (5) braces, (6) any piece of linen or string, etc. It is no part of the "First Aid" to reduce, or set, a fracture. This must only be undertaken by a Doctor. Do not remove the clothes, as clothes form an admirable padding for the temporary splints used, except when absolutely necessary, *e.g.*, in case of compound fracture with bleeding. If they have to be removed, remember they must not be dragged off, but gently removed. If only part of the clothing must be removed, cut up the outside seam. To remove the coats, in cases of injuries of the arm, cut up the outside seam of the sleeve on the injured side. Remove the uninjured arm first, then take the coat off the injured one. In putting the coat on, the order

is the reverse, the injured arm is put in first and the uninjured arm, the second. When boots have to be removed, they should be cut off. Cut up the back seam or the side elastic.

Short rules to be remembered when treating a case of fracture:—

(*a*) Treat doubtful cases as fractures

(*b*) Apply all bandages over the splint.

(*c*) Do not move a case of fracture before firmly fixing the splints.

(*d*) In the case of the leg keep the foot at right angles to the leg.

(*e*) In treating fractures of the wrist, hand, finger, ankle, and foot, always pad the splint.

(*f*) In all fractures of the upper limb, see that the hand is higher than the elbow, that the fingers are extended and that the thumb points to the chin.

(*g*) The joint above and below the fracture should be fixed, if possible, by the splint applied.

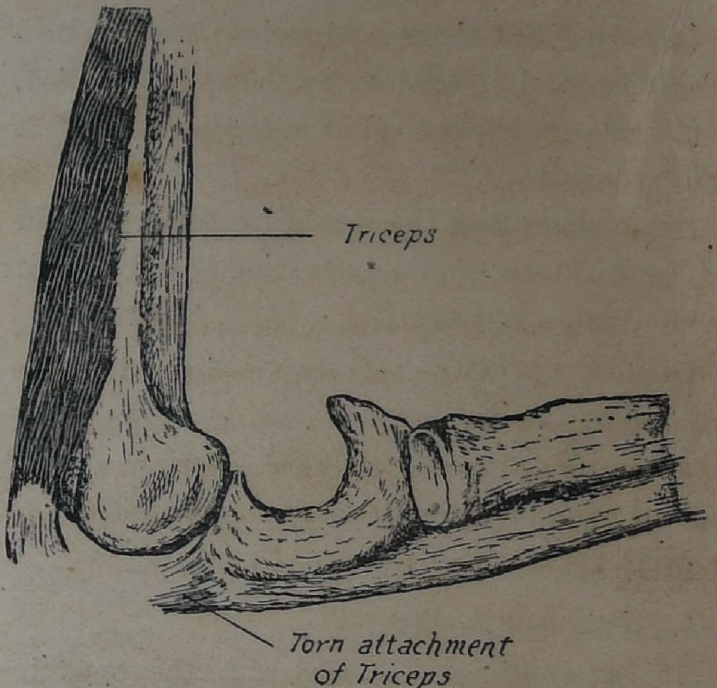
(*h*) Do not apply a splint over a wound, if it can be helped.

Before describing the special fractures, it will be as well to see what a dislocation is and how it differs from a fracture.

DISLOCATION.—This may be defined as the separation of the ends of two or more bones which are in contact or, in other words, the driving out of a bone from its socket at a joint.

THE SIGNS OF DISLOCATION:—

1. Pain and swelling.
2. Deformity, as compared with the opposite side.
3. Loss of power.
4. Alteration in length which may either be in the direction of lengthening or shortening.



5. The injury is necessarily at a joint and not between two joints.

6. There being no rough ends of broken bones there cannot be any crepitus.

7. There is no movement in an unnatural place.

8. The injured joint is fixed.

9. The displaced end of the dislocated bone can generally be felt in a different position, to that occupied by the similar bone on the opposite side of the body.

The treatment of dislocation consists in putting the limb in the most comfortable position possible, and supporting it. It is also useful to apply a cloth, dipped in ice water, or cold water, to the injured joint. On no account should an attempt be made to put *the bone* back.

SPECIAL FRACTURES.

1. FRACTURES OF THE SKULL:—These may be either of the vault or of the base.

(*a*) OF THE VAULT are nearly always accompanied by the wound of the *scalp* and are then compound.

Signs :—When compound, the fracture can be seen or felt through the wound. The patient may be unconscious which may be due to either concussion or compression.

Treatment :—Send for the Doctor at once. In the meantime, put a clean pad over any wound that may be present. Stop any bleeding. If the bleeding is profuse, tie round the head a necktie, a narrow bandage, or a dhotie in a horizontal direction, *i. e.*, across the forehead, backwards above the ears, tying the two ends together below the prominent part of the back of the head. Place the patient on his back, with the head and shoulders slightly raised, and apply ice or cold water to the head.

(*b*) OF THE BASE OF THE SKULL :—They are generally compound fractures and communicate with the air through the mouth, nose or ear.

(i) *Signs* :—The patient is, as a rule, unconscious and there is often bleeding from the nose, mouth, or ear, or one or both eyes are bloodshot, and there may be also a watery discharge from the ear.

(ii) *Treatment* :—Send for the Doctor. In the meantime, place the patient on his back, with his head and shoulders slightly raised. Apply ice to the head and keep the patient quiet until the arrival of the Doctor. A small piece of cotton wool may be put into the ears, if there be any bleeding, or watery discharge, from them.

(2) FRACTURE OF THE LOWER JAW :—

(i) *Signs* :—(*a*) Inability to open or close the mouth, (*b*) inability to speak plainly, (*c*) saliva, mixed with blood, is often seen running from the mouth, (*d*) the teeth are uneven and the mouth is fixed and partly open.

(ii) *Treatment*:—Send for the Doctor, and meanwhile, raise the jaw to its natural position. Get two handkerchiefs, tie one horizontally round the jaw, fastening it at the back of the head, then, tie the other, vertically round the jaw, passing it underneath the chin, and fastening it at the top of the head, and lastly, tie the two ends of the first handkerchief to those of the second as shown in the accompanying figure.

3 (*a*) FRACTURE OF THE COLLAR-BONE :— The fracture occurs generally near the middle of the bone.

(i) *Signs* :—The patient inclines his head towards the injured side and will be seen to support the elbow of the injured side with the hand of the opposite side. On passing the fingers gently over the bone, the fracture may be felt projecting under the skin.

(ii) *Treatment* :—Send for the Doctor at once. In the meantime put one large handkerchief, or a piece of cloth, or a muffler, or a dhotie, rolled tightly into a ball, into the arm-pit of the injured shoulder as high as possible. Take a large triangular bandage, lay one *end* over the shoulder on the uninjured side, place the *point* between the elbow and chest on the injured side, bend the elbow until the hand is slightly higher than the

elbow, carry the second end up under the pad in the arm-pit of the injured side, and tie the two ends together on the side of the neck. Take a broad-folded bandage, and fasten the elbow well to the side, by passing the bandage around the elbow and chest. The upper end of the arm-bone will thus be thrown outwards, taking with it the outer fragment of the broken collar-bone, which has previously overlapped the inner fragment. Another useful method is:—Tie a handkerchief around each shoulder. Tie the ends together behind. Insert two-folded handkerchiefs between the tied ends, and the back, between the shoulder blades, and sling the arm on the injured side.

3 (*b*) FRACTURE OF BOTH COLLAR BONES.—When both collar bones are fractured keep the shoulders back by narrow-fold bandages, tied round each arm, close to the shoulder, passed across the back over the opposite arm and tied together in front.

Keep the fore-arms raised and supported by bandages, as in the above Figure.

4. FRACTURE OF THE SHOULDER BLADE :—Apply the centre of a broad bandage in the arm-pit on the injured side and the ends over the injured shoulder, and then tie them under the arm-pit. Support the limb in a sling.

5. FRACTURE OF THE ARM :—

(i) *Signs* :—All the usual signs of a fracture would be present. Vide page 75.

(ii) *Treatment* :—Send for the Doctor at once.

In the meantime fix the arm with two, or more, splints, one being placed on the inner side, extending from the arm-pit to the elbow, and the other on the outer side, extending from the shoulder to the elbow. A shorter splint in front, and one behind, may also be used in addition. If the fracture is high up near the shoulder joint, the arm should be fastened to the side by a broad bandage, and the hand supported in a sling. The sling must be a small arm sling. The bandage should

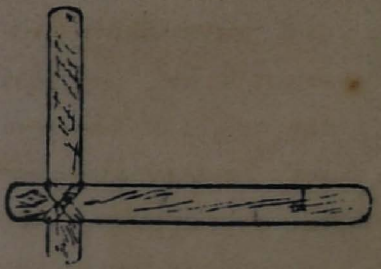
pass round the wrist, and leave the elbow unsupported, so that the weight of the arm may tend to overcome the overlapping of the two ends of the broken bone which is apt to occur.

N.B.—The short splint used in front of the arm should not be long to press on the artery at the bend of elbow.

6. FRACTURE OF THE ELBOW :—

(i) *Signs*:—Pain, swelling, deformity, inability to use the joint.

(ii) *Treatment*:—Send for the Doctor. In the meantime, take two straight splints about 3" wide and tie them, or nail them, together at right angles to one another. Fasten this rectangular splint to the inside of the arm, tie one bandage around the arm, and one round the fore-arm, and a third, apply in a figure of *8* form round the elbow. The thumb should be uppermost. Support the arm by applying the large arm sling.



7. FRACTURE OF THE FORE-ARM:—

(i) *Signs*:—The fracture may affect one, or both, bones. When both bones are broken, the deformity is easily seen, but when only one bone is fractured there may be no deformity visible,

although some irregularity may be made out by passing the hand gently over each bone separately There is no alteration in length, when only one bone is affected, but when both are broken, the fore-arm will be shortened.

(ii) *Treatment*:—Place and support the fore-arm across the chest so that the hand is a little

higher than the elbow, and the thumb pointed to the chin. Fix the injured part between two splints, one on the inside extending from the elbow to the tips of the fingers, and the other on the outer side, extending from the elbow to just below the wrist. Support the arm in a large triangular sling, the hand being slightly higher than the elbow.

8. FRACTURE OF THE HAND.

Treatment:—Send for the Doctor, and in the meantime, get a splint about 3″ wide, and long enough to reach from the finger tips to beyond the wrist Pad the splint. La

the hand gently upon the padded splint and fi by the figure of *8* bandage. Place the han across the breast, slightly higher than the elbow and support by the large arm-sling.

9. FRACTURE OF THE FINGERS.

Treatment:—Place the injured finger, together with the one next to it, on a straight splint which should extend from the tips of the fingers to the wrist and support in a triangular sling.

10. FRACTURE OF THE RIBS.

Signs:—Pain on breathing or coughing, and if the lung be injured as in complicated fracture, the patient may cough up blood.

Treatment:—Tie a large handkerchief, or bandage, firmly round the chest over the injured rib. Then, a second one, a little lower down, overlapping the first. These limit the movement of the ribs and the breathing and thus lessen the pain. The knots should be in front of, and not under, the arm. A towel, pinned firmly round the chest, makes an admirable bandage. Put the arm on the injured side in a large arm sling.

If the lung be injured, which may be suspected by blood being coughed up, the chest must not be bandaged; otherwise, the end of the broken rib may still further injure the lung. In such cases, simply sling the arm on the injured side. Lessen

ll tight clothing such as braces, etc., which would nterfere with free breathing. The patient should be turned slightly on to the injured side and hould be supported in this position by a pillow r rolled up coat.

11. FRACTURE OF THE PELVIS:—The pelvis ontains the bladder and other important organs, nd its fracture is therefore serious.

Signs:—Inability to stand or even to move the legs, and pain on the slightest attempt to do so.

Treatment:—Tie a broad bandage, or pin a towel, fairly tightly round both hips and tie the knees together. Remove the patient on a stretcher.

12. FRACTURE OF THE THIGH:—In addition to the usual signs of fracture, the patient is unable to stand and the foot is generally rolled outwards.

Treatment:—Before the injured man can have

splints applied and be removed, the damaged limb must be drawn down into position, alongside the other. To do this, ask a bystander to grasp the ankle firmly, so as to steady the limb, and then slip your hands between the limb and the ground, one above, and the other below, the spot where the bone is fractured and gently draw the limb alongside the other into its natural position. Fix the limb with splints. Temporary splints for the thigh can be made from umbrellas, walking-sticks, broom-handles, long dealwood pieces, bamboo pieces, and such like. The long splint must be applied on the outside of the thigh, and must extend from the arm-pit to a point a few

inches below the foot. An assistant should steady the limb by holding the foot, whilst the splint is being fixed by the bandages in the following manner:—Take a broad triangular bandage and pass it round the long splint and chest at the level of the arm-pit. Take a second broad bandage and pass it round the hips and the splint. Now take two narrow bandages, and tie one round the thigh above the fracture, and the other round the thigh below the fracture, taking in both splints. Take another narrow bandage, and tie it round the middle of the leg, and then tie the feet together by placing a narrow bandage beneath the legs, just above the heels, bringing the bandage round and crossing it over the instep, then carrying it round the sides of the feet and tying it over the sole. Lastly, tie the knees together and pad the top of both splints with a folded handkerchief. The knots of all the bandages

must be tied over the long outside splint. A splint should be used to push the bandages under a broken limb, as the hand passed under a limb entails unnecessary pain to the patient, and all the bandages should be placed in position before applying the splint.

13. FRACTURE OF THE LEGS :—As in the fore-

arm, either one or both bones may be broken. If only one is broken, the deformity may be entirely absent and no shortening will occur. But on passing the finger over the painful spot, a slight irregularity will be felt. If both

bones are broken, the usual signs will be present.

Treatment :—Send for the Doctor, and in the meanwhile, without removing the clothes, (which will act like pads) fix the legs in two splints. One on the outside, extending from well above the

knee to the foot, and another on the inside, extending from the knee to the inner ankle. Tie both legs together.

14. FRACTURE OF KNEE-CAP :—This is usually due to muscular action but may be caused by direct violence.

Signs :—Pain, inability to use

the leg, great swelling of the knee-joint. If the finger be passed over the bone, a depression will be felt.

Treatment :—Send for the Doctor. It must be

remembered that, on no account should the knee be bent, or an attempt to straighten the leg be made by his own effort, otherwise the two fragments will be pulled further apart. Raise the leg by passing your hand under the heel, and tie a broad splint behind the knee, taking care that

the splint extends from the top of the thigh to two inches below the heel. Fix the splint by applying a narrow bandage round the thigh, and a second bandage round the leg near the foot. Then, take a third narrow bandage, apply the centre immediately above the upper surface of the broken knee-cap, and carry the ends round the limb, and cross them behind, over the splint, and finally, bring the ends forward and tie them off below the broken bone in front. Let the patient lie down with his leg raised.

15. FRACTURE OF THE FOOT OR ANKLE:—Lay the patient out flat upon his back. Procure two splints. Fix them together at a right angle by a bandage, so that the foot can rest on one, against the angle part, while the other is a support to the ankle. Bind the splint to the foot by a figure of *8* bandage.

16. CRUSHED FOOT:—This is caused by the passage of a heavy weight over the foot. Pain, swelling, and loss of power are the symptoms.

Treatment:—Take a splint long and broad enough to reach from the heel to the toes. Pad the splint and apply it on the sole of the foot and bandage after the manner of the Figure of *8*. Keep the foot raised.

17. FRACTURE OF THE SPINE:—The vertebral column may be broken, either by direct, or indirect, violence. Falling from a height on the back across a bar or upon an uneven surface is an example of direct violence, and a fall on the head causing a broken neck is an example of indirect violence.

Signs:—There is always a history of severe injury to the back. The lower limbs may be rendered powerless (paralysed) and deprived of all sensation through the injury to the spinal cord.

Treatment:—Send for the Doctor. The back must on no account be bent. It is better not to disturb the patient until the Doctor arrives, lest any bending, or shaking of the back, should cause further injury to the spinal cord. In cases where a Doctor cannot be obtained, the patient must be removed on a stretcher, door, etc., as follows:—(*a*) Four people should be employed to lift it, one takes the head, one the feet, and the other two should stand, one on either side of the patient, and each with one hand takes a firm hold of the jacket opposite the arm-pits, and with the other a firm hold of the jacket opposite the buttocks, and then all four should gently and

slowly lift the stretcher together, and when the journey is over the stretcher, or door, should be as gently lowered.

(*b*) Turn up the collar of the patient's coat, roll up a stick or umbrella in each side of the coat so that the ends are level with the top of his head, pass a broad bandage, or handkerchief, under the head and secure it to the sticks. If no coat is worn, or there is a doubt as to its strength, pass a number of bandages under the patient.

SPRAINS.

By a sprain is meant a tear of some of the ligaments of a joint, the force not being sufficient to separate the bones.

Signs :—Pain at the joint after the twist, swelling, loss of power, and often discoloration.

Treatment :—Keep the part at rest, apply cold, or iced, water on a cloth and see that the cloth is

kept wet. If there is much pain and swelling and cold water cannot be borne, hot water fomentation may be applied. Raise the injured part.

STRAINS AND RUPTURED MUSCLES :— During severe exertion, muscles, or tendons, are overstretched ; they are then said to be strained, but if they are actually torn they are described as *ruptured.*

Signs :—Pain, swelling and tenderness.

Treatment :—Same as for sprain.

CHAPTER V.

Accidents connected with the organs of breathing and poisoning.

The wind-pipe, the bronchial tube and the lungs are the organs concerned in breathing. An adult breathes about 15 to 18 times per minute, and a young child about 20 times per minute. The air enters by the nose and mouth, and passes *via* the wind-pipe to the bronchial tubes and lungs. Air is essential to life. Respiration, or breathing, consists of two acts—inspiration, an expansion of the chest, during which air is drawn into the lungs,—and expiration—a contraction of the chest,—during which the air leaves the lungs. When respiration is stopped, suffocation is the result.

1. THE TREATMENT OF THE APPARENTLY DROWNED :—If a person who has not learnt to swim falls into the water, he may save himself from drowning, first, by lying on his back and throwing his head backwards and his mouth upwards ; secondly, by keeping the lungs well filled with air (by long inspiration and short expirations) and, thirdly, by not raising his arms out of the water. As life may not be extinct even after hours spent in the water, it is well to consider all drowned persons as only apparently dead. The effort to restore life must be carried out with quietness, caution, perseverance and continuous energy. No time must be lost. The treatment must be continued at least for an hour and a half, if the patient does not recover earlier. The first and most urgent task is to restore respiration. Prior to the induction of artificial respiration, send for the Doctor and

also for dry clothing and blankets. Loosen all tight clothing about the neck and waist. Put

Fig. 1.

your finger well to the back of the patient's throat and clear out the mud, sand, grass, seaweeds, etc.

Fig. 2.

Fig. 3.

If the patient be a child, turn the patient upside down a- in Fig. 1, and hold it in that position for a few seconds to allow the water from the air passages and lungs to escape, and if the patient be an adult turn him on his face, clasp your hand round his waist as in Fig. 2, raise his middle for a second or two to allow all the water to drain from his throat and the upper air passages, and then place the patient on his back. If the patient be a heavy person and unable to be managed by a single man do as shown in the Fig. 3.

If the breathing has not stopped, do not perform artificial respiration, hold smelling salts to the nose, and promote warmth by rubbing the chest and limbs. If the breathing has stopped, perform artificial respiration. There are three methods of performing artificial respiration :—(1) Dr. Sylvester's method, (2) Professor Schafer's method, and (3) Laborde's method.

DR. SYLVESTER'S METHOD :—Pull the tongue forward by grasping it with a handkerchief.

INSPIRATION.

It should be held by a bystander. It is necessary to keep the tongue forward, because in the unconscious state, the root of the tongue is apt to fall back and block the passage of air into the lungs. Carefully raise the head and shoulders and place a folded coat under the shoulder blades, and perform artificial respiration thus:—Kneel on one or both knees about half a foot from the head. Catch hold of the patient's arms just below the elbow, and press them firmly against the sides

EXPIRATION.

and front of the chest for two seconds. This movement imitates expiration and gets rid of the impure air already in the lungs. Now, imitate inspiration by pulling the arms slowly and steadily up over the head, keeping the elbows close to the ground. When the arms are in a straight line with the body, they must be steadily pulled down for two seconds. This movement expands the chest by pulling, on the sides, and air rushes in to fill the increased space. Repeat the move-

INSPIRATION.

ments of inspiration and expiration about 15 times a minute for an adult—and 20 times a minute for a child.

EXPIRATION.

PROFESSOR SCHAFER'S METHOD:—Place the patient in a prone position, *i.e.*, face downwards on the ground with a folded-up coat under the lower part of the chest, with his head turned to one side, so as to keep his nose and mouth away from the ground. Place yourself astride or one side of the patient's body in a

EXPIRATION.

kneeling position, facing the patient's head. Place your hand flat over the lower part of the back, *i.e.*, over the lowest ribs of the chest—the hands, however, must not be lower than the ribs —one on each side and gradually throw the weight of your body forward on to the patient, so as to produce a firm pressure. By this means, the air and the water, if any, are driven out of the patient's lungs. Now raise your body slowly so as to remove the pressure, but keep your hands in position. Repeat this forward and

INSPIRATION.

backward movement every 4 or 5 seconds, *i.e.*, 12 to 15 times a minute. Continue it for half an hour, or until natural respiration is restored. The advantages of this method are that only one person is enough to carry it out and that there is no necessity to fix the tongue outside the mouth, as there is no fear of the tongue falling back with the jaw downwards.

LABORDE'S METHOD:—This method is useful in suffocated children and when the ribs

are broken. Place the patient on his back or side. Open and clear the mouth, depress the lower jaw, seize the patient's tongue with a handkerchief and pull it forward. Hold it thus for two seconds and then allow it to go back into the mouth. These movements should be repeated about 15 times a minute.

AFTER TREATMENT:—When the patient begins to breathe—time your artificial respiration to correspond with the patient's attempts at breathing—and when breathing is normal, stop artificial respiration, and promote warmth and circulation by rubbing the legs and arms and body vigorously from below upwards. Remove the wet clothes and cover the body with blankets and dry clothes. Remove the patient to the nearest house, and cover him with hot blankets and put hot-water bottles and hot bricks, covered with flannel, on each side of the body and to the feet.

As soon as the patient has recovered consciousness, and is able to swallow, give him a little hot coffee or tea to drink. Watch the patient for some time, to see that the breathing does not stop again. If it stops, at once recommence artificial respiration.

N.B.—Artificial respiration should *only* be used when natural breathing has failed.

TREATMENT OF THOSE APPARENTLY SUFFOCATED :—

(*a*) BY HANGING :—Support the patient by catching hold of his waist, cut the rope and lower the patient carefully, remove the rope from the neck, loosen all tight clothing, fix the tongue outside the mouth, and perform artificial respiration. When the patient has recovered consciousness, give him a cup of hot coffee or tea to drink.

(b) SUFFOCATION BY POISONOUS GASES:—The suffocation occurs from the escape of ordinary coal gas, the fumes from a charcoal fire, the carbonic acid gas of sewers and wells, or the fumes from a burning room.

Symptoms:—The patient is unconscious. The face is of a dark colour. The breathing is feeble or has quite stopped.

Treatment:—Remove the patient to the fresh air. It must be remembered that, as heated gases tend to ascend, the air near the floor is the purest.

The following precautions will be found useful in attempting a rescue from a burning room:—Tie a handkerchief, moistened with water, tightly over the mouth and nose. Fill the lungs with pure air by taking a deep inspiration. Enter the room by crawling along the floor, and establish a thorough draught by opening the doors and win-

dows, loosen all the tight clothing of the patient as soon as he is brought out into the fresh air and perform artificial respiration. After the patient has regained consciousness, give him a cup of hot coffee or tea to drink.

(*c*) PRESSURE ON THE CHEST FROM FALLING EARTH, DEBRIS, ETC. :—Release the person as quickly as possible. Hold smelling salts or ammonia to the nose. Perform artificial respiration.

(*d*) CHOKING :—This is generally caused by swallowing food hurriedly, or by swallowing coins, or false teeth.

Treatment :—Try to hook out the foreign matter with the finger passed to the back of the mouth. If you fail to hook it up, push it down the throat, past the opening in the wind-pipe. Thumping on the back of the patient, while he is leaning, sometimes may release the foreign

tter. It may sometimes help the patient to ugh up the foreign matter. If the patient does t breathe after it has been removed, perform tificial respiration.

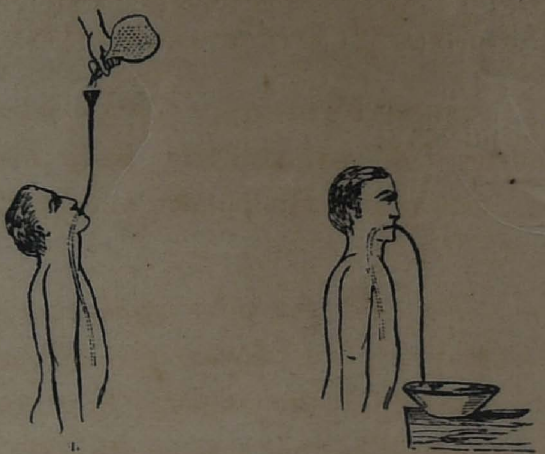
Poisoning.

In a case of poisoning, often the nature of ie poison taken cannot be ascertained. So, such cases of unknown poisoning, the eatment must be carried out as follows:— irst, send for the Doctor at once. See, whether iere are any stains about the lips, or inside the outh. If stains are present, do not make the atient vomit, as the stains are produced by burn- g, and if the vomiting is brought about, the urnt stomach walls might tear. In such cases ve oil such as gingelly, castor or cocoanut, white egg, barley water, milk, or eggs beaten with ilk.

If there be no stains, make the patient s
(vomit) by tickling the back of the throat wi
the finger. If this fails the following emet
(substances that produce vomiting) may
used:—*viz.*, a table-spoonful of mustard in
tumblerful of tepid water, or two table-spoonfu
of common salt in a half tumbler of tep
water, or a table-spoonful of wine of ipeca
repeated in 10 minutes if necessary. If t
patient is very sleepy keep him awake
walking him about, and slapping him on t
back and by giving him strong coffee
drink. Having thus carried out the fi
step, try to find out the nature of t
poison taken by looking for any remains
the cup, bottle, or glass, or by questioning th
patient, and if you are sure that the patient h
taken acid poison, give him one or two tabl
spoonful of magnesia, chalk, lime-plaster fro

e ceiling, or wall, soda or lime-water, and if u are sure the poison is alkali, give him acid ch as lemon-juice, vinegar, tamarind water, ange juice, etc. You must remember that ids and alkalies act as antidotes to, and neutraze, each other. All vomited matter must be preserved and shown to the Doctor. To protect he stomach and gullet from the corrosive action f poisons, bland and oily fluids such as gingelly-il, castor-oil, white of egg, milk, flour and ater, gum and water, should be freely administered. If you cannot make the patient omit and if there is any delay in the arrival of the Doctor, get rid of the poison by a stomach pump. A stomach pump can be improvised by a glass funnel and a yard of India-rubber tubing attached to it. Then begin to wash the stomach thus :—Pass the open end of the India-rubber

tubing into the patient's throat and gullet and



make him swallow 20 to 25 inches of the tubing enough to reach the stomach. Raise the other end of the tube where the funnel is attached above his head, pour as much water down as the stomach will receive. Then lower the free end below the level of the stomach and the stomach will empty itself. Repeat this process several times.

Poisons may be divided into three classes :—(1) Corrosives, (2) Irritants and (3) Narcotics.

(1) CORROSIVE POISONS :—Corrosive poisons are sulphuric acid, hydrochloric acid, nitric acid, caustic soda and caustic potash, ammonia, carbolic acid, etc.

Symptoms of corrosive poisoning :—White patches and shrivelled appearance of lips, mouth and throat, pain in the stomach, faintness, severe burning sensation in the mouth, throat and stomach, difficulty in speaking, blood stained vomit.

Treatment :—Give no emetics, dilute the poison which the patient has taken, by giving him water, barley water, milk, eggs, etc. If the poison be mineral acids such as sulphuric, hydrochloric, nitric, etc., neutralise the poison by giving chalk, lime plaster from the wall, etc. If the poison be

acid carbolic, give half an ounce of Epsom salt or sulphate of soda in half a pint of water. If the poison be alkaline, neutralise the poison by giving two or three table-spoonfuls of common vinegar, Lemon juice in water or Tamarind water.

IRRITANT POISONS :—Irritant poisons are arsenic, strychnine, mercury, lead, copper, phosphorus, (this poison is contained in many rat poisons and in matches) powdered glass, kerosine oil, turpentine, rotten fish and rotten mutton.

Symptoms :—Pain in stomach and bowels, vomiting and purging, faintness and cramp in the muscles.

Treatment :—Remove by emetics or by washing the stomach and afterwards give large quantities of bland and soothing drinks. Treat the collapse by strong coffee or tea. In case of *powdered glass*, first give large quantities of

bulky food such as bread, potatoes, rice and plantain to mix with the glass and protect the walls of the stomach against it and then give an emetic. In *strychnine* poisoning, one important symptom is violent convulsion. In the case of *kerosine oil* encourage vomiting and give stimulants. In the case of *phosphorus*, give five grains of potash permanganate in a pint of water in addition to emetics, but avoid oils.

NARCOTICS :—Narcotic poisons are opium, and its numerous preparations (chlorodyne, camphorodyne, morphia, syrup of poppies) alcohol, chloral, belladonna, dhatura, prussic-acid, cocaine, Indian hemp, (bhang, gunja,) etc.

Symptoms :—Profound drowsiness, and later, insensibility. In all forms of opium poisoning, the pupils of the eye will be contracted to the size of a pin's head. The breathing will be very

deep, slow and stertorous, skin cold and bluish. Often, the odour of the breath will help in the diagnosis. In cases of *dhatura and belladonna* and *bhang poisonings*, the pupils will be enlarged. In the case of *prussic-acid* poisoning, the smell of bitter almonds can be detected in the breath.

Treatment :—Remove the poison by emetics. Keep the patient awake. Treat collapse by strong tea or coffee. Give one tea-spoonful of Condy's Fluid in half a tumblerful of water. Artificial respiration should be resorted to, if the patient stops breathing.

The treatment of poisons generally may be summed up thus :—

1. Remove (except when there is staining).
2. Dilute (water is the handiest diluent).
3. Destroy (or kill the poison with an antidote).

4. Treat collapse (with strong hot coffee or tea).

5. Artificial respiration (if breathing stops, but not otherwise).

CHAPTER VI.

Nervous System.

All the processes of life are regulated, or presided over, by the nervous system.

THE NERVOUS SYSTEM is divided into :—

(*a*) THE CEREBRO-SPINAL SYSTEM (under the control of the will).

(*b*) THE SYMPATHETIC SYSTEM (not under the control of the will).

The cerebro-spinal system includes (1) the brain which fills the cranium and is the seat of consciousness ; (2) the spinal cord which is the prolongation of the nervous matter of the brain. (3) The nerves, which are twelve pairs in number, arise from the brain and which are distributed to the different parts of the head.

Besides these nerves, there are thirty-one pairs of nerves emerging from between the vertebrae and are distributed to all the muscles and the skin. All these nerves cross, either in the upper part of the spinal cord or at the base of the brain, the result of which is that the right side of the body is controlled by the left side of the brain, and the left side of the body by the right side of the brain.

The sympathetic system consists of a double chain of small nerve centres, which lie along the front of the backbone, extending from the skull to the lower end of the spine. These nerves are not under the control of the will. They act quite independently of the will, and they regulate circulation, respiration, secretion and excretion.

INSENSIBILITY (OR UNCONSCIOUSNESS):—Many accidents and sudden illnesses

are accompanied by insensibility. Insensibility is produced by the brain being thrown out of working order, and may be of short or long duration or may end in death. Unconsciousness may be caused by the following affections :—

1. Concussion.
2. Compression.
3. Apoplexy.
4. Epilepsy.
5. Hysteria.
6. Fainting.
7. Infantile convulsions.
8. Shock.
9. Collapse.
10. Sunstroke and Heatstroke.
11. Asphyxia.
12. Shock from electricity and lightning.

How to examine an unconscious person ?

First see if the eye is sensitive, *i.e.*, see whether the person blinks when the white of the eye is touched. Next ascertain if the pupil is fixed or not. If the person is unconscious the eye will be found not to be sensitive and the pupil will be fixed. Next see if there is any paralysis. The best way to find out if one side is paralysed or not, is to tickle or prick the soles of the feet. If paralysed the foot will not be drawn up and, also, if by lifting each arm and leg separately, no resistance is felt in the arm or leg that is paralysed.

General rules to be followed in treating a case of unconsciousness.

1. Send at once for the Doctor.

2. Lay the patient flat on the back.

3. If the face be pale, the head and shoulders must be on a level with the body, and if the face

be flushed, the head and shoulders must be slightly raised on a pillow or rolled up coat.

4. Loosen all tight clothing round the chest, such as collar, necktie, belt, dhoties, etc.

5. Unfasten the braces and top-button of the trousers in men, and the corsets in women.

6. Insist on the free access of fresh air.

7. If there are convulsive movements of the face, put something between the teeth to prevent the tongue being bitten.

8. Examine the body, especially the head, for wounds, fractures, etc.

9. Treat, if there are any.

10. Stop any bleeding.

11. Keep the body warm and the head cool.

12. Keep the patient absolutely quiet till the Doctor arrives.

13. Do not give any stimulants, if in doubt as to the cause of unconsciousness.

14. If he be sick, turn his head on one side and raise the shoulders.

15. Perform artificial respiration if necessary.

1. CONCUSSION :—Concussion is usually caused by blows, or falls on the head. It may be slight, and of short duration, or severe and of long duration.

Signs :—In slight cases, the only sign is confusion, lasting for a few seconds. In severe cases, the patient is unconscious and lies still, the face is pale, the breathing is slow and feeble, the pulse slow and weak, the skin is cold and often clammy and vomiting often occurs as the patient is returning to consciousness. Shouting will rouse the patient but the former condition quickly returns.

Treatment:—Send for a Doctor. Loosen all tight clothes. Attend to any other injuries, especially to the head. Place the patient on the back. Keep the body warm. Apply ice or cold water cloth to the head. Keep the patient absolutely quiet. Do not attempt to rouse him. Do not give any stimulants. Let the patient have plently of fresh air.

2. COMPRESSION:—Caused by blows or falls on the head. It is called *compression*, because the brain is compressed by either a piece of broken skull-bone being driven into the brain, or by the pressure of the blood which has come from a torn blood vessel on the surface of the brain, the blood having been shut up between the brain and the skull.

Signs:—Generally there is a wound, or swelling, on the head. The patient is unconscious.

The body may be paralysed on one or both sides. The pupils are equal in size, and are not affected by light, the eye becomes insensitive, the pulse is slow and strong, and the breathing is slow but of a snoring character.

Treatment :—Send for the Doctor. Loosen the tight clothing, lay the patient flat on his back, keep the body warm and the head cool. In short, treat as for concussion.

3. APOPLEXY :—This generally occurs in elderly people. The cause of apoplexy is the rupture of a diseased blood vessel in the substance of the brain.

Signs :—Insensibility comes on suddenly. The patient falls down and lies still. The mouth is frequently drawn to one side, the cheeks are puffed out with each expiration, one side of the body is generally paralysed, the face is flushed, the

breathing is deep and noisy, the eyeballs are insensitive and the pulse is slow.

Treatment :—The same as for compression.

4. EPILEPSY :—This may occur at any age, but it is more common in the young. There is also hereditary predisposition.

Signs :—The fit comes on suddenly without any warning. The patient gives a scream and becomes unconscious and falls. The legs and arms, and, sometimes, the head and body twitch and jerk in violent convulsion. The hands are tightly clenched. Foam and froth come from the mouth. The froth is often blood stained, the blood coming from the bitten tongue. The head is turned to one side. The face is livid. The pupils of the eyes are small. The fit lasts only a minute or two. The patient generally falls asleep after the fit is over.

Treatment :—Loosen all tight clothing. Place a cork, or well-padded piece of wood, between the teeth to prevent injury to the tongue. Put a small pillow made by rolling up a coat, or dhotie, under the head. During the fit, do not restrain the movements but see that the patient gets no hurt by hurling himself against any furniture, etc., which may happen to be near the patient. After the fit, encourage sleep. Don't give any stimulants.

5. HYSTERIA :—Hysteria is a disease which occurs mostly in young women with a very nervous temperament. It is often caused by excitement, grief, excess of joy, and sometimes without any obvious cause.

Signs :—The patient becomes excited, laughs, cries and sobs without any cause. Sometimes, she lies quietly, and sometimes she throws her-

self about. There may be jerky movements of the limbs. She clenches her fists, catches at any one, or anything, near her. The eyeballs are sometimes turned upwards and the eyelids open and shut rapidly. The patient is not completely unconscious. She loves sympathy. Sometimes she keeps her eyes partly open to see what effect the fit is producing on the on-lookers.

Treatment:—Avoid sympathy with the patient. Speak firmly to her. Exclude fussy friends and relations. Admit fresh air. Threaten that it may be necessary to pour cold water over the head. Even after the threat, if the fit persists, sprinkle the patient with cold water. Put her under proper medical treatment as the condition is due to ill-health.

6. FAINTING:—Fainting is due to the want of a proper supply of blood to the brain. It is caused by the feeble action of the heart. It may

be due to many causes such as hunger, fatigue, excitement, fright, heat, loss of blood, heart disease, a crowded room, etc.

Signs:—The patient becomes pale and complains of feeling giddy. If walking, he staggers. If sitting, he gets uneasy and shifts about. With loss of consciousness, he falls down and lies still. The skin is clammy, and there are beads of perspiration on the forehead. The breathing is hurried and shallow, accompanied by yawning. The pulse is feeble.

Treatment:—Loosen all tight clothes. Place the patient flat on his back with head and shoulders in a level with the body, and elevate the legs a little. Allow the free access of air. Apply smelling salt to the nose. When consciousness is regained, give the patient tea or coffee to drink. Bathe the hands and face with cold water.

7. INFANTILE CONVULSIONS:—Teething and stomach and bowel troubles are the commonest causes of this ailment.

Signs:—Unconsciousness, spasm of the muscles of the limbs and trunk, blueness of the face, suspended respiration and froth at the mouth.

Treatment:—Send for a Doctor. In the meantime, place the child at once in a warm bath. Keep him in the bath from 10 to 20 minutes. Apply a cloth, wet with cold water, or iced water, to the head.

Caution:—Avoid the risk of scalding the child by putting the cold water in the bath first and then adding the hot water gradually. Dip your naked elbow in the water to test the temperature of the water.

8. SHOCK:—May be defined as the suspension of the influence exercised by the nervous system

over the vital functions. It is caused by severe injuries such as broken bones, burns, etc., poisoning, fear and so forth.

Signs :—The patient feels cold and shivers, and the temperature is found to be sub-normal. The breathing is indistinct, the pulse weak and the face pale, the eyes sunken and the pupils dilated.

Treatment :—Keep up the body-heat by covering the patient with warm clothing, give plenty of warm drinks and apply heat to the body by means of hot-water bottles. Raise the foot of the bed.

9. COLLAPSE :—This is generally due to alcohol and other poisons.

Signs :—Total or partial insensibility. In collapse due to alcohol the pupils get dilated. In the case of opium poisoning the pupils get contracted. Breathing is slow and stertorous in

character, the pulse weak, the skin cold and moist. Sometimes the breath smells of poison.

Treatment :—Loosen all tight clothing, allow plenty of fresh air and keep the head and shoulders slightly raised. If the patient is apt to vomit, keep him on his side. Apply friction to the limbs, cover with warm clothing and put hot-water bottles round him. Whenever he can be roused, give liquid nourishment such as coffee, tea, soup, or beef-tea, etc. If collapse is due to alcohol and opium, treat as per directions given in page 131 under " Poisoning."

10. SUNSTROKE AND HEATSTROKE :— These are due to prolonged exposure to a high temperature, plus physical exertion such as that occurring in the engine-room, walking bare-headed in the hot sun, etc., and are produced by the direct rays of the sun, or by heat causing congestion of the coverings of the brain.

Signs :—The patient complains of a severe throbbing pain in the head with a feeling of faintness and giddiness and quickly becomes unconscious. The skin is hot and burning. The pulse is quick and bounding. Breathing is rapid and gasping. The pupils are small at first, later they are large. The face is flushed. Vomiting is frequently present.

Treatment :—Send for the Doctor. Admit the free circulation of air, loosen all tight clothing, remove the patient to a cool place, apply cold water or iced water to the head, neck, chest, and spine, or wrap a cold, wet sheet around him. If the patient is conscious, give him cold water to drink, but no stimulants.

Prevention :—During the hot months wear a white, big turban tying it loosely over the head. Do not have any tight clothing or collar round the neck.

11. ASPHYXIA :—When the blood is not supplied with oxygen, the patient becomes unconscious owing to the want of air. As for symptoms, signs and treatment. *Vide* page 122.

12*a*. SHOCK FROM ELECTRICITY :—Since the introduction of electric light and electrical machinery, shocks from it are becoming more and more common from exposed wires.

Signs :—On touching an exposed wire, the patient is seized with a sudden spasm. He is quite unable to release his hold. The part that comes in contact with the wire is burnt. There is sudden and severe pain. When, ultimately, he is able to let go, he utters a peculiar, sharp, short cry and falls. He may become unconscious and breathing may cease.

Treatment :—The first thing to be done, if possible, is to switch off the electric current

But if this is not possible, before rendering first-aid, insulate yourself. Otherwise the current will transmit the shock to you. Therefore, before you touch the patient, use India-rubber gloves or a mackintosh coat or sheet. In the absence of these, use dry woollen materials or dry wood, dry straw or dry cloth, or stand on your dry coat. All common metals must be avoided as they transmit electricity. Give the patient stimulants. Keep his body flat and warm. If necessary, perform artificial respiration.

12*b*. LIGHTNING SHOCKS :—The symptoms and the treatment are the same as the above.

CHAPTER VII.

Burns, Wounds, Bites, Etc.

BURNS AND SCALDS:—Burns are produced by dry heat such as that of chemicals, flames, or red hot metals, whereas scalds are caused by moist heat such as that of boiling water, hot oil, etc. There are three degrees of burns:—

(1) Simple reddening.

(2) Formation of blisters.

(3) Charring.

Treatment:—The great danger in severe burns is that the germs of disease may enter the system through the burnt area and cause blood-poisoning which, together with shock, is the cause of death. Therefore, the one chief aim in carrying out first-aid is to prevent germs entering from without.

The first thing to do is to exclude air. If the burn is covered, see that everything is ready before removing the clothing over the burnt area. If the cloth is stuck up to the skin it must not be dragged. The cloth must be cut all round the burn and the remaining piece over the burn must be left to come off of its own accord. In the case of the foot of a patient wearing a boot, the boot must be cut off at the lace in front, or at the elastic at the sides, or at the seam at the back. Do not prick the blisters but cover them up with a small piece of lint, dipped in some unirritating antiseptic lotion such as boric acid, or picric acid, and cover the lint with a layer of cotton wool and apply a bandage lightly. If the burnt area is extensive, use several small pieces of lint instead of one large piece, so that in subsequent dressing the wound may be dressed, a small piece at a time. By so doing, shock to the

system may be minimised. In the case of a hand or a foot being burnt, the part should be put in a basin of lukewarm sterilized water, (to which a little soda may be added to relieve pain) and the air excluded, while the dressing is being prepared. If the eyes are burnt, put a few drops of castor oil into the eye, between the lids. The severe shock accompanying burns must be treated accordingly. *Vide* page 146.

In burns from chemicals such as sulphuric acid, etc., soak the part in warm water to dilute the chemical and then treat as an ordinary burn.

Scalds of the throat are best treated by applying hot sponges, or flannel wrung out of hot water, to the outside of the throat and by giving the patient oil to drink and ice to suck.

WHAT TO DO WHEN THE CLOTHES CATCH FIRE:—If the patient is alone in a

room and the dress takes fire without bursting into flames, advise the patient to crush and smother it in the other folds of the dress or between the knees, and loosen the dress as shown in the accompanying figures.

In cases where the fire bursts into flames, at once lay the patient down with the burning surface uppermost, as flames, always having a tendency to run upwards, injure the eye and the face. Fire will not burn without air. So cover the burning clothes with a blanket or rug, table-cloth, coat, etc. These will at once put the fire out. If the patient is alone in a room, he should crawl along the floor to the nearest rug or cloth and wrap it round his burning clothes.

On no account rush out-of-doors as the air will fan the flame.

1. This illustrates how the child in rushing out into the air, is in a mass of flames.

2. This figure shows how the child lies on her face, to escape from being burnt to death.

3. The last figure illustrates how the rug (or mat, blanket, sack, cloak, coat, etc.,) quickly smothers flames if thrown on to them and pressed down.

STINGS AND BITES OF INSECTS AND ANIMALS:—Stings of insects such as bees, gnats, wasps, etc., cause a good deal of inconvenience and are occasionally fatal.

Symptoms.—Local swelling and pain. In severe cases, faintness, vomiting, diarrhœa, and unconsciousness may occur. Occasionally vomiting, swelling of the face, hands and feet are present.

Treatment:—Extract the sting by squeezing the part stung. Apply liquid ammonia, bicarbonate of sodium or spirits of wine, or a slice of fresh onion, or rub a little permanganate of potash. Treat shock, if present.

N.B.—Tincture of iodine is one of the best applications to all kinds of stings.

SNAKE-BITE.

When a poisonous snake bites, it injects poison into the blood of the person or animal bitten, and the blood carries the poison all over the body to the heart and brain, and death follows. The bite of a poisonous snake can be recognised by its producing two small bleeding points about an

inch apart. If the poison can be kept from

1.

2.

3.

1. Krait. 2. Russelle's Viper and 3. Cobra.

preading over all the body in the blood stream, nd from reaching the heart, death will not follow. Therefore, the object of first-aid men should be o prevent the flow of poisoned blood along the eins to the heart. The first and the most im-

portant thing to do is to put a constricti
between the wound and the heart, for example,
a finger is bitten, a bandage, ligature or strir
a piece of tape, handkerchief, etc., shou
be firmly tied round the finger, the wris
the fore-arm and the upper arm on the sic
of the wound nearest to the heart. As soc
as tight ligatures have been fixed to prevent th
flow of poisoned blood throughout the bod
bleeding from the wound must be encouraged b
scarifying the sides of the bite, with a sma
knife, or lancet, or needle, by letting the injure
limb hang down, by keeping it as low as possibl
and by bathing the part with warm water. Aft
doing this, rub powdered permanganate of potas
into the wound. If possible, hold the injure
part in a warm and strong solution of permang
nate of potash, as it destroys and neutralises th
snake poison. If potash permanganate is n

The above figure illustrates how bleeding from the poisoned wound is encouraged by scarifying the sides of the bite.

available, you can cauterise the part with a red-hot iron, or with burning firewood, or with caustic potash, nitric or carbolic acid.

Treat for shock and collapse by giving plenty of stimulants such as coffee, tea, etc. Perform artificial respiration, if necessary.

N.B.—Just after the bite, till aid comes, if the mouth is free from sores, suck the wound and spit out the sucked blood. After sucking the wound, the mouth ought to be washed with some brandy or other spirit.

SCORPION STING.—The pain produced by scorpion sting is intense and, occasionally, the sting is fatal to children. The sting is at first like the prick of a sharp needle, followed by a sensation as if a number of needles were being inserted.

Treatment:—Tie a handkerchief tightly above the bite. Then suck the wound. Rub the part

with a little ammonia, or Condy's Fluid, or the cut surface of a raw onion, or with tobacco juice.

BITES OF CENTIPEDES, SPIDERS, ETC.—Treat these exactly like snake bites *vide* page 161.

BITES OF MAD DOGS AND RABID ANIMALS.—The bite of a mad dog is less dangerous if the bite be through the clothing, as much of the poisonous saliva is wiped from the teeth of the dog by the clothes. In no case should the dog be destroyed. It should be kept under observation at least for 10 days. If it dies during that period, then it is rabid.

Treatment :—Constrict the limb as indicated for snake-bite and wash the wound well with warm water. Cauterise with pure carbolic acid or nitric acid. Send the bitten person to the nearest Pasteur Institute.

FROST-BITE :—This occurs after exposure to great cold. The parts affected are ear, nose, chin, fingers and toes.

Signs :—They have, at first, a bluish, later on a waxy appearance and are cold to the touch. All feeling is lost.

Treatment :—The object is to restore circulation and warmth to the part. If snow or ice is to be had, rub the part well with it. If not, rub with cold water, keep the patient in a cool room at first, and, when sensation has returned, take him to a warmer room. As soon as the patient can swallow, give him a cup of warm coffee or tea to drink.

FIRST-AID TREATMENT OF WOUNDS. The following are the general rules :—

1. If there be no bleeding, bathe the wound with clean, cold water, or ice water. But pene-

trating wounds of the abdomen and chest, and compound fracture of the skull, should not be washed until the Doctor arrives. For bathing a wound, use a clean piece of linen, or a piece of cotton wool if available, but never use a sponge.

2. Draw the edges of the wound as close together as possible, place a pad of clean dry linen over the wound, and fix with a bandage. If the wound be of the hand or arm, put the fore-arm in a large arm-sling. In case of transverse wounds of the abdomen the patient should be kept in a semi-recumbent position with the knees bent.

3. If bleeding be present, raise the part above the level of the heart, or make the person lie down and put the finger at once on the bleeding point in the wound ; press a piece of clean dry linen into the wound, apply a folded piece of linen over the wound, and bandage firmly.

4. If the bleeding is arterial and does not stop, compress the main artery on the side of the wound nearer the heart.

5. If harm will be done by direct pressure (*e.g.*, compound fracture of the skull, glass in the wound, etc.) check bleeding by pressure, near the wound, on the vessels supplying the blood and then cover with a piece of clean, dry linen. Do not fix with a bandage.

6. All bleeding wounds should be raised.

7. Paint every kind of wound with tincture iodine, before dressing, to prevent pus-formation.

8. If the wound is a clean cut one, the edges should be brought together and kept in position by means of a piece of "Johnson's Strapping," (or a clean adhesive plaster).

WOUNDS ARE DIVIDED INTO :—

(1) Incised, (2) Lacerated, (3) Contused, (4) Punctured and (5) Gunshot. All these varieties may become poisoned by the entrance of microbes.

1. INCISED WOUNDS are wounds inflicted by sharp instruments. In treating such cases, first stop bleeding, apply tincture of iodine and a piece of clean lint over it and bandage it up.

2. LACERATED WOUNDS :—When the skin and parts beneath are torn, and the surface of the wound is ragged or uneven, this condition is described as lacerated wound. Treat it as above.

3. CONTUSED WOUNDS :—These are usually due to a blow with a club or lathi, or blunt weapons. Treatment is the same as above.

4. PUNCTURED WOUNDS :—These are produced with a sharp instrument, *e.g.*, a stab with a knife or with a bayonet. Treatment same as above.

5. GUN-SHOT WOUNDS :—The injuries caused by fire-arms are called gun-shot wounds. As for treatment, shots buried in the fleshy parts of the body should be left alone as these cause no inconvenience. The best treatment is to paint the wounded part with iodine.

ABDOMINAL WOUNDS :—In wounds of this description the contents of the abdomen sometimes escape through the wounds. The treatment consists in placing a clean cloth over the wound, and keeping it constantly wet with a weak solution of salt, or warm water, to prevent the structure of the bowels becoming dry. If the wound of the abdomen is transverse, roll up a coat, or a dhotie, and place it under the knee to relax the muscles of the abdomen so as to bring the edges of the abdominal wound together.

BRUISES, STRAINS AND RUPTURE OF MUSCLES OR TENDONS:

BRUISES:—These are the results of the tearing of the capillaries under the skin, the blood which thus escapes from the true blood-vessels causing the discoloration.

Treatment:—Rest, application of cold or ice-water on linen.

STRAINS:—These may be either of the muscles or tendons. Pain on movement and tenderness are the important symptoms. Rest and the application of a bandage are all the treatment needed.

RUPTURE OF MUSCLES OR TENDONS:—A hollow depression may be felt at the injured spot and loss of power. Treatment same as above.

RUPTURE (commonly known as hernia):—One of the contents of the abdomen, usually the

ear; so take the patient to a Doctor. If any insects, such as ants, enter the ear, pour some gingelly, or cocoannt, oil in or pure glycerine which will float the insect out.

3. IN THE EYE:—It is best to obtain medical aid. Do not rub the eye. Try to remove the foreign body with the corner of a soft handkerchief. If you fail to do this, put a drop of oil such as castor-oil into the eye. Tie a handkerchief tightly over the eye to prevent the movement of the lid on the injured surface of the eyeball and wait for the Doctor. If the foreign matter be a liquid, wash the eye with milk and water. In cases of lime, bathe the eye with a weak solution of vinegar or milk and water. If the foreign body is beneath the upper eye-lid, lift the lid forward, push the lower lid beneath it, and let go. The hair of the lower lid brushes the inner

surface of the upper one and may dislodge the body. If this fails, turn the upper eye-lid inside out, and the foreign body can then be seen and easily removed.

4. IN THE NOSE:—The substance usually is a button, bead or pea.

Treatment:—Instruct the patient to blow the nose with considerable force, first closing the opposite nostril with the finger, and induce sneezing by giving the patient a pinch of snuff. If all these attempts fail, send for a Doctor.

5. FISH-HOOKS imbedded in the flesh can be removed by the following methods:—

(*a*) Push the hook onward through the skin, then cut off the barbed-point with a strong pair of wire-cutters and withdraw the hook, or (*b*) remove the dressing of the hook until only the

metal part is left and wash this in an antiseptic lotion. Then push the hook on until the point comes through the skin and remove the hook by pulling on the point.

CHAPTER VIII.

Removal of the injured or sick.

THE FOLLOWING PROCEDURES ARE USEFUL IN CARRYING THE PATIENT WHEN THERE IS ONLY ONE BEARER:—(1) If there is only one person at hand to help, and if the wounded, or sick, man can walk, (*a*) then the patient puts one arm round the neck of the person assisting him, so that his hand hangs down over the further shoulder; the person assisting, places his arm from behind, round the waist of the wounded man, and with his other hand holds the

hand of the patient hanging over his shoulder. In this way he can support him very efficiently. (*b*) Place the patient with his back to yours. Then slightly stoop, placing your hands over your shoulders and grasp the patient under the armpits, then bringing his weight well up on your back, stand up. When lowering the patient, sink down on your left knee and place him in a sitting posture.

(2) The "Fireman's lift." This is suitable when the sick or wounded is unconscious. When *lifting* the patient, lay the patient flat upon his back, with his two legs at full length, and his arms touching the sides. See Fig. A. Place one of his fore-arms

Fig. A.

across his forehead, and roll him over towards the opposite shoulder, (see Fig. B) on to his face.

Fig. B.

Stoop at the head of the patient, and insert your hands under his chest, between his arms and the sides of his chest, and interlock your fingers behind his back. See Fig. C. Draw him forward as high

Fig. C.

as possible resting his body against yours, slowly loosen your grasp, quickly interlock your fingers again round the waist, then lift and raise him to an upright attitude, holding the patient steadily to your left side. See Fig. D.

Fig. D.

Next take the patient's left wrist in your right hand, stoop down, draw his left arm round your neck, bending your head, place your left hand between his thighs and grasp his left thigh firmly. See Fig. E. Next bring his left wrist across your left hand, and adjust his weight evenly. Balance the patient upon your left shoulders and assume the upright attitude. See Fig. F.

Fig. E.

When *lowering*, transfer the patient's left wrist to your right hand. At the same time

Fig. F.

remove your left hand from his left thigh and hold him firmly round the buttocks. See Fig. G. Now

Fig. G.

gradually lower him until his feet touch the ground. See Fig. H. Kneel on the left knee, allowing his

Fig. H.

left arm to drop from your neck. Interlock your fingers behind his back and gently place him at full length on the ground. See Fig. I.

Fig. I.

THE FOLLOWING METHODS ARE USEFUL IN CARRYING THE PATIENT WHEN THERE ARE TWO BEARERS :—

1. *The two-handed seat* :—The two bearers face each other. The fingers of the right hand of the

one interlock with those of the left hand of the other, palm upwards. The free hands are now placed on each other's shoulder when the patient is tall, and on the hips in the case of a short patient.

The above figure illustrates how the patient, who is unable to give any assistance owing to some injury to his arms or from being unconscious, is lifted up by this method.

This illustrates how the patient is carried by o-handed-seat method.

2. *The three-handed seat* :—The two bea
No. I and II. face each other. No. I. bearer gr

his own wrist with his right hand and also grasp
the left wrist of No. II. bearer with his left hand
No. II. bearer grasps the wrist of No. I. bearer
with his left hand and places his free right hand
on the left shoulder of No. I. bearer. (See next Fig.)

3. *The four-handed seat* :—The two bearers face each other. Each grasps his own left wrist with his right hand and then grasps the right wrist of the other with his left hand. The patient sits

on the seat thus made, supports himself by placing his arms round the two bearers' necks.

N.B.—The four-handed seat ought to be used when the patient can give assistance, and the two-handed and three-handed seats are to be used when the patient is unable to give any assistance, due to injury to his arms, or from being unconscious.

4. *The blanket seat.*—The method requires the service of two bearers and the use of two blankets. Each blanket is folded, rolled or twisted into a

Fig. K.

Fig. J.

cylindrical form, as shown in the Fig. J. The two cylinders are placed side by side and their ends are tied together by reef-knots. The bearers then raise the tied blanket rolls, adjusting them with one knot on the right shoulder of the right bearer, and the other on the left shoulder of the left bearer, as shown in the Fig. K. To transport the patient the bearers kneel, the right bearer on his left knee, the left bearer on his right knee, the cylinder is pulled apart so as to form a sitting space of six or eight inches between the rolls, and the patient, supported by the arms of the bearers, is placed upon this space for transportation. By this method one arm of each bearer is free for any emergency.

N.B.—When a blanket is not available or handy, either a bed-sheet or any cloth, made out of strong material, may as well be utilised.

5. *The rope seat* :—This is a circular seat made by either a knotted rope or a straw rope

on which the wounded or sick person is placed and which is held on either side by one hand of each bearer.

6. *Stretchers* :—These are light, portable beds made of a framework of poles with a piece of canvas stretched between them. (See Fig. M.)

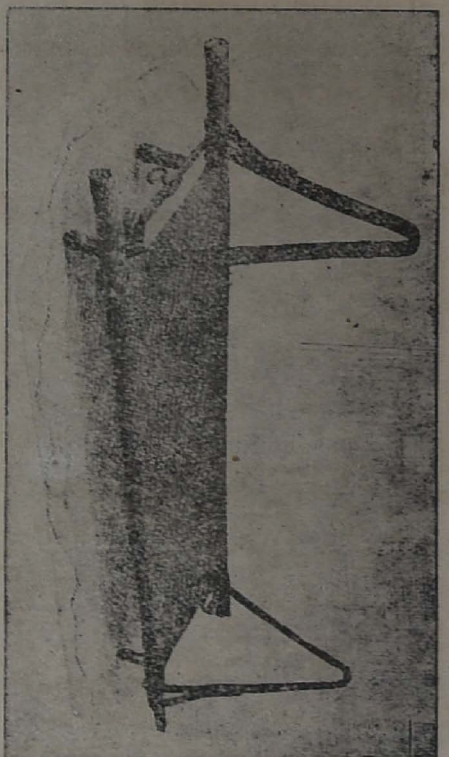


Fig. M.

If no stretchers be at hand, stretchers could be improvised by the following methods :—

(*a*) Get two strong coats, turn the sleeves inside out, button the coats and place them,

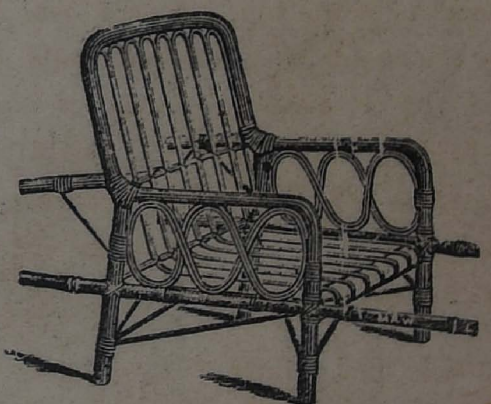
button side downwards, and with the lower edge touching one another, then pass a long pole through the sleeves on each side.

(*b*) Spread a long and strong rug, or bed-sheet on the ground. Place two long strong poles along the opposite sides of the rug, or bed-sheet. Roll the sides of the rug, or sheet, over the poles till they are about 24 inches apart, and stitch the unfolded rug or sheet by means of needle and thread to the folded part. If stitching is not possible, make holes in the rug or sheet, and pass twine or thin rope through them and thus fix the rug or sheet to the pole.

(*c*) Place two strong *gunny* sacks on the ground mouth to mouth, make holes in the bottom corners of each, and pass poles through them, one on each side.

(*d*) The articles found in houses such as bedsteads, bed-frames, sofas, benches, window and door-shutters can, as well, be used as stretchers.

(*e*) A chair can be converted into a stretcher by tying a pole beneath the seat, one on each side.



(*f*) If there are two persons to help, one of the bearers must support the upper part of the body,

standing behind the injured man, passing his hands and fore-arms beneath the patient's arm-pits, and the other, walking in front, takes the legs one under each arm.

METHODS OF REMOVAL OF THE INJURED ON A STRETCHER :—(I) To place an injured person on a stretcher, and carry him properly, requires a certain amount of practice. It is always better to have *four bearers*. To place a patient on it, place the foot of the stretcher at the head of the patient in a line with his body. The three bearers then place themselves on the left side of the patient facing him, one standing opposite the knee, the other at the hip and the third at the shoulder. The fourth stands on the right side of the patient opposite to the bearer standing at the hip. (See Fig. *a*.)

Then, all the bearers kneel down on their left knee, and take hold of the patient. The bearer kneeling at the knee of the patient passes his hand wide apart beneath the patient's legs, the bearer at the hip passes his hands beneath

Fig. *a*.

the thighs and hips, the bearer at the shoulder passes his hands beneath the upper part of the trunk, the fourth on the right side of the patient

passes his hands beneath the patient and grasps the hands of the bearer at the hip on the opposite side of the patient. (See Fig. *b*.)

Fig. *b*.

After this, the patient is raised gently and is rested on the knees of the bearers kneeling on the left side of the patient. (See Fig. *c*.) Next, the

Fig. *c*.

bearer on the right side of the patient disengages his hands and runs round by the head of the stretcher, carries it and places it under the patient close to the other three bearers' feet, with the head of the stretcher under the patient's head. (See Fig. *d*.)

Fig. *d*.

He then re-engages his hands with those of the bearer at the hip on the opposite side. (See Fig. *e*.)

The patient is then gently lowered on the stretcher, and the bearers rise and stand up.

Fig. *e*.

The bearer who was at the knee goes to the foot of the stretcher with his back to the patient, the bearer at the shoulder goes to the head of the stretcher with his face towards the patient, and the other two bearers remain one on each side of the stretcher and adjust the slings of the stretcher over the shoulders of the other two. Then all rise together steadily. The bearers will now move

on with a short step of twenty inches. (See Fig. *f*.) After reaching the destination, the bearers stand steady and the stretcher is gently lowered, and the slings are removed from the

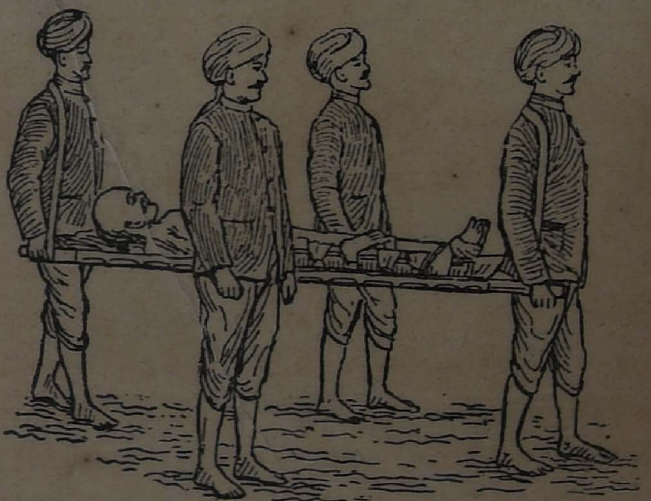


Fig. *f*.

handle. To remove the patient, the bearers stand themselves as for loading and the patient is lifted

on to the knees as before, and lowered carefully on to the bed.

(II) *If there are only three bearers*, of the three only two will stand at the left side of the patient, and the other will stand on the right side. The

stretcher is placed in a line with the patient's body close to his head. The patient is raised by the three bearers and carried over the foot of the stretcher, until his head is in a line with the

pillow. Then carefully lower on to the stretcher bed and carry him.

(III) *If there are only two*, the bearers place the stretcher in line with the patient's body close to his head, and lift the patient straddling over him, one grasping the patient at the level of the shoulders, with his hands both over the back and the other at the level of the hips, with the left hand,

and round the calves with the right hand. (See Figures above.)

The bearer, lifting the upper part of the body, ought to move forward by very short steps and the other ought to bend his body forward without moving his feet. When the patient's head is on a level with the pillow of the stretcher, lower him gently and carry him as usual.

CARRYING STRETCHERS OVER A WALL:—When the wall is reached, the front handles are rested on the wall. Two bearers then climb over the wall and the stretcher is gently passed forward until the end only rests on the wall. When this is done the remaining bearers climb over the wall and the stretcher is lifted from the wall and placed on the ground. The stretcher is now carried as usual.

CARRYING STRETCHERS OVER A DITCH:—The foot handle of the stretcher is placed at the bank of the ditch. Two front

bearers now get into the ditch, and the stretcher and the patient are advanced until the front handle of the stretcher can be rested on the bank. Then the other two hind bearers get into the ditch, and the stretcher is again advanced until the foot handle of the stretcher can be rested on the opposite bank when the front bearers supporting the foot handle of the stretcher come out of the ditch, and the stretcher is once more advanced till the head handle of the stretcher rests on the ground. The hind bearers climb out of the ditch and the stretcher is carried as usual.

N.B.—1. While carrying the stretchers, see that the patient's head is as high as, or just a little higher than, the feet.

2. The feet should always be in front while carrying a stretcher.

3. But when going up-hill the feet should be behind.

4. When going down-hill or down-stairs, in case of fractured thigh or leg, the feet must be behind.

5. In cases where a lot of blood has been lost, carry the feet first in going up-hill or up-stairs, and the head first when going down-hill or down-stairs, to prevent fainting.

CHAPTER IX.

Preparation of bedroom in cases of accidents and emergencies.

Choose a room that can be easily reached and which has got a good light and ventilation, preferably a room on the ground floor, or first floor, is the best. Remove all unnecessary furniture so that the patient can be carried in without any trouble.

A narrow, single bed with a spring mattress is the best. Do not choose feather beds; for they are unhealthy. A mattress case filled with fresh clean straw is very good for those who cannot afford better. In cases of fractures, large flat wooden boards are useful, immediately below the mattress to make it rigid. The head of the bed

should be next to the wall, leaving the sides free.

The clothes should be turned back, on each side, the full length of the bed. A draw sheet must be put on the bed. If possible have two small beds, so that the patient can be moved from one to the other occasionally. A strip of water-proof material should always be laid over the undersheet and beneath the draw sheet.

Two or more hot-water bottles covered with flannel should be got ready, or a brick heated in the oven and covered with flannel can also be used. A piece of soap, a nail brush, a packet of safety-pins should also be kept ready.

Two chairs may be kept ready on which the stretcher may be rested till the patient is fit to be removed to the bed.

The passages leading to the sick-room should be cleared of all furniture which might be in the way of the stretcher.

MANAGEMENT OF CLOTHES IN ACCIDENTS.—The clothes should not be removed unless absolutely necessary. If it is necessary they should not be dragged off, but be cut and removed. When removing the coat, in cases of injuries of the arm, cut the outside seam of the sleeves on the injured side, and remove the uninjured arm first and then take the coat off the injured one. In putting a coat on, the order is reversed—the injured is put first and then the uninjured arm. If boots have to be removed, cut up the back seam or side elastic.

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