

THESIS.

AMBULANCE INSTRUCTION.

BY

QUINTIN CHALMERS, M.B., C.M.,

SURGEON TO 10TH L.R.V. (GLASGOW HIGHLANDERS).

Illustrations Drawn by the Author.



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AMBULANCE INSTRUCTION.

THE word "Ambulance" is of French origin, signifying a hospital which accompanies an army into the field so as to render aid to soldiers when wounded in battle ; but the word is now used generally, meaning first aid to wounded when accident befalls them, whether it be in the battlefield or on the street. Taking this latter meaning of the word, we can trace ambulance work being done long before the St. John's Association of London and the St. Andrew's of Glasgow were originated ; for we read of the Knights of St. John or Hospitalers of St. John (afterwards called the Knights of Rhodes, and finally the Knights of Malta) doing ambulance work. The Knights were a religious military order, established at the commencement of the Crusades.

In the year 1048 some merchants from Amalfi, in Naples, having built a monastery, it became the duty of the Monks, who were called Brothers of St. John or Hospitalers, to attend to the sick and wounded. The sufferings of the wounded in the battlefield do not seem to have been much lessened, for they were generally left

lying on the field until the battle was over, but in the year 1792 Baron Larrey, a French surgeon under Napoleon I., instituted flying ambulances (*ambulances volantes*), capable of being moved from spot to spot, and so succeeded in mitigating the horrors of the battlefield and the sufferings of the wounded. Since then things have gone on improving, and now we have in the army an "Army Medical Corps," the bearers of which are placed behind the line of fire, and so when a man is wounded his injuries are at once attended to and many lives saved. Stretcher Drill will be found fully detailed at the end of the book.

Within the last few years classes have been extensively formed over the country for teaching ambulance work, and in many of our large public works, at the chief railway stations, in the police force, &c., trained ambulance corps are now formed, ready at any minute to attend to accident until a medical man arrives.

Having briefly given the origin and history of first aid to wounded, I intend in the succeeding pages to use words which will, as far as possible, be of a clear, non-technical nature, and will endeavour throughout to make the language not so much ornamental and polished, as thoroughly and practically useful. To those who have set before themselves the task of rendering aid to their fellow-creatures when accident or injury overtakes them, some knowledge is necessary of how the human frame is formed; of its various bones, muscles, blood-vessels,

nerves, and internal organs, and how each of these is joined or mingled with the other, so as to form man, the crowning work of the great Creator in the animal kingdom.

While a little knowledge is a dangerous thing, care will be taken to warn all that they must not presume on their knowledge, but only do what they know to be right, as will be laid down in the instructions for their guidance, and only till the doctor arrives. As a result of this teaching, a reader of this book passing by, instead of fainting at the sight of blood or being a helpless looker-on, may prove in need a friend indeed, by removing discomfort or even saving life itself.

Let us now consider of what the human body is composed, viz. :—

- 1st. The skeleton and its joints.
- 2nd. The muscles.
- 3rd. The nervous system and organs of sense.
- 4th. The blood and organs of circulation.
- 5th. The organs of respiration.
- 6th. The organs of digestion.
- 7th. The organs of secretion and excretion.
- 8th. The reproductive organs.

The Skeleton.

(1) Forms a framework to support the body ; (2) forms levers by which, when acted upon by the muscles, the body is moved ; and (3) protects various organs by forming cavities in which these organs are placed. It is composed of 200 separate bones, united together, which are for the most part movable. Bone consists of an earthy substance, mostly lime combined with phosphorus, which gives it hardness, and a fibrous structure of animal basis, which gives it toughness and tenacity.

THE BACKBONE OR SPINE.—The great central part of the skeleton is the backbone or spine (Fig. 1), which, however, is not a single bone, but is made up of separate bones called vertebræ (Fig. 2), divided into the following different

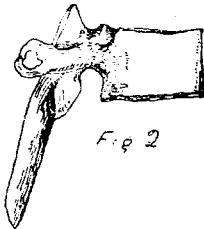


Fig 2

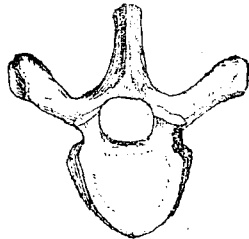
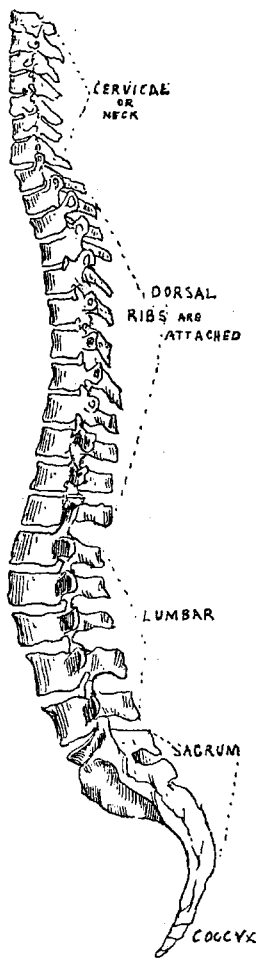


Fig 2

sections :—Seven cervical or neck ; twelve dorsal, and to which the ribs are attached ; five lumbar or loin vertebræ ; the sacrum or rump, formed by five vertebræ fused together into a single bone ; the coccyx or tail, consisting of four bones, also united so as to form a single bone. The cervical, dorsal, and lumbar vertebræ are joined together



CERVICAL
OR
NECK

DORSAL
RIBS ARE
ATTACHED

LUMBAR

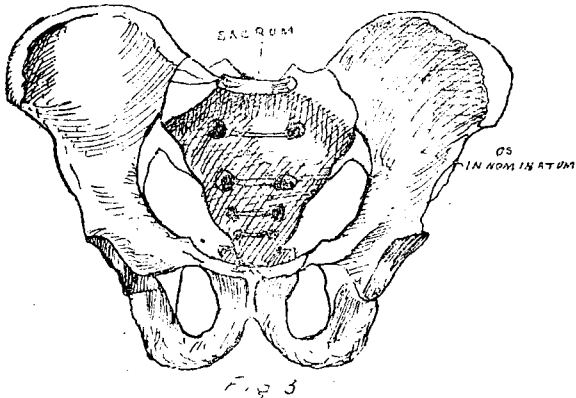
SACRUM

COCCYX

Fig 1

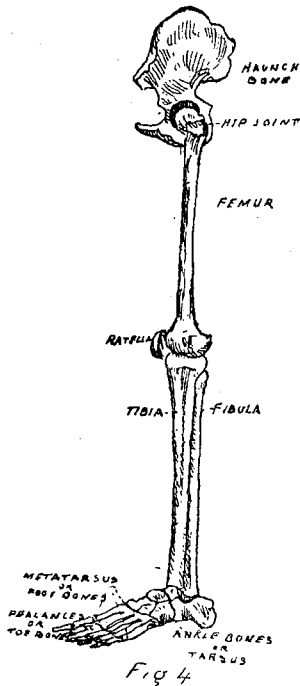
by means of movable joints, plates of tough gristle being placed between the bones to act as buffers. A canal runs down the spine in which the spinal cord lies protected.

THE SACRUM OR RUMPBONE.—At the lower end of the movable part of the spine is attached a series of bones fixed immovably to one another, viz., the rumpbone or



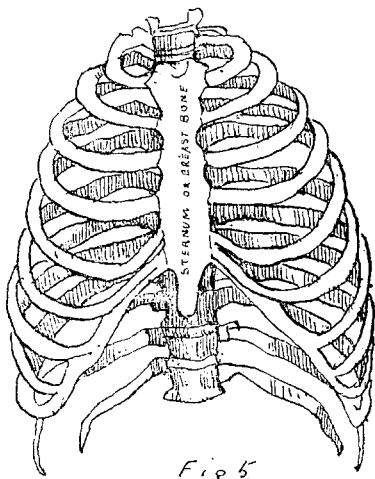
sacrum and the two haunch bones (*ossa innominata*, or the nameless bones), the whole forming a cavity called the pelvis (Fig. 3), and to which the lower limbs are attached.

THE LOWER LIMB consists of thirty bones in all, viz., the thigh bone or femur; patella or knee-cap; tibia or shin bone, in the inside of the lower legs, and the fibula on the outer side; ankle bones or tarsus, seven in number; metatarsus, five in number; toe bones or phalanges, fourteen in number (see Fig. 4).



THE CHEST (Fig. 5) is composed of the twelve dorsal vertebrae, to which are attached the ribs, twelve on each side. These pass from the spine behind, most of them to join the sternum or breast bone in front.

THE UPPER LIMB is attached to the chest by means of two bones, viz., the scapula or shoulder blade



and clavicle or collar bone. These along with bones which compose the upper arm, with their names, are shown in Fig. 6.

THE SKULL.—To the upper part of the backbone is attached the head, which is composed of twenty-two bones: eight forming the cranium or skull, which provides a strong case for the protection of the brain, viz., two parietals, one frontal, one occipital, two temporals, one sphenoid, one ethmoid; fourteen bones forming the face, viz., two malars, two nasals, two upper maxillaries, one lower maxillary, one vomer, two palate, two lachrymal, two turbinated. These bones, with the exception of the lower jaw, are all immovably united to one another. The principal bones are shown in Fig. 7, page 14.

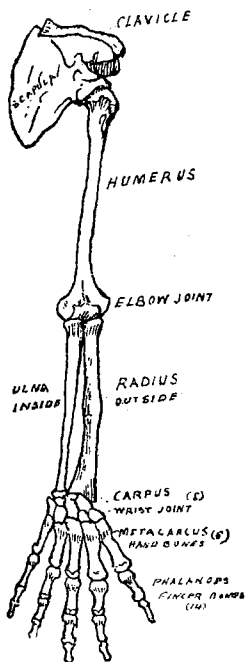


FIG 6

JOINTS OR ARTICULATIONS — Movable joints are found at the ends of all the bones, with the exception of the head and pelvis. They are formed by the ends of two bones coming together, which are covered with a smooth substance called cartilage, and are held together by means of **tough** strong bands called ligaments, which in some cases cover the whole joint and form a capsule; the

joint is lined within this capsule by a thin membrane called the synovial membrane, which secretes a fluid of oily consistency called synovial fluid, and which lubricates

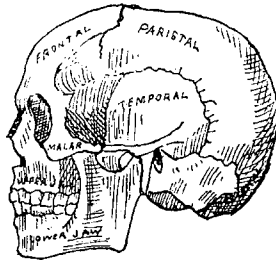


FIG 7

the joint, so as to make the movement easy and soft. There are two kinds of joints. The hinge, which is seen in the elbow, and the ball and socket, found at the shoulder

Hinge Joint.

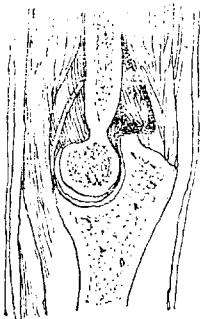


Fig. 8.

Ball and Socket Joint.

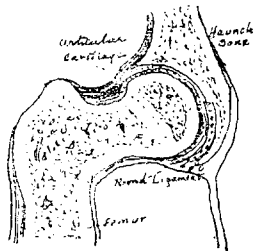


Fig. 8a.

and hip. A section of both of these will be seen in Fig. 8 and Fig. 8a.

Muscles.

The muscles, or fleshy part of the body, act as cushions to the bones, and have the power of contracting under

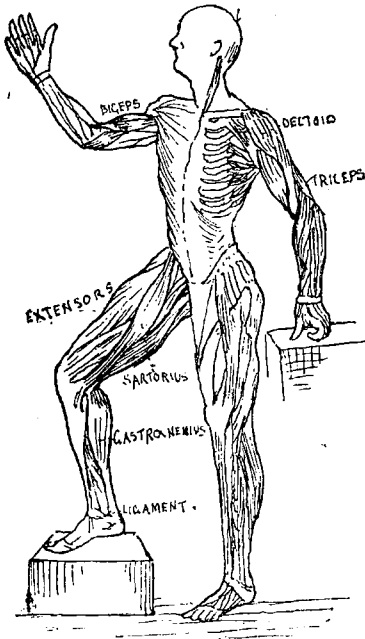


Fig. 9.

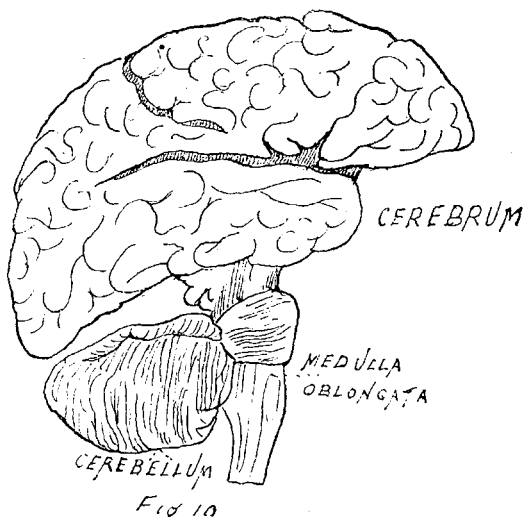
stimulation from the nervous system ; it is by this means that all the movements of our body are accomplished.

There are two kinds of muscles found in the human body : *Voluntary*, which are under the control of the

will, and found in the head, neck, limbs, walls of the chest, and abdomen; and *Involuntary*, which act independently of the will—these are found in the heart, stomach, intestines, etc. Tendons are composed of strong fibrous tissue which unites the most of the muscles to the bones. The principal muscles, with their tendons and ligaments, which bind them at the joints, are illustrated in Fig. 9.

The Nervous System.

The Nervous System consists of the Brain, the Spinal Cord, and Nerves.



The BRAIN is composed of three parts. First, the large brain or cerebrum, composed of nervous tissue

with blood-vessels running through it, and made up (as shown in Fig. 10) of a great many convolutions ; in it is the seat of the intellect and emotions of the will. The second part is called the cerebellum, or small brain, which regulates the movements of our body. The cerebellum lies underneath the large brain, and in front of the cerebellum is the third part, called the medulla oblongata. The nerves coming from the brain pass through this structure ; some of them cross one another. This is the reason when paralysis occurs on one side of the body, the seat of the disease is generally on the opposite side of the head.

The SPINAL CORD is a long cylindrical column composed of soft nervous tissue, which extends from the medulla oblongata to the sacrum, and lies in the canal in the vertebral column made for its protection. It is surrounded by fluid, which assists as a protection from injury to the cord ; when the brain or spinal cord is said to be concussed, it is a shaking of the organ within its covering.

The NERVES are of two kinds, cerebro-spinal and sympathetic. The cerebro-spinal arise in twelve pairs from the brain and thirty-one pairs from the spinal cord. These nerves preside over the movements of muscles and sensation ; they also supply the organs of sense, hearing, seeing, smelling, etc.

The sympathetic system consists of a double chain of small nervous centres, lying one on each side in front of the spine. These chains have a number of little swellings called ganglia. These nerves are not under the control of the will, but preside over the organs of respiration, circulation, excretion, and secretion.

The Blood and Circulation.

In order that the skeleton, muscles, and nervous system may grow, and that, having attained their maximum size, they may be fed so as to live, nourishment is got from the blood. Let us look shortly at what it is.

The BLOOD consists of a clear or nearly clear fluid called liquor sanguinis or serum. In this fluid are circulating millions of little microscopical bodies called blood corpuscles. There are two kinds of these corpuscles, red and white, the red being the most numerous. These corpuscles are round and flat in shape, and cling to one another not unlike several shillings on the top of one another in your hand. From these red corpuscles the blood derives its colour. In this fluid is a fine tissue called fibrine, and to this is due the coagulation or congealment of blood when exposed to the air.

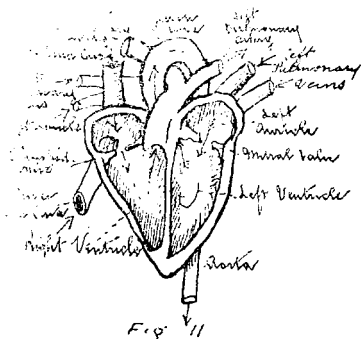
The blood circulates through the body in tubes called bloodvessels. The vessels going from the heart are called arteries, and carry arterial blood. These gradually become smaller until they form capillaries. These small bloodvessels form a network, which gives up the nourishment to the tissue, principally oxygen gas. Having done this the small capillary veins take up the carbonic acid from the system. This now forms venous or dark blood, which goes back by the veins to the heart, and from there to the lungs, where the blood becomes purified.

It will be seen from this that we have three kinds of vessels, viz., *arteries*, *veins*, and *capillaries*, and it is from these, as will be afterwards seen, that the different kinds of bleeding derive their names.

The HEART is a hollow muscular organ, triangular in shape, which lies within the chest, between the two lungs ;

but more to the left side than the right. The base of the heart is uppermost; the apex points downward and to the left; it can be felt beating between the sixth and seventh ribs, just underneath the left nipple. The heart is divided into a right and left side; these two sides again being divided into two chambers, called left and right auricles and ventricles, so the heart is thus composed of four separate chambers, called left auricle and ventricle, and right auricle and ventricle. The auricles communicate with the ventricles by means of valves, called bicuspid, or mitral, on the left side, and tricuspid on the right side, or right and left auriculo-ventricular valves. It is by the contraction of the muscular walls and these valves that the circulation is carried on.

CIRCULATION OF THE BLOOD.—Let us now trace the circulation of the blood, commencing at the lungs. The pure blood on leaving the lungs passes through the pulmonary veins (note the exception here to the rule that arteries always carry arterial blood and veins venous) into the left auricle; from there through the mitral valve into the left ventricle, then through the semilunar valve at the opening of the aorta; from there it goes through the body by means of the arteries, part to the upper arms, head, and neck, the remainder follows the aorta down the chest and supplies the rest of the body and lower limbs.



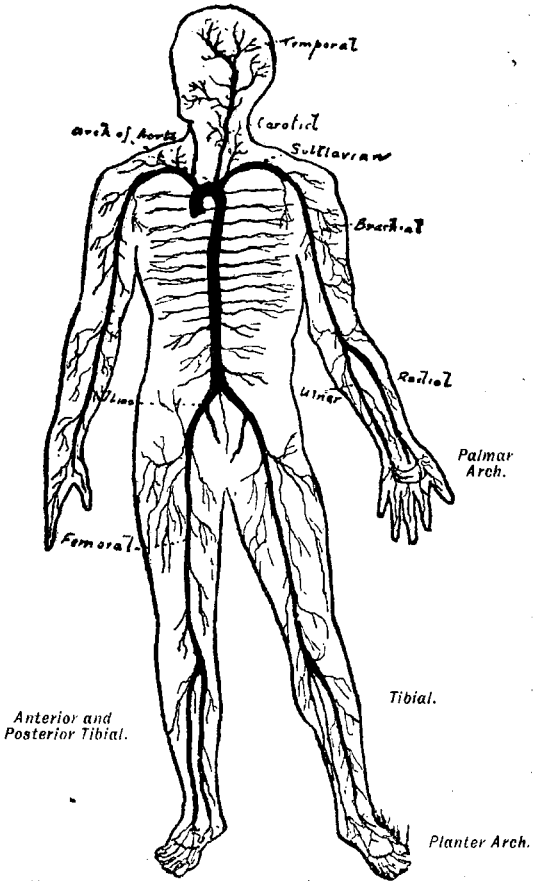


Fig 12

Having nourished the body the capillary veins take up

the blood, and it flows back to the right side of the heart by means of the upper and lower vena cava, which enter the right auricle, from there it goes through the tricuspid valve to the right ventricle, thence into the pulmonary arteries back to the lungs, where it gives up its carbonic acid and becomes purified, and continues on its course again. Fig. 11 shows the circulation, the course of which is indicated by the arrows.

THE ARTERIES.—The principal arteries of the body, with their names, will be seen in Fig. 12.

Most of the arteries of the body have accompanying veins. Some veins which lie superficial under the skin have no arteries, such as those seen very prominently in the arms and back of the hands.

The Organs of Respiration.

First let us study the lungs. They are two spongy organs, which lie within the chest, one on each side

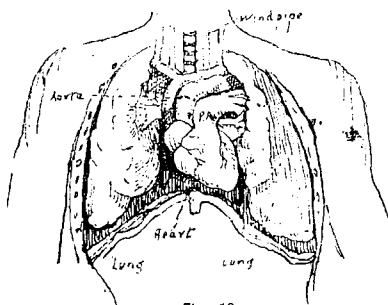


Fig. 13.

(Fig. 13). They nearly fill the cavity of the thorax, and extend from the top of the thorax down to the diaphragm, a muscle which separates the thorax from the abdomen.

Between the lungs lie the heart, large blood-vessels, large bronchi, gullet, etc. The lungs are covered by a double membrane, or sac, called the pleura; in this membrane occurs the disease called pleurisy.

The lungs are composed of a great many air-cells and bronchi; starting from the windpipe or trachea, this divides into the two large bronchial tubes, which divide and re-divide like the branching of a tree (Fig. 14). At the ends

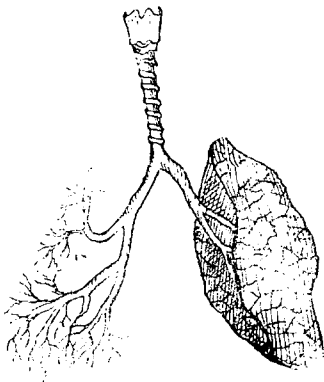


Fig. 14.

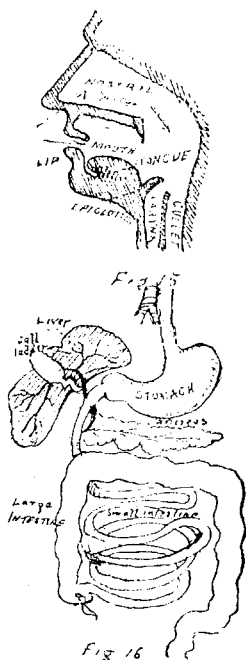
of the little bronchi are small air-cells. These cells are surrounded by a net-work of little bloodvessels or capillaries. This is where the venous or black blood gives up its carbonic acid gas and obtains oxygen, so that it becomes red again, and the air passing out and in these little cells through the bronchial tubes, assisted by the expansion and contraction of the lungs with the muscles of the chest, constitute the mechanism of respiration.

The Organs of Digestion.

These organs do not require much more attention by the

ambulance student than to be mentioned. They consist of the stomach, liver, intestines, kidneys, pancreas, etc.

The food when taken in at the mouth is rolled about by the tongue, chewed by the teeth, and mixed with saliva, which acts on the starchy part of the food, converting it into sugar; from there the food is passed by the tongue through the pharynx over the larynx or windpipe, which is protected by a little lid called the epiglottis, which closes over the windpipe in the act of swallowing, and so the food goes into the gullet, from whence it passes into the stomach, which is a large muscular sac whose walls secrete the acrid fluid, gastric juice. The food becomes acted upon by this juice, and then passes on through the pyloric end of the stomach into the small intestines. Here it becomes acted upon



by the bile coming from the liver and pancreatic juice coming from the pancreas, and certain physiological changes take place, when the food which has not been digested passes on into the large bowel. Fig. 15 shows the direction food and air take; Fig. 16 shows the digestive track.

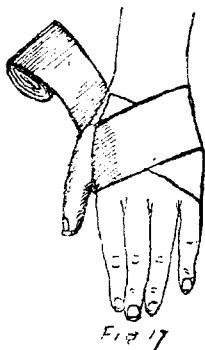
The Organs of Secretion and Excretion.

The organs of secretion are the liver, pancreas, salivary glands, glands of the stomach and bowels, etc. The organs of excretion are the lungs, throwing off carbonic acid and watery vapour; the skin, excreting sweat; and the kidneys, excreting urine.

Having described the anatomical parts of the body, let us consider now the practical points, what to do when called to an accident, which is, first, to *find out the injured part*. If the patient cannot tell you, you may be guided by the injured garment, by bleeding, or by the patient clutching injured part if not insensible. The next thing to do is to *attend to the nature of the accident*, which will be treated upon under their different headings.

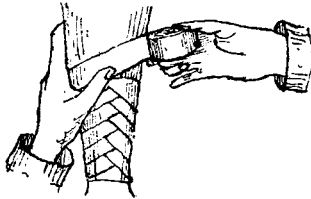
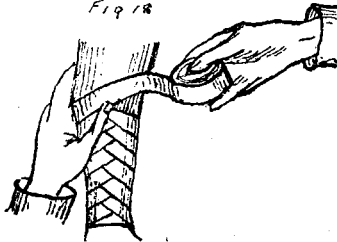
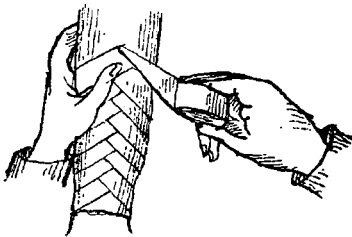
Bandaging.

Bandages are of two kinds, the roller and triangular. It is the latter which is mostly used in ambulance work. They may be made either of calico, linen, or flannel, their



chief use being to fix dressings or poultices, keep splints in position, and support the circulation. For supporting the circulation it is principally the roller bandage that is used. The roller bandage varies in length from three to eight yards. When applying it to a limb first make the figure 8 round the hand or foot, as the case may be, as represented on Fig. 17; then take an extra turn round the wrist, and instead of continuing the bandage spirally round the limb, commence reversing

by turning the bandage over on itself each time as the limb is gone round, and so get it to cling nicely

*Fig 18**Fig 18**Fig 19*

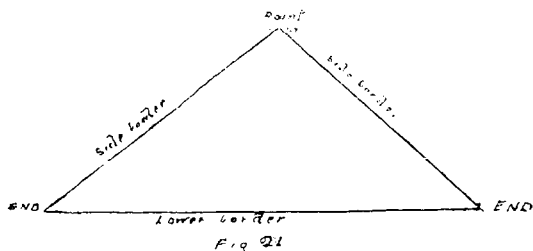
to the limb (Figs. 18 and 19). In applying pressure over the temporal artery take either a double-headed

roller or two roller bandages and stitch them together : place the outer surface of the centre of the double-headed bandage on temporal artery, carry the two ends horizontally round the head, cross them and bring the one end under the chin, while the other is carried over the head to the point of starting ; repeat the same over again and continue to repeat until the bleeding is arrested (Fig. 20).



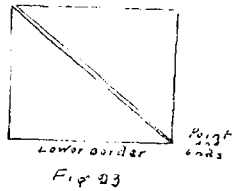
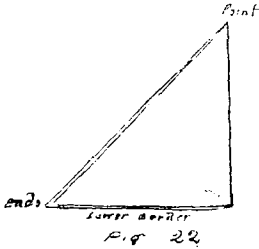
Fig 20

The triangular bandage may be made by cutting pieces of linen or calico, of thirty-six inches square, diagonally into two halves, each half forms a triangular bandage with three borders—a lower and two side borders ; of the three corners the upper one is called the point, the other corners the ends (Fig. 21).

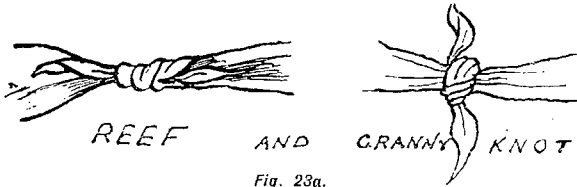


How to fold the Bandage.—If not in use bring the two ends together (Fig. 22). Next bring down the point to meet the centre of the lower border, and fold over the ends to meet the point, this forms a square (Fig. 23). Next fold it on itself, making it about 6 inches by 3 in size.

To make narrow and broad bandage bring down the point to the centre of the lower border, then fold it over two or three times in the same direction, as the case may be.



BANDAGE FOR THE HEAD.—For retaining a dressing on the head, lay the centre of the bandage on the head with the centre of the lower border on the forehead, the



point hanging over the back of the head ; bring the ends round the head ; if long enough cross them and bring to the front of the forehead, where you tie them in a reef or



Fig. 24.



Fig. 25.



Fig. 26

sailor's knot (Fig. 23 A.). Next turn the point up and pin on the top (Figs. 24, 25, 26).

For the **EYE**, fold bandage according to size desired, place the centre of the bandage over the eye; carry the ends round the head and tie. If long enough bring back to the front of the head and tie there.

For the **FACE**, fold bandage according to size desired, place centre of bandage under the chin and tie on the top of the head.

For the **SHOULDER**, place centre of the bandage on the shoulder point upward, carry the ends round the arms,

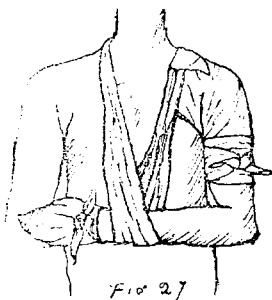


Fig 27



Fig 28

cross one another, and tie on the top. Next put a narrow sling on the affected arm, pass the point underneath the sling on the top of the shoulder and fasten with a pin (Fig. 27).

For keeping a poultice or dressing in axilla, place centre of bandage on axilla, carry the ends over the shoulder, cross them and fasten them in the opposite axilla (Fig. 28).

For retaining a dressing on any other part of the arm, fold bandage to required size, place centre of bandage on

top of dressing, carry round the arm and tie on the upper surface.

To make small sling, fold bandage to size required, and carry one end over the sound shoulder round the back of the neck so as to be visible at the opposite side ; now take the wounded arm across the centre of the bandage as it hangs down in front of the chest, next bring up the other end of the bandage and tie the two ends on the top of the shoulder (Fig. 29).

A large sling is made by throwing one end of the



Fig. 29.



Fig 30

bandage over the sound shoulder, the arm is then carried across the centre of bandage as it hangs down in front of the chest, with the point towards the elbow of the injured arm ; next bring up the other end and fasten on sound shoulder ; bring the point round the elbow and pin as in Fig. 30.

For the HAND, place under surface of the wrist on the centre of the lower border, with the point towards the fingers, bringing the point over the fingers to the wrist. Pass the ends round the wrist and tie (Fig. 27).

For the **CHEST**, lay centre of the bandage on the dressing, with the point over the shoulder, pass the ends round the chest and tie, leaving one end of the knot longer than the other. Tie this end to the point (Fig. 32).

For the **BACK**, reverse the above, lay centre of bandage on the back, and tie on front of the chest.

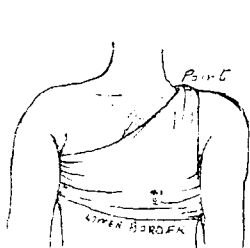


Fig 32

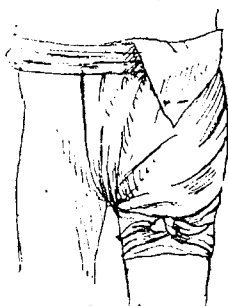


Fig 33

For the **GROIN** or **HIP**, pass one bandage folded round the waist, lay centre of another bandage on dressing, with the point upward. Pass the ends round the thigh and tie on the top. Next pass point under waistband and pin (Fig. 33).



Fig 34

For the **PERINEUM**, fold two triangular bandages, fasten one round the waist, then place centre of the other bandage on perineum, and carry the ends, one in front, the other behind under the waistband, and pin.

For the **THIGH** and **LEG**, the same as for the arm.

For the **FOOT**, place the foot in the

bandage with the lower border towards the heel, pass the point over the toes, carry the ends round the ankle, cross on top of the foot round the sole, and tie on top (Fig. 34).



Fig 35

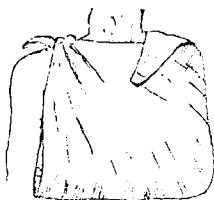


Fig 36

The accompanying figures illustrate the method of using slings. If injured shoulder cannot bear the weight

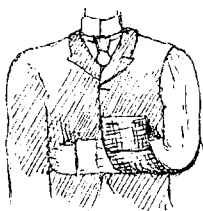


Fig 37.



Fig 38

of the sling, arrange it as shown in Fig. 35. Also improvised slings, such as large towel (Fig. 36); coat sleeve (Fig. 37); tail of tunic (Fig. 38).

Wounds and their Treatment.

Wounds are classified according to their appearance.

An **INCISED** wound is known by its clean cut edges, which are generally separated from one another, with a certain amount of bleeding.

Treatment.—Arrest the hæmorrhage, clean the wound, and dress it with a piece of lint moistened with clean water.

A **LACERATED** or **CONTUSED** wound is known by the torn and bruised condition of the edges of the wound, which often contains dirt, caused by a blow from some kind of blunt instrument, gunshot, a fall, bites of animals, etc.

Treatment.—Arrest the bleeding, clean the wound, and apply water dressing.

A **PUNCTURED** wound is generally caused by some sharp pointed instrument, such as the point of a knife, scissors, etc.

Treatment is the same as above.

POISONED wounds are caused by rabid dogs, snakes, bites of insects, etc.

Treatment.—If from a dog or snake, it is advisable to arrest the circulation above the wound so as to prevent the poison from entering the system. This is done by means of a ligature. Suck the wound, and have it thoroughly cauterised by a medical man. It must be washed well when first seen. If a dog bites through the clothes the same fear need not be entertained, as the teeth of the dog get cleaned in going through the garment. If an insect bite, use some cooling lotion, such as a weak solution of carbolic acid. If the sting of a wasp or a bee is to be dealt with and the sting can be seen, it is advisable to remove it either with a fine pair of forceps or a watch key.

Gunshot Wounds.

Under the above term all wounds, whether from shot and other substance discharged from firearms, splinters, fragments of wood, plaster, or stone caused by shot, or the bursting of shells or firearms, are included.

When you find a person lying insensible on the ground from a gunshot, to find out where he is wounded you must carefully examine his clothes, for if the bullet has entered there must be an inlet or tear in his clothes, with the edges of the tear and wound pressed inward ; a part of the clothes may be carried into the wound with the bullet. If the bullet has gone through the limb or body, there must be an aperture or outlet with its edges everted or lying outwards. The aperture of exit is generally larger than the aperture of inlet. and as a rule more torn.

Gunshot wounds give rise to all manner of accidents such as fractures, bruises, bleeding, loss of limbs, etc., so that the treatment will depend on what is to be dealt with and on the general principles laid down under the different headings in other parts of the book ; for example, a fracture must be treated ; or if hæmorrhage it must be arrested, etc. Never attempt to extract the bullet, simply wash the wound and dress it ; leave the extraction for the surgeon.

Dressings.

Dressings are the local applications to wounds and sores. The following list comprises nearly everything that will be required in ambulance work for dressing purposes, viz. :—Lint, gutta percha tissue, adhesive plaster, oiled silk, cotton wool, and tow ; materials for making poultices, such as linseed, oatmeal, charcoal, and

bread ; a dressing case, containing scissors, dressing forceps, etc. ; a basin and waterproof sheet.

The following rules should be observed in dressing a wound :—

Never remove one dressing until the other is ready.

Never tear the dressing off if adherent ; always damp it off with warm water.

Never employ a sponge for cleaning the wound unless it is thoroughly washed.

Always use clean lint, and see that the hands are clean.

SORES are also classified according to their appearance, such as healthy, weak, indolent, irritable, inflamed, sloughing, or varicose ; but as these are generally treated by a medical man, it will suffice simply to mention them.

MODE OF APPLYING A DRESSING.—All material must be got ready, such as water in a basin, the dressing cut to the size of the wound or sore, and the gutta percha tissue a little larger than the lint ; being thus prepared, put the waterproof sheet under the limb to be dressed ; wash the wound and apply the dressing if there is not much bleeding. If the bleeding be excessive, arrest it first, put on the gutta percha tissue—finish with the bandage.

Burns.

Burns are caused by some excessively hot agents coming in contact with the body. The danger lies not so much in the burn itself as in the shock to the system. This is specially so if the burn is about the head or neck, or if it covers a large surface. Children cannot stand burns well, so the ambulance worker must be prepared to treat COLLAPSE.

Treatment.—Remove all burnt clothing, and cover the burn from the air with cotton wool, oiled lint, etc. The best oil to use is Carron oil, prepared by mixing equal parts of lime water and linseed oil. If constitutional disturbance begins, such as shiverings which may continue for some time, the body growing cold, or the patient becoming voiceless and pulseless, then resort must be had at once to warm blankets, hot-water bottles, hot drinks, and small doses of stimulants.

Scalds.

A scald is generally caused by some boiling fluid, such as water, soup, tea, etc. Large blisters are usually the result. Treatment is the same as for burns.

Outbreak of Fire.

I think it will not be out of place to give a few practical hints on this important subject. We all know that to light a fire and cause it to burn it must have air. In dealing with a fire our first aim should be to *exclude* the air. This is the reason we always talk about “smothering a fire.” Supposing a fire occurs in a room, the first thing to do is to close the window and door if open, and cover the fire with a rug, coat, sheet, or anything which can conveniently be got hold of. By doing so a coat or rug may be destroyed, but better that than risk losing all. Failing this the next step is to retreat and shut the door, thus confining the fire for a time to the one room, and giving the inmates of the house time to escape.

If a person's clothes ignite, knock him down or cause him to lie down, because flames as a rule ascend, and by doing this the flames are kept from the face and head. Next, if possible, get a covering, cover the flames, beginning at the neck, and carry the flames downwards

keeping the covering close to the body so as to exclude all air. If a covering cannot be got at once, roll the person along the ground or floor ; the flames may be extinguished in this manner. I think children should be taught from infancy what they should do if their clothes were catching fire, viz, lie down and roll themselves along the floor.

Now let me implore my readers, if present at a theatre or meeting when an alarm of fire is given, not to make a mad rush for the doors. The time taken to empty a theatre any night after a performance, from the first person leaving it until the last, very seldom exceeds five minutes ; nay, some theatres can be emptied in two and a-half minutes. When a cry of fire is raised, if a rush is made, the result is a block, which may take an hour to clear, and may not be cleared until the theatre is burned. As a rule the fire generally begins on the stage, and it takes more than five minutes to reach the audience. By going out calmly many lives would be saved, and I believe not one need be lost.

Hæmorrhage (Bleeding).

There are three kinds of bleeding which the reader must be able to distinguish before he can adopt the correct treatment, viz., *Arterial*, *Venous*, and *Capillary*.

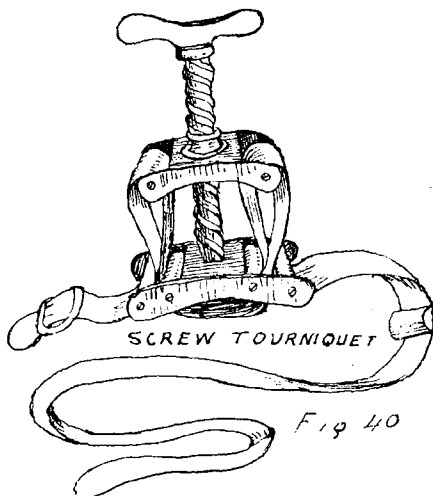
ARTERIAL bleeding comes from the arteries and is known by its bright red colour ; comes out in jerks, and from the end of the wound nearest the heart.

VENOUS blood comes from the veins, is dark purple in colour, flows continuously, and comes from the end of the wound farthest away from the heart.

CAPILLARY bleeding is simply an oozing of blood from the surface of a wound or sore.

Treatment.—If bleeding be arterial, and a large artery be cut, such as the femoral, brachial, etc., put on a tourniquet at once ; if one of the smaller arteries try first cold with elevation and pressure ; if that fails put on a tourniquet until a medical man arrives.

Venous bleeding should be treated with elevation, cold and pressure—never use a tourniquet. Capillary bleeding requires very little attention as a rule, with the



exception of cold applications and elevation. In some cases it may be necessary to use pressure.

The usual tourniquets are shown in Figs. 39 and 40, but handkerchiefs, neck ties, straps, rope, etc., may be improvised. Any one of these can be tied round a limb and screwed up with a walking stick, umbrella, bayonet, or any suitable article at hand. For alarming bleeding the hand makes the safest tourniquet until medical assistance is got.

The TEMPORAL ARTERY may be compressed by placing the finger on the centre of the temporal bone, or by applying a pad and the double-headed roller bandage (Fig. 20).



Fig. 41.

The CAROTID ARTERY is compressed by placing the thumb on the artery about midway between the lobe of ear and the breastbone, and holding it firm against the transverse process of the cervical vertebræ, as shown in Fig. 41.

For the SUBCLAVIAN, press the thumb firmly down behind the centre of the collarbone and catch the artery on the first rib. Instead of the thumb a large key can also be used here (Figs. 42 and 43).

Severe bleeding from any part of the arm can be



Fig. 42.



Fig. 43.

arrested by compressing the brachial artery against the humerus with the fingers in front of the biceps muscle, or by means of a pad and tourniquet at the same spot (Fig. 44).

If the bleeding is from the HAND either use the above means, grasp the wrist tightly, or put on a ligature round

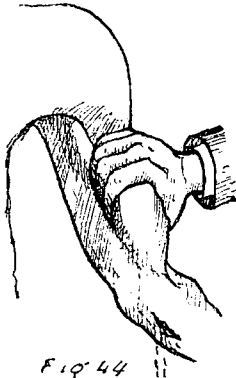


Fig 44

the wrist. Do not be in too great a hurry to put a tourniquet on when the bleeding is coming from the wrist or hand. I have seen very bad bleeding arrested simply with cold, elevation, and pressure. If the bleeding is not alarming always try these first.

The FEMORAL ARTERY is compressed by placing the thumbs on the vessel as it comes under Poupart's ligament and holding it firmly against the bone (Fig. 45). Never lose a second when this artery is cut; a man may bleed to death in a very few

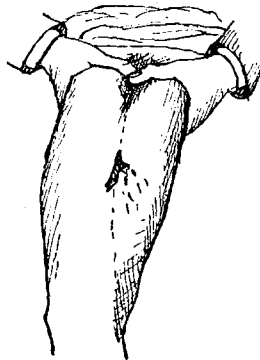


Fig 45

minutes. The hand is the safest tourniquet until assistance arrives. As strength soon fails here anything which can be got should be used. The hold should not be let go until the improvised tourniquet is on. It should be seen that the pad is on the artery (Fig. 46).

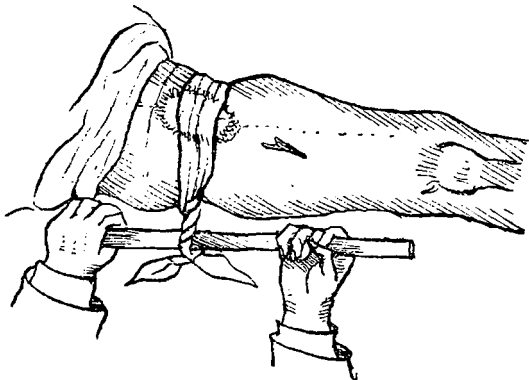


Fig. 46.

Severe bleeding from any other part of the leg can be treated the same way, if elevation, cold, and pressure fail.

Bleeding from the FOOT may be treated in the same manner as from the leg or hand. Let me impress upon the reader never to put on a tourniquet in venous bleeding.

In bleeding from the NOSE, unless it be alarming, there should be no hurry to stop it, because it is very often nature relieving what might otherwise be the cause of a fit. To stop the bleeding, elevate the head, apply cold pad to the bridge of the nose, cold to the back of the neck, and elevate the arms. If these fail, and medical

assistance cannot be got, carefully insert a piece of lint rolled round a pencil into the nostril from which the blood is coming, and compress the outside of the nose with the thumb against the pencil.

Distinguish between bleeding from the lungs and that from the stomach. Blood coming from the *lungs* is generally bright red in colour, comes up with a cough, is generally frothy, and the sputa of the following coughs are generally tinged with blood.

Treatment.—If the patient be not faint, elevate the chest slightly, apply cold externally, such as water or vinegar cloths, and give ice to suck.

Blood coming from the *stomach* is black or purple in colour, is vomited up, and may be mixed with food.

The treatment is the same as for the lungs, but apply cold over the stomach instead of the chest.

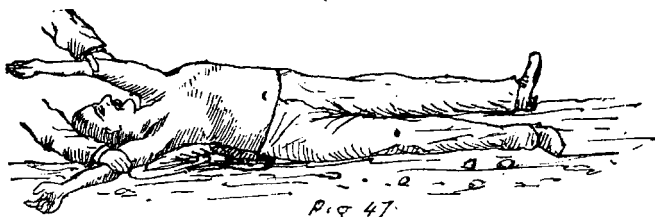
Drowning, Strangulation, Etc.

The treatment for drowning, strangulation, hanging, suffocation from coal gas, chloroform, etc., is essentially the same.

If the person has not been more than fifteen minutes in the water, at once proceed to produce artificial respiration; unfasten the clothes about the chest, lay him on his back with chest slightly elevated, turn the head over to the side, so as to let any water that may be about the windpipe and mouth run out, draw forward the tongue and tie it to the chin, or get someone to hold it out. Catch the arms at the elbow, draw them well above the head, hold them there for two seconds, then push them down to the side of the chest, and press them firmly against the walls of the chest. This should be repeated at least about fifteen times a minute, and persevered with

for at least an hour and a half unless breathing takes place or a medical man says life is extinct (Figs. 47 and 48).

Whenever the least sign of breathing, such as a gasp, is seen, at once cease, and restore the circulation by means of rubbing the limbs and body towards the heart. Rub always in the one direction. Apply hot water



bottles up the side of the limbs and body, and cover with warm blankets. Put smelling salts to the nostrils. When patient can swallow give him hot drinks in small quantities. Keep him in bed and perfectly quiet.

When performing artificial respiration, that the patient may get as much free air as possible, there should be no crowding round him. Send off at once for medical

aid, warm blankets, stimulants, etc. If the person breathes after being taken out of the water, at once keep up the circulation by the means described above.

Fits.

FAINTING FITS.—A person fainting generally swoons away, or he may drop suddenly and lie quite motionless and unconscious; the face and lips are very pale, and a cold, clammy sweat comes over the body.

Treatment.—Keep the head low, unfasten the clothes about the neck and waist, bathe the face and hands with cold water, apply smelling salts to the nostrils, and when the patient can swallow give him a little water or weak stimulant.

EPILEPTIC FITS.—A person in a fit of this kind falls down suddenly. He may scream before doing so. The muscles become convulsed, throwing the arms and legs about, the tongue may be bitten through, and the appearance of the face is deathly.

Treatment.—Elevate the head and shoulders, prevent patient from doing himself harm; get some one to hold his limbs, put a gag between the teeth to prevent biting if necessary, and keep perfectly quiet.

APOPLECTIC FITS generally occur in stout elderly people. They fall down suddenly, the face becomes red and the breathing loud or snorting. If patient recovers, the fit is generally followed by paralysis.

Treatment.—Elevate the head and shoulders, keep very quiet, and apply cold to the head; give no stimulants.

SUNSTROKE.—Generally suspected if the heat is excessive and person falls down suddenly after being exposed to a hot sun. The face is red.

Treatment.—Remove patient to a cool place under some shelter, dash cold water on the head and chest.

DRUNKENNESS.—The symptoms of drunkenness are not always the same. The patient may have a red face and snorting breathing, or he may be lying motionless with a deathly-white face. The chief guide is the smell of the breath, but here care must be taken, because when a person falls in a fit the first thing a bystander does is to pour over the throat either a little whisky or brandy, and inquiry should be made if this has been done.

Treatment.—Keep patient on his side, not on his back or face, for fear of suffocation. Induce vomiting by tickling his throat with a feather, or administering an emetic, and give him warm water to drink

CONVULSIONS IN CHILDREN are so common that I think ambulance students should know thoroughly how to treat them. The symptoms vary. In some children the limbs and body are jerked about; in others the whole body becomes quite rigid, the eyes fixed, and face black.

Treatment.—At once put the child up to the neck into a hot bath. Keep him there for twenty minutes, have warm blankets ready to receive him, apply cold-water cloths or vinegar cloths to the head, and clear the bowels out by an injection of castor oil.

Fractures.

Fractures are classified into various forms, such as simple, compound, impacted, starred, longitudinal, transverse, oblique, etc., according to the condition of the bone when broken; but for ambulance work classifying them into simple and compound, which includes all the above, will be sufficient.

A SIMPLE FRACTURE is the breaking of a bone without much injury to the soft parts. When the bone does not break completely through it is termed greenstick fracture, from its resemblance to the raw branch of a tree when broken.

A COMPOUND FRACTURE is the breaking of a bone with exposure to the air of the broken ends by means of a wound. A long bone may be broken in several places. This constitutes a COMPLICATED FRACTURE, which may be either simple or compound.

Causes.—A fracture is generally produced by external violence, such as a kick, a heavy substance falling on the bone, a person's foot going into a hole, by falling with the leg underneath, or by powerful contraction of muscle—this is rare. A compound fracture may be caused at once by great violence, either by rough handling of a simple fracture or by a person who has broken his leg attempting to rise, and so the broken ends are pushed through the skin.

The symptoms of fractures are (1) deformity; (2) extra mobility, that is a joint where one should not be; (3) crepitation, this is obtained by rubbing the ends of the broken bones together, producing to the ear a sound like the crackling of egg shells—the patient may say he feels something grating; (4) swelling; (5) pain; (6) discolouration. These symptoms need not always be expected. All may be present with no fracture, and not one of them may be found and yet there may be a fracture; so examine very carefully and when in doubt always treat for fracture.

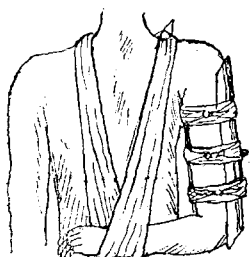
The symptoms of a compound fracture are the same as above, with the addition of an open wound; in some

cases the broken ends protruding through the wound can be seen.

Treatment.—The appliances are : bandages (roller and triangular, the latter being mostly used in ambulance work), pads, and splints, which may be made of either wood, junk, felt, tin, wire, etc. If no proper splints are at hand they must be improvised out of walking sticks, umbrellas, pieces of wood, thick card-board, etc.

When examining a limb for fracture it is advisable to rip up the sleeve or trouser at the seam, so as not to cause suffering by taking off the garment. Be very careful in handling the limb ; always catch it above and below where the fracture is suspected to be. If a joint is found where one should not be, use gentle extension till the two broken ends are brought together, then rub them gently and crepitation is produced.

Having made out that there is a fracture, prepare splints by placing the pads on them, and folding the bandages. Proceed to set the fracture (temporary).



SMALL SLING

FIG. 49

FRACTURE OF UPPER ARM.—Bring the broken ends together by extension ; put a small splint inside and see it does not press on the armpit, and a larger one outside.

Retain them there by three folded triangular bandages, one in the centre and the others on each side (Fig. 49). Bend the lower arm across the chest, supported by a large sling.

FRACTURE OF FOREARM.—Set fracture, put splint on each side, bend arm across chest, and put on sling.

FRACTURE OF FEMUR.—Set the bones : small splints for the inside and top of the thigh, with a long splint reaching from the arm-pit to below the foot on the outside, such as a broom handle or rifle (Fig. 50). This is to

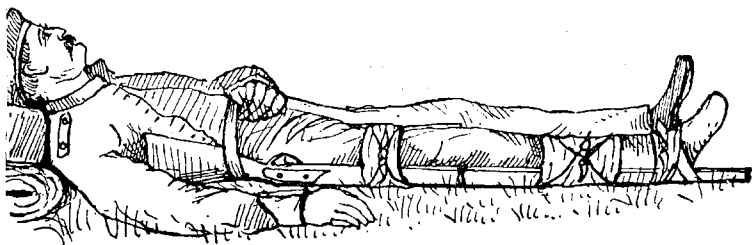


FIG 50

keep the patient lying flat on his back. Put on bandage round the ankle, another round the knee, fixing the body by one round the waist. The smaller splints can be retained by one large broad bandage or two folded ones.

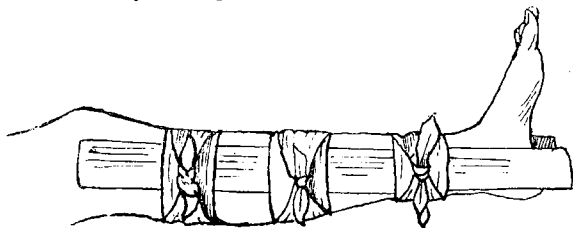


Fig 51

FRACTURE OF KNEECAP.—Keep legs straight by means of splint on each side well padded ; bandage above and below the knee.

FRACTURE OF LOWER LEG.—Put well-padded splint on each side large enough to reach beyond the knee

and foot, retained in position by three folded bandages; always see that your padding extends beyond the splints (Fig. 51).

FRACTURE OF RIBS.—Take a flannel bandage two or three yards in length and half a yard broad; roll it several times round the chest, and retain it in position by two flannel braces over the shoulder.

FRACTURE OF THE JAW—Place the two jaws together and put on a four-tailed bandage (Fig. 52)



Fig 52

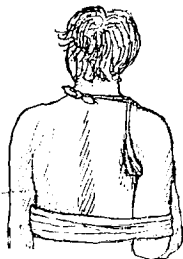


Fig 53

FRACTURE OF COLLARBONE.—Place a pad in the armpit; bring the elbow to the side by means of a bandage, and put on a large sling (Fig. 53).

When carrying a person whose leg is broken on a stretcher up a hill or stair always carry him feet first, so as to keep the weight of the body off the leg. This is the exception to the general rule, viz., always carry a person head first up a hill. Never put a bandage next the fracture.

To Distinguish Dislocations from Fractures.

To distinguish between a dislocation and fracture, note that in a dislocation the limb is fixed; in a fracture the

movement is increased. In a dislocation the limb may be lengthened ; in a fracture it is usually shortened. In reducing a dislocation the limb remains in position ; in reducing a fracture the limb does not remain in position.

It is advisable not to attempt to reduce a dislocation, but send patient either to a medical man or an infirmary.

Sprains.

A sprain is caused by a twist to a joint, and is most commonly met with in the ankle. It is an overstretching of the ligaments and tendons, which may be torn through, and it is known by pain and swelling in the joint, with the absence of symptoms of fracture and dislocation.

Treatment.—In the first stage apply cold to the joint, and let the patient rest. If swelling and pain continue apply heat, such as poultices, hot flannels, and rub the joint with some evaporating lotion.

Poisons.

The services of the ambulance student may be of great value in cases of poisoning, where a medical man is not at hand or until he arrives. The symptoms of the different poisons are so numerous that it would be useless to mention them in this little book. That a person has been poisoned is generally known by his becoming suddenly ill after having eaten or drunk something, he having been previously healthy. It may be that several persons having partaken of a meal are suddenly seized with sickness, vomiting, and purging, or it may be told that a person has swallowed some poison, such as laudanum, etc. If called to a case of poisoning, nothing should be allowed

to be removed until the arrival of the police or surgeon, and all the bottles seen about should be examined.

Treatment.—The first thing to do in a case of poisoning is to get rid of the poison. This is generally done by means of emetics which induce vomiting, with the exception where mineral acids, alkalies, caustics, oxalic acid, or other corrosives have been the poisoning agent. The handiest emetic is mustard—one teaspoonful of mustard to four of hot water, and this repeated about every ten minutes until vomiting begins. If mustard fails give fifteen grains of sulphate of zinc in water. After having got rid of as much of the poison as possible by vomiting, give plenty of demulcent drinks, so as to dilute what remains of the poison and hasten its elimination from the body.

The following table shows the symptoms of and treatment for the principal poisons :—

POISONS.	SYMPTOMS.	TREATMENT.
Opium, morphia, laudanum.	Giddiness, drowsiness, insensibility, pupils contracted.	Emetic of mustard or sulphate of zinc; make patient walk about, assisted by two persons; flip skin with towels; use pins; cold to the head and chest; hot strong coffee to drink.
Strong mineral acids, caustics, oxalic acid.	Burning sensation in the mouth, throat, and stomach, extending soon to the bowels; the mouth has appearance of burning; vomiting and purging may set in very soon.	Chalk and water; magnesia; wall plaster dissolved in water; raw eggs.

POISONS.	SYMPTOMS.	TREATMENT.
Arsenic.	The symptoms may be a long time in coming on; or, if much arsenic has been swallowed, it may act as its own emetic and cause no serious results; great dryness in the mouth, with sickness, vomiting, hiccup, and exhaustion.	Emetic.—Milk, raw eggs, oil in lime water.
Carbolic acid.	Hot burning sensation in mouth and stomach, going on to bowels; breath smells strongly of the acid.	Emetic.—Raw eggs, castor oil, magnesia.
Prussic acid.	No symptoms, death being so sudden.	Cold to head and chest; strong smelling salts; stimulants.
Strychnine.	Begins with twitchings of muscles, going on to violent convulsions of the whole body; eyes staring.	Emetic.—Oil, 30 grs. of chloral hydrate, beef tea, brandy.

STRETCHER DRILL.

SOLDIERS who collect the wounded during an engagement and remove them from the field of action are termed "Stretcher Bearers"—the duties of these bearers being to attend to the wounded by administering water and stimulants, by applying temporary dressings, arresting hæmorrhage, and removing them and their accoutrements to a place of safety. Four bearers will be told off to a stretcher, two to carry it at a time, and two for relief; upon the latter men will devolve the duty of removing the arms, ammunition, and accoutrements of the wounded to the rear, and of carrying the surgical haversack and water-bottle. Every such detachment constitutes a stretcher detachment—four detachments forming a section, which, when practicable, will be under the command of a staff-sergeant or sergeant. A bearer company is divisible into two sections, each under a non-commissioned officer.

Officers and non-commissioned officers of a bearer company will be responsible that the private property of the dead or wounded is not misappropriated; a severe punishment will follow any such act of misappropriation.

The regulation field-stretchers in use are those known as Mark I., or the old pattern field-stretcher, and Mark IV. and V., or Surgeon-Major Faris's field-stretcher.

Ambulance-Sergeant Reid, of the 6th L.R.V., invented a stretcher with folding feet, at the end of each foot being a small wheel encased in indiarubber, the feet being attached to the traverses, so that when the stretcher is opened the feet are raised, and *vice versa*, the traverses being fastened by means of a snib, which the writer had afterwards changed to a sliding nut.

FIRST FORMATION OF A COMPANY FOR STRETCHER EXERCISE.

"*Fall in and size.*"—At this command the tallest man takes up his position, the rest fall in in single file according to height. Having sized the men and numbered them, next form two-deep by giving the command, "*Even numbers, two paces step back,*" "*March;*" "*The whole on the right, close,*" "*Quick march.*" "*Number.*"

"*Fours deep*" are next formed. Each four men now form a stretcher detachment, and belong to the same stretcher.

"*Number the detachments.*"—At this command the front rank man of each detachment calls out the number of his detachment in succession from right to left.

"*No.—, the centre detachment.*"

"*On the centre detachment, close,*" "*Quick march.*"—All the detachments now close on the centre one.

"*Front rank, No. 1 bearers.*"—At these commands the "*Second rank, No. 2 bearers,*" bearers are numbered; "*Third rank, No. 4 bearers,*" the front rank being No. 1 "*Rear rank, No. 3 bearers,*" bearer; the two middle, Nos. 2 and 4 bearers; the rear rank, No. 3. Prove this by the following commands:—

"*No. 1 bearers, No. 2 bearers.*" etc., in succession.

"*Stand at ease.*"

"*Company,*" "*Attention.*"—The bearers now stand to attention.

"*Number by fours from the right*" and "*Post commanders.*"—The right hand man of the front rank calls out "one," the second from the right "two," the third "three," the fourth "four," the fifth "one," and so on to the left, successively by fours. Each four detachments now form a section. A commander will now be posted to each section, the guides to the flank sections, the markers

and other non-commissioned officers to the intermediate ones, each commander falling in two paces to the rear of the centre of his section, and as a fifth or supernumerary rank ; the officer commanding in his usual place.

"Number the sections."—The sections are now told off and numbered, and the numbers proved by the instructor. On the word "*Sections*" the commander of each section will call out the number of his section, "No. 1," "No. 2," etc., in succession, from right to left.

"Stand to stretchers," "Quick march."—The stretchers having been laid out about a dozen paces in front of the company in a row, at intervals of about thirty inches, the head or pillow end of the stretcher being next the parade, and the rollers to be directed towards the right flank of the company, on the word "*March*" the whole company now steps off towards the stretchers, each detachment keeping to the left side of the stretcher intended for them. Each bearer on reaching his post halts without further word of command, No. 1 with his toes in a line with the front end of the stretcher poles, No. 3 with his heels on a line with the rear end of the poles, No. 2 one pace in rear of No. 1, No. 4 one pace in front of No. 3, every man touching the stretcher with his right foot. On the other hand, if the stretchers are not laid out on the ground, but lying in a waggon or in a heap against the wall or hedge, the instructor will give the command

"No. 3 bearer left (or right) turn," "File on stretchers," "Quick march."—The men will now be marched towards the stretchers ; having received the stretchers, the guide who has marched them over will give the command

"Left (or right) about wheel," and on reaching the left (or right) of the company,

"Left (or right) form."—The men now fall into places.

"*Lower stretchers.*"—The men take the stretchers off their right shoulders and place them on the ground by stooping without moving their feet, the pillow end being uppermost when on the shoulders, and towards the rear when on the ground; having done this the men rise to attention together.

"*Lift stretchers.*"—Nos. 1 and 3 stoop down, lay hold of the stretcher by both poles with their right hand (rollers away from them), and then rise up to attention, holding the stretcher at the full extent of the arm.

"*Lower stretchers.*"—Nos. 1 and 3 stoop down, lay the stretchers on the ground, and rise up to attention together.

The company will now be practised in marching in close and extended order.

"*Advance.*"—The whole company steps off, the left detachment taking time from the right or No. 1 detachment.

"*Retire.*"—The bearers of each detachment will turn about towards the stretcher, Nos. 1 and 3 transferring the poles from the right to the left hand. When the command "*Advance!*" is again given the same thing takes place, but the poles are transferred from the left to right hand.

In extended order the line will be retired, or, if retiring, advanced, by each detachment wheeling to the right-about, No. 3 marking time on his own ground until the stretcher becomes square.

When a quick movement of the company is necessary, instead of wheeling in sections, the company will be turned in the direction required by the command, "*Move to the right (or left) in fours.*"

"*No. 2 (or 4) take stretchers.*"—Here whichever number is named takes the stretcher and puts it on his right shoulder at the slope, pillow end uppermost.

"*Right (or left) turn.*"—The whole company turn to the right (or left). To resume the forward movement the command "*Front turn*" is given; all turn to the front. No. 2 or 4 lowers the stretcher, and the handles are grasped by Nos. 1 and 3 again.

At this stage, if the men are to be dismissed, the following words of command are given:—"Halt," "*Lower stretcher,*" "*Right about turn,*" "*Quick march,*" "*Halt,*" "*Front,*" "*From the right re-form two deep,*" "*Quick march,*" "*Right dress,*" "*Right turn,*" "*Dismiss.*"

TO PREPARE STRETCHERS FOR USE

To prepare stretchers for use the company must be extended at intervals of four paces by the command (stretchers having been lifted), "*From the right (or left) extend four paces,*" "*Quick march,*" "*Lower Stretchers.*"

"*Prepare Stretchers.*"—On receiving this command, Nos. 1 and 3 of each detachment turn to the right, kneel down on the left knee, and proceed to unbuckle the straps; they then separate the poles, passing their hand underneath the stretcher to fasten the traverse; the slings are now arranged on the poles by doubling each sling on itself, the buckle being outside; now place the loop end of the sling over the handle next to you, with the free ends hanging over the opposite pole. This being done, the right hand man will give a sign by holding up his hand when ready, and all rise together and front, the left detachments taking their time from the right; Nos. 2 and 4 stand fast while this is being done.

"*Fold-up Stretchers.*"—When it becomes necessary to do this, Nos. 1 and 3 of each detachment turn to the right, bend down on the left knee, remove the slings from the poles and place them on the ground beside them; the

hand is now passed underneath to unfasten the traverses ; having done this, Nos. 1 and 3 stand up, lifting the stretchers up between them, then resting the poles between their thighs, they roll the canvas tightly round them, and spread out the slings evenly along the top of the roll, a traverse strap at either end ; this strap is now passed through the loop of the other sling, then round the stretcher, and buckled tightly, upon which the Nos. 1, taking the time from the No. 1 of the right detachment, front, Nos. 1 and 3 retaining hold of the handles of the stretcher.

“*Lower Stretcher.*”—To repeat the exercise this order will be given, and the company directed to prepare them as before.

TO LIFT PREPARED STRETCHERS

Nos. 1 and 3 must work in unity. If No 1 is ready before No 3, No 3 must call out “*Stand fast,*” and when No. 3 is ready he calls out “*Go on.*” The men are first practised to lift the stretchers by numbers, then by judging the time.

“*Lift Stretchers.*”—Nos. 1 and 3 of each detachment stoop down, and catching the slings by the centre, between the first finger and thumb of the right hand, remove them from the handles and stand up again ; they then with their right foot step over the nearest handle of the stretcher, and place their heels together ; having done so they put the slings over their shoulder, with the buckle end over the right shoulder and to the front. At the command

“*Two*” Nos. 1 and 3 stoop down, pass the loops of the slings over the ends of the poles and grasp the handles ; at the command

“*Three*” they stand up, lifting the stretchers with

them, retaining the stretcher at the full length of the arms. No. 2 now takes one pace to the front and wheels to the right about, while No. 4 turns to the left about; they then adjust the straps properly over the shoulders of Nos. 1 and 3, putting them well down under the collar and in the hollow of the shoulder. When this is done No. 2 turns to the right and wheels to the left-about into his place, upon which No. 4 fronts with No. 2.

"*Lower Stretchers.*"—Nos. 1 and 3 slowly stoop down, place the stretchers carefully on the ground (No. 3 watching the movements of No. 1), remove the slings from the poles, and then stand up and remove the slings from their shoulders, holding them between the finger and thumb of the right hand in the manner already described. On the command

"*Two*" Nos. 1 and 3 step over the stretchers with the left foot, bend down and place the slings on the poles as before and stand up again.

TO MARCH WITH STRETCHERS.

For two bearers to carry a stretcher properly necessitates a great deal of practice. So as to carry the wounded with little annoyance, the stretcher should always be carried as near the horizontal position as possible, and to do this it is necessary to have men of equal height. By using the broken step, which should be short (not more than 20 inches), and no springing from the fore part of the foot, and keeping the knees well bent while advancing, little impulse will be given to the stretcher. When carrying a wounded person up hill always carry him *head* first, except in cases where the leg is broken, when the feet should be carried first; you thus keep the weight of the body off the broken leg, and

cause less suffering. In descending a hill carry with the *feet* first, with the same exception. If carrying a patient over fields always look for a gate, although it should be a good distance off. Failing to get a gate the wall should be knocked down, so as to run no risk in conveying your patient to ambulance wagon or hospital. The stretcher having been lifted, and the command

"*Advance*" given, No. 4 doubles round by the head of the stretcher to the centre of the opposite pole, and No. 2 steps short two spaces, which brings him opposite No. 4. During this performance No. 1 steps off with his left foot and No. 3 with his right, the step being according to the above description. At the command

"*Retire*" each stretcher detachment will wheel to the right-about, the No. 3 marking time till the stretcher is wheeled. Then the marching is continued till "*Advance*" is ordered, when they again wheel about. When the command

"*Halt*" is given, No. 4 of each detachment doubles round by the head of the stretcher to his place, while No. 2 takes a pace to his front, all standing to "*Attention*" until the next order is given, such as

"*Lower stretchers,*" or

"*Take post at right (or left) of the wounded.*"

"*Advance.*"

To place a patient on a stretcher involves three separate movements, viz. :—

The patient must be lifted off the ground by the four bearers;

The stretcher must be laid on the ground under him by No. 4;

And the patient must be lowered on the stretcher by Nos. 1, 2, 3, assisted by No. 4.

The most important point in lifting and lowering the wounded is unity of action by all the bearers. When drilling, four or five men, according to the number of detachments, should be told off to lie down (as wounded) with their heads towards the company. At the above command, viz., "*Take post at right of the wounded,*" "*Advance,*" the company marches off, each detachment towards its corresponding patient. Having reached his side a halt is made without further word of command. Having halted, the next command is

"*Lower stretchers.*"—The stretchers are lowered in the manner already described, and the command

"*Two*" is given, when Nos. 1 and 3 stand to stretchers.

"*For loading,*" "*Lift wounded.*"—At this command Nos. 1, 2, and 3 of each detachment move off (while No. 4 marks time) and wheel to the left-about round by the patient's feet, continuing the wheel until No. 1 comes opposite the shoulders, No. 2 opposite the pelvis, and No. 3 opposite the knees; each man as he reaches his post halts, and all turn together inwards to the patient, No. 4 placing himself opposite No. 2.

If the stretcher has been placed at the left side of the patient, Nos. 1, 2, and 3 wheel to the right about past the foot of the stretcher, round the feet of the patient, till they come to their proper position, No. 4 wheels round the stretcher with the other bearers, but he takes the near side of the body, viz., next the stretcher; the whole now turn inwards, No. 4 placing himself opposite No. 2. At the command

"*Two,*" the whole stoop down on the left knee (if the stretcher has been placed at the right side and *vice versa*) and proceed to lay hold of the patient. No. 1 passes one hand underneath the opposite axilla

under the patient's neck, the other hand under the shoulder nearest to him; he must watch disturbing a broken arm. Nos. 2 and 4 pass their hands underneath the patient's loins and hips. No. 3 passes both arms underneath the lower limbs; if there is a fracture he passes one hand above and the other beneath the seat of fracture in order to support it and prevent movement of the broken fragments. If the patient is able he should pass his arms round the neck of No. 1. At the command

"*Three*," the detachment working together lift the patient slowly off the ground on to their knees, the horizontal position of the patient's body being maintained throughout the movement. No. 4 now relinquishes his hold and doubles round by the head of the stretcher to the centre of the pole furthest away from the patient; he now catches the nearest pole by his left hand while he catches the furthest away pole with his right hand, lifts the stretcher and places it underneath the patient, taking care not to knock the knees of the other bearers; he now assists the other bearers. When all are ready the command

"*Lower wounded*" is given; the patient is now slowly lowered down on the canvas, the bearers gently remove their hands and arms from under him and stand up, all detachments keeping time with the right. At the command

"*Two*," all bearers now stand to stretchers (if the stretcher has been at his right side) by Nos. 1, 2, and 3 turning to the right, No. 4 to the left, and all wheel to the right-about round to their places. If at his left side, the whole make a left turn, and Nos. 1, 2, and 3 wheel to the right-about round to their places.

Stretchers may now be lifted by the usual commands

and the company practised marching with loaded stretchers. The company having been halted unload by the following command :

"For unloading," "Lift wounded."—Nos. 1, 2, and 3 wheel to their left about, No. 4 to his right, to their appointed places; the whole halt and turn inwards together. At

"Two," all proceed to lay hold of the patient as before; at

"Three," he is raised and steadied as before; No. 4 now withdraws the stretcher and then assists to lower the patient; for this purpose he doubles round the head of the stretcher.

"Lower wounded."—The patient will be lowered, made to stand up and marched to the front again so as to repeat the exercise. When the patients are clear of the stretchers the men will stand to stretchers as follows:—Nos. 1, 2, and 3 wheeling to his left about into their places, No. 4 falling into his place.

TO CHANGE THE NUMBERS.

In order that each member of the stretcher detachment may be able to perform all the duties the numbers must be changed, and this is done by the following commands when the men are standing to prepared stretchers:—

"Nos. 2 and 4 two paces left-close." "Quick march."

"Nos. 1 and 4 right-about turn."

"The whole Quick march." "Mark time." "Front turn." "Halt."

"Stand to stretchers." "Quick march."

The Nos. 2 and 4 now become Nos. 1 and 3.

Or Nos. 1 and 2 can be made to change places with Nos. 3 and 4 by

"Nos. 1 and 2 two paces left close," "Quick march."

"Nos. 1 and 2 right-about turn." "The whole quick march."

"Mark time." "Front turn." "Halt."

"Stand to stretchers." "Quick march."

LOADING AND UNLOADING WITH REDUCED NUMBERS.

3 Bearers.

When only three bearers are available, the stretcher will be placed at the head of the patient and in the same line as the body. One bearer places himself on the injured side of the patient opposite the knees and supports the lower limbs; the other two bearers place themselves opposite one another, passing their one arm underneath the thighs, the other under the back of the patient and interlace their fingers: this is done in the kneeling position. The bearers now rise and carry the patient, head first, over the stretcher and place him gently on the canvas. When carrying the patient off the stretcher he is carried feet first, the body being kept in a horizontal position.

2 Bearers.

When only two bearers are available, the stretcher is placed in the same position as above. The method of lifting will vary according to whether the lower limb is fractured or not; if it is, both bearers place themselves on the same side of the body, one bearer attending to and supporting the lower limbs, while the other lifts the body, the patient assisting as much as he can by grasping the bearer round the neck, carrying him head first over the stretcher.

If the lower limbs are intact and not much injured, then one or other of the improvised seats described

later may be used ; if the patient is suffering from shock, then the horizontal position of the body must be kept by the first method.

Since the publication of the last "Manual for Medical Staff Corps," orders have been sent out from the War Office that rifles are not to be used for carrying any heavy load, so they will not be now used for stretcher drill except in cases of necessity. I will describe how they are formed.

TO FORM RIFLE STRETCHERS.

(For this Drill Rifles and Rugs are required.)

The company having been sized in the usual manner, the rifles (with bayonets fixed) and rugs will be served out, the rifles to every right file, front and rear rank, viz, Nos. 1 and 4, and the rugs to every front rank of the left files, or No 2. The rifles being held at the order, the formation of the company will now be gone on by, and the detachments extended at, four paces interval. At the command

"*Prepare Rifle stretchers*" all the bearers turn to the right ; Nos. 2 and 4 of each detachment remain steady, but Nos. 1 and 3 take two paces to their front, halt, and turn to the right about. As soon as Nos. 2 and 4 see this done, they close outwards till they get opposite Nos. 1 and 3, upon which No 2 takes the rug off his shoulder, takes off the strap, and throws one end of the rug to No. 3, who assists him to unroll it and spread it out lengthwise, evenly between the four men. Nos. 1 and 4 now stoop down and place the rifles under the edge of the rug, muzzles to the front, hammers facing inwards (if old pattern). All the numbers now proceed to roll the rugs tightly round the rifles, a like number of rolls around each, until the space between the rifles measures twenty inches. The rolling

now ceases, and the men stand up and stand to stretchers as follows:—Nos. 2, 3, and 4 of each detachment turn to the left; No. 1 to the right. No. 1 now wheels to his left-about to his place, halts, and fronts. No. 3 wheels to the right-about round by the head of the stretcher to his place; while Nos. 1 and 3 are wheeling, No. 2 steps back two paces, and No. 4 steps forward a pace

“*Lift arms and rugs.*”—No. 3 of each detachment now turns to his left-about. and wheels to his left to the opposite side of the stretcher. No. 1 wheels to his right to the opposite side. Nos. 2 and 4 close outward, opposite Nos. 1 and 3. The whole now turn inwards together; kneel on the left knee and unroll the rug. Nos. 1 and 4 take up the rifles, while Nos. 2 and 3 roll up the rug as follows:—The foot end will be brought up to the head end and then roll the rug from the head end towards the foot. The strap is now buckled on the ends, No. 2 puts the rug on his shoulder and all stand up—Nos. 2 and 4 still facing Nos. 1 and 3. Nos. 2 and 4 take two side paces inwards. Nos. 1 and 2 take two paces to their front, upon which the whole front together.

TO FORM 2, 3, OR 4-HANDED SEATS.

The company having been sized in the usual manner, when the company is standing two deep, the ranks will be opened by the command

“*Rear rank two paces step back.*” “*Slow march*”

“*Form 2-handed seat.*”—The left files lock the fingers of the left hand with the fingers of the right hand of the right files, palms uppermost, at the same time crossing the unoccupied arms as if they were placed round the loins of a patient sitting in the seat (Fig. 54, page 66).

"*Front.*"—At this command bearers stand to "*Attention*" again.

"*Form 3-handed seat.*"—This is done by the right files catching the thick portion of their left forearm with their right hand. The left files now grasp the right forearm

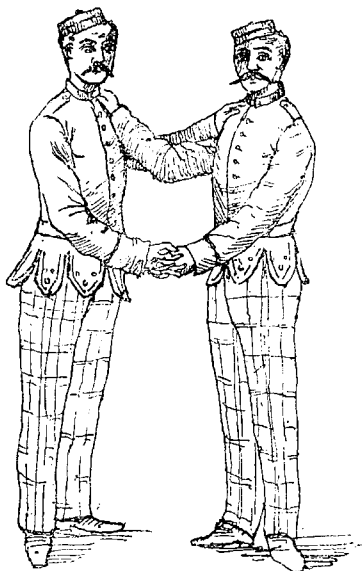


Fig 54'

of the right files with the left hand, and the right files the left forearm of the left files with the disengaged hand. The left files now rest their right hand on the left shoulder of right file so as to act as a support to the back of the patient (Fig. 55).

"Front."—Company again stand to *"Attention."*

"Form 4-handed seat."—Both files grasp the thick portion of their left forearm with their right hand, and with their disengaged hands (back uppermost) grasp one another's disengaged forearms (Fig. 56, page 68).

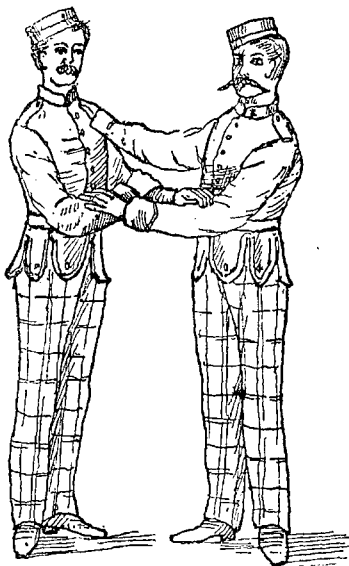


Fig 55

"Front."—Men smartly drop hands to the side, and turn to front at *"Attention."*

"Close order."

"March."—Rear rank now closed on front rank as before.

TO LIFT AND CARRY WOUNDED BY IMPROVISED SEATS.

The company having been sized and numbered as before, the command will be given

“*Rear rank, right-about turn,*” “*Quick march.*”—Here the rear rank will be retired ten paces from the front rank, when the command

“*Halt,*” “*Front*” will be given. Now a party of dummy wounded in the proportion of one to every two

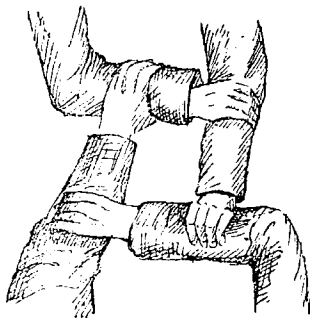


Fig 56

bearers will be extended at four paces interval in front of both ranks, and directed to sit down, back towards the bearers. The next command—

“*Ranks from the left (or right) extend*”—will be given, the two bearers on the flank named stand fast, while the remainder turn outwards, each successive two stopping in rear of a patient, the supernumeraries pacing along the lines to see that this is done.

“*By 2-handed seats lift wounded.*”—The right half-files now take up an oblique pace to the right-front with the

right foot, and the left file to the left with the left foot, each man now makes a left and right turn respectively, so as to face each other. At the command

"*Two*," each bearer kneels on the knee next the patient's feet and forms a 2-handed seat beneath his thighs. At command

"*Three*," they steadily rise together, lifting the patient off the ground, close their heels and jam the patient's body in between and against their own, passing their unoccupied arms round his loins to give them support (Fig. 57).

If required to advance, that command will be given, and both bearers will step off with opposite feet, the right half-files with the right foot, the left half-files with the left foot, the left half-files dressing from the right. If to retire, the right half-files will mark time while the left come round, both men moving off when square.

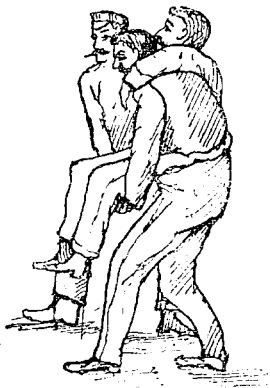


Fig. 57.

"*Halt*," "*Lower wounded*."—At this command both men halt, stoop and kneel down, place the patient sitting on the ground, disengage their hands quietly, and rise to erect position.

"*Two*."—Both men front and take an oblique pace to the rear, the right half-file to the left rear and the left half-file to the right rear. When lifting wounded with

3 or 4-handed seats the wounded will be placed standing instead of sitting.

"*By 3 or 4-handed seats lift wounded.*"—The bearers now turn so as to face one another.

"*Two.*"—3 or 4-handed seats are formed. The bearers now stoop, bending the knees slightly, and place the seat under the patients' buttocks, the patients at the same time are to pass both arms over the bearers' heads and place them on their shoulders.

"*Three.*"—Bearers steadily rise together, lifting the patient off the ground. Advancing and retiring will now be practised.

"*Halt,*" "*Lower wounded.*"—The patients are placed standing, and the bearers take up their original position, when the exercise may be repeated, or the company dismissed by the commands—

"*Ranks on the left (or right) close.*"

"*Rear rank.*" "*Quick march.*" "*Halt.*"

For more particulars regarding stretcher drill and how to load and unload waggons, readers are referred to the "*Manual for Medical Staff Corps.*"

The following is a tabulated form of the Stretcher Drill :—

FIRST FORMATION.

"*Company.*" "*Fall in.*" "*Size.*" "*Number.*"

"*Even numbers, two paces step back.*" "*March.*"

"*The whole on the right close.*" "*Quick march.*"

"*Number.*"

"*Fours deep.*"

"*Number the detachments.*"

"*No. —, the centre detachment.*"

"On the centre detachment close." "Quick march."

"Front rank, No. 1 bearers."

"Second rank, No. 2 bearers."

"Third rank, No. 4 bearers."

"Rear rank, No. 3 bearers."

"No. 1, No. 2, etc., bearers." "Stand at ease."

"Company." "Attention."

"Number by fours from the right," and "Post commanders."

"Number the sections."

"Stand to stretchers." "Quick march."

"Lift stretchers." "Right dress."

"Advance." "Retire."

"No. 2 (or 4) take stretchers."

"Right (or left) turn."

"Front turn." "Halt."

"Lower stretchers."

TO PREPARE STRETCHERS FOR USE.

"Prepare stretchers."

"Fold up stretchers."

TO LIFT AND LOWER PREPARED STRETCHERS.

"Lift stretchers."

"Two."

"Three."

"Lower stretchers."

"Two."

TO MARCH WITH PREPARED STRETCHER.

"Advance."

"Retire."

"Right (or left) incline."

"Halt."

LOADING AND UNLOADING STRETCHERS.

"Take post at right of the wounded." "Advance."

"Lower stretchers."

"Two."

*"For loading." { "Lift wounded." "Two." "Three."
"Lower wounded." "Two."*

"Lift stretchers." "Two." "Three." "Advance."

"Halt." "Lower stretchers." "Two."

*"For unloading." { "Lift wounded." "Two." "Three."
"Lower wounded." "Two."*

"Fold up stretchers."

"Right about turn." "Quick march." "Halt."

"Front."

"From the right (or left) re-form two deep." "Quick march."

"Right dress." "Right turn." "Dismiss."

It must be understood that drilling with numbers, such as *"Two," "Three,"* is only for exercise ; if the company were on the field they would work by time.

TO FORM 2, 3, OR 4-HANDED SEATS.

"Rear rank two paces step back." "Slow march."

"Form 2, 3, or 4-handed seats."

"Front."

"Close order." "March."

TO LIFT AND CARRY WOUNDED BY 2-HANDED SEAT.

"Rear rank right-about turn." "Halt." "Front."

"Ranks from the left (or right) extend."

"By 2-handed seats lift wounded."

"Lower wounded."

"Ranks on the left (or right) close."

"Rear rank Quick march." "Halt."

TO LIFT AND CARRY WOUNDED BY 3 OR 4-HANDED SEATS.

"Rear rank right-about turn." "Quick march."

"Halt." "Front."

"Ranks from the left (or right) extend."

"By 3 or 4-handed seats lift wounded."

"Lower wounded."

"Ranks on the left (or right) close."

"Rear rank quick march." "Halt."

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