placed men on their feet and enabled them to carry on their work. The following quotation from a letter of Major L. C. Carr's expresses this mental influence: "Is like a ray of hope in a desert of desolation." She was always welcomed wherever she went and it was a rare pleasure that was afforded to the officers of the ship to act as the dispensers of the charity of the Massachusetts Volunteer Aid Association.

THE MEDICAL AND SURGICAL HISTORY OF THE HOSPITAL SHIP, "BAY STATE."

BY J. T. BOTTOMLEY, M.D., BOSTON.

PERHAPS not the least interesting and instructive of the developments of the late war was the work done by hospital ships. Both the army and navy possessed such ships as adjuncts to their regular medical service and found them invaluable. Attached to neither, but co-operating with both, was the hospital ship, *Bay State*, sent out by the Massachusetts Volunteer Aid Association.

It may add to the interest of her history to know that the sending out of this ship was an unique occurrence in two particulars: she was the first hospital ship in the world to be fitted out by an aid association and authorized by a sovereign power under the articles of the Geneva Conference; she was the only hospital ship in the late war sent out by the people of any State to care for its soldiers—a distinction that added to the already great fame of Massachusetts, and made her soldiers the envy of their less fortunate brothers.

Under the auspices of the Volunteer Aid Association the *Bay State* made three trips to and from Cuba and Porto Rico and was in active service about three months, during which time she received on board, as patients, 336 soldiers. To care for these she carried on her first trip five physicians, six nurses and six baymen; on her second, six physicians, six nurses and eight baymen; on this trip two of the nurses and two baymen were left in Porto Rico to aid in the management of the hospital of the 6th Massachusetts Regiment at Utuado; on her third trip she carried four physicians, six nurses and six baymen. These comprised the working medical force of the ship.

The first consignment of patients was made up of 101 men of the 2d and 9th Massachusetts Regiments—40 from the 2d and 61 from the 9th; these were received at Santiago, Cuba, in August of the present year. The second and third consignments came from Porto Rico in September and October; the second consisted of 100 and the third, of 135 men. Of these 235, 207 were from the 6th Massachusetts Regiment, 25 from the 1st U. S. Volunteer Engineers, 2 from the U. S. Hospital Service and 1 from the 5th Light Artillery.

We naturally preferred to have Massachusetts soldiers as patients, because the boat was fitted out and supported by Massachusetts people and money; but when sick Massachusetts men were not to be found we were glad to receive and care for the sick of other States, as well as of the regular service. Of our 336 patients, 321 lived in Massachusetts, 7 in New York, 3 each in Pennsylvania and Maryland, 1 in Connecticut and 1 in New Jersey.

All these patients were received in tropical climates

after they had been there from six to sixteen weeks. Our work was to take the men and care for them until they were delivered to the proper authorities at whatever point it was deemed expedient. All of our patients were landed at Boston.

In the 336 patients whom we carried, the following diseases were represented:

Malaria and Complications.—Acute, 34; convalescent, 32; with chronic diarrhea, 14; with dysentery, 16; with yellow fever (convalescent), 5; with phthisis, 1. Total, 102.

Typhoid Fever.—Acute, 20; convalescent, 53. Total, 73, including post-typhoid abscess of thigh, 1; of parotid, 1; post-typhoid neuritis, 3.

Diarrhea.—Acute, 55; convalescent, 42; with malaria, 14; with neurasthenia, 1; with tonsillitis, 1. Total, 113.

Dysentery.—Acute, 16; convalescent, 9; with malaria, 16. Total, 41.

Yellow Fever.—Convalescent, 16.

Rheumatism.—7.

Scattering.—Gonorrhea, 4; debility, 4; febricula, 4; hernia, 4; bronchitis, 3; gastritis, 2; phthisis, 2; after-effects of sunstroke, 2; syphilis, 1; sprained ankle, 1; varicocele, 1; septicemia, 1; myelitis, 1; cardiac, 1; cervical adenitis, 1; flat-foot, 1; paresis of extensor muscles of hand, 1. Total, 34.

The foregoing table demonstrates that of the 336 patients, 102, or 30.36 per cent., had malaria; 73, or 21.73 per cent., had typhoid; 113, or 33.63 per cent., had diarrhea; and 41, or 12.2 per cent., had dysentery. Considering dysentery and diarrhea together, they affected 154 of the 336 patients, or 45.86 per cent. This means that 45.86 per cent of the patients as they came on board had some degree of diarrhea or dysentery; yet these figures do not convey a fair idea of the prevalence of intestinal affections among the troops. Almost every northern soldier who was sent to Cuba or Porto Rico had a more or less severe attack of diarrhea during his stay there. Improper food, its improper preparation, the failure of the men to grasp the great importance of boiling all drinking-water and the careless use of tropical fruits, all aided in producing a disastrous effect. When you add to this the necessary exposure to wet and dampness, without the possibility of exchanging wet clothing for dry, the prevalence of intestinal inflammation is not remarkable.

There is one striking fact brought out by the table and one that speaks for itself of the general *morale* of Massachusetts soldiers. It is the very small number of cases of venereal disease among the men. There were but four cases of gonorrhea and one of syphilis. This is all the more remarkable when we consider the low standard of morality among the natives in both Cuba and Porto Rico. Of course, these men were ill, and, perhaps, in them the chance of exposure was less; but, even granting that, the percentage, under the conditions, is low.

Let us now consider the diseases of the patients brought from Santiago on the first trip as compared with those of the men brought from Porto Rico on the second and third trips.

Of the 101 brought from Santiago, 81, or 80.2 per cent., had malaria in some form; but 16, or 6.81 per cent., of the 235 from Porto Rico showed malaria. These figures probably place the percentage of malaria in Porto Rico too high; for some of these 16 cases were doubtful. Blood examination of 106 patients, among whom were these 16, showed the plasmodium only twice. Again, Dr. Cabot examined the blood of at least 100 patients in the military hospitals at Guánica and Ponce, and did not find the plasmodium once—a fact which makes it very probable that malaria was comparatively rare in Porto Rico among the soldiers. The diagnosis of malaria is put down for them out of deference to the regimental surgeon, who had far

¹ Read before the Boston Society for Medical Improvement, November 21, 1898.

greater opportunity of observing them than we, and who had already made this diagnosis.

Eight of the Santiago men had typhoid fever, a percentage of 7.92 per cent., while 63 of the Porto Rican patients showed it, a percentage of 26.89 per cent. It is probable that more cases of typhoid would have been discovered among the Santiago men had it not been for the peculiar behavior of our typhoid cultures on the first trip, which rendered the doing of the Widal test impossible. This forced us to make the diagnosis of typhoid on clinical features alone.

The percentages of the patients with diarrhea do not, as has been noted above, convey a fair notion of its prevalence. Eighteen, or 17.82 per cent., of the Santiago men had dysentery; 23, or 9.79 per cent., of the men from Porto Rico showed it. Examination of the stools for the *amœba dysenteriae* was very difficult on ship board. Some were examined on the second trip; the examination was negative but not satisfactory. At the hospitals in the city a number of cases of amebic dysentery were found among the patients from Santiago. As far as I know, but one such case was found among the Porto Rican patients.

The 16 cases of yellow fever received at Santiago were convalescent. The diagnosis had been made by the regimental surgeons. The histories of the men did not seem to point to yellow fever but rather to malaria. However, the men who made the diagnosis had observed the whole course of the illness of these patients. Several of the cases showed a peculiar yellowish discoloration of the finger-nails, which, according to Dr. McCollom, might come after yellow fever. There were no cases of yellow fever among the patients from Porto Rico.

The above facts show well the difference in the healthfulness of the two climates. Malaria was very prevalent and of an extremely severe type at Santiago; it was very uncommon in Porto Rico, and the two undoubted cases that we had an opportunity of seeing there were very mild. Typhoid was apparently more prevalent in Porto Rico, and the type was sometimes very severe, the victims often dying from the sixth to the tenth day; in fact, autopsy would show the pathological changes in the lymphoid elements of the bowel to be in the stage of hyperplasia, there being no sloughing or necrosis. We were told that before the advent of the soldiers in Porto Rico typhoid was comparatively unknown. The soldiers brought it with them. Seventeen fresh cases of typhoid developed on the *Yale* when she was carrying the 6th Massachusetts to Porto Rico. Dysentery was much more common in Santiago and was more severe than that seen in Porto Rico. It is not within our province to attempt to explain why there was less sickness in Porto Rico than in Santiago. The climate of the former is surely more wholesome and the war was older when the campaign there began and, hence, there was more time to make preparations for protecting the health of the soldiers. Whatever the reason was, the men in Porto Rico were in a much better condition physically than those in Santiago; from the latter came the sickest-looking and, indeed, the sickest, men we had ever seen or ever expect to see. The marked muddy pallor, the great emaciation, the sunken eyes, the starved looks and the terrible weakness, which was so manifest, made a picture that cannot be adequately described. Even the men said to be fairly well looked to us sick. It was war in its

most terrible aspect, shorn of all its pomp and glory, clothed in all its wretchedness and misery.

The malaria at Santiago was all of the continued and remittent type; the crescent form of the organism was present in all the cases from that place. We found the organism of the tertian form but once, and that in one of the Porto Rican patients. At Santiago the men with malaria were many of them very ill, and these cases bore a strong resemblance to typhoid fever. The temperature was irregular, but the remissions were greater than are usually seen in typhoid and did not come at definite intervals; the typhoidal facial expression was common; the spleen was enlarged but was apparently more firm than the typhoid spleen. Cachexia and anemia were marked. Malarial edema was not common but was present in several instances. Chills were not seen in all cases. Paroxysms, when they came, usually occurred in the afternoon. Co-existing diarrheas and dysenteries often complicated the diagnosis and treatment of these malarias. There were undoubtedly some instances of double infection with malaria and typhoid; this was proved afterwards at the hospitals here. The behavior of our typhoid cultures on the first trip prevented the possible discovery of the fact on the ship.

When we obtained our first stock of typhoid cultures on agar and serum they came from a perfectly reliable laboratory, and the tubes, stoppered with cotton and sealed with paraffine, were delivered in a practically air-tight jar. Ten days later, when the Widal reaction became of importance, we found that all cultures made from these were either sterile or contaminated. This misfortune we ascribed to our lack of skill and technique and to draughts of air from a wind-sail. The stock on the second trip came from a different source and was on agar; the tubes, stoppered with cotton and unsealed, were placed in a box covered only by paper; they were not touched for ten days; then, with the same technique, etc., in planting cultures, the results obtained were very satisfactory; the tubes not used on this trip were preserved. Fresh agar cultures were taken on the third trip and were again placed in the glass jar. When we came to use them most of them were again sterile; some were contaminated; none were useful, though, from external appearances, they seemed to be all right. Then we fell back, as a last resort, on the tubes kept over from the second trip, which were at that time over six weeks old. Again, the conditions and the technique remaining the same, these cultures gave excellent results. The cultures on the first and third trips came from the same source, and, when received, were apparently in good condition and showed a growth. The interesting points are: the apparent effect of the air-tight jar on cultures of the typhoid organism; and the very lively growth obtained from the second cultures after they were six weeks old.

The cases mentioned in the table as febriculæ formed an interesting class. They were very common in Porto Rico, and were said to have been common in Camp Alger. As far as we could learn from the four patients we had, the prodromal symptoms were like those of typhoid, though the period of incubation was not so long, being only two to three days. The most distressing symptom was pain in the back—and patients complained chiefly of that. Diarrhea and headache were usually present. The temperature ran between 102° and 104° for three or

four days and then fell by lysis. An urticaria, which itched intolerably, usually accompanied the fever; while this was not the only condition in which urticaria appeared, yet it was more common with this than with the other fevers. It appeared usually in the giant form and covered irregular areas of considerable size on various parts of the body. The urticaria usually passed away with the fever. The blood of these patients did not give the Widal reaction, and whether the fever was due to a gastro-enteritis, to heat or to exhaustion — all of which were advanced as causes — we could not decide.

Blood Examinations. — The number of very ill men in our first consignment, and the amount of attention they demanded, made it possible for us to examine the blood of the sickest patients only. Fifty-six examinations were made for the *plasmodium malariae*, and the crescent form was found in 49; 7 examinations were negative. On the second trip, with an increased medical force and fewer sick patients, 100 Widal's and 100 examinations of blood for the plasmodium were done. Ninety-five of the Widal's were negative and 5 positive. Ninety-eight of the examinations for the plasmodium were negative and 2 positive — one showing the crescent form and one the tertian. Dr. Richard Cabot was of the greatest service to the ship on this trip. On the third trip, because of the loss of two members of the medical staff, we could do only such work on the blood as seemed necessary. Fifteen Widal's were done, 11 of which were positive and 4 negative; as many examinations for the plasmodium were made, and all were negative. There are some difficulties about the use of a microscope at sea. Of course with the motion of the boat — and there is a good deal of motion in a small boat — the light was constantly changing and it was difficult to focus. If we used artificial light we had to work below decks, where it was exceedingly hot and uncomfortable. It was sometimes difficult to keep either ourselves or the microscope upright.

Surgery. — Though we were well equipped for surgical work, we did but little of it because of the cessation of hostilities. On this account, our surgical work was limited to the opening and draining of two abscesses.

Treatment. — First, of ourselves. It is notable that the medical department of the ship, aside from casualties and sea-sickness, was never incapacitated by illness. As a matter of precaution we all took four grains of quinine every morning while in Cuba. After any unusual exertion or after a trip ashore the dose was repeated and supplemented by a cup of coffee. We worked as little as possible in the heat of the day — that is, from 11 A. M. till 3 P. M. Contrary to all the principles of temperance, we never drank water when ashore. Fruits, except those carried from the north on the boat or those to which we were accustomed, were not allowed. Plenty of rest was one of the maxims. Except when the good of the ship demanded it, no one was allowed ashore after one hour before sunset. Our drinking-water was distilled from sea-water, and even the water in Santiago harbor, which was unquestionably foul, and where there is practically no tide to float the sewage, etc., away, was used by us for purposes of distillation. Some few cases of moderate diarrhea among the medical staff followed the use of this water. While the general trend of opinion among the dwellers in hot climates

seems to be against sleeping at night in the open air, yet a number of the medical force of the boat did so more or less constantly, and apparently suffered no ill effects. However, sleeping in the berths on straw matting was usually not intolerably uncomfortable. When we were at sea the decks were washed down with sea-water every morning. When we were in infected harbors this process was entirely omitted. Washing of the floor about the serving tables in the wards was allowed then but once a day, and that with fresh water only. These measures were taken on the advice of some of the medical officers of the navy. They were necessary in Cuba, but not in Porto Rico.

Treatment of Patients. — While not coming exactly under the head of treatment of patients, it may not be amiss to speak here of the method employed in treating their clothing and personal effects. When a patient reached the ward after his corrosive bath he wore a suit of new pajamas. The clothing he had worn and all his personal effects that could not be injured by exposure to steam were placed in numbered canvas bags and passed through the deck into the sterilizing room. Here they were subjected for twenty minutes to steam at 340° F., under twenty pounds' pressure. All articles not sterilized by steam were placed in a box and disinfected by formaldehyde gas. Schering's lamp, with pastils, was used. The wards were disinfected by formaldehyde and thoroughly washed after each trip.

Diets. — Diets were divided into three classes: (1) liquid, (2) soft solids, and (3) ship's diet. The following articles were contained in these:

- (1) *Liquid.* — Beef tea prepared from either the extract or juice, clear soups, clam juice, malted milk, Mellin's food, tea and coffee occasionally.
- (2) *Soft Solids.* — Bread, puddings, eggs, oatmeal, ice cream.
- (3) *Ship's.* — Soup, meats, potatoes, desserts, ice cream, fruit.

Drug Treatment. — Comparatively few drugs were used. Malaria was, of course, treated by quinine. It was usually given in 8-grain doses three times daily. Cases which did not do well under this treatment were given half-ounce doses of Warburg's tincture; the change worked very well in two or three instances. The very sick cases — those in whom vomiting was a prominent symptom or whose stomachs would not tolerate quinine — were given 15-grain doses of the bisulphate with tartaric acid subcutaneously. The anemia and cachexia were treated by Fowler's solution or by the iron, arsenic and strychnine tablet. Where arsenic was contraindicated, reduced iron was used. Steady high temperatures were treated by cold sponge baths. The hardest cases to treat successfully were those complicated by diarrhea or dysentery.

The treatment of the diarrheas varied. Mild cases, having four to six movements a day, were treated simply by a restricted diet — usually the liquid; in two or three days the diarrhea generally gave way to constipation. No drugs were given these cases. Whether the resulting constipation was the effect of the sea-air — which, some hold, is decidedly constipating — or of the rest and restricted diet matters not. Somewhat more severe cases were treated by bismuth or by the opium, camphor and tannin tablet in addition to the restricted diet. Severe diarrheas and the dysenteries showed but very little improvement under the use of drugs by the mouth. Opium was always given in these cases, but it was supplemented by large high enemata. Quinine in the proportion of thirty grains to two quarts of water, and nitrate of silver in the pro-

portion of twenty grains to two quarts of water, were both used. One worked well in some cases, the other in others, but on the whole the quinine enemata worked more satisfactorily.

Typhoid fever was treated in the usual way. Cold sponge baths were given when the temperature required it. The diet was limited to liquids, with soft boiled eggs occasionally. The drug treatment was not unusual. Bedding that was infected was thrown overboard. After each trip all bedding, bed-pans, etc., were sterilized by steam. Rubber sheets, etc., were washed in carbolic-acid solution. All stools were disinfected with chloride of lime and carbolic acid, and the bed-pans and urinals carefully cleansed after their use. The water-closets were closely watched; chloride of lime was freely used, and flushing with corrosive was a matter of daily routine. Closets were inspected twice daily. Pails of corrosive solution, for disinfection of the hands, were always in the wards. All these precautions were taken to minimize the danger of contracting or spreading infection.

Most of the men, as they came to us, looked pale and weak. Such men we tried to tone up by iron, strychnine, etc. All had marvellous appetites, and it was difficult to restrain even the sick from over-eating; this was particularly true of the men from Santiago.

All patients who were able to be out of their berths were kept on the upper deck as much as possible on suitable days. Here in their steamer-chairs under the awnings they drew in large doses of the best of tonics—pure, fresh air. No patient was allowed to leave the wards after sundown. Even on days when the convalescents could not leave the wards—and these were fortunately few—the wards were not uncomfortable. A chart of the temperature, as indicated by a thermometer hung in the pilot-house on the upper deck and by thermometers hung in the wards, showed an average temperature of 80° F. on deck and of 85° in the wards. This represents the average temperature while the ship was in tropical waters on her third trip.

Mortality.—Of the 236 patients five died—three of the Santiago men and two of the Porto Rican. One of the Santiago men died before we left the harbor, and two more the first night out; all three men were desperately ill when brought on board; the cause of death was either typhoid or malaria complicated by dysentery. One of the Porto Rican patients died of typhoid fever; the other of transverse myelitis; one came to us in a state of collapse, the other with complete paralysis of his lower extremities and of the muscles controlling the bladder and rectum. The total mortality was 1.49 per cent. The mortality among the Santiago men was 2.97 per cent; among the Porto Rican patients .85 per cent. The percentages given represent simply the mortality among the patients while on the boat. A number died in the hospitals after reaching Boston. In fact, some of the men who, while on the boat, ran normal temperatures and spent most of their time on deck were afterwards admitted to the Boston hospitals seriously ill with amebic dysentery or malaria, and several of them died.

The patients, in general, improved very much during the voyage; in fact, it can be said that all, those who died excepted, left the ship in much better condition than when they came aboard her. The malarias complicated by diarrhea or dysentery improved the least. Drugs and the attending physician played a com-

paratively small part in bringing about this improvement. The pure, bracing sea-air, the good food and careful dieting had much to do with it. But the great factors were two: first, the splendid work of the nurses and baymen. Too much praise cannot be given to them. Under the most trying circumstances, and under conditions that were often most disagreeable and distressing, these women and men rendered magnificent service; they were able, willing, tireless and uncomplaining. It is only their just due to say that very much of the success of the hospital ship was due to her excellent corps of nurses.

The mental effect produced by the fact that they were homeward bound was the other great factor. Sick men who would have died without a struggle in the camps and hospitals took a new grip on life, and were filled with a determination to live when they realized that every throb of the engines brought them nearer to Massachusetts and home. One cannot well describe the effect of such a thought on men, but one can see despair give way to hope, and resignation to resolution—that must have its effect upon disease.

The good accomplished by hospital ships in the late war, and their valuable services to the sick of both the army and navy, assure them a place in the war of the future. The time when it was considered humane and just to carry sick on ill-fitted transport ships has passed. Note the great mortality among the men carried north from Santiago on transports. And yet this should occasion no surprise; for transports had not the conveniences either in berths or medical supplies; they were officered by men not in the regular military service, to whom the requests and advice of the physician is of small import and from whom no redress is obtainable. Let the transport remain for the well and strong, but let the properly fitted, well-officered and well-stocked hospital ship be considered the only humane way of carrying the sick and wounded.

Yet even hospital ships are not without their limits and disadvantages. There is somewhat less working room on them than in the land hospitals; this, however, is of small importance, for one soon becomes accustomed to working in limited quarters.

Sea-sickness, as far as we could observe, had no marked ill effect on the patients. Less than 10 per cent. were affected after the first twenty-four hours out. Of course, some patients were unable to take much food or medicine by the mouth for twenty-four hours. Fortunately, whether by chance or otherwise, our sickest cases were but little affected. It is possible that after abdominal operations the vomiting of sea-sickness would be a very unpleasant feature; but, on the whole, sea-sickness is not a marked disadvantage.

Diagnoses were sent with the patients in a good proportion of the cases; but we rarely received any history of the cases, of the run of the temperature, or of the previous treatment. We depended solely on what we could learn from the patient and what we could see for ourselves. This was not ideal. The defect, however, is capable of easy amendment. It should be a matter of routine that with each patient there should be sent a short résumé of his case.

The factor that limits most—and it limits it seriously—the use of a hospital ship is the problem of getting patients to the ship without doing them serious or even fatal harm. What class of patients can hospital ships take and take safely? If all military

camps and hospitals were on the seashore, with good docks and landings convenient, hospital ships could handle with safety any class of patients with almost any degree of sickness. But unfortunately camps and hospitals must sometimes be inland, and the route to the sea must often be long and difficult. When disease invaded the United States Army in the tropics there came a cry from the friends of the soldiers to get the sick men north. It was a very natural but often a thoughtless call. Undoubtedly lives were sacrificed by the unnecessary moving of patients. Consider for a moment the actual conditions: At Santiago the patients we received had to be brought in army ambulances over from four to six miles of rough, rocky road, and then were only at the docks whence they had to be moved first to boats and then to the ship. All this consumes energy — priceless to men as sick as they. Again, accidents may happen. Ambulances were said to have broken down and even overturned when bringing the sick to the dock, and that meant delay and more moving. In Porto Rico transportation over eighteen miles of wretched road was necessary. In this eighteen miles were six or seven fords, which in an hour's time might have become impassable rivers — streams in that country rise from four to six feet in an hour. The possibilities may be imagined. Under such circumstances, is it at all wonderful that we received many men in a state of complete exhaustion and some in a state of collapse? The greatest judgment must be exercised in selecting cases for hospital ships. It is questionable whether it is not much better for very sick men to remain at a fairly good hospital, even in a tropical country, than to be carted over six to eighteen miles of rough road in order to reach even excellent hospital ships.

On the other hand, a hospital ship should not be turned into a mere transport by filling her up with convalescents — men who are practically well. Errors of judgment will creep in, however, and if they must be made, let them be rather in the direction of taking convalescents than of taking men who are too sick. For in taking the former you do no injury to the men themselves, and you aid the regimental surgeon by taking just so many men off his sick call and giving him so much more time for his hospitals.

In one way the *Bay State* did not have the opportunity of showing her entire usefulness. Had she been near the scene of an engagement the ship could have been of great assistance in caring for the wounded. Even if they were too far away for immediate transportation to the ship, yet, with our facilities for making a temporary shore camp, with our large store of surgical supplies and apparatus, we could have rendered good service. We would have been at our best, perhaps, if an engagement had taken place in our immediate neighborhood, for the ship had a fully-equipped operating-room, in which were two operating-tables and all facilities for doing aseptic surgical work.

As we look back on the whole incident, the thing, perhaps, that gives us the greatest pleasure and satisfaction is the fact that we never have heard of a patient complaining of his treatment while on the *Bay State*. The men were usually courteous and invariably grateful for even the slightest attention. We cannot but feel that any effort we made or any time we gave has been fully repaid by their appreciation.

THE DUTIES AND WORK OF THE PURSER OF THE MASSACHUSETTS HOSPITAL SHIP "BAY STATE."¹

BY MR. W. H. SEABURY, BOSTON,
Volunteer Purser.

You have paid me a great compliment in inviting me to appear before you this evening, to give you some idea of what my duties were as volunteer purser of the hospital ship *Bay State*.

I did such a small amount of work on the ship, in comparison to what others did, that I have found it rather difficult to make a paper containing anything of special interest. I said to Dr. Fitz that this would be an entirely new departure for me, but I felt that if I could say anything that would be of the slightest interest to you all I ought not to decline the polite invitation. He wishes me to tell you what I had to do, what I had to do with, and how I did it.

WHAT I HAD TO DO.

Make myself generally useful to our surgeon-superintendent, Dr. Burrell. Take charge of all the finances of the ship. Purchase all the supplies (those relating to the hospital department excepted). Pay all bills, wages of crew, etc. Receive requisitions for supplies of all kinds, from hospitals and troops, have them approved by the surgeon-superintendent, see that they were delivered and receipted for. To keep a general idea of what food supplies we had on hand, and say whether we could spare them from our stores or not. Receive the patients on shore in tents, or on the main deck of the ship. Give each one a number, take their names and temperatures, also their valuables. All this was recorded by me in a book at the time.

When a requisition for supplies was received (and nothing was delivered without a written requisition), it was divided into three different lists, one for medical supplies, one for clothing, and one for the food. These were handed to the heads of departments, and they saw that the articles were issued and turned over to me. I saw them delivered and receipted for.

WHAT I HAD TO DO WITH.

Everything in a commissary's department that I could think of or that others could suggest. I was not limited as to expenditure, nor hampered in the slightest degree. My instructions were, obtain what you think best, and have it all of the first quality. And what pleasure it was for me to labor under such instructions!

The food supplies were stored in six of the eleven large storerooms, or lockers, in the lower hold, the other five being used for a part of the hospital supplies. On the deck over these storerooms there was a large space enclosed with an iron grating, which I called the grocery shop. Our daily wants were supplied from this.

Our supplies consisted of in part, that is, for one trip, 10,000 pounds fresh beef, 500 pounds mutton, 600 pounds poultry, 2,000 eggs, 500 pounds fresh butter, fresh vegetables and fruits in variety, all kinds of canned goods, evaporated cream. Twenty-five to fifty loaves of bread were baked each day. Sixty gallons of ice cream (this kept in perfect condition, and the last was distributed to the patients the day before our arrival home). Our ice machine made three tons a day. Temperature of freezing-room about 28; cold

¹ Read before the Boston Society for Medical Improvement, November 21, 1898.