an efficient Military Ambulance Organization in connection with the Volunteer Force, which may also constitute a reserve, in case of need, for the regular army—there should be formed (in addition to all existing Volunteer Regimental Surgeons and Regimental Stretcher-Bearers) one Bearer Company and one Field Hospital for each Regimental District, such bodies to be composed of Officers (i.e., Skilled Surgeons) and Men (i.e., men disciplined, and trained in all the varied duties of military ambulance work) of a Volunteer Medical Staff Corps. Such a Corps should be raised, in accordance with this scheme, in connection with every Regimental District, consisting of about ten Surgeons (as Officers), two Quarter-masters (to take charge of stores, etc.), and 100 Non-commissioned Officers and Privates (men of good character, healthy, disciplined, drilled, and trained in ambulance work).

On the publication of the foregoing account of Military Ambulance Organization, Surgeon-General Sir Thomas Longmore very kindly presented me with two plans illustrative of the help-stations in time of war, remarking that, when Surgeon-Major Evatt's diagram (Fig. 44) is added to them, all the Field Medical (and Ambulance) Organization may be readily studied. I have much pleasure in now inserting reduced copies of these plans (Figs. 45 and 46), which, when carefully examined in connection with the diagram (Fig. 44) and letterpress on pages 165-171, show very clearly the Medical and Ambulance arrangements necessary in time of war.

APPENDIX.

Illustrated Triangular Bandages—Precautions necessary in the presence of foul air and poisonous gases—What to do when dress catches fire—Rescue from drowning and ice accidents—Carrying by oneself, unaided, an insensible man—Rules for carrying stretchers—Special appliances for use in mines—Local Ambulance Corps, and Nursing Guilds or Corps—The Invalid Transport Corps—The St. Andrew's Ambulance Association—First Aid: Light, Warmth, and Water—The Signs of Death.

Illustrated Triangular Bandages.

Triangular bandages, marked with figures showing the ways of applying them, are of great service to Ambulance pupils, more especially to those who have but little time for study or practice, and their usefulness is still further increased by each bandage being accompanied by a paper or book of printed instructions.

On Esmarch's bandage (Fig. 7), meant chiefly for the use of troops on active service, there is imprinted a sketch of "an ambulance place, behind the line of engagement, where the wounded soldiers are dressing each others wounds with the triangular cloth (or bandage)," the diagram on the bandage being "intended to instruct its owners as to the proper way in which to use it." As the figure of this bandage (Fig. 7) is much reduced in size, it may be usefully examined by means of a hand magnifying glass.

The bandage issued by the St. John Ambulance Association (figured in frontispiece) is illustrated by diagrams clearly showing its application in cases of wounds, in the binding on of splints, in fractures of the lower jaw and (in the central lowest figure) of the collar-bone. This bandage is accompanied by a paper of printed instructions. The bandage of the St. Andrew's Ambulance Association, an illustration of which the authorities have courteously permitted me to produce, has printed upon it no less than fifty designs, and is issued with a little book of instructions as to its application. The figure of this bandage (Fig. 47) will amply repay careful examination with a magnifying glass, on account of the numerous diagrams imprinted on it, showing clearly the varied uses of the triangular bandage, and also illustrating many other

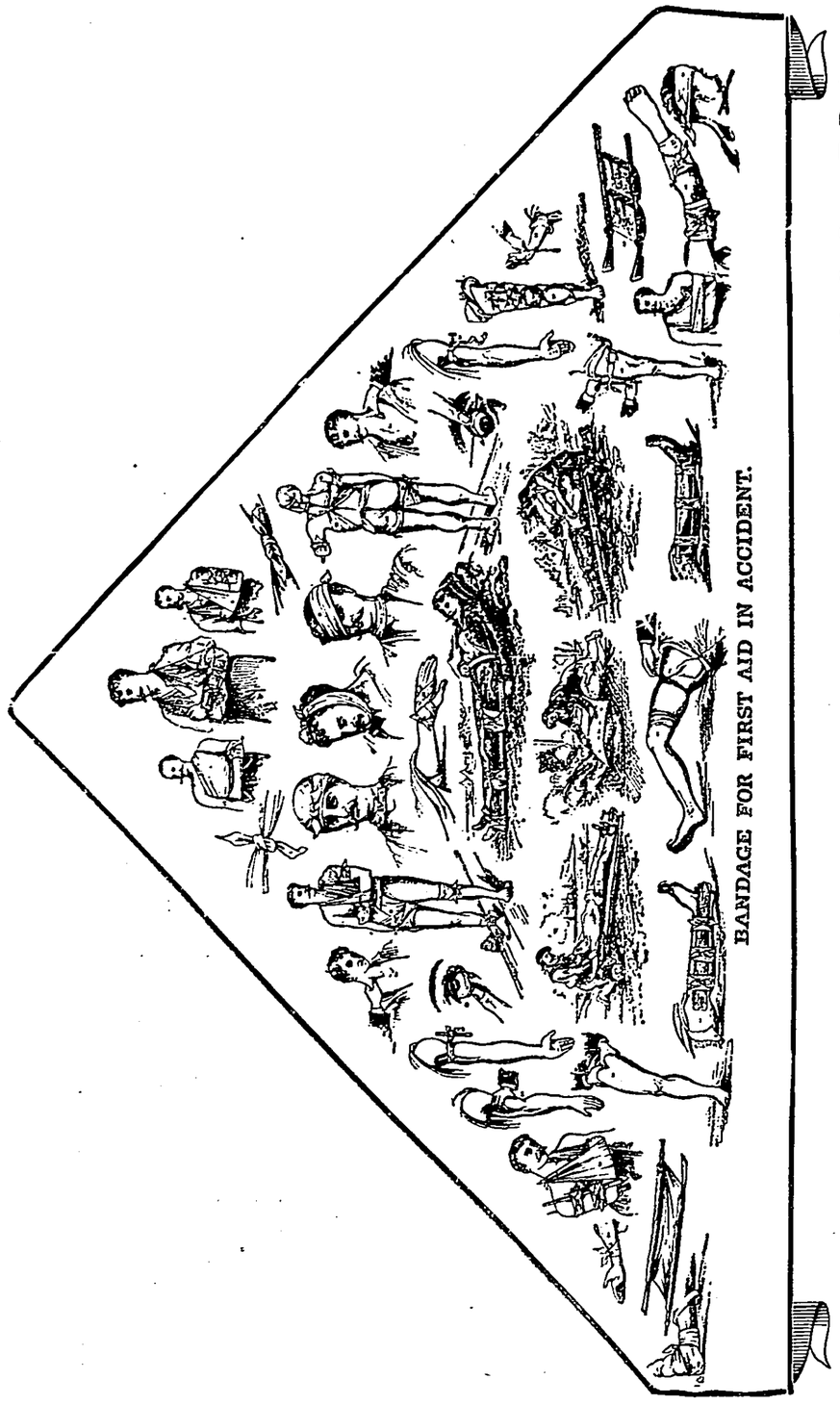

FIG. 47.—Illustrated Triangular Bandage of the St. Andrew's Ambulance Association, designed by Dr. George T. Beatson. These Bandages, with printed instructions, can be had for 7*d.* each, or post free 8*d.* each, on application to the Secretary at the Head Office (93 West Regent Street, Glasgow), or to the Hon. Secs. of any of the Centres of the Association.

things as well, as, for instance, improvised stretchers made "with two oars and canvas" and with soldier's knapsacks and rifles, fastened with their straps;" the "temporary treatment of fractured collar-bone;" a "fracture of upper arm put up with bayonet and scabbard;" a fractured fore-arm put up with "splints and large arm sling (the sling is represented as transparent);" artificial respiration by Sylvester's method; removal of foreign bodies from the eye; "extinguishing flames by wrapping in hearth-rug;" a "wound of fore-arm, with hæmorrhage, treated by local pressure with finger;" a broken thigh put up with "two long lateral splints and a short one in front;" etc.

Precautions Necessary in the Presence of Foul Air and Poisonous Gases.

No one should venture into any old wells, pits, shafts, vaults, graves in over-crowded church-yards, brewer's vats, cellars full of new wine or beer, or drains, without first lowering into them a lighted candle: for, in such places, there is often collected a quantity of carbonic acid gas or "choke-damp." This gas, being heavy, accumulates next the soil or at the bottom of the well or vat; and if it exists in the proportion of 12 or 15 per cent., it puts out the candle (thereby giving notice of its presence) and would certainly suffocate and destroy anyone descending into it. This test is a very good one as far as it goes; as the foul air which extinguishes the candle would speedily be fatal to a man. But yet other precautions are needful, for a candle will burn if the "choke-damp" is only in the proportion of 10 per cent., a proportion which would quickly cause insensibility and death to man. Therefore, even if the lowered candle is not extinguished, the first man who descends into the well should have a rope securely fastened around him, so that, if he staggers or becomes unconscious, his companions at the top may rapidly pull him up. This precaution is all the more necessary as in certain places, as sewers, drains, and cesspools, other very poisonous gases (such as sulphuretted hydrogen) frequently accumulate, in which a candle will burn freely, but which are fatal very speedily to any one breathing them. The foul air in such places is sometimes

dangerously explosive, as when sulphuretted hydrogen is present in the proportion of about 7 per cent.; so that when applying the candle test, you must be careful that you are not injured by the gas bursting into flame or exploding.

When a man is suddenly overcome by the foul air of a well or other confined space, you can do no good by recklessly descending with the view of saving him; for, on reaching the gas, you yourselves will immediately be overwhelmed and suffocated. Many lives have been lost in this way, one after another being successively destroyed in vain attempts at rescue. The best way is to throw large quantities of lime-water (or, failing that, of water) into the pit; or to lower down buckets of quick-lime well sprinkled, or "loosely mixed into a paste," with water, as all these absorb carbonic acid gas: or the foul air may be displaced by a current caused by making a fire at the mouth of the pit, or by lowering a weighted open umbrella and pulling it up again—doing this repeatedly and quickly; or "what is better when available, by a jet of high-pressure steam."*

Mr. Thomas Bell, H.M.'s Inspector of Mines, speaks of a case which came under his notice, where some men were overcome in a pit shaft 60 feet deep, when the workmen tied up some bundles of straw and threw them down with a cord attached, drawing them up and repeating this until the fresh air caused to circulate disturbed the gas, and they were then enabled to get down.

At the same time, however, that such steps are taken, ropes, and ladders (if needed) should be obtained: and one man, with a sponge or handkerchief soaked in vinegar and water bound over his mouth and nose, with a cord securely fastened about his chest (held by two men at the other end), and a signal rope attached to his wrist, should go down into the well and fasten the end of another rope (lowered down to him and held above also by two men) around his suffocated comrade for him to be pulled out. One of the men at the top should have sole charge of the signal rope, and see that his signals are regularly answered by the rescuer, who should of course be pulled up if any signs of faintness or unconsciousness show themselves.

People are sometimes suffocated by poisonous gases above ground: for instance, in dwellings by the vapour of burning

* *Medical Jurisprudence*, Taylor.

charcoal, as when rooms are warmed by charcoal-braziers; or by coal-gas, escaping from the leakage of pipes or from not being properly shut off at the taps or meter; or by the smoke of a burning house.

The utmost care is needed, in rescuing anybody from a room full of charcoal vapour or coal-gas, to establish free ventilation by breaking in the door, and also the windows from the outside. If the windows cannot be got at from the outside, the rescuer, having first taken a deep breath, should hold a handkerchief or sponge soaked in water, or vinegar and water, to his mouth and nostrils, then dash through the room and break open the nearest window, pushing out his head to inhale some fresh air, before hastening to the next window, and so on till free ventilation is established, when those lying helpless can readily be got out and attended to. The presence of coal-gas is readily detected fortunately by its horrible smell, and as it is most dangerously explosive, no light must be used by the rescuers. In the case of the smoke of a burning house, the following remarks by Captain Eyre Shaw* are very instructive.

"Should it be found difficult to breathe in a room on fire or full of smoke, it will be found an advantage to go on the hands and knees, with the head low down, as there is often pure air close to the floor even when it is impossible to see across the room; and by placing in the mouth a pocket-handkerchief, or any substance through which the air can be filtered, it is quite possible to remain for several seconds in a room under these conditions; and, if the pocket-handkerchief or other article be previously dipped in water, it will be found a still more efficient respirator."

"To relieve a room of smoke, it is best to open a small portion of the window, by breaking the glass, or otherwise, both above and below, in which case the cool air will come in underneath, and the hot air and smoke will pass off from the top."

"It cannot be too often impressed on a fireman, that so long as there is flame there must be plenty of oxygen to support it, and that consequently there can be no difficulty in finding plenty of air to breathe—in other words, that so long as the fire is burning brightly, a man cannot be smothered. He may, it is true, be burned, blinded, or otherwise injured,

* *Fire Protection*, Eyre Shaw.

but it is impossible, under such circumstances, that he can suffer from want of air; on the contrary, so long as he can keep his head below the seat of the fire, he will feel a very considerable draught, and will experience no difficulty whatever in breathing."

What to do when Dress catches Fire.

If your own dress—throw yourself at once on the ground (so that the rising flames may not catch the upper part of your clothes nor burn your head and chest); roll about (so putting out the flames by pressure); and at the same time, if possible, wrap yourself up closely in a rug, hearth-rug, blanket, table-cloth, overcoat, or carpet (so as to smother the fire). Do not get up to call for assistance, but for that purpose crawl to the bell-rope or door.

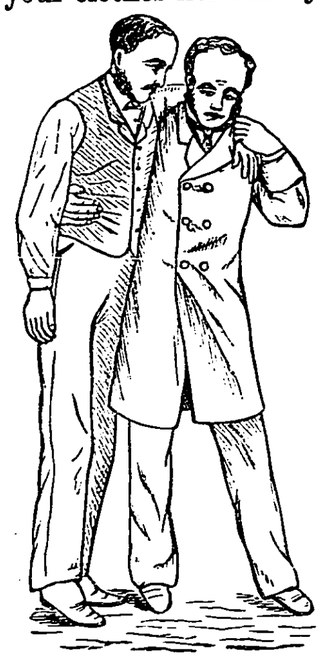

Fig. 48.—Giving aid by means of one Helper. See page 127 (*a*).

If another person's dress—throw the person on fire down at once, and wrap him (or her) up in a rug, blanket, or similar article, or, if nothing at hand is suitable, use your own coat, rolling the patient about in it (for the purpose of smothering the flames). It is difficult for a woman to give aid of this kind without considerable risk to herself; hence the advice of Professor John Marshall, "if a woman render assistance she must be careful not to approach the patient except by her head, so that the flames may not attack her own clothes." If any "smouldering" of the dress continues after the flames are extinguished, pour a quantity of cold water over it.

Rescue from Drowning.

The Pocket Grapnel (as improved by Major Scott, formerly Hon. Sec. of the Dover Centre) is an instrument supplied by the St. John Ambulance Association for the purpose of rescuing

people from drowning. It is light, weighing only 6½ ounces: strong, as each Grapnel issued has been tested up to 2 cwt.: cheap, for the price of Grapnel, a leather pocket to hold it, with a strap to be worn across the body, is but seven shillings: and it is really of use, since I am told that it "has undoubtedly saved many lives. At Dover several instances could be quoted, and the Coastguard services in France have been supplied with them for many years." The directions for use are:—"First throw the wooden reel, retaining the hooks of the grapnel in your hand, but should the person in peril sink, then throw the grapnel, retaining your hold

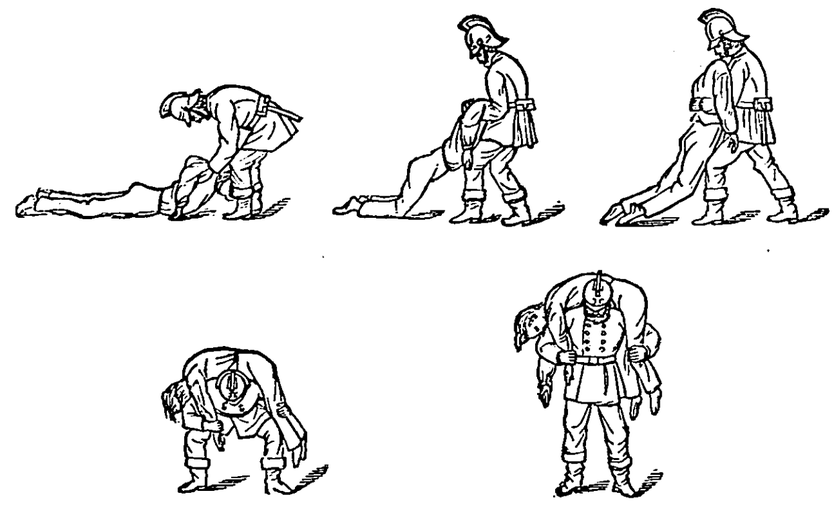

Fig. 49.—Picking up and carrying by oneself, unaided, an insensible man. See pages 127-8 (*d*).

of the line. Endeavour if possible to hook the clothes. A little practice is advisable. The line, when not in use, should be kept dry." If no grapnel is at hand, it is best to throw a rope to the drowning man, or an oar or other piece of timber for him to catch hold of. "If, however, there is nothing of the sort at hand," Esmarch suggests that "one should pull off his coat, and holding it by one sleeve throw the other or the coat-tails to the drowning person, thereby establishing a communication with him." Professor Esmarch was told by an old ship's captain "that he had saved many lives in this way."

Rescue from Ice Accidents.

Ice balls (invented by Herr Rüdel, of Kiel), price ten shillings and sixpence each, are supplied by the St. John Ambulance Association, for the purpose of saving life in ice accidents, when the ice is too weak to bear. It is described as consisting "of a wooden ball to which a metal axle and a few yards of rope are attached, and this may be easily projected, even by women, to anyone in danger of drowning; or where the piece of water is not too broad, it may be bowled from shore to shore, and the rope thus drawn across the surface and put within reach of the person in peril.

The line, when not in use should be kept dry." Under similar circumstances, ropes may be thrown along the ice, or ladders, planks, or poles pushed towards the person in danger.

Carrying by Oneself, Unaided, an Insensible Man.

The plan shown in the illustration (Fig. 49), and described on page 127, is that recommended by Captain Eyre Shaw for Fire Brigade men. If it is wished to send the person carried down a Fire Escape, Captain Eyre Shaw adds to his other instructions—"In this manner, carry the person to the window where the escape is pitched, and raise the feet to the mouth of the shoot with one arm; then take hold of one of the wrists, and ease the body gently off the shoulders into the shoot, always taking care to keep the face uppermost. As a rule, women should be passed down a shoot head foremost, and men either way. When women are passed down the shoot feet first, a small line should invariably be used to tie round their clothing, in order to prevent it from catching in the shoot." To carry children down ladders, the same authority says: "place a child under each arm, and grip each tightly by the elbow and forearm, in such a way as to leave both hands quite free to take hold of the sides of the ladder. Another way, is to place one child under the arm, and the other over the same shoulder, and lay hold of the latter with that hand, which leaves the other arm and hand quite free for taking hold of the ladder in descending."

Rules for Lifting and Carrying on Stretchers.*

When, from want of space, a stretcher is of necessity laid *by the side* of a patient (as explained on page 139), the advantage of the bearers, Nos. 1, 2, and 3 being *on the injured side* of the sufferer is that they can more easily support the injured parts, the chests of the bearers assisting in the support. Thus, in the case of a broken arm, leg, or thigh, after putting on some temporary splints, the patient can be

Fig. 50.—An insensible man carried by two bearers. See page 132 (*f*).

raised and held more easily and securely, until the stretcher is moved into position, with the bearers on the same side as the broken limb; while as soon as the patient is on the stretcher, the hands of the bearers are free and close by to do anything that may be required for the injured parts.

Special Appliances for use in Mines.

Stretchers are supplied by the St. John Ambulance Association, especially intended for use in mines, which are provided with telescopic handles, *so that the length can be adapted*

* *Stretcher Exercise*, No. 2, St. John Ambulance Association.

to the size of the "Cages" employed. And for mines in which, from want of space, a stretcher cannot be placed in the "Cages" in a horizontal position, the "Lowmoor Jacket" (Fig. 51), described on page 142, can be used with the ordinary folding stretcher; and *in this way an injured person can be safely placed at any angle*—as shown in the illustration. Moreover, the Association supplies stretchers similar to those mentioned above, with telescopic handles, which are also jointed in such a manner that they *can be placed in coal tubs or the smaller cages.* The "Tibshelf Ambulance Tram," described on page 143-4, is another eminently useful appliance for underground workings. "Ambulance Hampers," with waterproof cover and strap, containing splints, lint, bandages, and other first aid requisites, are issued by the Association, and are found highly serviceable for collieries, mines, railway stations, and other works, as well as for domestic use.

FIG. 51.—Furley's Lowmoor Jacket. See page 142.

ST. JOHN AMBULANCE BRIGADE.

To reap the full benefit of Ambulance knowledge, as well as to sustain such knowledge when once acquired, it is found an excellent plan to group men who possess "Ambulance Certificates" together into organized bodies or *Corps*—this more especially in towns, and in connection with collieries, factories, large railway stations, and other centres of labour.

All such Corps formed in connection with the Ambulance Association are combined or massed together in the *St. John Ambulance Brigade.* This arrangement is found to act admirably: it conduces to the "further development of the means of rendering aid to the injured," greatly to "the public advantage"; it still further develops that "form of public assistance which, with the sanction of the Commissioner of Police for the metropolis, has been tried with success on several occasions; and to maintain in activity and readiness a body of men qualified to act as supplement to the Police for Ambulance purposes"; it leads to the enrolment of "a *highly trained* body of civilians willing to be placed at the disposal of the Military Authorities as a supplement to the Army Medical Staff, in case of necessity either at home or abroad"; and it forms a means of helping the "Invalid Transport Corps at St. John's Gate."

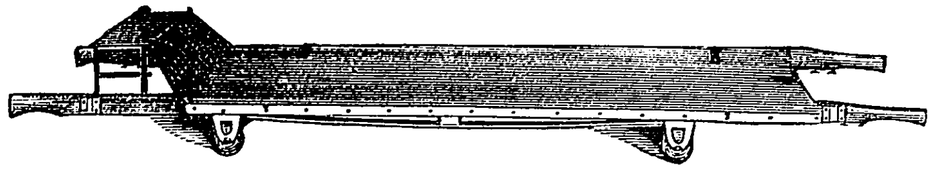

FIG. 52.—Stretcher of St. Andrew's Ambulance Association—without awning.

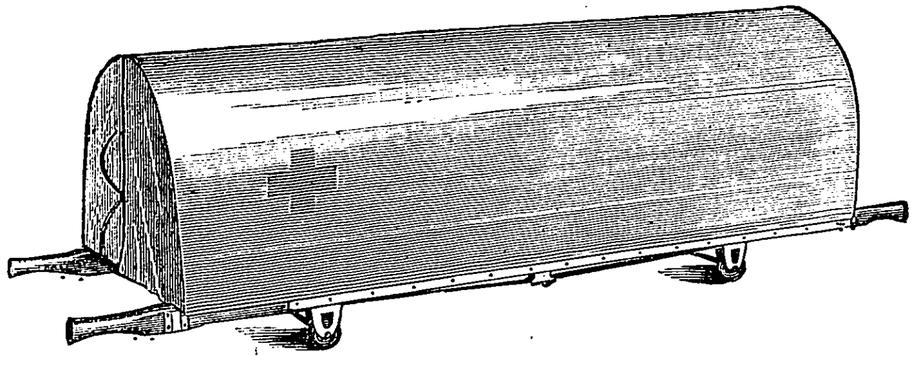

FIG. 53.—Stretcher of St. Andrew's Ambulance Association—with awning.

As examples of Ambulance Corps, I may briefly refer to those located in Leicester, Northampton, and Derby.

The *Leicester Corps* includes the Town, Railway, and Gas *Divisions*. The Gas Division is most completely equipped, and is said to be one of the most efficient in the Midlands. In addition to splints, stretchers, &c., a number of hampers are placed in different parts of the works (where most likely to be needed) with supplies of lint, tow, bandages, and remedies, with a card showing what remedy or restorative is to be used in different emergencies. Each remedy has a letter against it on the card; and each remedy has the same

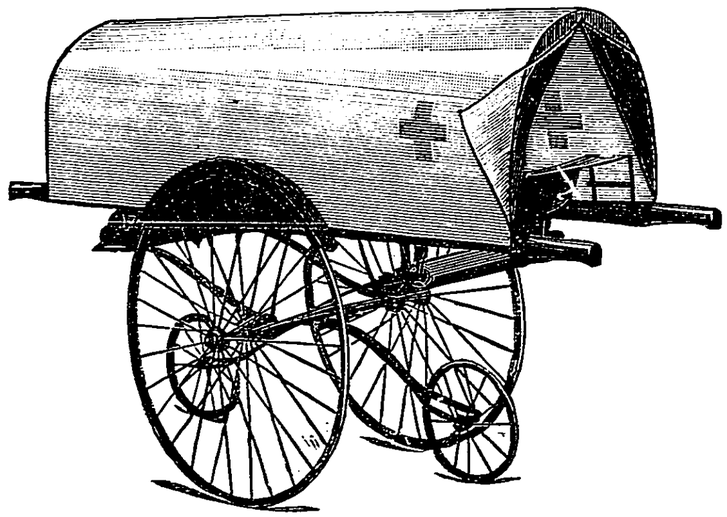

FIG. 54.—Wheeled Litter of St. Andrew's Ambulance Association.

letter, as well as its name in English, on the bottle, box, or parcel in which it is contained. All the men are provided with these cards. There are eight different stations where an Ambulance is kept, provided with everything needful for any ordinary emergency; and a "Furley" Horse Ambulance Waggon is kept at the Town Hall for the purpose of transferring patients when long distances have to be travelled. Cards, &c., are circulated with the positions and custodians of all these Ambulances printed on them, and the latter can *always* be obtained, upon proper application, for use in cases of sickness (non-infectious) or accident.

The *Northampton Corps* has attracted notice by its complete organization. Its chief officers are a Local Honorary Director, Chief Superintendent, Honorary Inspector of Material, and Chief Registrar. Each separate part of the Corps which holds a separate drill is called a "Division," and each Division has a Superintendent, Sergeant, and Registrar. There are now, I am informed, 24 Divisions, comprising some 400 men on the rolls. All manner of men are represented in the Corps, and strive by friendly competition to become proficient in their voluntary work; thus,

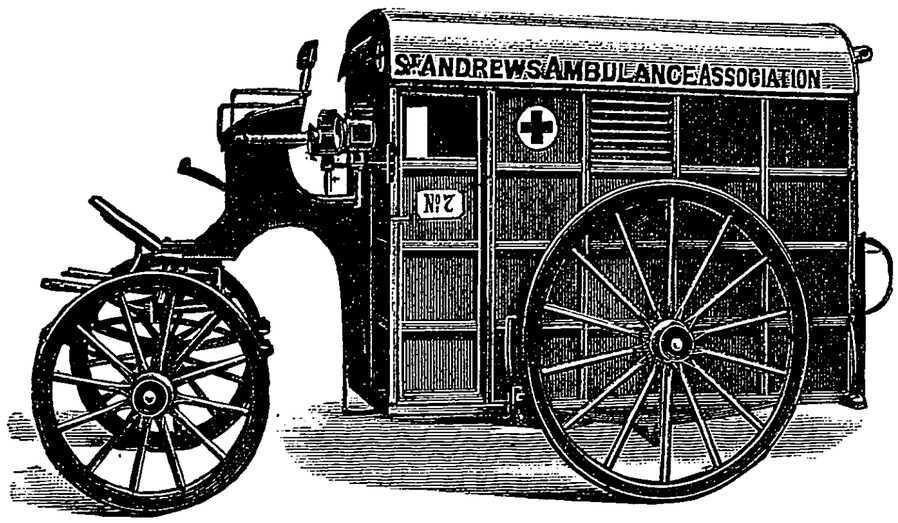

FIG. 55.—Ambulance Waggon of St. Andrew's Association—side view.

amongst others, there are the Police, Fire Brigade men, Rifle Volunteers, Railway, Brewery, and other Employés. Monthly Drills are held to keep up the efficiency of the men, as well as two Medical Inspections, a Public Parade, and three Lectures every year. A list of the names and addresses of the men are posted up in all public buildings and telephone rooms, and a similar list is carried by each individual member. There are 24 stretcher stations in the town and 9 in the country, at each of which is an Ambulance Valise, containing First Aid Appliances, and a

Stretcher or (in two instances) a Wheeled Litter. A Blanket for use in cold weather, and a Canvas Cover are placed with most of the stretchers. The Corps also possesses an excellent Ambulance Waggon. Further, "the Corps furnishes contingents to all large public fêtes, with all necessary Ambulance appliances; and a considerable amount of transport work has also been undertaken, one patient being removed from Northampton to Glasgow by the Corps, "never leaving the stretcher on which he was originally placed till the end of his journey."

In *Derby* there is (besides other Ambulance services) an Ambulance Corps connected with the Carriage and Waggon Department of the Midland Railway. The Corps meets for practice and drill on alternate Wednesdays; and members must attend at least half of the meetings for drill and instruction held during the current year, or they are disqualified for competing for Prizes. Members of the Corps pay in advance one shilling per annum, and these subscriptions cover expenses, since the Company provides First Aid Appliances for use in accidents. In each shop of the works there is an Ambulance Bag (containing lint, bandages, and other requisites), a set of Splints, a list of the Ambulance Men in the shop hung up in a conspicuous place, a bottle of carron oil where required, and a Committee Man, who sees that the Ambulance Bag is always in order and well supplied with stores, and that the men on his list attend to their drills and keep themselves generally efficient. There are also two Canvas Stretchers, and one Ambulance Carriage, distributed in suitable places about the works.

These are but a few instances of Corps of the St. John Ambulance Brigade; there are many others, and fresh Corps are continually being organized as the Ambulance movement progresses and develops. Moreover, just as Ambulance Corps are usefully constituted for men, so there are established Nursing Guilds (or Corps) for women. Speaking generally, the *objects of a nursing guild* (beyond enabling its members to keep up, and add to, their knowledge and skill in practical nursing) are (1) to afford skilful nursing to the poor in their own homes during severe illness, or in case of accident; (2) to form a store of nursing materials (some of which would be for loan only), such as lint, bandages, old linen, linseed meal, turpentine, cotton-wool, gutta-percha tissue, bronchitis kettles, water-

beds, air-pillows, inhalers, blankets, sheets, nightdresses, waterproof, and other materials not generally within the reach of the sick poor, and which medical men are, therefore, unable to order, however needful they may be; (3) to obtain the services of ladies holding certificates of efficiency for the work and willing conscientiously to carry out the directions of the doctor in charge of the case.

Invalid Transport Corps.

One of the greatest obstacles in the management of patients, either sick or injured, has always been, until recently, the difficulty of moving them easily and safely from place to place. It is often desirable to carry a patient from one room to another, one house to another, frequently from one part of the kingdom to another, even from this country to some favourable spot abroad, or it may be from a foreign state back to Britain. This conveying of patients, formerly so difficult, expensive, and dreaded a business, is now managed both easily and cheaply, being accomplished by the proper use of certain especially constructed appliances, as stretchers, carrying chairs, litters, and ambulance carriages. The essential article is really the Stretcher; and the stretchers used by the Corps are of a particularly useful pattern, as they are made with either plain or telescopic handles, and, as their width can be reduced without disturbing the patients on them, they can be put into any railway carriage or ship-cabin. Moreover, all these stretchers are interchangeable, and can be fitted on to any of the two-wheeled hand litters, and placed in any of the Horse Ambulance Carriages, constructed by the St. John Ambulance Association, and used by the Invalid Corps. The two-wheeled hand litters are also very carefully designed for their proper uses. "We adapted," says Mr. Furley, "our two-wheel litter to the regulation pattern stretcher of the Army. That would not be of much use on the field, but it is of considerable use in the military stations at home. We have also adapted it to the Navy cot for the Admiralty—so that an invalid in a cot when a ship arrives can be disembarked and immediately put on one of these two wheeled litters, and taken to the hospital."

To explain more clearly the way in which the removal of patients is managed, I will quote one or two instances; but first it is right to explain that the *Invalid Transport Corps*, which takes this good work in hand, consists only of three or four Members, all however enthusiastic and skilful, and stimulated by the example of their leader, Hon. Secretary, and Manager—who is also the originator and founder of the Corps—Mr. John Furley.

A gentleman was conveyed safely and easily in a bed arranged on a stretcher from Cannes (a port on the South

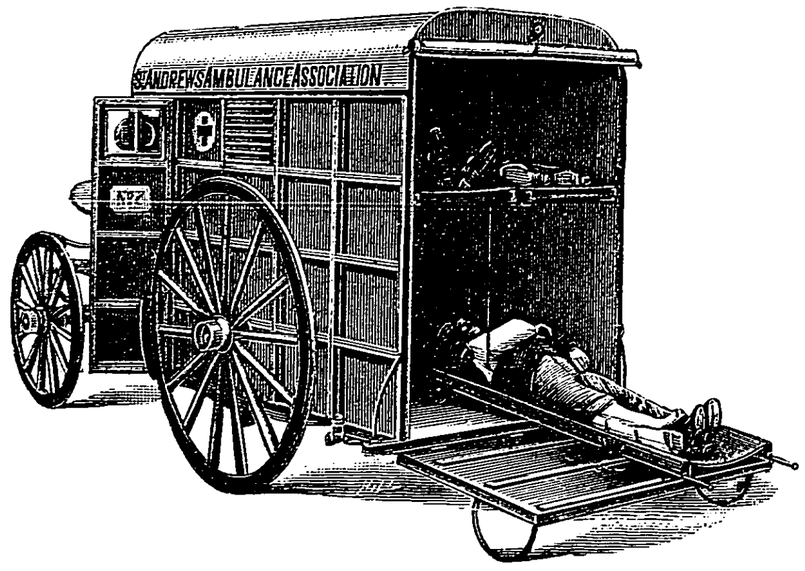

FIG. 56.—Ambulance Waggon of the St. Andrew's Ambulance Association—end view.

Coast of France) to London. At Cannes, the stretcher was taken, with its burden, on a wheeled litter from the house to the railway station, and then placed in the train. When the train reached Calais, the stretcher was removed to the steamer, from which it was again transferred at Dover to the train; and on the arrival of the latter in Charing Cross Station (London), it was placed in an Ambulance Carriage, and the invalid was so driven to his home. In this case, the patient was a "distinguished statesman." I will now give a case nearer home and in another sphere of life. There was a poor girl, very ill indeed, at Reigate, in Surrey, who said

she "would rather be a month in London with her mother than a year at Reigate without her." Two of the corps went down to Reigate, with a wheeled litter in the luggage van; the patient, comfortably placed on the stretcher, was wheeled on the litter to the station, put into the train, and wheeled away again, on arriving in London, to be laid in bed "on the third floor of a house where her mother was lodging;" and, remarks Mr. Furley, "the total charge, including the railway tickets for the girl, her mother, and the men was thirty shillings, that was all we asked the lady who had kindly undertaken to pay." Similarly, patients have been moved,

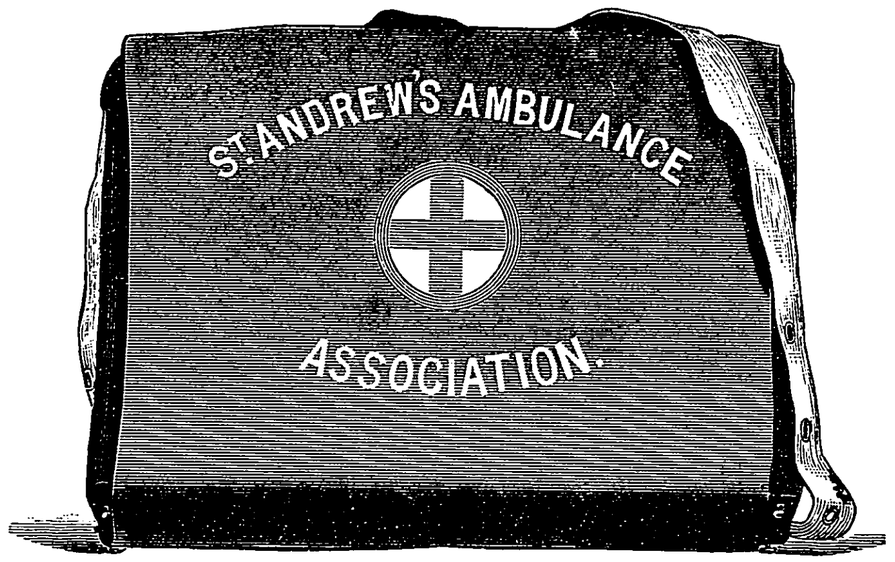

FIG. 57.—Ambulance Knapsack of St. Andrew's Ambulance Association—closed.

without taking them off the stretcher, to Scotland and Ireland, Germany and the Mediterranean.

More recently a Carrying-Chair has been designed, in which a patient, when needful, may be carried in a sitting position; and it is so constructed that, when desired, the invalid can be gradually lowered and the chair used as a bed. This chair can be used up and down stairs, and can be placed in an ordinary railway compartment as well as in any of the Ambulance Carriages of the corps. To quote again from Mr. Furley, "in this chair, an invalid can be moved to the

railway station, wheeled down the platform and lifted into a carriage, and if necessary, travel right across Europe in it."

It only remains for me to add that arrangements can be made for the removal of invalids (infectious cases excepted) both within the United Kingdom, and to or from any part of the Continent of Europe, by applying to John Furley, Esq., St. John's Gate, Clerkenwell, London, E.C., with the addition of "Transport Corps" in the upper left hand corner of the envelope.

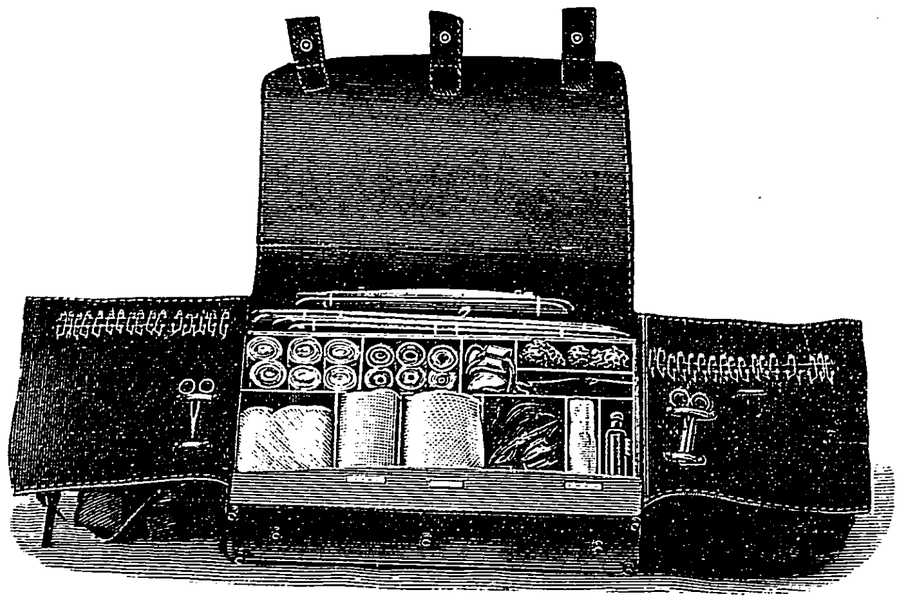

FIG. 53.—Ambulance Knapsack of St. Andrew's Ambulance Association —open.

THE ST. ANDREW'S AMBULANCE ASSOCIATION.

My account of Ambulance work and its rapid development would be incomplete were I to leave unnoticed the *St. Andrew's Ambulance Association*, justly described as "a useful and benevolent institution," which "bids fair, before long, to embrace within its folds the whole of Scotland."

Established in the spring of 1882, with its head quarters in Glasgow (93 West Regent Street), this Society resembles the St. John Association very closely in its objects and

methods of working. By means of First-aid Classes, instruction is given to people of all ranks and grades of society as to the ways of giving useful help to the injured and the suddenly stricken, *pending the arrival of a medical man;* and further, arrangements are made (by placing Ambulance Waggons, Wheeled Litters, Stretchers, Baskets or Knapsacks of first-aid appliances in convenient spots, and teaching people how to use such articles) whereby the sick and the maimed may be speedily attended to, and rapidly, comfortably, and safely carried to their homes or the nearest hospital. The Association makes and issues its own Ambulance Appliances; thus, it has its own Illustrated Triangular Bandages (Fig. 47), its own Stretchers (Figs. 52, 53), Wheeled Litters (Fig. 54), Ambulance Waggons (Figs. 55, 56), and Baskets and Knapsacks of First-aid requisites (Figs. 57, 58). The formation of Local Ambulance Corps is encouraged; and, as a matter of fact, several corps exist and work well in connection with ship-building, engineering, chemical, iron, thread, locomotive, and other works. In order to ensure uniformity in the drill of such Corps, four Stretcher Exercises, (adapted to four, three, and two bearers, under variable conditions) have been arranged by Dr. W. A. Wilson, of Greenock, and revised by the Medical Sub-committee of the Association. Much importance is naturally attached to the employment of "properly equipped Ambulance Waggons," of which Glasgow has three, Greenock two, and Edinburgh, Coatbridge, Baillieston, Dumbarton, Hamilton, Govan, Paisley, Pollokshaws, and Wishaw, one each. These "*Ambulance Waggons are at the call of any person by day and night, free of all cost and responsibility.*" It is expressly stated that "on receipt of alarm by messenger, telegraph, or telephone, they will be sent with all possible speed to the scene of accident, and the trained attendant who accompanies the waggon will, pending the arrival of a doctor, temporarily dress the injuries, and take every care of the injured person during the drive home or to the Infirmary."

And it is further remarked that "the Central Executive wish to see an Ambulance Waggon in every town and manufacturing district in Scotland, and will give all the help they can towards this end."

When it is practicable, the Central Executive permit these Waggons to be used for the conveyance of persons who are ill (from *non-infectious* diseases) from one part of the town or country to another.

First-aid: Light, Warmth, and Water.

In connection with the Lymington Ambulance Centre, Dr. Braxton Hicks has contrived a simple plan by which "Light, Warmth, and Water" may be conveyed, with a litter or stretcher, to the injured; and this, it is needless to add, may prove of vital importance under some conditions, such as wintry or rainy weather, long exposure of the injured to wet, cold, etc. For *light*, he uses a Hinck's stable lamp, to which a tin shade is adapted to shield the eyes when attending to the patient on the ground; this can be swung between the front handles of the litter, and "when the patient is on it it should be brought close beneath his feet so as to give warmth; and, again, when the tent is over him the warm air will pass up beneath and so give warmth to the whole body." But for *warmth* more especially, Dr. Hicks has "a *copper bottle* of a gallon and a half, tinned within, with a screw plug. It is of concavo-convex shape, for feet or chest, etc. If filled with boiling water and rolled up in a rug, it will be quite hot three hours after, and fairly warm seven hours. When, however, the litter arrives at the injured, the water can be used to drink, mixed with beef extract, spirits, cocoa, etc., readily added to the hamper." Lastly, he adds a pint water bottle and cup of vulcanite, like that used by the Indian sportsmen; this holds cold water for the injured or the bearers, (very grateful for either in hot weather).*

The Horse Ambulance Carriages of the St. John *Invalid Transport Corps* are fitted up with appliances for giving Light, Warmth, and Water; and purchasers of Stretchers, Litters, and Ambulance Carriages from the St. John Ambulance Association can have the same provided with similar appliances on application.

The Ambulance Waggons of the St. Andrew's Ambulance Association are chiefly used for conveying the injured from large works in a town or its outskirts to the infirmary, and as the time taken is very short, no special apparatus for heating is necessary. For longer journeys, however, hot water bottles are used to produce warmth. As regards light, each Waggon is provided with a lamp inside, and, moreover, the light from the carriage lamps is reflected inside.

* *Lancet*, March 24th, 1888

It appears to me that men of Local Ambulance Corps can usefully exercise their ingenuity in devising methods by which light, warmth, and water may be taken with their litters or other vehicles to the spot where the injured are lying—methods suitable to the particular transport material available, and adapted to the character of the country in which the corps is situated.

I should add that, as regards Dr. Braxton Hicks' suggestions, the Hinck's lamp, burning rock oil (which remains good when out of use) will keep alight for twelve hours, and cannot be put out by the wind. Further, Dr. Hicks states as to the cost of his simple apparatus:—"The lamp can be obtained everywhere; with shade, made by any tinman, to fit over handles, the whole costs about two shillings and six pence; the copper bottle, tinned inside, made by Allen, Marylebone-lane, fifteen shillings; the vulcanite bottle and cup, for about eighteen shillings, can be got at Silver's, Cornhill; an ordinary tourist's "pocket pistol" might be less. The addition of these three, with a packet of cocoa or tin of beef-juice, with brandy, would not exceed two pounds extra."

The Signs of Death.

Finally, I propose to allude briefly to the usual well-known *signs of death*, in deference to the expressed opinion of one of my critics, who considers that a knowledge of those signs which show a patient to be beyond medical aid "must prove not only important to the Ambulance man, but invaluable to other unfortunates who may be requiring his assistance."

When actual death takes place, as distinguished from only apparent death, the entire machinery of the body comes to a permanent stand-still, and the performance of the functions on which life depends ceases for ever.

There is *complete cessation of breathing*, not the slightest movement of the chest or abdomen being visible, no moist breath being exhaled to dim a looking glass placed before the mouth.

There is *complete cessation of the heart's action, and of the circulation;* no heart-beat can be felt on the left side of the chest near the nipple, neither can it be heard on placing the

ear on the chest in the same spot; no pulsation can be felt in the arteries of the wrist or elsewhere.

The *eyes have lost their brightness, and look dim and glazed.* "Who," says Caspar, "has ever lifted the eyelid of anyone just expired and not remarked this peculiar dull listless stare"? The *eyes soon lose their prominence and become, ere long, flattened and collapsed.*

"*The whole body grows ashy-white,*" from the absence of circulation. And the hands, held in front of a strong light, look—for the same reason—opaque; whereas the hands of the living, under like conditions, appear translucent and red. Later on, the *body is marked by livid discolorations* in some parts, specially on its under surface, from stagnation of the blood in the capillaries.

The body becomes gradually cold; the time usually given for the cooling of the dead body to the temperature of the air is from fifteen to twenty hours, but this varies greatly according to the state of the corpse, and the surrounding circumstances.

"*Immediately after death a general relaxation of the muscular system occurs,*" shown by the drooping eyelids, the drop of the lower jaw, the soft and flabby state of the limbs, and the suppleness of the joints; *but in a few hours* (usually about 5 or 6) *the body becomes quite stiff and rigid.* After lasting from about 16 to 24 hours, this stiffness and rigidity passes away, never to return.

The hands of the dead are partially closed, the thumbs being turned inwards towards the palms of the hands, beneath the half-bent fingers.

Lastly, the *appearance of a green or greenish-blue discoloration of the abdomen*, soon spreading to other parts of the body, *marks the commencement of putrefaction.*

As regards Drowning, Hanging, and Suffocation by foul gases, it is often difficult to ascertain whether the patient is really dead or not; for the body, though apparently dead, yet retains in some cases a lingering spark of life. So the bystanders, in such emergencies, should immediately make every effort to restore the patient, however hopeless the matter may at first appear. The following remarks by Dr. Alfred Swaine Taylor are very apt in these cases:—"Coldness and stiffness of the body in the drowned, should not prevent the application of means for the restoration of life... There is reason to believe that some persons removed from water in a state of apparent death are consigned to actual

death, owing to want of timely application of the means, and a want of perseverance in the treatment... some caution is required in pronouncing that a person is really dead (from drowning, hanging, or suffocation) since it at once discourages the efforts of those who are employing means for resuscitation. If the body has been for half an hour or longer under water, if it has been found hanging or in a suffocating medium and is cold and rigid, there can be no hope of resuscitation."

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