United Services Medical Society.

FUNCTIONS OF HOSPITAL SHIPS.

By Fleet-Surgeon D. J. P. McNABB, R.N.

After a few preliminary remarks on hospital ships in general, I propose to submit to the meeting some considerations or suggestions on the following points:—

1. Functions of the hospital ship in peace time.
2. Functions of the hospital ship in war time.
3. Methods of transporting sick and wounded to hospital ships.
4. Methods of embarking sick and wounded into boats from fighting ships.

A hospital ship may be defined as a ship placed at the disposal of the Commander-in-Chief for the purpose of relieving his fleet of sick and providing them with the best possible accommodation and opportunities for treatment in peace time; and in war time undertaking the care of all the wounded resulting from a naval action so avoiding the necessity for depleting the fleet by having to detach ships to a base to get rid of the wounded.

To fulfil these requirements a hospital ship should have ample accommodation to deal with every class of disease or injury which is likely to be met with; she should be well fitted in all the essentials for comfort, and in every well-tried and up-to-date appliance for dealing with wounds and disease; she should be constructed or transformed with a view to giving fair play to the main canons of hospital construction, namely, light airy wards as little encumbered with accessories as possible, easy access to the wards, efficient and up-to-date arrangements for cooking and bringing food to patients, well arranged lavatories and latrines, and a well-trained nursing staff. Moreover, she must be entirely independent of the fleet in the matter of supply of food, coal, water, and in the matter of the crew required for her maintenance and locomotion.

Hospital ships have been attached to fleets on many occasions prior to the present day, but in most cases these have been men-of-war or merchant vessels which have been transformed temporarily, and the qualities of a good hospital have in many instances been sacrificed to the peculiar character of the ship employed.

As a purely naval hospital ship the "Malacca" may be quoted.
She was a P. and O. cargo steamer which was transformed and sent out to the Naval Expedition which dealt with the city of Benin in 1897. Naturally, the vessel was sent out empty of cargo, and had little or no ballast beyond water ballast; as a result she rolled so much while at anchor off Forcados River that at no time were the fiddles off the dining tables, making efficient nursing a matter of difficulty, whereas by contrast the men-of-war anchored in the same place were comparatively steady. This is only one defect. There were many others. Still, she was equipped speedily and did good work.

In later days the "Maine" has shown that in peace time she can cater very satisfactorily for the medical and surgical wants of a fleet, though in many respects she too falls short of what is desirable.

From this and the experience gained in military hospital ships we should have plenty of material to embody a new and specially built vessel.

I have not attempted to go into any details as to the construction of the ideal hospital ship, as that is rather too comprehensive a subject for a paper like this, but I have confined myself to a more or less general review of the possible duties of such a ship in both peace and war, with a view to drawing out criticism and ideas likely to be of use to medical officers who may have to advise various Commanders-in-chief on points connected with the use of the hospital ships at their disposal.

**The Functions of a Hospital Ship.**

In peace time the duty of a hospital ship is to accompany the fleet on all cruises, and to carry out towards that fleet all the duties which are normally ascribed to the shore hospitals.

It follows from this that the design or arrangement of any hospital ship must be such that the general principles of a hospital are given fair play.

Whilst the fleet is cruising the hospital ship might accompany it or make an independent passage from port to port according as the Commander-in-chief may determine, her wireless equipment rendering her easy of access.

Naturally only cases of extreme urgency would be transferred in the open sea, and the circumstances attending this will be discussed later on.

On arrival in harbour the number and nature of cases to be
sent from each ship would be signalled from the flagship, and the routine of their reception in the hospital ship set in motion. This routine is a matter of detail, but it is an essential in a hospital ship that she should always be in a state of preparedness for the reception of patients, and it is only by the establishing and practising of a definite routine that the business of the ship can run smoothly.

The preparation for embarkation, the actual embarkation, the conduct of patients on board, and the disembarkation practically summarize the duties of a hospital ship.

(a) The Preparation.—This includes reviewing ward inventories, preparation of beds and utensils, testing electrical fittings, seeing that latrines are in proper working order, and fresh water supplies efficient. Ventilating shafts must be examined. Labels with pieces of yarn should be attached to each bed for the purpose of identifying and storing such clothing as each patient may be wearing when brought to his bed. Lifts should be seen to be working properly.

Incidentally I might mention that all the beds in the hospital wards should be numbered. This is advisable both in telling off the beds for incoming patients and in disposing of the occupants of the beds to the various boats in case of having to abandon the ship.

If a nominal list of cases is available, or has been signalled, then the individuals are told off to certain beds in certain wards beforehand, so that when the cases arrive alongside they may be transferred to their respective beds without delay. Diets should be roughed out, and supply of milk, ice, and soda got ready.

(b) Embarkation.—On the approach of the patients, the derricks or whips are got ready, and the cot carriers got out under the supervision of the deck officers of the hospital ship. On arrival on board the cases are told off to wards by the ward-master from a prepared list. In the meantime all baggage is stowed and entered in the baggage book by the ship’s corporals, assisted by the working parties from the ships. All valuables are collected by the paymaster and his staff, also all papers concerning invalids are collected and registered by him.

(c) Routine on Board.—As soon as possible after arrival on board a statement of the case of each patient is copied into the hospital ticket, in accordance with the usual hospital practice, and his scale of diet is ordered.

Likewise the patients are made acquainted with their stations for “Fire” and “Abandon ship,” and in the case of helpless
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patients the necessary arrangements are made for conveying them to the boats.

The comfort of the patients being the first consideration in the ship, every effort must be made to check unnecessary noise, and to have machines such as capstans, boat-hoists, winches, &c., working as quietly as possible.

Care must also be taken that patients do not interfere with anything which is essential to the safety and the navigation of the ship.

(d) Disembarkation is practically a reversal of the process of embarkation, but it is expedited by having the cots for disembarking got ready and placed alongside each bed, and also having the baggage for each patient got out of the baggage-room and arranged on deck some time prior to the hour of disembarkation.

Of necessity it will happen that the supply of provisions for the hospital ship will be entirely independent of the victualling of the fleet, and it will be the paymaster's duty to see that there is a sufficient supply of provisions, both cold stored and others, to last at least three months without replenishing.

There should be no necessity for bringing fresh food into the ship, and if, for any reason, this should be done, it must only be with the special approval of the Senior Medical Officer.

While in harbour it is necessary that an efficient gangway watch be kept, partly by the Naval Police and partly by the mercantile crew, to prevent the access of unauthorized persons to the ship, and to check leakage of stores.

In case of an epidemic of infectious disease breaking out in the fleet, in addition to the wards set apart for these diseases in the ship herself, the hospital ship should be in a position to supply the equipment necessary to form an isolation camp on shore, on an island for choice.

Again, every opportunity should be given to the medical officers of the fleet to avail themselves of the clinical material on board the hospital ship, always providing that this is done subject to the authority of the Senior Medical Officer and without disturbing the routine of the ship.

War Time.

The duties of the hospital ship in war time, in addition to those carried out in peace, also comprise dealing with the eventualities peculiar to a naval action.

The circumstances under which these latter will be met and
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Dealt with depend on (a) whether the fleet is making a passage with the object of intercepting and fighting the enemy in the open sea; (b) whether the fleet is operating in narrow waters in proximity to its base; or (c) whether the fleet is taking part in combined naval and military operations on the enemy's coast line.

(a) Assuming that an action takes place in the open sea at a distance from a base, the only pretext which might induce a hospital ship to approach the fighting zone would be found in the desire to assist a battleship or cruiser which had hauled out of line owing to damage and was in danger of foundering. But as such a disabled vessel would be the legitimate prey of the enemy's destroyers or cruisers, the approach of these latter would, I suppose, be the signal for the withdrawal of the hospital ship.

The fight being over, the next point for consideration is how to relieve the fighting ships of their wounded as speedily as possible. As the action has been assumed to take place in the open sea away from any available base, it follows that the transfer of wounded must also take place at sea. In this I am assuming that the hospital ship is with the victorious fleet, because in the event of a defeat, in the first place there would not be much left to give assistance to; and in the second, the hospital ship would come under the direction of the victorious commander, who would be entitled to use her for his own wounded. The methods for carrying out this transfer will be suggested later on.

(b) In the second case the fleet has been assumed to be operating in narrow waters, in proximity to a base or a place which could be used as a temporary base. In that case it would seem reasonable to suppose that the hospital ship remained at that base during an action, and that after the action such ships as were not employed in the immediate chase of the scattered enemy should return to that base to disembark their wounded. It might easily happen that the whole fleet would be employed on this duty, i.e., chasing the enemy, in which case the hospital ship could follow it, taking the wounded on board at the first favourable opportunity.

In one or two of the fights off Port Arthur the Russian hospital ship accompanied the fleet and remained with it to the base, but in this case the object of the Russian Fleet was to escape from Port Arthur as an intact fleet with all its auxiliaries, and this object being defeated by the Japanese the hospital ship was obliged to return with the fleet. The Japanese never brought their hospital ships with them; they remained at the base at the Elliott Islands.
Most probably, as was the case with the Japanese as far as I know, in addition to the hospital ship there would be present at the base "carriers," that is, converted transports or mail steamers.

The cases which could bear an immediate voyage would be sent to these carriers, while the more serious cases would be retained in the hospital ship until they were in a better condition to undergo the voyage.

(c) Lastly, where the operations are of a combined nature, it would appear natural to suppose that where bluejackets or soldiers are landed, means will be at hand for the embarkation of the wounded.

**Methods of Transporting Sick and Wounded to Hospital Ship.**

Having outlined the functions of the hospital ship in peace and war, I now wish to offer suggestions on the best means of bringing the patients alongside the hospital ship under the varying conditions hinted at above.

I have divided the subject as follows:

1. From ship to ship.
   - (a) In harbour or in a sheltered anchorage.
   - (b) In the open sea.

2. From shore to ship.
   - (a) Good harbour for ships, with embarking facilities.
   - (b) Open anchorage with small camber for boats.
   - (c) River mouth, navigable for boats, but not ships.
   - (d) Open beach.
   - (e) Open beach with surf.

(1) (a) The transfer could be carried out by special hospital boats, carried by the hospital ship, and towed by motor launches. These boats should be of the following design:

| Length | 86 ft. |
| Beam | 10 in. |
| Depth (ceiling to deck) | 6 in. |
| Draught | 3 in. |

Decked in, with a well 24 ft. by 4 ft. amidships, this well surrounded by coamings 1 ft. 6 in. in height. The well should be covered with a tarpaulin carried over galvanized iron spreaders of a height of 2 ft. above the coamings of the well. When this is opened, the tarpaulin is rolled or pushed back (concertina fashion,
the spreaders being made to travel along a rail fitted on the outer side of the coamings (see Diagram).

The interior of the craft should be fitted to carry sixteen cots, eight a side, superimposed, with a gangway amidships of 3 ft. 6 in. When in use, the boat should carry her complement of cots, with or without bedding.

The cots being embarked, the tarpaulin and spreaders, which are in two sections, one forward and one aft, are drawn together and clamped amidships. The after end of the tarpaulin should not be laced down, but should hang loose as a curtain. The boat or boats can then be towed to the hospital ship, and the cases embarked in the usual way by means of cot carriers and cranes.

(b) At Sea.—If the weather is calm, the same routine as above may be carried out. If there is a heavy sea, then the matter becomes more difficult; but, subject to the criticism of
experts, I would suggest the following proceeding: The hospital ship should approach the fighting ship end to end on her starboard (or port) beam, passing to leeward, and assuming that the fighting ship is lying broadside on to the sea with engines stopped. A buoyed line could be dropped from the fighting ship's forecastle, and picked up by the hospital ship; and by this a hawser run from her starboard bow to the fighting ship's forecastle, and by a repetition of the process from her port bow to the fighting ship's quarter-deck. The hospital ship would then be using the fighting ship as a sea anchor. Under the lee of this sea anchor, one or more of the hospital ships' boats could be hauled up alongside the battleship, loaded up and dropped back to the hospital ship.

The operation being repeated as often as required, oil might be used from the battleship to minimize the breaking of the seas. The ships might be kept apart by the hospital ship going gently astern during the manœuvre, and so keeping a slight strain on the cables. This is not a matter which can be dogmatized upon by the Medical Officer, but such as it is I offer the suggestion; and if it is practicable, then so much the better.

(2) Next comes the question of the embarkation from shore to ship.

(a) Where embarking facilities are good, with the boats available from the hospital ship, the operation should present no difficulties.

(b) Where there is a small harbour, camber or pier, with an adjacent anchorage for the hospital ship the same routine may be followed as in 2 (a).

(c) Where there is no camber or pier, but a river navigable for boats, then the hospital boats may be brought in and loaded from a temporary pier or floating stage, or by wading in with the cots.

In a muddy river or estuary a temporary landing-stage could be constructed by a series of rafts or pontoons anchored and connected by gangways, the stage reaching out far enough to allow of the boats being loaded at all states of the tide. The circumstances in Medina Creek, West Africa, in 1894, should be remembered in this connection.

(d) Open Beach, no Surf.—Temporary landing-stage if one is available; if not, the boat must be veered in as far as possible and loaded by hand.

If the beach is steep or there are rocky ledges available, a pair of sheer legs would probably be found for landing stores, and these could be used for embarking cots.
(e) An Open Beach with Constant Surf.—In this case it would be better to rely on some local type of boat manned by men accustomed to the work. Apropos of this I may mention that there is a model of an ambulance surf boat in the British Museum, which seems to meet all the requirements. The originals were used at Cape Coast Castle in 1873. The boats were built by Messrs. Forrest and Sons, of Limehouse, they were 25 ft. long, 5 ft. broad, with a draught of 2 ft. 3 in. They were whaler built, manned by a crew of twelve men and carried twenty-four passengers, including two cots.

As far as the hospital ship's boats are concerned I would suggest that all boats carrying sick (except surf boats) should be towed. This leaves the whole of the space in the boat to be devoted to the stowage of the sick in their cots, and lessens the number of hands required in each boat.

**METHODS OF GETTING SICK AND WOUNDED INTO BOATS.**

The many appliances which have been and are in use on board ships are no doubt suitable, and have been found useful for the special duties they were designed for.

These articles consist of hammocks, carrying cots, stretchers of the ordinary service pattern and of special design for slinging, sleighs and cot carriers. When it comes to disembarking wounded from a ship most stretchers may be put to one side, not because they cannot be slung over the ship's side, but because of the difficulty of stowing them in the boats, and also because they are probably not numerous enough. Sleighs also are not easy to stow and their great weight makes them unhandy.

It comes to this, then, that hammocks and carrying cots are the most likely to be of use, and, especially in cases of emergency, I can see a great field for their use.

Lastly, cot carriers as at present in use are heavy wooden frames made to carry the ordinary cots and suspended from a wire strop by four wire slings. In my opinion this is too heavy and clumsy, and it cannot be carried in an ordinary hospital boat.

I would like to suggest that the cot carrier be made of stout No. 1 canvas with sides, the corners being specially strengthened with double canvas, and the whole slung by eyelets at the corners from four slings, these slings being in turn suspended from the four arms of two light spars lashed amidships diagonally. The whole could be lifted by a tackle made fast to a strop passed round the spars where they are lashed. A carrier such as this could easily be carried in each hospital boat.
Now, supposing that a hospital boat comes alongside a ship with her complement of empty cots and the cot carrier. The cots are at once passed on board either by hand or by means of the cot carrier. The patients are quickly placed in the cots, with their own bedding if there is none in the cots, the cots lifted into the carrier, and the carrier hoisted over the side, lowered into the hospital boat and emptied; this being repeated until the patients are all embarked. The carrier need not wait for cots. Patients who require it may be lashed up in their hammocks, or may be even laid in the carrier without anything. They cannot fall out, and there should be no difficulty in making a rapid transfer.

DISCUSSION.

Deputy-Surgeon-General J. J. DENNIS, R.N., asked what type of ship as regards tonnage, speed, and accommodation was considered most generally suitable for a hospital ship?

Major W. S. HARRISON, R.A.M.C., asked whether there were any data by which one could estimate the rate at which a hospital ship could be loaded with sick and wounded from an open shore. He had in mind circumstances in which it might be necessary to know this, as, for example, a case like the embarkation of Sir John Moore's army after the retreat to Corunna with an active enemy pressing the rearguard; or, again, the shore zone might be unhealthy, and it might be necessary to ensure that no more patients should be sent down to the coast than could be embarked in one day.

Major E. B. WAGGETT, R.A.M.C.(T.) inquired as to the best arrangements for isolating sick on board hospital ships. The very common arrangement of a cabin in the stern of the boat seemed to provide unnecessarily uncomfortable quarters for sick men.

Inspector-General R. BENTHAM, R.N. (retired) described the arrangements which were in vogue in Malta for embarking sick; he emphasized the necessity for getting the baggage on board before embarking the sick.

Fleet-Surgeon McNABB, in reply, said that the ideal hospital ship was one of from 3,000 to 4,000 tons, with a speed of about 12 knots per hour, and with accommodation for about 240 sick in peace time and about 340 sick in war time. Four isolation wards should be provided on the boat deck. It was impossible to give any definite details as to the speed at which sick and wounded could be embarked from an open shore; the character of the shore, the presence or absence of surf, and the distance of the ship from the shore, all affected the problem, but one might say that so far as the ship itself was concerned, it could take in patients at a rate of thirty to forty an hour.

Fleet-Surgeon McNabb afterwards gave a demonstration, by means of models, of the methods used in embarking sick and wounded, and in transferring them from place to place on board ship.
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