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Wounded.

WOUNDED IN BATTLE ON SHIPBOARD.

The President of the College having asked for a lecture on "The Wounded on Shipboard," it is intended to bring to your attention only such points in reference to that subject as shall have a military bearing and hence be of general service application.

1. If we note the extraordinary means taken to limit the number of wounded on board ship during the latter part of the Russo-Japanese war, i.e., after each Navy had gained experience from actual battle conditions, we cannot but be impressed with the importance of this subject in the minds of the combatants. For example, look at the MIKASA in the battle of the Sea of Japan. In addition to the, to us, extraordinary preparations for caring for the wounded (to which we will refer later), the efforts made to limit wounds included: (1) the protection of gun crews by hammocks and festoons of hawsers about the gun positions; (2) the isolation of the port and starboard batteries from each other by screens in all open intervening spaces; (3) the protection of gun crews on the bridge deck from splinters, by the use of wire torpedo nets; (4) protection to bridges as high as a man's chest by hammocks and small hawsers; (5) the removal of everything that could be dispensed with that would be likely to explode shell or cause splinters even to semaphores on the bridges, and (6) the use of chain about the engine room hatches and uptakes not only to protect vulnerable spots but also to limit splinters.

After the first engagement with the Japanese, the Russians on the cruisers stationed at Vladivostok saw that the gun crews needed more protection. So, following this idea, we read: "a strong bulwark made of steel hawsers was placed across the gun deck forward to stop fragments of

shell or splinters from forward; (2) the same kind of a screen was placed longitudinally between the port and starboard batteries wherever there was an open space between the guns; (3) hawsers were fitted about the shields of the guns on the main deck so as to make practically small turrets of each gun position; and (4) other gun crews were protected by sand bags, a large wire mesh net being secured to the under parts of the superstructure in a semicircular form back of each gun, the net falling to the deck and used as a support for the sand bags which were placed in position upon it." Thus did each side seek extra protection to the personnel.

The defeat of the Russian Fleet off Tsushima has been ascribed to demoralization of the personnel through the number of wounded. While this is undoubtedly not entirely true there can be little doubt but that the presence of the dead and wounded had its part in lowering the morale of the fighting force. On one Russian ship at least, the dead were thrown overboard and the reason given was; "because of the demoralizing effect on the crew produced by mangled bodies lying on the decks." No one can read Semenov's descriptions of the piles of dead and wounded lying about the decks without appreciation of the effect the sight must have had on their shipmates. Doctor Suzuki, who was Surgeon of the Fleet, on board the MIKASA, throughout the war, has told me that the officers of the Japanese Navy soon were convinced that the presence of maimed and wounded comrades seriously interfered with the service of the guns. He stated that the spirit of comradeship was strong among sailors and that when a wounded man groaned or asked for water a still active combatant would invariably go to his assistance. This diminished the rapidity of fire of the guns. He also stated that the presence of dead bodies was found to affect the morale of the uninjured and that

therefore it became a matter of military necessity to rapidly remove not only the wounded but also the dead from the sight and hearing of their mates. If this be true for the Japanese with their well known stoicism it would certainly be true for our enlisted personnel with their comparatively nervous dispositions. The subject is of interest to us then not solely from a humanitarian point of view but also from its bearing on military efficiency.

2. Consider now, if you please, the lack of a definite policy, throughout our service as a whole, in regard to the care of the wounded in battle. Some time since, the Surgeon General sent letters of inquiry in regard to the organization of the medical department for battle to each of the twenty-five battleships and armored cruisers then in commission. The replies to these letters were reviewed by Medical Inspector H. G. Beyer, U.S. Navy. To Doctor Beyer I am indebted for the following extract from his report:

"I have studied the reports from twenty-five battle ships and armored cruisers, and now respectfully submit a report on this work, in so far as for the present it may be considered as completed.

"For a standard of comparison, I have used the instructions to be found in the Manual for Ships and Gun Drills. This manual, under the head of 'organization of the medical department in battle', states: (1) that a definite plan is impossible for each ship, and (2) that such organization should be worked out for each ship, as soon after going into commission as practicable and should provide for relief stations and surgeons' dressing stations.

"The lack of directions and the absence of definitions in the manual leave, of course, the doors wide open for a great variety of plans in general organization and in establishing the required relief, and dressing stations, even on ships of the same build and type.

"Considerable confusion seems to exist in the minds of medical officers as to what organization means and what relief and dressing stations are intended for, and should be made up of. Their number, location, personnel and equipment vary quite considerably on the different ships from which the reports have been examined.

"It has seemed to me nevertheless proper as long as the directions in the manual stand unrevised and uncorrected, that they should serve as our guide and that every medical officer in the service in organizing his department for battle should make his plans in accordance with these directions, so far as practicable. It was for these same reasons that they were used in this study as the standard by which some of the shortcomings in the reports under consideration were judged.

"INSTRUCTION TO MEN.

"The instructions in first-aid to the men on board ship has, at all times, been recognized as a duty of the greatest importance. The manual for Ship and Gun Drills, Art. 27, Par.5, says: "So far as practicable, all members of the ship's company will be instructed by the medical officer in applying the First-Aid Dressing," and Art. 96, p. 279, speaks of the great importance of the instruction of all men in the precautions to be observed in handling and care of the wounded."

"As the result of an examination of the reports from the twenty-five ships, it is found that nothing is said as regards instructions being given to the men in:

	15 ships	60%
That there is limited instruction in	5 "	20%
That there is instruction given to the whole crew in:	5 "	20%
	<u>25</u> "	<u>100%</u>

"In the twenty-five reports of ships and cruisers, we find, therefore, in brief, that the instruction (in accordance with the letter and the spirit of the manual) to the men, is given only in five of the twenty-five ships of which the reports were examined."

"RELIEF STATIONS.

"The manual is, unfortunately, a little indefinite in its description of relief stations. All it says with reference to their location is: 'That such stations should be established at various protected points about the ship, in the neighborhood of, and accessible to, the men who are most exposed.' One of the reports even states that no relief stations could be established, on account of there being no such protected points on the ship, as are required by the manual. With regard to the personnel, however, the manual plainly states that 'at least four well-instructed men should be assigned to each station:' that these men should report to the medical officer, and should have no other duty to perform in action.

"(a) Number of Stations: Among the twenty-five ships from which the reports were examined, there are eight which either have no such stations at all, or, which have not been described as such, or, which are represented merely by one man and a stretcher:

	8 ships	32%
Two ships have one relief station,	2 "	8%
Five ships have two relief stations,	5 "	20%
Three ships have three relief stations,	3 "	12%
Three ships have four relief stations,	3 "	12%
Two ships have five relief stations,	2 "	8%
One ship has six relief stations,	1 "	4%
One ship has eight relief stations,	1 "	4%
	<u>25</u> "	<u>100%</u>

"(b) Location of Relief Stations: The distribution of the stations on the twenty-five ships examined is as follows:

No definite location assigned in:	5 ships	20%
On bridge deck, exclusively, in:	1 "	4%
On berth deck, exclusively, in:	2 "	8%
On splinter deck, exclusively, in:	2 "	8%
On gun deck, exclusively, in:	8 "	32%
On gun and main decks, in:	4 "	16%
On berth and splinter decks, in:	1 "	4%
On gun, main and bridge decks, in:	1 "	4%
On bridge, berth and splinter decks, in:	1 "	4%
	<u>25</u> "	<u>100%</u>

(c) Number of Men per Station:

Number of men not stated in:	13 ships	52%
One man per station in:	3 "	12%
Two men per station in:	3 "	12%
Three men per station in:	1 "	4%
Four men per station in:	4 "	16%
Eight men per station in:	1 "	4%
	<u>25</u>	<u>100%</u>

(d) Personnel, derived from:

Hospital Corps, exclusively, in:	4 "	16%
Hospital Corps and reserve gun crews in:	7 "	28%
Pay Division, exclusively, in:	2 "	8%
Bandsmen, exclusively, in:	1 "	4%
Marines, exclusively, in:	1 "	4%
Med.Off.Hops.Corps, and gun crew men, in:	2 "	8%
Not definitely stated in:	8 "	32%
	<u>25</u>	<u>100%</u>

(e) Equipment: From the reports under examination, it is difficult and even impossible to arrange the equipment systematically. Very few of the reporters give an accurate and satisfactory list of things that would seem to be necessary in a relief station, while a few others give such a long and complete list as to strongly suggest a theoretical rather than practical character of it. No uniformity, whatever, exists, and every medical officer seems to have a different idea of it."

"DRESSING STATIONS.

"The Manual for Ship and Gun Drills (Art.98, ps.280-281), states: 'The surgeons' dressing stations should be easy of access from all parts of the ship; should have an abundant supply of water close at hand; should be behind armor or other protection; and should be well ventilated and as cool as circumstances will permit..... it may (!) be advisable to establish two dressing stations, so that the surgeons can go from one to the other, work being prepared at one, while the other is in use.'

(a) Number. Of the twenty-five ships examined the number is impossible to make out, if any, in:

3 ships	12%
There is one dressing station in:	3 " 12%
There are two dressing stations in:	17 " 68%
There are three dressing stations in:	1 " 4%
There are six dressing stations in:	1 " 4%
	<u>25</u> " <u>100%</u>

(b) Location:

On the berth deck in:	21 "	84%
On the gun deck in:	1 "	4%
Impossible to make out, if any, in:	3 "	12%
	<u>25</u>	<u>100%</u>

(c) Personnel:

Medical and Hosp.Corps men, exclusively in	18 "	72%
No mention made in:	3 "	12%
Medical-Hosp.Corps-and crew men in:	4 "	16%
	<u>25</u>	<u>100%</u>

(d) Equipment: The equipment differs for every ship and is, therefore, impossible to tabulate. "

Nothing more would seem to be necessary to show the need for the adoption of some definite system, so that we may be prepared when the emergency arises. In this institution it is unnecessary to state that the efficiency of this service will depend upon preparedness and that after war is declared it will be too late to secure an efficient service.

3. It is my understanding that the Surgeon General has in preparation plans for general adoption which will shortly be submitted. The attention of the officers attending the conference is invited to this subject in the hope that you may consider the matter, and, if you find it of sufficient importance, that you will assist by your recommendations in securing for our service the adoption of an efficient organization for aid to wounded in battle on board ship. It is only by all corps and interests uniting that substantial advances are made and the most efficient navy may be secured.

Certainly the medical officers alone can not secure the adoption of a uniform system throughout our service. To illustrate this, allow me to relate my individual experience in this connection. This spring, I completed a three years cruise which included service on three ships of the first rate, under four commanding officers and with five executive officers. During the entire time I strove for an organization of the medical department that would be reasonably efficient in battle. The organization I wished included the formation of a specially instructed ambulance party so that the wounded might be rapidly removed to the dressing stations.

To get such a party for drill and instruction it was, of course, necessary to apply to the executive and commanding officers for the detail of the men thought necessary. Here I met with all shades of opinion as to the desirability of such an organization; and encountered from opposition and denial to approval and assistance, with a consequent variation in the organization for aid to the wounded. The ambulance party varied from sixteen men regularly assigned and drilled, through an ambulance party of varying numbers and frequent changes with no drills, to no ambulance party at all. And, singularly enough, when the best organization existed, it had to be thoroughly explained and the reasons for its existence enumerated to an inspecting Admiral because his flag lieutenant said

"the book says the wounded are to be dragged clear of the guns by a member of the gun's crew". When there was no ambulance party allowed me, I was called upon to have photographs taken to illustrate the method of extending aid to the wounded on board ships of the United States Navy. These photographs were to illustrate, in a volume published by The International Red Cross Association, our methods of caring for wounded in comparison with those adopted in foreign services. Naturally it was desirable to make as good a showing as possible. As the same hospital apprentices had to be used as carriers of the wounded and as aids to the surgeons at the dressing stations, it was impossible to accompany the pictures with a description of a complete system such as might be expected from a country popularly supposed to have high ideals on such subjects. However, it was largely by means of those pictures that I was able to convince the Admiral aforesaid that a complete organization for aid to the wounded in battle might be desirable.

4. Other navies have long since seriously considered this subject. The German Navy has adopted a much more complete system than any other European Navy, so far as I have been able to learn. The following description of this organization was obtained through the Office of Naval Intelligence in March last. It is in the form of answers to questions propounded.

"The Reichs-Marine Amt furnished the following information in reply to a series of questions concerning the organization of the Medical Department in Battle.

(Q)What are the stations and duties in battle of the medical officers, the petty officers and men regularly belonging to the ships' medical department, and also of other men whose ordinary duties are elsewhere but who are assigned to the medical department for battle?

"(A)Of regular personnel, there are on board German ships, for medical service, "Sanitary Officers" and "Sanitary Men". In action and in landing, the "Sanitary Personnel" are assisted by "sick carriers", men of the complement, who are otherwise employed ordinarily in work on board and who, during the exercises of the Action and Landing Bills, have been especially trained for "Sick Carrier" service by the Sanitary Officers of the ship. The Sick Carriers, like the Sanitary Personnel, are under the protection of the Geneva Convention, and wear a white band with a red cross around the left upper arm. Besides

the Sick Carriers, however, all men as far as possible, but especially the gun crews and other men employed on upperdecks, according to the Action Bill, are instructed in the principles of careful transportation of wounded and rendering first-aid. For this purpose, they are divided into groups, and successively, in certain periods, ~~are~~ turned over for instruction to the Sanitary Officers until their training is complete.

"For action, the ship's sick bay, being situated on the uppermost decks and, therefore, unprotected, are given up as such. At the signal, "Clear ship for action", the sanitary men and sick carriers take the necessary materials for caring for the sick from the Sick Bay and the Dispensary, to special "Action dressing lockers." Medicaments likely to catch fire which do not find place in these lockers, are taken to the spirit room. Mattresses, sick hammocks, blankets, etc., are taken to the "Action dressing Stations" and "Storing rooms (for wounded after being cared for) which are under armor protection.

"At the same time, the Transport Stations are cleared away by the Sick Carriers. Such Transport Stations, as a rule, are established where it is possible to lower the wounded from the upper decks in a vertical direction into the lower spaces of the ship. Ladders and hand-rails, as far as they interfere with the transportation, are removed. The Transport Stations serve at the same time as assembling places for those who are wounded on the different decks. Their number and position depend upon the size and structure of the ship; as a rule, there are two, one forward and one aft.

"The Medical Officers' activity in action should, as a rule, be confined to the first care of the wounded, in the Action Dressing Stations, surgical operations being made only in cases where it is imperative not to be delayed, as stanching hemorrhage, wind-pipe pierced, emergency amputation, urethrotomy, etc. In any event, the principal aim of supplying all the wounded as quickly as possible with protecting and supporting dressings must not be lost sight of in the care of the individual. Further, the performance of major operations, and the application of permanent dressings to fractures, depend on the number of wounded, the possibility of an early transfer to hospital ships, and other external conditions.

"The Sanitary Men assist the surgeons in the Action Dressing Stations; besides this, it is their duty to inspect, and as far as possible care for the wounded, and sick in the "Storing rooms.

"The duty of the Sick Carriers comprises, in the main, a proper preparation of the wounded for removal from the Transport Stations to the Action Dressing Stations (applying rubber bands as tourniquets; lashing them into the transportation hammocks); the handling of wounded at the Transport Station itself, and, if not occupied thus, the care of wounded in the "Storing rooms.

"The removal of wounded from the place of injury (from the upper deck, guns, casemates, etc.,) to the Transport Stations, and thence to the Action Dressing Stations, is done by any members of the crew trained as mentioned above.

"(Q) How many additional men are assigned to the medical department for battle, and what are their rank?

"(A) The number of sick carriers is for ships with a complement of less than 300, 4 to 8 men

from 300 to 500, at least 12 men.

of more than 600, at least 16 men.

"Their rating is that of seaman or leading seaman. As regards the selection of these men, it is required that, if possible, one-half of them be professional seamen. Ammunition men, cooks, waiters, buglers, men of the administration personnel, etc. (Navigation duties, etc.), who, during intervals in the action and after the action is over, are indispensable at other points, should be not detailed as sick carriers. In the first instance, such sick carriers as have been already trained on shore should be detailed as such on board also.

"(Q) What instruction and training do these additional men receive for their duties in the medical department in battle?

"(A) The sick carriers, as explained above, receive their special instruction from the surgeons on board during the exercises of the Action and Landing Bill. The instruction, besides the actual transport of wounded (handling, means of transportation, careful transport), also extends to the rendering of first-aid in case of wounds, and to the necessary assistance in caring for the wounded and sick.

"(Q) Dressing stations: how many, where situated, how equipped, what medical officers, petty officers, and men at each? are there any special arrangements for extra ventilation at these stations, or for extra light or fresh water supply?

"(A) Battleships and large cruisers have each two special "Action Dressing Stations." Of smaller ships, such as possess a dispensary (complement of 100 or more) have an "Action dressing locker", placed at a point protected, as far as possible, which serves in action for holding the necessary means for caring for the wounded.

"The Action Dressing Stations should be situated under armor protection and in cool places easy of access. They should be entirely separated from one another; for example, one on the starboard side forward, and one on the port side aft. The neighborhood of the Conning-bridge should be avoided. One should be installed as the main dressing station, the other as an accessory dressing station. These rooms should be entirely isolated from the other parts and duties of the ship when cleared for action. Any auxiliary machinery, etc., by the working of which the surgical work would be disturbed, must not be situated in these stations. As a minimum of space, an area of 5.5 metres fore and aft, and 4.25 m, athwartships is required; to this must be added a gangway of a width of at least 1.5 m, situated, if possible, fore and aft. Near to the action dressing stations, and of easy access from them, there must be protected and well ventilated rooms for bedding the wounded (previously referred to as "Storing rooms"); for instance, store rooms, holds, cells, passages. Altogether, there should be provided berthing place for at least 10% of the complement. The Action dressing rooms have ample electrical illumination, for each 4 square metres of area, one connection-box for an upper deck lamp (our cargo-lamps) of 6 lights; the connections should be distributed on two circuits. Besides, for emergency lighting by oil lanterns should be provided. Further they have air supply and exhaust.

"They should be connected with the drinking-water pipe, which is installed under armor protection; moreover, in case of an interruption of the drinking-water supply, which might nevertheless occur, water tanks should be installed in each action dressing station. The total capacity of these tanks for both action dressing stations should be at least 5 liters per man, allowing for 20% of wounded. Small cruisers have only one tank for a water supply of 3 liters per head, with 20% of wounded, near the Action Dressing Locker.

"Drainage of the Action Dressing Stations should be provided. Other fittings required are:--

- 1 action dressing locker, in two parts;
- 1 handling double table, for instruments and bandaging;
- 1 folding table, for refreshments;
- 2 small folding writing tables;
- 1 wash stand, with 2 basins;
- Electrical connections for the sterilization apparatus, and for a number of electric fans;
- 1 shelf for the sterilization apparatus,
- 2 hooks for a bottle stand.

"Additional equipments for the Action Dressing Stations are half-tubs, water-buckets, swabs, brooms, refreshments, etc., taken from the ship or mess supplies as required.

"Still to be mentioned is a Roth-Drager oxygen apparatus, which is also placed here.

"In peace time, the Action Dressing Stations naturally can not be at any time available for surgical purposes, being more urgently needed for berthing the complement; but in emergency, one of these places must be given up for operations.

"The distribution of Sanitary Officers and Sanitary Men between the different action dressing stations depends on the special conditions and requirements resulting from an action.

"(Q) Are stretchers, cots, or slings, of special arrangement provided for lowering wounded men below? If so, what kind of such devices are used?

"A) For transportation means, there are used on board almost exclusively, the Transport Hammock; but the Transport Chair is also used.

"The Transport Hammock consists of a canvas cot, at the head of which is a double bridle-sling, while at its foot is a single sling. It is stiffened by two ash stretchers which are pushed through pockets especially provided and secured by two ties, fast to the hammock, which are drawn through a hole in the stretcher bars and then knotted. The bars are spread apart by two similar short ones, which are held in canvas pockets, closed by flaps, at the left end at the head of the hammock, at the right end at the foot, and knotted by four ties each. In the middle of the cot is the Breast-Piece, stitched on close to the inner edge of the long stretcherbars. The other ends of the Breast-Piece (which is in two parts) are loose; it is put around the body of the wounded man, and secured on the right side by a lacing. At the upper edge of the Breast-Piece, between the rods, two canvas straps are stitched on, having at their upper ends each an eyelet. The ends are laced above by strings provided on the hammock, and serve to hold a pillow by means of four straps stitched on its under side. The pillow has on its face a Head-Cap, the rear part of which is sewn to the pillow, and the free part of which is placed around the head of the wounded man, fastened by two ties under the chin.

"Below the Breast-Piece, a narrow pad (riding seat) is attached. It carries two long canvas straps, which are provided at their ends each with three eyelets; these pass up over the shoulders of the wounded man, and the ends are secured by lacings at the second head-sling eyelet, at the right and left. At the lower end, the Transport Hammock runs out into a foot-muff, at the mouth of which on either side two lace eyelets are provided. These, together with the strings (two on each side) sewn on the outer and lower edges of the side flaps of the hammock, serve for closing the foot-muff in and towards the head. Outside, on the side flaps, there are also, at regular spaces, five eyelets on the left and five ties on the right, by which the flaps, brought together over the wounded man are laced up.

"Eight handles are fitted on the hammock, two each, at the top, lower end, and sides.

"The Transport Chair consists of three iron frames, connected movably with one another and covered with canvas. The parts are Back with Girth, Seat with Side-arms, and Foot Part with Foot-Muff (pocket or boot). The Chair can be folded up.

"(Q) Are first-aid packages distributed among men at the guns, on going into action?

"(A) In war, small dressing packets ("Verbandpackchen") are served out to every member of the complement, not only to the gun crews. Besides, canvas pouches, with small-dressing-packets of different sizes, and compression bandages are provided at certain points specified in the Action Bill, in the turrets, in the casemates, and at the Transport Stations."

The latest information at hand in regard to the method of caring for the wounded in the British Navy is dated May, 1905, and is in the form of a circular from the Admiralty. It is of course quite possible that a better organization has been adopted since that date, but if this has not been done, the British Navy is no further advanced in the solution of this problem than is our own navy. In brief, the British policy is a do nothing policy during action. According to the circular no attempt to remove wounded to a place of shelter during action is to be made, it being directed to "place wounded men in a comfortable position, near the place where they fall and out of the way of combatants". The surgeons and their staff are to render first aid only during lulls in action on some predetermined bugle call. The lives of the medical officers are to be conserved and they must not be suffocated. Thus: "It is very important that a suitable position should be provided for the medical officers of the ship. Their lives are of the greatest possible value when regarded from the standpoint of the sick and wounded. For this reason all medical officers should be stationed under the best possible protection due regard being had to the possibility of their being incapacitated if retained during a prolonged action under atmospherical or other conditions likely to prostrate them." Two "distributing stations" for surgical dressings, etc., are to be established, to be selected as far as possible, one forward and one aft, and are to be beneath the protective deck. They are for the conservation of medical stores, the distribution of dressings, the stations of the medical staff during action, and "for the treatment of any one slightly wounded who can gain access to them of his own accord." A large percentage of nearly all ratings are instructed in first aid, and bags containing dressings are distributed in different parts of the ship. In the absence of a hospital ship, the wounded are to be treated after action on the upper deck properly screened. The circular concludes with this

paragraph:

"It is hoped that, even under the most unfavorable circumstances, a hospital ship would be in attendance upon a fleet within a few hours of an action. It is not, therefore, considered justifiable to attempt to set apart any space in a man-of-war for the provision of a permanent operating room, as such a room could be used for one purpose only." So that they evidently rely mainly on the presence of hospital ships. According to the Japanese experience as related to me by Doctor Susuki, this system will prove totally inadequate.

In the French Navy the organization includes general instruction in first aid and transportation of the wounded; dressing stations (Poste Principale) beneath the protective deck, "in a place communicating directly and freely with the places whence the wounded must come to it;" and relief stations (Poste Secondaires) "located in places as sheltered as possible". Further details of the system are not at hand.

In the Japanese Navy at the beginning of the war with Russia the organization for aid to the wounded included general instruction in first aid; the establishment of at least two temporary dressing stations in protected parts of the ship, generally beneath the protective deck; and an allowance of men to act as carriers of the wounded. The carriers of the wounded were all especially instructed in this duty, amounted to some fifty odd men on a battleship and included bandsmen, cooks, mess attendants, etc. Since the war, it is my understanding that they are providing in each new armored ship two dressing stations with appropriate fittings situated behind heavy armor protection and with adjacent spaces arranged as storing rooms for wounded during action. The dressing stations are so situated as to allow rapid transfer of the wounded to them from the various deck levels and different parts of the ship. This is, in brief, the structural arrangements made on

the TSUKUBA, an armored cruiser completed since the war. It is well to note that it is in accordance with the verbal and written opinions expressed by Surgeon General Susuki as embodying the features believed to be necessary as a result of Japanese experience in the war. In an article published by Doctor Susuki after the close of the war in 1905, entitled "Notes on Experiences During the Russo-Japanese Naval War, 1904-1905", the following extracts pertinent to these arrangements are found. "(1) Many ideas have been broached in the various navies as to the proper place for a ship's surgery. Ideally speaking the right thing would be that at the time of designing a ship a proper space below the water line should be allotted for the purpose with proper arrangements for the conveyance of wounded men." "(2) It is important, but extremely difficult to find a safe place for the bestowal of the wounded after their wounds have been dressed. On battleships and armored cruisers we used the passages on either side of the lower deck, placing the sick on each side of the passage, with a narrow space left open down the middle; and in this way we found that we could provide for sixty or seventy men. When the wounded were in excess of this number, other places had to be found, and here we were confronted with a difficulty. The only places really suitable were far down below the water line, accessible only by narrow and steep ladders which made the carrying of wounded men almost impossible, and devoid of light and proper ventilation. Fortunately in none of our engagements did the number of wounded men requiring treatment here exceed the limits of the space provided on the lower deck. The difficulty was therefore not an acute one, but we have learned a lesson which may be of use to us in the future." It would seem that the Japanese Navy had not only learned a lesson but that they were applying the remedy also.

5. In contrast to these more or less complete arrangements of other large navies, Great Britain excepted, we rely on a few meagre directions on this subject in drill books. As you are all doubtless familiar with these directions, it is unnecessary to quote them. Their inadequacy and the different interpretations possible are well shown in the extract from Doctor Beyer's report heretofore quoted. As a result, no serious effort has so far been made to solve this problem in our navy. It is to be noted that our voluminous regulations do not refer to this subject, and it is submitted that, until the subject becomes a matter of regulation, no system will secure general adoption. It seems evident that it will only be through the general adoption of a plan that a critical trial, so far as may be in times of peace, can be secured.

6. If it be granted that the Japanese conclusion that it is a military necessity to remove speedily the maimed and wounded from the sense of their still active comrades on board modern ships of war is correct, and it seems to be a reasonable conclusion, the principles of an efficient organization are evident. First, to accomplish rapid removal of wounded, an ambulance party must be established. This party must be sufficiently large to rapidly remove the dead and wounded and must have extensive preliminary training and instruction to become efficient. Second, there must be a prearranged place to which the wounded may be taken, and means of access to such place must be provided.

7. Any good organization may be likened to the building of a house or ship, which is first carefully planned and then the various constituent parts are erected and fitted together. As an architect submitting only a preliminary plan, then, the sketch of an organization is suggested which shall include:

(A) Dressing Stations, and (B) an ambulance party.

(A) Dressing Stations:

An allowance in the construction of future armored ships

for two dressing stations, one forward and one aft, situated behind heavy armor protection, out of sight of active combatants and adjacent to hatches extending vertically through the decks above, so that wounded may be rapidly passed down the hatches from the various deck levels. Each dressing station should consist of two parts, one a compartment suitable for use as a surgical operating room, and the other an adjacent compartment or space where wounded may be segregated during action after receiving first aid.

Two dressing stations are necessary to facilitate the rapid conveyance of the wounded and to provide an alternate in the event of the destruction of one.

The decks in these compartment should preferably be tiled and the bulkheads and ceilings should present smooth surfaces so as to permit thorough cleaning. The operating room compartments should be fitted with running water supply and also extra water tanks with a capacity of a gallon per man allowing for 20% of wounded; should be provided with abundant electric lights with the connections distributed on two circuits; and should be artificially ventilated by both supply and exhaust systems. It is suggested that one of these operating rooms be constantly equipped and used as such. The second operating room and the spaces for reception of the wounded could be used as storerooms or crew spaces in peace times. It is perhaps needless to state that these dressing stations would be the battle stations for the surgeons and their operative assistants. Only emergency operative and dressing work is to be done during an engagement, operations consume much time, many will require attention, and the aim of supplying all the wounded with protective dressings as quickly as possible must not be lost sight of in attention to individual cases.

A storeroom for surgical supplies should be located adjacent to the permanent operating room.

(B) Ambulance Party:

The detail in watch, quarter and station bills of the number of men calculated to be necessary to compose this party should be a matter of regulation. Unless required by order or regulation, the composition of this party will vary in number in service, and practice will not be uniform. These men should be attached to the surgeon's division at "general quarters" for both drill and action. They should have no other station at drill or in battle. In determining the number of men in this party, it is suggested that there should be one member of the ambulance party to every four of the minimum expectation of wounded. The expectation of wounded on board a modern battleship seems to have been most frequently estimated as about 20% of the personnel. The Japanese statistics do not seem to be very reliable and it should be borne in mind that the Japanese had almost invariably "the best of it". My understanding from conversation with Doctor Susuki was that the number of wounded on board the MIKASA in the battle of the Sea of Japan was something over one hundred. Doctor Braisted visited the MIKASA immediately after her return to Japan from that battle and states that the "total wounded was 120." The official statistics published give a total wounded of 63 only, divided as follows: 8 killed 21 severely wounded and 34 wounded. We have fairly accurate statistics from the two Russian protected cruisers which escaped after a running fight in the Straits of Corea, on August 14, 1904. On the ROSSIJA, a large protected cruiser of over 12,000 tons displacement, with a complement of 1000, there were 150 wounded and 57 killed; i.e. 20% of casualties. On the GROMOBOI, a sister ship with the same complement, there were 300 men wounded and 70 killed in the action and 21 of the wounded died later making the total deaths 91. This gives a percentage of casualties of 37%. The lesser number of casualties on the ROSSIJA as compared to the GROMOBOI is

accounted for by the Russian officers by the ~~fact~~ that on the former vessel the men were kept below and not exposed any more than necessary. A Japanese naval surgeon has estimated the probability of 25 to 50 wounded to every large shell bursting on board, of which 10% are killed outright and 30% seriously wounded. It would seem to be a conservative estimate to place the minimum expectation of wounded at 10%, at least with the victorious side. With a crew of 1000 men then we might expect at least 100 wounded and our ambulance party should consist of 25 men. This, you will note, independently arrives at a mean between the Japanese allowance of 50 men for the ambulance party and the German regulation requiring at least 16 men for "sick carriers" on a vessel with a complement of over 600.

The men detailed to the ambulance party should be as intelligent as possible in type, as they have some knowledge to acquire, they must use judgment and must be men of initiative to succeed. It is suggested that the men detailed to this duty should not be drawn from the ratings used at the battery, but should be drawn from among the bandsmen, marines, painters, printers, etc., with any yeomen who may not be needed in the fire control party as leading men. The servant ratings on board ship are now mostly filled by negroes who are unfit for this work because of little intelligence, poor judgment, lack of initiative, of uncleanly habits and of doubtful courage in action. In considering the personnel of an ambulance party it is to be noted that the hospital corps men are the only surgically trained assistants which the surgeon has and therefore must be stationed with him at the dressing station.

The men composing the ambulance party are to be drilled in the performance of their duties by the medical officers regularly at general quarters' drill, and are to receive instruction from the medical officers in the application of first aid dressings, control of hemorrhage, transportation of

wounded by hand and by various devices used on board ship, and in personnel hygiene and surgical cleanliness. It is only by special instruction that they may acquire proficiency in dressing and transporting wounded. It is intended that they shall stop serious hemorrhage, apply temporary dressings to prevent contamination of wound surfaces by dust and powder, and transport the ^εseriously wounded to the surgeon at one or the other of the dressing stations. To slightly wounded men they will apply a dressing and return the man to his fighting station. Here is where intelligence and judgment will be called into play, and the use of sufficiently intelligent men in this capacity will be well repaid from a purely military standpoint by the prompt return of the slightly wounded to their guns or stations instead of the delay necessary if all wounded were to crowd to the surgeons. Men of the ambulance party detailed to the engine and fire rooms will be especially instructed and equipped for the treatment of scalds.

The men of the ambulance party would be stationed at various designated places throughout the ship. These places would be known as relief stations. The relief stations would be placed in as sheltered positions as possible which would be convenient to the lines of transportation to the dressing stations below. The majority being sheltered, a lookout would be posted so that he might be called to attend wounded at any part of the deck through hand signal. The handling and disposition of wounded in turrets should be made the subject of special study and drill in the different types to be found on different types of ship.

8. With the above indicated system generally adopted and practiced, it is submitted that the wounded and dead would be of the least menace to military efficiency on board fighting ships in battle, and humanitarian considerations of care for the wounded and shelter after being put out of action would be complied with.

9. All military considerations seem to demand the evacuation of wounded from fighting ships as soon after the close of an engagement as possible. For this purpose hospital ships are necessary. How many would be required? If the fleet is composed of 16 battleships and 8 armored cruisers, with an average complement of 900 men each, the entire personnel would number 21,600 men. With an average expectation of wounded of 20% we might expect to have 4300 wounded men on our hands, but at least 10% or 430 of these will be killed outright, and probably only 40% or 1720 would be seriously wounded and require transfer to hospital ships. It is a rather unusually large hospital ship that will accommodate 400 patients so that we will require at least four hospital ships to be able to evacuate the fighting ships of seriously wounded men only. This would mean one hospital ship to each six of the armored ships. To be extremely conservative let us say one hospital ship to each two divisions, as at present constituted, of the armored ships, or three hospital ships to accompany the above mentioned fighting fleet. Should the scene of battle be far from the fleet's base, ambulance ships in addition to the hospital ships would be needed to convey wounded to base hospitals.

It has been stated that it is an unusually large hospital ship that will accommodate 400 patients. This is especially true where merchant ships are hurriedly converted into hospital ships on the outbreak of war; but should we build specially designed hospital ships, it is perfectly practical to give them accommodation for that or a greater number of patients. In no type of naval auxiliary is the need of an especially designed ship more evident than in the hospital ship. In fact, it can be asserted that, short of gutting and almost entirely rebuilding, a merchant ship cannot be converted into anything more than a make-shift hospital ship. The hospital ship does not become obsolete in type with the passage of years as do

battleships. Three or even four hospital ships in commission would be of great service to the fleet in peace time cruising, so that their use would not be limited to war purposes. You may recall that on various occasions commanders-in-chief of our fleets have been compelled to use war ships, supply ships, colliers and transports as hospital ships. During the short winter cruise lasting from the middle of January to May in 1906, the COLUMBIA, although wholly unfitted for such work, was used to transport the sick of the fleet from Guantanamo to home hospitals, The COLORADO was sent north on ~~the~~ account of the death of her commanding officer, the PENNSYLVANIA was sent north in order to transfer her typhoid fever patients to hospitals, the MARYLAND was sent north with the injured from the KEARSARGE turret accident, and the WEST VIRGINIA (which had acted as hospital ship for the torpedo boat destroyer division) was finally sent north ahead of the fleet because she was the only remaining ship of the armored cruiser division and could not be drilled advantageously by herself. Thus an entire division was diverted from proper fleet work and the COLUMBIA was used for work unsuited to her solely because there was no hospital ship in commission. And this on a peace time cruise of less than four months under sulubrious climatic conditions! Again, Paymaster Dyer has told us how the MISSOURI went without fresh provisions, although the supply had been arranged for four months previously, because a refrigerator ship was diverted to transport sick from Colon. The nation can well afford to build hospital ships. They are necessary adjuncts to our growing fleet. Is it not desirable for military reasons to ask Congress for authority to construct at least three such ships?