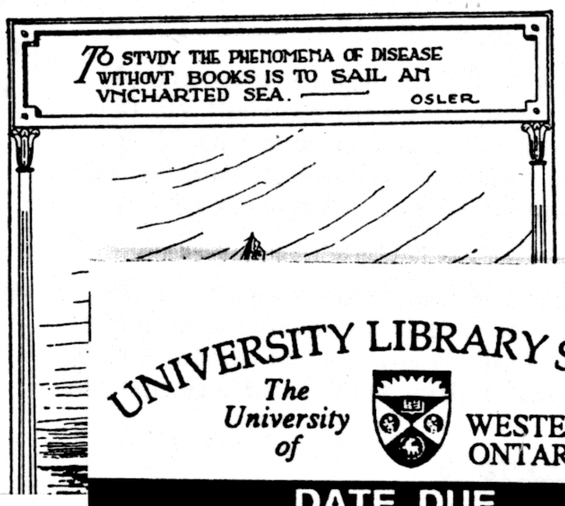

MANUAL

FOR THE

ROYAL ARMY MEDICAL CORPS.

WAR OFFICE, 1904.

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How to distinguish from fracture.

A dislocation can be distinguished from a fracture by :—

(1) Its always happening at a joint.

(2) By there being no grating.

(3) If the end of the bone can be felt it is found to be smooth and rounded in dislocation, sharp and angular in a fracture.

(4) The limb instead of being unnaturally movable, as is the case in a fracture, is unnaturally stiff.

Treatment.

74. On no account should the orderly attempt to put it back.

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, and fix it there with a bandage.

6. SPRAINS.

Definition and signs of a sprain.

75. 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, loss of power, and there is no alteration in shape.

Immediate treatment.

76. 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. In every case it is best to apply a splint.

7. WOUNDS.

Definition of wound.

77. A wound is an injury of the body involving a division of the skin or mucous membrane deep enough to cause bleeding.

It may be large or small, deep or shallow, and of any shape. It may be caused by a blunt or sharp instrument.

Wounds may be described as follows :—

Incised wounds, produced by a sharp-cutting instrument, as a razor, and presenting clean-cut edges.

Lacerated wounds, in which the skin is torn as by a sharp nail, and in which the edges are ragged.

Contused wounds, characterised by bruised edges, and produced by some blunt instrument, as a hammer or stick.

Punctured wounds, in which the skin is pierced, and in which the wound is deep and very narrow, as in wounds produced by a dagger or bayonet.

Sabre wounds would be mostly incised wounds. Wounds produced by fragments of shell or a large bullet are classed as contused wounds, or as contused and lacerated wounds. Wounds produced by an unbroken small-bore bullet—*e.g.*, the Lee-Metford, are classed as punctured wounds.

Incised wounds heal the most readily, and contused wounds the least readily. Lacerated wounds will occupy an intermediate position. Punctured wounds will heal well at the surface, but are dangerous, owing to their depth and long extent.

To secure the best healing of a wound, it is essential that the skin should be clean, that the instrument making the wound is clean, and that nothing unclean is carried into the wound.

Actual poison may be introduced into a wound, as in wounds by poisoned arrows, in snake bite, and in bites from mad dogs.

These wounds are of a special character, and are considered in paragraph 109.

8. THE DRESSING OF WOUNDS.

78. A simple wound should be treated in the following way :—

(1) Stop the bleeding.

(2) If the wound appears to be dirty, clean it by either irrigating it with antiseptic lotion, or wiping it with a piece of dry antiseptic gauze.

(3) Apply a dressing.

First field dressing.

79. 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 adaption 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 4¼ 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.

Directions for use are printed upon both the outside and inside cover.

Rules to be followed in applying dressings.

80. Rules for applying dressings. When about to apply dressings, the following rules will be observed :—

(1) The dresser will be careful that his hands and nails are perfectly clean (*see* paragraph 85).

(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 stuck ; this must first be loosened by bathing with tepid antiseptic solution from an irrigator.

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

(5) The dresser will avoid touching his eyes, nose, or any sore with his hands or anything which has touched 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 collodion, so as to make a water-proof coating.

(7) Dressing forceps and not the fingers should be used for removing old dressings, especially in cases where there is danger of infection, such as in syphilitic cases, &c.

Mode of changing a dressing.

81. The different parts of the old dressing will, one by one, be very gently and carefully removed, those that stick being 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 boiled water, or boiled water to which some antiseptic has been added. 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. An irrigator containing tepid antiseptic solution is next held on a higher level than the patient, and the parts flushed by a stream from the irrigator to the requisite extent. This having been accomplished, the new will be applied, and the old dressings at once burned.

Articles for dressing wounds.

82. The following articles are required for dressing wounds in the ordinary way, and none of them must be handled unless the hands have previously been prepared as in paragraph 85 :—

Antiseptic gauze, antiseptic wool, jaconet waterproof cloth or Christia tissue, iodoform in dredgers, drainage tubes, instruments in antiseptic solution, antiseptic swabs in antiseptic solution, dressing trays, irrigator, waterproof sheet, plaster and bandages for fixing on dressings, and safety-pins.

9. THE ANTISEPTIC TREATMENT OF WOUNDS.

Healing of wounds.

83. The way in which a wound heals is as follows:—

(1) The blood escapes.

(2) The ends of the divided blood vessels draw back, contract, and clots of blood form in them, thus stopping the bleeding.

(3) The fluid part of the blood continues to ooze out, finally gets jelly-like, and sets, forming a scab or crust.

(4) New blood vessels gradually make their way from side to side of the wound, the circulation is thus restored, new tissue is produced and unites firmly the cut surfaces, and all that remains is a scar.

This is what happens in a cut when the surfaces of the wound touch one another. When the wound is large, and the raw surfaces cannot touch one another, the wound is said to suppurate, and small rounded projections, called granulations, grow, come up to a level with the skin, and a new skin is gradually formed over them. In the end a scar forms, which, when the wound has quite healed, is slightly drawn in. The main object in the dressing of

a wound is to protect it from the entry of small bodies, called germs. These not only prevent healing but lead to the formation of matter, and, possibly, to blood poisoning. A wound into which these germs have entered is called a *septic wound*, and the treatment which is directed against these germs is called the *antiseptic treatment*. A wound free from germs is called an *aseptic wound*.

Antiseptic treatment of wounds.

84. These germs, sometimes called microbes, and scientifically called bacteria, belong to the vegetable world. They are to be found everywhere, especially in dust and dirt. They are on the skin; in all dressings which are not specially prepared; in clothing, on instruments, and in water which has not been recently boiled. They are exceedingly small, and cannot be seen by the naked eye. One of them, alighting on a wound, where, owing to the warmth and moisture, it becomes active, can in 24 hours produce seventeen millions of like germs. The growth of these germs irritates the wound, causes it to form matter or to suppurate, and produces poisonous substances which, being drawn into the blood, cause fever, and, perhaps, blood poisoning. The wound is then said to become septic or poisoned. The killing of those germs which have already reached a wound, and the cleansing of the hands, skin, instruments, and dressings, constitutes the antiseptic treatment of wounds. No wound should ever be treated except by this method.

85. It is carried out as follows :—

Antiseptic precautions.

(1) In the case of the hands of the surgeon and skin of the patient, which are all more or less greasy (the germs are protected by this grease), it is necessary first to remove the grease. To do this the skin of the patient, and the hands of the surgeon and assistants, are scrubbed with yellow soap, hot water, and a nail brush, which has been kept in some antiseptic lotion.

Antiseptics.

(2) The next thing is to use some substance which has the power of killing the germs. These substances are called antiseptics. Those most commonly used are perchloride of mercury or corrosive sublimate and carbolic acid. Perchloride of mercury is used either as a solution, in the strength of one part in two thousand of water, or in dry dressings. It is not used for the cleansing of metal instruments, as it causes them to corrode and become black, and spoils the edge of any cutting instrument. Carbolic acid is used as a solution, in the proportion of one part to twenty parts of water. This lotion is much used to kill the germs, or to sterilize instruments. These two substances are very poisonous, and cannot be used without much care. There are other antiseptic substances—namely, boracic and salicylic acids, iodoform, formalin, biniodide of mercury, &c.

When an operation is about to be done, everything that will touch the wound must be thoroughly freed from germs :—

Cleansing of hands.

(1) The hands of the surgeon and orderlies must first be washed as already described. The nails, which harbour all kinds of germs, are thoroughly attended to and well cleaned. No finger rings must be worn. Next the hands must be well soaked in perchloride of mercury lotion, or in a 1 in 500 solution of biniodide of mercury in methylated spirit. The hands cannot be

effectually cleaned except in a lotion made with spirit. They must not be wiped. After a few minutes they can be considered free from germs, and safe to handle a wound.

Cleansing the skin of patient.

(2) The skin of the person on whom the operation is to be performed, for at least 10 inches around the place where the cut is to be made, must be carefully shaved, next cleansed with hot water and soap, then washed with ether to remove the grease; washed with a 1 in 500 solution of biniodide of mercury in methylated spirit, and then covered with a piece of antiseptic gauze, called a guard, which has been dipped in some antiseptic lotion, such as 1 in 30 carbolic lotion, and is laid over the place and kept in position by a bandage.

Cleansing of instruments.

(3) All instruments used must first be boiled in water, containing one part in a hundred of carbonate of soda. The water itself must have been previously boiled for some time. This is done in an apparatus called a sterilizer. After the instruments, placed in the tray, have been boiled in the trough of the sterilizer for at least 5 minutes, they are tipped out into a tray or basin containing a solution of carbolic acid, one part in twenty, until required for use. Just before the instruments are to be used this solution is very freely diluted with warm sterilized water. A solution of carbolic acid so strong as 1 in 20 would be an irritant to any wound with which it was brought in contact. On no account must instruments thus sterilized be touched or handled by anyone whose hands have not been prepared as above described, nor must the hands, skin, clothing, or blankets of the patient be allowed to touch the instruments. To guard against this, one or two sterilized towels are placed around the part to be operated upon. Should an instrument fall upon the floor during an operation, it must, on no account, be used again until it has been re-sterilized. Should a dressing fall upon the floor it must be thrown away.

Dressings.

(4) Materials used for dressings have been sterilized previous to use. In the case of dry antiseptic dressings, such as gauze or wool, these have been specially prepared by being saturated in antiseptic solution, then dried, and afterwards wrapped up in waterproof paper, which has also been sterilized. They are done up in small packages, which can be considered safe for use, provided they have been freshly opened. The materials for stitches and drainage tubes have also been sterilized, and are usually kept ready for use in an antiseptic fluid in closed glass bottles or tubes.

Towels, aprons, and sleeves.

(5) Towels, aprons, and sleeves which are used by the surgeon, nurse, or orderlies, have been thoroughly boiled and dried by heat, and are kept in a sterilized closed box until required for use. As it is impossible to sterilize sponges, they are never used in connection with wounds.

Swabs.

Instead of sponges, pieces of antiseptic wool, wrapped in antiseptic gauze, of about the size of an apple, are generally used. They are called swabs. These are kept in a basin containing antiseptic solution until required at the operation. After having been used they are at once destroyed.

Flushing or washing of a wound.

(6) Water which has been thoroughly boiled, or antiseptic solution, is used during and after an operation to flush or wash any part of a wound as required.

Trays, &c., for instruments and dressings.

(7) All boxes, trays, basins, &c., used for holding dressings or instruments are made of some hard, smooth material, such as glass, china, or vulcanite, and are sterilized by heat before and after use. Instruments such as scissors, forceps, &c., are so made as to be able to be taken to pieces, and they, as well as knives, are made as smooth as possible without crevices, so that they can be easily cleaned and do not harbour germs.

All these points must be carefully attended to, as the neglect of any one of them will certainly make all the rest useless, leading to infection of the wound and great distress to the patient.

How antiseptic dressings are used.

86. The exact way of using these antiseptic dressings to wounds is as follows:—

(1) In the case of an operation in hospital, where everything is at hand for the thorough carrying out of the antiseptic treatment, after all blood has been wiped away by means of antiseptic swabs, the edges of the wound are drawn together by the surgeon by means of stitches, a drainage tube, if necessary, having been put between its lips. Iodoform or boracic acid powder are then sprinkled over the wound by means of a dredger, pieces of dry crumpled antiseptic gauze are next placed over the wound, and over the top of this antiseptic wool is laid—much if the wound is large, less if it is small. Over the wool is placed a bandage to keep the dressing in its place.

In the field.

(2) In the field, or where all precautions as to sterilizing hands, skin, &c., cannot be carried out, it is best, first, not to handle the wound more than is necessary to stop bleeding or remove dirt, next to apply the "first field" or other dry antiseptic dressing, taking care to handle it as little as possible, and not to touch with the fingers the part of the dressing which is to come next to the wound.

Antiseptic bath and fomentation.

87. When a wound has become infected with germs, is inflamed and discharging, it is usual to treat it by antiseptic baths or antiseptic fomentations. This is done as follows:—Boracic acid is the usual antiseptic used in such cases. An antiseptic bath consists of boracic acid dissolved in warm water (strength, 5 grains to 1 ounce of water). The limb, or other part, is to be held in a clean bucket, basin, or other vessel containing this warm lotion for such a length of time as may be directed.

An antiseptic fomentation is commonly made by pouring warm boracic lotion on boracic lint and then wringing the lint out and applying it at once to the wound. It is then covered by waterproof material, to keep in the heat and moisture, and fixed on with a bandage. It should be renewed before it becomes dry or cold.

10. OPERATIONS.

Preparation of patient for operation.

88. It is usual to give an aperient the night before a surgical operation, followed by an enema in the morning. Five hours before the operation, if an anæsthetic (chloroform or ether) is to be given, the patient is allowed to have a light meal. After that no solid food may be given. If there is a wound all dressings must

be removed, and the wound cleaned and then covered with antiseptic gauze soaked in antiseptic lotion. If no wound is present the skin of the part on which the operation is to be performed must be cleansed as already described. If the arm or chest is to be operated on, the sleeve of the shirt must not be put on on that side. Patients must keep their socks on, and be kept warm. The clothes about the neck and chest must be left loose. Any false teeth must be removed.

Hands of assistants.

89. The orderlies who are to assist must sterilize their hands as already described.

Instruments.

Instruments will be got ready, sterilized, and placed in a tray in which there is carbolic lotion (1 in 20). As many sterilized needles as are likely to be required should be threaded (the hands having been first sterilized) with the sutures which are to be used, and placed in antiseptic solution in a tray. This solution is much diluted just before the operation by adding boiled water.

Dressings, &c.

Towels, dressings, &c., will be sterilized.

Operating room.

90. The operation room should be kept at a heat of from 65 to 70 degrees. There must be plenty of hot and cold water ready, and extra blankets, mackintosh sheets, basins, towels, &c. It should be ascertained what dressings will be required for the case, and these should be prepared.

A towel and small basin should be ready in case of vomiting, which often happens when a patient is taking, or recovering from, chloroform.

Preparation of patient's bed.

91. The patient's bed should be prepared for his return. A cradle should be at hand, also hot-water bottles and spare blankets, which should be warmed. After he is put to bed he must be turned upon one side, unless otherwise ordered, and be carefully watched in case of vomiting, collapse, or stopping of breathing. When a patient is being taken to and from the operating room, he must be kept well covered with blankets, as when under the influence of chloroform or ether he is very liable to a chill.

After effects.

92. After an operation in which an anæsthetic has been given, there is a tendency to faint, and the patient should not be allowed to sit up. After a limb has been amputated, a cradle should be placed over the stump.

Hæmorrhage after operation.

Sometimes hæmorrhage occurs after an operation, and it is well to see, from time to time, if any blood is oozing through the dressings. Any pallor or faintness should be watched for. If there should be much hæmorrhage, the orderly must proceed as laid down in the section on hæmorrhage, and at once report the matter. Pending the arrival of the officer, he should have cold water, ice, hot water, swabs, and towels ready, and a fresh dressing. If hæmorrhage, after amputation, takes place from a stump, the stump should be kept well raised until the officer arrives. It is better not to let the patient see what is going on.

Secondary hæmorrhage.

93. Hæmorrhage taking place two to six weeks after an operation is called "secondary hæmorrhage." It is caused by sloughing into an artery, and requires prompt action on the part of the orderly. The limb should be raised, and a tourniquet applied to the main artery. It should be at once reported

Nursing of Tracheotomy Cases.

Tracheotomy.

94. This operation consists in opening the windpipe in the neck, and inserting a tracheotomy tube. These cases require the most careful attention, and the after success of the operation depends greatly on the care and watchfulness of the orderly. The wishes and wants of the patient must be watched for, as he cannot speak out loudly enough to make himself heard, until he has learnt to put his finger over the tube.

Tent and steam kettle.

A tent made of sheets is usually erected round the bed of the patient. This tent prevents draughts round the bed and helps to keep up an even temperature. If a steam kettle is used, the tent keeps in the warm, moistened air. To regulate the temperature within the tent, a ward thermometer is suspended inside. The temperature of the air should be between 65 and 70 degrees, and it is very important this temperature should be kept the same night and day. The kettle should not be more than two-thirds full, and when more water is added to it it should be boiling water.

Instruments Required.

Scalpels.
Retractors.
Dilating forceps.
Artery forceps.
Dissecting forceps.
Tongue forceps.
Scissors.
Tracheotomy tubes, with tapes attached.

Dressings.

Shields, made of lint and jaconet.
Strips of antiseptic gauze.
Swabs.
Boiling water.
Antiseptic solution.
Receivers.
Sand-bag.

Cleanliness of the parts.

The neck must be kept perfectly clean and dry, and everything done to prevent soreness of the parts. All directions as to the tube must be most carefully attended to.

After operation keep the patient under very careful observation.

Have at hand—

(1) Basin of warm water with soda or lime water added, in which to clean tube.
(2) Tray containing tracheal and dilating forceps, tracheotomy tubes, scissors.
(3) Tapes, shields.
(4) Swabs wrung out in boracic solution.
(5) Receivers.

Do not move the outer tube.

Do not attempt to clean the inner tube whilst in position in neck, but remove it and clean it thoroughly in soda or lime water.

1. *Corrosive Poisons.*

Symptoms.	Treatment.
Great pain immediately after taking the poison in the mouth and throat, which look as if scalded; mouth and lips stained and blistered; shock, and perhaps difficulty in breathing; poison a liquid, breath may smell very sour, or of hartshorn.	If the smell is sour probably the poison is an acid, in which case magnesia mixture, lime water, or chalk and water, linseed or olive oil, poured into the mouth help to stop the further action by neutralising the acidity. If the breath smells of hartshorn, or does not smell acid, probably the poison is an alkali, in which case some weak vinegar and water or lime juice should be used to the parts touched by the poison. No emetic is to be given. The stomach tube should not be used except under very special circumstances. Hot-water bottles to the feet, and other means for restoring from shock. Use remedies as soon as possible Have the tracheotomy instruments in readiness.

The following are the most common corrosive poisons:—
Oil of vitriol (sulphuric acid), spirits of salts (hydrochloric acid), nitric acid, caustic soda, caustic potash, strong ammonia, oxalic acid (salts of sorrel), carbolic acid.

2. *Irritant Poisons.*

Symptoms.	Treatment.
Pain not at first very great, generally a sensation of burning, or a strong taste in the mouth and throat, coming quickly if the poison is liquid, and less quickly if it is solid when taken. The parts touched by the poison are not burned, and the pain is not so great as in the case of corrosive poison, but it gradually increases, and vomiting sets in, with pain in the stomach; diarrhœa, with straining, and sometimes blood in the stools. Much can be learned by looking at the vomited matter. Shock and exhaustion set in gradually.	Give warm water and encourage vomiting until the water returns clear, then small quantities of milk or white of egg, oil, or melted butter, to allay the irritation. Get the stomach tube ready.

The following are the most common irritants:—
Arsenic, antimony (tartar emetic), corrosive sublimate, copper, zinc, iodine, cantharides, powdered glass, stale or badly tinned fish or meat.

3. *Systemic (Constitutional) Poisons.*

Symptoms.	Treatment.
No sign of burning, redness, or pain, but there may be giddiness, dimness of sight, drowsiness gradually increasing, difficulty in breathing, irregular or weak pulse, delirium, cramps, convulsions, the pupils of the eye either widely open or tightly closed; according to the particular systems of the body affected—nervous, vascular, respiratory, &c.	The stomach must be emptied by means of emetics or the stomach tube; symptoms must be treated—that is, in case of drowsiness the patient must be kept awake by being walked about, cold water being freely used, and hot coffee given. If the drowsiness becomes greater, or the breathing threatens to fail, artificial respiration should be resorted to, sometimes for hours; if the pulse is weak, give ammonia (sal-volatile); if there are cramps, gentle rubbing of the limbs; if delirium or convulsions are present, patient should be carefully watched and kept as quiet as possible, and the administration of the special antidotes in the case of each poison. If the case is prolonged, nourishment must be given by the mouth or rectum.

The following are the most common narcotics:—
Opium and morphia, chloral, belladonna, strychnine, prussic acid, cocaine.

4. Certain poisons act both as irritants and by producing systemic effects; such are arsenic, phosphorus, chloroform, carbolic acid, alcohol, &c.

The treatment at first is usually directed to preventing their irritant effect; subsequently to antagonising their dangerous action on the constitution of the body.

12. SURGICAL INSTRUMENTS AND APPLIANCES.

126. 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.

Bougie.—An instrument used for dilating strictures.

Catheter.—A tube for passing through the urethra into the bladder to draw off the urine.

Catheters are either made of silver or silver plate, or of gum-elastic; they contain a wire like a *stylet.* French olivary catheters are flexible and have no stylets. In the metal and gum-elastic catheters the eye is near the point. In French catheters it is 1½ inches from the point. English catheters are numbered from 1, the smallest, to 16, the largest; and French catheters, from 1 to 30.

Caustic-Holder.—A little case for holding caustic, usually made of vulcanite 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.

Drainage Tubes.—Indiarubber or glass tubes used after operation for draining a wound.

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

Enema Apparatus.—An instrument for administering enemata.

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

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

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

Forceps, Ferguson's Clawed, or Lion Forceps.—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, Spencer Wells', or Pressure Forceps.—Forceps for the compression of bleeding vessels during operations.

Hernia Director.—Made of steel, and broader than the ordinary director, used for the operation of strangulated hernia or rupture.

Irrigator.—A metal or glass vessel to which a tube is attached fitted with a nozzle and stop-cock, used for flushing or washing wounds with boiled water or antiseptic lotion.

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

Ligatures.—Threads of sterilized silk, catgut, or tendon used for tying up blood vessels.

Needle Holder.—A strong special forceps for holding a needle to put in stitches during operations.

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

Ophthalmoscope.—An instrument for examining the eyes.

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

Probang, or Œsophageal Bougie.—A flexible instrument for passing down the gullet.

Probe.—A silver instrument for probing wounds.

Retractor.—A blunt hook or flat piece of metal bent at an angle for holding apart the edges of a wound during operation.

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 purposes 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.

Spatula.—A blunt knife for spreading ointments; also an instrument 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 Tube.—An apparatus used for washing out or emptying the stomach.

Sutures.—Threads of wire, silk, catgut, silkworm gut, horsehair, or tendon used by the surgeon for stitching wounds.

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

Syringe, Higginson's.—An apparatus consisting of an indiarubber pump, to be squeezed by the hand, and two pipes, one fitted with a nozzle to pass into the anus, and one with a pewter end to slip into the basin for giving enemas.

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

Tourniquet.—An instrument for making pressure on an artery to stop the flow of blood through it (*See* para. 130.)

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.

Truss.—An appliance used to keep the bowel in its place in cases of rupture.

127. The following are the contents of a SURGICAL HAVERSACK, which is a waterproof canvas bag :— Surgical haversack.

CONTENTS OF SURGICAL HAVERSACK.

(Weight about 7 lbs. Dimensions 13″ × 5″ × 9½″.)

Bandages, loose-woven, sal-alembroth	....	....	....	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; needles (3) in glass tube; cocaine tablets, $\frac{1}{4}$ gr. (2 tubes); morphia tablets, $\frac{1}{6}$th gr. (2 tubes); and glass mortar.		
Medicine-cup and mortar combined, vulcanite, with 2 pestles	„	1
Plaster, rubber, adhesive, 1-inch tape	spool	1
„ isinglass, transparent, 12 yds., 1-inch tape	tin	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 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. 36.—SURGICAL HAVERSACK.

128. The following are the contents of a MEDICAL COMPANION :— (Weight about 13 lbs. Dimensions 14″ × 7″ × 9″. Medical companion.

Chloroform (in 2 tubes)			oz.	4
Bottle, chloroform, capped, empty			No.	1
Iodoform			oz.	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.	62
„ 3. Tablets	Ipecac: Pulv: *sine* Emetine, 10 grs. in each		„	24
„ 4. Tablets	Pulv: Cretæ Arom: *sine* Sacchar:, 8 grs.; Acac: Pulv:, 1½ grs.; Opii Pulv:, ½ gr.	in each	„	44
„ 5. Tablets	Antipyrin, 5 grs. in each		„	28
„ 6. Tablets	Ferri Hypophosph:, 2 grs.; Acid: Arseniosum, $\frac{1}{50}$th gr.; Quinin: Acid: Sulph:, 1 gr.; Strychninæ Sulph:, $\frac{1}{50}$th gr.; Saccharin, $\frac{1}{100}$th gr.	in each	„	60
„ 7. Tablets	Hydrarg: Subchlor:, 1 gr. in each		„	144
„ 8. Pills	Plumbi Acet:, 3 grs.; Opii Pulv:, 1 gr.	in each	„	50
„ 9. Pills	Hydrarg: Subchlor:, 2 grs.; Pil: Rhei Co:, 2 grs.; Pil: Coloc: Co:, 2 grs.	in each	„	36
„ 10. Tablets	Quinin: Acid: Sulph:, 2 grs. in each (pink)		„	76
„ 11. Pills	Camphor:, 3 grs.; Opii Pulv:, 2 grs.; Capsici Pulv:, ½ gr.	in each (brown)	„	24
„ 12. Pills	Opii Pulv:, 1 gr. in each		„	134
„ 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	„	60
„ 14. Tablets	Potas: Permang:, 2 grs. in each		„	180
„ 15. Tablets	Quinin: Acid: Sulph:, 5 grs. in each (pink)		„	34
Bandages, loose-woven, sal-alembroth			„	3
„ suspensory			„	2

Bandages, triangular sal-alembroth	No.	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

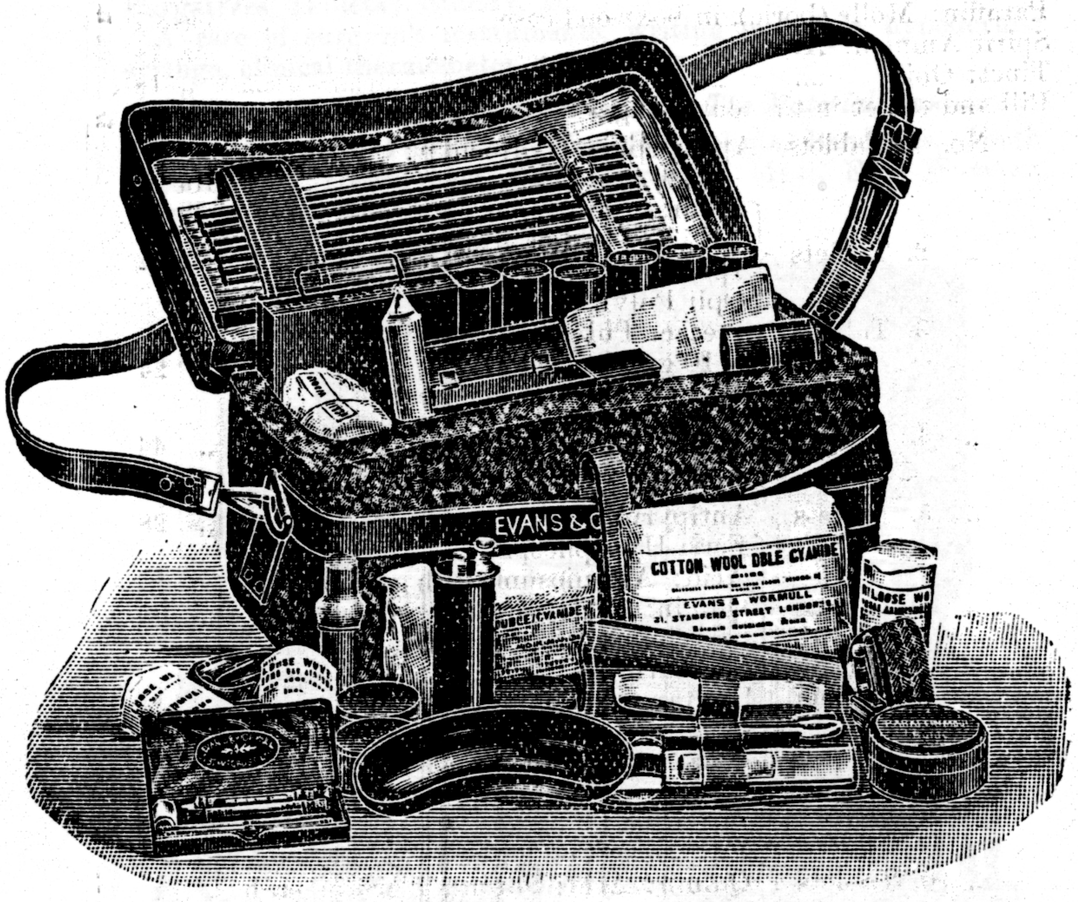

FIG. 37.—CONTENTS OF MEDICAL COMPANION.

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; needles (3) 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	No.	1
Minim measure in case....	„	1
Plaster, rubber, adhesive, 1-in. tape	spool	1
„ isinglass, transparent, 12 yds., 1-in. tape	tin	1
Silk, twisted, fine and medium, in aseptic solution	tube	1
Splints, rattan cane, with pad cases	pair	1
Tape, pieces of	No.	6
Tin containing candle and 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

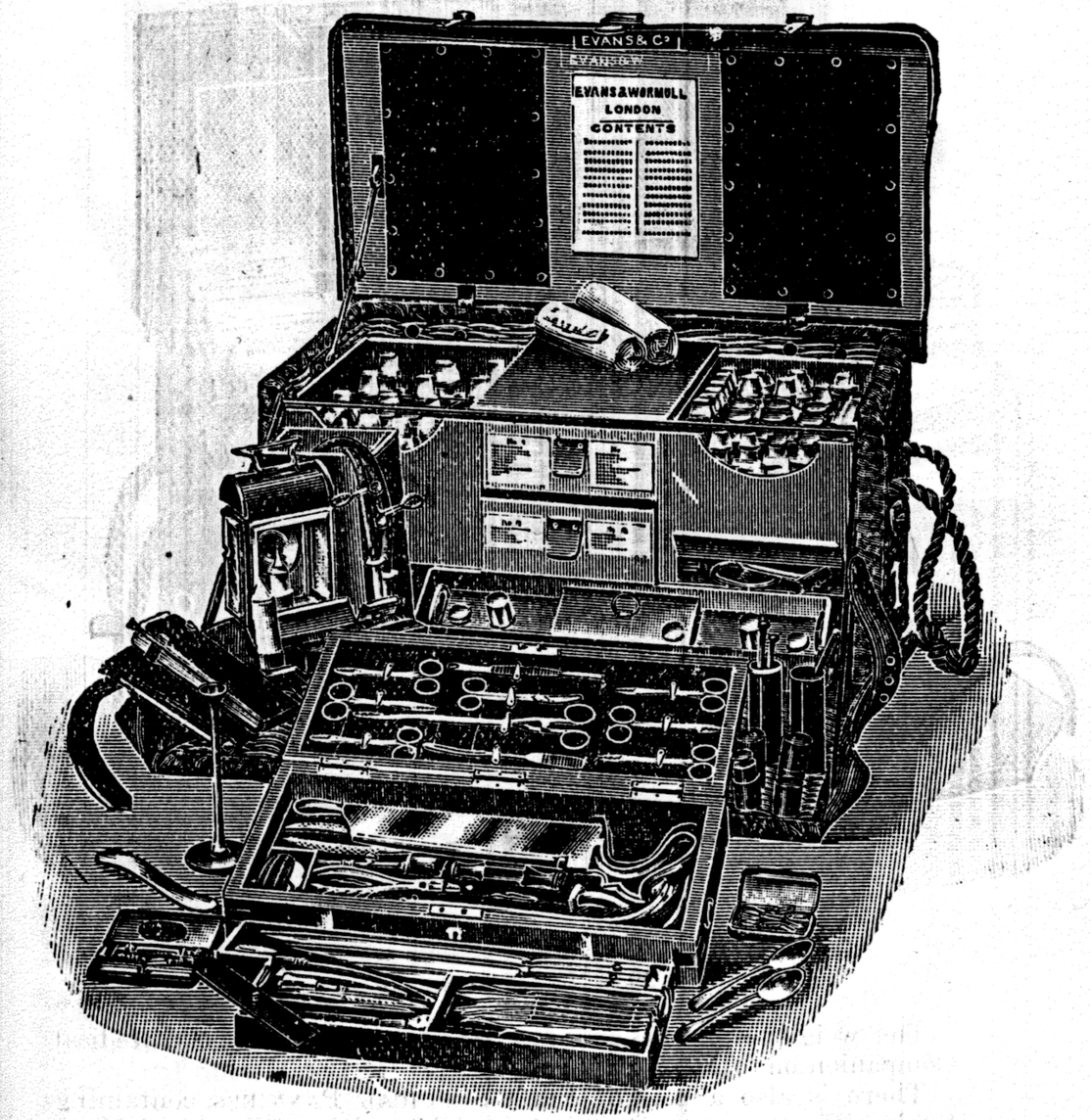

FIG. 38.—No. 1 PANNIER.

Field medical panniers.

129. 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, Tablets; Brandy, &c.

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

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.

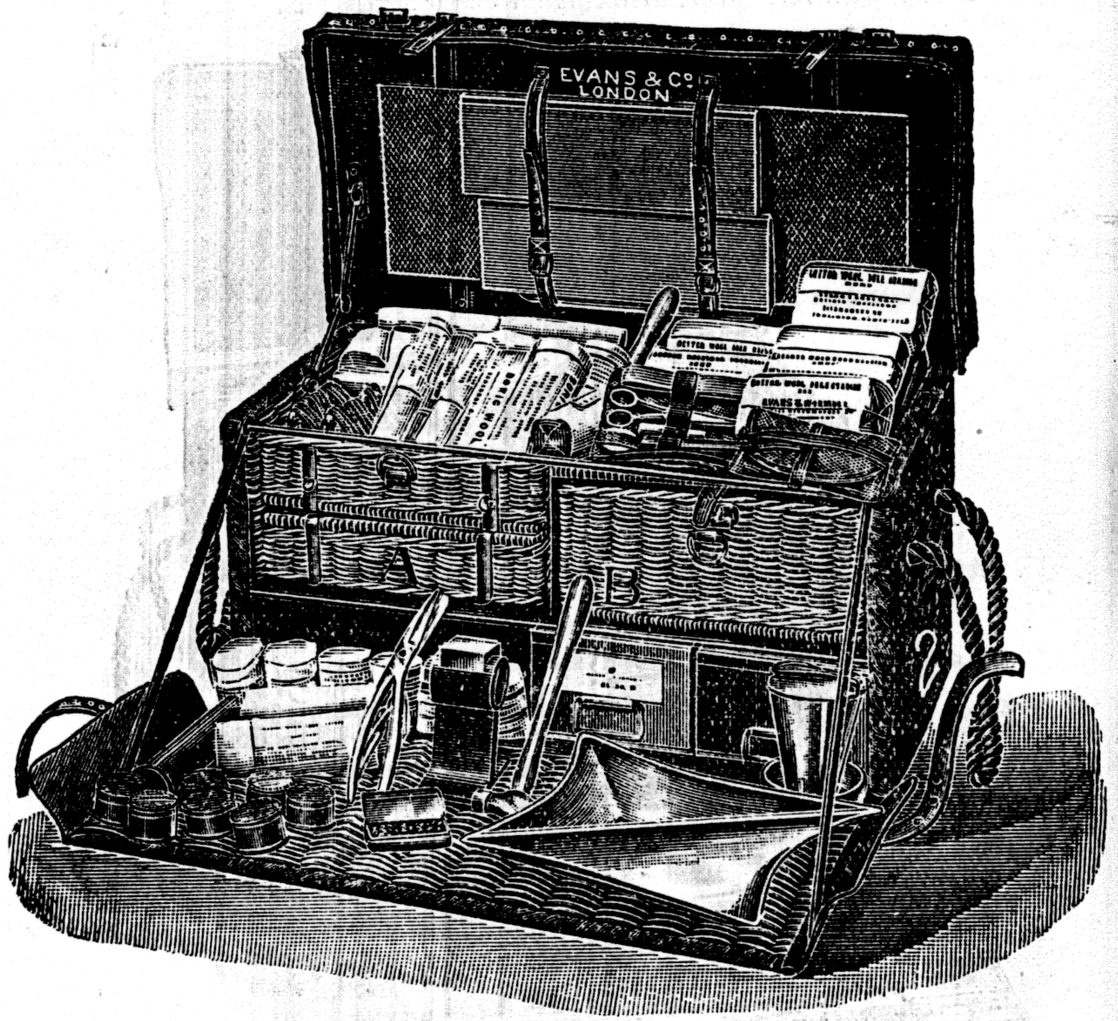

FIG. 39.—NO. 2 PANNIER.

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

There is also a pair of FIELD SURGICAL PANNIERS, containing Surgical Instruments, Dressings, and Materials. Weight of No. 1 about 90 lbs. of No. 2 about 91 lbs.

130. The following are the contents of the FIELD FRACTURE BOX. (Weight about 72 lbs.) :—

(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

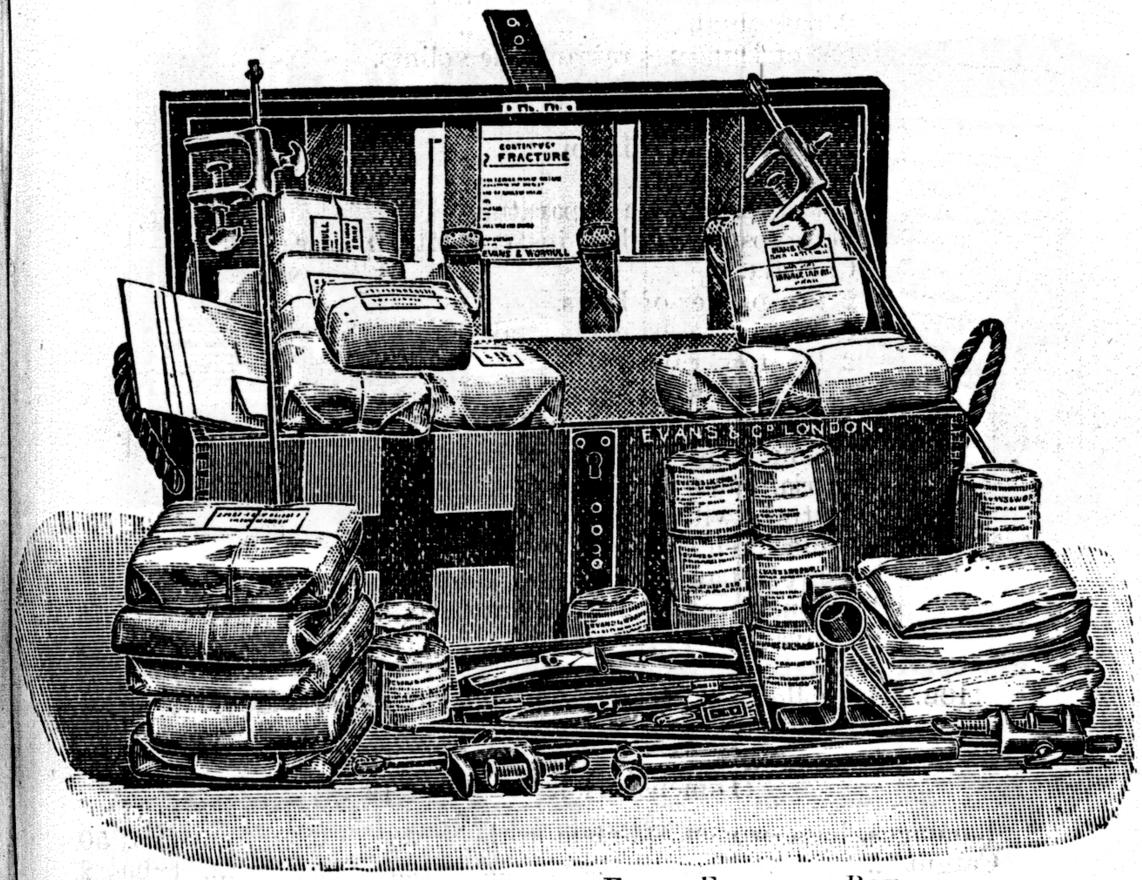

FIG. 40.—CONTENTS OF FIELD FRACTURE BOX.

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

131. 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 rattan 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, sal-alembroth.
2 lbs. tow, carbolised.
1 lb. wool, sal-alembroth.
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.

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

(Dimensions 32″ × 12″ × 12″.)

Bandages, loose-woven, sal-alembroth	No.	50
Catgut	tubes	2
Drainage tubing, assorted sizes, in aseptic solution	„	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).

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

Jaconet, waterproof, in 2-yd. packets	yds.	6
Silk, twisted, fine and medium, in aseptic solution	tubes	3
Wool, boric, in 2-oz. packets	lb.	2
„ double cyanide, in 2-oz. packets	„	6
Box, tin lined ,with sliding lid, to contain above	No.	1

FIG. 41.—CONTENTS OF ANTISEPTIC CASE.

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

No. 1 BAG.

Acid, Carbolic (liquid)	oz.	2½	
Bottle, 3 oz., capped, empty, for chloroform	No.	1	
Hydrarg: Perchlor: (soloids)	„	70	
Iodoform	oz.	3	
Sp: Ammon: Arom:	„	2	
Antipyrin, 5 gr. tablets } in one tin	No.	30	
Pulv: Ipecac: Co:, 5 gr. tablets }	„	60	
Potas: Bromid:, 5 gr. tablets }	„	70	
Potas: Permanganas, 2 gr. tablets }	„	100	
Quininæ Acid: Sulph:, 5 gr. tablets (pink)	„	280	
„ „ „ 2 „ „ „	„	348	
Catgut, in carbolic solution } in leather-covered case	tubes	2	
Silk ligatures, in aseptic solution }	„	2	
Minim measure, in case	No.	1	
Pins, safety	box	1	
Plaster, rubber, adhesive, 1 inch tape	spools	2	
„ isinglass, transparent, each 12 yds., 1 inch tape	tin	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	6
„ 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
Probes, silver	„	4
Saw, Butcher's, metal handle, and spare blade	„	1
Scalpels, metal handles	„	3
Scissors, dressing	pair	1
Tourniquet, screw	No.	1
Case, mahogany (to contain above)		1
Trays, tin, enclosing case	„	2

FIG. 42.—CONTENTS OF SURGICAL SADDLE BAG.

No. 2 BAG.

Bandages, loose-woven, sal-alembroth	No.	12
„ triangular „	„	12

Bearer's dressing case, canvas, containing :—	No.	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).		
Chloroform, in 2 oz. tubes	oz.	8
Christia tissue	yd.	1
Gauze, double cyanide	yds.	12
Hypodermic case, containing :—	No.	1
Syringe; Needles (3) 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 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
Water bottle, cup, and straps		1

13. INFECTIOUS DISEASE.

134. In nursing a case of infectious disease every possible care must be taken to guard against the spread of infection. Infectious disease is spread by infective material, usually minute living germs, carried by the air, water, milk, books, clothes, bedding, &c., or by these germs remaining alive in previously infected rooms or houses. Every precaution should be taken by the orderly to avoid taking the disease himself, and to prevent its being conveyed to others. The hands of an orderly attending on infectious and enteric cases should be frequently washed, and all precautions made use of to keep in a good state of health, such as frequent warm baths, regular exercise, food, &c. Any carelessness on his part may cause a most serious outbreak of the disease; consequently he must be careful to keep himself and his charge isolated from other persons. Bed-pans, urinals, and drinking vessels, also linen, Spread of infection.

should be specially marked and kept only for the use of infectious cases.

Disinfection of clothing and bedding.

135. It is the duty of the orderly to see that all the hospital clothing and bed linen is soaked according to directions given for use in the hospital, or by special instructions from the medical officer, before it is put aside as soiled linen for the washerman.

Treatment.

136. No noise should be allowed in the ward. Should there be any excitement or delirium, all causes of disturbance should be avoided, and it may be advisable to darken the ward. Patients must be strictly confined to bed. The ventilation of the room should be carefully attended to, the temperature of the air being kept at from 60° to 65° Fahrenheit.

Feeding.

137. Nourishment ordered must be given with regularity. Water, barley water, or lemonade may be given freely when permitted, but in small quantities at a time.

Food or drink from an infected room must not be taken by other persons, but should be thrown away. It is highly dangerous for an orderly to drink out of a cup or mug which is in use by an infectious or enteric patient. Therefore not more food or drink than is likely to be required by the patient should be taken to the room.

The directions as to times, and the amount of nourishment to be given must be strictly carried out, and on no account should any article of food or drink be given to the patient unless such has been ordered.

Cleanliness of room and patient.

138. Both the room and the patient must be kept very clean. As regards the room, a duster which has been damped with some disinfectant solution should be used to dust the room and furniture so as to prevent the dust, in which infectious germs may be present, from being scattered about. The duster should then at once be thrown into a vessel containing some disinfectant solution.

The body of the patient should be often sponged with water with the chill taken off. This not only tends to keep the patient clean, but is very comforting, and increases the action of the skin. Part of the body should be sponged at a time to avoid chill. The patient should not be uncovered more than is necessary while he is being sponged ; a blanket must be kept over him.

Disinfection of motions and urine.

The motions and urine must be mixed with carbolic or cresol solution before being thrown down the water-closet.

Enteric or typhoid fever.

139. In enteric or typhoid fever the infectious germs are contained in the motions and in the urine. They multiply outside the body, and are very dangerous to others should they get into water, milk, or food, or if left on soiled linen, clothing, or bedding. Every care should therefore be taken by the orderly in washing and disinfecting his hands when nursing a case of enteric fever. All soiled linen must be placed in some disinfectant at once.

140. The number and character of stools, as well as the amount of urine, should be carefully noted, and reported to the officer at his visit. The temperature in enteric cases is usually taken every four hours. Special reports are kept in these cases by the orderly in charge, and, on being relieved, the report should be carefully read by the orderly coming on duty.

Disinfection of enteric stools.

141. The greatest care should be taken to disinfect the stools immediately they are passed from the patient. A strong disinfectant is used. Whatever disinfectant is ordered to be employed, a quantity, equal to the amount of the stool, should be mixed with it, and allowed to come into contact with all the germs. To ensure this, the stool, mixed with disinfectant, must be allowed to stand for 20 or 30 minutes covered up before being thrown down the closet. Bed pans used for enteric patients should be disinfected after use, and not be used by others. Urine which is passed should be treated in the same way. It is important to bathe the patient after use of bed pan, and the swab of tow or wool used for this purpose should be promptly burnt.

Patient to be kept in bed.

142. In this fever the bowels are ulcerated, it is therefore very important to keep the patient in bed, and on no account allow him to sit up, or exert himself. Patients have been often known to drop back dead if these instructions have not been attended to. He should not be allowed to lie constantly on his back for fear of congestion of the lungs or bed sores. Special attention should be given to prevent bed sores by cleansing and keeping the skin dry.

Feeding.

On account of the ulceration, and consequent weakening of the walls of the intestine, there is great danger of perforation occurring if hard or indigestible articles of food are given to the patient. The ulcerated condition of the bowels is the reason why solid food is kept from a patient so long, and as the patient's friends do not understand this, it is the duty of the orderly to see that nothing is given to the patient by his friends who may be allowed to visit him. Many patients have been killed by being given improper food. Nourishment is usually given every two hours, and directions as to feeding must be most carefully obeyed.

Mouth to be kept clean.

The tongue and teeth of an enteric patient should be kept cleaned with any mouth wash which may be ordered.

Hæmorrhage from bowels.

The ulcers in the bowels in some cases bleed more or less profusely. If hæmorrhage occurs, it should be at once reported. Hæmorrhage causes the temperature to fall, and there may be other signs of collapse.

14. MEDICINES FOR INTERNAL AND EXTERNAL USE.

How medicines act.

143. Medicines for internal use contain drugs which either produce their effect directly, on the mouth, stomach, or intestines ; or, becoming absorbed into the system, act on remote parts of the body, such as the brain, kidneys, heart, &c.

Ways in which given.

They are given in the following ways :—

(1) By being swallowed.
(2) By being passed into the lower end of the bowel through the anus.
(3) By being inhaled into the lungs.
(4) By being rubbed into, or applied to, the skin.
(5) By being injected under the skin, or more deeply among the muscles.
(6) By means of medicated baths.