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MANUAL

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WAR OFFICE, 1899.

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[The Amendments made in the 1894 Edition of this Manual are denoted by a black line in the margin. As some typographical errors may have occurred in publication, it is requested that, should any be discovered, they may be at once pointed out, in writing, to the Under Secretary of State for War.]

MANUAL

FOR THE

ROYAL ARMY MEDICAL CORPS.

1899.

SECTION I.—TRAINING OF THE MEN OF THE ROYAL ARMY MEDICAL CORPS IN FIRST AID AND NURSING.

1. PRELIMINARY REMARKS ON THE GENERAL SCOPE AND OBJECT OF THE INSTRUCTION OF MEN OF THE ROYAL ARMY MEDICAL CORPS.

The duties of Royal Army Medical Corps.

1. The Royal Army Medical Corps is organised for the performance of duties in connection with the hospital and ambulance service of the army.

Duties in hospitals.

2. In hospitals, both in peace and war, at home and abroad, the corps is responsible not only for the nursing of the sick and the dispensing of medicines, but is called on to perform various duties connected with the charge of equipment, the making timely requisition for fuel, light, provisions, and all requisite supplies and repairs, the cooking and expenditure of diets, the custody of patients' kits, the cleanliness of the hospital and its surroundings, the exchange of soiled for clean linen, bedding and clothing, and the preparation of the necessary accounts, abstracts and vouchers of expenditure. The detailed instructions relating to these duties are contained in the Standing Orders for the corps.

Duties in the field.

3. In the field, the corps is further charged with another duty. It supplies to the army an organisation designed expressly for the purpose of speedily collecting and succouring the wounded during and after an engagement, and removing them from the battle-field to the field hospitals. The soldiers by whom this duty is performed are designated Stretcher Bearers, more briefly Bearers, and the unit of this organisation is called a Bearer Company.

Bearer Companies.

Duties of bearers.

4. The duties of bearers are in the first place to search for and tend the wounded, by administering to them water and stimulants, by arresting bleeding, by applying splints or a temporary dressing if the nature of the case so require, and by removing them, their arms and accoutrements, to a place of safety; and secondly, to pitch tents and hospital marquees, to cook for the wounded, and to find guards for the wagons on the line of march and in camp.

Necessity for technical training.

5. To enable the men of the Royal Army Medical Corps to undertake even the most elementary of these duties, either in

hospitals or in the field, it follows as a matter of necessity that they must undergo a course of technical training.

Preliminary training.

6. This technical training will commence as soon as the recruit has gone through a short preliminary training in squad and company drill, and the modified course of musketry instruction prescribed by the Queen's Regulations.

Duration of technical course.

7. The technical training, which embraces the subjects mentioned in the next paragraph, will, as a general rule, occupy about two months, the theoretical and practical instruction, which will invariably be imparted by, or in the presence and under the direction of, a medical officer, being carried out at the same time.

Which is theoretical and practical.

8. The theoretical training will embrace the subject treated of in this section.

The practical training will include the application of field splints, tourniquets, and temporary dressings, and the various methods of lifting and carrying the wounded laid down in the Corps Drills and Exercises, in Section II.

Corps drill.

9. This drill was originally arranged by Brigade-Surgeon Sandford Moore, M.B., and published by him in 1877 in his "Manual of Exercises for training Stretcher-Bearers and Bearer-Companies."

Division of daily work.

10. The daily work should consist of 1-hour lecture, 1-hour corps drill, 1-hour exercise in the application of bandages, splints, tourniquets, &c., and 1 hour devoted to questioning on the previous day's work. During the summer months an extra hour will be devoted to drill.

2. ANATOMICAL AND PHYSIOLOGICAL OUTLINES.

Method of instruction.

11. The instructor will by explanation and demonstration expand the brief anatomical and physiological outlines here given, sufficiently to impart to the men such a knowledge of the subjects referred to as will enable them to carry on their duties as nurses and hospital attendants intelligently. He will particularly explain the course and position of each of the principal arteries and veins, and point out the situations where the former can be most effectively compressed. The instructor will obtain material assistance by employing Marshall's physiological diagrams to illustrate his subject.

Construction of the human body.

12. The human body is made up of :—(1) the skeleton or bony framework with its joints ; (2) the muscles ; (3) the heart and blood vessels ; (4) the lungs and air passages ; (5) the brain, spinal cord, and nerves ; (6) the stomach, intestines, and organs connected with digestion ; (7) other organs contained in the abdominal cavity ; (8) the skin.

Skeleton.

13. The skeleton consists of a number of bones, some long, some short and irregular, held together by bands or ligaments to form joints, which allow of greater or less movement between them. The bones determine the general shape and proportions of the body, give attachment to the muscles, and form levers on which the muscles act to move the body from one position to another. They also form cavities for the protection of important organs.

14. The bones of the head and face are collectively called the skull. The more important of these bones are the following :— The skull.

The *cranium* is the name given to the eight bones, closely united together, which form a strong bony case for the protection of the brain. In front is the *frontal* bone, behind is the *occipital* bone, at the sides are the two *temporal* bones, above and at the sides are the two *parietal* bones, and forming the base are the *sphenoid* and *ethmoid* bones. The extreme top of the head is called the *vertex.* The cranium.

The occipital bone is articulated to the spinal column, and here has an opening through which the spinal cord from the brain passes into the canal in the spinal column. Just above this opening there is a projection of the bone forming a sort of knob, the *occipital protuberance.*

The frontal bone, in connection with the sphenoid and the bones of the face, forms sockets for the eyes. Bony protection of eyes and ears.

The temporal bones contain the apparatus for hearing, protected in strong bony canals.

The face is made up of a number of small irregular bones, which give shape to the face and attachment to its muscles. They are immovably united together like the bones of the cranium, with the exception of the lower jaw or *inferior maxilla.* The upper edge or border of the lower jaw has set in it sixteen teeth, which meet and shut against sixteen similar teeth set in the lower edge or border of the upper jaw bones or *superior maxillæ.* Bones of the face.

15. The bony parts of the trunk are the spinal column, the chest, and the pelvis. Bones of the trunk.

The *spinal column* or back bone, to allow of the movement of the trunk, is composed of twenty-four separate and somewhat similarly shaped bones called *vertebræ*, placed one above the other, down the centre of which runs a canal or cavity, the *spinal canal*, which contains and protects the *spinal cord.* The first seven of these bones from above down are the *cervical* or neck vertebræ, the next twelve the *dorsal* or back vertebræ, and the last five the *lumbar* or loin vetebræ. Below these come the *sacrum* or rump bone, and the *coccyx* or tail bone, both continuations of the spinal column, the former being joined with the hip bones to form the pelvis. Spinal column.

The chest or *thorax* is a large bony cavity, containing the heart, lungs, *œsophagus* or gullet, and great blood vessels, formed by the union of the twelve dorsal vertebræ of the spinal column with the *costæ* or ribs, and the *sternum* or breast bone in front. There are twelve ribs on each side, seven termed *true* and five *false* ribs ; two of the latter are called *floating* ribs. The chest.

The *sacrum* and the *innominate* or nameless bones, one on either side, are firmly united to form the basin-shaped cavity of the *pelvis* which contains and protects the bladder, rectum, and several large blood vessels ; from it the lower extremities or limbs are suspended. The pelvis.

16. The upper limb is divided into the shoulder, the arm, the fore-arm, and the hand. Bones of the upper limb.

The *shoulder* connects the arm to the trunk, and includes two bones, the *clavicle* or collar-bone and the *scapula* or shoulder-blade. The former is a long, curved bone in front connecting the The shoulder.

scapula to the breast-bone, the latter a large, flat, triangular bone lying upon the ribs behind.

The arm.

The bone of the arm is called the *humerus;* it is a long bone, having at its upper end a rounded head, which articulates with the scapula, and at its lower end a grooved surface, which, with the bones of the fore-arm, forms the elbow joint.

The fore-arm.

The bones of the fore-arm are the *radius* and the *ulna*. The radius extends from the outer side of the elbow to the thumb side of the wrist. The ulna extends from the inner side of the elbow to the little finger side of the wrist. At its upper end is a projection, the *olecranon*, which forms the point of the elbow. The space between the radius and ulna is called the *interosseous space*.

The hand and wrist.

The bones of the hand are arranged in three series; firstly, in the wrist are a number of small bones called the *carpus*; secondly, a row of long bones called the *metacarpus*, forming the palm; and lastly, fourteen bones called *phalanges*, forming the skeleton of the fingers and thumb, these being disposed two to the thumb and three to each of the fingers.

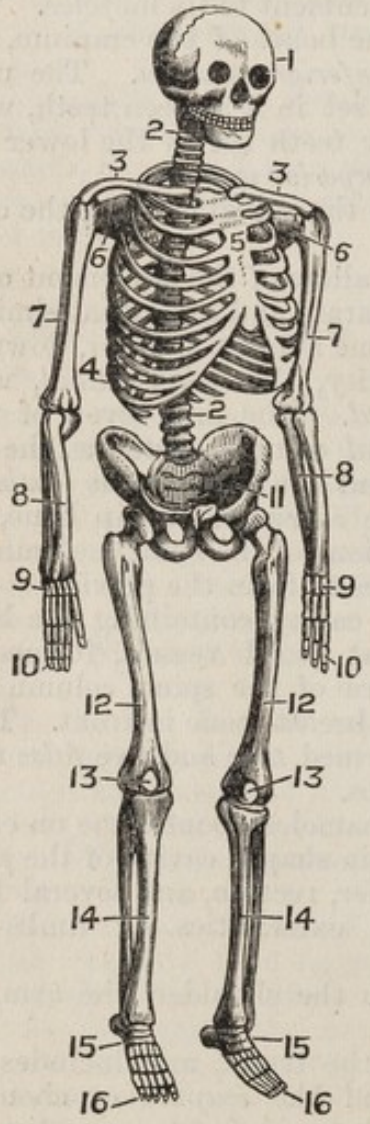


FIG. 1.

SKELETON OF HUMAN BODY.

1. Cranium, or skull.
2. Spine formed of vertebræ.
3. Clavicle, or collar-bone.
4. Costæ, or ribs.
5. Sternum, or breast-bone.
6. Scapula, or shoulder-blade.
7. Humerus, or arm-bone.
8. Radius and ulna.
9. Carpal and metacarpal bones.
10. Phalanges, or finger-bones.
11. Innominate or nameless bones.
12. Femur, or thigh-bone.
13. Patella, or knee-cap.
14. Tibia and fibula.
15. Tarsal bones.
16. Metatarsal bones and phalanges.

17. The lower limb is divided into the thigh, the leg, and the foot. Bones of the lower limb.

The *thigh* is that portion which extends from the hip above to the knee below ; its one bone is named the *femur* or thigh bone, and is the largest and strongest in the body. At its upper end there is a rounded head, which fits into a deep cup-shaped depression in the nameless bone forming the hip joint ; below, the expanded end of the bone enters into the formation of the knee joint. Protecting the knee joint in front there is a small bone called the *patella* or knee-cap. The thigh.

The *leg*, extending from the knee to the ankle, has two bones, a larger one lying on the inner or great toe side, called the *tibia* or shin bone, upon the flat expanded head of which rests the lower end of the femur, and a more slender one on the outer side, called the *fibula*. The leg.

The construction of the foot is similar to that of the hand, and like it has three series of bones : several short strong ones in the ankle which are called the *tarsus* ; secondly, a row of longer ones, the *metatarsus* ; and lastly, fourteen *phalanges*. The foot and ankle.

18. A joint or *articulation* is the place where two or more bones are joined together. Where bones move on one another, the ends coming in contact are covered with a soft bluish-white material called *cartilage*, and surrounded by a sort of bag, the *capsule*. From the inside of the capsule an oily material called *synovial fluid* is poured out, which causes the ends of the bones to move smoothly over one another. Outside the capsule are bands of tough material connecting the ends of the bones together, the *ligaments*. Joints or articulations. Ligaments.

The two principal varieties of joints are the ball and socket and the hinge joint. The ball and socket joint allows one of the bones to move freely in all directions. The shoulder and hip are joints of this description ; the scapula and the innominate bone, each having a cup-like depression, into which fit the rounded, ball-shaped ends of the long bones of the arm and thigh. The second kind of joint, working like the hinge of a door, allows of movement up and down or backwards and forwards only, as seen in the elbow and knee. Varieties of joints.

19. The muscles are red bands of flesh attached to the bones, by the contraction of which, under the influence of the will, the limbs and different parts of the body are made to move. Muscles.

20. The organs of the circulation consist of :— Organs of circulation.

(1) The heart.
(2) The blood vessels.
(3) The blood.

21. The heart is a hollow muscle about the size of a closed fist, lying in the cavity of the chest between the two lungs, and a little to the left of the middle line. Heart.

It is divided into a right and left half, separated by a muscular partition, so that nothing can pass directly from the right to the left side of the heart.

Each half is divided by a movable partition or valve into an upper, thin-walled receiving chamber and a lower, thick-walled Auricles and ventricles.

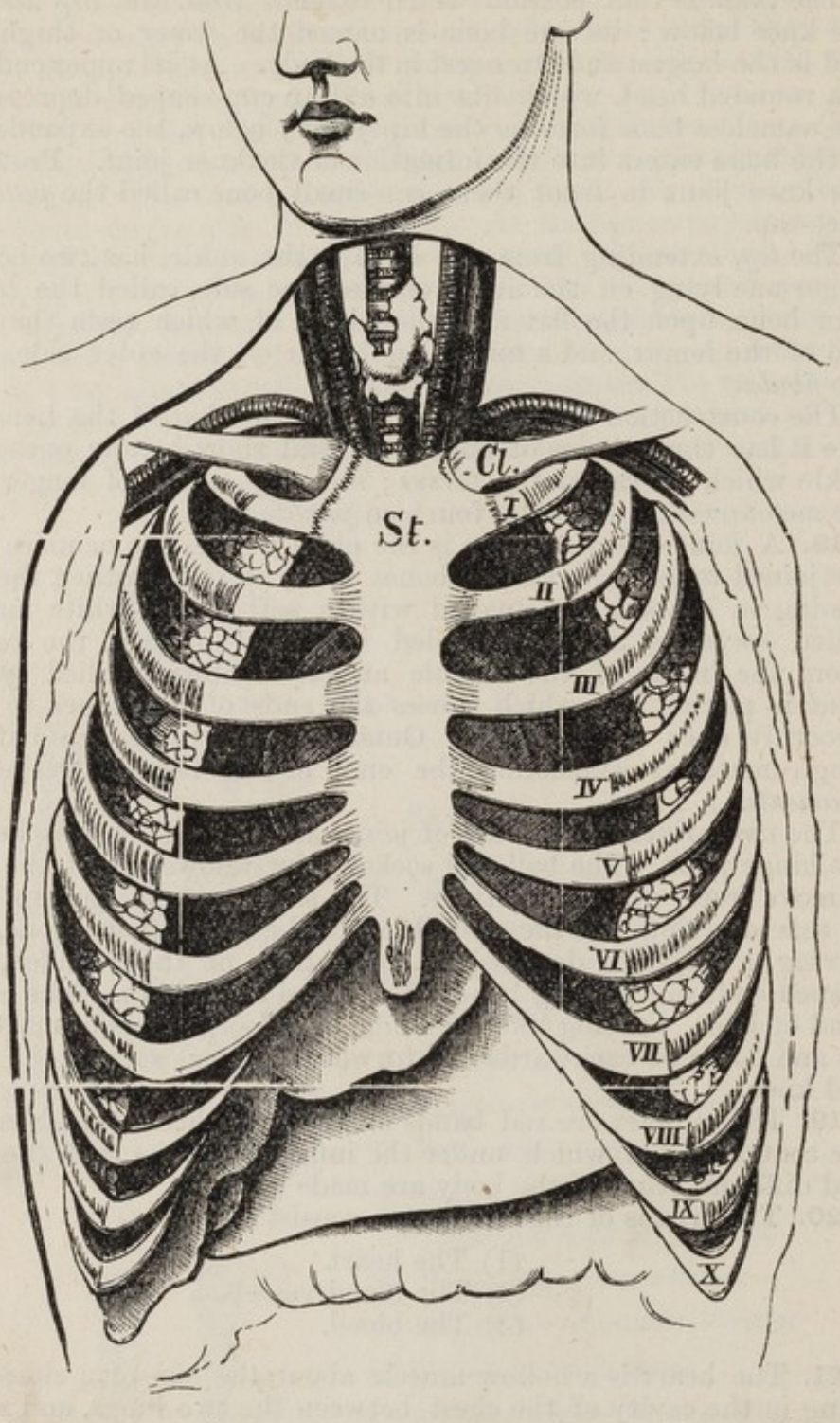


FIG. 2.—CAVITY OF CHEST EXPOSED, SHOWING LUNGS, HEART, TRACHEA AND LARGE BLOOD VESSELS IN THE NECK.

pumping chamber. The upper chamber is called an *auricle*, the lower a *ventricle*. The valve between each auricle and ventricle allows fluid to pass in one direction only, viz., from the auricle to the ventricle.

22. The blood vessels are a system of tubes extending from the heart to every part of the body, and which, with the heart, contain the blood. Blood vessels.

There are three kinds of blood vessels :—

Arteries.
Capillaries.
Veins.

FIG. 3.

DIAGRAM OF CIRCULATION THROUGH THE BODY AND LUNGS.

L.V. Left ventricle. A. Arteries of body. C.B. Capillaries of body. V. Veins of body. R.A. Right auricle. R.V. Right ventricle. P.A. Arteries of lungs. C.L. Capillaries of lungs. P.V. Veins of lungs. L.A. Left auricle.

Arteries. Arteries are thick-walled, strong tubes, leading from the lower chambers of the heart—the ventricles—branching and getting smaller as they proceed, and ending in extremely small, thin-walled vessels called capillaries.

Capillaries. The capillaries lie between the extremities of the arteries and the commencement of the veins, and are so small that a microscope is required to see them. They form a close network all over the body, and gradually collecting together and getting larger they become veins.

Veins. The veins, thin-walled tubes, commencing thus in the capillaries, become fewer in number and larger in size as they get nearer the heart, until they end in the large veins which open into its upper chambers—the auricles.

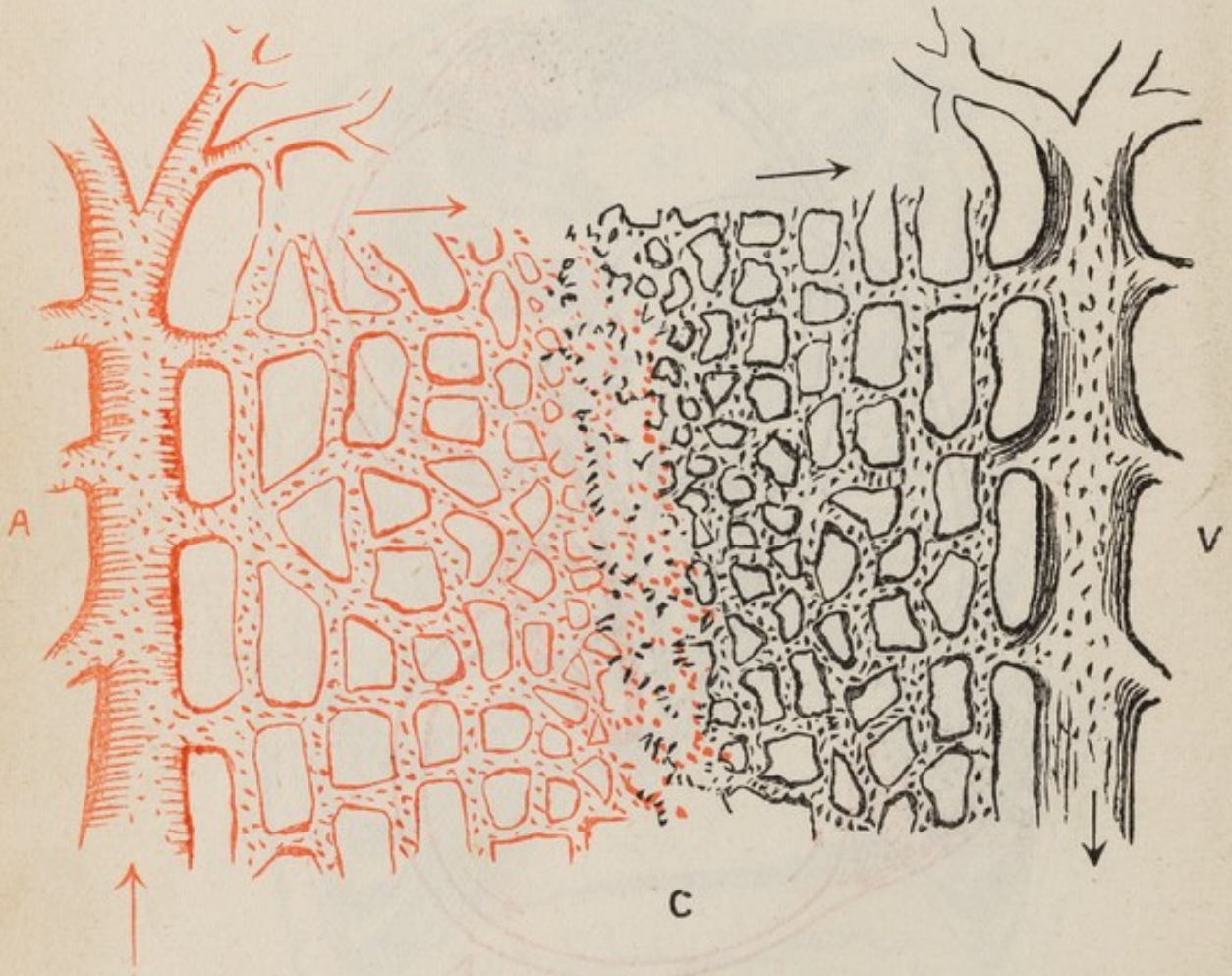


FIG. 4.—DIAGRAM SHOWING:
A. ARTERIES. C. CAPILLARIES. V. VEINS.
(Greatly magnified.)

The blood. **23.** The blood is a red fluid which coagulates or changes into a jelly-like mass when it escapes from the heart or blood vessels.

Liquor sanguinis and blood corpuscles. It is composed of a colourless fluid, *liquor sanguinis*, in which float a number of minute discs, the red blood corpuscles, the diameter of which is about $\frac{1}{3200}$ of an inch; and a few somewhat larger white round bodies, the white corpuscles or leucocytes.

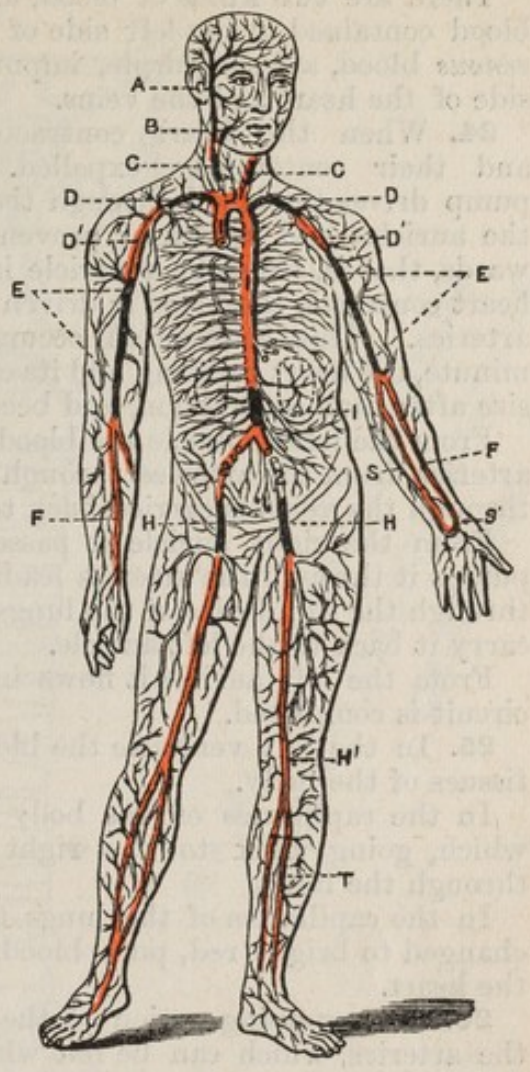


FIG. 5.

ARTERIES OF THE BODY.

1. Thoracic aorta.
2. Iliac arteries.

A. External carotid.
B. Internal carotid.
C. Common carotid.
D. Subclavian artery.
D¹. Axillary artery.
E. Brachial artery.
F. Radial artery.
H. Femoral artery.
H¹. Popliteal artery.
I. Abdominal aorta.
S. Ulnar artery.
S¹. Palmar arch.
T. Tibial artery.

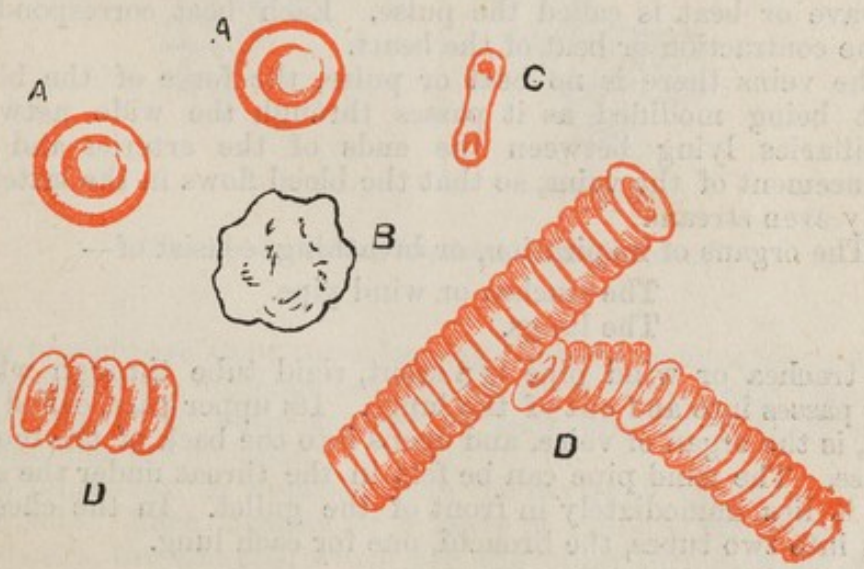


FIG. 6.—BLOOD CORPUSCLES (greatly magnified).

A. Red corpuscles. B. White corpuscle. C. Red corpuscle seen edgeways. D. Rouleaux of red corpuscles.

Arterial blood. There are two kinds of blood, *arterial* blood, a bright red pure blood contained in the left side of the heart and the arteries, and

Venous blood. *venous* blood, a dark purple, impure blood contained in the right side of the heart and the veins.

The circulation of the blood. **24.** When the heart contracts, its cavities become smaller, and their contents are expelled. The heart thus acting as a pump drives the blood through the vessels.* The valves between the auricles and ventricles prevent the blood from flowing backwards, that is, from the ventricle into the auricle, so that when the heart contracts, the blood is driven from the ventricles through the arteries. This contraction occurs in health about 72 times a minute, the heart relaxing and its cavities enlarging to their original size after each contraction, and becoming again filled with blood.

Course of the blood. From the left ventricle the blood is driven through the aorta and arteries, from the arteries through the capillaries to the veins, and through the veins is carried back to the right auricle.

From the right auricle it passes to the right ventricle, which pumps it through the arteries leading to the lungs; it then passes through the capillaries of the lungs to the veins of the lungs, which carry it back to the left auricle.

From the left auricle it flows into the left ventricle, and so the circuit is completed.

Character of blood in its course. **25.** In the left ventricle the blood is arterial, going to feed the tissues of the body.

In the capillaries of the body it is changed to venous blood which, going back to the right side of the heart, is pumped through the lungs.

In the capillaries of the lungs this dark purple, impure blood is changed to bright red, pure blood, and returned to the left side of the heart.

The pulse. **26.** The pumping action of the heart produces a wave through the arteries, which can be felt where they come near the surface of the body, as at the wrist just above the root of the thumb. This wave or beat is called the pulse. Each beat corresponding with the contraction or beat of the heart.

In the veins there is no beat or pulse, the force of the blood current being modified as it passes through the wide network of capillaries lying between the ends of the arteries and the commencement of the veins, so that the blood flows in the latter in a steady even stream.

Organs of respiration. **27.** The organs of respiration, or breathing, consist of—

The trachea or wind pipe.
The lungs.

Trachea or wind pipe, larynx, and bronchi. The trachea or wind pipe is a stout, rigid tube through which the air passes into and out of the lungs. Its upper part, called the larynx, is the organ of voice, and opens into the back of the mouth and nose. The wind pipe can be felt in the throat under the skin where it lies immediately in front of the gullet. In the chest it divides into two tubes, the bronchi, one for each lung.

* The action of the two sides of the heart may be demonstrated by two Higginson's syringes and two basins, the capillaries of the body and lungs being represented by the basins.

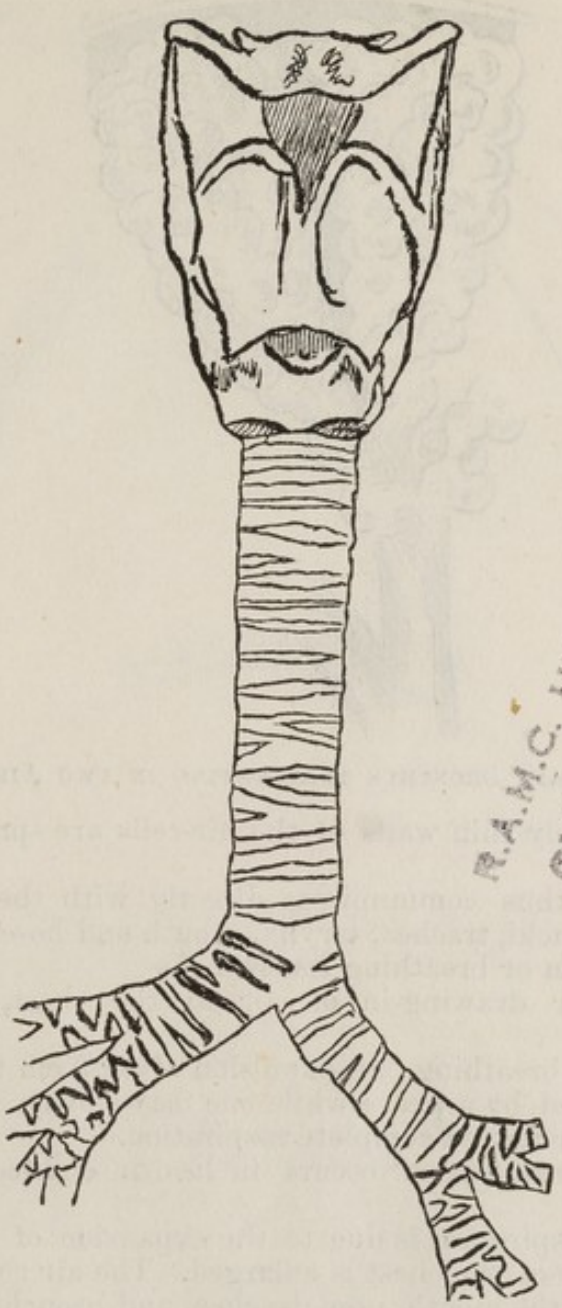


FIG. 7.—LARYNX, TRACHEA AND BRONCHI.

Bronchial tubes.

The bronchi are stout tubes leading from the trachea to the lungs. In the lungs the bronchi branch out in all directions, becoming smaller and their walls thinner as they proceed to their closed terminations, the air cells.

Lungs.

The lungs, two in number, lie in the cavity of the chest, one on either side. Each consists of a mass of minute, extremely thin-walled cells, the air cells, which are the blind terminations of the bronchi.

Air cells.

FIG. 8.—SMALL BRONCHUS TERMINATING IN TWO AIR CELLS.

Lung capillaries.

In the extremely thin walls of the air-cells are spread networks of capillaries.

The air-cells thus communicate directly with the external air through the bronchi, trachea, larynx, mouth and nose.

Description of respiration.

28. Respiration or breathing consists of—

Inspiration or drawing-in of air to the chest, immediately followed by—

Expiration or breathing out, expulsion of air from the chest.

This is followed by a pause while one may slowly count two.

These together form a complete respiration.*

A complete respiration occurs in health eighteen times in a minute.

Mechanism of inspiration.

The act of inspiration is due to the expansion of the chest, by which the cavity of the chest is enlarged. The air rushing in from outside through the mouth, nose, trachea, and bronchi to fill up the increased space, passes into and expands the air cells.

Action of the diaphragm and other muscles.

This enlargement of the cavity of the chest is brought about by the contraction of certain muscles, which raise the ribs, and the action of the large flat muscle forming the floor of the chest cavity and called the *diaphragm*. This muscle in a state of rest and relaxation is arched upwards. When it contracts it is flattened and drawn down, enlarging the cavity from above down.

Mechanism of expiration.

The act of expiration is performed by the falling-in of the chest walls and the return of the diaphragm to its arched condition on the relaxation of the various muscles which were contracted in inspiration, and also by the natural elasticity of the lung tissue—

* The importance of impressing the relation to one another of these three phases of respiration becomes manifest when the practice of artificial respiration is being taught.

which had been expanded by the air drawn in—causing the air cells to return to their original size.

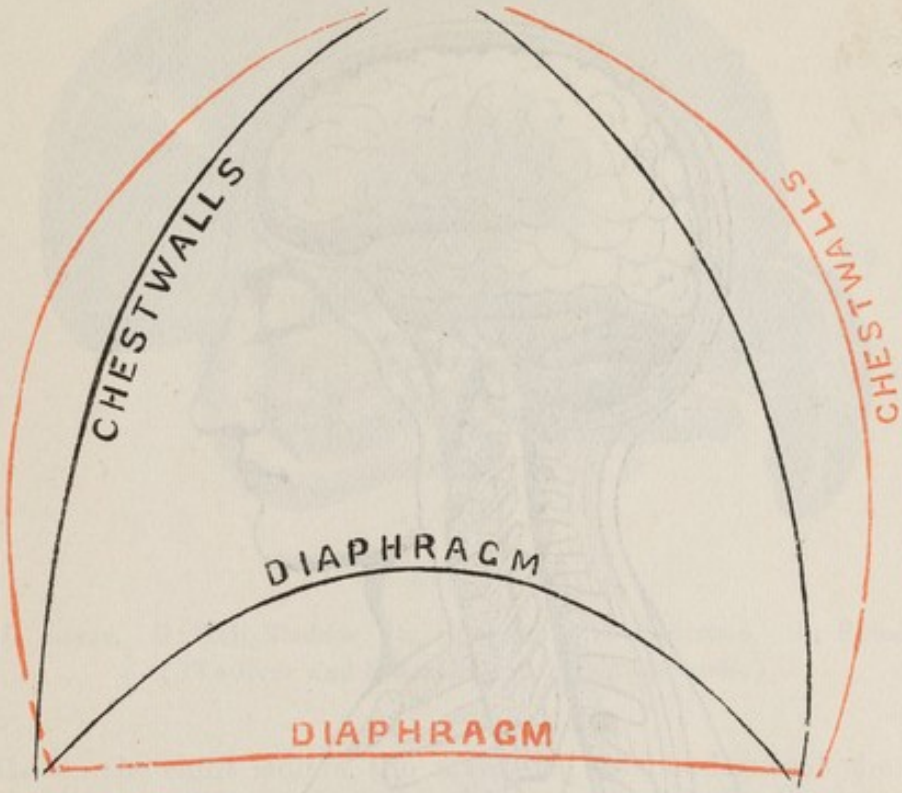


FIG. 9.—DIAGRAM OF CAVITY OF CHEST.
Position in inspiration shown in red lines, and expiration in black lines.

The pause is a short period of rest during which the muscles recover themselves for their next contraction. The pause.

The object of respiration is to purify the blood, which in passing through the capillaries of the body is rendered impure by taking up certain waste products from the tissues. Object of respiration.

This impure blood returns to the right side of the heart and is pumped through the lungs. Passing along the network of thin-walled capillaries which are spread through the walls of the air cells, it is brought into close contact with the air in the cells. The walls of the capillaries and air cells are so thin as to allow changes to take place between the air and the blood. Thus the impurities brought from the body are given up by the blood to the air, and the blood takes up from the air a gas called oxygen, which renders it bright red in colour and pure. Purification of the blood. Effect of oxygen.

This chemical change takes place in the red corpuscles by means of the oxygen combining with the hæmoglobin, which is the principal constituent of these bodies.

29. The brain is the largest and most important portion of the nervous system. It is an oval shaped mass of nervous substance. The spinal cord, as its name implies, is a cord-like mass of nervous matter springing from the base of the brain and extending down the spinal canal. The brain and spinal cord give off white cords called nerves, which divide into branches for distribution to the Nervous system includes brain, spinal cord, and nerves.

different parts of the body. These together form the nervous system upon which, taken as a whole, depend sensation, perception, the power of voluntary movement and the will.

Fig. 10.—Brain and Spinal Cord in Position.

Organs of digestion.

30. The organs connected with digestion are the alimentary canal, consisting of the mouth, gullet, stomach, and intestines, and the glands which pour their secretion into it, the liver and *pancreas*, or sweetbread. With the exception of the mouth, and the gullet which lies in the back of the neck and chest, these organs are

Abdomen.

contained in the *abdomen*, the large cavity which occupies the lower part of the trunk being separated from the chest above by the diaphragm. The food passes from the mouth through the gullet to the stomach, where the principal change in the food by digestion takes place. From the stomach the altered food passes along the intestines; in the upper four-fifths of the intestinal canal—that is to say, in the small intestine—the food is acted upon by the secretions from the liver, sweetbread, &c.; the nutritive materials thus prepared are slowly absorbed by special vessels in the walls of the small intestine, and from these are conveyed into the current of the blood, while the portions of the food not absorbed find their way through the lower fifth of the canal (the large intestine), and are passed from the bowel by the *anus*, as the outlet is called.

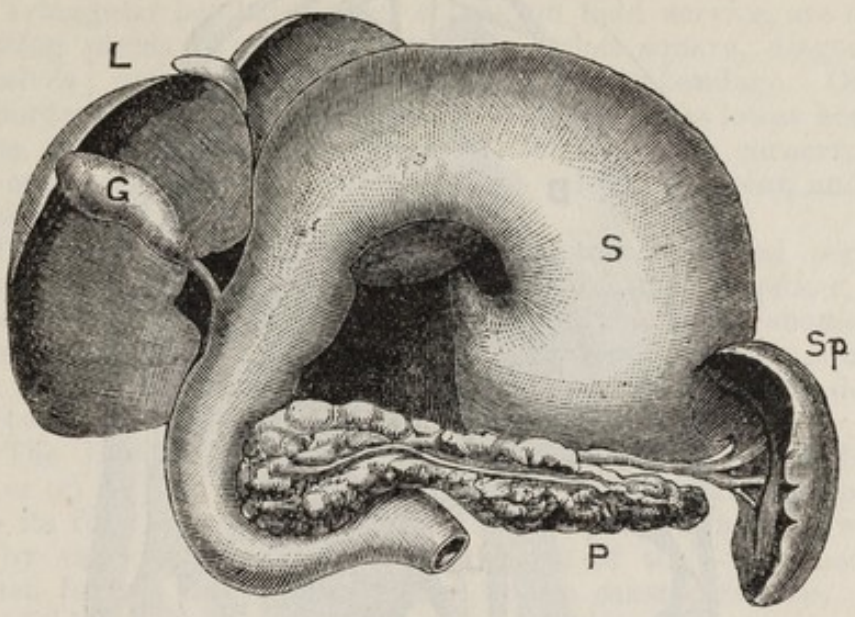


Fig. 11.

L. Liver. G. Gall Bladder. S. Stomach. P. Pancreas. Sp. Spleen.
(The liver and Stomach are turned upwards.)

Other organs in the abdominal cavity.

31. On the right side of the abdomen, just underneath the ribs, is the liver, and across in front of the spinal column, the pancreas. In addition to the organs connected with digestion, the abdomen contains, on the left side, the spleen. Behind and on either side of the spinal column in the loins are the kidneys. The urine formed in the kidneys is conveyed by tubes called ureters to the bladder whence it is voided by the urethra.

Skin.

32. The skin is the outermost covering of the body, serves as a protection to the deeper tissues, and is the principal seat of the sense of touch. It is also an important excretory organ, throwing off considerable quantities of water vapour and waste products. Underlying the skin there is a layer of fat, varying in thickness in different individuals. This fat serves as "packing" for the several structures enclosed by the skin, and is also an efficient agent in retaining the bodily heat.

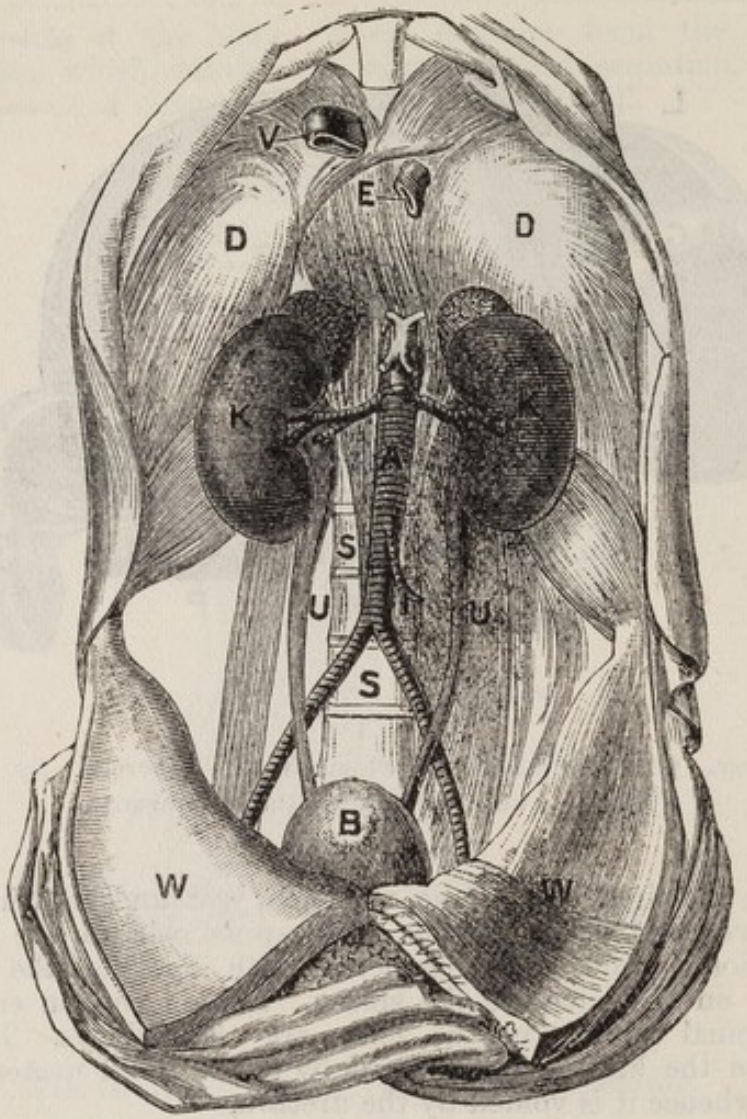


FIG. 12.

A. Aorta. B. Bladder. D. Diaphragm. E. Gullet. K. Kidney. S. Spinal Column. U. Ureter. V. Vena cava. W. Walls of Abdomen.

3. BANDAGES AND BANDAGING.

Method of instruction.

33. Great economy of time and labour will be effected in imparting instruction in bandaging by practising one-half of the members of the class at a time in bandaging the other half. This can probably be best carried out by forming up the men in two ranks, and then causing the front rank to bandage the rear rank, and *vice versâ*.

Various kinds of bandages.

34. Bandages are used for many purposes, the chief of which are to fix splints or dressings, to apply pressure to a part, and to support the circulation. They may be divided into three classes :—

Triangular.
Roller.
Special.

Triangular Bandages.

Description of triangular bandage.

35. Triangular bandages, used chiefly on field service, are made by cutting pieces of calico or linen, 38 inches square, diagonally into halves; each half then forms a triangular bandage. Of the three borders of the bandage, the longest is called the lower border, and the two others the side borders. Of the three corners, the upper one, opposite the lower border, is called the point, and the remaining corners, the ends.

Stowage.

To fold the bandage for stowage, it should be folded perpendicularly down the centre, placing the two ends together, the right end on the left; then the ends and the point should be brought to the centre of the lower border, thus forming a square; fold in half from right to left, and in half again from above downwards twice, and pin off.

Three modes of application.

36. The bandage is applied as: (*a*) a whole cloth; (*b*) broad fold; or (*c*) narrow fold. The whole cloth is the bandage spread out to its full extent. The broad fold is made from the whole cloth by carrying the point to the centre of the lower border, and then folding the bandage again in the same direction. The narrow fold is made by folding the broad fold once lengthwise.

Reef knot.

37. In every case where a knot has to be tied, a reef knot will be used, the formation of which is best explained by the accompanying diagrams showing how to make it and how not to make it.

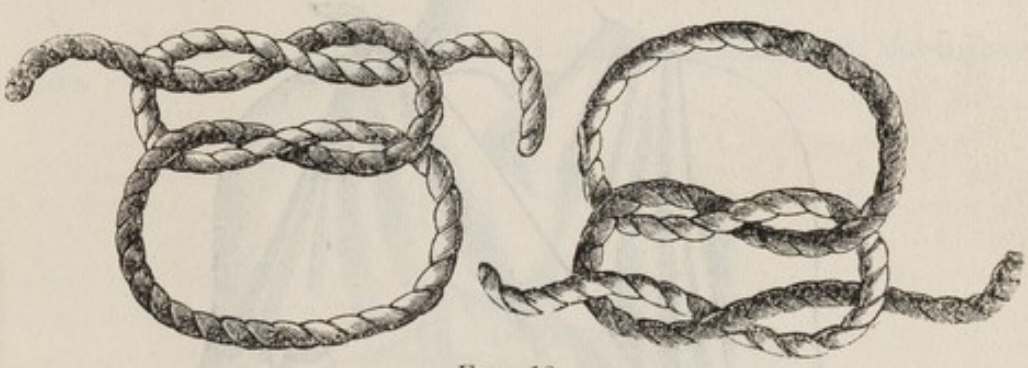


Fig. 13.

Reef Knot. Granny Knot.

To bandage top of head.

38. Take a whole cloth, lay the centre on the top of the head, the lower border lying along the forehead just above the eyebrows; fold in the edge, pass the ends round behind, leaving the ears free; cross below the occipital protuberance over the point of the bandage; bring the ends to the front again, and knot off on the centre of the forehead. Place the hand on the top of the head to steady the dressing, draw the point down to tighten and fit the bandage to the head, then turn it up and pin off on the top.

Side of head.

39. Place the centre of a narrow fold over the dressing, pass the ends horizontally round the head, cross and knot off over the dressing.

Both eyes.

40. Place the centre of a broad fold between the eyes, carry the ends backwards, cross and knot off in front.

One eye.

41. Place the centre of a narrow fold over the injured eye, pass one end obliquely upwards over the forehead, the other downwards

across the ear ; cross below the occipital protuberance, and knot off above the eyebrow on the injured side.

Chin and side of face.

42. Place the centre of a narrow fold under the chin, pass the ends upwards, and knot off over the vertex, tucking in the ends.

Neck.

43. Place the centre of a narrow fold over the dressing, cross the ends, bring back and knot off over the wound.

Chest.

44. Apply the centre of a broad fold over the dressing, pass the ends round, and knot off on the other side, leaving a long end ; take a narrow fold, tie to long end, bring it over the shoulder, and pin off to broad fold over the dressing.

Abdomen.

45. Place the centre of a broad fold over the wound, and knot off on the side.

To apply the greater arm sling.

46. Take a whole cloth, throw one end over the shoulder on the sound side, carry it round the neck so as to lie over the opposite shoulder ; place the point behind the elbow of the injured arm, allowing the other end to fall down in front of the patient ; bend the injured arm carefully, and place it across the chest on the middle of the bandage, thumb pointing towards the chin ; bring up the lower end in front of the forearm, and knot off to the end lying over the shoulder on the injured side ; draw the point forward round the elbow and pin off.

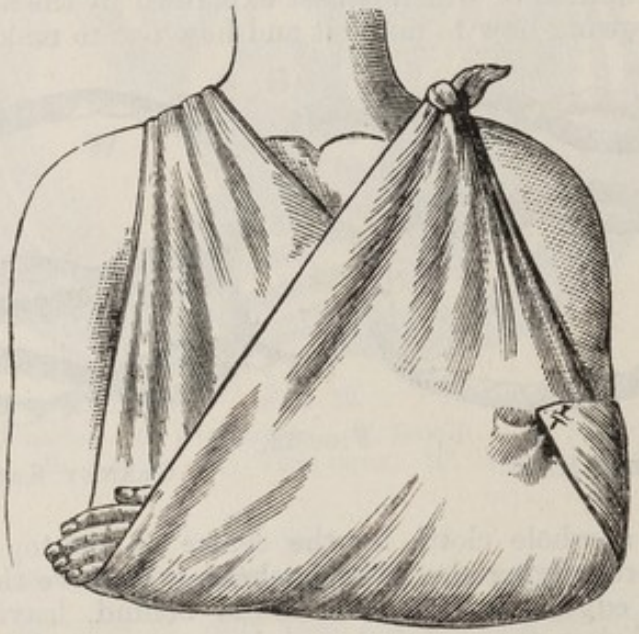


FIG. 14.—GREATER ARM SLING.

In broken collar bone.

There is one exception to this method of applying the greater arm sling, viz., in fracture of the clavicle, where it is not advisable to allow anything to press on the injured bone. To avoid this, the lower end which is brought up in front of the forearm, should be passed between the arm and the side of the injured shoulder, and knotted off to the upper end behind the neck. *See* para. 87.

To apply the lesser arm sling.

47. Take a broad fold, place one end over the shoulder on the sound side, carry it round the back of the neck so as to lie over the opposite shoulder, allowing the other end to fall down, bend the

arm carefully and place the wrist across the middle of the bandage with the hand a little higher than the elbow, bring up the lower

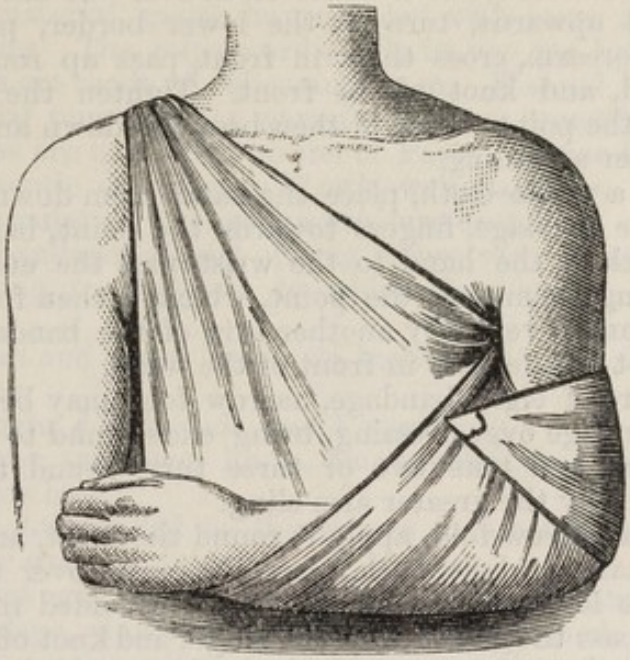


Fig. 15.
Arm Sling for Fractured Collar Bone (Clavicle).

end, and knot off to the upper end over the shoulder on the injured side.

Fig. 16.
Shoulder Bandage and Lesser Arm Sling.

48. Lay the centre of a whole cloth on the top of the shoulder, point upwards, the lower border lying across the middle of the arm. Fold in the lower border, carry the ends round the arm, cross them, and knot off on the outer side. Apply the lesser arm sling, draw

To bandage the shoulder.

the point of the first bandage under the arm sling, fold it back on itself, and pin off over the shoulder.

Elbow. **49.** Place the centre of a whole cloth over the back of the bent elbow, point upwards, turn in the lower border, pass the ends round the forearm, cross them in front, pass up round the arm, cross behind, and knot off in front. Tighten the bandage by drawing on the point which is then brought down and pinned off. Apply greater arm sling.

Hand. **50.** Take a whole cloth, place the hand palm downward on the centre of the bandage, fingers towards the point, bring the point over the back of the hand to the wrist, pass the ends round the wrist, crossing them over the point, which is then folded towards the fingers, and covered by another turn of the bandage round the wrist. Knot off the ends in front of the wrist.

Or a figure of eight bandage, narrow fold, may be used. Place centre of bandage over dressing, bring ends round to opposite side of hand, cross and take two or three turns round the wrist and knot off. Apply the greater arm sling.

Hip. **51.** Take a narrow fold, apply it round the waist, and knot off in front, then take a whole cloth, place the centre over the hip, point upwards, the lower border which should be folded in lying across the thigh ; pass the ends round the thigh, and knot off on the outer side. Draw the point upwards beneath the bandage round the waist, turn it down and pin off.

Knee. **52.** Keep the leg straight, apply a broad fold, cross behind, and knot off in front below kneecap.

Foot. **53.** Place the sole of the foot on the centre of a whole cloth, toes towards the point ; turn the point upwards over the instep, take one of the ends in each hand close up to the foot ; bring them forward, cross them over the instep covering the point. Draw the point up to tighten the bandage, and fold it towards the toes. Carry the ends back round the ankle, cross them behind, catching the lower border of the bandage. Bring the ends forward, cross them again over the instep, covering the point, carry them beneath the foot, and knot off on the inner side.

Other parts of limbs. **54.** When applied to any other part of the limbs, a broad fold is used, the centre of the bandage being placed over the dressing, the ends passed round the limb, and knotted off over the wounds.

Perinæum, and lower part of abdomen. **55.** Take a whole cloth, lower border uppermost, pass the ends round the waist immediately above the hips, and knot off behind, leaving one long end : pass the point between the legs, draw it upwards, and knot off to the long end behind. Another method :— Apply a narrow-fold bandage round the waist ; pass the end of a second bandage, similarly folded, beneath the waist bandage at the centre of the back, fold over and secure with safety pin ; bring the other end forward between the thighs, up to the waist bandage in front, pass beneath, turn over and secure with safety pin. This forms a modified T bandage. (*See* para. 67.)

To fix splints. **56.** Take a narrow-fold bandage, double it upon itself, and place the loop thus formed upon the splint on the outer side of the limb ; pass the free ends round the limb from without inwards, and one of them through the loop ; tighten the bandage by steadily drawing on the two ends, and then knot them in the usual way.

Roller Bandages.

Varieties of roller bandages.

57. Roller bandages are made of calico, linen, flannel, some loose-woven material, gauze impregnated with some antiseptic, or elastic webbing. The rollers ordinarily in use for bandaging the head or limbs are made of calico and linen. Flannel bandages are used for special purposes, for warmth, or after inunctions. Loose-wove bandages are used with plaster of Paris. Gauze bandages are used in antiseptic dressings. Elastic web bandages are used to support the circulation or exercise pressure on a limb.

Sizes of roller bandages.

58. Roller bandages consist of long strips, varying in length and width according to the part to which they are to be applied, thus :—

For the head and upper limbs, 2½ inches wide, and from 3 yards to 6 yards long.

For the fingers, ¾ inch wide, and 1 yard long.

For the trunk and lower limbs, 3 or more inches wide, and 6 to 8 or more yards long.

They are tightly rolled on themselves in a compact cylindrical form ready for use.

Practical instruction in rolling bandages.

59. The class will first be instructed in the proper methods of rolling a bandage, single-headed, and double-headed, and, at the conclusion of exercises given in accordance with paragraphs 60 to 66, the bandages will invariably be inspected, to see that each man hands his in properly rolled.

Application of a roller bandage.

60. To apply the bandage the operator stands opposite the patient. The limb is placed in the position it is to occupy when bandaged, and care must be taken that the bandage is not put on so tightly as to cause discomfort or swelling of the limb below : a bandage thus too tightly applied may produce gangrene of the limb, by cutting off its blood supply. If, on squeezing the tips of the fingers or toes of the bandaged limb, it is observed that the colour returns much more slowly than when this is done on the unbandaged limb, it may be assumed that the bandage is too tight. The roller is taken in the right hand when bandaging the left limbs and in the left hand when bandaging the right. The outer surface of the bandage is applied to the inner side of the wrist or ankle, and two turns taken straight round the limb from its inner to its outer side by the front.

Simple spirals.

From this point the bandage may be taken up the limb in *simple spirals*, that is, evenly put on turns of the bandage, each overlapping for one-third the width of the bandage, from below up, taking care to have the lower edges of the turns of bandage parallel with each other.

Reverse spirals.

When the swell of the limb is reached, the edges can no longer be maintained parallel, the bandage will not lie evenly, and gaps occur between the turns if the simple spiral is used. It therefore becomes necessary to use the *reverse*. To make the reverse, the thumb of the disengaged hand is placed on the lower border of the bandage on the outer side of the limb, the bandage is slackened and turned over, reversed, downwards, and passed round the limb to the opposite side, its lower edge parallel with that of the turn below. On reaching the outer side the reverse is again made, and

so on up to the joint. The angles formed by the successive reverses must be kept in a straight line.

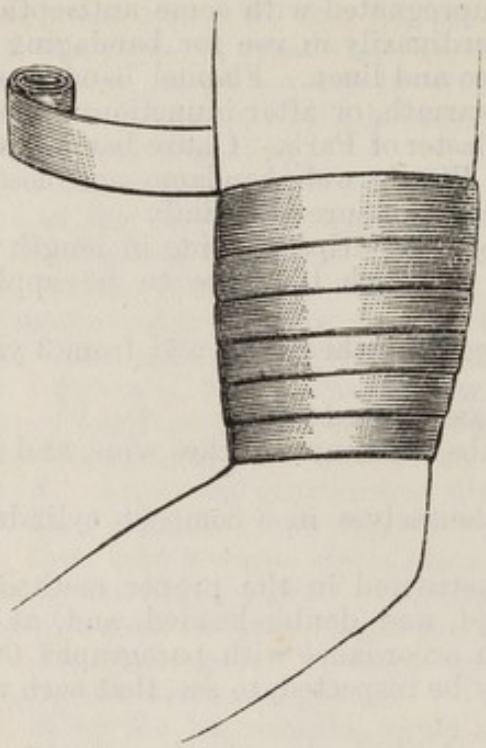


Fig. 17.—Simple Spiral.

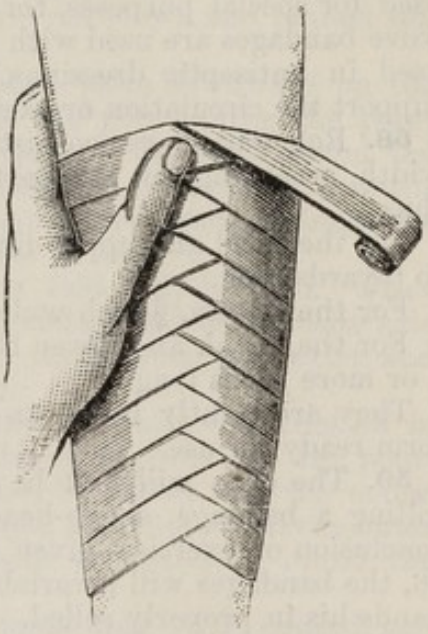


Fig. 17a.—Reverse Spiral.

Figure of eight.

On reaching the joint, neither the spiral nor reverse will lie evenly, so that the *figure of eight* has to be resorted to. This, as its name implies, is applied by passing the roller obliquely round, alternately upwards and downwards, thus making a figure of 8, each figure overlapping the one below by one-third the width of the bandage. The crossings of the figures should be kept in the same line as the reverses below.

Removal of bandage.

To remove a bandage it should be unrolled from the top and the slack gathered into a ball and passed from hand to hand round the limb.

To bandage a finger.

61. Take two turns round the wrist, carry the bandage across the back of the hand to the root of the injured finger, up the finger by an open spiral to the top, whence it is brought by an evenly-laid close spiral to the root; then across the back of the hand to the opposite side of the wrist which it started from, round the wrist once or twice, and pinned off.

To bandage the hand or foot.

62. Two turns are taken round the wrist or ankle, the bandage carried across the back of the hand or foot to the opposite side, passed across the palm or sole, and brought back to the opposite side of the wrist or ankle, over the back of the hand or foot, thus forming a figure of eight, which may be repeated as often as required.

To bandage the chest.

63. A roller 6 inches wide and from 6 to 8 yards long is used. It is applied from below upwards in a simple spiral, each spiral overlapping the one below for one-half its breadth. On completing the last spiral the bandage is pinned off behind, leaving about a

yard and a half free ; this end is brought over one shoulder as a brace, carried obliquely down over the bandage in front to the lowest turn, to which as well as to the upper turns it is fastened, thus preventing the bandage from slipping down.

To bandage the abdomen.

64. A bandage to the abdomen is similarly applied to that for the chest, except that it is put on from above downwards, and that it is kept in position by the free end being carried from behind forward between the thighs and fastened in front.

To bandage the head.

65. To keep a dressing on an ordinary wound of the head a few circular turns of a bandage are sufficient. To exert pressure on a graduated compress applied over a bleeding wound (*see* para. 162) the *knotted bandage* is used. This is made with a single-headed bandage. The bandage should be unrolled for about a foot, and the end held in the left hand which is kept close to the temple ; the roller is then carried round the forehead and occiput, so that it comes back to the unrolled end at the wound. At this point the roller is twisted round sharply and then carried down below the chin and round over the vertex. On coming to the temple again the same twist is made, and the roller is once more passed round horizontally ; where sufficient pressure is obtained the bandage is fixed by knotting the two ends together.

The knotted bandage.

To bandage the groin, shoulder, or thumb.

66. A roller bandage may be applied to the groin, shoulder, or thumb in the following manner, which is known as the spica bandage :

The spica bandage.

It is made by applying the bandage in a series of figure of eight turns, overlapping from below up. Take two turns of a single

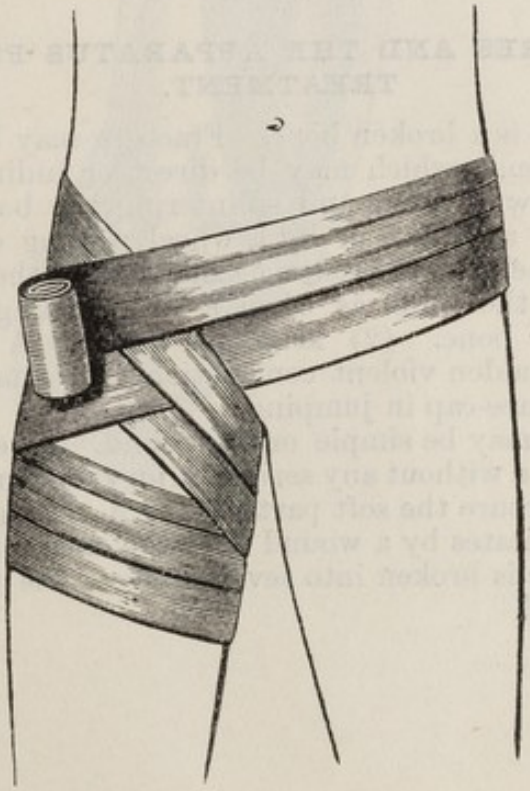


Fig. 18.—Spica Bandage.

headed roller round the thigh, as a point of attachment, from within outwards, carry the bandage upwards over the groin above the hip, and round the back to the opposite hip, then across in front of the abdomen, passing round the outer side of the thigh and upwards between the thighs to complete the figure of eight. The turns are to be repeated as often as necessary.

Special Bandages.

The T bandage.

67. The T bandage is specially prepared by taking a piece of bandage 3 inches wide and 1½ yards long and sewing it to another similar strip 1 yard long, so as to form a T. It is applied by passing the long strip round the hips so that the attached piece is at the sacrum ; pin off in front. Bring up the short piece between the thighs and fasten to the first piece in front. It is used to keep a dressing on the perinæum.

The four-tailed bandage.

68. To prepare the four-tailed bandage, take a yard and a half of 3-inch roller bandage, make a slit in its centre about 3 inches long, and then slit up the ends, so as to leave 6 inches in the centre.

In applying it, place the central slit on the point of the chin, tie the two upper tails behind the neck, and the two lower tails on the top of the head ; the ends of the upper and lower tails should then be tied together behind the head to prevent the bandage from slipping forward.

It is used for fracture of the lower jaw or to retain a dressing on the chin.

4. FRACTURES AND THE APPARATUS FOR THEIR TREATMENT.

Definition and causes of fracture.

69. A fracture is a broken bone. Fracture may be produced by (1) external violence, which may be direct or indirect ; direct, as from a heavy blow crushing and splintering the bone at the seat of injury, as by a bullet, or by a wheel passing over the part ; indirect, when the bone is broken or snapped by the weight of the body falling on the limb, as when a man, falling on his hand, breaks his collar bone. (2) Muscular action. A bone may be broken by the sudden violent contraction of a muscle, as seen in fracture of the knee-cap in jumping.

Simple fracture.

Compound fracture.

70. Fractures may be simple or compound. In simple fracture the bone is broken without any serious injury to surrounding parts. In compound fracture the soft parts are torn through, so that the fracture communicates by a wound with the open air.

Comminuted fracture.

When the bone is broken into several pieces the fracture is said to be comminuted.

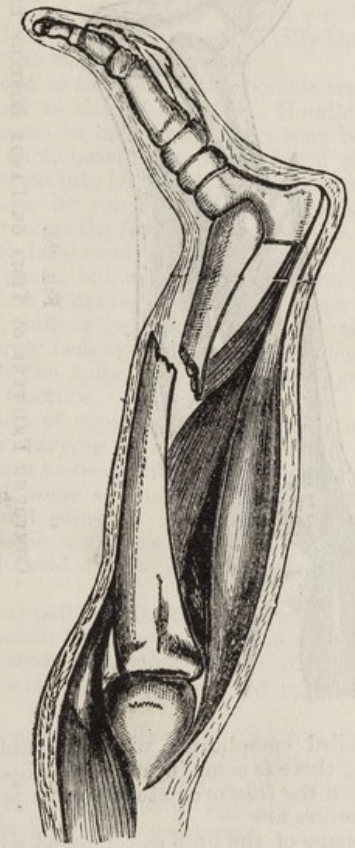


Fig. 13.
Simple Fracture of Tibia or Large Bone of Leg.

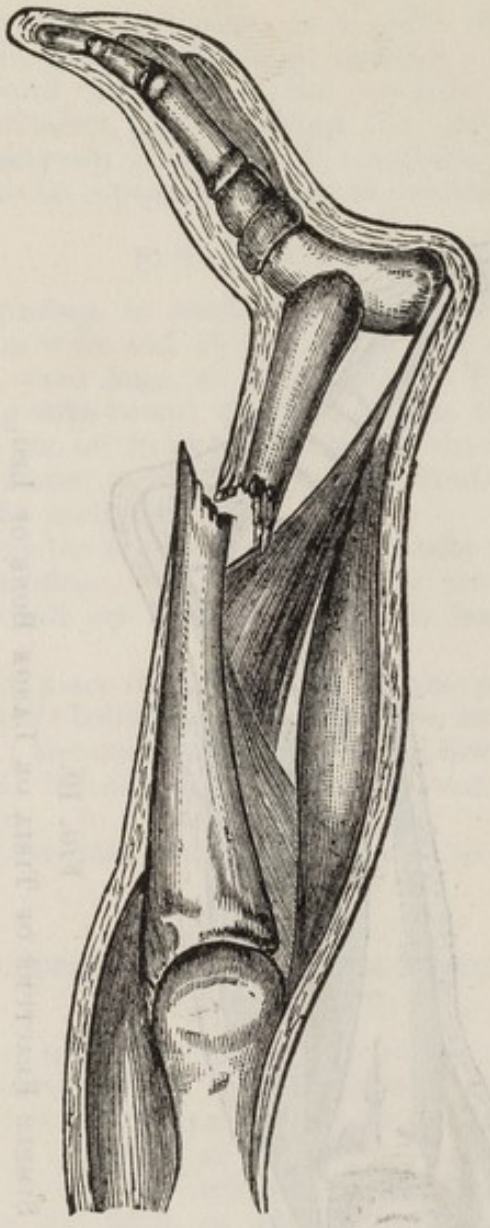


Fig. 20.
Compound Fracture of Tibia or Large Bone of Leg.

Complicated fracture.

The fracture is called complicated when, in addition to the breaking of the bone, there is some injury to an important organ, or blood vessel, or when the fracture extends into a joint.

Signs of fracture.

71. The signs of fracture are :—

(1) Change in the shape of the limb as compared with the sound limb, the result of the altered position of the broken ends of the bone. This altered position of the fragments is caused either by the force of the blow, as in depressed fractures of the skull, or by muscular action, as shown in fig. 20.

(2) Unnatural mobility, that is, motion similar to that of a joint where none should be possible.

(3) A peculiar grating sensation, called *crepitus*, which is felt by the hands grasping the bone when the ends of the fragments are moved upon each other ; but no attempt will, on any account, be made to produce this except by a medical officer.

(4) Loss of power. As a rule the patient is unable to use the broken limb.

(5) Pain at the seat of injury. It must be remembered that the two last-named symptoms, viz., loss of power and pain may also be present in those cases where only a sprain or bruise has been sustained.

Mode of repair.

72. The joining or *union* of a fractured bone is produced by a soft substance called callus being thrown out between and around the broken ends, which substance eventually hardens into new bone, thus soldering the fragments together.

Immediate measures to prevent further injury.

73. If in doubt as to whether the bone is really broken, the case must be treated as one of fracture. Handle the limb with the greatest gentleness, in order that there may be no risk of further injury to the part, bearing in mind that a simple fracture may easily be converted into the much more serious compound, or complicated fracture, by rough handling. Apply splints round the limbs so as to render the fragments immovable.

In doing this there need be no effort made accurately to replace the fractured parts, but merely in a general way, to reduce the deformity by first fastening the lower bandage round the carefully applied splints, pulling gently and slowly in the line of the limb, and then securely fastening the upper bandage. To support the limb effectually the splint should extend beyond the joints above and below the fracture.

Splints.

Splints consist of supports made of some unyielding material, wood generally, varying in length, width and shape with the part to which they are to be applied. Before being applied they should be padded with some soft material to protect the limb from the hard surface and edges of the splint. They are bound to the limb by bandages or tapes, so that when fixed the limb is protected and held firmly in its proper position. (Refer to para. 87.)

Moving a patient suffering from fracture.

In moving a patient all disturbance of the limb should be prevented as much as possible. In the upper extremity the arm may be supported in a sling and tied to the side. In the lower extremity the limbs may be tied together at the knees and ankles.

Subsequent treatment.

74. The subsequent treatment of fractures, that is, the setting of the bones and final application of the splints is carried out by the officers ; but it is necessary that the men should be familiar with the apparatus in general use in military hospitals, in order that they may render intelligent assistance.

Apparatus required for various fractures.

75. The apparatus contained in the boxes described in paras. 156 and 157 will be shown and explained by the instructor. The following eleven paragraphs describe the apparatus required for the treatment of various fractures.

Fracture of lower jaw.

76. The apparatus required for making a gutta-percha splint, viz. : A sheet of gutta-percha, lint, a knife, cold water, boiling water in a wide basin, and a four-tailed bandage.

Fracture of ribs.

77. Adhesive plaster, scissors, a can of hot water, and a roller bandage (8 yards × 6 inches).

Fracture of collar-bone.

78. An axillary wedge-shaped pad (6 × 4 × 2 inches) with two tapes attached (2 feet long), and two 8-yard bandages.

Fracture of arm.

79. Either four wire splints, four of Duncan's ratan cane splints, or the jointed elbow-splint, together with suitable pads, roller bandages for fingers, fore-arm, and arm, and an arm-sling.

Fracture of fore-arm.

80. A pair of fore-arm splints (wire), or a pair of cane splints, with suitable pads, roller bandage, and arm-sling.

Fracture of radius.

81. A radius or pistol splint (wire) and pad, roller bandage, and arm-sling.

Fracture of thigh.

82. The jointed wooden thigh splint, and pad. Three short cane, or wire splints and straps; cotton wool; a perineal bandage (made by folding a triangular bandage narrow, padding it along the centre with cotton wool, and covering it with oiled silk), roller bandages and a wire cradle.

Fracture of leg.

83. Either McIntyre's double-inclined plane (fig. 21), with pads, straps, roller bandages and cradle, or a pair of japanned or wire leg splints, with suitable pads, straps, roller bandages, and Salter's sling and cradle.

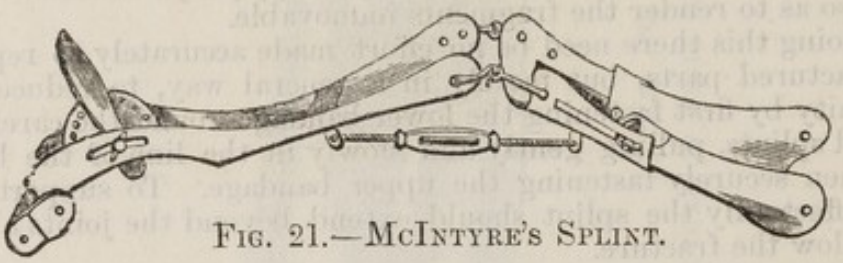


Fig. 21.—McIntyre's Splint.

Fracture of fibula.

84. Either Dupuytren's splint and wedge-shaped pad (2 inches at thick end), or Pott's wood or wire splint and pad, and a roller bandage 4 yards × 3 inches.

Plaster of Paris splint.

85. For a plaster of Paris splint there are required, one or two pounds of fresh plaster of Paris, which after the tin has been opened should be put on the hob for twenty minutes; one or two flannel bandages; three or four loose-wove or muslin bandages; two clean basins, one for the dry plaster, and the other for cold water; a newspaper is spread under the limb to protect the bedding. Method of applying:—The muslin bandages are soaked in water; the flannel bandage is wrapped round the limb, this is then covered by one layer of the wet muslin bandage; a handful of dry plaster is taken, dipped into the cold water, and smeared on; another muslin bandage is applied, and covered with more plaster. The limb is kept carefully in position till the plaster sets.

Starch bandage splint.

86. A supply of starch, or dextrine, roller bandages, cotton-wool, pasteboard in sheets, boiling water, Seutin's scissors, and a wooden splint.

Improvised splints.

87. On the battlefield, or in cases of emergency, specially-made splints may not be at hand, and it therefore becomes necessary to contrive an apparatus which shall take their place. Such splints are called improvised splints.

How made.

They may be made of any firm unyielding substance which may be at hand, such as sticks, telegraph wire, bark of trees, stiff paper folded, bundles of twigs, rushes, or straw, portion of a soldier's equipment such as rifles, bayonets, swords, lances, &c.

How applied.

They may be padded with grass, straw, heather, leaves, or articles of clothing, and the straps of the soldier's equipment or

strips torn from shirts may be utilised as bandages or slings. The triangular bandage is used to secure improvised splints, in the manner described in paragraph 56.

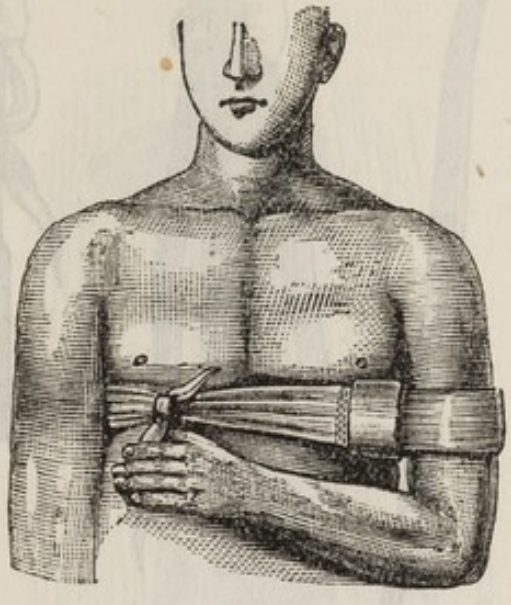


FIG. 22.—BANDAGES FOR FRACTURED CLAVICLE.

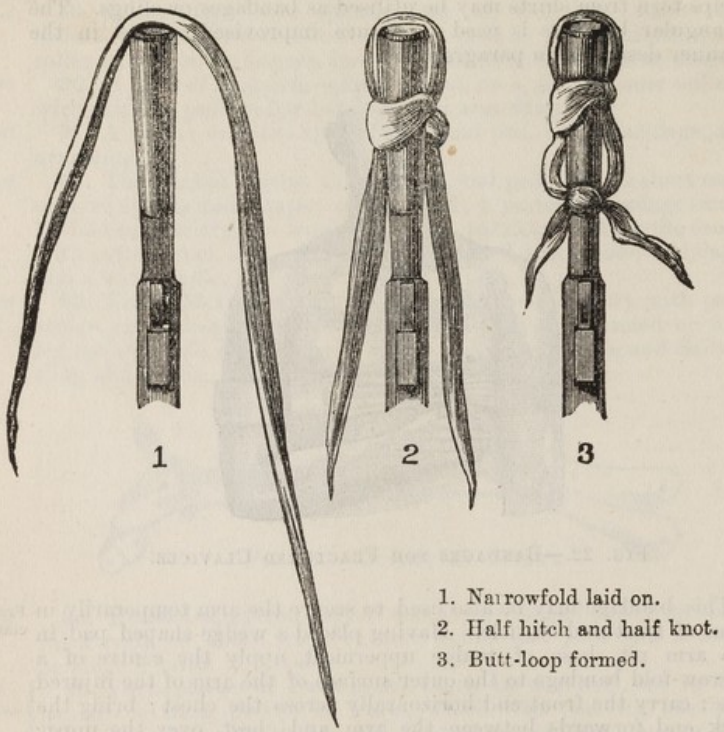
Fractured clavicle.

This bandage may be also used to secure the arm temporarily in cases of fractured clavicle. Having placed a wedge-shaped pad in the arm pit, base of wedge uppermost, apply the centre of a narrow-fold bandage to the outer surface of the arm of the injured side ; carry the front end horizontally across the chest ; bring the back end forwards between the arm and chest, over the upper margin of front part of bandage, then up through the loop formed ; carry backwards round chest, exercising steady traction, so as to draw the arm backwards ; then secure the two ends on the opposite side of the chest. The arm-sling depicted in Fig. 15 can then be applied.

To use a rifle splint for a fractured thigh.

88. The following are the rules for the application of a rifle splint (Figs. 23 and 24). See that the rifle or magazine contains no cartridges. If the splint be for the right side, remove the bolt.

Take a narrow-fold bandage, place it over the heel plate of butt in such a way that two-thirds of its length are on what will be the outer side, and one-third on the other side of the butt : take a half hitch with the long end round the butt, making a half knot on outer side. Tie the ends with a reef knot so as to form a loop, the knot of which must come below the stock and be on a level with the projecting part. This is for the perineal bandage to pass through, and is called the butt-loop. Leave the magazine in position : place the rifle along the injured limb, butt towards the armpit, trigger guard to the front. Take a narrow-fold bandage, placed its centre over the ankle of the injured limb, pass the ends behind, enclosing muzzle of rifle, cross behind. With the outer end take a turn round the muzzle in front of the sight or D for sling, bring both ends up, cross over instep and tie off on the



1. Narrowfold laid on.
2. Half hitch and half knot.
3. Butt-loop formed.

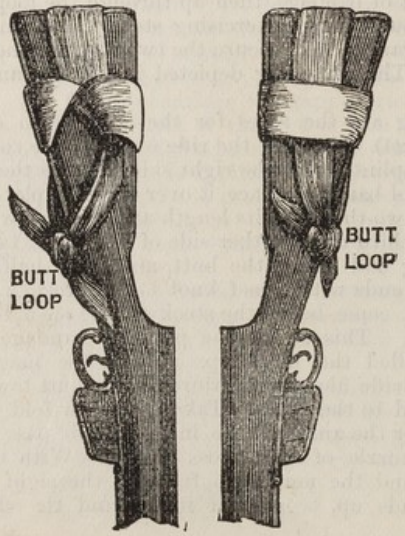


FIG. 23.—FORMATION OF BUTT LOOP.

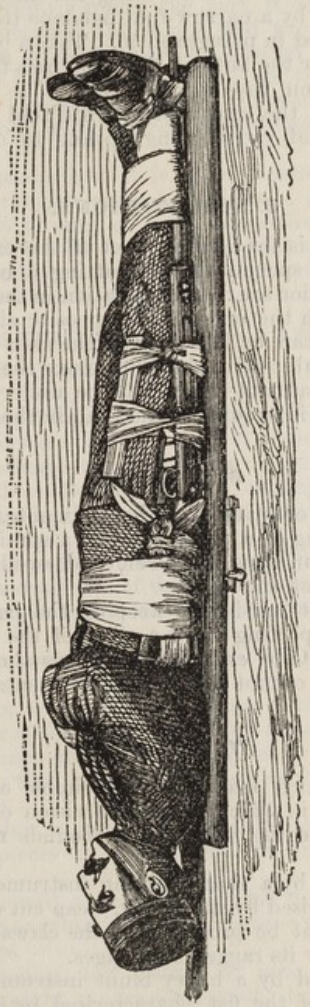


Fig. 24.—Rifle Splint Applied.

inside of the foot. Take a narrow-fold, place its centre on the perinæum, bring one end out behind, the other in front of the limb; pass one end through the butt-loop and tie, gradually tightening the knot as the limb is gently drawn to its proper length. Pass both ends round small of butt and tie off. Take two long splints, place one on the top and the other along the inner side of the thigh and fix at each end by a narrow-fold bandage tied over the rifle in the manner described in paragraph 56. Take a broad-fold bandage, place the centre over the butt of the rifle, pass the ends round the body, and tie off on the opposite side. Tie the patient's legs together by placing the centre of a broad fold over both ankles, pass the ends behind, cross, bring up and tie off on top between the legs.

5. DISLOCATIONS.

Definition and signs of a dislocation.

89. A dislocation is the displacement of the end of a bone at a joint. It is often spoken of as "putting a bone out of joint." The signs of dislocation are :—(1) alteration in the shape of the joint when compared with the one on the opposite side ; (2) the end of the displaced bone can be felt through the skin ; (3) alteration in the length of the limb ; (4) inability to move the joint.

Immediate treatment.

90. The only treatment that is to be undertaken before the arrival of the officer is to support the limb in the position easiest to the patient.

6. SPRAINS.

Definition and signs of a sprain.

91. The straining or tearing of the ligaments, from the sudden twisting or wrenching of a joint, is called a sprain. The signs of a sprain are pain, heat, loss of power, and swelling in the joint immediately following the injury.

Immediate treatment.

92. The treatment consists in keeping the part at rest ; if the upper limb, by supporting it in a sling, if the lower, by putting the patient to bed. Cold evaporating lotions should be applied to the part, or, if these cannot be borne, hot fomentations.

7. WOUNDS.

Definition of wound.

93. A wound, which may either be simple or poisoned, is an injury of the body in which there is division of the skin, and is characterised by bleeding and pain. Wounds may be classed as follows :—

Incised wounds.

Incised, produced by a sharp cutting instrument as a razor or sword, and characterised by its gaping, clean cut edges.

Lacerated wounds.

Lacerated, as might be produced by the claws of a cat or sharp nail, characterised by its ragged torn edges.

Contused wounds.

Contused, produced by a heavy blunt instrument as a hammer or stick, or a blow of the fist, characterised by its bruised edges. The wound produced by a bullet is generally classed as a contused wound.

Punctured wounds.

Punctured, produced by a narrow, sharp-pointed instrument such as a bayonet or prong of a pitchfork, characterised by its greater depth as compared with its outer opening.

94. The treatment of a simple wound consists in arresting the hæmorrhage, cleansing the part and applying the dressing. Immediate treatment.

95. A poisoned wound is one into which some poison has been introduced. It may be of any of the above varieties and is treated constitutionally as well as locally. Poisoned wounds.

96. Firstly, to prevent the poison spreading beyond the wound, by tying a string tightly round the part, if possible, immediately above the wound, between the wound and the heart; secondly, to remove the poison from the part by suction, if possible by the patient himself, or by burning or cutting out the flesh immediately around the wound. In less severe cases, as the stings of small insects, the treatment is to allay irritation by applying aromatic spirits of ammonia. Local treatment.

97. In cases of snake bite it is often necessary that stimulants, such as brandy, ether, or aromatic spirits of ammonia, should be administered freely at once, or artificial respiration resorted to (*see* paragraph 174). For other cases of poisoned wounds, such as post mortem wounds, and bites from rabid animals, special constitutional treatment is undertaken by the officer. Constitutional treatment

8. DRESSINGS AND THEIR APPLICATION.

98. Dressings are local applications used in the treatment of wounds and sores. Materials used.

The following are the materials usually required for dressings :— lint ; adhesive and soap plaster ; hot water can ; oiled silk ; gutta-percha tissue ; drainage tubes ; jaconet ; medicated gauze ; cotton wool (simple and medicated) ; tow ; bandages ; dressing case ; dressing trays, basin, irrigator, some antiseptic solution and waterproof sheet.

The Instructor should show and thoroughly familiarise the class with the appearance and use of these materials.

99. When about to apply dressings, the following rules will be observed :— Rules to be followed in applying dressings.

(1) The dresser will be careful that his hands and nails are perfectly clean (*see* paragraph 107).

(2) Never begin to change a dressing until everything that is likely to be required for the new dressing is ready close at hand.

(3) Never attempt to remove by force a dressing which has become adherent ; this must first be loosened by bathing with tepid antiseptic solution.

(4) Never employ a sponge for washing a wound or sore, but use fresh clean pieces of cotton wool or lint, and subsequently destroy them.

(5) The dresser will avoid touching his eyes, nose, or any sore with his hands or anything which has been contaminated by contact with the discharge.

(6) Before dressing any wound or sore, or assisting at an operation which might produce infection, it is advisable to protect any cuts or scratches on the hands by covering them with a couple of layers of gauze, and painting this over with collodium, so as to make an impervious coating.

100. The different parts of the old dressing will, one by one, be very gently and carefully removed, those that are adherent being Mode of changing dressing.

first softened and loosened by the aid of tepid antiseptic solution. If a roller bandage has been used, it will be unpinned and wound off the limb, the slack being gathered up and passed from one hand to the other. After the dressings have been removed, the parts will be washed with a gentle stream of tepid water to which some antiseptic has been added. When removing strips of plaster immediately overlying the wound, one end should first be raised as far as the wound, and then the other, so as to avoid tearing it open. If so directed olive oil or turpentine may be used to remove the marks of old plaster. If the patient be confined to bed, measures will first be taken to protect the bed-clothes from damp by covering them over with a waterproof sheet, and by arranging an empty vessel under the wound or ulcer so as to catch the waste solution. A vessel containing tepid antiseptic solution—a basin or irrigator as the case may be—is next held on a higher level than the patient, and the parts bathed with a piece of fresh cotton wool, or flushed by a stream from the irrigator to the requisite extent. This having been accomplished, the surrounding parts will be thoroughly dried with a piece of cotton wool, the new dressing applied, and the old dressings at once burned. (*See* paragraph 199.)

Wet dressing.

101. Wet dressing is used for the purpose of keeping warmth and moisture continuously applied to a part. It consists of a double fold of lint saturated with medicated lotion, or antiseptic solution, with the excess of fluid squeezed out. This is applied to the part and covered with waterproof material, such as oiled silk or gutta-percha tissue, to prevent evaporation. The lint should be cut according to the size of the wound or ulcer, and the waterproof material so as to be a little larger in every direction than the lint, as, if the lint project beyond the edge of the waterproof covering, the moisture will escape and the lint become dry and adherent. Wet dressing should usually be renewed at least twice in the twenty-four hours, or oftener if there be much discharge.

Evaporating dressing.

102. As evaporation causes reduction of temperature, this form of dressing is used to keep cold continuously applied to a part. It consists of a single layer of lint, saturated with water, or evaporating lotion, placed over the part, which should be freely exposed to the atmosphere to favour evaporation.

The lint should be kept constantly wet. This may be effected either by re-dipping the lint in the water or lotion from time to time as it begins to dry, or, by keeping it moistened by irrigation, that is, by conducting a trickling stream over it. The simplest

Irrigation.

plan of irrigation is by placing a basin or bottle containing water near, but on a higher level than the patient's bed ; from this a skein of worsted, one end in the water and the other laid on the piece of wet lint covering the part to be irrigated, conducts the water to it in a trickling stream, and in this manner keeps it constantly wet. A waterproof sheet must be spread over the bed-clothes to protect them from damp, and so arranged that the excess of water may be conducted along a channel into an empty vessel placed by the side of the bed to receive it.

Ointment dressing.

103. Ointment dressing consists of lint upon the dressed side of which a thin layer of ointment has been spread by means of a

spatula ; the edges of the lint having been trimmed to the required shape, it is applied to the part, maintained in position by cross strips of adhesive plaster, and, if necessary, by a few turns of a bandage. As a rule it is not renewed oftener than once a day.

Universal presence of germs.

104. The main cause of the irritation of wounds is due to the presence of exceedingly minute living bodies or germs, which exist in the air, in earth, in water, on the surface of the skin and of all articles of clothing, furniture, instruments, and materials, which have not been specially protected, and these germs may thus readily find their way into wounds unless every precaution be taken to prevent them doing so. The object of the antiseptic treatment is to destroy those bodies, or prevent their entrance into a wound, and its success depends upon the completeness with which not only those inhabiting the air in the vicinity of the patient, but also those which have deposited themselves on the dresser's hands, the dressings, and in point of fact everything which may be brought in contact with the wound, and which may give rise to the infection of the wound, are destroyed. This it is endeavoured to accomplish by the use of chemical substances called antiseptics, the chief of which are corrosive sublimate, carbolic, boracic, and salicylic acids.

Antiseptic dressing.

105. Antiseptic dressings require to be changed or added to when the least trace of discharge reaches the surface ; these dressings may take the form of a simple dry dressing, which consists of adhesive plaster and dry lint, or absorbent or medicated cotton wool, and is thus applied :—Narrow strips of plaster are cut in the length of the web and warmed by holding the non-adhesive side against a hot water can, and with these the edges of the wound are brought together ; it is now, however, more customary to approximate the lips of wounds by means of sutures or stitches instead of by plaster, as it is difficult to keep the latter free from septic influences. Over these is then placed a pad of antiseptic cotton wool, kept in position by a few turns of bandage or else a couple of folds of dry lint, retained by strips of plaster. Dry dressing is generally allowed to remain on for several days before it is removed. This simple form of dressing is the one usually adopted for small and unimportant wounds. In the case of more severe wounds, the result either of injury or of a surgical operation, more elaborate dressings may be required. These may consist of antiseptic gauze, impregnated either with iodoform, carbolic acid, salicylic acid, or cyanide salts ; cotton wool, containing one of the above agents : various antiseptic solutions ; some impervious material, as mentioned in paragraph 98 ; antiseptic bandages, &c., &c. It is necessary to bear in mind that the several medicated wools are tinted with different colours in order to distinguish one from the other ; thus, that containing perchloride of mercury (salalembroth) is coloured blue, boracic preparations are coloured pink, cyanide ones are lilac, and so forth. The greatest care must at all times be observed to keep these materials protected from the air, from being handled, or from any other chance of contamination.

106. All instruments used must first be boiled in water containing 1 per cent. of carbonate of sodium. The water itself must be previously boiled for some time. The instruments will then be

placed in carbolic solution (1 in 40) until actually required. They must on no account be placed in perchloride of mercury solution, as they would be corroded by it.

Antiseptic precautions.

107. It must always be borne in mind that the object of surgery is to prevent germs from gaining access to wounds. The danger of their doing so has been noticed in paragraph 104. Over and above the use of antiseptic dressing and solutions, it is moreover necessary that absolute surgical cleanliness be observed by all persons having anything to do with operations or the dressing of wounds. To ensure this cleanliness the following personal precautions must be taken as regards

(*a*) the patient,
(*b*) the operator and his assistants.

(*a*) The skin in the vicinity of the intended operation must be well scrubbed with hot soap and water, and then carefully dried with a sterilized towel or other surgically clean material ; it is then washed with alcohol or ether, and covered up with a compress wetted with a solution of carbolic acid, perchloride of mercury, or other antiseptic. All hairs must be removed by careful shaving, before the skin is thus treated.

(*b*) Clean (sterilized) aprons must be worn. The arms are to be bared to the elbow, the nails cut short, the skin of the hands and forearms is to be prepared as in the case of the patient, except that instead of using the compress, it will be finally washed in 1 in 1,000 perchloride solution.

The nails must be carefully scrubbed with a brush which should have been previously boiled, and kept in a solution of perchloride (1 in 2,000).

These precautions having been taken, care must be observed that nothing which can again contaminate the skin be touched or brought into contact with it.

First field dressing.

108. A Field Dressing forms a component part of every British soldier's kit on active service, so as to be available, at all times and in all places, as a first dressing for wounds.

When a soldier goes on active service the first field dressing will be placed in the pocket on the right side of the skirt of his frock (*see* Clothing Regulations), and thus the quantity of material required to be carried as medical stores is greatly reduced.

The field dressing now in use is an adaptation of that used in the French service, and consists of :—

Outer cover (sewn cloth).

Two safety pins.

Inside cover (thin waterproof, cemented, air tight).

Thin waterproof (mackintosh) folded over dressings (size 12 inches by 6 inches, to be torn in half if required).

Gauze bandage 4½ yards long, folded flat into 2½ inches by 4 inches.

Piece of gauze, 17 inches by 13 inches, weight not less than 3 pennyweights, folded to suit the size of the package.

Compress of compressed charpie to be of flax between layers of gauze (like Gamgee's dressing), capable of being teased out into a thick pad.

Minimum weight of charpie, 155 grains ; maximum weight, 165 grains. The antiseptic agent used is corrosive sublimate, 1 in 1,000.

Field dressing an article of soldiers' clothing.

Directions for use are printed upon both the outside and inside cover. A sealed pattern of this dressing is deposited in the Pattern Room of the Royal Army Clothing Department.

It is issued by that department as an article of clothing.

Strapping.

109. Strapping is a form of dressing, simple or medicated, which is applied to a part with a view to exerting pressure on it. Strips of plaster, adhesive, soap, or medicated, are employed for strapping. They should be cut in the length of the web or plaster, to measure 1½ inches in width, and at least 6 inches longer than the circumference of the limb at the site of application. The strips should be applied from below upwards, and each strip made to overlap the one preceding it to the extent of one-third of its width. A roller bandage is then applied over all.

Strapping a testicle.

110. To strap a testicle :—Leather should generally be used for this purpose. The part having been shaved, draw down the gland with one hand and then encircle the upper portion of that side with a strip of strapping so as to isolate the testicle below it : strips of strapping are now passed from the encircling strip above, down, round, underneath, and up to the circular strip again on the opposite surface ; each successive strip partially overlapping the preceding one, until the whole gland is evenly enveloped. Lastly another circular strip can be passed round above, so as to include and hold down the ends of the vertical strips.

9. MEDICINES AND EXTERNAL REMEDIES.

Administration of medicines.

111. Medicines, dispensed at the surgery, are labelled with :—

The name of the patient for whose use the medicine is intended ; the number of the ward in which he is.

The amount to be taken, the directions for use, and the date of prescription.

Poisons and medicines intended for external use have special labels (see Standing Orders 223).

Those entrusted with the administration of a medicine should bear in mind that it is criminal to give a dose to a patient without first carefully reading the label. If this be not done an overdose may be given, or poisonous drugs intended for external use may be given internally, often leading to the death of the patient, and the consequent punishment of the attendant.

As a general rule a bottle of medicine should be shaken before pouring out its contents. The label side should be uppermost when a dose is being poured out, in order that the label may not be soiled or destroyed. The bottle should not be left uncorked longer than is absolutely necessary, as if the active principle be volatile it is thus lost ; for the same reason the dose should be swallowed as soon as possible after it is poured out.

Patients should not be roused from sleep for the purpose of taking medicine, except when the officer has expressly so ordered.

112. Unless orders are given to the contrary, medicines will be administered at the times given in the following table :—

	2 a.m.	6 a.m.	10 a.m.	2 p.m.	6 p.m.	10 p.m.
"At bed time"	—	—	—	—	—	1
"Morning and evening," or "Twice daily"	—	—	1	—	1	—
"Three times a day"....	—	—	1	1	1	—
"Four times a day"....	—	—	1	1	1	1
"Every four hours"....	1	1	1	1	1	1

No small display of tact on the part of the attendant will sometimes be necessary in order to induce refractory patients to consent to swallow their medicine ; on these occasions the attendant will not fail to remember that gentleness as well as firmness are required of him, and on no account must he treat the patient roughly.

Various forms of medicines.

The following are the usual forms in which medicines are prescribed :—

Mixture.

113. A mixture is a medicine in liquid form, administered internally by the mouth, made up in several doses, varying from drops to wine-glassfuls. The exact dose should be measured in a graduated glass measure, and only when the use of such a glass is not available should medicine be measured in a spoon or wine-glass. The subjoined table will assist in the use of these measures :—

Fluid measures.

1 drop	.... = 1 minim	.... = ℿ j
60 minims	.... = 1 drachm	= ʒ j
8 drachms	.... = 1 fluid ounce	= ℥ j
20 fluid ounces	.... = 1 pint	.... = O j

A tea spoon is generally calculated to hold about 1 drachm, a dessert spoon about 2 drachms, a table spoon 4 drachms, and a wine glass 2 ounces ; but the table spoons used in military hospitals hold about 8 drachms or 1 ounce, and must, if used, be taken at their actual capacity.

Draught.

114. A draught is medicine in liquid form, made up as a single dose—that is, the whole to be taken at once. Draughts vary in quantity from one to two or more ounces. Draughts of castor oil are usually administered floating on peppermint water or warm milk.

Pill.

115. A pill is medicine in solid form, made up in a small round mass and intended to be swallowed whole. Pills are best administered by placing them, one at a time, on the patient's tongue and then giving him a mouthful of water to swallow, which generally carries the pill down along with it ; when any further difficulty arises the pill may be enclosed in a crumb of bread, and then washed down with a mouthful of water. Care should be taken that the lids of pill boxes, upon which the directions are written, do not get transferred from one box to another.

Tabloid.

116. A tabloid is medicine in a solid form, compressed into small discs, which as a rule should be broken up and taken in the same manner as a powder.

Powder.

117. Medicine in solid form, made up loosely in a paper packet.

When small, the contents of the paper are to be placed on the back of the tongue and washed down with water; when larger, the powder should be mixed with water in a mug or tumbler, stirred up with a spoon, and given without delay to the patient to drink, care being taken that none remains in the glass.

Seidlitz powder.

118. A seidlitz powder consists of two parts, a large and a small powder; the contents of the large package are to be placed in a large tumbler with 6 ounces of water and stirred; the contents of the smaller, dissolved in 4 ounces of water in another tumbler, are then to be added, and the whole again stirred and drunk off while effervescing.

Electuary.

119. A medicine in semi-solid form, made up with molasses or honey, and dispensed in a mug or pot.

Emetic.

120. An emetic is medicine in liquid form, given by the mouth, followed by the administration of large draughts of tepid water. Its object is to produce vomiting. A tablespoonful of mustard or salt mixed with a tumblerful of warm water, is a safe and easily-obtained emetic. An emetic having been ordered for a patient, the attendant should satisfy himself that it has acted; if it fails to do so in 20 minutes the wardmaster should be informed. Tickling the throat with a feather may be tried in order to stimulate the act to vomit.

Gargle.

121. A gargle is medicine in fluid form used as a wash for the mouth and throat. A tablespoonful is to be taken into the mouth, the head then thrown slightly back, and the fluid set in motion by breathing through it, at the same time taking care not to swallow any; this is to be repeated at least twice on each occasion.

Inhalation.

122. An inhalation is a medicine in the form of vapour which is drawn in with the breath—inhaled. The medicine to be inhaled is put into a vessel called an inhaler, which is then filled up with one part of cold water and two parts of boiling water. The patient inhales the vapour arising from the vessel through the tube placed at the top.

Enema or injection for bowels.

123. An enema is medicine or nourishment in a fluid state, which is thrown up into the rectum or lower bowel, through the anus, by means of a syringe. Enemata vary in quantity from one to twenty, or more ounces, according to the purpose for which the enema is intended; nourishing enemata (beef tea, brandy, &c.) and those prescribed to allay pain, are usually small in amount, while on the other hand those intended to clear out the contents of the bowel are large. The syringe will invariably be tested before it is used, to see that it is in working order, and the enema heated to a temperature of 98° Fahr.

Administration of an enema.

To give an enema:—The foot of the bed on which the patient lies should be raised about 18 inches and the patient placed on his left side, his hips brought to the edge of the bed, and a waterproof sheet placed beneath him. The pipe of the apparatus, having been well oiled, will be carefully passed up the anus, first upwards then somewhat backwards, for a distance of two inches, and the fluid injected slowly into the bowel. The patient must be directed to resist the inclination to strain which follows, and he may be aided by keeping a folded towel pressed against the anus. The patient should not be uncovered more than is absolutely necessary, and

a screen will be put round the bed. When an aperient enema is given a night-stool should be placed conveniently in readiness. Sometimes small quantities (one or two drachms) of glycerine are used as an aperient enema ; this is administered either from a glass or special-pattern syringe.

Suppository. **124.** A suppository is medicine mixed up with cacao butter, of a conical form, which is introduced into the lower bowel by the anus. The patient should be in the position already described for the introduction of an enema, except that the foot of the bed need not be raised.

Lotion. **125.** A lotion is medicine in fluid state, used as an external application. Except in the case of evaporating lotion the quantity required for immediate use should be poured into a gallipot, and the lint required for the dressing saturated in it.

Injection. **126.** A medicine in fluid form used for washing out the urethra, the ear, or any other cavity, by means of a syringe.

Urethral injection. A patient will be instructed to use an injection for the urethra as follows : Having placed a chamber utensil on a chair in front of him, or, if in bed, between his thighs, he will first make water, so as to clear away all discharge from the urethra, then fill a syringe with the injection ; place the forefinger of the right hand in the ring on the head of the piston, and hold the barrel firmly with the thumb and remaining fingers. Then holding the penis with the fingers and thumb of the left hand, he will insert the pipe of the syringe into the urethra, where it is held by the fingers of the left hand, and slowly press down the piston. When the injection has passed into the urethra the syringe will be withdrawn, and the injection, after having been retained for a few seconds by keeping up pressure with the fingers and thumb on the urethra, allowed to escape into the chamber utensil.

Hypodermic injection. **127.** A hypodermic injection is medicine in a fluid form introduced in small quantities beneath the skin by means of a small syringe and hollow needle. It is invariably to be administered by the medical officer himself.

Collyrium or eye wash. **128.** An eye-wash is medicine in fluid form used as a lotion for the eyes. It is applied either by means of a vessel called the eye bath, or an apparatus, the eye douche.

Every patient using an eye lotion must have his own appliances, and retain them exclusively for his own use.

Eye drops and lamellæ. **129.** Eye drops are medicine in fluid form dropped into the eye. In the absence of a proper glass pipette, they are applied by means of a quill cut the shape of a penholder, and a small hole made at the upper part of the barrel. To charge the quill : the quill is introduced into the bottle of eye drops, and the fore-finger placed over the small hole ; it is then withdrawn, and a portion of fluid with it. To introduce the drops into the patient's eye : throw the patient's head slightly back, draw the lower lid downwards with the fingers of the left hand ; now holding the end of the charged quill over the outer side of the eye, the attendant will allow air to enter the barrel by the small hole until the required number of drops have fallen into the eye. Lamellæ are minute discs of medicated gelatine sometimes used instead of eye-drops.

Liniment. **130.** A liniment is medicine in a fluid state applied to a part by

rubbing. To apply a liniment: Pour out a small quantity in the palm of the hand, and rub it over the part affected until the liniment is absorbed. This will be repeated for the required length of time. As many liniments contain irritating substances, care should be taken that they are not brought in contact with the eyes or any tender surface.

Liniments which are not rubbed in.

Some liniments, as for example iodine, instead of being rubbed in, are painted on the part with a camel-hair brush, or with a small piece of cotton wool twisted on the end of a small stick.

Inunction.

131. An inunction is medicine in the form of an ointment rubbed into the skin. A piece of ointment the size of a bean is to be rubbed in the skin, as ordered, with the palm of the hand, gentle and steady friction being continued until the ointment is exhausted; a few turns of a flannel bandage may then be passed round the part so as to protect the bed-linen and favour absorption. If the ointment used be a mercurial one, the patient himself should be directed to apply it.

Caustic.

132. Caustic is applied externally with a view of destroying unhealthy tissues. The caustics most commonly in use are nitrate of silver (lunar caustic), nitric acid, potassa fusa, and sulphate of copper (blue stone).

Lunar caustic.

Sticks of nitrate of silver are kept for use in quills, or caustic-holders. This caustic should be cleaned with a damp rag, and dried with a piece of lint or paper after being used, and should not be placed in contact with any metal, as such decomposes it, nor should it be allowed to touch linen, or the hands, as it produces a dark stain. It is occasionally necessary to point a piece of caustic. To effect this, it should be rubbed on wet lint until it is pointed, but it should not be cut or scraped.

Nitric acid.

Nitric acid is generally applied by means of a glass brush or a piece of wood, one end of which is pared off thin and flat.

Blue stone.

Sulphate of copper (or blue stone) is used in crystals. The crystal should be ground on a fine stone to a chisel point, and tied in a cleft cut in the end of a piece of wood. It should be wiped clean after use.

Poultices.

133. Poultices are intended as a means of applying heat and moisture to a part, either to assuage pain, or for some other purpose; they are made of various materials, and the following is the mode of preparation of those most commonly used:—

Linseed poultice.

134. Mix 4 ounces of linseed meal gradually with half a pint of boiling water, or proportionate quantities according to the size of poultice required, by stirring in a previously warmed basin. Some tow, neatly teased out, of the required size, is placed on a table, the poultice is turned out upon this and spread out with a spatula in a layer half an inch thick, leaving a margin of tow uncovered about an inch in width. Care should be taken not to apply it too hot to a tender surface. Unless otherwise ordered this poultice should be renewed every two hours: a poultice must not be removed until the fresh one is ready to be applied.

Bread poultice.

135. Pour boiling water on bread crumb; let the vessel stand by the fireside for five minutes, then strain off the water and beat the whole up, and treat in the same manner as linseed meal poultice just described.

Mustard poultice.

136. Mix 2½ ounces of linseed meal gradually with half a pint of boiling water; then add 2½ ounces of mustard, constantly stirring; then spread on tow in the same manner as a linseed meal poultice. A mustard poultice should be kept on until the skin is thoroughly reddened, but not long enough to produce a blister.

Charcoal poultice.

137. Take half an ounce of charcoal, two ounces of bread-crumb, and an ounce and a half of linseed meal, and half a pint of boiling water. Soak the bread in the boiling water by letting it stand for ten minutes near the fire. Add the linseed meal gradually. Mix this with half the charcoal, spread on tow, and sprinkle remainder of charcoal on the surface of the poultice.

Mustard plaster.

138. To make a mustard plaster, mix some fresh mustard powder into a paste with cold water, and spread the paste into an even layer on stiff brown paper of the required size. This is then to be applied to the part, smoothed over, and pressed to the skin with the hand. It is allowed to remain on for a quarter of an hour, and, if the mustard is good, a burning sensation is produced, and the skin is reddened. After the plaster is removed, any mustard adhering to the skin must be washed off; this inconvenience may be obviated by laying a piece of thin tissue paper, or of fine muslin over the mustard plaster when prepared, so as to intervene between the mustard and the skin.

Mustard leaf.

139. A mustard leaf is frequently used in place of a mustard plaster. Before application it must be moistened with cold water.

Blister.

140. A blister is made by spreading blistering plaster to the size ordered, upon stiff brown paper, or adhesive plaster, leaving a margin of at least half an inch. It is applied to the part in order to produce vesication or watery blebs, and so to act as a counter-irritant. To apply it, the plaster is held for a moment before the fire, if in cold weather, then laid on the skin, and a few strips of adhesive plaster laid down over it to retain it in position and prevent it slipping. A bandage may be loosely applied over the whole for greater security, but should not be so tight as to prevent the plaster being raised by the accumulation of fluid in the blebs underneath it.

Dressing a blistered surface.

Unless directions be given to the contrary, the blister should be removed and the part dressed after a lapse of twelve hours. The bandage and strips of plaster being loosened, the blister is gently raised from one side and removed. Several openings are then made in the blebs with a pair of scissors, a vessel having been placed in a position to receive the fluid which escapes. This done, a dressing of simple ointment (paragraph 103) is applied, and renewed twice or three times daily until the surface is healed.

To keep a blister open.

If orders are given not to allow the blistered surface to heal up at once—in other words, to keep it open—the old skin should be completely removed, and such other ointment dressing as may be ordered will be substituted for simple ointment dressing. This will be continued until orders are given to allow the sore to heal, when simple ointment is to be applied as first described.

Blistering fluid.

141. Blistering fluid is painted on the part with a camel hair brush, and the blister made is subsequently treated as above. Great care is to be taken that none of the fluid is allowed to run on to the skin beyond the actual region to be blistered.

142. Leeches are employed to draw blood locally. Some little skill is necessary in their application, otherwise they will not bite. The part to which they are to be applied should first be washed thoroughly clean with warm water and soap, then with clean cold water, and lastly well dried. The leeches before being applied should be well cleaned and dried between the folds of a soft cloth; and when they are to be applied to the mouth, or where the temperature is high, it is recommended to put them into tepid water for a few minutes. To apply them, the box containing them may be inverted over the part, and the leeches, thus confined, readily bite if the part has been properly prepared. Leeches.

Another very ready method of applying them is first to place the number intended to be used in a hollow in a towel folded like a napkin, then to turn the towel, with the leeches in the hollow, upon the part prepared for their reception, and thus with the towel over them confine them with the hand until they bite, when the towel may be removed. Each leech may also be taken in the fingers and its head directed towards the spot where it is wished to bite, and in this way it will often take hold when all other methods have failed.

If either of these methods cannot be pursued, as when it is necessary to apply them in the mouth or other cavity, or to confine them to a very small space, a glass tube, into which each leech is put separately with its head towards the small end, should be brought into contact with the part, and there retained until the leech bites.

Leeches, when full, drop off spontaneously. If it is necessary to remove them before they are full they should be sprinkled with salt, but they should never be pulled off, as their teeth are apt to be left in the wound and cause inflammation.

It is undesirable to use the same leeches more than once.

The part should now be well bathed with warm water containing some antiseptic, to favour the bleeding from the bites. It occasionally happens that leech bites bleed profusely and exhaust the patient, consequently it should be seen that all bleeding has ceased before leaving the patient for the night. Should bleeding continue longer than is desirable, a small compress tied firmly over the bites will usually arrest it. If these means fail, the officer should be at once informed of the circumstance. Treatment after leeches are removed.

143. When ice is to be applied, it should be broken into small pieces by means of a straight packing needle, or similar instrument, thrust into the ice by a few taps with a mallet or small hammer. The pieces are then put into a bag of indiarubber, or other waterproof material and laid over the part; the bag should not be more than half filled, should be carefully tied, and, as soon as the ice is all melted, be removed and refilled. Application of ice.

144. Bottles or special metal or earthenware vessels containing hot water are frequently applied to the feet, legs, and other parts of the body to restore the temperature. They should be carefully corked, wrapped in a roll of flannel or fold of a blanket, and then applied; great care is necessary lest the heat be too great and the parts be burnt, especially if there is any want of feeling in the part, or insensibility of the patient. Hot bricks are occasionally used for the same purpose. Application of heat.

Fomentations or stupes.

145. Fomentations or stupes are applications of hot water to a part. To apply a fomentation : two pieces of flannel, each a couple of yards in length, or two pieces of spongio-piline, are immersed in a bucket of hot water placed by the side of the patient's bed ; one piece is taken out, and, by means of wringer or towel, wrung out nearly dry, and placed as quickly as possible on the part to be fomented, and covered by a piece of waterproof sheeting ; the second piece is to replace the first as soon as the first begins to cool. The process will be continued for the space of at least 20 minutes, unless otherwise ordered.

Turpentine and boracic stupes.

Oil of turpentine is sometimes directed to be sprinkled over the flannel or spongio-piline each time after being wrung out, and the application is then called a turpentine fomentation or stupe. A boracic fomentation consists of boracic lint saturated with hot water, or boracic lotion, and covered with gutta-percha tissue.

Sponging the surface of the body.

146. Sponging may be employed in fevers to reduce the temperature of the body by means of evaporation. Either cold or tepid water is used.

A waterproof sheet is placed over the bed, the patient undressed and laid upon it ; a large wet sponge is then rapidly passed over the different parts of the body, until the temperature is sufficiently lowered by the evaporation, when the patient is put to bed and covered up. This treatment is invariably carried out in the presence and under the direction of an officer.

Classification of baths.

147. Baths may be classified as water baths, vapour baths, and hot air baths ; each of these again may be divided into (*a*) simple, and (*b*) medicated, when some drug is added. Water baths, as well as being simple or medicated, may be local or general, according as a part or the whole of the body be immersed. The temperature of the different kinds of baths, and the time that patients should be allowed to remain in them, are shown by the accompanying table :—

		Description.	Temperature.	Time allowed for remaining in.
			degrees.	minutes.
Water	simple (water alone)	Hot	93-105	10
		Warm	92-98	20
		Tepid	85-92	20
		Cold	temp. of the air	a few minutes
	medicated (water with mustard, acids, alkalies, iodine, or sulphur)	Warm	92-98	20
Vapour	simple (steam alone)	...	...	15-30
	medicated (steam first, then either calomel, iodine, or sulphur).	...	...	
Hot air	simple (hot air alone)	...	...	15-30
	medicated (hot air first, then chlorine)	...	...	

Water baths.

148. The temperature of a water bath should always be determined by the bath thermometer, the use of which will be carefully explained by the instructor.

It may be regarded as an invariable rule that the original temperature of a bath is to be maintained the whole time the patient remains in it, if necessary by additions of hot water, care being taken in so doing not to scald the patient.

In preparing a hot, warm, or tepid bath, cold water should be poured into the vessel first, and hot water then gradually added and mixed until the proper temperature is reached, as shown by the thermometer. The patient is then placed in the bath, which to avoid spilling should not be more than two-thirds full, the whole body with the exception of the head and face, or a part of the body, as ordered, being immersed.

At the end of the appointed time, when taken out of the bath, the patient should at once be rubbed dry with a towel, avoiding exposure to draughts.

Tendency to faint in a hot bath.

Exhaustion and faintness are sometimes produced by a hot bath; weakly patients must be carefully watched, and removed immediately they appear faint.

Cold baths.

The temperature of a cold bath will vary with the temperature of the air. The body and the head should be immediately submerged on entering the bath, and as much movement as possible maintained while the patient remains in it.

Different forms of baths.

The baths used in military hospitals are the long bath—either fixed in a bath room, or movable so that it can be wheeled to the bedside—the hip, the slipper, the foot, and the arm bath; these latter are used when certain parts only of the body require bathing; the hip bath, for example, when it is intended to influence the organs in, or the parts about the pelvis. In preparing a hip bath, the vessel must not be more than one-third full, otherwise when the patient sits down in it the water will overflow. The foot bath is one in which only the feet and legs are immersed; it can be given at a temperature up to 115°. The vessel should be so full as to permit the water to reach nearly as high as the knees.

A blanket should be wrapped round the patient as he sits with his feet and legs in the bath.

Medicated baths.

Medicated baths, as a rule, should be given in wooden vessels. For the immersion of the whole body 30 gallons of water are required, in which the ingredients for the medicated bath will be dissolved.

Vapour and hot air baths.

149. Vapour and hot air baths may be given by means of the portable vapour and hot air bath invented by the late Surgeon-Major John Wyatt, C.B., of the Coldstream Guards. The apparatus is contained in a small tin case, and consists of the following parts: a lamp, a bent tube enlarged at its base to take the lamp, vessels of different kinds (a tin basin for water, an enamelled dish for chemicals, a stone generator for chlorine), a diaphragm, and a portable cradle. By means of this apparatus a vapour or hot air bath may be given either in the recumbent or sitting posture.

Use of Wyatt's portable bath.

150. The following are the directions for using Wyatt's bath when the patent is in bed:—Remove the clothes from the bed, leaving a blanket only to lie upon. Put the cradle together on the bed, cover it with one or two sheets of paper, previously to placing the remainder of the clothes upon it; this will be found as efficient

as a waterproof covering, and quite free from any unpleasant smell.

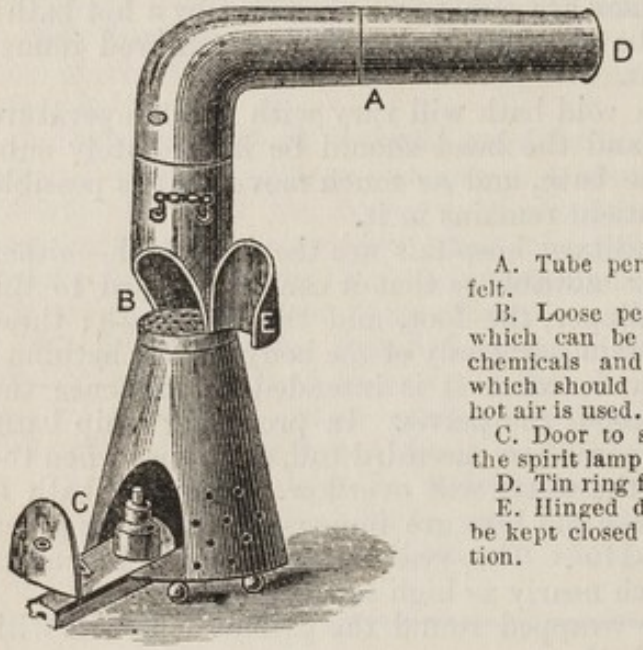
Trim the lamp with methylated spirit; the wick should be well spread out, so as to give a good-sized flame; when lighted, place the end of the tube beneath the cradle, at about its transverse centre, tucking the bed-clothes well down, so as to entirely exclude cold air.

As a simple vapour bath.

For a simple vapour bath, place the tin basin three parts full of warm water over the lamp. When free perspiration has been induced all over the body, and the skin subsequently become tolerably cool, the body should be rapidly rubbed over with a coarse towel, and the patient carefully enveloped in blankets.

As a medicated vapour bath.

If iodine, sulphur, or mercurial vapours are required, the ingredients are to be placed in the enamelled dish upon the



A. Tube perforated, and covered with felt.

B. Loose perforated diaphragm, upon which can be placed vessels to contain chemicals and liquids for evaporation, which should be removed when simple hot air is used.

C. Door to slide, to which is attached the spirit lamp and extinguisher.

D. Tin ring for chlorine generator.

E. Hinged door, which should always be kept closed while the bath is in operation.

FIG. 25.—WYATT'S APPARATUS.

diaphragm and volatilized, after perspiration has been produced. After a medicated vapour bath the patient's body should not be wiped.

As a hot air bath.

When hot air only is required, remove the perforated diaphragm. If chlorine gas is required, withdraw the apparatus after a free perspiration has been produced by the hot air. Mix the ingredients (15 grains of oxide of manganese, and a teaspoonful of hydrochloric acid) in the stone generator, gently shake it, and place it in the tin ring just within the extremity of the projecting arm, care being taken to keep the thumb over the orifice of the generator until the apparatus has been replaced under the cradle. When the bath is administered to a patient in the sitting position the base of the apparatus is placed under a cane-bottomed chair, and the patient, seated on this, is enveloped in a mackintosh cloak, tied at the neck and reaching to the ground all round, as shown in the illustration of Lee's apparatus (Fig. 26). After its administration the patient is at once put into bed between the blankets.

151. Lee's apparatus is used for giving a simple or medicated vapour bath to a patient in the sitting position. Use of Lee's apparatus.

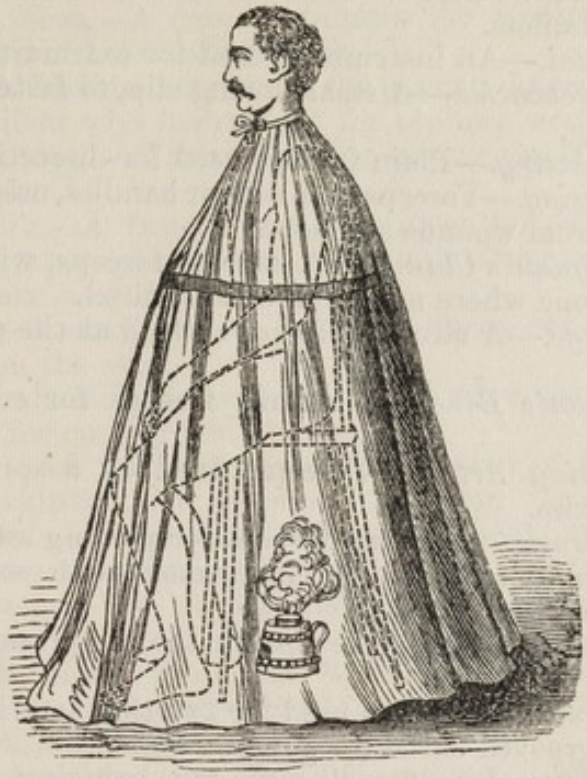


FIG. 26.—LEE'S LAMP AND CLOAK IN USE.

10. SURGICAL INSTRUMENTS AND APPLIANCES.

152. The following are brief descriptions of the instruments and appliances in most common use :— Description of instruments.

Aspirator.—An instrument for drawing off fluids by means of an exhausting air pump.

Bistoury.—A long narrow knife, which is either straight or curved, sharp or blunt-pointed.

Bistoury, Hernia.—A long narrow knife, blunt except for about the space of an inch from the point, which is also blunt, used in the operation for rupture.

Blow Pipe.—A tube used for inflation in post-mortem examinations.

Bougie.—An instrument used for dilating strictures.

Capital Case.—A case containing the instruments required for performing capital operations.

Catheter.—A tube for passing through the urethra into the bladder to draw off the urine. Catheters are made of silver or gum-elastic, of various sizes, numbered from 1 to 12, and each contains a wire called a *stylet*.

Caustic-Holder.—A little case for holding caustic, usually made of gutta-percha or silver.

Cupping Case.—A case containing the apparatus required for performing the operation of cupping.

Director.—An instrument with a groove in which to guide the point of a knife,

Elevator.—An instrument for raising depressed pieces of bone.

Enema Apparatus.—An instrument for administering enemata.

Extractor, Coxeter's Bullet.—An instrument, with a scoop and pin, for extracting bullets.

Forceps, Dental.—An instrument used for extracting teeth.

Forceps, Dieffenbach's.—A small spring clip, to fasten on an artery to stop bleeding.

Forceps, Dissecting.—Plain forceps used for dissecting purposes.

Forceps, Dressing.—Forceps with scissor handles, used for removing old dressings from wounds and sores.

Forceps, Ferguson's Clawed.—A strong forceps, with claws, used for gripping bone where much force is required.

Forceps, Gouge.—A strong forceps, cutting at the points, so as to gouge bone.

Forceps, Liston's Bone.—A strong forceps for cutting bone in operations.

Forceps, Spring Artery.—Forceps, fixed by a spring catch, for taking up arteries.

Forceps, Necrosis.—A strong forceps for pulling away dead bone.

Forceps, Savigny's Bullet.—An instrument with separate blades, used for extracting bullets.

Forceps, Spencer Wells'.—Forceps for the compression of bleeding vessels during operations.

Forceps, Torsion.—Forceps used for twisting arteries.

Gouge.—A grooved chisel for gouging bone.

Hare-lip Pins.—Long steel pins for bringing the edges of wounds together.

Hernia Director.—A steel instrument, with a groove, used in the operation for rupture.

Knife, Amputating.—Used for amputating a limb ; a large one is used for amputation of the thigh, medium for the leg, small for the arm.

Knife, Tenotomy.—A small narrow knife for cutting tendons under the skin.

Lachrymal Probes.—Small silver probes for introducing into the tube or duct leading from the eye to the nose.

Lachrymal Styles.—A button-headed silver instrument for passing into the duct leading from the eye to the nose.

Lancet.—An instrument used for bleeding, vaccinating, and opening boils or small abscesses.

Lancet, Gum.—An instrument used for lancing the gums.

Laryngoscope.—An instrument for examining the throat and larynx.

Needle, Aneurysm.—A curved blunt instrument, with an eye near the end, used for passing a ligature under an artery.

Needle, Cataract—A needle, without an eye, in a handle, used in the operation for cataract.

Needle, Liston's.—A curved needle in a handle, the eye near the point, used for sewing wounds.

Needle, Simpson's.—A hollow curved needle in a handle, used for sewing wounds with silver wire.

Needle, Surgical.—Curved and straight needles of various sizes.

Ophthalmoscope.—An instrument for examining the eyes.

Pliers, Wire.—A sharp strong instrument for cutting wire and pins.

Pocket Case.—A case in which the more commonly required instruments are carried, and which fits into an officer's uniform pouch.

Post-mortem Case.—A case containing the instruments used in the examination of bodies after death.

Probang.—A flexible instrument for passing down the gullet.

Probe.—A silver wire instrument for probing wounds.

Saw, Amputating.—A saw used for sawing the bone in amputations of a limb.

Saw, Butcher's.—A framed saw, the invention of Mr. Butcher used for the same purpose as the amputating saw, but more especially for excision of joints.

Saw, Hey's.—A small saw for cutting a piece out of a bone used in operations on the skull.

Scalpel.—A short knife with a curved edge, made in different sizes and used for cutting and dissecting.

Scarificator.—An instrument with a number of lances, used for scarifying the skin in the operation of cupping.

Scissors, Bowel.—A pair of scissors, with a hook, used for slitting up the intestines in *post-mortem* examinations.

Scissors, Seutin's.—A strong instrument used for cutting up plaster bandages.

Spatula.—A blunt knife for spreading ointments; also an instrument in the pocket case, used for depressing the tongue when an examination is being made of the throat.

Sterilizer.—An apparatus for killing germs on instruments or in dressings, by means of heat.

Stethoscope.—An instrument with which to listen to the sounds in the chest.

Stomach Pump.—An apparatus used for pumping into and out of the stomach.

Syringe.—An instrument made of glass or pewter, used for injecting fluids.

Syringe, Hydrocele.—A glass syringe with a metal nozzle made to fit into the *canula* of a *trocar*, with which to inject the sac of a hydrocele when it has been tapped.

Syringe, Hypodermic.—A graduated glass syringe fitted with a hollow needle, employed in the injection of morphia and other medicines beneath the skin.

Tenaculum.—A sharp hook for taking up arteries or anything which may require hooking up during an operation.

Tourniquet.—An instrument for making pressure on an artery to stop the flow of blood through it. (*See* para. 164.)

Tracheotomy Tubes.—Two curved silver tubes, one fitting inside the other, used for putting into the windpipe when it has been opened by an operation called tracheotomy.

Trephine.—A circular saw, used in operations on the skull.

Trocar and Canula.—A sharp-pointed instrument and sheath for tapping collections of fluid. Large for tapping the belly or chest, small for tapping hydrocele.

Trocar and Canula, exploring.—A very fine instrument for searching for fluid.

Truss.—An appliance used in the treatment of rupture.

Surgical haversack.

153. The following are the contents of a SURGICAL HAVERSACK, which is a waterproof canvas bag.

CONTENTS OF SURGICAL HAVERSACK.

(Weight about 7 lbs.)

(Dimensions 13″ × 5″ × 9½″.)

Bandages, loose-woven, salalembroth	No.	4
„ triangular „	„	6
Bearer's dressing case, canvas, containing :—	„	1
Clasp-knife, long-bladed (1).		
Forceps, dressing, pair (1).		
Pin-cushion, emery (1).		
Pins, common (40).		
„ safety (6).		
Probe and director, plated (1).		
Scissors, strong, pair (1).		
Spatula, plated (1).		
Thread, sewing, tablet (1).		
Vulcanite case, containing (in vaseline) :—		
Needles, sewing (6).		
„ surgeon's plated (6).		
Gauze, double cyanide	yds.	6
Hypodermic case, containing :—	No.	1
Syringe ; platina needles (2) in glass tube ; cocaine tablets, ¼ gr. (2 tubes) ; morphia tablets, ⅙ gr. (2 tubes) ; and glass mortar.		
Medicine-cup and mortar combined, vulcanite, with 2 pestles	„	1
Plaster, adhesive, 6 yds., 1-inch tape	tins	2
„ isinglass, transparent, 12 yds., 1-inch tape	„	1
Silk, twisted, fine and medium, in aseptic solution	tube	1
Specification tallies (Army Book 166)	book	1
Splints, wire, arm, japanned, with tapes and buckles ...	pairs	2
Spirit Ammon: Aromat:	oz.	2
Tin containing candle and waterproof wax vestas	No.	1
Tourniquets, screw, small	„	2
Wool, boric, in 2-oz. packets	oz.	4
„ double cyanide	„	4
Waterproof canvas bag (to contain the above)	No.	1
Water-bottle, with felt cover, drinking cup, and straps ...	„	1

FIG. 27.—SURGICAL HAVERSACK.

154. The following are the contents of a MEDICAL COMPANION :— Medical companion.

(Weight about 13 lbs.)

(Dimensions 14″ × 7″ × 9″.)

Chloroform (in 2 bottles)	oz. 4
Iodoform	„ 1
Mixture for diarrhœa	„ 1½
Paraffin: Molle (boric), in boxwood case	case 1
Spirit Ammon: Arom:	oz. 1½
Tinct: Opii	„ 1½
Pill and tablet in tin containing :—	No. 1
No. 1. Tablets Apomorphia Hydrochlor: $\frac{1}{10}$th gr. in each	... tubes 2
„ 2. Tablets { Hydrarg: Subchlor:, 2 grs. / Antim: Oxid: Pulv:, 1 gr. / Ipecac: Pulv:, 1 gr. ... / Opii Pulv:, 1 gr. ... ... }	in each No. 72

No. 3. Tablets	Ipecac: Pulv: *sine* Emetine, 10 grs. in each		No. 24
„ 4. Tablets	Pulv: Cretæ Arom: *sine* Sacchar:, 8 grs. ... / Acac: Pulv:, 1½ grs. ... / Opii Pulv:, ½ gr. ...	in each ...	„ 48
„ 5. Tablets	Antipyrin, 5 grs. in each		„ 60
„ 6. Tablets	Ferri Hypophosph:, 2 grs. / Acid: Arseniosum, $\frac{1}{50}$th gr. / Quinin: Acid: Suph:, 1 gr. / Strychninæ Sulph:, $\frac{1}{30}$th gr. / Saccharin, $\frac{1}{100}$th gr. ...	in each	„ 84
„ 7. Tablets	Hydrarg: Subchlor:, 1 gr. in each ...		„ 144
„ 8. Pills	Plumbi Acet:, 3 grs. / Opii Pulv:, 1 gr.	in each ...	„ 72
„ 9. Pills	Hydrarg: Subchlor:, 2 grs. / Pil: Rhei Co:, 2 grs. ... / Pil: Coloc: Co:, 2 grs. ...	in each	„ 60
„ 10. Tablets	Quinin: Acid: Sulph:, 2 grs. in each (pink)		„ 120
„ 11. Pills	Camphor:, 3 grs. ... / Opii Pulv:, 2 grs. ... / Capsici Pulv:, ½ gr. ...	in each (brown)	„ 36
„ 12. Pills	Opii Pulv:, 1 gr. in each		„ 144
„ 13. Tablets	Resin: Podoph:, ¼ gr.... / Ext: Hyoscy:, ¼ gr. ... / Ext: Tarax:, ¼ gr. ... / Ext: Coloc: Co:, 1 gr. / Ext: Jalap:, ½ gr. ... / Resin: Leptandrin, ½ gr. / Ol. Menth: Pip:, q.s. ...	in each ...	„ 72
„ 14. Tablets	Potas: Permang:, 2 grs. in each ...		„ 336
„ 15. Tablets	Quinin: Acid: Sulph:, 5 grs. in each (pink)		„ 72
Bandages, loose-woven, salalembroth			„ 3
„ suspensory			„ 2
„ triangular salalembroth			„ 4
Basin, vulcanite			„ 1
Calico, thin			yd. 1
Catheters, olivary, Nos. 3, 6, and 8, in tin case			No. 3
Christia tissue			yd. ½
Gauze, double cyanide			„ 6
Housewife, canvas, containing :—			No. 1

Pincushion, emery (1).
Pins, common (40).
„ safety (6).
Scissors, pair (1).
Tape, piece (1).
Thread, sewing, tablet (1).
Vulcanite case, containing (in vaseline) :—
Needles, sewing (6).
„ surgeon's plated (6).

Hypodermic case, containing :—	No.	1
Syringe; platina needles (2) in glass tube; cocaine tablets, $\frac{1}{4}$ gr. (2 tubes); morphia tablets, $\frac{1}{6}$ gr. (2 tubes); and glass mortar.		
Medicine-cup and mortar combined, vulcanite, with 2 pestles	„	1
Minim measure in case	„	1
Plaster, adhesive, 6 yds., 1-in. tape	tins	2
„ isinglass, transparent, 12 yds., 1-in. tape	tin	1
Silk, twisted, fine and medium, in aseptic solution	tube	1

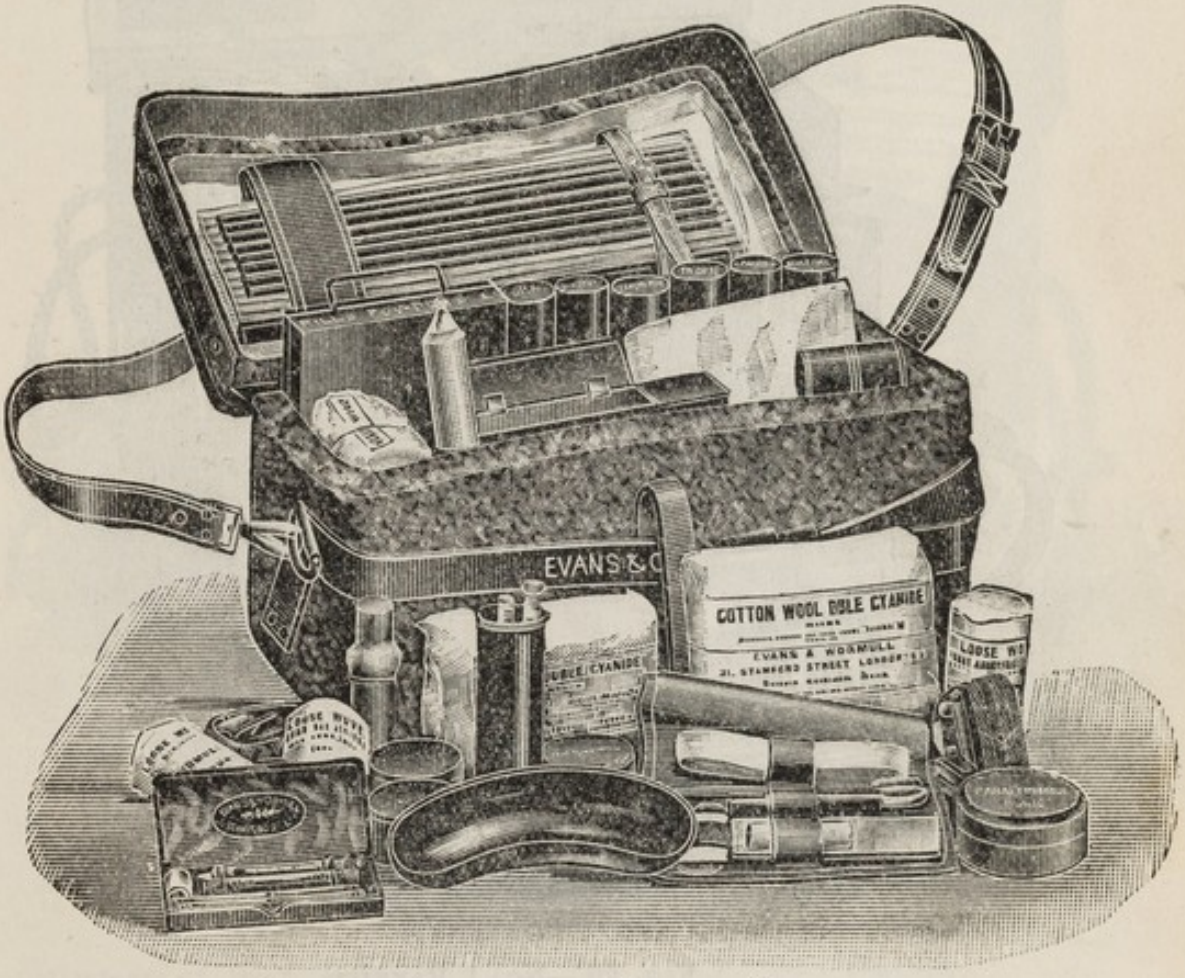


Fig. 28.—Contents of Medical Companion.

Splints, ratan cane, with pad cases	pair	1
Tape, pieces of	No.	6
Tin containing candle and waterproof wax vestas	„	1
Tourniquets, screw	„	2
Wool, boric	oz.	4
„ double cyanide	„	4
Medical companion, hide-covered, with straps (to contain the above	No.	1
Water bottle with felt cover, drinking cup, and straps ...	„	1

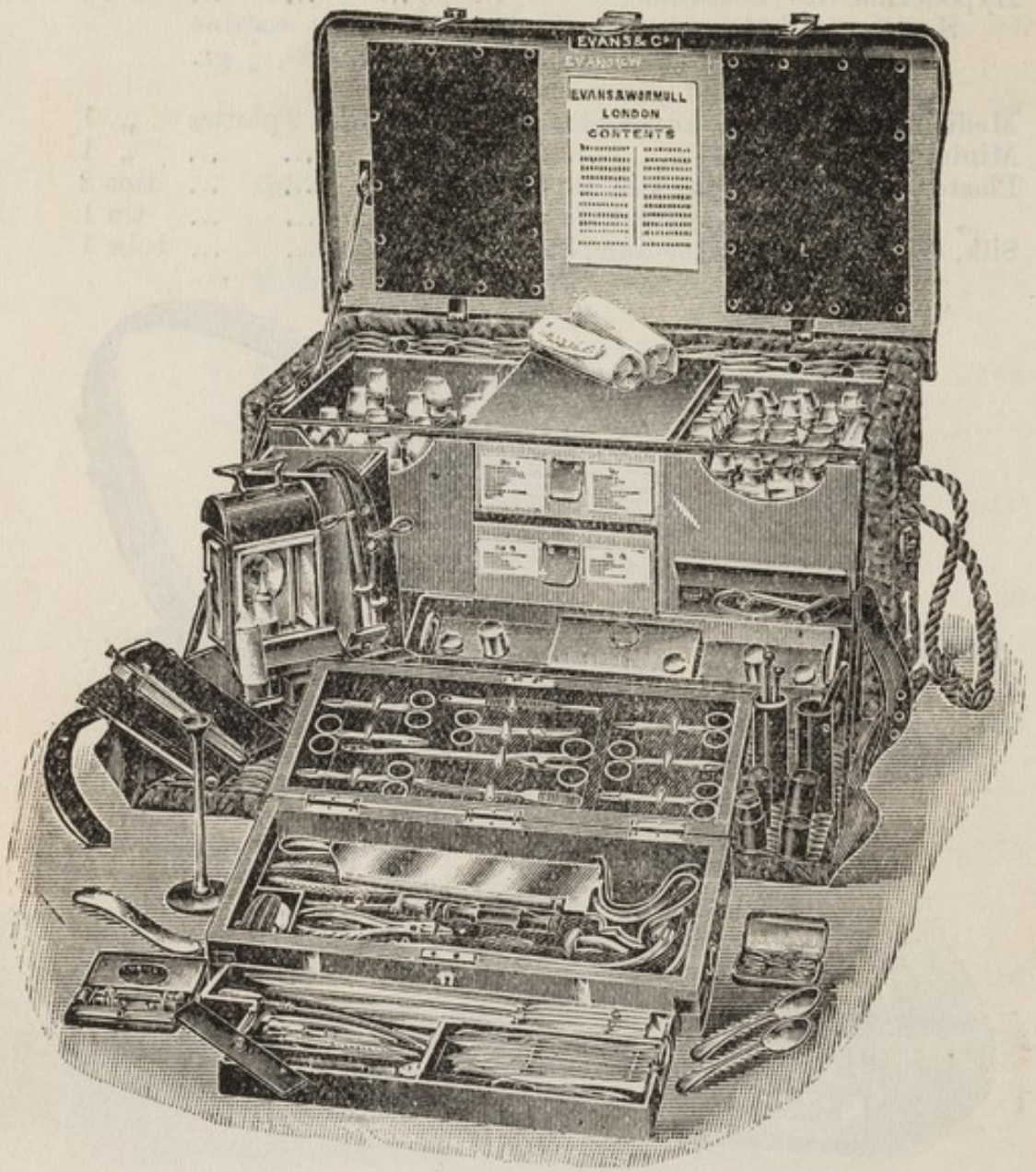


FIG. 29.—NO. 1 PANNIER.

Field medical panniers.

155. The following are some of the principal contents of the FIELD MEDICAL PANNIERS, the complete details of which are given in the Regulations for Army Medical Services :—

Contents of No. 1 (*weight about* 91 *lbs.*), *The Medicine Pannier.*

Chloroform, Morphia inject.; Iodoform, Diarrhœa Mixt., Quinine; Purgatives, Lamels, and Discs; Brandy, &c.

A case of surgeon's instruments, writing materials, hypodermic syringe, clinical thermometer, candles, &c.

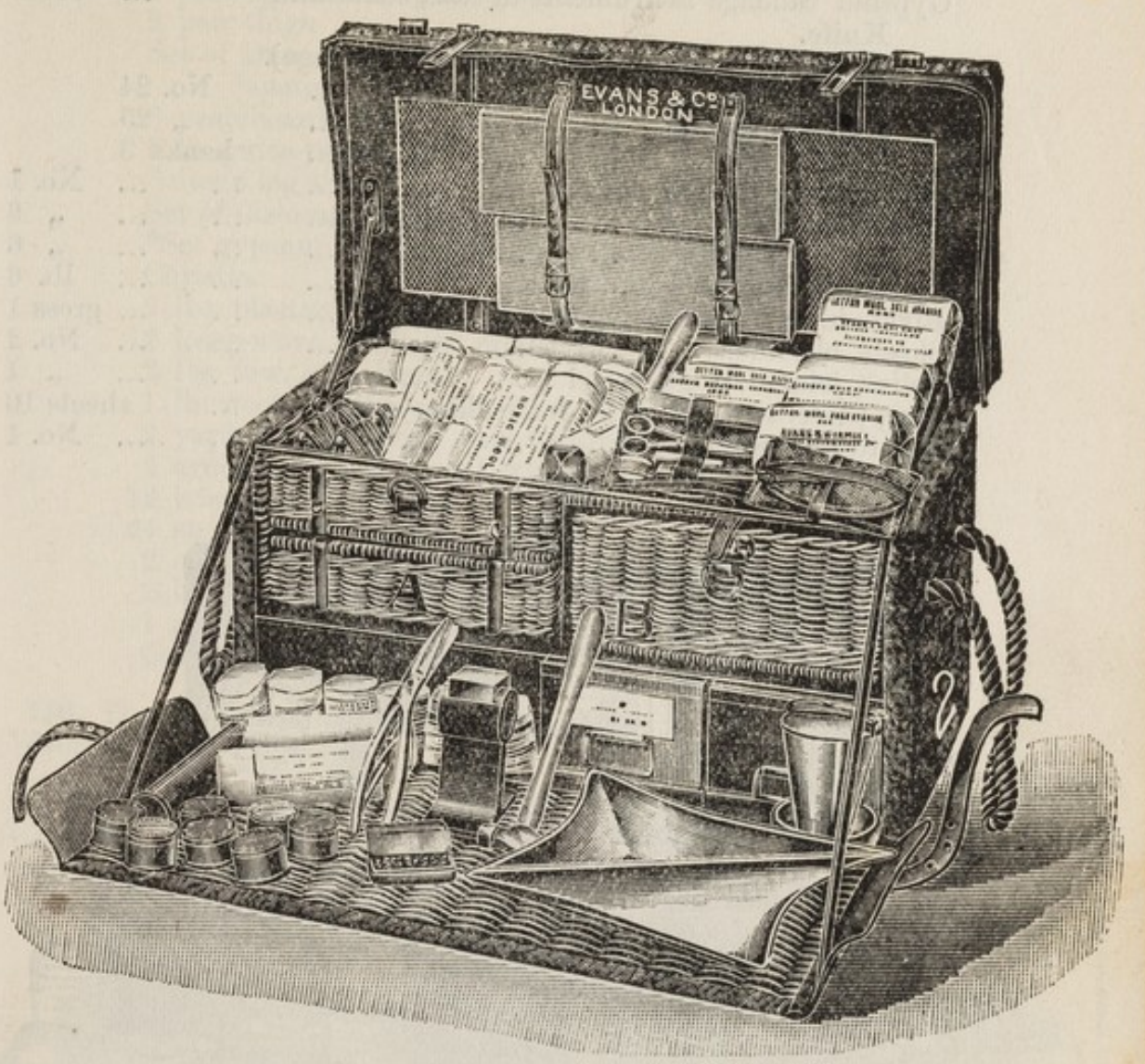


FIG. 30.—No. 2 PANNIER

Contents of No. 2 (weight about 72 lbs.), The Material Pannier.

Gauze, Plaster, Perforated Zinc for Splints, Bandages, Tooth Instruments, Tourniquets, &c. ; Extract of Meat, Food-Warmer, Anvil.

The weight is equalised for side loads by strapping the Medical Companion on to No. 2 Pannier.

156. The following are the contents of the FIELD FRACTURE Box. (Weight about 72 lbs.) :— Field fracture box.

(Dimensions 32″ × 12″ × 12″.)

Anvil, for making splints	No. 1
Bandages, loose-woven	„ 50
„ triangular	„ 50
Counter extension app., with improved clamp and bags (2)	„ 4

Gypsum bandage instruments in case, containing :—	... set 1
Knife.	
Shears (for cutting zinc or gypsum bandage).	
Pins, safety	No. 24
Needles, sewing	„ 25
Thread, fine	hanks 3
Hammer, for making splints	No. 1
Pasteboard, sheets of	„ 6
„ splints	„ 6
Plaster of Paris in ½ lb. tins	lb. 6
Rivets in box, for making splints	gross 1
Sheets, old linen	No. 2
Splint, jointed, thigh, wood	„ 1
Zinc, perforated, 23″ × 9″, for making splints ...	sheets 16
Box to contain above	No. 1

FIG. 31.—CONTENTS OF FIELD FRACTURE BOX.

General fracture box.

157. The following are the contents of the GENERAL FRACTURE BOX. (*Weight* about 94 lbs.) :—

Double incline plane, McIntyre's.
2 jointed thigh splints, wood.
Jointed elbow „ wire,
Radius „ „
1 pair fore arm „

1 pair upper-arm splints, wire.
2 pair thigh „ „
Set of Duncan's ratan cane splints.
„ japanned leg splints.
6 pasteboards for „
1 lb. gutta-percha for „
Salter's leg sling.
Set of dislocation apparatus.
*Set gypsum bandage instruments, in case.
Christia.
2 lbs. plaster of Paris.
12 loose-wove bandages, salalembroth.
2 lbs. tow, carbolised.
1 lb. wool, salalembroth.
2 yards flannel serge, open texture antiseptic.
2 arm slings, 1 leather, 1 wire.
12 triangular bandages.
24 straps with buckles.
2 old linen sheets.
2 broad flannel bandages, 7 by 6.
1 counter extension apparatus.
Canvas covers for splints.

158. The following are the contents of THE ANTISEPTIC CASE. (Weight about 43 lbs.) :—

(Dimensions 32″ × 12″ × 12″.)

Bandages, loose-woven, salalembroth	...	...	...	No.	50
Catgut in carbolised oil	...	...	...	tubes	2

FIG. 32.—CONTENTS OF ANTISEPTIC CASE.

* Contents—1 gypsum knife, 1 gypsum shears, 24 safety-pins, 1 paper sewing needles, 3 hanks fine thread.

Drainage tubing, assorted sizes, in aseptic solution ...	tubes	3
Gauze, double cyanide, in 6 yd. packets	yds	48
Housewives, canvas, containing :—...	No.	2
Pincushion, emery (1).		
Pins, common (40).		
Pins, safety (6).		
Scissors, pair (1).		
Tape, piece (1).		
Thread sewing tablet (1).		
Vulcanite case containing (in vaseline) :—		
Needles, sewing (6).		
„ surgeon's plated (6).		
Jaconet, waterproof, in 2 yd. packets	yds.	6
Silk, twisted, fine and medium, in aseptic solution ...	tubes	3
Wool, boric, in 4 oz. packets...	lb.	2
„ double cyanide, in 4 oz. packets	„	4
„ iodoform, in 4 oz. packets	„	2
Box, tin lined, with sliding lid, to contain above	No.	1

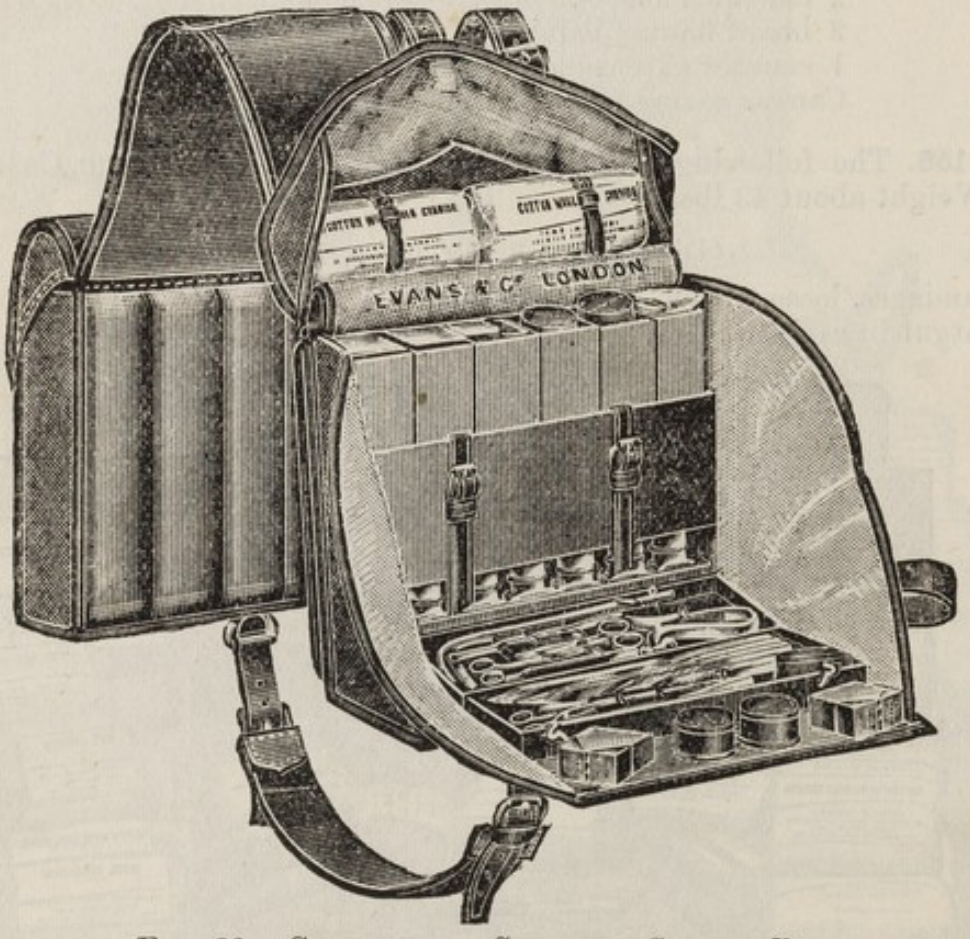


FIG. 33.—CONTENTS OF SURGICAL SADDLE BAG.

159. The contents of a pair of SURGICAL SADDLE BAGS are—(weight about 32 lbs.)—

No. 1 BAG.

Acid, Carbolic (liquid)	oz.	2½

Chloroform (in three bottles)	oz.	9
Hydrarg: Perchlor: (soloids)	No.	70
Iodoform	oz.	3
Sp: Ammon: Arom:	„	2
Antipyrin, 5 gr. tablets Pulv: Ipecac: Co:, 5 gr. tablets } in one tin	No.	30
	„	60
Potas: Bromid:, 5 gr. tablets Potas: Permanganas, 2 gr. tablets }	„	70
	„	100
Quininæ Acid: Sulph:, 5 gr. tablets (pink)	„	280
„ „ „ 2 „ „ „	„	348
Catgut, in carbolic solution Silk ligatures, in aseptic solution } in leather-covered case	tubes	2
	„	2
Minim measure, in case	No.	1
Pins, safety	box	1
Plaster, adhesive, each 6 yds., 1 inch tape	tins	3
„ isinglass, transparent, each 12 yds., 1 inch tape	„	1
Splints, wire arm	pair	1
Wool, boric	oz.	2
Wool, double cyanide	„	8
Surgical instruments, containing	case	1
Catheter, nickel, No. 8	No.	1
Elevator, double	„	1
Forceps, artery, Spencer Wells'	pairs	2
„ bone, short, straight, aseptic	pair	1
„ bullet	„	1
„ dressing, spring	„	1
„ necrosis	„	1
Knives, amputating, metal handles	No.	2
Needle, aneurysm, metal handle	„	1
Needles, surgeon's, in vaseline in vulcanite case	„	6
Probe, bullet, Nelaton's	„	1
Saw, Butcher's, metal handle, and spare blade	„	1
Scalpels, metal handles	„	2
Scissors, dressing	pair	1
Tourniquet, screw	No.	1
Case, leather covered (to contain above)	„	1
Trays, tin, enclosing case	„	2

No. 2 Bag.

Bandages, loose-woven, salalembroth	No.	12
„ triangular „	„	12
Bearer's dressing case, canvas, containing :—	„	1

Clasp knife, long-bladed (1).
Forceps, dressing, pair (1).
Pin cushion, emery (1).
Pins, common (40).
Pins, safety (6).
Probe and director, plated (1).
Scissors, strong, pair (1).
Spatula, plated (1).
Thread, sewing tablet (1).

Vulcanite case containing (in vaseline) :—		
Needles, sewing (6).		
Needles, surgeon's plated (6).		
Christia tissue	yd.	1
Gauze, double cyanide	yds.	12
Hypodermic case, containing :—	No.	1
Syringe ; Platina needles (2) in glass tube ; cocaine tablets, $\frac{1}{4}$ gr. (2 tubes) ; morphia tablets, $\frac{1}{6}$th gr. (2 tubes) ; and glass mortar.		
Spoons, tea	No.	2
Specification tallies (A.B. 166)	book	1
Splints, wire, arm	pairs	1
Tourniquets, screw, small	No.	2
Tins containing candle and waterproof wax vestas ...	„	2
Vulcanite cases containing, in vaseline :—	„	2
Needles, sewing (6).		
„ surgeon's plated (6).		
Wool, boric	oz.	4
Wool, double cyanide	„	12
Waterproof canvas bags (with girth and transverse strap) to contain the above	pair	1

11. CASES OF EMERGENCY AND THEIR IMMEDIATE TREATMENT.

Reference to Standing Orders.

160. In all cases of emergency the officer should be sent for at once, and until his arrival the instructions given below will as far as possible be carried out (see Standing Orders, paragraph 198).

Bleeding or Hæmorrhage.

Varieties of bleeding.

161. Bleeding may take place when any portion of the system of blood-vessels gives way or is opened into. It is either arterial, venous, or capillary.

Arterial bleeding.

In bleeding from an artery, or arterial hæmorrhage as it is called, the blood that escapes is of a bright red colour, and spouts out forcibly in quick jerking jets, coming from the side of the wound nearest the heart, and in large or small quantity, according to the size of the vessel injured ; in the case of a large artery, such as the femoral or carotid, life is destroyed in a few minutes if the bleeding be not arrested.

Venous bleeding.

In bleeding from a vein, or venous bleeding as it is called, the escaping blood is of a dark colour, and flows in a slow steady stream from the side of the opening farthest from the heart.

Capillary bleeding.

In capillary bleeding, the blood oozes from the entire surface, and not from any one point as when an artery or vein is injured.

Relative danger.

Arterial hæmorrhage is more dangerous than venous, and more difficult to stop by reason of the greater force of the current ; capillary bleeding is less dangerous than either.

Measures for temporary arrest of bleeding from an artery.

162. The means for temporarily arresting arterial bleeding until more permanent means can be resorted to by the officer, are :—

Direct compression of the bleeding point ;

Compression of the artery between the wound and the heart.

Forcible flexion of a limb upon itself.

Direct compression by the fingers.

In all cases of severe bleeding from a wound, no time should be lost—

(1) In making firm pressure with the fingers on the bleeding point.
(2) Laying the patient down.
(3) Fully exposing the wound.
(4) The main artery should be compressed in its course with the fingers or thumb, or where possible with a tourniquet.

This pressure should be maintained until some of the more permanent means can be employed, or medical assistance procured.

Or by a graduated compress.

Direct compression may also be made by a graduated compress in the following manner :—Fold a piece of lint so as to form a small hard pad about the size of the point of the finger ; slip this under the finger at the bleeding point and press it there until another piece, a little larger, is placed on the top of it, and so on until the pile thus formed rises above the surface or edges of the wound, forming a cone with its apex on the wounded vessel and its base rising above the surface ; over this a bandage is firmly applied. (Refer to para. 65.)

Compression between the wound and the heart.

163. Compression of the artery between the wound and the heart may be effected by the fingers (digital compression) or by the application of a tourniquet ; but these methods can only be successfully carried out where the artery lies over a bone.

Digital compression of carotid artery.

Digital compression of the following arteries is carried out as follows :—

The common carotid lying in the side of the neck may be compressed against the vertebræ by pressing with the thumb backwarks and inwards in the hollow of the neck, formed between

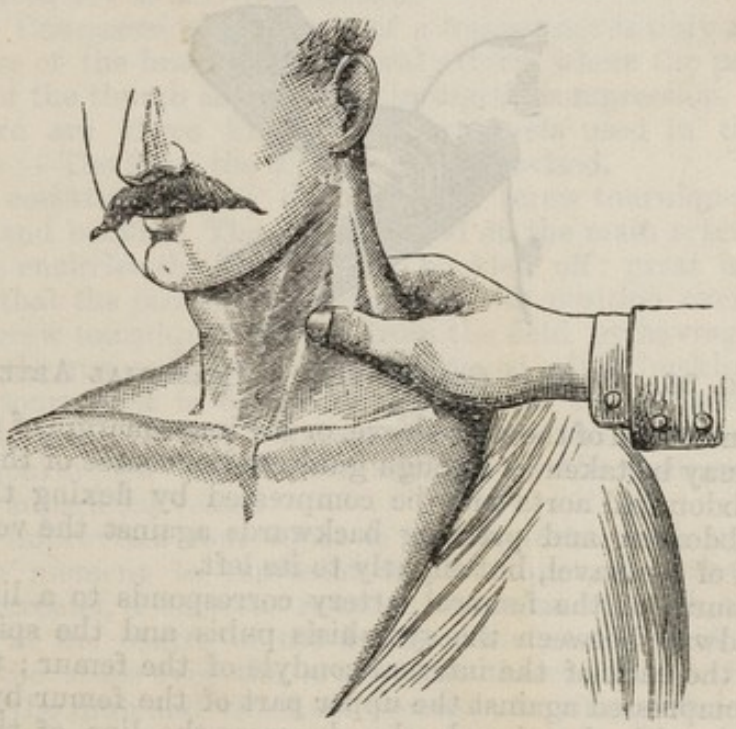


Fig. 34.—Digital Compression of the Carotid Artery.

the windpipe and the ridge of muscle running from behind the ear to the centre of the breast-bone.

Of subclavian artery.

The subclavian artery may be compressed at the centre of the collar bone by drawing forward the shoulder ; thus the artery will be more easily reached by the thumb pressing downwards against the first rib behind the clavicle.

Of axillary artery.

To compress the axillary artery raise the arm, place the fingers in the armpit and press upwards against the head of the humerus.

Of brachial artery.

The brachial artery may be compressed with the fingers against the inner side of the middle of the humerus.

Fig. 35.—Digital Compression of Subclavian Artery.

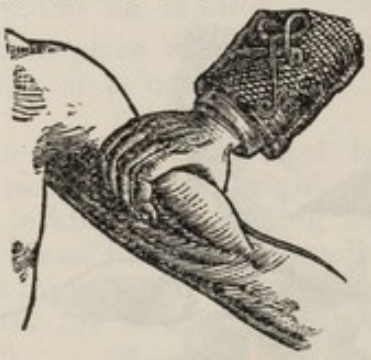


Fig. 36.—Digital Compression of Brachial Artery.

The inner seam of the coat sleeve, or the inner margin of the biceps muscle, may be taken as a rough guide to the course of the artery.

Of abdominal aorta.

The abdominal aorta may be compressed by flexing the thighs on the abdomen, and pressing backwards against the vertebræ at the level of the navel, but slightly to its left.

Of femoral artery.

The course of the femoral artery corresponds to a line drawn from midway between the symphisis pubis and the spine of the ilium to the back of the internal condyle of the femur ; the artery can be compressed against the upper part of the femur by pressing backwards with the thumb placed across the line of the artery four fingers' breadth below the fold of the groin.

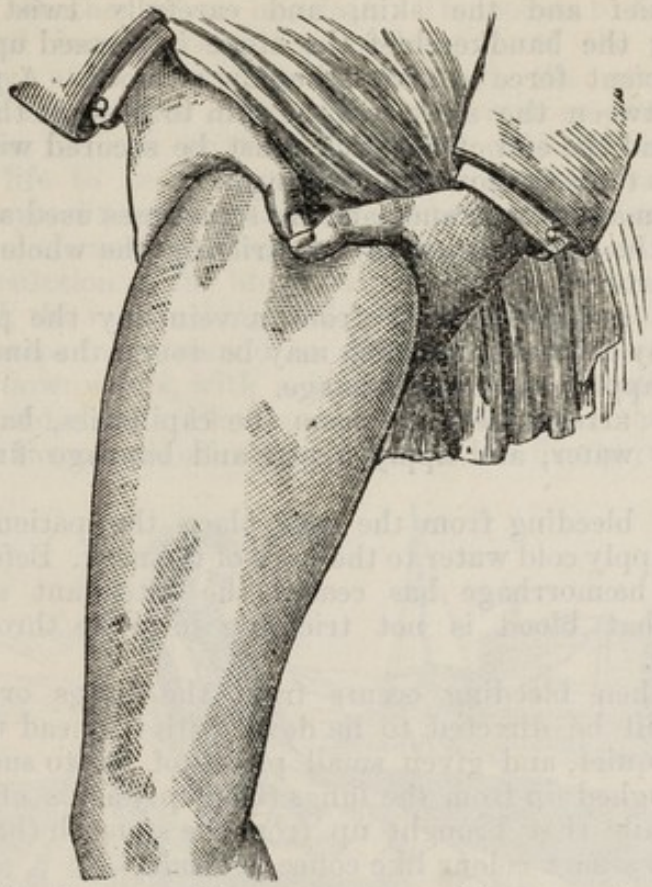


FIG. 37.—DIGITAL COMPRESSION OF FEMORAL ARTERY.

Bleeding from any other artery of the upper or lower extremity should be controlled by applying pressure on the brachial or femoral artery as above described. Other arteries of the extremities.

164. Compression by means of a tourniquet is only applicable in the case of the brachial or femoral artery, where the pad takes the place of the thumb as described in digital compression. Compression by tourniquet.

There are three kinds of tourniquets used in the military service :—The field, the screw, and improvised. Kinds of tourniquets.

The essential parts of the field and screw tourniquet are a pad, strap, and buckle. The pad is placed on the main artery, the strap tightly encircles the limb, and is buckled off: great care must be taken that the pad never shifts from its position over the artery. The screw tourniquet differs from the field by having a screw by which the strap can be further tightened after buckling off. The screw tourniquet is especially appropriate for compression of the femoral artery, which requires more force than the brachial; the field tourniquet being more suitable for the compression of the latter, superficial vessel. Field and screw tourniquet.

An improvised tourniquet is an apparatus made upon the spur of the moment to represent a tourniquet, as follows :—Take a handkerchief, a smooth, rounded stone, and a stick, wrap up the stone in the centre of the handkerchief, tie a knot over it and place the stone over the artery, pass the ends of the handkerchief round the limb and tie them securely, leaving sufficient space for the stick to be admitted; pass the stick then between the Improvised tourniquet.

handkerchief and the skin, and carefully twist it until by tightening the handkerchief the stone is pressed upon the artery with sufficient force to arrest the flow of blood. A pad should be placed between the stick and the skin to prevent the latter being bruised, and the end of the stick must be secured with a bandage to prevent the tourniquet untwisting.

Esmarch's web.

165. Esmarch's web and tape are sometimes used as tourniquets, but have the disadvantage of constricting the whole limb equally with the artery.

Arrest of venous bleeding.

166. To arrest bleeding from a vein lay the patient down, remove any constriction which may be round the limb, elevate the limb and apply a pad and bandage.

Arrest of capillary bleeding.

167. To arrest bleeding from the capillaries, bathe the part with cold water, and apply a pad and bandage firmly over the wound.

Bleeding from the nose.

168. In bleeding from the nose place the patient in a sitting position, apply cold water to the back of the neck. Before concluding that the hæmorrhage has ceased the attendant should satisfy himself that blood is not trickling into the throat, and being swallowed.

Bleeding from the lungs or stomach.

169. When bleeding occurs from the lungs or stomach the patient will be directed to lie down with his head raised, be kept perfectly quiet, and given small pieces of ice to suck or swallow. Blood coughed up from the lungs (hæmoptysis) is of a bright red colour, while that brought up from the stomach (hæmatemesis) is usually of a dark colour like coffee grounds.

Burns.

Immediate treatment of burns.

170. The damage to the body occasioned by burns varies with the degree of heat applied to the part burnt—the more intense the degree of heat, the more severe the burn. As regards immediate treatment, it should be remembered that severe burns, more particularly those situated on the head, neck, and trunk, and those which occupy a great extent of surface, are likely to be attended from the outset by serious constitutional disturbances, described under the head of "shock," and from which alone the patient may sink unless properly supported. The points to be aimed at in all cases are protection of the injured surfaces from the air, and relief of pain. This will be best accomplished by removing burnt clothing (cutting the clothes, not pulling them off), and then covering the surface with flour; enveloping the part in lint steeped in oil, or Carron oil (equal parts of lime-water and linseed oil), or in cotton wool. Where shock is present it must be treated as laid down in paragraph 177.

Scalds.

171. A scald is occasioned by the application of some hot fluid to the body, and is treated in precisely the same manner as a burn.

Dislocations.

Dislocations.

172. The immediate treatment of dislocations is laid down in paragraph 90.

Drowning.

Restoration of the apparently drowned.

173. Send immediately for medical assistance, blankets, and dry clothing, but proceed to treat the patient instantly on the spot, in

the open air, whether ashore or afloat. The points to be aimed at are, first and immediately, the restoration of the breathing; and secondly, after breathing is restored, the promotion of warmth and circulation. The efforts to restore life must be persevered in for one or two hours, or until a surgeon has pronounced life to be extinct. Efforts to promote warmth and circulation beyond removing the wet clothes and drying the skin, must not be made until the first appearance of natural breathing, for if the circulation of the blood be induced before breathing has recommenced, the restoration of life will be endangered.

Dr. Silvester's method of restoring breathing.

174. The steps taken should be as follows :—Instantly turn the patient face downwards, with a large firm roll of clothing under the stomach and chest. Place one of his arms under the forehead, so as to raise the mouth off the ground. Press firmly two or three

Fig. 38.—Inspiration in Dr. Silvester's Method.

times, for four or five seconds each time, upon the patient's back. By this means the water is drained out of the lungs and stomach. Then turn the patient quickly on his back with the roll of clothing under the shoulder blades, the head being allowed to fall back. Draw forward the patient's tongue and keep it projecting beyond the lips; an elastic band over the tongue and under the chin will answer the purpose, or a piece of string or tape may be tied round them, or by raising the lower jaw the teeth may be made to retain the tongue in that position. Remove all tight clothing from about the neck and chest, especially the braces. Standing at the patient's head, grasp the arms just above the elbows, and draw the arms gently and steadily upwards above the head and keep them stretched upwards for two seconds. By this means air is drawn into the lungs.

Then turn down the patient's arms and press them gently

and firmly for two seconds against the sides of the chest, crossing the fore-arms over the pit of the stomach. By this means air is pressed out of the lungs.

Repeat these measures alternately, deliberately, and perseveringly about fifteen times a minute until a spontaneous effort to respire is perceived, which should be aided by gently expanding and relaxing the chest as above, until the patient's breathing is thoroughly restored. Then cease to initiate the movements of breathing, and proceed to induce warmth and circulation.

This is known as Silvester's method.

Whilst the above operations are being proceeded with, dry the hands and feet; and as soon as dry clothing or blankets can be procured, strip the body, and cover or gradually reclothe, but taking care not to interfere with the efforts to restore breathing.

Promotion of warmth and circulation.

175. To promote warmth and circulation rub the limbs upwards with energy, using handkerchiefs, flannels, &c. This friction must be continued under the blanket, or over the dry clothing. Promote the warmth of the body by the application of hot flannels, or hot-water jars to the pit of the stomach, arm-pits, and to the soles of the feet; if the power of swallowing has returned, small quantities of wine, warm brandy and water, or coffee should be administered. On no account place the patient in a warm bath unless under medical orders.

Further instructions.

176. Prevent unnecessary crowding round the patient, especially if in an apartment. Avoid rough usage, and do not allow the patient to remain on the back unless the tongue is secured. Under no circumstances hold the patient up by the feet.

Artificial respiration must also be resorted to in cases of suffocation either from the fumes of charcoal or *choke damp*, in mining accidents, or from hanging, also in cases of lightning stroke, severe electric shock, chloroform poisoning, &c.

Shock, Loss of Consciousness, and Fits.

Symptoms of shock.

177. *Shock* is the constitutional disturbance caused by severe injuries, such as extensive burns or severe crushing of limbs. The symptoms are as follows :—The patient becomes cold and is pale, almost voiceless and pulseless, is seized with fits of shivering, which may continue for a considerable time, and he may break out into a cold perspiration.

Treatment.—Reaction must be promptly brought about by placing the patient in bed with the head low, restoring the warmth to the body by warm blankets, hot water jars to the feet, and by administering hot drinks with small quantities of stimulants.

Symptoms of concussion.

178. *Concussion* or *stunning* is a variety of shock caused by injury to the brain, generally from a blow or fall on the head. The symptoms resemble those of shock, but are generally accompanied by a more confused and bewildered state of the patient.

Treatment.

The treatment is as for shock, but stimulants are not to be given without orders.

Fainting.

179. *Fainting fits* may be caused by over-exertion in hot weather or heated rooms, or by getting into the upright position when weak from disease. A fainting fit is distinguished by the patient falling down in a helpless condition generally insensible without

convulsions. The face and lips are pale, and the surface of the body cold, often covered with a clammy perspiration.

Treatment.—Lay the patient on his back with his head low and loosen the clothes about the neck and chest. Sprinkle cold water on the face and neck. Apply smelling salts to the nose, and, when the patient is able to swallow, administer stimulants in very small quantities. Fresh air is a necessity.

Epilepsy.

180. *Epileptic fits* are due to constitutional or local causes. The patient falls down with a scream, is insensible, is convulsed, throws his arms and legs about, foams at the mouth, and often bites his tongue, making it bleed ; the face is livid.

Treatment.—Lay the patient on his back with his head slightly raised ; loosen the clothes about the neck and chest, and prevent him biting his tongue by placing a cork or piece of wood between his teeth as a gag. Employ only sufficient restraint to prevent him injuring himself, but avoid pressing on the chest ; it will be sufficient if one man restrains the patient's legs,—kneeling by his right side and placing the right arm across the knees to do so ; a second attendant lightly restrains the patient's right arm, and a third the left arm, and also watches the head.

No treatment will cut short an epileptic fit.

Apoplexy.

181. *Apoplectic fits* occur mostly in elderly and stout persons. The patient falls suddenly insensible. The face is red, the breathing loud and snorting, and the pupils frequently of unequal size.

Treatment.—Raise and support the head and upper part of the chest. Loosen the clothes about the neck. Apply cold water to the head. Do not give stimulants.

Compression.

182. *Compression* of the brain is the result of severe injuries to the head, such as fracture of the skull ; the symptoms resemble those of apoplexy, and the same precautions should be taken.

Sunstroke.

183. *Sunstroke* or heatstroke, which is the result of excessive heat, occurs in hot climates or summer weather. The patient falls suddenly, generally insensible, sometimes in convulsions, the skin feeling burning hot to the hand.

Treatment.—Carry the patient at once into the shade, and if in a room into the open air. Raise the head and remove the clothes from the neck and upper part of the body. Douche the head, neck, chest, and spine with cold water. Avoid crowding round the patient. Do not give stimulants.

Alcoholic poisoning.

184. *Drunken fits* are caused by the drinking of a large quantity of alcohol at one time. They occur suddenly, but may not come on for some time after the liquor has been taken. The patient falls into a deep stupor, there is a ghastly vacant expression of the countenance, which is sometimes red and bloated. The lips are livid, the pupils dilated and fixed, and the breath smells strongly of liquor.

Treatment.—Place the patient on his side with head slightly raised and do not allow him to lie on his back, or on his face. Remove all constrictions from the neck and chest. Induce vomiting by tickling the throat with a feather. Have the stomach pump ready in case the officer, on his arrival, should decide on using it.

Fractures and Sprains.

185. The immediate treatment of fractures is laid down in paragraph 73, and that of sprains in 92.

Frost Bite.

Frost bite.

186. *Frost bite.*—This condition is the result of exposure to excessive cold. It affects the nose, ears, fingers, or feet; the part tingles and becomes blue; in the more severe cases white and free from pain. The treatment is to rub the affected part with snow or cold water, avoiding taking the patient into a warm room until the part has been thoroughly but very gradually thawed.

Poisoning.

General symptoms of poisoning.

187. A case of poisoning is recognised by (1) the sudden appearance of the symptoms in a person otherwise healthy, by (2) the symptoms coming on soon after food or drink has been taken, and, if after a meal of which many have eaten, the symptoms will then be complained of by several, or all who have partaken of it. The symptoms vary in character, and the treatment will depend on the poison taken.

Use of emetics and stomach pump.

188. In the table given in the next paragraph, emetics are recommended in some cases, and these should be administered in accordance with the instructions contained in paragraph 120. Emetics should not be given in poisoning by mineral acids, caustic alkalis, oxalic acid, or other corrosives. The stomach pump may be required in arsenic, opium, strychnine, or alcoholic poisoning, and will be in readiness for use by the officer.

189. Table of Poisons.

Poison.	Symptoms.	Emetics, &c.	Antidotes, &c.
1. Strong mineral acids 2. Caustic alkalis 3. Oxalic acid .. 4. Corrosive sublimate 5. Chloride of zinc 6. Chloride of antimony	*Immediate* burning pain in mouth, throat, and stomach, rapidly extending to abdomen. Vomiting occurs early, followed by purging. Speedy death from shock, exhaustion, or suffocation.	Emetics not to be given, nor stomach pump used.	1. Magnesia (calc. or carb.), 2 to 4 oz. to a pint of water, and 2 oz. for a dose at a time; or soap and water, or chalk, whiting, or wall plaster in water. 2. Lemon juice or vinegar. 3. Chalk and water; magnesia or whiting in water. 4. Raw eggs abundantly; flour made into a paste; milk. 5. Solution of sodii bi-carb., immediately followed by raw eggs. 6. Tannic acid in any form; tea, nutgalls, bark, or other astringent solutions or tinctures.
7. Arsenic .. 8. Tin .. .. 9. Lead .. .. 10. Copper.. .. 11. Phosphorus .. 12. Iodine .. .. 13. Cantharides ..	Here the symptoms vary considerably: usually there is *considerable delay* in their appearance. After a time pain and great dryness of the throat, great thirst, nausea and vomiting; hiccup, loss of voice, cold sweats. Death will occur from shock or exhaustion.	Stomach pump may be required and emetics to induce vomiting.	7. Recently prepared iron peroxide, formed by precipitating tinct. ferri. perchl. by caustic ammonia ½ oz. of the precip. for a dose; raw eggs and milk; oil and lime-water. 8. Carb. ammonium in solution, or white of egg. 9. Magnesia or soda sulphate. 10. Raw eggs and milk. 11. Magnesia or chalk mixed in gruel. 12. Starchy fluids, gruel, &c. 13. Thick warm liquids, linseed tea, &c.

Symptoms of and antidotes for particular poisons.

TABLE OF POISONS—*continued.*

Poison.	Symptoms.	Emetics, &c.	Antidotes, &c.
14. Irritant gases	Headache and drowsiness ..	None required.	14. Cold affusion; artificial respiration; fresh air.
15. Opium (morphia) ..	Giddiness, headache, dim sight, contraction of pupils, drowsiness passing into insensibility.	Stomach pump may be required.	15. Keep the patient roused, walking him about in the open air quickly; strong coffee; tannic acid; cold affusion to head and chest.
16. Belladonna .. }	Delirium, illusion of the senses, thirst; dilated pupils.	Sulphate of zinc.	16. } Animal charcoal. Tannic acid. Strong
17. Hyoscyamus .. }			17. } coffee.
18. Strychnine	Violent paroxysms of rigid convulsions, with great suffering; lockjaw. Mind not much affected.	Stomach pump usually required.	18. One or two tablespoonfuls of powdered animal charcoal in water; keep all quiet round the patient; support strength with beef tea and brandy.
19. Prussic acid	Death by shock, and the action so rapid as not to allow of any special symptoms.	Stomach pump or sulphate of zinc if the clenched jaws can be separated.	19. Restore animation by repeated cold affusions over head and neck; smelling salts to nostrils; brandy. Give magnesia, or sodii bi-carb. Artificial respiration.
20. Carbolic acid	Breath smells strongly of the acid; intense burning pain from mouth to stomach. Immediate giddiness. White, leathery appearance of mouth.	Mustard or sulphate of zinc.	20. A mixture of olive and castor oils, with magnesia in suspension; raw eggs beaten up with sugar, *ad lib.*
21. Aconite..	Numbness and tingling; feeling of constriction, and burning in the throat.	Sulphate of zinc.	21. Friction to limbs and spine with hot towels; stimulants.
22. Lunar caustic.. ..	Immediate vomiting usually ..	Should not be given.	22. Solution of common salt, or sal-ammoniac, or sea water.

12. MANAGEMENT OF WARDS.

General instructions.

190. Hospital wards must be kept clean, and free from dust which always contains germs, which in their turn may produce disease; wards must be well ventilated, with a full supply of pure air, but without a draught.

The ventilation and warming can be regulated by means of the doors, windows, ventilators, and fires.

Arrangement of furniture, utensils, &c.

191. Every attendant in charge of a ward is responsible for its proper management. The furniture should be neatly and systematically arranged, and the utensils and other articles kept each in its appointed place. The head of the bedstead should be not less than 6 inches from the wall, the towel spread out on it to dry, and the chamber utensil and boots arranged as shown in Fig. 39. The diet board will be suspended on the wall over the head of the bed. On the top of the bedside table, which should be in a line with the bed-head, will be arranged the mug, bowl, plate, butter-pot, knife, fork, and spoon; on the centre shelf the comb and brush, and books; and on the lower shelf articles of clothing, neatly folded. Should the bedside table be provided with only one shelf, then all these articles must be arranged to the best advantage on it. The cap will be placed on the bracket. As soon as the towel is dry, and in any case before the morning visit, it should be neatly folded up and placed, under the comb and brush, on the centre shelf.

Cleaning floors.

192. Every morning the floor of a ward will be swept and then well dry-rubbed and afterwards again swept. Much depends upon the manner in which this is done. If a floor be well dry-rubbed every day, it will smooth and polish the surface of the boards and prevent the dust from adhering to them, thus obviating the necessity of washing them so often as would otherwise be the case, which in itself is a matter of great importance to the welfare of the sick.

Using the long scrubber.

In using the long scrubber the following are the main points to be attended to:—That the scrubber be forced firmly and evenly along the floor in the direction of the grain of the wood; that the stroke be not too long, and that each successive stroke of the scrubber partly covers the previous one. After the floor has been thoroughly rubbed over it will require to be swept clean, and in doing this there are a few points to be attended to, viz., that the brush is not jerked but pushed smoothly, so as to raise the dust as little as possible, and, instead of sweeping the dust over the floor from the one end of the ward to the other, it should be collected in small heaps, each being put into the dust-pan, until the whole of the floor is swept, when it can be put into the dust-box for removal from the ward.

Washing floors.

The floor of a ward will never be washed without the permission of the officer. (*See* Standing Orders 300.) A dry day should be chosen for the purpose, and the washing ought to be done as early as possible in the day. Before commencing, the floor should be swept clean, and the attendant should have a hand scrubber, some soft soap, two pieces of old blanket or flannel (one to put the clean water on the floor and the other to mop up the dirty), two buckets of hot water, in one of which some soda is placed, and the other kept to wring the flannel in after it has mopped up the dirty

water. Leaving dirty water marks on the floor should be avoided, and the whole should be wiped as dry as possible. When anything is spilt upon the floor it should at once be carefully wiped up and the surface cleaned with a little hot water and soda, and dried and brushed.

Polishing floors.

Where the floors are polished they require to be first swept and then polished with beeswax and a long scrubber. To apply the beeswax it should be lightly rubbed on the scrubber or on a piece of flannel bound over the scrubber, and thus applied to the floor.

Cleaning windows.

193. The woodwork of windows should be cleaned by washing it with warm water and soap. The glass itself is cleaned by smearing over it a mixture of whitening and water, about the consistence of cream, allowing it to dry, and then polishing it with a clean thoroughly dry duster. This mode of cleaning is not always necessary, for if the glass be wiped over daily with a duster it will generally suffice to keep it in good order. The cloths used should be free from nap or fluff.

Cleaning walls.

194. The walls of wards should be frequently dusted, and cobwebs removed with a duster tied over the top of a long hair-broom. Cement walls, in addition to dusting, require to be occasionally washed with hot water and carefully dried.

Cleaning stoves.

195. In cleaning a stove care is required that other things are not dirtied. A good plan to prevent this is to hold a thin strip of wood with one hand against the surrounding wall, while the brush is used with the other. The blacklead should be made into a thin paste and applied with a small round brush over every part that is to be blacked. When the blacklead is dry on the stove, the polishing brush is to be used briskly until every part of the iron-work shines. The ends of the fire-irons are cleaned in the same way as the stove, the bright parts rubbed with bath brick and a piece of leather or course cloth.

The best time for cleaning a fire-place is before the fire has been lighted; but as this can seldom be done, it should be cleaned immediately afterwards before it gets hot.

Cleaning paint work.

196. The paint-work of a ward will require to be occasionally scrubbed with hot water and soap. Soda should not be used, as it soon destroys the paint.

Cleaning furniture and utensils.

197. Tables and forms should be scrubbed with hot water and soap. Tumblers and such articles are best washed in cold water; it gives them a better polish and does not crack them. Mugs, basins, and such like must be washed in hot water. Vessels of tin and white metal are best cleaned by washing them with hot water to remove the grease, and then polishing them with whitening. In washing knives and forks the blades only should be placed in hot water. Coal scuttles and brasses should be polished with a paste made of finely-powdered bath brick and water, and rubbed with a piece of leather or coarse cloth. When the brasses are very dirty they should be washed with hot water before being polished.

Dusting.

198. Every ward should be dusted at least once in the day. In doing this great care is necessary, for if a dry duster be flipped about, as is frequently done, it merely raises the dust into the air

to be again deposited in the same place or elsewhere. The duster should be slightly damp, and every article requiring to be dusted should be wiped over with it. By this means the cloth will take up the dust and not drive it from one place to another.

Emptying slops.

199. Slops should not be allowed to remain in the wards. All ward slops, such as the contents of chamber pots, bed urinals, bed pans, expectoration cups, washings of sores and wounds, and water used for washing bedridden patients, should be thrown down the slop closet, where such is provided ; but where this does not exist, they must be thrown down the water closet, care being taken in doing so not to soil the seat. Slops are never to be emptied into the sink. Old dressings, such as lint, poultices, tow, plasters, &c., should on no account be thrown down the slop closet or water closet, as they will block the pipes. Such articles should be removed to the dust heap to be burnt. (Refer to Standing Order 300.) The utensils from which slops have been emptied must be well washed, by running water freely into them from the tap, and using disinfecting fluid when necessary. They will then be dried, and cloths used for this purpose must be carefully washed, dried in the open air, and not used for any other purpose.

Old dressings, poultices, &c., to be burned.

Warming.

200. The stoves in use in military hospitals are either set in the wall or stand in the centre of the room. The fires should be properly built up before lighting, and afterwards so replenished with fuel as at all times to be bright and cheerful, and not allowed, as is too often the case, from their having been too long neglected and then heaped up with a large quantity of coal, to become a mere spark, half smothered in cinders and coals. The temperature of the ward should be kept as near 60° F. as possible, and sudden alterations of heat and cold avoided as far as practicable.

Lighting by gas.

201. Where gas is used in wards it should not be kept higher than is necessary to give sufficient light, as the combustion of the gas renders the air impure, and the greater the quantity burned, the more impure will the air become ; moreover, too bright a light is often distressing to patients.

Ventilation.

202. By ventilation is meant the changing of impure for pure air in an apartment. If the air of a ward be not constantly changing, it becomes loaded with impurities given off from the lungs, from the skin, from the excretions of the occupants, and from combustion.

Effects of bad air.

The effect of an atmosphere thus rendered impure is to favour the development of fevers, the spread of gangrene, erysipelas, and other diseases, to retard the healing of sores and wounds, and to lower generally the health of patients.

Principle of ventilation.

The principle to be kept in view is, that the air within the ward shall be, as nearly as possible, as pure as that outside the building, while at the same time the temperature is maintained at the proper standard. To effect this the air of the ward must be constantly changing, fresh air entering as impure air escapes. There must therefore be both inlets and outlets. In hospitals the inlets are so arranged that the amount of air entering by them can be regulated by opening or closing them. They are so placed that the air, as it enters, is diffused generally over the apartment, and currents of air with a high degree of velocity, that is to say, draughts, are thus

Air inlets.

prevented. Sheringham's ventilators placed in the walls, and Moore's louvre ventilators in the windows, are the inlets most generally employed. Galton's stoves also have a channel communicating with the outer air, and opening into the wards, by which means

Air outlets.

air, heated in its passage, is admitted into the ward. The outlets are generally placed in the ceiling, and lead into a shaft. The chimney also acts as an outlet. By means of these several openings an interchange of air is constantly carried on. The air within, as it becomes heated and impure, ascends and passes away through the outlets, while the pure air from without, being colder and consequently heavier, rushes in through the inlets to supply its place, and thus a continuous current is established. Where these means

Opening of windows.

of ventilation are insufficient, they may be supplemented by drawing the window sashes down from the top, but they should not, as a rule, be raised from the bottom.

Test of good ventilation.

If the ward is properly ventilated there should be no smell perceptible on entering it from the open air, the temperature should not exceed 60°, and there should be no draughts.

Making beds.

203. The comfort of a patient depends much upon the manner in which his bed is made. Care should therefore be taken to keep it as comfortable as possible. Before making up the bed, the whole of the bedding should be thoroughly aired, and afterwards well shaken, particular care being taken to remove all lumps and irregularities from the mattress. A bed is very apt to become hollow in the centre. This may be caused by the lacing of the sacking getting slack, which defect should be at once remedied by tightening the cord. If due to packing, the mattress should be well shaken up and turned over.

These preliminaries being attended to, the mattress is laid on the sacking, and a blanket spread out evenly over the mattress ; the sheet is now laid out over the blanket, leaving sufficient of the former at the head end of the bed to roll round the bolster, which is then placed across the sheet and enveloped in it. Both blanket and sheet being smoothed out free from folds or wrinkles, should then be tucked firmly and neatly under the edges of the mattress. This tends to keep them smooth, and prevent them getting into folds. The pillow, having first been well shaken, should be placed on the bolster. The oversheet, the blankets, and counterpane are now spread, tucked in round the sides and the foot of the mattress, and neatly folded down at the head.

Lacing the bed sacking.

The following are the directions for lacing the bed sacking :— Pass the ends of the rope from below upwards through the two centre holes at the head end of the bed frame, equally dividing it so as to have its centre between the two centre holes. Pass an end from above downwards through each of the two centre holes of one end of the sacking, work round towards the two sides, passing the rope ends alternately through the holes in the framework and sacking, from below upwards in the former, and above downwards in the latter. Each corner eyelet in the sacking must have four strands of rope passed through it, namely, those from the last two holes of the head end and the two first of the side. This ensures the head end of the sacking being opposite the second side hole, and the other end in a corresponding position from the foot of the

bed. The lacing is continued down the sides and round the corners at the foot end in a similar manner, the ends being secured in a firm hitch when the lacing is completed at the centre of the foot. The sacking and rope must be pulled perfectly taut before fastening off.

204. The bedding of patients who are able to get up will be folded up in the following manner:—The bed-clothes, pillow, and Folding up beds.

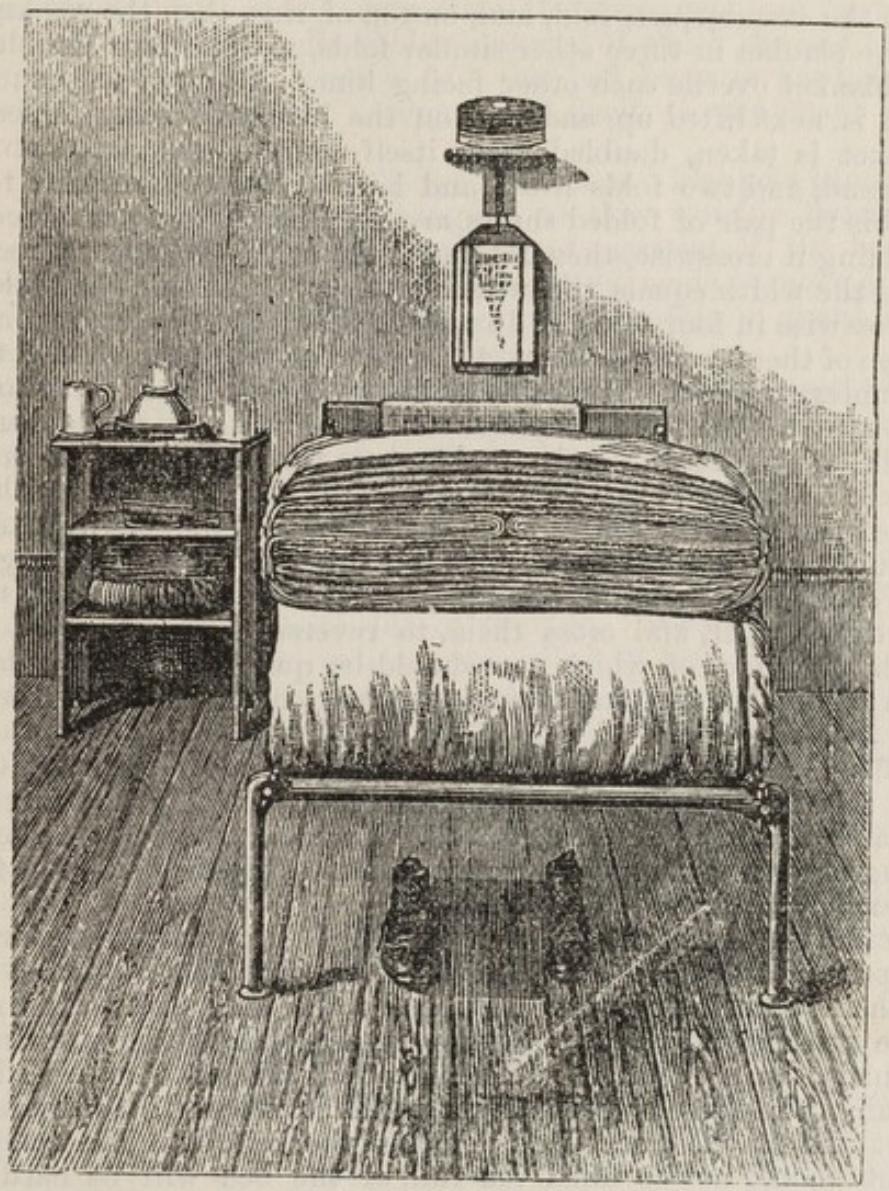


FIG. 39.—HOSPITAL BED AND BEDSIDE TABLE.

bolster having been removed from the bed, and placed on a form or chair close by, the pillow will be laid across the mattress at the foot of the bed, and on it the bolster; the attendant, now placing himself at foot of the bed, will roll the mattress, pillow and bolster twice over into as compact and even a roll as possible, drawing the mattress towards him as he does so, and will then arrange it in a line with the end of the bedstead. The next step will be to fold and

arrange the bed-clothes neatly on top of the roll formed by the mattress. The counterpane is first taken and spread out lengthwise across the bedstead, and with the "right" side downwards; the side border next the foot of the bed is then turned over upon itself to the extent of about 6 inches, and the fold so formed then drawn down, and laid across the centre of the roll of mattress. A blanket is next taken, doubled up on itself lengthwise, and placed on the bedstead; this the attendant now takes hold of, draws a fold of it towards him (the fold should be about 10 inches wide), and lays it on the counterpane fold, and, on top of this, then the remainder of the blanket in three other similar folds, so that four doubles of the blanket overlie each other facing him. A fold of the counterpane is next lifted up, and laid on the blanket folds. A second blanket is taken, doubled upon itself lengthwise, placed on the bedstead, and two folds lifted and laid on the counterpane fold; on this the pair of folded sheets are then laid (a sheet is folded by doubling it crosswise, then folding it again in the same direction until the width equals the width of the mattress roll, then folding it crosswise in four folds, and lastly doubling these folds over once); on top of these two more blanket folds, and on top of the blanket folds a counterpane fold. The third blanket will then be taken, arranged in four folds—in a similar manner to the first blanket—and laid on top of all. When there are only two blankets the package of bed-clothes will be so arranged as to have the blankets in four folds with the folded sheets in the centre, separated from the blankets by a fold of counterpane on either side. The last thing to do is to bring the free ends of the counterpane up to meet each other, to draw them tightly together, and cross them, to reverse the package of bed-clothes, the face of which now should be quite square towards the man folding the bed, and arrange it neatly on the centre of the roll (fig. 39).

Preparing an air-bed.

205. An air-bed is laid on the top of the ordinary mattress, the smallest of the three compartments of the bed being laid towards the head of the bedstead. Each compartment of the bed being distinct and separate from the others, will require to be filled separately in the following manner:—

Insert the nozzle of the small round bellows provided for the purpose into the inlet tube, and turn the ferrule on the inlet tube to the left until it stops. This opens the inlet, and at the same time attaches the bellows. Pump in air with the bellows in the ordinary way. When sufficiently full the inlet is closed by turning the ferrule to the right until it stops. This closes the inlet and at the same time detaches the bellows. The compartments should not be filled too full, or the bed will be hard and unyielding, but should contain just sufficient air to render them soft and elastic. As air-beds usually leak, the bellows should be kept at hand and fresh air forced in occasionally to replace that lost by leakage. At least two under-blankets should be laid on to absorb perspiration, and the bed made in the usual way.

Preparing water-bed.

206. A water-bed is placed on the ordinary hair mattress, with the funnel or opening by which it is filled towards the foot of the bedstead. The foot of the bedstead should be raised four or five

inches by a couple of bricks under the two lower feet. By this the water when poured in will run towards the head of the bed. One person taking charge of the funnel, holds it firmly in an upright position. Water at a temperature of about 70° F. should now be poured in until the bed is about three-fourths full. The mouth of the inlet should now be secured, and the bed made in the ordinary manner, using, as in the case of the air-bed, at least two under-blankets to absorb perspiration.

Cold water must not be used to fill a water-bed, as it is liable to chill the patient; at the same time, the water must not be too hot, or it will injure the india-rubber material of which the bed is made. If more than three-fourths full the bed becomes hard and unyielding, and does not accommodate itself to the shape of the body.

Both on air and water-beds the sheet and blankets beneath the patient require frequent changing, as they quickly become wet from perspiration, which the waterproof material of the bed does not allow to escape. No attempt must be made to move a water-bed when filled; it must first be emptied in order to guard against such an expensive article being torn or strained.

The draw-sheet.

207. Where there is a discharge of any kind from a patient, the bed should be prepared in the following manner:—A waterproof sheet should be laid across the bed where it is necessary to protect it, and over this a draw-sheet is placed. The draw-sheet is made by folding an ordinary cotton or linen sheet lengthwise to nearly the same breadth as the waterproof sheet on the top of which it is placed. One end is tucked in under the mattress, and the other rolled up on the opposite side of the bed. When the part of the draw-sheet under the patient gets soiled, it may be withdrawn a little towards one side of the bed, and thus a dry part can be constantly kept under the patient without the necessity of replacing it by a fresh sheet whenever it is soiled. In cases of amputation, where, to support the stump, pillows are used, precautions should be taken to keep them dry by covering them with waterproof material of some kind.

Fracture-bed.

208. A fracture bed is made by placing the mattress upon a set of boards specially provided for the purpose, in order to produce a firm and even surface. A 6ft. table can be used instead.

13. THE NURSING OF HELPLESS PATIENTS.

General instructions.

209. It is the duty of attendants to pay the greatest attention to the feeding of, and administration of medicine to, the sick.

The patient must have no food except that which has been ordered him by the officer in charge of the case.

Disobedience of this rule may result in the death of the patient. Medicines must be administered with the utmost regularity (see paragraph 112).

Causes of helplessness of patients.

210. Patients may be helpless from a variety of causes: from weakness, from paralysis, or from injury, and it is of great importance that attendants should be acquainted with the easiest, gentlest, and safest methods of lifting and laying them. When patients are weak, or have been a long time in bed, the tendency

Tendency to faint.

they have to faint when moved into an erect position should be borne in mind. Thus when lifting or laying such patients, they should be kept in the horizontal position as far as possible. This is taken into consideration in the methods recommended for performing the offices for helpless patients described in paragraphs 211 to 217.

Lifting and laying a helpless patient.

211. There are three methods of lifting and laying a helpless patient.

First method : An attendant takes up a position on either side of the patient, and, stooping, each passes one hand under his back at the lower part of the shoulder-blades, locking them together, the other hands are passed under his thighs, close up to the hips, locking them also. Rising together, they steadily raise the patient and carry him in the horizontal position. Where the leg is injured, both lower extremities will be supported by a third attendant.

Second method, where Captain Russell's stretcher is provided : This stretcher consists of two poles connected by strips of webbing and two cross-bars. To use it, one pole is removed, and the other, with the webbing attached to it, is laid by the side of the patient. The looped ends of the strips of webbing are passed under the patient, and the pole, which was removed, passed through the loops. The cross-bars being put into proper position, an attendant takes hold of the handles at each end, and carries the patient as if on an ordinary stretcher. When the patient has been laid down, one pole is removed, and the strips of webbing thus set free withdrawn from under him.

Third method : A patient can be lifted with great ease and comfort by four attendants, two poles six feet long, and the blanket and under sheet. One pole is placed at each side of the patient, and the sheet and blanket firmly rolled round it. The four attendants take up a position, two at each side, facing the patient. Each grasps with one hand the end of one of the poles surrounded by the sheet, and with his other hand the pole near its centre. Acting together the patient is steadily raised and carried, feet foremost, over the foot of the bed.

Remaking bed for a helpless patient.

212. When the bed of a helpless patient is to be remade, a second bed should be prepared to take the place of the one in use, the patient being lifted from one to the other. The new bed should be placed by the side of the old one, but sufficiently distant to allow space for attendants to move freely between the two. The patient may be lifted by any one of the three methods just described, and being moved feet foremost over the foot of the old bed, so as to clear it, he is carried head foremost over the foot of the new bed, and steadily lowered into his proper place.

Changing an under sheet.

213. The under sheet may be changed by either of the following methods, as directed by the officer :—

First method : Roll up lengthwise half of the dirty sheet, and push the roll as far under the side of the patient as possible. Next roll up one-half of the clean sheet and spread the other half over the side of the bed from which the dirty sheet has been removed, and tucking it under the mattress, place the roll alongside the roll of the dirty sheet. This done, gently raise the patient at the

opposite side and turn him over the rolls of sheets. Then take away the dirty sheet and unfold the clean one, and tuck it neatly under the mattress, when the patient may be turned into his old position.

Second method: Gently raise the patient nearly into the sitting posture, and roll the dirty sheet from the head of the bed downwards, and push the roll as close under the hips as possible. Next roll up crosswise half the clean sheet, and lay the roll by the side of the roll of the dirty sheet, and spread the other half over the pillow and that part of the bed from which the dirty sheet has been removed. Now lay the patient down, and raising the lower extremities and hips, draw away the dirty sheet, unfold the clean one, spread it out, and tuck it in under the mattress.

214. A draw-sheet requires to be frequently changed, in addition to a fresh part of it being brought under the patient as often as one part becomes soiled. Changing a draw-sheet.

To bring a fresh part under the patient, the hips of the patient should be raised by two attendants, each passing a hand and locking them under the thighs, and when thus raised the folded sheet is gently pulled, without the waterproof, towards one side.

To change the draw-sheet, both the folded sheet and the waterproof should be removed; this may be done in the same way as the first method for changing an ordinary sheet, or the patient may be raised by two attendants as just described, and the dirty sheet removed and the clean slipped in.

215. Weakly patients frequently require to be raised in bed. This may be done by pillows, by a bed with a head-lift, or by a head-lift which can be slipped in under the mattress and worked by a rack and pinion. When pillows are used they should be placed under the patient's back as well as his head, sloping up from his back gradually to where a pillow is placed for the head to rest upon. If merely piled one on top of the other under his head, and not arranged so as to support his back, the chin is pressed forward on the chest, a position which is very irksome to the patient and obstructs his breathing. Raising helpless patients in bed.

When the upper part of the body is raised by any of the methods described, there is a great tendency for the patient to slip down towards the foot of the bed. A foot-board with a pillow for the feet to rest against will prevent this, but often the patient cannot bear his feet against the board. Under such circumstances an air or water pillow, either horse-shoe shaped or circular, with a hole in centre, may be put under the hips of a patient, and tied by two tapes to the head or sides of the bed, and thus a fixed point will be opposed to the hips slipping down.

216. When it is necessary to give food, drink, or medicine to a helpless patient, the head and, if possible, the upper part of the body should be raised. For fluids a feeding cup may be employed. Where this is not provided, a spoon, a glass, or mug may be used. When a glass or mug is used, the precaution should be taken of only half filling it, as otherwise the fluid is sure to be spilt. Feeding helpless patients.

217. The bed-pan should be used with the greatest care, and with as little disturbance as possible to the patient, who should not The bed pan for helpless patients.

be exposed more than is absolutely necessary, lest he catch cold. There are two kinds in use, the circular and the slipper. When the circular bed-pan is used, the patient must be lifted by two or three attendants by the first method described under the head of lifting a helpless patient, and the pan slipped under him. With the slipper bed-pan the patient should be raised at one side, and the thin edge shoved in under the hips. The bed-pan before being used should be warmed (dipping it in water at about 110° will effect this) and sufficient carbolic or other antiseptic fluid poured in to cover the bottom of the pan. While being removed from the ward it should be placed in the receptacle, where one is provided for the purpose, or covered with a cloth or duster.

Bed-sores.

218. Bed-sores generally occur on those parts which are most subject to pressure, viz., the skin over the back and prominences of the hips and the heels. When using the bed-pan, washing the patient, or changing sheets, the attendant should watch carefully for any signs of approaching bed-sores, and report to his officer. If the skin is red and tender it should be bathed with spirits of camphor, or equal parts of spirits and olive oil, or painted with a solution of gutta-percha and chloroform, and the sheets sprinkled with finely-powdered starch or arrowroot. The use of a water-bed affords the best preventative against bed-sores; and the parts threatened may be individually protected by judiciously-applied rings of soft material, such as cotton wool wound round with a loose wove bandage. In all cases the sheets must be kept free from wrinkles and any trace of crumbs.

14. THE OBSERVATION OF THE SICK.

Necessity for noting symptoms.

219. Symptoms are the signs of disease on which the medical officer has to depend to determine its nature, its severity and danger, the treatment, and the probability of recovery. It will thus be understood how important it is that the attendant should be able to note any change in the symptoms of a patient during the absence of the officer.

General appearance of a patient.

220. The appearance of the patient will very often show whether he has changed for the better or worse. The expression of the face may be that of pain, anxiety, or vacancy. On the other hand, it may be calm, hopeful, and intelligent. The colour may be bright red, congested and dark, or pale. The lips may be crimson, purple, or white and bloodless. The nose may look pinched. The cheeks may be sunken and the temples hollow. The eye may be glassy and staring, or dull and heavy. The patient may lie in a listless, careless manner, or he may be restless and toss about; or again he may be picking at the bed-clothes, and his movements tremulous and uncertain.

Position in which he lies.

The position in which he lies should also be noticed; whether he lies on his back or on his side, with his legs drawn up or stretched out. Patients helpless from extreme weakness have a tendency to slip down towards the foot of the bed, which should be watched for and rectified.

Intelligence.

221. The attendant should observe whether a patient shows his usual intelligence and interest in his surroundings or whether he

appears to be dull and stupid, or only rousing himself when spoken to. He may show mental derangement, which is called delirium, and may be boisterous, or low and muttering: so slight that the patient can be recalled to himself and for a time speak rationally, or so severe that it will be impossible to arouse him from it. In it the patient may see objects and hear sounds which do not exist, and speak and act as if these sights and sounds were real. It occurs more frequently during the night than in the daytime. A close watch should be kept on delirious patients lest they should get out of bed and escape from the ward, throw themselves out of the window, or do themselves or others some bodily injury. Delirium.

The manner of a patient should be observed. It may be calm and collected, excited, depressed, or in some way differing from his ordinary manner. Manner.

The temper also of a patient may vary. At one time he may be irritable, peevish, and easily annoyed, while at others he may be quiet, good-tempered, and easily pleased. Temper.

222. It should be noted how long the patient sleeps; whether his sleep is disturbed, whether it is sound and calm, and accompanied or not by heavy breathing. It sometimes happens that a patient will report that he has not slept "a wink" at night, when in reality he has slept well; so that it becomes necessary not to rely too much upon the patient's statement with regard to sleep. Sleep.

223. Pain is an accompaniment of most diseases. It varies much in its nature and modes of occurrence. It may come and go or be continuous, wander about or be fixed, or it may moderate for a time and again come on with greater severity. It also varies much in degree, from mere uneasiness to agony. It may be dull, aching, smarting, burning, tingling, or throbbing. The statements of the patients have to be relied on as regards the existence of pain, but its degree may be generally judged from the expression of the countenance and the tone of the voice. The time of attack, the duration, the cessation, the degree and character of the pain should all be carefully noted. Pain.

224. The condition of the skin should be watched, especially in fevers and inflammations; whether it is dry, moist, or perspiring, hot or cold, pale, red, or shrunken. The skin, from being cold, may become hot, then moist and perspiring. The time at which such changes occur should be carefully noted. State of skin.

Associated with the condition of the skin is the occurrence of shivering, or rigor, a symptom which should never be overlooked. Any rash or eruption making its appearance on the skin should also be carefully noted. Shivering and eruptions.

Fig. 40.—Clinical Thermometer.

225. The temperature is taken by means of the clinical thermometer, which is self-registering, and so does not require to be read while in position. The index of the thermometer consists of a small piece of mercury detached from the column in the stem of Use of clinical thermometer.

the instrument, which must be set before commencing to take an observation.

To set the index it must be brought down into the clear part of the stem just below the lines indicating the degrees. This is done by taking the thermometer firmly in the hand, and then by one or more rapid swings of the arm the index can be brought down.

When the index has been set, the bulb of the instrument is placed in the arm-pit, or any part where it can be completely covered by the soft parts, and after having been retained in position for five minutes, the instrument is carefully and gently removed. The top of the index, namely, the end farthest from the bulb, will denote the maximum temperature during the time the instrument has been in contact with the part.

Normal temperature.

The normal temperature, that is, the temperature of the body in health, as registered by the thermometer, is 98·4°.

In ascertaining the temperature, care should be taken that the clothes do not come between the bulb of the thermometer and the skin, and that no hot-water bottle, poultice, or anything which might affect the temperature, is near it. Clinical thermometers will be carefully washed with antiseptic solution before and after use.

Temperature observations.

226. Temperatures are recorded upon an official chart (Army Form B 181), the heading of which must be accurately filled in, the chart mounted upon a piece of card-board and hung over the patient's bed. Each temperature observation is recorded by placing a dot upon a line corresponding with the height of the temperature exhibited by the clinical thermometer, and under the proper column for the day of observation. As a general rule these observations are made twice daily, *i.e.*, in the morning and evening, but in important and critical cases it may be necessary to repeat the observations every two, three, or four hours. The dots on the chart which represent each observation are day by day connected by a carefully ruled line. By this means the variations of the temperature may be seen at a glance.

In fevers, an evening temperature of 103° is of frequent occurrence. A temperature of 104° or over must be at once reported to the wardmaster, for the information of the officer in charge of the case.

Respiration in disease.

227. The signs presented by respiration are of the highest importance. In diseased conditions it may be frequent or slow, rapid or prolonged, forcible or feeble, spasmodic, wheezing, or stertorous, and it may be difficult or laboured so that the patient cannot lie down.

Associated with disturbed respiration may be sneezing, coughing, hiccough, or a blue and congested state of the face and upper part of the body.

Cough.

228. Cough is a sign of irritation in the air-tubes, and shows that an attempt is being made to get rid of some matter interfering with respiration. It may occur occasionally, incessantly, or in paroxysms. It may be dry, that is to say, without expectoration, or moist, that is, with expectoration. It may be short and hacking, harsh, or hollow. It may occur at some particular time of the day or night, and not at other times. Whatever character it presents should be carefully noted.

229. Expectoration is the act of coughing up matters from the air passages. The matter expectorated is called *sputum*. Every patient who expectorates should be provided with a spitting cup, and the sputum should be kept for the medical officer's inspection. The sputum may be watery and frothy, yellow, thick, and purulent; rusty, or streaked with blood; or it may consist for the most part of blood, and then constitutes *hæmoptysis*. Expectoration.

Should blood be present, it should be carefully observed whether the patient coughs it up, vomits it, or brings it up from the back of the throat, the mouth, or the gums (*see* paragraph 169). While in use in the ward some disinfecting solution should be kept in the spitting cup, and the cup must be emptied at least once a day, after having been inspected by the officer in charge of the case.

230. The quantity and character of the urine and the manner in which it is passed vary in disease. The patient may pass it more freely than usual, with or without pain, in a large or small stream, even in drops, or he may be unable to pass it at all, a condition which is called *retention of urine*. Urine.

The quantity may be increased, or diminished, or even suppressed altogether. The colour may vary from pale yellow to smoky red, and there may or may not be a deposit. If urine is kept for the officer's inspection and examination, it should be placed in a clean glass vessel, having a cover of paper, on which is written the patient's name and number and the date, and sent at once to the surgery.

231. The stools should be observed as to colour, consistence, frequency, and nature, particularly as to the presence of blood or slime; and whether or not there is pain, griping, or straining in passing them. Stools retained for the inspection of an officer should not be kept in the ward. State of bowels.

232. Any variation in the appetite, whether for better or worse, and any peculiarity or fancy should be noted. Patients often take a dislike to some particular article of food, or express a wish for some other. Thirst should always be attended to and gratified as far as possible. Appetite and thirst.

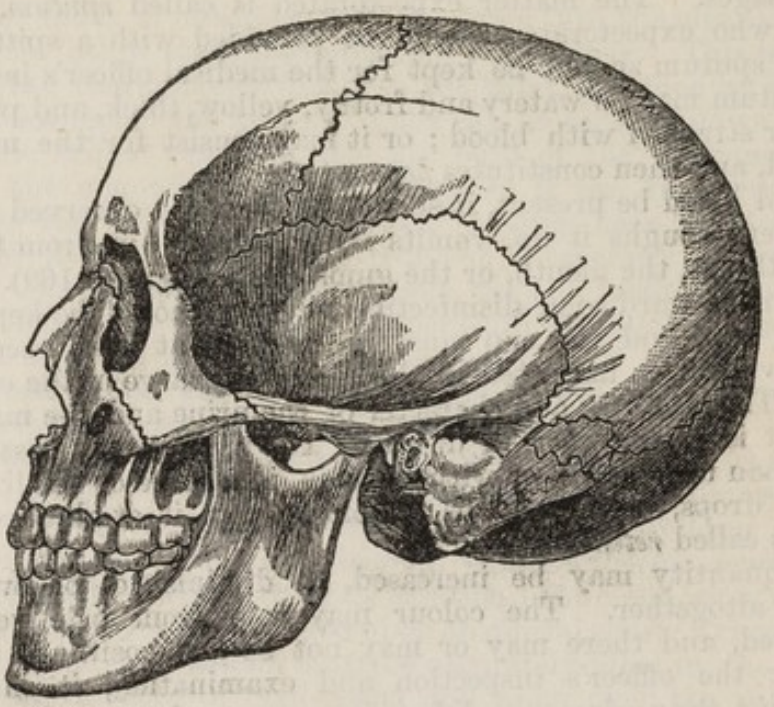


FIG. 41.—SKUL .

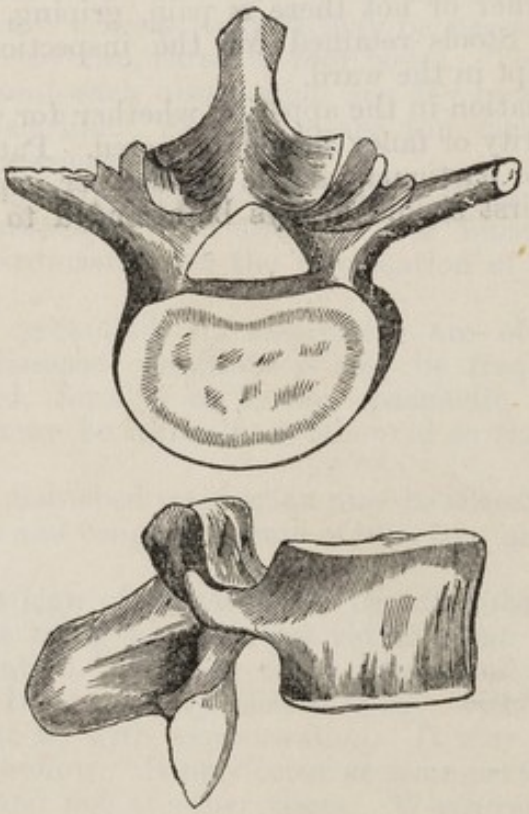
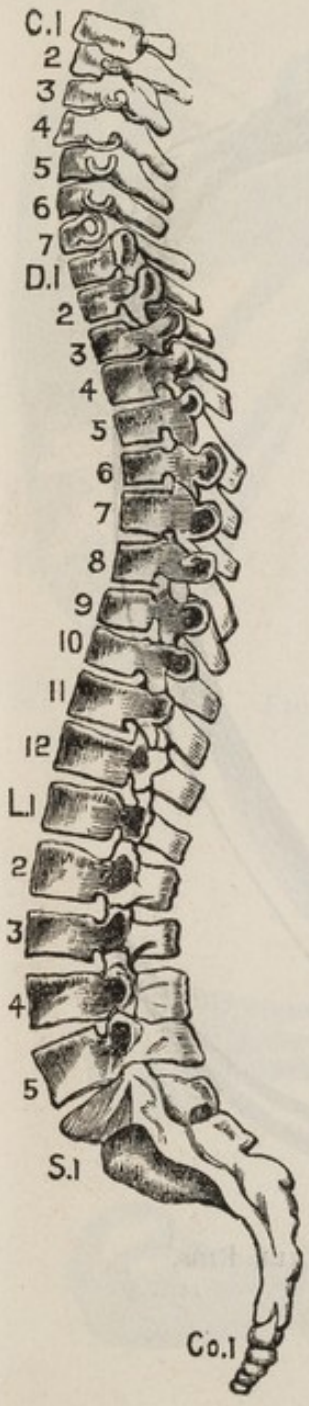


FIG. 42.—VERTEBRÆ.



43.—Spinal Column.

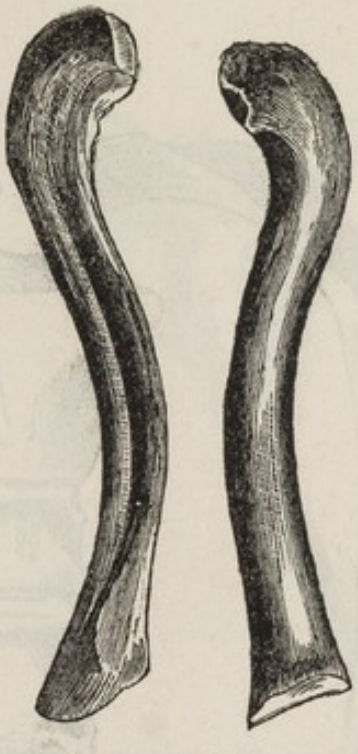


Fig. 45.—Clavicle or Collar Bone.

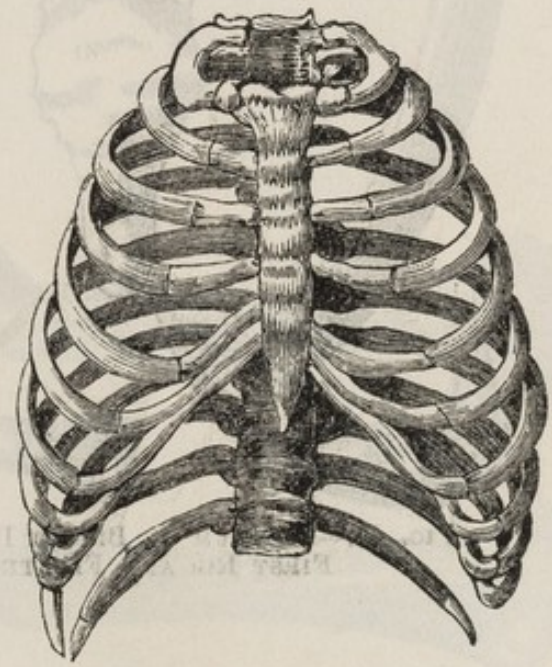


Fig. 44.—Thorax or Chest.

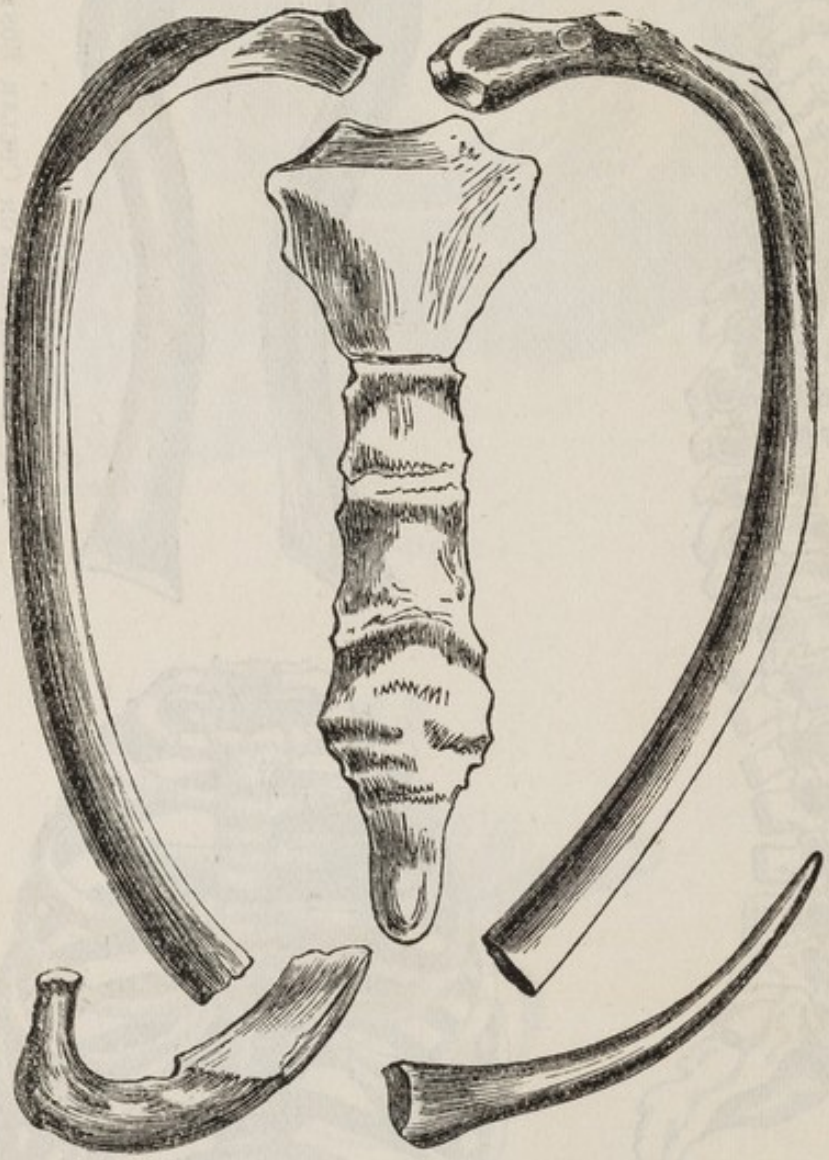


Fig. 46.—Sternum or Breast Bone, True Ribs, First Rib and Floating Rib.

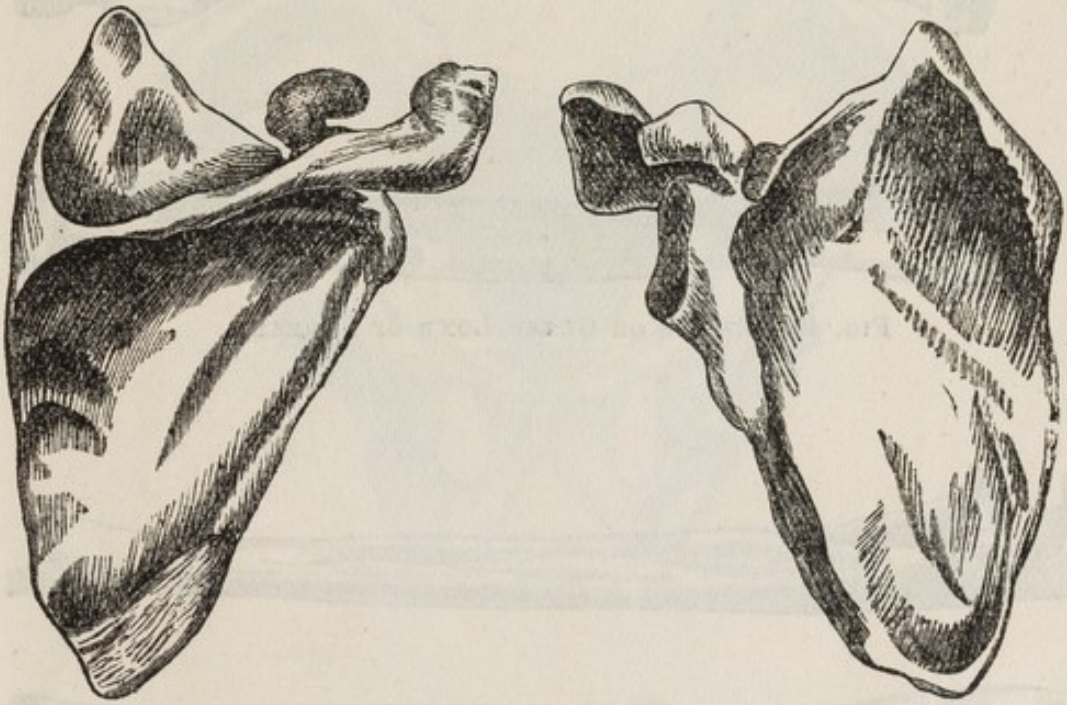


FIG. 47.—SCAPULA OR SHOULDER BLADE.

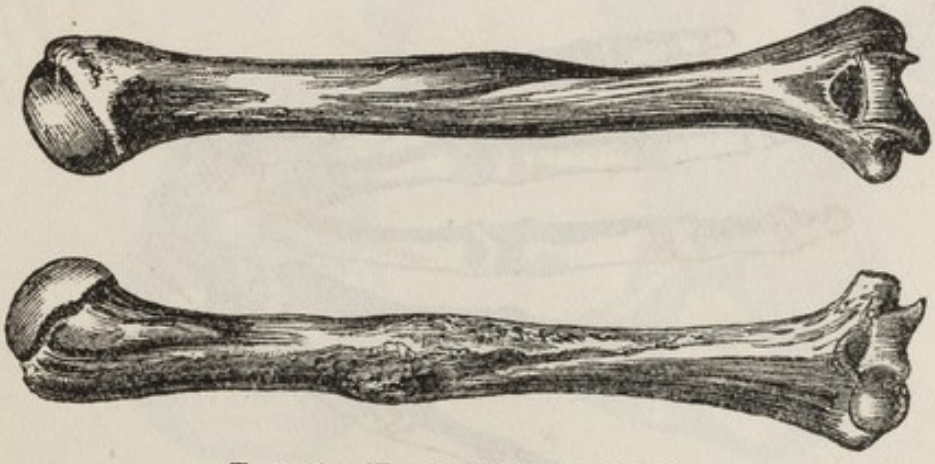


FIG. 48.—HUMERUS OR ARM BONE.

Fig. 49.—Radius or Outer Bone of Forearm.

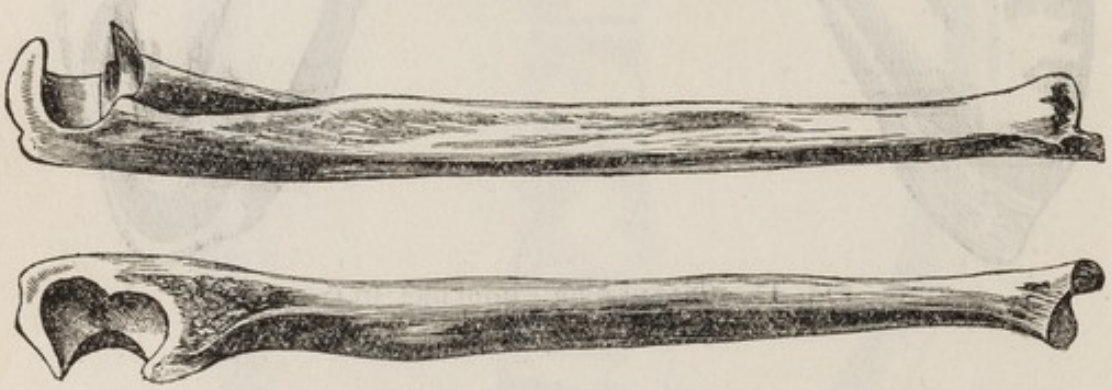
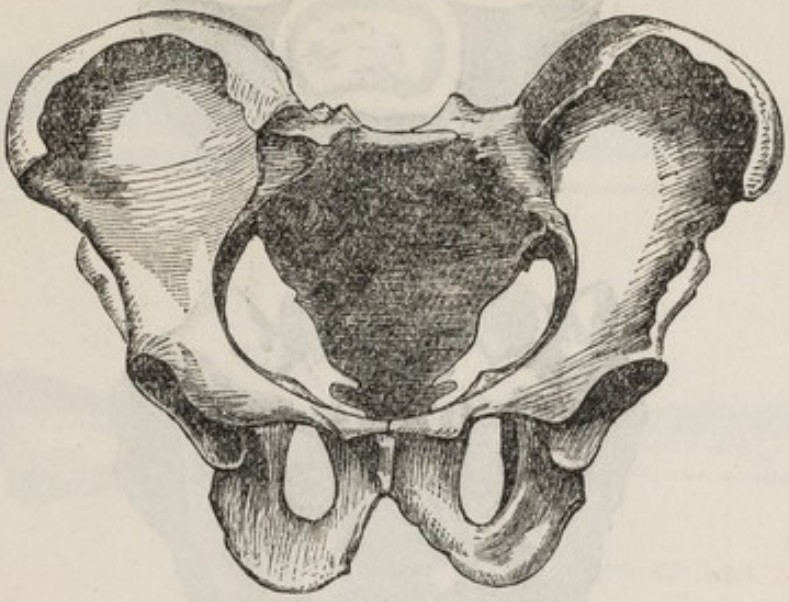


Fig. 50.—Ulna or Inner Bone of Forearm.

Fig. 51.—Carpus, Metacarpus, and Phalanges,
Bones of Wrist, Hand, and Fingers.



F . 52.—Pelvis.

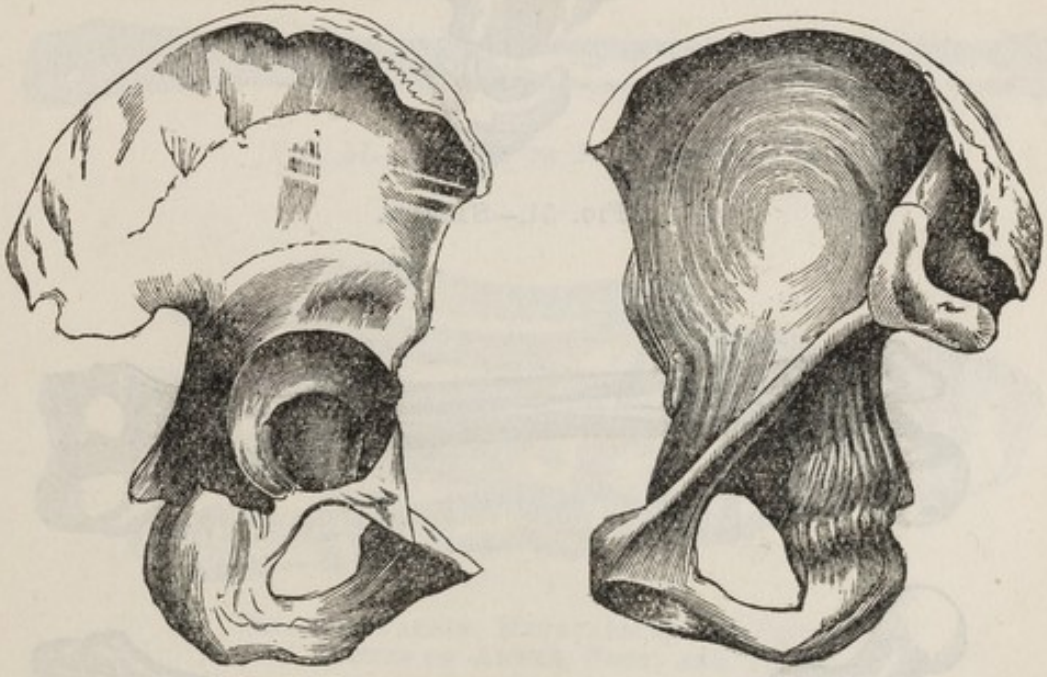


Fig. 53.—Innominate or Nameless Bones.

FIG. 54.—SACRUM.

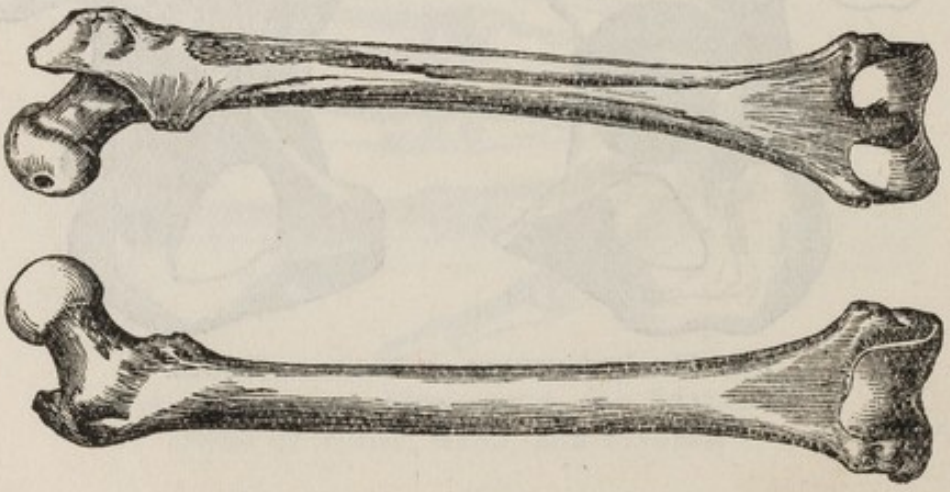


FIG. 55.—FEMUR OR THIGH BONE.

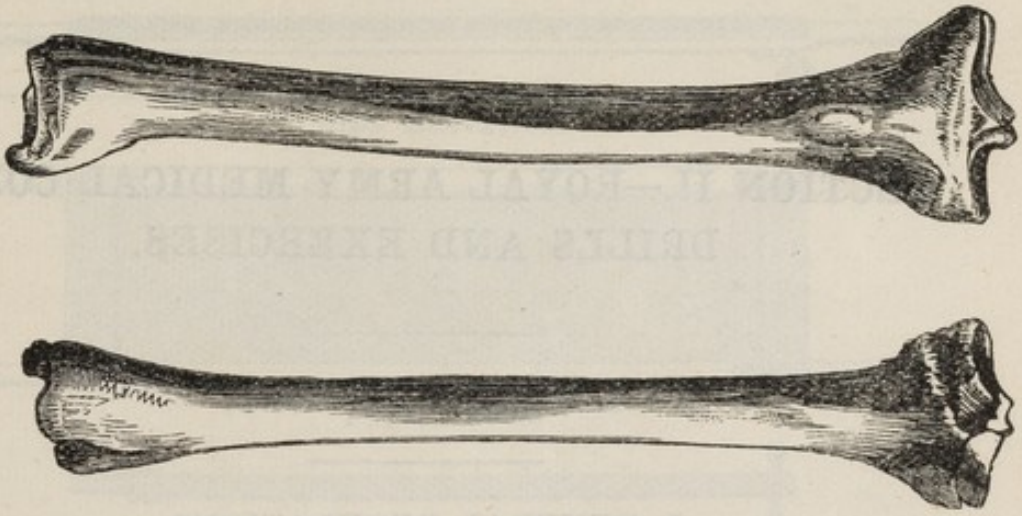


FIG. 56.—TIBIA OR LARGER BONE OF LEG.

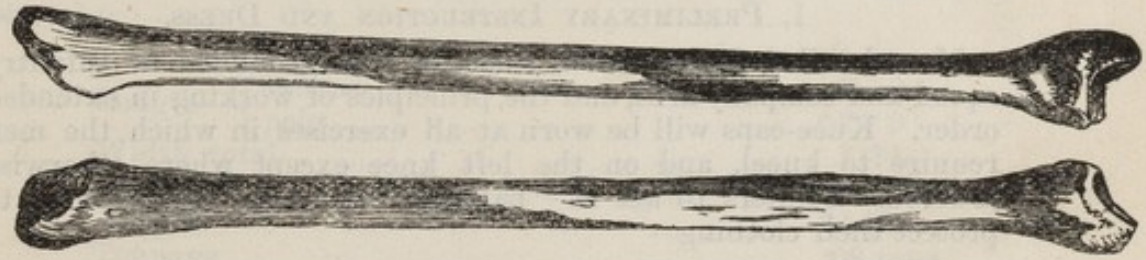


FIG. 57.—FIBULA OR SMALLER BONE OF LEG.

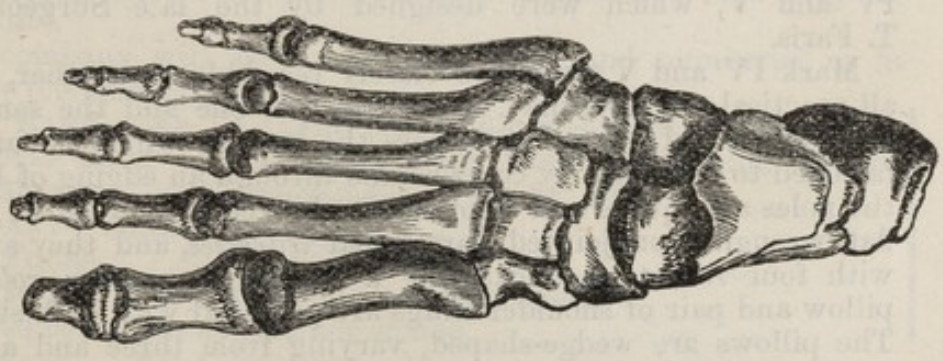


FIG. 58.—TARSUS, METATARSUS, AND PHALANGES, BONES OF ANKLE, FOOT, AND TOES.

SECTION II.—ROYAL ARMY MEDICAL CORPS DRILLS AND EXERCISES.

I. STRETCHER DRILL.

I. GENERAL REGULATIONS.

1. Preliminary Instruction and Dress.

Men detailed for this drill must be well grounded in Infantry squad and company drill, and the principles of working in extended order. Knee-caps will be worn at all exercises in which the men require to kneel, and on the left knee except where otherwise ordered. Soldiers to act as "patients" will wear canvas suits to protect their clothing.

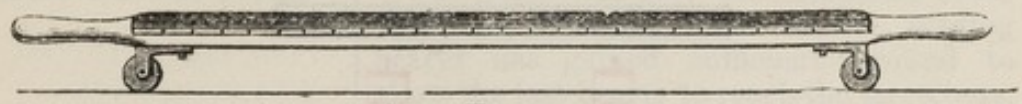
2. Description of Stretchers.

The regulation field stretchers in use are those known as Mark IV and V, which were designed by the late Surgeon-Major T. Faris.

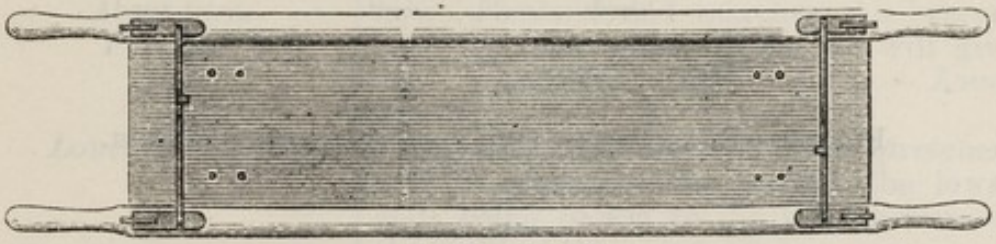
Mark IV and V stretchers closely resemble each other, and for all practical purposes may be regarded as one and the same form of stretcher. In these stretchers the canvas, which is tanned, is fastened to the poles by copper nails through an edging of leather; the poles are square and kept apart the required distance by two flat, wrought-iron jointed bars called *traverses*, and they are fitted with four *rackets* each carrying a three-inch wooden *roller*. A pillow and pair of shoulder slings are provided with each stretcher. The pillows are wedge-shaped, varying from three and a-half to one and a-half inches in thickness, and are kept in the ambulance wagon for use with the stretchers supplied with the wagon. There are eyelet holes in the canvas of the stretcher at both ends for the attachment of the pillow at either end by strings. The *sling*, which is either a broad leather strap, or, if of the latest pattern, a strip of tanned web, has at either end a loop, one of which is furnished with a buckle by means of which the sling can be lengthened or shortened, and at the opposite end is a narrow

transverse strap fixed at right angles, which is buckled round the stretcher when closed.

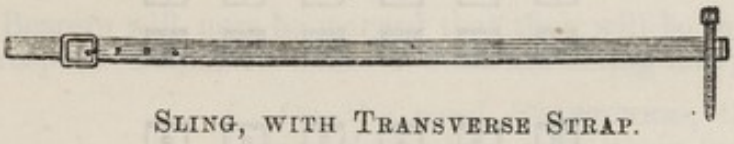
FIG. 59.—FARIS'S FIELD STRETCHER, MARK V.



SIDE ELEVATION.



PLAN, UNDER.



SLING, WITH TRANSVERSE STRAP.

The following are the dimensions and weight of the field stretcher :—

		ft.	ins.
Length	canvas	6	0
	pole	7	9
Width, total		1	11
Height		0	$5\frac{7}{8}$
Weight		34 lbs.	
Tonnage		·08 tons.	

3. FORMATION OF A COMPANY FOR STRETCHER DRILL.

Previous to the parade the stretchers will be laid in a heap on the ground.

The company will be formed up, sized, and numbered as in Infantry (ceremonial) Drill.

REAR RANK—ONE PACE STEP BACK—MARCH. The rear rank step back one pace, the supernumerary rank conforming to the movement. (See fig. 60.)

COMPANY—FORM FOURS. (See fig. 61.)

Each section of four forms a stretcher *squad*.

Four squads form a stretcher *section*.

FRONT RANK. No. 1 BEARERS—STAND AT EASE.

SECOND RANK. No. 2 BEARERS—STAND AT EASE.

THIRD RANK. No. 3 BEARERS—STAND AT EASE.

FOURTH RANK. No. 4 BEARERS—STAND AT EASE.

The bearers will thus be proved.

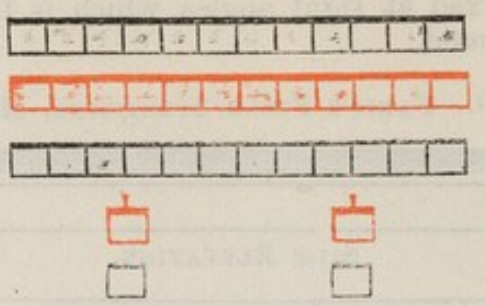


FIG. 60.—REAR RANK—ONE PACE STEP BACK—MARCH.

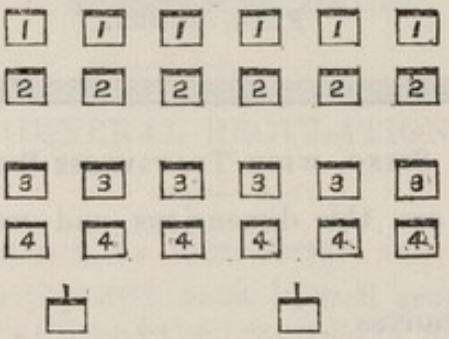


FIG. 61.—FORM FOURS.

N.B.—The bearers are numbered consecutively from front to rear.

COMPANY—ATTENTION. As usual.

NUMBER THE SQUADS. { On the word SQUADS the Nos. 1 number from right to left.

No. 4, 8, 12, 16, &c. { On the number being called the Nos. 1 of the named squads raise the left hand level with the elbow.

LEFT OF SECTIONS. { On the word SECTIONS the hands are dropped smartly to the side.

Section Commanders, who will act as guides and markers when required to do so, as in Infantry Drill, will now be posted.

NUMBER THE SECTIONS. { On the word SECTIONS, the section commanders number.

No. 1, 2, &c., SECTION—STAND AT EASE. } The sections will thus be proved.

COMPANY—ATTENTION. As usual.

NOS. 3—LEFT (OR RIGHT) TURN. { The Nos. 3 turn to the flank named.

FILE ON STRETCHERS—QUICK MARCH. { On the word MARCH the commander of the section on the flank named leads the Nos. 3 by the nearest route to the stretchers; each bearer in turn takes up a

stretcher, places it on his right shoulder, at the *slope*, rollers to the front, holding the stretcher by the lower rackets, and marches on.

Mark Time in Front. The guide will give the command *Mark Time in Front* as soon as the leading bearer has gained sufficient ground to allow the last bearer to reach the stretchers, when he will give the command *About turn—Forward* and marches the bearers back to their places, when he will give the commands *Halt — Front — Lower Stretchers.*

About turn. Forward. Halt. Front. Lower Stretchers.

On the word *Stretchers* the stretchers will be placed on the ground, the lower ends being passed to the front, rollers to the right of the company.

No. 4 Bearers will now be warned that they will be in command of their respective squads whenever these are acting independently.

STAND TO STRETCHERS. On the word STRETCHERS, the Nos. 1 place themselves with their toes in line with the front end of the poles, Nos. 3 with their heels in line with the rear end of the poles, Nos. 2 placing themselves at the centre of the poles ; all three touch the stretcher with the right foot. The Nos. 4 are one pace in rear of and covering Nos. 3. (See Fig. 62.)

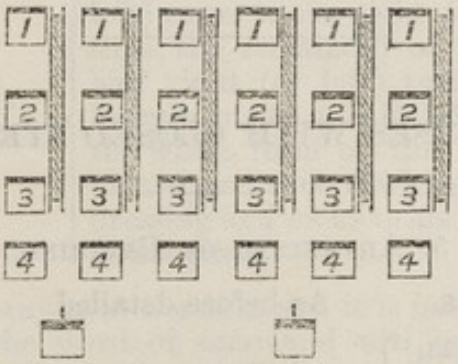


FIG. 62.—STAND TO STRETCHERS.
No. 2 in Position at Centre of Stretcher.

LIFT STRETCHERS. On the word STRETCHERS the Nos. 1 and 3 stoop, grasp both handles of the poles with the right hand, and rise smartly together, holding the stretcher at the full extent of the arm, rollers to the right of the company.

RIGHT (OR LEFT) DRESS.	The No. 1 of the flank squad stands fast, and the remaining Nos. 1 look to the flank named and take up their dressing; the other bearers looking to their front will cover and correct their distance as the Nos. 1 take up their dressing.
Eyes Front.	Will be given by the right (or left) guide when the dressing is completed.
LOWER STRETCHERS.	On the word STRETCHERS, the Nos. 1 and 3 stoop, place the stretchers on the ground, and rise smartly together.

4. DISMISSING.

LOWER STRETCHERS. ABOUT TURN. BY THE RIGHT (OR LEFT)—QUICK MARCH.	The company is marched clear of the stretchers.
HALT—FRONT. REAR RANK—ONE PACE FORWARD—MARCH. STAND AT EASE. STAND EASY.	As usual.
REMOVE KNEE-CAPS.	Knee-caps are taken off and collected.
COMPANY—ATTENTION. RIGHT TURN. DISMISS.	The company will break off as in Infantry Drill.

II. EXERCISES WITH CLOSED STRETCHERS.

5. ADVANCING OR RETIRING.

LIFT STRETCHERS.	As before detailed.
THE COMPANY WILL ADVANCE. BY THE RIGHT (OR LEFT)—QUICK MARCH.	The company will advance, being directed by the guide on the named flank.
THE COMPANY WILL RETIRE. ABOUT TURN. THE COMPANY WILL ADVANCE. ABOUT TURN.	In these movements Nos. 1, 2 and 3 turn about towards the stretcher, which will be passed from one hand to the other by the Nos. 1 and 3. Nos. 4 and the supernumeraries will conform in turning to the movements of Nos. 1, 2 and 3.

6. Changing Stretchers.

Change Stretchers.	If the company is advancing, on the word Stretchers the Nos. 1 will pass the stretchers from one hand to the other behind them, the Nos. 3 seeing this done, will pass the stretchers in front of them from one hand to the other, the Nos. 2 moving diagonally to their places. If the company is retiring the Nos. 1 act as above described for Nos. 3, and the Nos. 3 as for Nos. 1. Nos. 4 in each case continue in their respective positions.

7. Changing Front.

Right (or left) Form.	On the word Form, the No. 1 of the squad on the flank named turns to the right (or left), the remainder of the Nos. 1 make a half right (or left) turn, and the Nos. 2, 3, and 4 make a half left (or right) turn.
Quick March.	On the word March, all except the No. 1 of the inner flank step off and move by the shortest line to their places in the new front, halt, and are dressed by the guide on the flank of formation, who will give the command *eyes front* when the dressing is completed.

8. Changing Direction.

Right (or left) Form.	The No. 1 of the squad on the right (or left) turns to the right (or left) and marks time, the remainder of the Nos. 1 make a half right (or left) turn, the rest of the bearers make a half left (or right) turn, the whole form on the No. 1 of the flank named, and each marking time takes up his dressing and looks to his front as he arrives in his place.

When the company is at the *halt*, and it is intended to move off on a new front, the word of command will be On the move—Right (or left) Form—Quick March, followed by Forward when the requisite angle has been reached.

9. Moving to a Flank and Resuming the March to the Front or Rear.

The Company will move to the right (or left), Nos. 2 taking the Stretchers.	On the word Stretchers Nos. 2 will take hold of the stretchers left hand on top, right hand beneath, with the hands far apart, and place them on their shoulders at the *slope*.

RIGHT (OR LEFT) TURN. } The company will turn as directed.

This movement is only used where it is necessary to make a quick movement to either flank.

THE COMPANY WILL ADVANCE. FRONT TURN. — If the company is required to advance while marching to a flank with sloped stretchers, on the word TURN the whole turn to the front, the Nos. 2 will bring the stretchers down to the *trail* with both hands, passing the lower ends to Nos. 1, and the upper ends to Nos. 3.

THE COMPANY WILL RETIRE. CHANGE STRETCHERS. — If the company is required to retire while marching to a flank with sloped stretchers, the command CHANGE STRETCHERS will be given after the caution, on which the Nos. 2 will change the stretchers from the right to the left shoulder.

REAR TURN. — The company will turn as directed, Nos. 2 bring the stretchers down to the trail, passing the lower ends to Nos. 3, and the upper ends to Nos. 1, who will grasp them with their left hands.

10. FORMATION OF SECTIONS.

ADVANCE IN COLUMN OF SECTIONS FROM THE RIGHT. — The Instructor will give the command, which will be repeated by the company commander.

NO. 1 SECTION TO THE FRONT—REMAINDER HALF-RIGHT TURN. *No. — Section by the left—Quick March. Front turn by the left.* — *From the halt.*—On the word TURN the commander of No. 1 Section gives the command, *No. 1 Section by the left—Quick March*, placing himself on the directing flank in line with the leading rank; the remaining sections turn half-right, and their commanders repeat the command when their sections are disengaged from the section on their right, and give *Front turn by the left* as each arrives in column.

NO. 1 SECTION TO THE FRONT—REMAINDER—MARK TIME—HALF-RIGHT TURN. *No. 1 Section by the left. No. — Section. Forward. Front turn by the left.* — *On the march.*—No. 1 Section leads on, the commander of that section giving the command, *No. 1 Section by the left*, the other section commanders giving the commands *Forward* when disengaged from the section on their right, and *Front turn by the left* when in column.

The other movements of sections, such as Forming Half Companies and Companies, Changing Direction, &c., and the positions of officers and section commanders are, so far as they apply, as laid down in Infantry Drill.

11. Extending.

FROM THE RIGHT (LEFT, CENTRE, OR No. — SQUAD) FOUR PACES EXTEND.

From the halt.—On the word EXTEND the Nos. 1, 2 and 3 of the named squad stand fast, the No. 4 places himself on the right of the centre of his stretcher opposite No. 2, the remainder turn outwards (*i.e.*, away from the named squad), step off in quick time covering correctly without opening out. As each squad completes the paces of extension ordered it will halt and turn to the front, the No. 1 of the squad, before turning, tapping the No. 1 of the squad in front of him on the shoulder. As each squad halts the No. 4 places himself on the right of the centre of his stretcher opposite No. 2.

On the march.—When a company on the march is ordered to extend, the squad named will continue to move on, stepping short; the remainder making a half turn outwards, moving to their places in quick time, and then stepping short. As each squad disengages the Nos. 4 place themselves on the right side of the centre of their respective stretchers. When the extension is completed, on the word *Forward* the whole will advance.

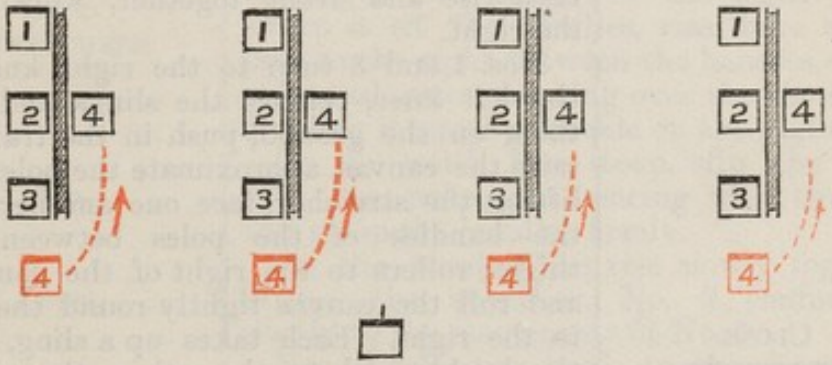


FIG. 63.—POSITIONS IN EXTENDED ORDER.

12. Closing.

ON THE RIGHT (LEFT, CENTRE, OR No.—SQUAD) CLOSE.

From the halt.—On the word CLOSE the Nos. 1, 2 and 3 of the named squad stand fast, the No. 4 resumes his place in rear, the remainder turning inwards close in quick time, halting and turning to the front as they arrive at their places. As each squad halts the No. 4 resumes his place in rear.

On the march, the named squad will continue to move on, stepping short; the remainder will make a half turn towards it and close in quick time, turning to the front and stepping short as they reach their

places, the Nos. 4 resuming their places in rear of Nos. 3. When the closing is completed, on the word *Forward* the whole will advance.

In closing, the squads will be careful to preserve the proper distance of 27 inches from one another.

III. EXERCISES WITH PREPARED STRETCHERS.

13. Preparing and Closing Stretchers.

The preparing of stretchers and all movements with prepared stretchers are performed in extended order.

Prepare Stretchers. Nos. 4 take two side paces to the right, Nos. 1 and 3 turn to the right, kneel on the left knee, unbuckle the transverse straps, separate the poles and straighten the traverses. Each taking a sling, doubles it on itself, dressed side of the leather outwards, slips the loop thus formed on the near handle and places the free ends over the opposite handle, buckle uppermost. They then rise and front together, working by the right.

Close Stretchers. Nos. 1 and 3 turn to the right, kneel on the left knee, remove the slings and place them on the ground, push in the traverses, raise the canvas, approximate the poles, rise, lifting the stretcher, face one another, place the handles of the poles between their thighs, rollers to the right of the company, and roll the canvas tightly round the poles to the right. Each takes up a sling, passes the buckle end to the other, threads the transverse strap through the loop of the other sling and buckles tightly, close to the rackets. Grasping both handles in their right hands, back of the hand to the right, they turn to the right of the company in a slightly stooping position, rise and front together, the Nos. 4 taking two paces to the left.

14. Changing the Numbers.

In order to instruct each man in a squad, the numbers must be changed. This can be done by the following method, when the men are standing to stretchers in extended order.

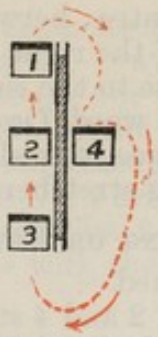


FIG. 64.—CHANGE NUMBERS.
Each bearer moves to the next place.

CHANGE NUMBERS. Nos. 4 turn about, and the whole step off, the Nos. 1 and 4 wheeling round by the foot and head of the stretcher respectively. Each man halts in the position of the bearer whose place he has taken. The new Nos. 4 front together.

15. LIFTING AND LOWERING STRETCHERS.

To facilitate instruction this should first be taught by numbers and afterwards judging the time.

In turning about, when beside the prepared stretcher, Nos. 2 and 4 always turn away from the stretcher.

LIFT STRETCHERS. Nos. 1 and 3 stoop, grasp the doubled sling midway between the poles with the forefinger and thumb of the right hand, sweep it off the handles, rise, take a side pace to the right between the handles of the poles and place the sling over the shoulders, dividing it equally, buckle on the right.

Two. On the word *Two* stoop, slip the loops over the poles, commencing with the left, and grasp the handles firmly.

Three. On the word *Three* rise slowly together lifting the stretcher, No. 3 conforming closely to the movements of No. 1.

ADJUST SLINGS. Nos. 2 take two paces to the front, the Nos. 2 and 4 turn about together (the Nos. 4 turning away from the stretcher) and Nos. 4 step forward one pace. They adjust the slings over the shoulders of Nos. 1 and 3, taking care that they lie below the collar of the frock behind, and in the hollow of the shoulders in front. Nos. 2 take two paces to the rear, Nos. 2 and 4 front together, and Nos. 4 step up one pace.

LOWER STRETCHERS. Nos. 1 and 3 slowly stoop and place the stretcher gently on the ground, slip the loops from the handles, and stand up, remove the slings from the shoulders, double them as before described and hold them at

their centre between the forefinger and thumb of the right hand, buckle to the front, hand close to the side.

Two. — On the word *Two* they stand to stretchers, stoop, place the sling on the poles as in preparing stretchers and rise together.

16. Advancing or Retiring.

The centre squad will be named.

By the Centre—Advance. — Nos. 1, 2 and 4 step off with the left foot, No. 3 with the right, in quick time, taking a short pace of twenty inches, knees bent, feet raised as little as possible. The Instructor will see that the squad of direction marches straight on the point given, takes the correct pace, both as regards length and cadence, and that the remainder preserve their interval and alignment.

By the Centre—Retire. — Each squad will move round on the circumference of a circle of which its No. 3 is the centre. No. 3 will mark time, turn gradually in the direction named, and the whole move forward when square.

By the Centre—Advance. — Each squad will resume the original direction to the front by a movement similar to that detailed for retiring.

Halt. — The whole halt.

17.—Moving to a Flank.

Right (or left) Incline. — Each squad will move round on the circumference of a circle, of which its No. 3 is the centre, one-eighth to the right (or left). No. 3 will mark time, turn gradually in the direction named and the whole will move forward when facing in the new direction.

If the INCLINE is repeated the squads will be in file, moving direct to the flank indicated with an interval of one pace between them.

On the command Advance or Retire, the original direction to the front or rear will be resumed on similar principles.

18.—Wheeling as in File.

Left (or right) Wheel. — When moving in file, on the word Wheel the leading squad will wheel to the left (or right) and lead on when square; the remaining squads follow on and wheel at the same point.

19.—Loading and Unloading Stretchers.

A party of patients, proportionate to the number of stretcher squads, will be extended to four paces, marched ten paces in front of the company, and directed to lie down with their heads towards the company.

TAKE POST AT THE WOUNDED—ADVANCE.

Each stretcher squad moves off by the nearest way towards its corresponding patient, the No. 4 placing himself on the right of the centre of his stretcher as the squad disengages. Each squad halts when the No. 1 arrives one pace from the patient's head, Nos. 2 and 3 covering correctly in a line with the patient. (See Fig. 65.)

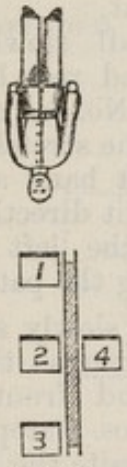


FIG. 65.—TAKE POST AT THE WOUNDED—ADVANCE.
The Squad has advanced and halted in position for loading.

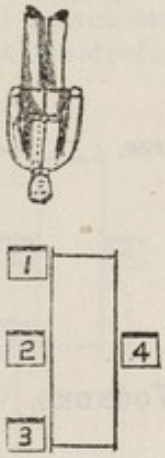


FIG. 66.—PREPARE STRETCHERS.

LOWER STRETCHERS. As before detailed.

PREPARE STRETCHERS. As before detailed. (See Fig. 66.)

FOR LOADING—LIFT WOUNDED.

Nos. 1, 2 and 3 advance to the left side of the patient, Nos. 4 to his right, Nos. 1 halting opposite the knees, Nos. 2 and 4 opposite the hips, and Nos. 3 opposite the shoulders. (See Fig. 67.) The whole then turn inwards together.

FIG. 67.—FOR LOADING—LIFT WOUNDED.
The bearers march direct to the wounded.

Two. On the word *Two*, kneel on the left knee and take hold of the patient, No. 1 passing his hands and forearms beneath the patient's legs, hands wide apart. Nos. 2 and 4 pass their hands and forearms beneath the patient's hips and loins, No. 3 passes his left hand across the patient and under his right shoulder, the right hand beneath the left shoulder of the patient.

Three. On the word *Three*, all slowly lift the patient off the ground and rest him on the knees of 1, 2 and 3, No. 4 disengages, doubles to the centre of the stretcher, grasps a pole in each hand, left hand across, lifts the stretcher and places it directly beneath the patient, kneels on the left knee and again assists in supporting the patient.

LOWER WOUNDED. The patient is lowered slowly and gently on to the centre of the canvas, the bearers disengage, stand up and front, Nos. 1 stepping forward and Nos. 3 stepping back to place themselves opposite the handles of the stretcher.

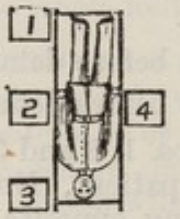


FIG. 68.—LOWER WOUNDED.
Bearers turn to front after rising.

FOR UNLOADING—LIFT WOUNDED. The whole turn inwards together, No. 1 placing himself opposite the knees, and No. 3 opposite the shoulders of the patient; they kneel on the left knee and take hold of the patient as described for loading.

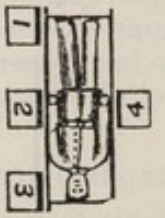


FIG. 69.—FOR UNLOADING—LIFT WOUNDED.
Bearers turn inwards.

Two. — On the word *Two*, the patient is lifted and supported as before. No. 4 grasps the stretcher as described, and lifting it clear of the patient, carries it forward, placing it on the ground one pace clear of the patient's feet. He then rejoins his squad and resumes the support of the patient.

Lower Wounded. — The patient is gently lowered to the ground, the bearers disengage, stand up, turn to their front and march straight forward to their position at the stretcher, where they halt.

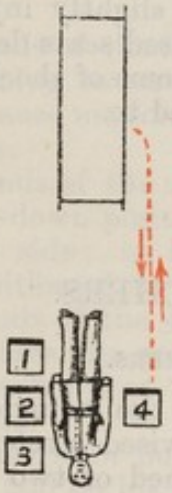


Fig. 70.—Lower Wounded.

Bearers turn to front after rising.

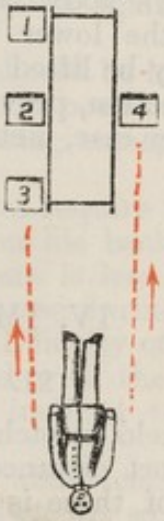


Fig. 71.—Lower Wounded —(*continued*).

Bearers march straight to positions on the stretcher.

20. Loading and Unloading Stretchers with Reduced Numbers.

With Three Bearers.

(1) in the event of there being only three bearers available, the stretcher will be placed at the patient's head, and in the same line as his body. The bearers will then lift the patient, rise to the erect position, carry him head foremost over the foot of the stretcher, the horizontal position of his body being maintained throughout the movement, and then lay him in a suitable position on the canvas. When unloading, the patient will be lifted and carried head foremost over the head of the stretcher. To lift the patient :—one bearer, placing himself on the injured side in a line with the patient's knees, raises and supports the lower limbs, while the other two, kneeling on opposite sides of the patient near his hips, facing each other, each pass an arm under his back and thighs, lock their fingers so as to secure a firm grasp, and raise and support the trunk.

With Two Bearers.

(2) When only two bearers are available, the stretcher will similarly be placed at the patient's head, and in the same line as his body. The bearers will then lift the patient, rise to the erect position, carry him, in loading, head foremost over the foot of the stretcher, and in unloading, head foremost over the head. The method of lifting will vary according to whether the lower limbs are severely injured or not. (*a*) With a severe injury of one of the lower limbs, both bearers place themselves on the injured side; the one in a line with the patient's knees must raise and support the lower limbs, the one near the patient's hips, the body; assisted by the patient himself as far as possible, the horizontal position of the patient's body being maintained throughout the movement. (*b*) With the lower limbs intact, or only slightly injured, the patient may be lifted by one of the improvised seats described in the next section, provided there are no symptoms of shock present; in the latter case, method (*a*) must be resorted to.

IV. IMPROVISED STRETCHERS.

21. Varieties of Stretchers.

When field stretchers are not available, the wounded may be carried short distances by means of improvised stretchers. The principal of these is the *rifle stretcher*, formed of two rifles with fixed bayonets and a rug, by which four bearers can remove a patient in the recumbent posture.

The following is a very simple and excellent way of forming a rifle stretcher, suggested by Staff-sergeant F. J. Spary, Royal Army Medical Corps:—Spread a blanket on the ground; lay two rifles parallel to one another, each ten inches from the centre of the blanket, both muzzles pointing in the same direction, trigger guard outwards; turn a fold of the rug, six inches wide, over the ends of the butts; fold the right side of the rug over the rifle on that side to the rifle on the opposite side, then similarly fold the left side. A stretcher is thus formed, consisting of three folds of blanket, the end at which the butts are being the head end. It can be lifted and carried in the same manner as is laid down for carrying field stretchers when loading wagons.

A rifle, before being used as a stretcher pole, will invariably be inspected, and if found to be loaded the cartridge will be withdrawn, and the magazine emptied.

Improvised stretchers can also be made of lances, or other poles, bamboo, &c., with rugs, great-coats, cloaks, canvas, &c.

V. GENERAL RULES FOR THE CARRIAGE OF STRETCHERS.

22. Position of Patient, &c.

The following rules are condensed from Surgeon-General Sir T. Longmore's "Treatise on Ambulances": Consideration of the nature of injury.

(1) Special care should always be taken to notice the part injured and the nature of the injury, as these determine in a great measure the position in which the patient should be placed during transport. In all cases the head should be kept low, and on no account pressed forward on to the chest.

In wounds of the head care should be taken that the patient is so placed that the injured part does not press against the conveyance.

In wounds of the lower limb the patient should be laid upon his back inclining towards the injured side; such position being less liable to cause motion in the broken bone during transport in cases of fracture.

In wounds of the upper limb, if the patient require to be placed in a lying-down position, he should be laid on his back, or on the uninjured side; as in cases of fracture there is less liability in such a position of the broken bones being injured during transport.

In wounds of the chest there is often a difficulty of breathing. In such cases the patient should be placed with the chest well raised, his body at the same time being inclined towards the injured side.

In transverse or punctured wounds of the abdomen, the patient should be laid on his back, with his legs drawn up, so as to bring the thighs as close to the belly as possible; a pack or other article being placed under his hams to keep his knees bent. If the wound be vertical, his legs should be extended.

(2) Care should be taken at starting that the slings are buckled so that the parts supporting the poles are all at equal distances from the surface of the ground. Adjustment of slings.

(3) The patient is usually carried feet first, but in going up hill the position is reversed, and the patient is carried head first. To do this the bearers will lower the stretcher and turn about. If the patient is suffering from a recent fracture of the lower extremity he will, in all cases, be carried with his head down hill The stronger and taller bearer should be down hill. Carriage of the patient.

(4) Under all circumstances the stretcher should, as far as possible, be carried in the horizontal position, which may be maintained in passing over uneven ground, by raising or lowering the ends of the stretcher. Carriage of stretcher.

It is an important matter for bearers to practise the carriage of stretchers, so as to acquire facility in keeping the stretcher level on uneven ground. Bearers trained and habituated to this duty perform it with ease and dexterity, irrespective of differences in their heights; while those who have not practised it are not unlikely to cause considerable distress to the patient when they have to carry him up and down hill. A concerted action of the front and rear bearers is necessary, and each must be aware what part he is to Necessity for practice.

perform according as the end of the stretcher at which he is placed is rendered higher or lower by the unevenness of the surface over which they are passing. This can best be acquired by practising the carriage of the stretcher up and down steps, or over uneven ground.

Passing a wall or fence.

No attempt will be made to carry a helpless patient over a high fence or wall, if it can possibly be avoided, as such is always a dangerous proceeding. A portion of the wall should be thrown down, or a breach in the fence made, so that the patient may be carried through on the stretcher; or, if this be not practicable, the patient should be carried to a place where a gate or opening already exists, notwithstanding the distance to be traversed may be increased by the proceeding. It is better to do this than risk the safety of the patient.

Crossing a ditch.

In crossing a ditch, the stretchers should be first laid on the ground near its edge. Nos. 1 and 2 then descend. The stretcher, with the patient upon it, is afterwards advanced, Nos. 1 and 2 in the ditch supporting the front end of the stretcher, while its other end rests on the edge of the ground above. While thus supported, Nos. 3 and 4 descend. All the Nos. now carry the stretcher to the opposite side, and the fore part is made to rest on the edge of the ground while the rear part is supported by Nos. 3 and 4 in the ditch, and Nos. 1 and 2 climb up. The stretcher is lifted forward on the ground above, and rests there while Nos. 3 and 4 climb up. The bearers then resume the carriage of the stretcher.

Stretcher not to be carried on the shoulders.

On no account will bearers carry a stretcher on their shoulders, as it is necessary that one of them should have the patient in view. In the event, also, of the patient's falling from such a height, owing to one of the bearers tripping or being wounded, his injuries might be considerably aggravated.

II. HAND SEAT DRILL.

23. Formation of Hand Seats.

The company will be drawn up in two ranks, and, after each exercise has been gone through, ranks will be changed, so that the men may be equally drilled.

Full interval from the Right Left—Close. Quick—March. } As in Physical Drill (Part I. Infantry Drill).

Eyes—Front. { Will be given by the nearest section commander; the men acting as in Physical Drill.

All the section commanders will now be in the supernumerary rank.

Form Two-handed Seats. { Each rear rank man takes a side pace of 27 inches to his left and two paces to the front, aligning himself on the left of his front rank man and both turn inwards together.

Two. { On the word *Two*, the rear rank man locks the fingers of his left hand with the fingers of the right hand of the front rank man, palms uppermost, and both place the disengaged hand upon each other's hips.

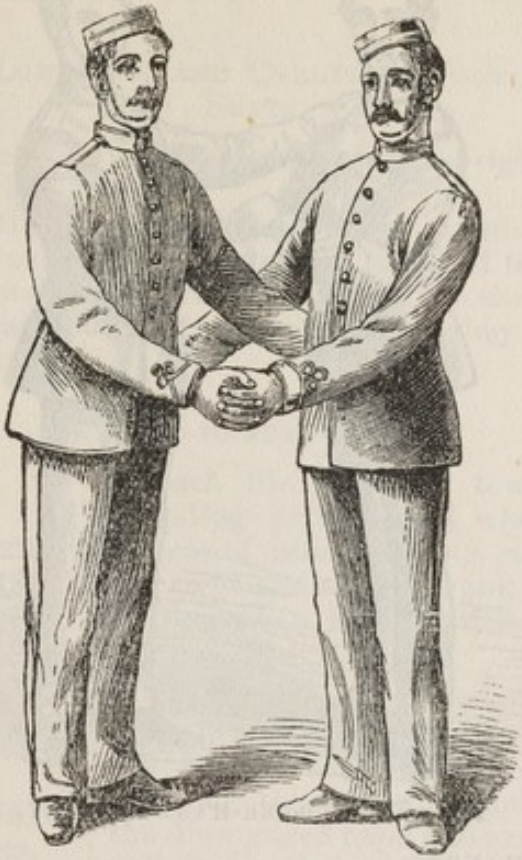


FIG. 72.—TWO-HANDED SEAT.

FRONT. The front and rear rank men disengage and turn to the front, the rear rank man taking two paces to the rear and a side pace to the right, so as to again cover his front rank man.

FORM THREE-HANDED SEATS. As in two-handed seats.

Two. On the word *Two*, the front rank man grasps his own left forearm. The rear rank man grasps the right forearm of the front rank man with his left hand, and the front rank man the left forearm of the rear rank man, with his left hand, the rear rank man placing his right hand on the left shoulder of the front rank man.

FRONT. As before.

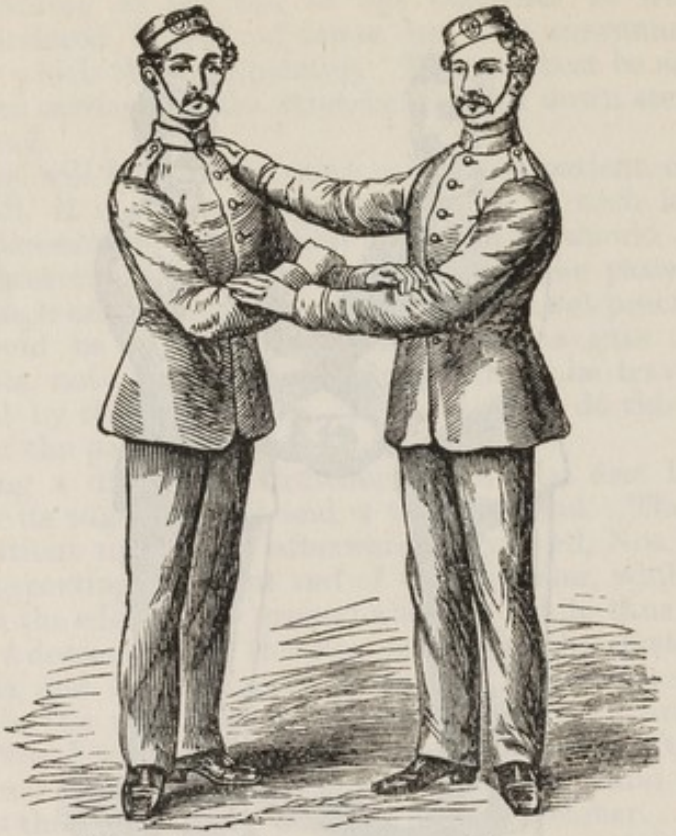


FIG. 73.—THREE-HANDED SEAT.

FORM	FOUR-HANDED SEATS.	As in two-handed seats.
	Two.	On the word *Two*, both bearers grasp their own left wrists with their right hands, and each other's right wrists with their left hands. Backs of the hands uppermost.
FRONT.		As before.

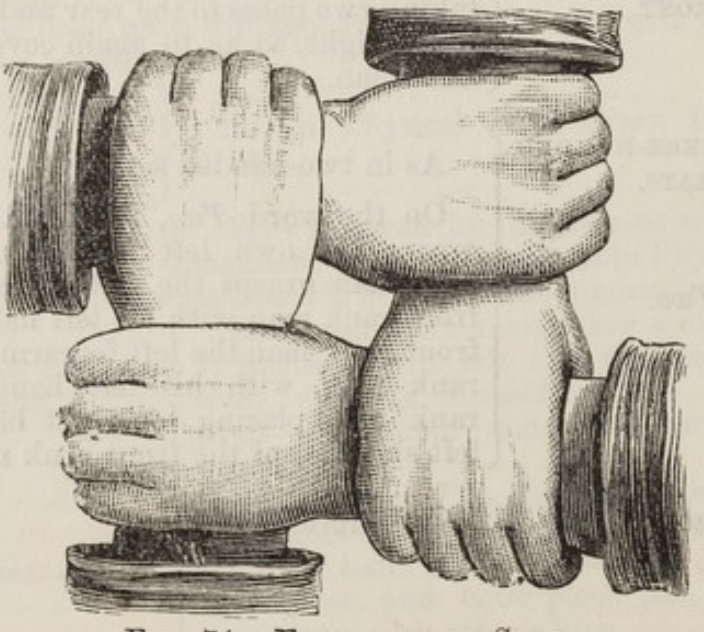


FIG. 74.—FOUR-HANDED SEAT.

On the Right—Close—Quick—March.	As in Physical Drill.

24. Lifting, Lowering, and Carrying Wounded by Hand Seats.

Front rank men will wear knee-caps on the right knee, and the rear rank on the left knee.

A party of patients, proportionate to the number of files to be exercised, will be extended to four paces, marched ten paces in front of the company, and directed to stand when the exercise is in three or four-handed seats, but for two-handed seats they will be directed to sit on the ground.

BY TWO-HANDED SEATS.

Take Post at the Wounded—Advance.	Each file steps off towards its corresponding patient, and when immediately in rear of him the front rank man goes to the right and the rear rank man to the left; halting when in line with and close up to the patient.
By Two-handed Seats—Lift wounded.	The bearers turn inwards, kneel on the knee nearest the patient's feet, and form the two-handed seat beneath his thighs, grasping the patient round the loins with the disengaged hand and arm. The patient will be directed to pass an arm round the neck of each bearer.
Two.	On the word *Two*, the bearers rise steadily together, lifting the patient off the ground.
Advance.	The bearers step off, the front rank with the right and the rear rank with the left foot, marching by a side step in which the feet are alternately crossed, one before the other.
Retire.	The front rank man marks time and brings the rear rank man round, both moving on when square.
Advance.	Each file will resume the original direction to the front by a movement similar to that detailed for *Retiring*.
Halt.	As usual.
Lower wounded.	The bearers kneel and gently place the patient in a sitting posture on the ground and stand up, still facing inwards.
Retire. Halt. Front.	The bearers turn to the rear and march back to their original position, closing in as they do so (rear rank men leading), where they will be halted and turned to the front.

BY THREE-HANDED SEATS.

TAKE POST AT THE WOUNDED—ADVANCE.	As in two-handed seats.
BY THREE-HANDED SEATS—LIFTWOUNDED. *Two.*	The bearers turn inwards, form the three-handed seat and, stooping, place it beneath the hips of the patient, who will be directed to pass an arm round the neck of each bearer. On the word *Two*, as in two-handed seats.
ADVANCE. RETIRE. ADVANCE. HALT.	As in two-handed seats.
LOWER WOUNDED.	The bearers stoop instead of kneeling, and the patient stands up.
RETIRE. HALT. FRONT.	As in two-handed seats.

BY FOUR-HANDED SEATS.

TAKE POST AT THE WOUNDED—ADVANCE.	As in two-handed seats.
BY FOUR-HANDED SEATS—LIFTWOUNDED. *Two.*	The bearers turn inwards, form the four-handed seat and, stooping, place it beneath the hips of the patient, who will be directed to pass an arm round the neck of each bearer. On the word *Two*, as in two-handed seats.
ADVANCE. RETIRE. ADVANCE. HALT. LOWER WOUNDED. RETIRE. HALT. FRONT.	As in two-handed seats.

25. METHOD BY WHICH A HELPLESS PATIENT MAY BE CARRIED BY ONE BEARER.

In certain emergencies it may be necessary for a bearer to carry a helpless patient unaided; this may be accomplished either by "picky-back," or by means of the "fireman's lift." The latter is specially adapted to cases of insensibility, and is carried out as follows:—

(1) Roll the patient over on the face, the arms to the sides.

(2) Stand at the head, place your hands beneath patient's shoulders and raise him to the kneeling position. (See Fig. 75.)

(3) Place your hands under the patient's armpits, raise him up, stoop, place your head beneath his body, bring his right arm around your neck, put your right hand around patient's right thigh, bring his weight well on to the centre of your back, grasp his right wrist with your right hand, and rise to the erect position. (See Figs. 76 and 77.)

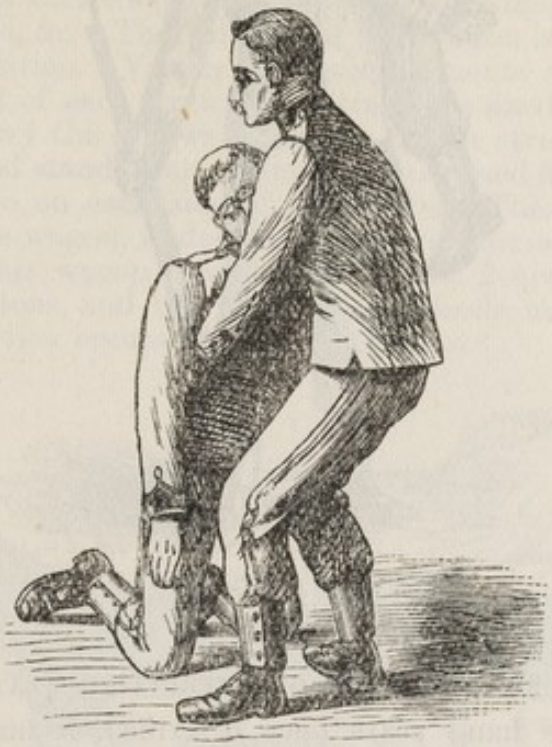


Fig. 75.

Fig. 76.

Fig. 77.

26. Varieties of Improvised Seats.

Besides the hand seats here described, it may sometimes be possible to utilise canvas, straps, a conveniently-shaped board, or other material by which the patient may be carried in a sitting posture with comfort to himself and less fatigue to the bearers.

III. AMBULANCE WAGON DRILL.

The regulation carriages, which are designed expressly for the conveyance of sick and wounded troops, are called Ambulance Wagons and Carts.

27. Description of Ambulance Wagons and Ambulance Cart.

The two latest patterns of Ambulance Wagons, in use in the Service at the present time, are Mark III and Mark V.

MARK III AMBULANCE WAGON.

This wagon affords accommodation for six wounded persons, two lying on field stretchers on the floor of the wagon, two seated in front and two in rear. There is room on the back seat also for the wagon orderly. The front seat is reached by a ladder, and the hind seat by a step attached to the tailboard.

The wagon consists generally of a wood-framed body, a roof, and a forecarriage (to lock under) mounted upon steel springs. It is

provided with a cover, curtains and hood of canvas, extended on a skeleton framed roof attached to and supported by six galvanised tubular standards fitting into sockets in the wagon sides. A corn locker and a water tank are carried under the body. The locker is accessible from two openings with lids formed in the bottom of the body, and will contain three bushels ; the tank is fitted with a leather funnel and tube, and will contain nine and a half gallons ; a movable box is carried on each side, one for wine, the other for tools, small stores, &c. The interior of the wagon is divided by a longitudinal partition. Valises and accoutrements are carried at the head and foot of each stretcher. Straps are fixed to the centre of the roof, to carry the pillows belonging to the stretchers, and to the front and hind standards, to admit of four closed field stretchers being carried two on each side of the wagon. There are loops at the bottom of the wagon, under each stretcher, for securing rifles. The weight of this wagon complete is 17 cwt. 2 qrs. 23 lbs. Its tonnage is 3·625 tons, and the track of its wheels measures 5 feet 2 inches. The driver occupies a seat on the box.

FIG. 78.—AMBULANCE WAGON (MARK III).

MARK V AMBULANCE WAGON.

This wagon is constructed to accommodate twelve men seated, or two men on stretchers and four seated.

It is fitted with a perch, and a "Jacob's" lock fore-carriage, which reduces the strain on the body in travelling, and admits of large front wheels being used, so as to minimise the pull on the horses. It is also fitted with a pole and swingletrees for long rein driving.

The front part of the wagon body is partitioned off, and provided with seats to accommodate two men. Entrance to this part is

gained from the front of the wagon, over the driver's seat, the back rail of which can be folded up out of the way. The remaining part of the body is fitted with seats along the sides, arranged to fold upwards when not in use, to make room for two stretchers. A sliding step to the back of the wagon, which, when not in use, can be raised and pushed close up to the tail-board in guides fixed along the bottom for that purpose. The sides are fitted with ventilators, staples for the bale hoops, and standards for the back rail. Fittings are attached to the back rails and under the seats for carrying rifles, and there are two straps attached to the back rails for the safety of the patients. Sockets are fixed to the sides for supporting the lamp brackets.

A wooden ladder to assist the patients in mounting is carried, and is strapped to the underside when not in use. A water cask, capable of carrying 10 gallons, is secured under the rear by iron bands, and a small tackle is fitted just above it to facilitate lifting it into position when required.

The spiinter bar is arranged to allow a vertical play to the pole ; and spiral "draw springs," through which the loops for the swingle-trees pass, are fixed at the rear of the bar. These are intended to ease the strain of draught upon the horses, particularly at starting.

The wheels have wooden naves and phosphor-bronze pipes.

The fore wheels are 3 feet 9 inches diameter, the hind 4 feet 8 inches. The tires are $2\frac{1}{2}$ inches wide.

The wagon is fitted with a brake, which acts on the front of the hind wheels. It is applied by the driver by means of a hand lever (*a*), which is connected by an iron rod to a brake lever (*b*), the lower end of which is furnished with a wood block (*c*) ; an iron cross bar is secured to the lever (*b*) at (*d*), and connects a similar block which acts on the "near" wheel. A rack (*e*) keeps the brake on when it is applied.

The wagon is fitted with bale hoops and a canvas cover, a leather apron for the driver, cranked guard irons, a driver's seat, two lockers beneath the front seat, a drag shoe, and a 3-lb. grease tin. The stretchers used are of the Service pattern, and, when not in use, they are packed beneath the seats.

							cwt.	qr.	lbs.		
Weight	...	...	...	...	...		18	1	14		
							tons.				
Tonnage	...	...	...	...	...		11·08				
									ft.	in.	
Minimum space in which the wagon can turn	...	...	...	...					30	7	
			ft.	in.		ft.	in.		ft.	in.	
Rectangular space occupied in boats	...	...	12	$7\frac{1}{2}$	×	6	1	×	9	$2\frac{1}{2}$	

MARK II AMBULANCE CART.

The cart is constructed to carry four patients in a sitting posture, or two lying on stretchers.

It consists of a wood body fitted with side springs, and front and rear foot-boards, an axletree with two 4-feet 8-inch wheels and two removable shafts

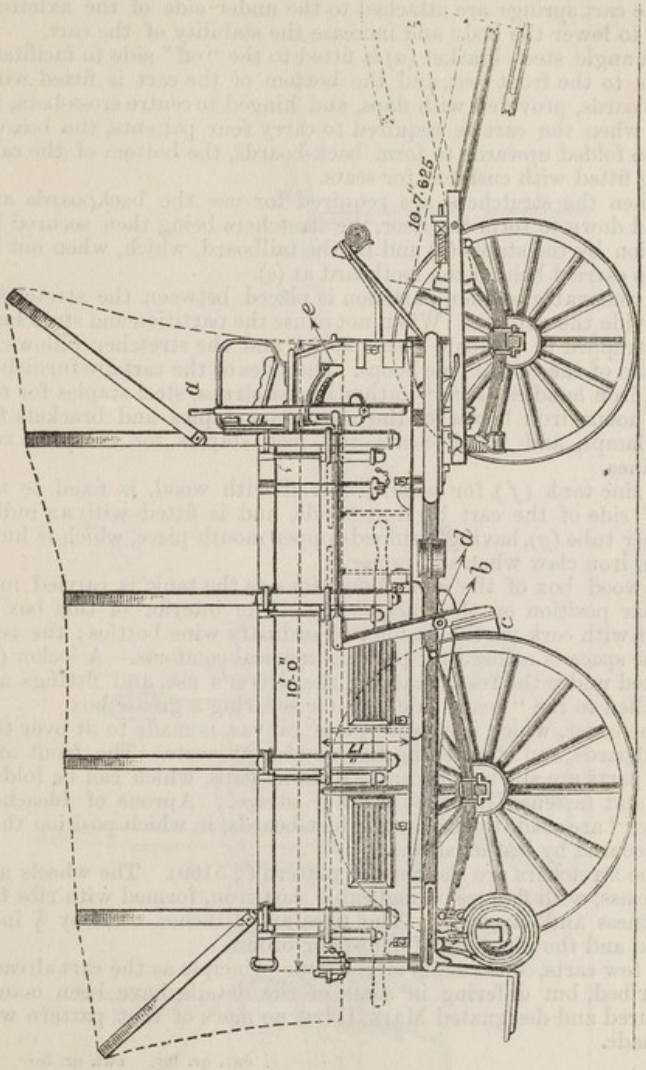


Fig. 79.—Ambulance Wagon (Mark V).

Spiral "draw-springs," through which the loops for the swingle-trees pass, are fitted behind the splinter-bar ; these are intended to ease the strain of draught upon the horses, particularly at starting.

The cart springs are attached to the under side of the axletree, so as to lower the body and increase the stability of the cart.

An angle steel bracket (*a*) is fitted to the "off" side to facilitate access to the front seat, and the bottom of the cart is fitted with two boards, provided with flaps, and hinged to centre cross-bars, so that when the cart is required to carry four patients, the boards can be folded upwards to form back-boards, the bottom of the cart being fitted with cushions for seats.

When the stretchers are required for use the backboards are folded down to form the floor, the stretchers being then secured in position by the staple (*b*) and by the tailboard, which, when not in use, is carried behind the footboard at (*c*).

A removable wooden partition is placed between the stretchers to divide the patients. When not in use the partition and stretchers are strapped to the bale hoops at (*d*) and the stretcher pillows to the top of the centre bale hoops. The sides of the cart are furnished with iron handles (*e*) for leather breast straps, steel staples for the bale hoops, iron hooks for the cover, iron staples and brackets for the lamps, and wood cleats and iron staples for carrying two carbines.

A zinc tank (*f*) for water, covered with wood, is fixed to the "off" side of the cart by iron bands, and is fitted with an india-rubber tube (*g*), having a tinned-copper mouth-piece, which is hung on an iron claw when not in use.

A wood box of the same dimensions as the tank is carried in a similar position on the "near" side. The interior of this box is fitted with cork partitions for two ordinary wine bottles ; the rest of the space is utilised for packing medical comforts. A locker (*h*) is fixed under the front seat for the driver's use, and fittings are attached to the "near" side of it for securing a grease box.

The cover, which is of waterproof canvas, is made to fit over the foot-boards, and enclose the front and rear seats. The front and rear parts are slit up the centre to form flaps, which can be folded up, and fastened back by leather straps. Aprons of bleached "duck" are made to fit over the foot-boards, in which position they are secured by leather straps.

The stretchers are the Service pattern (§ 5169). The wheels are 3rd class, with flanges of malleable cast-iron, formed with ribs for lightness and strength. The tires are 2 inches wide by $\frac{1}{2}$ inch thick, and the pipes are of phosphor-bronze.

A few carts, constructed on the same principle as the cart already described, but differing in some of the details, have been manufactured and designated Mark I, but no more of that pattern will be made.

		cwt.	qr.	lbs.	cwt.	qr.	lbs.
Weight	cart	8	2	14	9	0	19
	stretchers (two) ...	0	2	5			
					tons.		
Tonnage					3·5		
		ft.	in.		ft.	in.	ft. in.
Rectangular space occupied in boats		16	$4\frac{1}{2}$	×	6	$0\frac{3}{4}$	× 7 $9\frac{1}{4}$

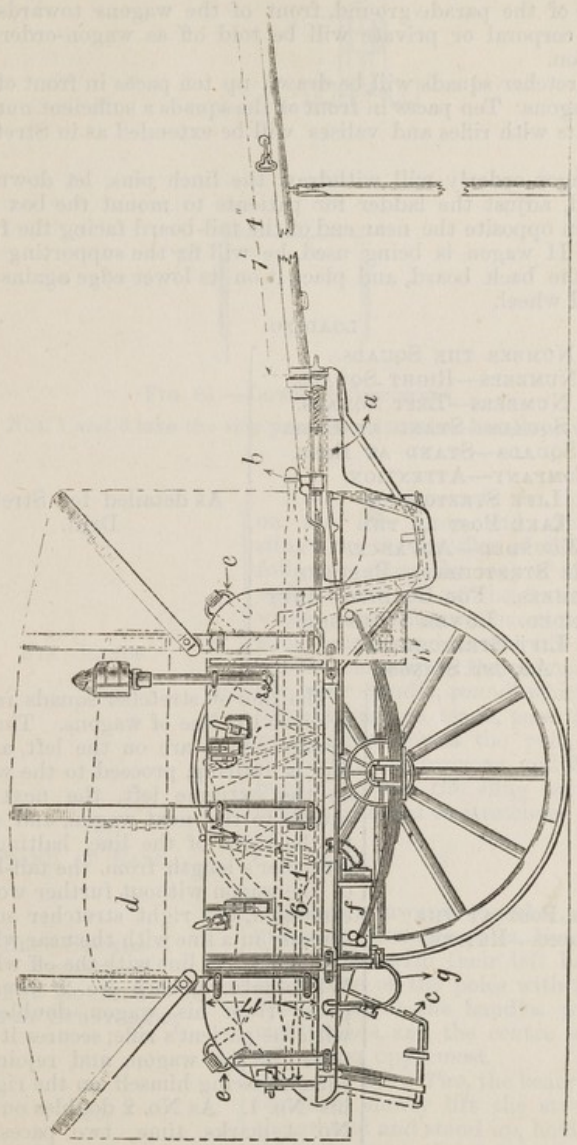


Fig. 80.—Ambulance Cart (Mark II).

28. Loading and Unloading Ambulance Wagons with Patients on Stretchers.

A line of ambulance wagons will be drawn up in single rank at "close interval" (4 yards from near wheel to near wheel) at the rear end of the parade ground, front of the wagons towards the rear. A corporal or private will be told off as wagon-orderly to each wagon.

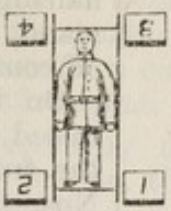
The stretcher squads will be drawn up ten paces in front of the line of wagons. Ten paces in front of the squads a sufficient number of patients with rifles and valises will be extended as in Stretcher Drill.

The wagon-orderly will withdraw the linch pins, let down the tail-board, adjust the ladder for patients to mount the box seat, and fall in opposite the near end of the tail-board facing the front. If Mark II wagon is being used, he will fix the supporting rods, remove the back board, and place it on its lower edge against the near hind wheel.

LOADING.

Number the Squads. Odd Numbers—Right Squads. Even Numbers—Left Squads. Right Squads—Stand at Ease. Left Squads—Stand at Ease. Company—Attention. Lift Stretchers. Take Post at the Wounded—Advance. Lower Stretchers. Prepare Stretchers. For Loading—Lift Wounded. Lower Wounded. Lift Stretchers. Adjust Slings.	As detailed for Stretcher Drill.
Take Post at the Wagons—Retire.	The line of stretcher squads retires towards the line of wagons. The two squads which are on the left, as the line is retiring, proceed to the wagon on the extreme left, the next two squads to the next wagon, and so on to the right of the line, halting one stretcher's length from the tail-board of the wagon without further word of command, the right stretcher squads directly in a line with the near wheels, and the left in line with the off wheels. While retiring, each No. 2, when ten paces from his wagon, doubles out with the patient's rifle, secures it in its place in the wagon, and rejoins his squad, placing himself on the right of his No. 1. As No. 2 doubles out, the No. 4 marks time, two paces, and places himself on the right of No. 3.

LOWER STRETCHERS. — As usual.



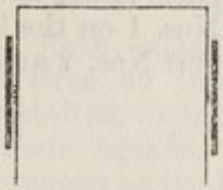


FIG. 81.—LOWER STRETCHERS.

Nos. 1 and 3 take the side pace over Stretcher handle as usual.

FIX SLINGS. — Nos. 1 and 3 turn to the right, kneel on the left knee, and arrange the slings on the handles of the poles as follows :—Pass the loop of the buckle end, dressed side of the leather downwards, over the near handle, carry the sling under and round the opposite handle, close up to the canvas, back to the near handle, round which two or three turns are made, pass the transverse strap round the pole, between the racket and traverse, and fasten the buckle outside the sling between the poles, and stand to stretchers.

STAND AT EASE. — As usual.

LEFT SQUADS—ATTENTION. FOR LOADING—LIFT STRETCHERS. — All turn inwards together, stoop and grasp the stretcher poles, Nos. 1 and 4, the handles with their left hands, and the centre of the poles with the right. Nos. 2 and 3, the handles with their right hands, and the centre with their left, palms uppermost.

Two. — On the word *Two*, the bearers, acting together, slowly lift the stretcher off the ground and stand up, holding it at the full extent of the arms.

LOAD.

Two.

Nos. 2 and 4 step off with the left foot, and Nos. 1 and 3 with the right, halting, without further word of command, one pace from the floor of the off compartment.

On the word *Two*, the stretcher is raised on a level with the floor, and the front pair of rollers rested on it. Nos. 1 and 2 stand by, allowing the stretcher to be passed through their hands by the Nos. 3 and 4, who give it the proper direction and gently push it home. The bearers then fall in one pace from, and facing the wagon, the Nos. 1 on the left, Nos. 4 on the right, and Nos. 2 and 3 between them.

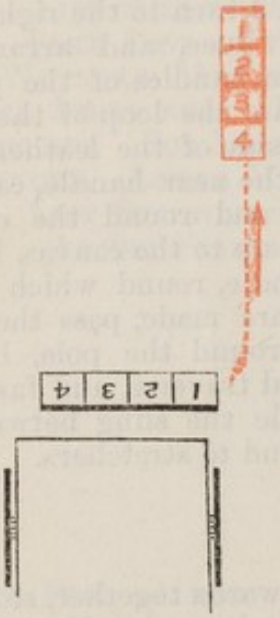


FIG. 82.
Bearers shown, having fallen in after loading and marched to front.

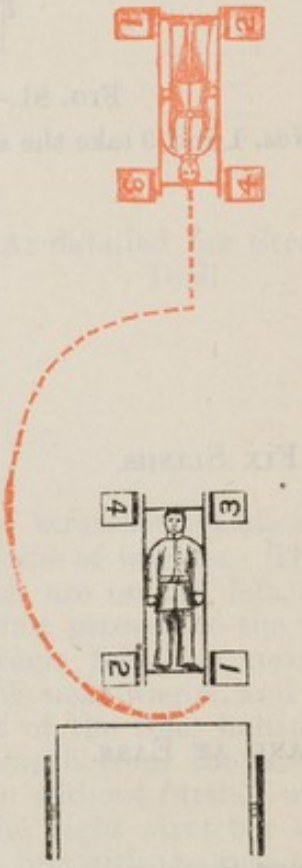


FIG. 83.

LEFT TURN.
LEFT WHEEL.
QUICK—MARCH.
HALT.
STAND AT EASE.

The order to HALT is given when clear of the right squads.

RIGHT SQUADS—ATTENTION. FOR LOADING, &c. &c.	The right squads will now be ordered to load the near compartments, and when this is done the wagon orderlies replace the backboards and ladders, and seat themselves on the back seat of their respective wagons.
COMPANY—ATTENTION. ADVANCE.	The company moves off, the squads opening out to their proper interval as they advance.
HALT.	The order to HALT is given when the squads are in the position from which they retired.

UNLOADING.

TAKE POST AT THE WAGONS. RETIRE.	Each squad, wheeling by the right, retires on the line of wagons as before detailed, except that Nos. 2 remain with their squads. Wagon orderlies prepare wagons as for loading.
STAND AT EASE.	As usual.
LEFT SQUADS—ATTENTION. UNLOAD.	Nos. 2 and 4 bearers take a side pace of 27 inches to the right and one of 30 inches to the front, aligning themselves with Nos. 1 and 3.
Two.	On the word *Two*, each squad steps forward three paces, the Nos. 3 and 4 pass up between the Nos. 1 and 2, the latter closing outwards, stand by to support the stretcher as it is withdrawn; the Nos. 3 and 4 now take hold of the handles nearest to them, the Nos. 3 with the right, the Nos. 4 with the left hand; withdraw the stretcher till the rollers at the foot end rest on the edge of the floor, supporting it at the centre of the poles with the disengaged hands; the Nos. 1 and 2 now take hold of the handles at the foot end, and the whole lift the stretcher clear of the wagon and lower it to the full extent of the arms. Each squad taking time from the right wheels (by the right) to the front and advances five paces. (See Fig. 83.)
LOWER STRETCHERS.	Each squad stoops and lowers the stretcher gently to the ground; the bearers stand up and turn to the front.
Two.	On the word *Two*, each squad stands to stretchers as follows:—No. 2 wheels round by the left of No. 1 to his place, and No. 4 steps up to the centre of the stretcher.

STAND AT EASE.	"Patients" will be ordered to rise.
RIGHT SQUADS— ATTENTION. UNLOAD. &c. &c.	The right squads will now be ordered to unload the near compartments in a similar manner, and when this has been done the wagon orderlies fix ladders, backboards and tailboards, while the squads are standing to stretchers.
COMPANY— ATTENTION. CLOSE STRETCHERS.	Slings will be unfixed and placed on the ground, and stretchers closed, as before detailed.
ON THE RIGHT— CLOSE. BY THE RIGHT— QUICK MARCH. HALT. LOWER STRETCHERS, &c.	As detailed in Stretcher Drill.

Ambulance carts will be *Loaded* and *Unloaded* on similar principles.

LOADING AND UNLOADING AMBULANCE WAGONS AND CARTS WITH PATIENTS ABLE TO SIT UP.

After the men have been thoroughly instructed in the preceding exercise, they will be taught to assist into the front and back seats, patients supposed to be able to sit up. Practice will be given in lowering the ladder and in lashing it up again, and in putting away articles of equipment, rifles, valises, &c., in the various positions assigned to them in the wagon or cart.

IV. DRILL WITH COUNTRY CARTS, GENERAL SERVICE WAGONS, &c.

29. GENERAL REMARKS.

It may be necessary to employ country carts or general Service wagons for the transport of wounded. When used for this purpose the floors of such conveyances should be thickly covered with straw, on which the stretchers conveying wounded requiring the recumbent position should be placed.

In practising loading these carts or wagons, stretchers and patients will be drawn up on the parade ground, as detailed for Ambulance Wagon Drill, and the same steps taken to load and unload as in the case of ambulance wagons. In loading, however, the Nos. 1 and 2 of each squad, after the end of the stretcher has been placed on the floor, will spring into the wagon, and, with the assistance of the other Nos. on the ground, lift the stretcher into position.

Sometimes the recumbent wounded have to be put into the wagons without stretchers, none being available. When this happens, four bearers, following as far as possible the instructions

given for lifting wounded in Stretcher Drill will lift each wounded man, and carefully carry him to the wagon. On arriving at the back of the wagon, No. 4 will get into it, and supporting the wounded man under both shoulders will lift him in, assisted by the other Nos., who will subsequently get into the wagon and help to place the wounded man in the most advantageous position possible.

Unloading is the converse of this proceeding.

V. RAILWAY WAGON DRILL.

The railway wagons in this country which can be made use of for the purpose of transporting wounded men are passenger carriages, in which the patients can, if necessary, be laid on the seat, and goods wagons.

No special instructions appear to be necessary for loading and unloading such wounded men as are able to walk and assume the sitting posture, recumbent patients alone being alluded to in the text.

30. Preparation of Wagon by Zavodovski's Method.

To prevent jarring, these wagons require to be fitted with some special apparatus. That most generally used is known as Zavo-

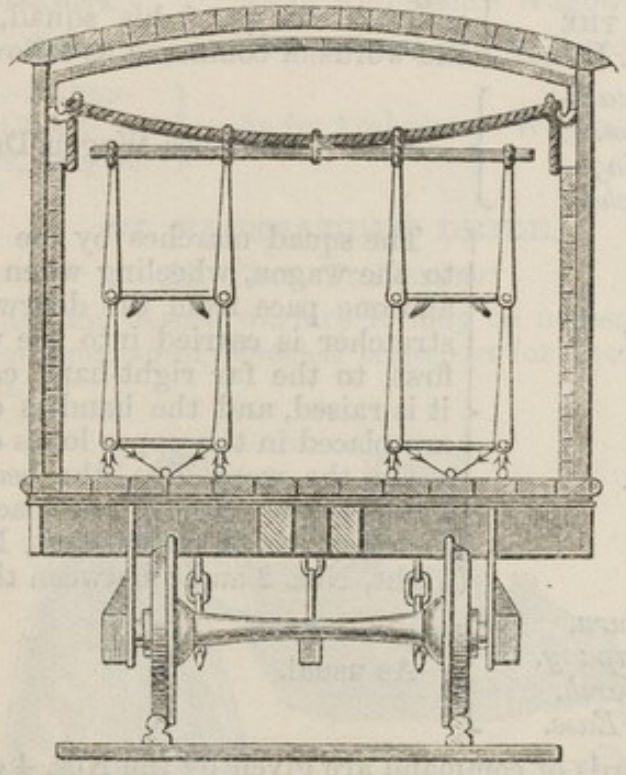


Fig. 84.—Transverse section of a Goods Wagon fitted on Zavodovski's Plan.

dovski's. (Fig. 84.) To prepare a wagon according to Zavodovski's method the following stores are required :—

4 cables,
16 ropes prepared with loops,
8 large hooks and rings,
32 small ring-bolts,
4 stout poles of suitable length,
8 field stretchers, and
28 stout cords for lashings.

The large hooks and rings are inserted in the sides of the wagon near the roof ; from these the cables are suspended across the wagon, the poles are secured lengthwise to the cables and the looped ropes attached to them. By means of these, two tiers of stretchers are supported, four stretchers in each tier. The lower tier is made fast to the small rings on the floor.

31. Loading and Unloading.

The company, with lowered loaded stretchers, will be drawn up in extended order ten paces from and facing the goods wagon.

LOADING.

Fix Slings.	As in Ambulance Wagon Drill.
Stand at Ease.	As usual.
Squads—in Succession from the Right—will Load.	Each No. 4 in succession from the right assumes charge of his squad, and gives the words of command as follow :
No. — Squad— Attention. For Loading— Lift Stretcher.	As in Ambulance Wagon Drill.
Load.	The squad marches by the nearest way to the wagon, wheeling when opposite to and one pace from the doorway, and the stretcher is carried into the wagon, head first, to the far right-hand corner where it is raised, and the handles of the poles are placed in the upper loops of the ropes.
Two.	On the word *Two*, the bearers fall in outside the wagon one pace from the doorway, No. 1 on the left, No. 4 on the right, Nos. 2 and 3 between them.
Right Turn. Rejoin company. Quick March. Stand at Ease.	As usual.

Similar words of command are given by the Nos. 4 of successive squads when they see the squad on their right falling in outside the wagon. No. 2 squad loads the upper near right-hand corner, No. 3 the lower far right-hand corner, No. 4 the lower near right-hand corner.

The lashings are fixed by No. 4 squad as follows :

The lashing attached to the ring in the floor of the wagon immediately beneath the handles of the stretcher is carried up round the handle, back through the ring and fastened off ; if long enough this may be repeated. The lashing attached to the ring lying between the handles is passed up round the left handle, back through the ring, round the right handle and back to the ring—thus forming a V, where it is fastened.

The upper tier is steadied by a lashing starting from a ring-bolt in the side of the wagon, which is carried across and secured to the opposite side, a firm hitch being taken round each handle. The lashings will be drawn tight to prevent swaying of the stretchers.

The left half of the wagon is loaded in a similar manner.

UNLOADING.

Squads—In succession from the Left—will Unload.	The converse of the above. The lashings of the left half of the wagon are unfixed, and the unloading commenced with the near lower stretcher on the left.
No. — Squad— Attention. Unload.	Nos. 3 and 4 enter the wagon first and proceed to the head end of the stretcher ; the stretcher is brought out foot first and carried to its original position, where the bearers wheel about.
Lower Stretchers.	As in Ambulance Wagon Drill.
Stand at Ease.	The patients will be directed to rise.
Company—Attention—Close Stretchers, &c., &c.	As in Ambulance Wagon Drill.

VI. PACKSADDLE DRILL.

32. Pack Transport.

In mountain and desert warfare it may be necessary to employ pack transport instead of wheeled transport for the conveyance of the wounded.

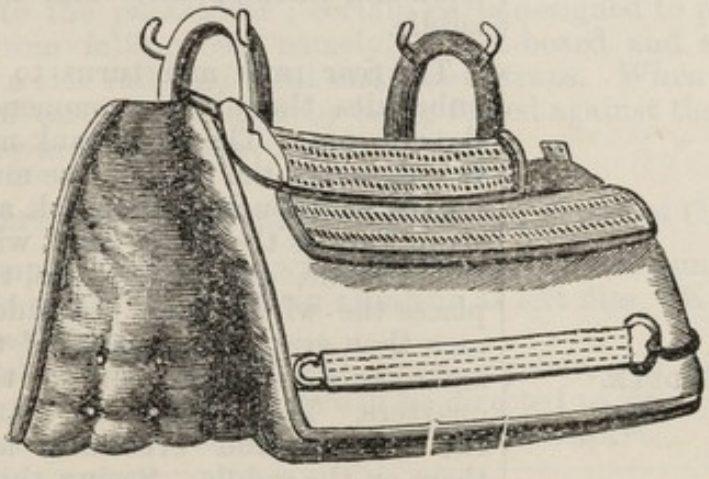


Fig. 85.—Packsaddle.

Cacolets, of which the so-called mountain equipment consists, are constructed to be hooked in pairs on packsaddles, one on each side.

Description of Packsaddle.

The packsaddle used is the large pattern, and weighs, with the following accessories, 53 lb.

Bit, bridoon with reins.
Breeching, with Ds and chains.
Covers, waterproof, 6′ × 6′.
Collar, breast, with Ds and chains, neck straps, and buckling pieces.
Collar, head stall.
Crupper, leather.
Girths, pair of.
Pannels, pair of.
Rein chain.
Surcingle or wantie, 14′ × 3″.
Tree with front and rear arch.

33. Saddling and Off Saddling.

The company will be drawn up in two ranks, and pack animals, saddled and bridled, will be brought ten paces in front of, and with their quarters towards the company, the animals to be ten paces apart.

— Files on the Right— Take Post at the Mules— Advance. — The named files advance towards the mules. The file on the right marches to the mule on the right, the next file to the next mule, and so on, from right to left. The front and rear rank man in each case separate immediately in rear of the mule, the front rank man passes to the off side and the rear rank man to the near side of the mule, both halting without word of command when opposite and close to the saddle.

Off Saddle. — The rear rank man turns to the right, unbuckles the girths, commencing with the rear one. The front rank man passes round under the neck of the mule to the near side, unbuckles the neck and breast strap, carries the latter back with him to the off side, and picking up the girths, places the whole upon the saddle. Both men then grasp the pannels of the saddle and sweep it back on to the mule's quarters. The front rank man removes the crupper and breeching and places them on the saddle. Seeing this done the rear rank man grasps the front arch with

	the left hand and passes his right arm under the pannels, lifts the saddle clear, takes a pace to his rear and places the saddle, resting on its front arch, on the ground.
SADDLE.	The rear rank man stoops down, grasps the front arch with the left hand and passes his right arm under the rear arch as far as the elbow, lifts the saddle, takes a pace to his front and places it on the mule's quarters. The front rank man then adjusts the breeching and crupper,* and both men *lift* the saddle forward. The front rank man draws down the girths and breast strap, places the neck strap over the mule's neck, takes the breast strap in his left hand and passes round under the mule's head to the near side ; buckles it and returns to the off side. The rear rank man buckles off the girths, commencing with the front one. Both remain steady, facing inwards.
RETIRE. HALT. FRONT.	As in hand-seat drill.

The files in excess of the number of available mules will be similarly exercised.

VII. CACOLET DRILL.

34. DESCRIPTION OF CACOLETS.

Cacolets, or folding chairs, are intended for the conveyance on pack animals of patients in the sitting posture.

A pair of the latest pattern (Mark III) cacolets weighs 56 lbs. Each cacolet consists of the following parts :—a seat, or cushion ; two hanging bars, terminating in hooks by which the cacolet is attached to the packsaddle ; certain parts designed to prevent the patient from falling out, namely, a foot-board and slings, two uprights, a side rail, and front and waist straps. When not in use, the pair of cacolets is closed by being folded against the saddle, to which they are then secured by a surcingle.

35. PREPARING, LOADING, UNLOADING AND CLOSING CACOLETS.

The company will be drawn up in two ranks, odd numbers being told off as right files and even numbers as left files. Knee-caps as in hand-seat drill.

The pack animals, loaded with closed cacolets, will be drawn up as in SADDLING. Two patients will be directed to sit on the ground ten paces in front of each mule and two paces apart.

* Care being taken that no hairs are left under the dock-piece.

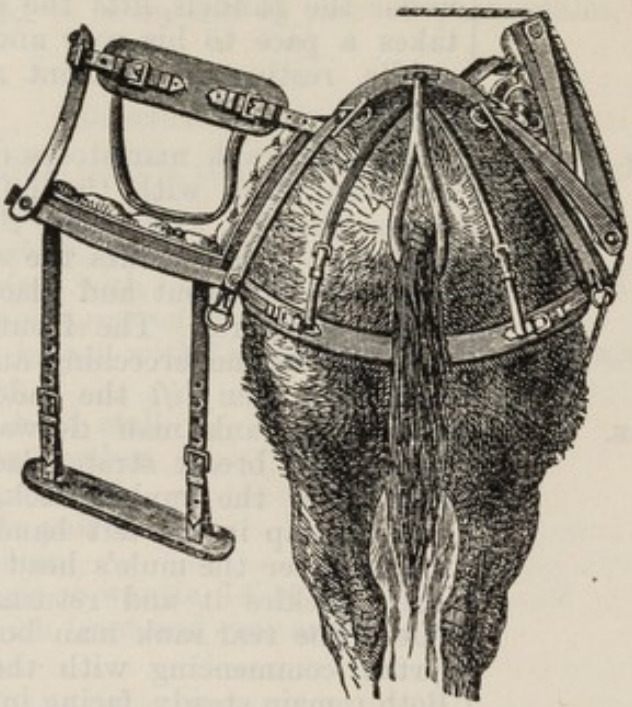


FIG. 86.—END VIEW OF A PAIR OF CACOLETS, SHOWING ONE PREPARED AND THE OTHER CLOSED.

— FILES ON THE RIGHT—TAKE POST AT THE MULES—ADVANCE.	The named files advance towards the mules. The two files on the right march to the mule on the right, the next two files to the next mule, and so on from right to left.
	The files in each case separate immediately in rear of the mule, the right file passes to the off side, the left file to the near side, the whole halting without word of command when the front rank men are opposite and close to the cacolets.
PREPARE CACOLETS.	Each front rank man turns inwards; the man on the near side unbuckles and removes the surcingle, doubles it twice and hangs it through the front arch towards the near side. Both men then draw down the seats (the rear rank men closing outwards to make room), raise and fix the side rail, unbuckle the waist and front straps, and front together.
TAKE POST AT THE WOUNDED—ADVANCE. BY TWO-HANDED SEATS—LIFT WOUNDED.	As in hand-seat drill.

LOAD.	Each file retires towards the mule, advancing and halting when immediately in front of the cacolet.
Two.	On the word *Two*, the "patients" are raised and placed at the same moment in the cacolets. The "patients" will be directed to assist in this movement. The front rank man places the foot-board beneath the "patient's" feet, passes the front strap through the slot in the hanging bar and buckles it. The rear rank man passes the waist strap round the "patient" and secures it. Both men then take post outside the cacolet.
UNLOAD.	Each front rank man unbuckles the front strap and removes the foot-board; the rear rank man unbuckles the waist strap. They then form the two-handed seat beneath the "patient's" thighs, the front rank man placing himself on the right, the rear rank man on the left of the patient.
Two.	On the word *Two*, the "patients" are lifted clear and carried ten paces to the front.
LOWER WOUNDED.	As in two-handed seats.
TAKE POST AT THE MULES. RETIRE.	Files turn to the rear, take post outside cacolets, halt and front together.
CLOSE CACOLETS.	Each front rank man turns inwards, buckles the waist and front straps, lowers the side rail, pushes up the seat, and places the foot-board on the top. The man on the near side takes the surcingle, unfolds it and passes it through the loop between the girths to the man on the off-side, who pulls it through and throws the end over the top of the cacolets to the man on the near side, who buckles it opposite to the centre of the cacolet. Both men front together.
UNHOOK CACOLETS.	Each front rank man turns inwards; the man on the near side unbuckles the surcingle, removes it and disposes of it as in *preparing* cacolets. Both men then grasp the closed cacolets, fingers on the cushions, thumbs on the seats, unhook and take a pace to their rear; stoop, place the cacolet on the ground with the hooks pointing away from the mule; place the foot-board on the top of the cacolet and rise together.

HOOK ON CACOLETS. — Each front rank man, stooping, removes the foot-board, takes hold of the cacolet, as before, and rises up; steps up to the mule, raises the cacolet, drops the hooks into their places, and lays the foot-board on the top, the men on either side working together.

The surcingle is then passed, and buckled as in closing cacolets.

RETIRE. HALT. FRONT. — As in hand seat drill.

The files in excess of the number of available mules will be similarly exercised.

36. LOADING AND UNLOADING CACOLETS WITH REDUCED NUMBERS.

When only three bearers are available, they will take post at the mules, two on the off side and one on the near side.

The loading of both cacolets will be carried out by the two men on the off side, who will commence with the cacolet on that side. The man on the near side holding down the near cacolet by the side rail while the opposite cacolet is being loaded, and until his own cacolet is loaded.

In unloading, the cacolet on the near side will be first unloaded by the two bearers from the off side, the man on the near side balancing the cacolet on the off side as before.

The cacolet on the off side will then be unloaded, and the bearers resume their positions outside their respective cacolets.

37. DIRECTIONS FOR ASSISTING WOUNDED ON AND OFF HORSES.

Three bearers are required, four if the patient be quite helpless, or if the horse be tall and the bearers short. No. 1 bearer always holds the horse's head, 2, 3, and if necessary 4, carry and steady the patient.

The practice can be carried out from either the near or off side.

Dismounting.

(*a*) Injuries of the upper extremities not very severe.

No. 1 stands to horse's head.
No. 2 on the side at which the patient is to dismount.
No. 3 on the opposite side.
No. 2 steadies the patient.

No. 3 takes the patient's foot out of the stirrup and passes the leg across, over the pommel, to No. 2, who then grasps both legs, at the same time looking towards the horse's head and standing on the side of the patient farthest from it.

No. 3 passes round the horse's head and Nos. 2 and 3 ease the patient down and form a two-handed seat.

(*b*) Wounds of lower extremities.

The same detail, except that the patient should be dismounted on the side on which the injured limb is.

Mounting.

(*a*) In injuries of the upper extremities, if patient cannot walk :

Nos. 2 and 3 carry by two-handed seat, if to near side, No. 2 in rear, patient's back to the horse.

Raise and seat patient in the saddle, the patient assisting with the uninjured hand, which should be to the front, and, in injuries of the left arm, to the near side, and of the right arm to the off side.

The foot to the rear is placed in the stirrup and steadied by No. 2.

No. 3 passes by the head of the horse and steadies the patient, and the leg to the front is passed round over the pommel and placed in the stirrup.

Stirrups may be tied together under the horse's belly with the patient's straps.

Nos. 2 and 3 steady him while No. 1 leads the horse.

(*b*) In wounds of the lower extremities :

The patient is carried similarly by the two-handed seat, the legs tied together and the injured limb towards the horse's head, No. 2 in rear.

The patient is raised as before, but sits side-saddle ; the uninjured foot is placed in the stirrup, and the bearers steady from both sides.

In the case of a patient being helpless, with an injury of the upper extremity :

No. 4 bearer mounts and covers the wallets with a coat.

The patient is raised as before by Nos. 2, 3 and 4 assisting, and seated on the wallets. The front leg is put across, and No. 4 steadies the patient between his arms, Nos. 2 and 3 assisting.

In injuries of the lower extremity, the patient being helpless :

The procedure is the same, except that the leg is not put across.

The injured leg should be to the front.

Advantage should be taken of sloping ground, the bearers standing on the higher level in mounting and dismounting the patient.

If the horse be over fifteen hands, and the bearers are not tall, some difficulty is experienced in transferring a patient from a two-handed seat to the saddle. In this case a fourth bearer may be required to mount behind the saddle and help the patient to his place, then dismounting.

If the horse is unsteady, hold up one foreleg, the knee bent, and, if necessary, blindfold the horse.

A man accustomed to horses should always be No. 1.

If the patient be wearing spurs, these must invariably be removed.

FIELD TRAINING.

38. Organization and Duties of Bearer Companies.

Personnel. The personnel of the war establishment of a bearer company consists of 1 major in command, and 2 captains or lieutenants, 1 serjeant-major, 6 staff-serjeants and serjeants, 6 corporals, 44 privates and 1 bugler of the medical corps, and one warrant officer, 1 serjeant, and 37 rank and file of the Army Service Corps attached for transport duties.

Disposition in action. In action the company is normally distributed thus :

I. Two stretcher sections under a captain or lieutenant, each section consisting of 1 serjeant and 4 stretcher squads.
II. 1 serjeant and bugler at the collecting station.
III. 5 corporals and 5 privates as wagon orderlies, each in charge of an ambulance.
IV. The major, 1 captain or lieutenant, 1 serjeant-major, 2 serjeants (1 as compounder), 1 corporal and 4 privates (1 as cook) at the dressing station.
V. 1 staff-serjeant, 2 privates (company cooks), and 1 private (supernumerary) of the medical corps, and 4 bâtmen, 1 cook, and 2 supernumeraries of the transport section in rear with the company baggage, supplies, &c.
VI. The remainder of the Army Service Corps will be with their respective vehicles.

Wheeled transport. The wheeled transport of a bearer company includes ambulance wagons, general Service wagons for equipment and medical stores, store carts and a water cart. The ambulance wagons or other sick carriage are divided into two Lines. The First Line is intended to convey the wounded from the collecting station to the dressing station, and the Second Line to carry them from the dressing station to the field hospital. The proportion of carriage detailed for each of these services will in every case be determined by the officer commanding the bearer company, failing the receipt of orders from higher authority. It will rest with him to decide,

Distribution of sick carriage. from consideration of the character of the enemy, the rapidity with which the wounded are being brought in, the state of the roads, the distance between the collecting station and the dressing station, and between the latter and the field hospital, how best to employ the ambulances at his disposal. It may in some cases seem advisable to employ, in the first place, the carriage of both lines between the collecting station and dressing station, while under other circumstances it may be better to at once employ the ambulances of the Second Line in evacuating the dressing station. A rapid review of the conditions referred to will enable him promptly to decide whether the rendezvous of both lines of ambulances shall in the first place be at the collecting station, or whether he will order only those of the First Line thither, and those of the Second Line to rendezvous at the dressing station.

Pack transport. The pack transport of a bearer company for use in mountain warfare, or where there are no roads suitable for wagons or carts, consists of cacolets for the transport of the wounded, and field

panniers, &c., for the transport of stores, the whole being carried by pack animals.

Duty of stretcher sections.

The stretcher sections will be sent out to succour and collect the wounded. The No. 4 of each squad will be in charge of his squad, and on the two men who are not actually carrying the stretcher 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. The squads will bring the wounded to the collecting station and place them in the ambulance or other sick carriage, returning at once to the scene of action, and taking fresh stretchers with them. The stretcher squads will not pass in rear of the collecting station.

Collecting station.

The collecting station will usually be under shelter, and, if possible, near a road, but as near the fighting line as is consistent with safety. The serjeant in charge of it will have in his care a Field Companion and water-bottle, and a small reserve of bandages and first dressings to replenish the surgical haversacks of the bearers.

Ambulances of First Line.

The ambulances or other sick carriage ordered to rendezvous at the collecting station will move off to the dressing station as they are loaded with wounded, each under charge of a wagon orderly. After taking the wounded to the dressing station, those of the First Line will return at once to the collecting station, and they will never go in rear of the dressing station until the field has been cleared.

Dressing station.

The dressing station will, if possible, be out of fire near a road, and advantage will always be taken of a good water supply and of buildings or other shelter in the vicinity of the scene of action. The necessary surgical and medical equipment, medical comforts, water cart, and, if so ordered, the ambulances constituting the Second Line, or, in mountain warfare, the whole of the pack transport, will be assembled at the dressing station, and if no building is available the operating tent will be pitched. Here beef tea and stimulants will be got ready, and every preparation made to succour the wounded as they come in.

Ambulances of Second Line.

After the wounded are dressed they will be placed in the ambulances of the Second Line or other sick carriage, and taken to the field hospital. As soon as they have been transferred to the field hospital, the wagon orderlies will return with the ambulances to the dressing station. Before despatching wounded to the rear, the officer commanding the bearer company will ascertain, by signal or otherwise, that the field hospital is ready to receive them.

Baggage party.

The remainder of the company left in charge of the baggage and supplies will have food ready for the company at the close of an action.

Application of general principle.

The foregoing instructions must necessarily be varied to meet the exigencies of the locality and warfare in which the army is engaged, and according to the need of advancing or retiring the collecting and dressing stations, on a forward or retrograde movement of the troops being made. The general principle will, however, always be kept in view of having the collecting station as near the fighting line as possible, and at no great distance from the dressing station, so as to shorten the journeys of the bearers

and the ambulances of the First Line and bring the wounded within reach of surgical aid as speedily as possible. In some cases, and invariably with mountain equipment, the collecting and dressing stations will be combined.

Distinguishing flags and lamps.

All medical establishments in the field are distinguished during daytime by a flag bearing a red cross on a white ground, and during the night by two white lamps placed side by side. Directing red cross flags will be placed between the collecting and dressing stations, and between the latter and the field hospitals to mark the road.

Searching woods and ditches.

When all the wounded have been removed from the open, the woods and ditches in the neighbourhood will be methodically searched, so that there may be no possibility of any wounded remaining uncared for. Lanterns for searching in the dark form part of the equipment of a bearer company.

Search lanterns.

Specification tallies.

When the necessary surgical treatment has been afforded, the officer will attach* to the clothes of the wounded man a "specification tally" (Army Book 166), on which will be specified his regiment, number, rank, and name, with the nature of the injury, the treatment, and any precautions required in transport. The soldier's name and the nature of his wound will also be entered on the counterfoil of the tally book. Green-coloured tallies will be used for serious cases and for those requiring immediate attention, and white tallies for other cases.

Disposal of arms, ammunition, and accoutrements.

The arms, ammunition, and accoutrements of a wounded man will be carried with him to the Dressing Station and Field Hospital, and handed over to the quartermaster of the hospital into which he is received.

Rendezvous after an action.

At the close of an action, and when the Dressing Stations have been evacuated, the bearer companies will rendezvous with the brigades to which they are attached and in the vicinity of the field hospitals, unless otherwise ordered.

39. Bearer Company Practice.

With Wheeled Transport.

Order of march.

The bearer company will be drawn up in column. (See Fig. 97, page 159.) The Collecting Station party and the Dressing Station party will be detailed before marching off. The ambulance wagons, each accompanied by a wagon orderly, general service wagons, carts and water cart will parade in rear. In front of the bearer company a party of men told off to act as "patients," in marching order, but with their valises empty, will be formed up as a separate company in charge of an officer or non-commissioned officer who will be provided with specification tallies (see para. 38) to be distributed one to each man, stating the nature of his supposed injury. These tallies will be numbered, and the non-commissioned officer in charge of the Collecting Station will enter in a note book, as each wounded man is brought in, the number of the tally and the name of the No. 4 of the squad, so as to trace by whom the dressing was applied.

Soldiers acting as patients to have tallies showing their supposed injuries.

* Unless this has been already done by the medical officer accompanying the man's regiment.

KEY TO FIGS. 87, 88, 97, AND 98.

COLUMN OF ROUTE FORM FOURS—RIGHT —BY THE LEFT). QUICK MARCH. — The officer in command having inspected the parade will march it off in column of route, the warrant officer in charge of the transport giving the executive command to the drivers.

Formation of Dressing Station. On reaching suitable ground the HALT will be sounded and the order FORM DRESSING STATION given.

On this order the Dressing Station party will be detached from the main body, and with the General Service wagons, carts, water cart, and if so ordered the Second Line of ambulances will take up their position on the ground selected, and proceed to form the Dressing Station under the orders of the officer commanding.

Formation of Collecting Station. On the ADVANCE being sounded, the remainder with the First Line of ambulance wagons, will proceed further on and form a Collecting Station in a suitable place under the orders of one of the remaining officers. The Collecting Station should be in a sheltered position and at a sufficient distance from the Dressing Station to illustrate the method of working. It is formed by the wagons aligned at close interval with horses' heads to the rear. Its position should be marked by a Red Cross Flag.

Distribution of patients. The patients will be marched on for about five hundred yards, distributed over the ground and directed to lie down.

Preparations by wagon orderlies. As soon as the Collecting Station is formed the wagon orderlies will get out the stretchers, haversacks and water-bottles; place them together on one side, and prepare the wagons; the field companion being given over to the non-commissioned officer in charge of the Collecting Station.

Searching for wounded. The bearers will be formed up and told off as in Stretcher Drill in front of the line of wagons. The Nos. 3 will be filed on stretchers, the Nos. 4 on haversacks and water-bottles. The officer in charge will then move the sections off towards the wounded—a non-commissioned officer being in charge of each section; as he approaches the scene of action he will give the order SEARCH FOR WOUNDED. On this command the squads will extend, each acting independently under the orders of its No. 4, and proceed by the quickest route towards the wounded, the non-commissioned officers keeping touch with their respective sections, the officer supervising the whole.

First aid to wounded. On reaching a wounded man the squad halts, No. 1 one pace from the patient's head; the stretcher is lowered and prepared by the Nos. 1 and 3, the No. 4 giving the commands "Lower Stretcher," "Prepare Stretcher"; the No. 4 doubling to the right side, and No. 2 to the left attend to the patient, applying such dressings as are indicated by the nature of the supposed injuries; removing and taking charge of his equipment. The patient will then be placed on the stretcher in the usual way, the No. 1 placing himself opposite the patient's knees, and No. 3 opposite the shoulders, unless his injury is so slight as to allow of his walking to the Collecting Station, where he will be placed in the ambulance wagon for transport to the Dressing Station. The words of command given by No. 4 will be as in Stretcher and Ambulance Wagon Drills.

Accoutrements to be utilized. The equipment and accoutrements of the patient should be used,

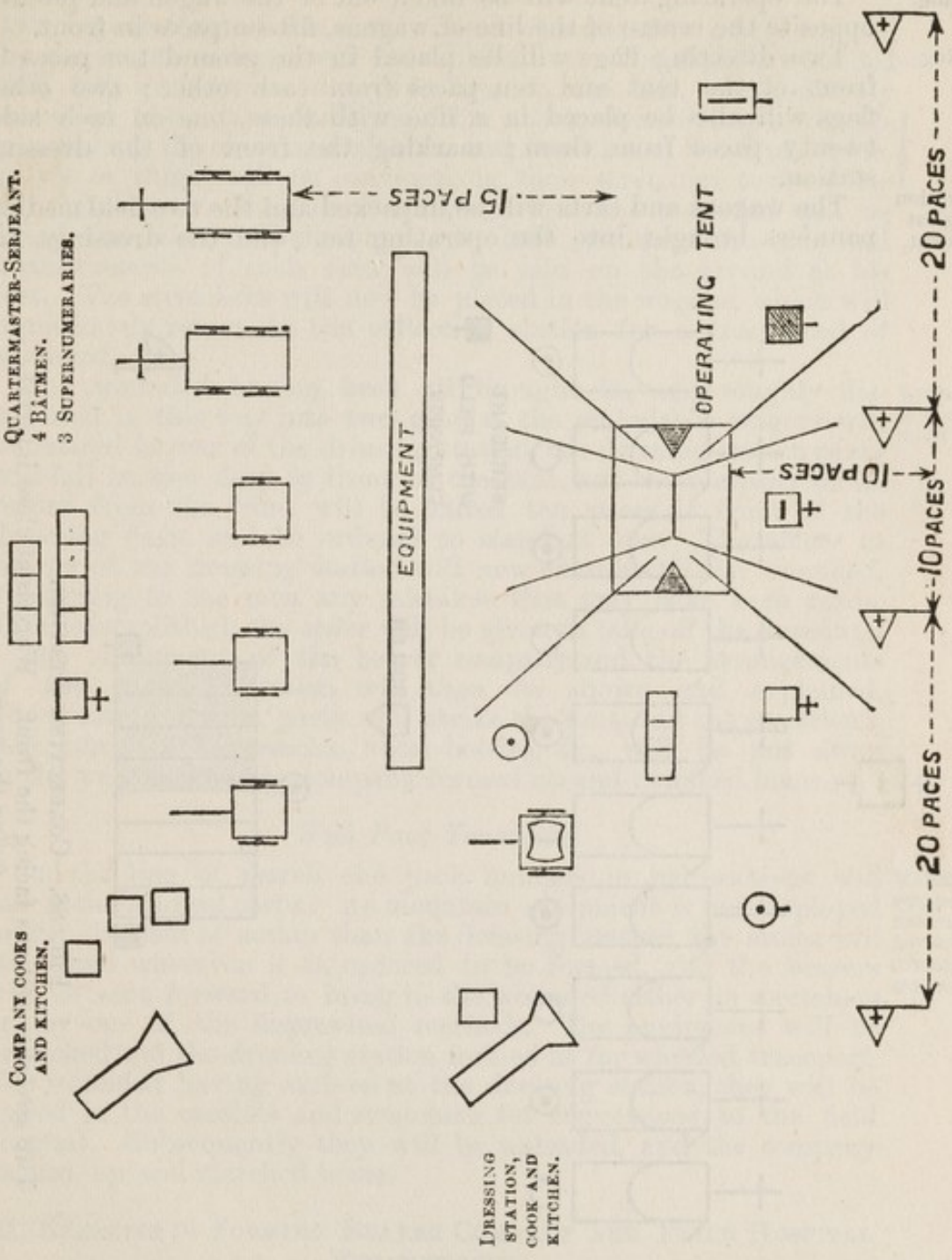


FIG. 87.—PLAN OF DRESSING STATION.

as far as possible, to supplement the splints and bandages carried by the No. 4.

Work at the dressing station.

While the collecting station party has been at work the dressing station party will have pitched the operating tent and prepared the dressing station as follows :—

Arrangement of wagons.

The second line of ambulance wagons, if so ordered, the general service wagons, carts and water cart, will form line at close interval, horses' heads to the rear.

Operating tent.

The operating tent will be taken out of the wagon and pitched opposite the centre of the line of wagons, fifteen paces in front.

Directing flags.

Two directing flags will be placed in the ground ten paces in front of the tent and ten paces from each other; two other flags will also be placed in a line with these, one on each side, twenty paces from them; marking the front of the dressing station.

Preparation of surgical equipment.

The wagons and carts will be unpacked and the two field medical panniers brought into the operating tent, and the dressings, instruments, &c., taken out and arranged ready for use. The operating table is prepared. The remainder of the equipment will be placed on the ground between the tent and the wagons, so as to be at hand when required.

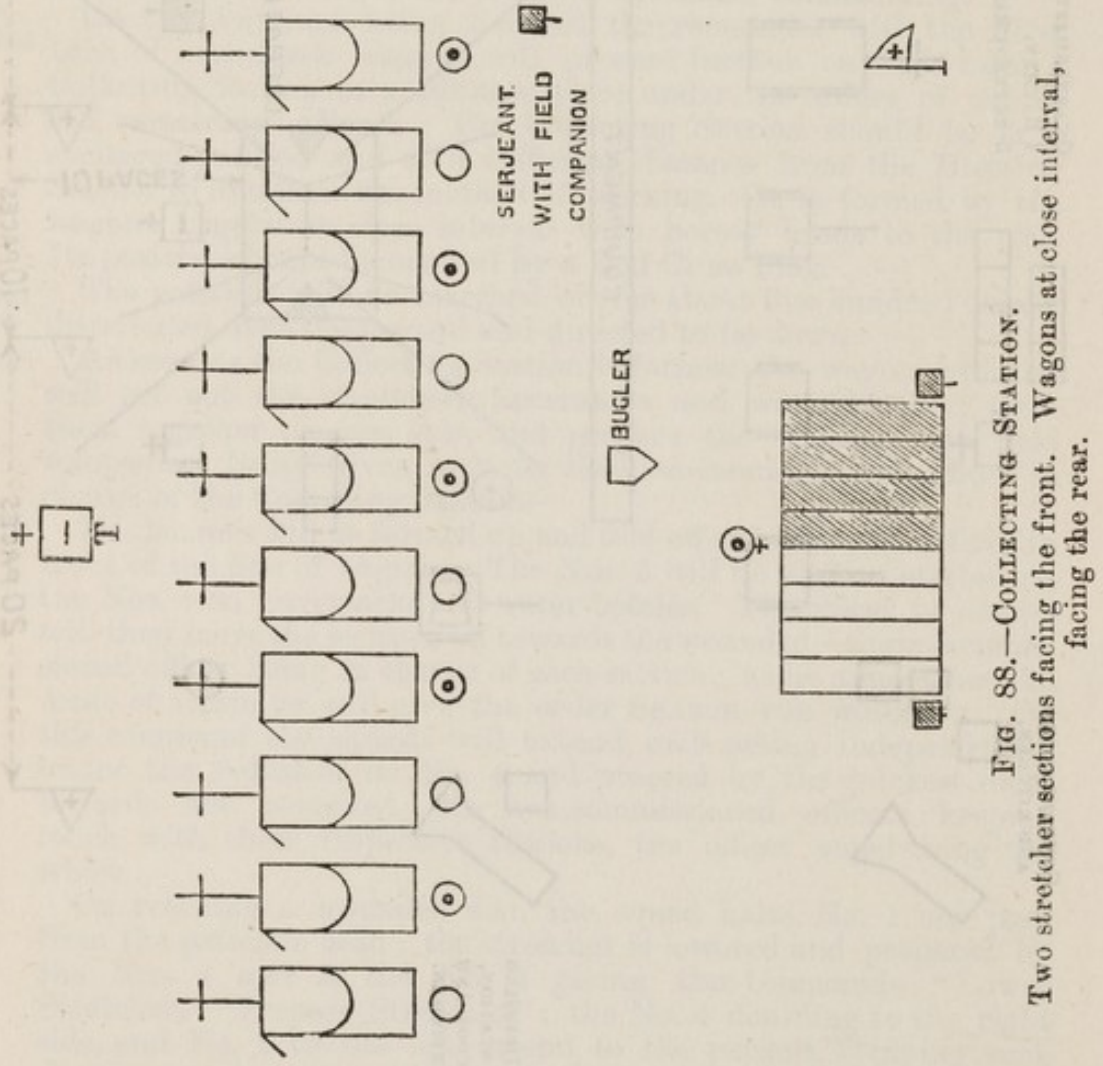


Fig. 88.—Collecting Station.
Two stretcher sections facing the front. Wagons at close interval, facing the rear.

Trench kitchen.

Trench kitchens will be dug in a suitable spot in rear or to one side of the dressing station; fires will be lighted and water boiled ready to provide the wounded with hot drinks on arrival.

Arrival of wounded.

As each ambulance wagon arrives at the dressing station from the front, it will halt and reverse opposite the space between the

two flags in front of the tent. The dressing station party, assisted by the wagon orderly, will then unload it. The slightly wounded will fall in between the two flags on the left. The severely wounded (*e.g.*, those suffering from shock, hæmorrhage, wounds penetrating the chest or abdomen, and fractures of the skull, spine, pelvis, or thigh) will be conveyed on their stretchers to the space between the two flags on the right, where the wounded will be lifted and laid on the ground. In both instances the rifle and accoutrements of each man will be laid on the ground at his feet. The stretchers will now be placed in the wagons, which will immediately return to the collecting station for a fresh load of wounded.

Examination of work done.

The wounded having been all brought in, and roughly distributed in this way into two groups, the ambulance wagons will be retired in rear of the dressing station, the dressing station party will fall in two deep in front of the tent, and the company on its return from the front will be halted ten paces in front of the directing flags, and be ordered to stand at ease. The officer in charge of the dressing station will now examine all the wounded, explaining to the men any mistakes that may have been made. This accomplished, the order will be given to take off the dressings.

The equipment of the bearer company and the arrangements of the dressing station will then be shown and explained. The dressing station party will strike the tent, and the stretchers, tent, surgical haversacks, water-bottles, &c., will be put away in the wagons, and the company formed up and marched home.

With Pack Transport.

Mountain equipment not carried beyond the dressing station.

On the line of march the pack animals in half-sections will follow the medical corps. As mountain equipment is not employed nearer the field of action than the dressing station, the mules will be halted wherever it is ordered to be formed, and the bearers will be sent forward to bring in the wounded either on stretchers or by one of the improvised methods. The equipment will be unpacked and the dressing station formed as for wheeled transport. The wounded having arrived at the dressing station, they will be placed in the cacolets and stretchers for conveyance to the field hospital. Subsequently they will be unloaded, and the company formed up and marched home.

40. Exercise in Forming Bearer Company and Field Hospital Encampments.

Choice of site.

The site having been chosen and the base line decided upon, the camp will be marked out as follows :—

Marking out camp.

Mark the base point with a flag ; measure off the distance required for the front of the camp, viz. : for a Bearer Company 60 yards, or 72 paces ; for a Field Hospital 70 yards, or 84 paces ; mark this with a second flag. The front of the camp being thus laid down, the rear of the ground will now be determined. Place a flag, or man, on the front alignment 6 feet from the base point ; another flag, or man, 8 feet from the base point, towards the rear and 10 feet diagonally from the other flag, or man ; the angle thus formed will be a right angle. Place the third camp colour in the

same straight line as the 8 feet side of the triangle and distant from the base point 100 yards, or 120 paces, for the Bearer Company, and 160 yards, or 192 paces, for the Field Hospital. The rear line of the camp will be equal in length and parallel to the base line, and will be marked by the fourth camp colour.

Pitching tents.

The several rows of tents will now be pitched in the manner described in para. 44. Each row of tents will be accurately dressed from the front as well as from the flank. The distances between tents, &c., to be in accordance with the plans given in the Encampment Regulations, as follows :—

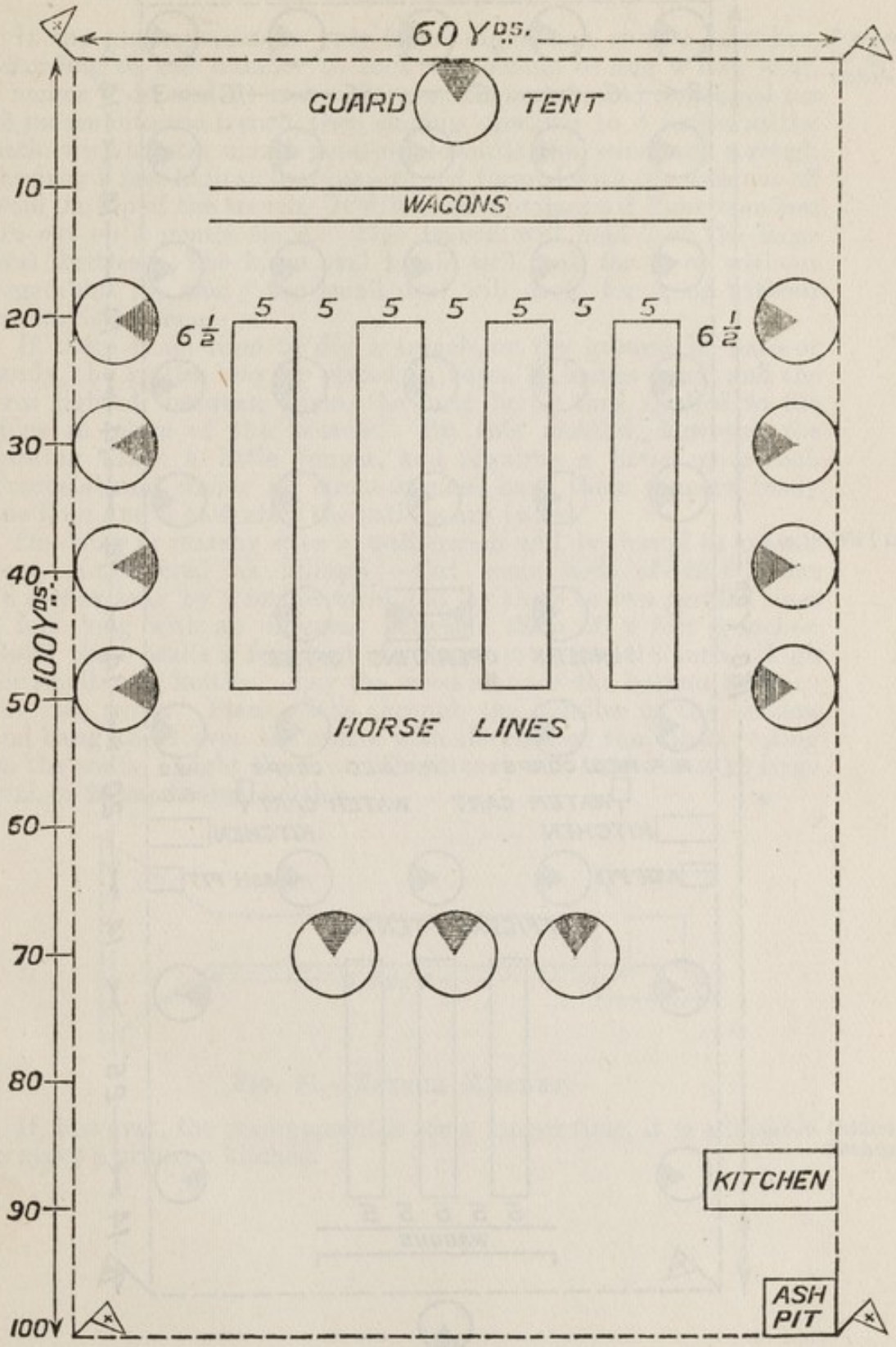


FIG. 89.—BEARER COMPANY CAMP.
(Service Abroad.)

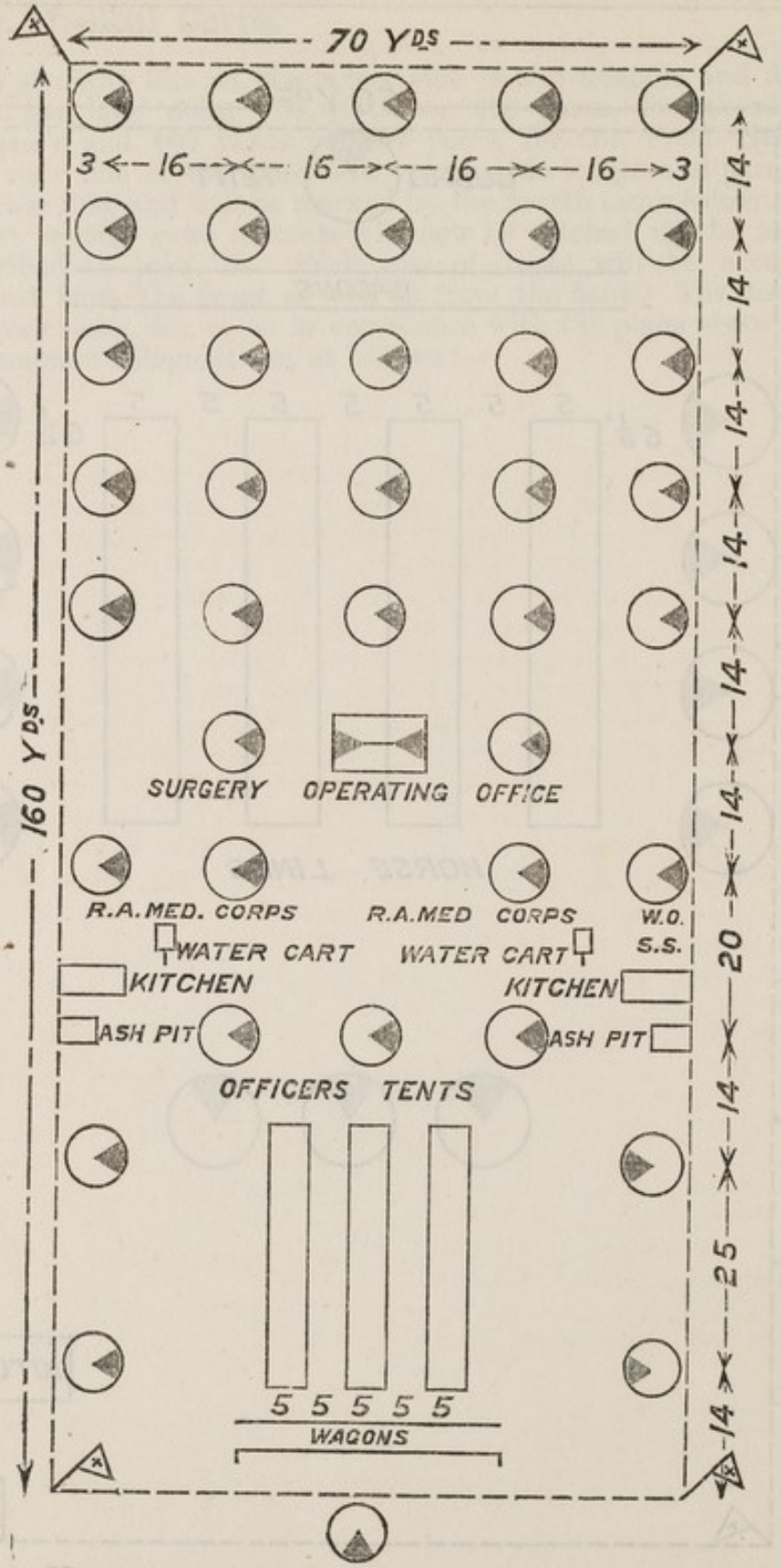


FIG. 90.—FIELD HOSPITAL CAMP.
(Service Abroad.)
(Scale 30 yards to 1 inch.)

41. Field Kitchens.

Preparation for one night's halt.

If the encampment be only for a night, one or two trenches, according to the number to cook for, should be dug 6 feet long, 9 inches wide, and 18 inches deep at the mouth, and continued for 18 inches into the trench, then sloping upwards to 4 inches at the back, with a splay mouth pointing towards the wind, and a rough chimney 2 feet high at the opposite end formed with the sods cut off from the top of the trench. It will be advantageous if these trenches are cut on a gentle slope. This trench will hold 7 of the large oval kettles. The large oval kettle will cook for 8, or without vegetables 15, men; the small oval will cook for 5, or without vegetables 8, men.

If there is no time to dig a trench, or the ground be hard or sandy, the kettles may be placed in rows, 10 inches apart, and the fires lighted between them, the heat being thus applied to the sides in place of the bottom. By this method, however, the cooking takes a little longer, and requires a little more fuel. Troops should, under all circumstances, have their dinners ready one hour and a half after the rations are issued.

Wall trench.

On damp or marshy sites a wall trench will be found to answer best, constructed as follows:—Cut some sods of turf about 18 inches long by 9 inches wide, and lay them in two parallel lines 6 feet long with an interval between them of 2 feet 6 inches. Build these walls 2 feet high for large oval, and 18 inches high for small oval, kettles. Lay the wood all over the bottom between the two walls. Place sticks through the handles of the kettles, and hang them over the centre with the ends of the sticks resting on the walls. Light the fire. This trench will hold about 12 large oval, or 20 small oval, kettles.

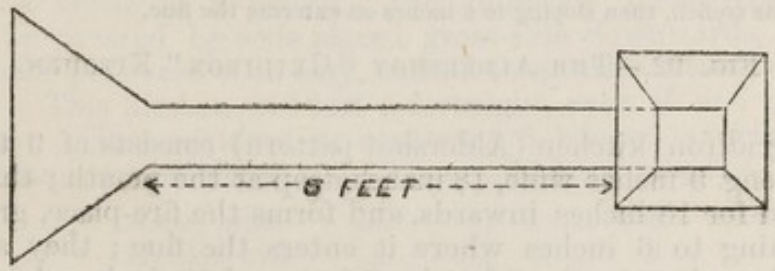
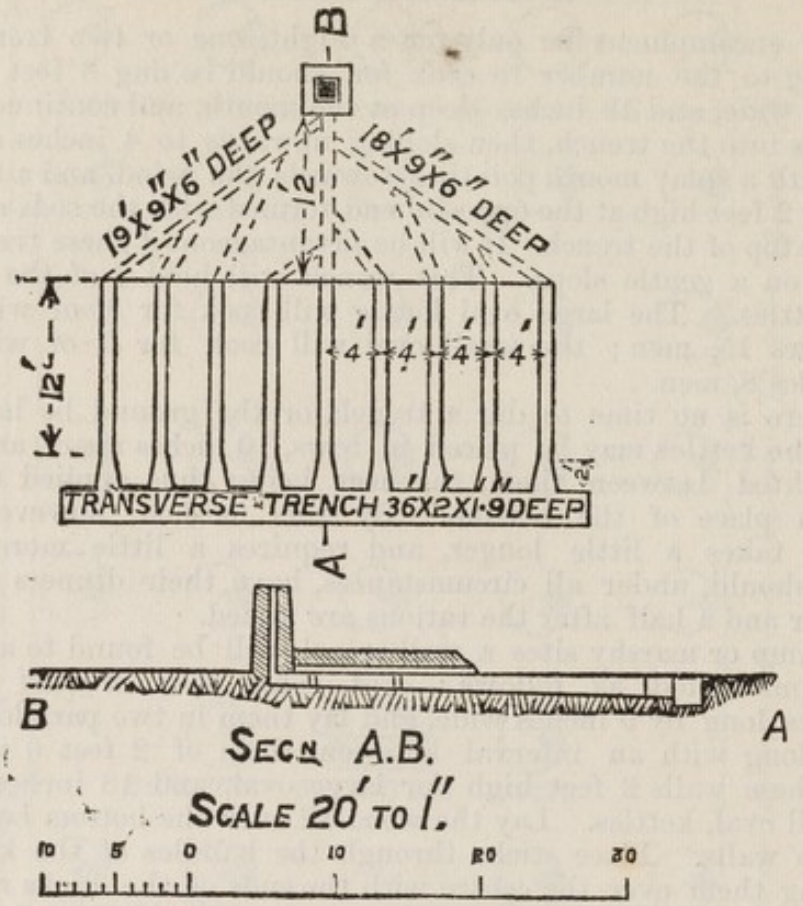


Fig. 91.—Trench Kitchen.

Gridiron kitchen.

If, however, the encampment is for a longer time, it is advisable to make a gridiron kitchen.



Chimney 6 feet high, 3 feet square at bottom, sloping to 2 feet at top. The trenches are 12 feet long, 9 inches wide, 18 inches deep at the mouth, and continuing so for 18 inches in the trench, then sloping to 6 inches on entering the flue.

FIG. 92.—THE ALDERSHOT "GRIDIRON" KITCHEN.

The gridiron kitchen (Aldershot pattern) consists of 9 trenches 12 feet long, 9 inches wide, 18 inches deep at the mouth; this depth is carried for 18 inches inwards, and forms the fire-place, gradually diminishing to 6 inches where it enters the flue; they are connected by splay mouths 2 feet by 2 feet, and 18 inches deep to the transverse trench, which is 36 feet long, 2 feet wide, and 21 inches deep.

The centre trench is connected with the chimney (6 feet high, 3 feet square at the bottom, sloping gradually up to 2 feet square at the top) by a flue 12 feet long, 9 inches wide, and 6 inches deep, covered with the sods removed from the trenches.

To mark out the kitchen, drive a picket to mark the centre of the chimney, a second one 12 feet below, which will mark the top centre of the trench; the third one, 12 feet below, marking the bottom centre of the trench; the fourth one, 2 feet below, marks the centre of the splay mouth; and the fifth, 2 feet below, the outer edge of the transverse trench. For a single trench this would be 4 feet long. For each extra trench added a picket would be driven in 4 feet from each of the latter 4 pickets used in forming

the centre or main trench, and parallel to it, leaving after the excavations 3 feet 3 inches for the cooks to work in, the top of each trench being attached to the chimney by a covered flue as shown in diagram.

Where it is possible to build the kitchen on a slope, flues are not required. The trench should be lengthened 1 foot, and a chimney about 2 feet high will be found sufficient to provide the draught and carry away the smoke.

Construction.—One man excavates each trench, commencing from the ends nearest the chimney; another man cuts out the bottom of the chimney, and builds it up with the sods cut in construction of the trenches. The third man excavates the draught or flue, which is 12 feet long, 9 inches wide, and 6 inches deep; and as soon as the trenches are dug, he cuts a flue from the head of each into the main flue, taking care that the openings from the outer tunnels do not face one another (which would interfere with the proper working of the draught), then covers the flue with turf or sods from the top of the trenches to the chimney.

The other two men excavate the transverse trench, and provide turf for the coustruction of the chimney.

The men, on the completion of the trenches, are employed respectively in providing and mixing clay, carrying water, and covering the trenches for the reception of the kettles.

Great care must be taken in the construction of the chimney; all holes and interstices must be plastered with clay.

The inside of the trenches may be plastered with clay if it be plentiful. If this is done the dimensions should be slightly increased. If the clay is scarce the trenches should be cut smooth. Each trench will accommodate about 11 oval or 12 small oval kettles, the holes for which should be modelled in clay, using the base of a kettle as a mould. The intervals across the trench should be covered by sods placed grass-side downwards, or hoop-iron sticks plastered with clay, and all interstices closed with clay or sods. This kitchen will last a fortnight, even if not plastered with clay. Time required to construct, 8 hours; working party, 1 non-commissioned officer and 12 men; tools required :—

Axes, pick	3
Hooks, bill	2
Kettles, camp	9
Pickets, bundle of	1
Spades	11

It will be seen that this kitchen admits of easy extension by the addition of more trenches.

Advantages.—More room is provided between the trenches for the cooks to work in; less ti ne is required to build. Eighteen feet less ground is required to provide this transverse trench; the flues are easy to repair.

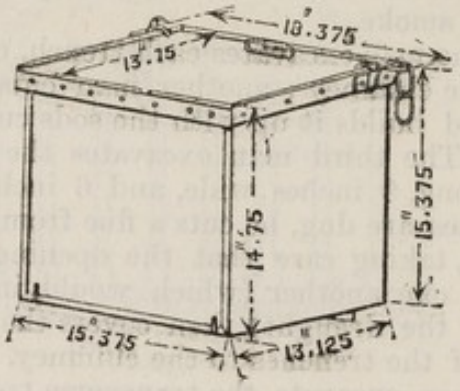
42. Portable Stove.

This stove is for use in field, stationary, and base hospitals. It consists of two ovens, two boilers with lids, four baking dishes, one grate, and two shelves.

The ovens (one of which is smaller than the other) are made of steel plate. The grate is made of wrought-iron, and the boilers and baking dishes of tin-plate.

Each apparatus is considered capable of cooking for 50 patients.

PACKED.



READY FOR USE.

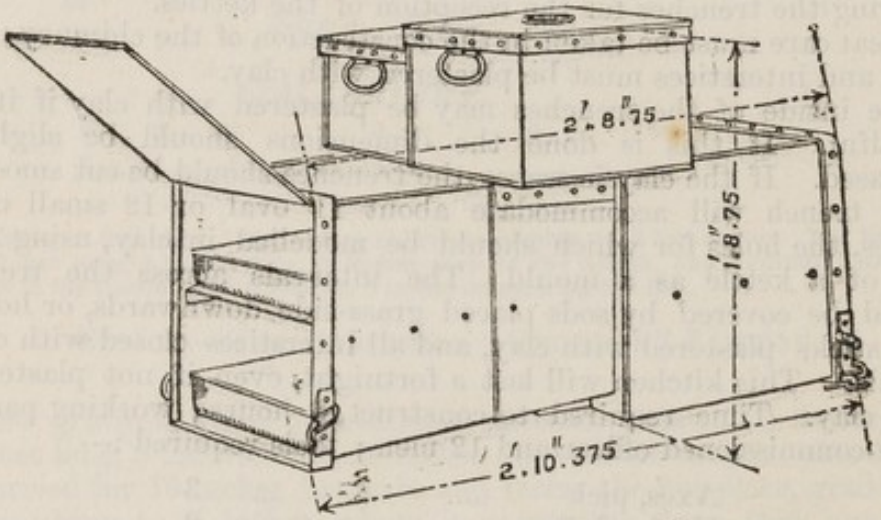


FIG. 93.—TO PUT THE STOVE TOGETHER FOR USE.

Place the ovens back to back, leaving space between them to receive the grate, which is provided with four hooks to engage in slots in angle pieces fixed to the bottoms of the ovens. Before the grate is set in its place, connect the ovens together by means of the plates pivoting on the sides of the smaller oven, and furnished with hooks to fit into slots cut in the top of the larger oven. These plates, when in position, close in the fire space. The doors of the oven have their hinges at top, and open upwards. Each oven has a movable shelf of plate-iron to rest on a ledge, and intended to receive one baking dish, the second being placed on the bottom of the oven. The boilers rest on the top of the ovens over the fire.

To pack the stove for transport.

Place the small oven inside the large one, with the large shelf on its top, and the small shelf at one side of it. Put the small boiler into the large one, and place the latter with the baking dishes inside the small oven. Place the grate in last, resting on the boiler. In packing the grate, place the bottom bars (not the hooks) next the boiler, or the latter will be injured.

The large oven is fitted with links for pack transport.

	lb.
Total weight	90½
Dimensions, packed for transport—	in.
Height	14
Length	18¾
Depth	16¾

43. Latrines.

Latrines should be made as soon as the troops arrive on the ground. Selection of situation.

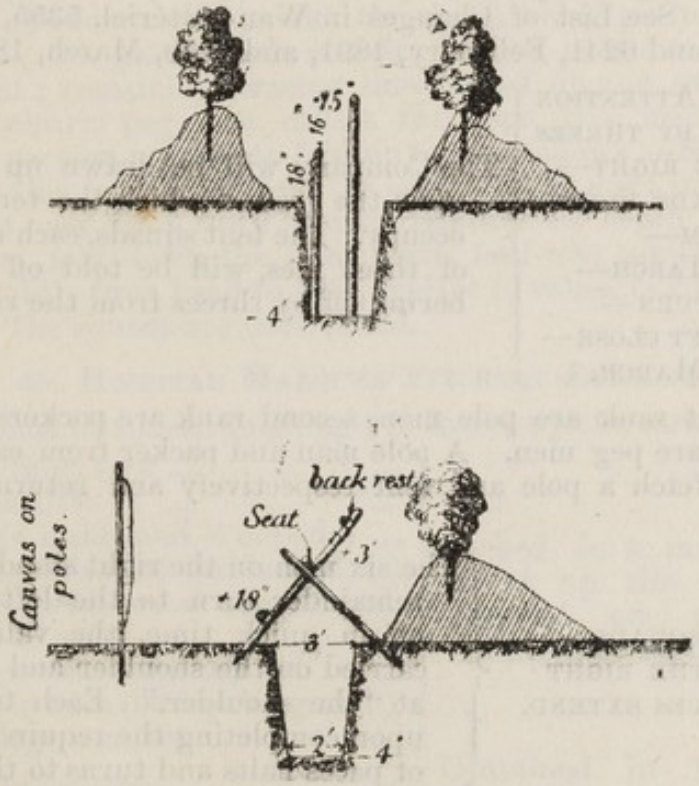


Fig. 94.—Latrines.

A small shallow trench will suffice for one night, and should be invariably filled in in the morning, before the troops march off. In standing camps latrines may be made with seats, as shown in Fig. 94. Preparation for one night's halt.

The seat being a simple rough pole, the trench should be made as narrow as possible, and from 3 to 4 feet deep. A fatigue party For a longer stay.

should throw a couple of inches of earth over the soil every day. This, if carefully done, will prevent all smell.

Urinals. In a standing camp urinals should be established.

44. Tent Pitching Exercise.

Patterns of circular tents. The latest patterns of circular single tents are Mark III, Mark IV, and Mark V. These tents are intended to accommodate 15 soldiers or 4 patients. They are made of duck, are provided with 6-inch eaves to carry off water clear of the walls, and have three ventilators covered with bibs. Mark III weighs, without appurtenances, 41½ lbs., has an internal capacity of 623 cubic feet, and its diameter is 13 feet. It has 23 bracing lines, 21 looping lines, and 45 pins are supplied with each tent, 42 being actually required to pitch it. Mark IV weighs 44½ lbs., has an internal capacity of 672 cubic feet, and its diameter is 13 feet 6 inches. It has 24 bracing lines, 22 looping lines, and 47 pins are supplied with each tent, 44 being actually required to pitch it. The height of the wall of both patterns is 2 feet 2 inches, and the pole, suitable for both patterns, is in two parts, and is 9 feet 9 inches long. Mark V weighs 49¾ lbs., but in other respects is similar to Mark IV. (See List of Changes in War Matériel, 5355, January, 1888, 6240 and 6241, February, 1891, and 7359, March, 1894.)

Pitching tents.

Company—Attention—Number by threes from the right—Tent squads right form—Quick March—Left turn—On the left close—Quick March.

The Company will be drawn up two deep upon the ground which the tents are to occupy. The tent squads, each consisting of three files, will be told off by numbering off by threes from the right.

The front rank are pole men, second rank are packers, and the third rank are peg men. A pole man and packer from each squad will then fetch a pole and tent respectively and return to their places.

Tent squads—From the right to —*paces extend.

The six men on the right stand fast; the remainder turn to the left and step off in quick time, the valises being carried on the shoulder and the poles at "the shoulder." Each tent squad upon completing the required number of paces halts and turns to the front.

The valises are placed on the ground; the jointed poles fitted together and held upright between the feet; the pole man holding it looks to the right for his dressing. Steady is given when this has been effected. In the meantime the packers open the valise, remove the tent and peg bag, and adjust the mallets, being assisted by the peg men. The second pole man drives in a peg (flat surface facing the direction in which the tent is to be raised)

* Ten paces will be found a convenient distance.

between the heels of the other pole man. Open out the tent; lower the pole and insert it into the cup at the head of the tent; the base of the pole is placed against the peg; the fly of the doorway fastened over the pole as this lies upon the ground. The two pole men get inside the tent, the four other men each take a peg and a red runner; all being ready, at a given signal the tents are raised simultaneously by the pole men acting in concert with the others. The four pegs for the red runners are at once driven in and the runners placed upon them; the pegs for the other runners and for the tent walls are then placed, care being taken that the former are in a straight line with the seams and at such a distance as will insure the runners being midway between the tent and the peg.

A small trench and drain will then be dug around the tent. The mallets, valises, &c., are placed inside the tent; the doorway laced up, and the squad falls in before its tent.

Striking tents.

To Strike the Tent.—Unlace the doorway, leaving the fly fastened; remove the valise and mallets; roll up and secure with a hitch the bracing lines, except those attached to the red runners. Detach the walls from the pegs.

Pole men enter the tent and grasp the pole; remainder of squad stand by the four red runners; the signal being given, the tent is lowered to the ground, pole withdrawn, and pole men come from under tent; remaining bracing lines rolled up and secured; tent dragged clear; peg men collect the pegs, pole men lash poles together, packers proceed to fold up tent as follows:—Spread it out neatly in this form ⅄ and fold the sides over to meet in the centre; fold right over again until breadth required for depth of tent bag is obtained, fold down the head about half-way towards the base, roll up tightly from head to base, replace in valise, bag being placed on top. The squads are then closed.

45. Hospital Marquee Pitching Exercise.

Description of marquee.

A hospital marquee, weighing 512 lbs. complete, consists of—

1 inside linen roof	Packed in a canvas valise, laced up the centre, and marked on the outside "Hospital Marquee."
1 outside ditto	
8 walls (4 inside and 4 outside)	
82 bracing lines (40 inside and 42 outside), with wood runner and button to each	
2 wooden vases, painted red	
2 weather lines (90 feet long each) with large runners	
180 small tent pegs	Contained in 1 peg bag marked on the outside with contents and marquee to which it belongs.
4 large ditto (for weather lines)	
2 mallets	
1 set of poles, consisting of 8 pieces, viz., 1 ridge in two pieces and 3 standard or upright in two pieces	Lashed together in one bundle by two box cords.
1 waterproof bottom, made of painted canvas, in four pieces, each piece measuring 15 by 8 feet	Rolled in a bundle round a thin pole, and tied by three box cords.

Laying out the ground.

Laying out the Ground for Pitching.—Undo and empty the peg bag (keeping the four large pegs for the weather lines by themselves), fit the handles in the mallets, and fix the two pieces of the ridge pole together. This done, proceed to lay out the ground for pitching the marquee as follows:—Lay the ridge pole on the ground selected, and drive in a peg at its centre and at each of its two end holes. These pegs will mark the positions of the standard or upright poles, and will be 7 feet apart. With each end peg as centre, in a semi-circle with a radius of 6 yards, lay thirteen pegs with their points inwards where they are to be driven. This will be easiest done as follows:—Step 6 yards from one of the end pegs, and in a straight line with the three standard pegs lay the centre peg of the semi-circle; next step 6 yards to each side of the end peg, and on a line at right angles to the three standard pegs lay a peg for each end of the semi-circle; then lay at each side between the centre peg of the semi-circle and the two end pegs, equal distances apart, five pegs, and the semi-circle of thirteen pegs is complete. The other end will be done in the same way.

For the sides of the marquee on a straight line parallel to the three standard pegs, and 5 yards distant, lay six pegs, the first

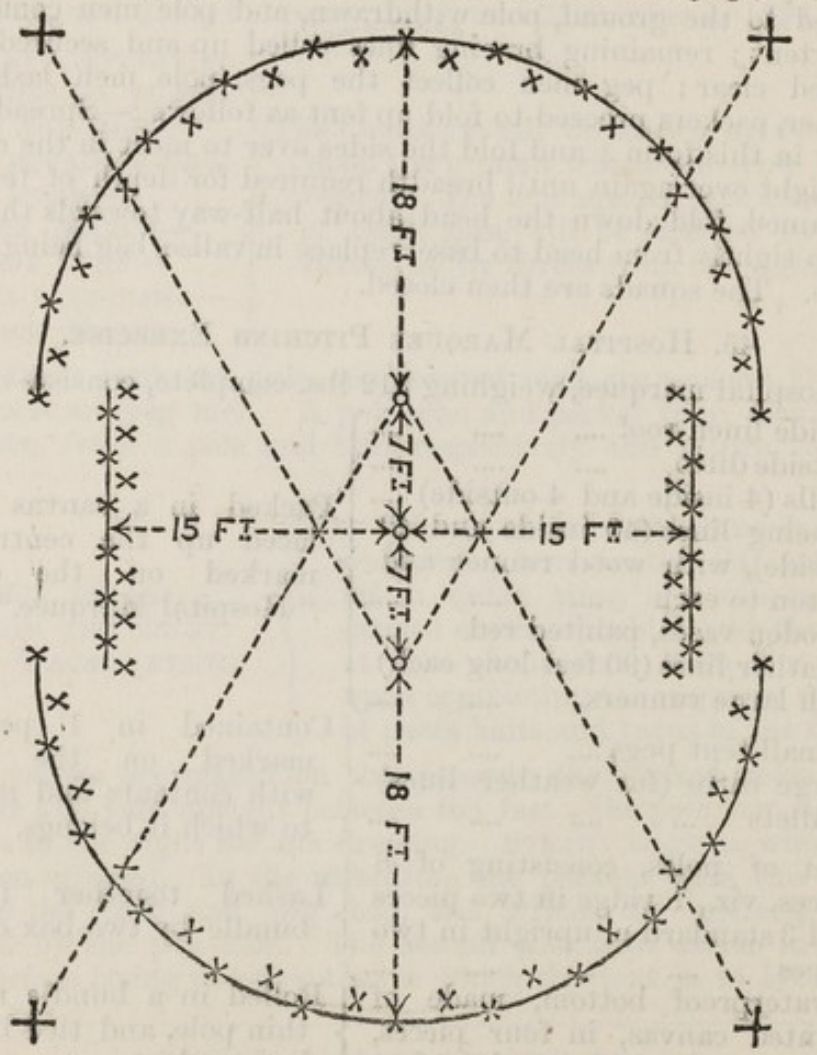


Fig. 95.—Ground Plan of the Pegs of the Marquee.
(Showing direction of weather lines.)

and last of which will be 18 inches distant from the lines formed by each end standard peg and the two end pegs of each semi-circle. Now the pegs for the outer roof are all laid, and should be driven before proceeding further.

For the inner roof, lay a peg between each two pegs of the outer roof, but on a line one foot further in. The space, however, between the third and fourth pegs on each straight line is to be left blank for the doorway. These driven, the pegs are complete for the marquee, except the four weather-line pegs. These are each driven at a corner where two lines would meet to form a right angle if drawn from each end and centre peg of the semi-circle.

Arrangement of marquee.

Arrangement of Marquee before raising.—The ground being laid out, carry the marquee within the line of pegs, unlace the valise, and arrange and spread out the marquee, the roofs one inside the other, in such a manner that the base and ridge will be parallel with the line of the standard pegs, and the former touching them. Roll up the upper side of the outer roof as far as the ridge, so as to expose the web slings of the inner roof, insert the ridge pole, and roll up the upper side of the inner roof in a similar manner.

Fix the two pieces of each standard pole together by their numbers. This done, pass them through the openings in the inner roof, and their pins through the holes in the ridge pole, through the eyelet in the two end web slings and also through the eyelet-holes in the ridge of the outer roof. Now fit the vases on the pins of the end standards, and pass the opening lines of the ventilators through the holes in the ridge of the inner roof by the side of the standards. Next pass the lines for opening and shutting the windows through the corresponding eyelets in the inner roof. Unroll the inner and outer roofs to their proper position, bring the ends of the standard poles so as to prop against the three standard pegs, and square the ridge-pole on the three standards thus placed.

Raising marquee.

Raising the Marquee.—To raise the marquee ten men and one non-commissioned officer will be required. These will be styled four weather-line men, six standard men, and one director. One weather-line man will take up a position at each large peg, holding in his right hand the runner, and in his left the line, with a loop ready at any moment to slip on the peg. Two standard men will take up a position at each pole, one at the foot, the other at the top, facing each other. When the instructor sees all are ready he will give the word to raise, when all, working together, should steadily erect the standards, taking care not to raise one before the other. The instructor should now go to the side and dress the standard poles, tightening and slackening the weather-lines as required until the poles are perpendicular. He should next go to the end and dress the poles in a similar manner in that direction.

Bracing lines.

Putting on the Bracing Lines.—The weather-line men should not leave their posts until the bracing lines are on. Four of the standard men should put on the bracing lines, while two of them should take mallets to drive any loose pegs there may be. To put on the bracing lines, two men should go to each side of the marquee, commencing with the outer roof; one should take the line at one side of the window, and the other the line at the other

side, which should be put respectively on the third and fourth pegs of the outer straight line, thus working towards the ends until meeting the men from the other side. In tightening the bracing lines the marquee should be pulled towards the pegs so as to slacken the line, otherwise the pegs will be pulled out of the ground. The lines of the inner roof should be put on in a similar manner, beginning at each side of the window and working round to the ends. When two lines are together, they should for the present go on the same pegs, but afterwards be shifted.

Curtains. *Putting on the Curtains.*—The curtains are in eight pieces, four for the inner wall and four for the outer wall. The outer curtain should be put on so that the ground flap be inside, and that it can be pegged on the outside. The inner curtain should be put on with the flap out, so that it can be pegged on the inside. Commence with the outer curtain at each side of the doorway and work round towards the ends, taking care to leave enough to overlap and close the doorway. When the curtains are on they should be pegged down both inside and outside.

Trenching. *Trenching a Marquee.*—A trench 9 inches broad and 4 to 6 inches deep should be dug round the curtain, especially on the upper side, if the ground be sloping. The trench should be cut well under the curtain, so as not to leave a ledge, otherwise the water will drip on the ledge and run under.

Points to attend to. *Points to be attended to.*—When rain comes on, the ropes, as they become wet, get tight, and, if not attended to, will pull the pegs out of the ground or break the poles. They will also get tight with a heavy dew. Thus it will be necessary to slack them when rain is expected, and also at night if there is a heavy dew. Again, if the ropes have been wet, they will slacken as they dry, and will require to be braced up, otherwise the marquee may flap and draw the pegs. The doorway of the marquee should be on the sheltered side. The curtains should be taken off the pegs and raised daily for ventilation. They can be fastened to the bracing lines by the buttons of the peg loops.

Striking marquee. *Striking the Marquee.*—Unfasten the curtains at the bottom, and unhook them from the roof, beginning with the inner one. Fold each piece into eight parts. The four weather-line men should now stand by the weather lines, while four men should unfasten and do up into a skein the bracing lines, beginning with the inner roof at each side of the doorways and working round to the ends. The two mallet men should take up the pegs as the lines are taken off them, and put them away in the peg bag.

Lowering marquee. *Lowering the Marquee.*—The men should take up positions as in pitching, one to each weather-line and two to each pole. When all are ready, the non-commissioned officer should give the word to lower. The weather-line men should take the lines off the pegs, but keeping a firm hold, and the standard men should have hold of the poles. All together they should steadily lower the poles, the men at the feet of the poles keeping them from slipping, and the other men lowering them by walking backwards towards the ridge, in the same way as men lowering a ladder.

Repacking marquee. *Repacking the Marquee.*—Roll up the four weather-lines and take the vases off the pins, leaving them there attached by the

ventilating cords. Spread out the roofs and roll up the upper flap so as to expose the ridge-pole. Next pull away the standard poles, and remove the ridge-pole from the slings.

Folding the Marquee.—This done, unroll the upper fold of the roof. Bring over each end to the centre, across the middle of the window, and fold the square thus made from side to side into three equal parts. Place the eight pieces of curtain on the roofs lengthwise, overlapping in the centre, and the flaps towards the thick end. Roll up the whole, thus placed, evenly, commencing with the thick end, taking care not to have the roll too wide or too narrow for the valise. Folding marquee.

Putting Marquee in Valise.—Spread out the valise, and shoving one of the side flaps under the marquee, roll it in. Having arranged the flaps, lace them, commencing with the ends. Stowing marquee.

46. Operating Tent.

The tent is rectangular in shape, and has a doorway at each end. It is fitted with six ventilators of the ordinary type, and also with a large ventilator on each side to give extra light and air. The wall is permanently attached to the tent.

The poles used with it consist of two upright poles and one ridge pole, each made in two pieces.

Dimensions, &c.

	ft.	ins.
Length	20	0
Width	14	0
Height	9	4
Height of wall	3	0
	lbs.	
Weight of tent .... (about)	116	
Weight of tent *with poles* and appurtenances complete .... (about)	181	

The duck used in making this tent is of the same quality as for Mark V circular tents (§ 7359). For the main part of the tent the duck is of 27 inches width, and $10\frac{1}{4}$ oz. per yard in weight. For the wall, 36-inch duck is used of about $13\frac{3}{4}$ oz. per yard in weight.

The valise and pin bag are the same as for the laboratory tent.

The pins and mallets are of the ordinary Service pattern. The complement is—2 mallets, 1 pin bag, 60 small pins, and 8 large pins; this allows 2 spare small pins.

Note.—On account of the rods in the large ventilators, this tent must be folded and rolled up lengthwise, and the weather lines must not cross the ventilators when the tent is pitched.

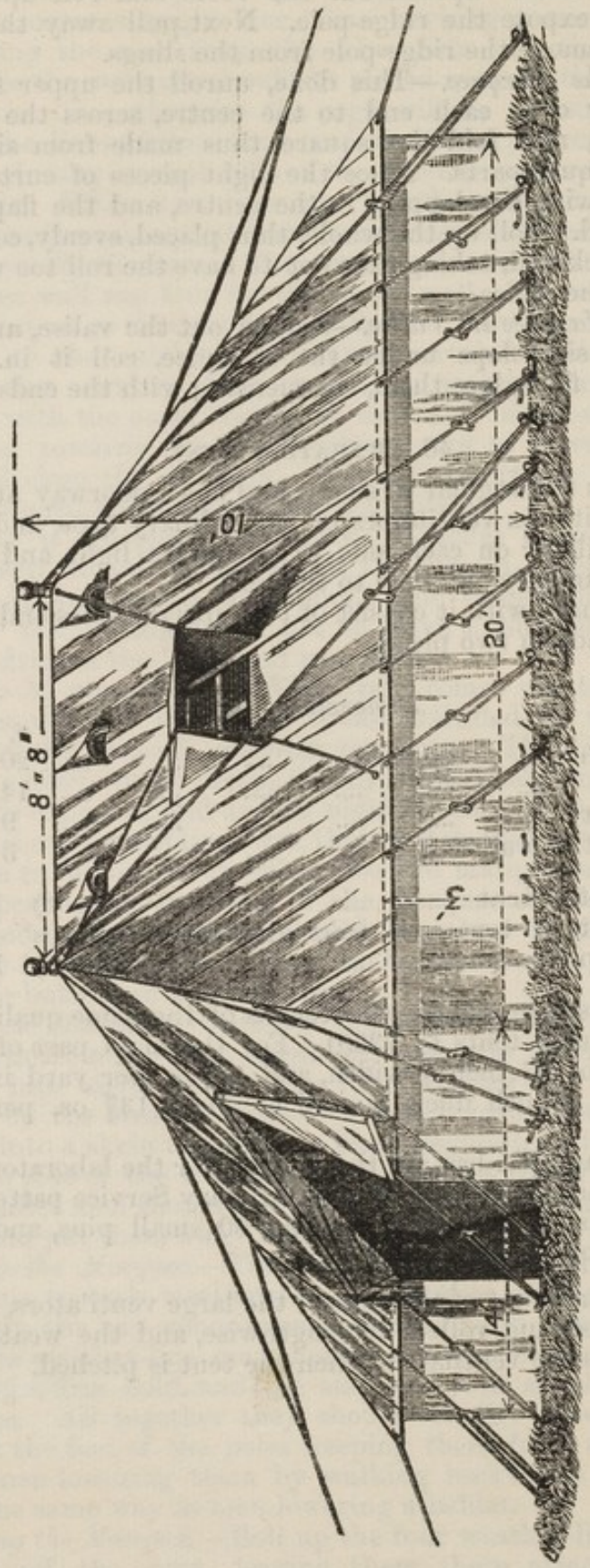


Fig. 96.—Operating Tent (Mark I).

Drill for Pitching Operating Tent.

Numbers Required.—1 non-commissioned officer and 6 men—2 as pole men, 4 as tent men. Pole men take ridge-pole and uprights, tent men take pegs and mallets (a maul is required to drive large pegs).

Tent men unpack tent and spread it on the ground flat, the lower edge about two paces from the ridge-pole, and top to windward.

Pole men put ridge-pole together and lay it on the ground on site of tent, and a peg is driven in at each end of it. Pole men stand back to back with these pegs between their feet.

Two tent men take post at pegs, backs to faces of the two pole men, and take eight paces to their front, dress themselves on pole men and turn to windward.

Two other tent men join them, and stand back to back with them, the four now take eight paces to their front and halt.

The pole men take a maul and four large pegs, and drive them at points marked by feet of tent men.

The four tent men return to pegs, marking ends of ridge-pole, and after taking two paces in continuation of the line marked by it, turn back to back at right angles to the line, take six paces to front and halt. Four large pegs are driven at their feet by pole men for weather lines; pole men return to poles and lay the frame with the feet of the uprights against the pegs first driven, ridge to windward.

Tent men roll up the upper side of the tent until the top is exposed, and the pole men raising the poles, the underside of the tent is drawn beneath them, and the poles adjusted; the vases with weather lines are now fitted on, the lines uncoiled, and the four tent men, taking one each, move towards the weather-line pegs. The pole men working with them, the tent is raised and the lines fastened to the pegs. The lines must not be crossed. The four tent men each take an upper corner rope (distinguished by its being fastened to a ring through which another line passes) and adjust it to the large pegs first driven in.

The doors are now laced.

The tent men take the four lower corner ropes, and fasten them to the small pegs driven in a line with, but two paces nearer the tent than, the upper corner pegs. The pole men adjust the windows, the tent men drive pegs and adjust the front and side lines of the roof, drawing them square with the tent, and fasten down the curtain.

Striking the Tent.—Pole men pull up curtain pegs and let down windows. Tent men cast off all ends and side lines and coil them, and draw pegs. Then take post at lower corner pegs.

Pole men stand to poles, tent men cast off first lower corner, then upper corner ropes and coil down; stand to weather-line pegs, cast off and hold in hand, then working with pole men lower tent to windward, coil weather lines and remove vases.

The pole men withdraw the poles and lash them together.

The tent men fold up the tent as follows:—

The under side is first spread out flat, and the upper side

drawn over it ; the ends are folded over so as to form a square ; the top and bottom of the square are folded over the middle, and the whole rolled from end to end and placed in valise.

X. CEREMONIAL.

47. Inspection or Review.

1. *Formation.*—The Royal Army Medical Corps for inspection will be drawn up at open order, as detailed in Infantry Drill. Swords will be at the *slope*.

Receiving an Inspecting Officer.

General salute—Carry swords. — When the inspecting officer arrives in front of the centre, at a distance of about 60 paces, he will be received with a salute, the men carrying swords, the officers saluting with the right hand, taking the time from the commanding officer, and the bugler sounding the general salute.

Inspection in Line.—The commanding officer, who will ride on the side furthest from the troops, accompanies the inspecting officer as he passes down the front of the line from right to left, returning along the rear, the other officers remaining steady, and the men standing with swords at the carry. The commanding officer then takes the orders of the inspecting officer as to the movements to be performed.

Return swords. Close order—March. — Swords will be returned and close order taken as the inspecting officer is going to the front of the line.

Inspection in Column.—When companies in column are required to take open order for inspection, the captain of each company will receive the inspecting officer with a salute, and follow him during the inspection of his company.

2. *Inspection of a Bearer Company or Field Hospital.*—When these units parade for inspection or review they will be formed up as follows :—

(*a*) The Bearer Company—

The medical corps drawn up as in 1 in front ; the Transport attached in rear, paraded in three lines at close (or half) interval ; the first line 20 yards in rear of the front rank of the medical corps, the other lines four yards distant from each other, measured from tail-boards to heads of leaders ; the ambulance wagons (with tail boards lowered and wagon-orderlies as detailed in para. 28) in the first two lines, the G.S. wagons and carts in the rear line ; the directing flanks of the whole correctly covering.

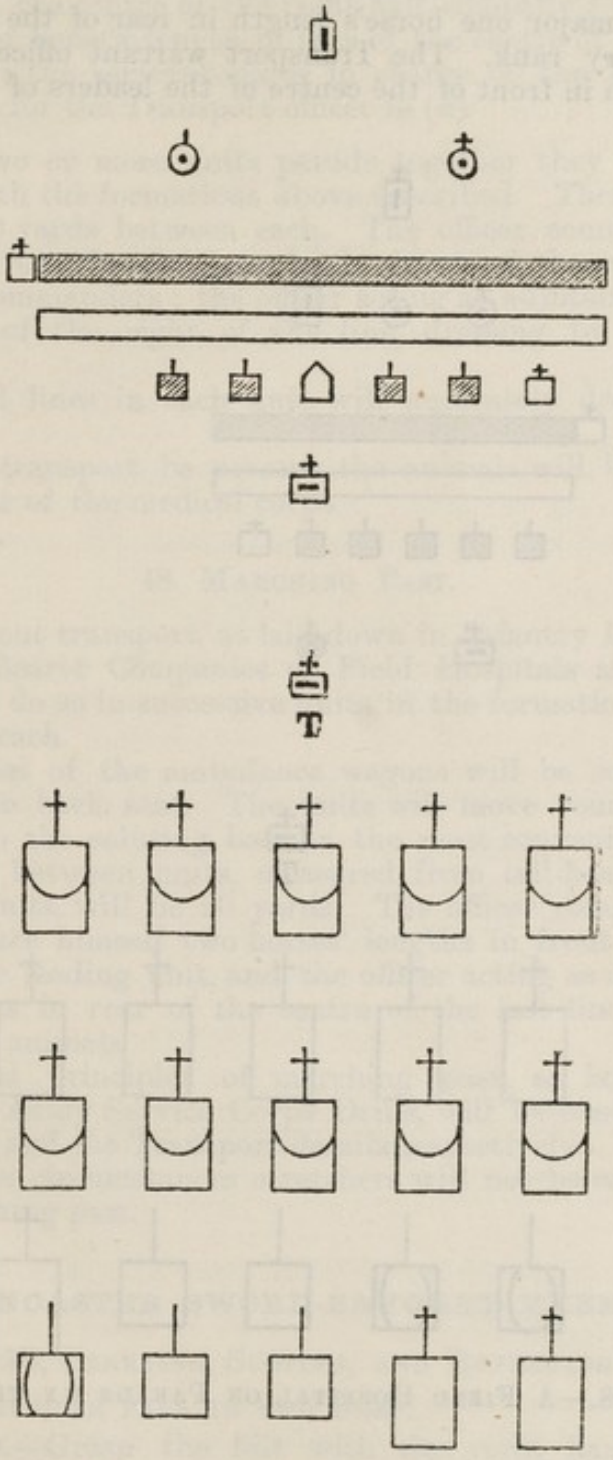


FIG. 97.—A BEARER COMPANY ON PARADE BY THE LEFT.

Position of Officers and Warrant Officer.—The captain and lieutenant to be one horse's length in front of the centre of the right and left half company respectively ; the major one horse's length in front of, and midway between, the two former officers ; the serjeant-major one horse's length in rear of the centre of the supernumerary rank. The Transport warrant officer to be one horse's length in front of the centre of the leaders of the first line.

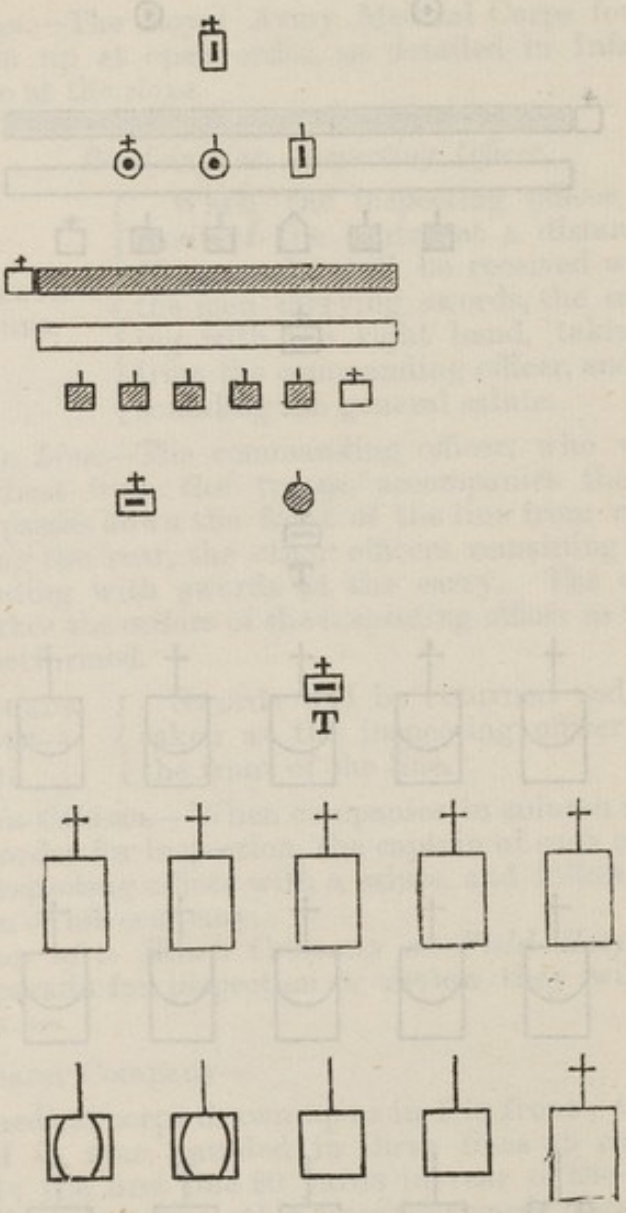


Fig. 98.—A Field Hospital on Parade by the Left.

(*b*) The Field Hospital—

As for a Bearer Company, but the vehicles will be in two lines only, five G.S. wagons in the front line, and the remaining wagon and carts in the rear line.

Position of Officers and Warrant Officers.—The major to be one horse's length in front of the right half company ; the

captain one horse's length in front of the centre of the left half company ; the lieutenant between the two former ; the commanding officer one horse's length in front of the centre of the line of officers ; the quartermaster one horse's length in rear of the centre of the right half company ; the serjeant-major one horse's length in rear of the centre of the left half company ; the serjeant-major in charge of the Transport as described for the Transport officer in (*a*).

3. When two or more units parade together they will do so in accordance with the formations above described. There will be an interval of 10 yards between each. The officer commanding the whole will be two horses' lengths in front of the centre of the line of unit commanders ; the officer acting as adjutant one horse's length clear of the right of the line, dressing by the line of officers.

The several lines in each unit will accurately dress by each other.

4. If pack transport be present the animals will be drawn up in lines in rear of the medical corps.

48. Marching Past.

(*a*) If without transport, as laid down in Infantry Drill.

(*b*) When Bearer Companies or Field Hospitals are to march past they will do so in successive units in the formation previously described for each.

The orderlies of the ambulance wagons will be seated on the off-side of the back seat. The units will move round from the parade line to the saluting base in the most convenient manner. The distance between units, measured from tail-boards to commanders of units, will be 20 yards. The officer commanding the whole will place himself two horses' lengths in front of the commander of the leading unit, and the officer acting as adjutant two horses' lengths in rear of the centre of the last line of wagons, carts, or pack animals.

The general principles of marching past, as laid down in Infantry and Army Service Corps Drills, will be observed by the medical corps and the Transport details respectively.

Under these circumstances stretchers will not be carried in the hand in marching past.

XI. LANCASTER SWORD-BAYONET EXERCISE.

49. Drawing, Carrying, Sloping, and Returning Swords

FOR SWORD EXERCISE FALL IN TWO DEEP.

DRAW SWORDS.—Grasp the hilt with the right hand and the scabbard just below the frog with the left.

Two.—On the word *Two*, draw out smartly to the front, come to the "recover," the sword perpendicular, edge to the left, hilt in line with the chin, elbow close to the body ; the left hand resumes the position of attention directly the sword is drawn.

Three.—On the word *Three*, bring the sword smartly down to the position of "carry," hand level with the elbow, blade perpendicular, edge to the front.

SLOPE SWORDS.—Relax the grip of the third and fourth fingers, and allow the blade to fall on the right shoulder.

RETURN SWORDS.—From any position. Grasp the scabbard with the left hand, and enter the point about one inch.

Two.—On the word *Two*, return the sword smartly, and drop the hands to the sides.

DRAW SWORDS.—As before

SLOPE SWORDS.—As before.

STAND AT EASE.—When at the slope. Draw back the right foot 6 inches, and bend the left knee.

Except at the SLOPE, when the fingers may be slightly relaxed, the same grasp of the sword is to be retained throughout the exercise, the middle knuckles in the line of the edge, the thumb and fingers clasped round the handle.

Staff-serjeants being equipped with the long sword will perform these movements according to the instructions laid down in Infantry Sword and Carbine Sword-Bayonet Exercises.

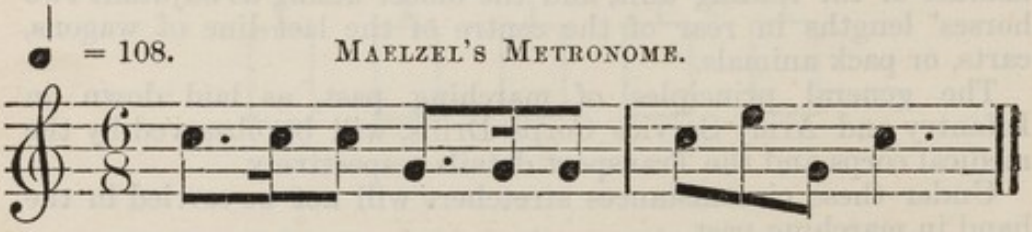
Compliments to Officers, &c.

Non-commissioned officers and men on duty with drawn swords will CARRY SWORDS to all officers and armed parties.

XII. ROYAL ARMY MEDICAL CORPS BUGLE CALLS.

50. The calls for the Royal Army Medical Corps are given in "The Trumpet and Bugle sounds for all branches of the Army."

The following is the Regimental Call :—



XIII. SEMAPHORE SIGNALLING.

51. GENERAL INSTRUCTIONS FOR THE TRAINING OF THE ROYAL ARMY MEDICAL CORPS IN SEMAPHORE SIGNALLING.

System and use.

The semaphore system will be used exclusively. When circumstances allow, it will link collecting and dressing stations, and the latter to the field hospitals. Between the First Line and collecting stations it will be employed as occasion may demand.

Preliminary details.

The size and colour of the flags, size of poles, position of the signallers, the alphabet, simplest method of teaching the same, and the distance at which the system can be read, are laid down in the "Signalling Instructions."

Detail of lectures.

The lectures mentioned in the following table are to be taken from the matter in the above "Instructions" :—

(*a*). Phonetic distinction of letters.
(*b*). Addressor's method of writing a message, &c.
(*c*). Miscellaneous signals :—Full Stop—Stop—End of Message—W B—W A—R D—G—I M I—Break—Oblique Stroke—W W—O O O—Block.
(*d*). Semaphore.
(*e*). Use of telescope and field glasses.
(*f*). Message form and counting.
(*g*). Signal stations, duties and telling off.
(*h*). Station calls, method of sending a message.
(*i*). Orders for those in charge of stations.
(*j*). Completion of message form.
(*k*). Tactical application of signalling.
(*l*). Abbreviations.

Division of lectures.

A course of twenty-one working days, carried out generally on the lines indicated in the following table, should make the class thoroughly efficient in this subject :

Days.	Description of work.	Time allotted.
1st to 3rd ...	Learning to read letters of alphabet sent by the instructors and also to send them. Sending to and reading letters from each other.	Four attendances of one hour daily, half an hour of which is to be devoted to a lecture.
4th to 10th ...	Reading and sending groups made up as in the appendix to the Signalling Instructions.	When proficiency is attained, three hours a week will probably suffice to keep the signallers efficient.
11th to 21st ...	Station work consisting of messages most likely to be dealt with in the field *vide* Corps Code.	

52. Corps Code.

Address.	Code.
The Principal Medical Officer	P M O
The do. do. Lines of Communication	P M O Lines Cmue
The Officer in Medical Charge of :—	Off I M C :—
„ „ H. M. Transport ...	„ H M Tpt
„ „ The Base Hospital ...	„ Base Hpl
„ „ Station Hospital ...	„ Sn Hpl
„ „ Convalescent Hospital	„ Con Hpl
„ „ Cholera Camp ..	„ Ch Camp
„ „ Infectious Hospital...	„ Fec Hpl
The Officer Commanding :—	
„ „ Field Hospital ...	O C Fld Hpl
„ „ Bearer Company ...	„ Br Coy
„ „ Stretcher Bearers...	„ St Brs
„ „ Detachment R.A.M. Corps.	„ Dth R.A.M.C.
The Non-Commissioned Officer in charge :—	
„ „ Collecting Station...	N C O Clt Sn

A, C, H, N, P, S, X, Z	collated as	O
D, T, R,	„	B
E, G, K,	„	U
F, I, O,	„	R
M, Q,	„	E
Code follows, Signal ...	...	R R
Code finished, Signal ...	...	J
Interrogative Signal ...	...	U U
Negative Signal	...	N N

Both latter to be sent immediately after R R, thus R R, U U equals question, &c.

The code is divided into three groups to facilitate finding messages suitable to each of the positions, but messages may be used generally if so required.

Messages between Collecting Stations and Bearers in front :

No.	Message.	Code	Coll.
	Send Water	A A	O O
	„ Dressings	A C	O O
	„ Brandy	A D	O B
	„ Surgical Haversack	A E	O U
	„ More Bearers	A F	O R
	„ Another Md. Officer	A G	O U
	„ Stretchers	A I	O R
	„ Cacolets	A K	O U
	„ Ligatures	A M	O E
	„ Tourniquets	A N	O O
	„ Champagne	A O	O R
	„ Ice	A P	O O
	„ Beef Tea	A Q	O E
	„ Hot water	A R	O B
	„ Blankets	A S	O O
	Am sending water	C A	O O
	„ „ Dressings	C C	O O
	„ „ Brandy	C D	O B
	etc.	etc.	
	Will obtain and send Water	D A	B O
	„ „ „ Dressings ...	D C	B O
	„ „ „ Brandy, etc. ...	D D	B B
	„ „ „ etc.	etc.	

No.	Message.	Code	Coll.
	Have none left	E A	U O
	Have transmitted your message to Dressing Stn.	F A	R O
	Danger Beware!	G A	U O
	Come in at once. You are in great danger	G C	U O
	Danger past. You can proceed ...	G D	U B

Messages between Collecting and Dressing Stations :

No.	Message.	Code	Coll.
	Troops are advancing beyond reach of Bearers. Please give instructions ...	G E	U U
	Troops have advanced out of sight ...	G F	U R
	Troops are retiring	G G	U U
	Troops are retiring very rapidly ...	G I	U R
	Bearers in danger from Enemy on right flank	G K	U U
	Ditto ditto, left flank	G M	U E
	Collecting Station has become exposed to enemy's fire, and is untenable. Please give me instructions	G N	U O
	I am advancing	P A	O O
	„ retiring	P C	O O
	„ moving to right	P D	O B
	„ „ to left	P E	O U
	„ „ diagonally out	P F	O R

No.	Message.	Code	Coll.
	I am advancing diagonally in	P G	O U
	I am complying with your instructions	P I	O R
	Nature of Country in front will prevent further advance of ambulances...	P K	O U
	Send Ambulances	P M	O E
	„ „ more quickly ...	P N	O O
	The direct road is dangerous, send ambulances by other	P O	O R
	Impassable obstacles prevent my complying with instructions	P P	O O
	Horses disabled	I S	R O
	Send Bearer's rations on	I T	R B
	Advance Collecting Station	I E	R U
	Come in and signal to Bearers to withdraw as much as necessary	I F	R R
	Halt and form a Collecting Station ...	I G	R U
	Withdraw all Bearers	I K	R U
	„ those Bearers that are in danger	I M	R E
	Bearers are being protected and must go on with work	I N	R O
	Move to nearest shelter...	I O	R R
	Advance	K A	U O
	Retire	K C	U O
	Move to right	K D	U B
	Move to left	K E	U U
	Move diagonally out	K F	U R

No.	ssage.	Code	Coll.
	Move diagonally in	K G	U U
	Remain where you are	K I	U R
	Advance with cacolets and form Collecting Station further on	K K	U U
	Detain Ambulances at Collecting Station to await further instructions	K M	U E
	Send back Ambulances	K N	U O
	Am moving Dressing Station. You must move in conjunction	K O	U R
	Am moving Dressing Station. You must remain where you are and send ambulances to the new position ...	K P	U O
	No further assistance can be given you at present	K R	U B
	Send wounded in by means of Stretcher Bearers	K S	U O
	Do you require any more Ambulances at the Collecting Station ?	K T	U B

Messages between Dressing Station and Field Hospital :

No.	Message.	Code.	Coll.
	Am sending on wounded	M A	E O
	Am detaining wounded	M C	E O
	All Ambulances are in use conveying wounded from Collecting Station, so transfer to you is postponed till later	M D	E B
	Officer severely wounded	M E	E U

No.	Message.	Code	Coll.
	Send materials and appliances to replace those sent back to you on wounded...	M F	E R
	Require more Horses	M G	E U
	Require Mules or Horses for cacolets...	M I	E R
	Send on wounded	N A	O O
	Detain wounded and await instructions	N C	O O
	Signal particulars of case to enable arrangements to be made before his arrival	N E	O U
	Have applied for more	N G	O U
	Will send as soon as possible	N I	O R

These abbreviations are in addition to those given in the Signalling Instructions :

	Word.	Abbrev.		Word.	Abbrev.
A	Abdomen	Abd		Bayonet	Byt
	Accident	Acn		Bearer	Br
	Accommodation	Acomn		Bearer Company	Br Coy
	Advance	Adv	C	Chloroform	Chfm
	Ambulance	Amb		Collecting Station	Clt Sn
	Amputation	Amp			
	Attack	Atk		Contagion	Ctgn
B	Baggage	Bg	D	Daybreak	Dybk
	Bandage	Ban		Detachment	Dth

	Word.	Abbrev.		Word.	Abbrev.
	Direction	Di	M		
	Disinfect	Dif	N		
	Dressings	Dgs			
	Dysentery	Dys	O	Obtain	Obt
				Operation	Opr
E	Enemy	En			
	Escort	Ect	P	Patient	Pat
	Exchange	Exc	Q	Quickly	Qk
F	First Field Dressing	F F Dg	R	Report	Rpt
G			S	Signal	Sig
				Stretcher	St
H				Serjt.-Major	S M
I	Immediately	Imd	T	To-morrow	Tmr
	Important	Imp		Transmit	Tmt
	Infection	Fec		Tourniquet	Tq
	Inspection	Isp			
	Instrument	Itr	U	Undertake	Uk
J			V	Vegetable	Vgt
K			W	Wounded	Wnd
L	Ligatures	Ligs	Y	Yards	Yds
	Left	Lf		Yesterday	Ya

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