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The Best Method of Carrying Life-Saving Apparatus on Board Our Men-of-War

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Ebening Meeting.

Monday, 18th March, 1878.

REAR-ADMIRAL JASPER H. SELWYN in the Chair.

THE BEST METHOD OF CARRYING LIFE-SAVING APPARATUS ON BOARD OUR MEN-OF-WAR.

By Commander A. H. GILMORE, R.N.

THE subject of the paper which I am about to have the pleasure of reading to you, although embracing the vast issues of life and death, is, at the same time, so simple, that, whilst I hope to enlist your sympathies, I shall not trench long upon your time in reading it. The question affects directly those who go down to sea in what we are pleased to call ships; though what our ancestors would have designated them, I am at a loss to say. Well, these ships, although they, like the old men-at-arms, armed *cap-à-pie*, possess all the elements for destruction, also, like the men-at-arms unhorsed, are equally helpless when disabled, and are completely at the mercy of the light troops. Indeed, when not disabled they may receive a vital wound between the joints of their armour. In the prize-ring it was considered cowardly to hit below the belt, as the blow would be dangerous, and the pugilist dealing the blow lost the fight; in naval warfare the exact reverse is the case—the great aim and object is to strike below the belt and win the fight. A man struck below the belt could be carried out of the ring by his backers; a ship struck below the belt has but the resources of the ship for its crew to depend upon, for their safety. As I said before, the question touches immediately the crews of our ships; it also touches the relations and friends of these men and the country to which these trained men belong.

Although warfare has become so much more deadly of late years, our means of saving life are no greater (if so great) as they were some years ago. It was very rare in the old days of our wooden walls for a ship to go down in action, and I don't think there is a case on record of both combatants being sunk at the same time, the survivor was thus able to save the crew of its beaten foe; besides that, the floating *débris* was left for the men to cling to.

Very different are the conditions of warfare now-a-days; it will only be by possessing the greatest skill, seamanship, nerve and pluck (all of which I believe our seamen possess to a greater extent than the sailors of other nations), that a ship can hope to escape an action in which shot, ram, and torpedo are all brought into play, the injury

inflicted by two of which might cause instant destruction. C I should prefer to be sunk by a ram, as it might remain one up, although it is quite possible, that whilst effecting man- tion I might in the death-struggle give the ram its *coup*. Well, to save the crews of our vessels we have the usual ship but the larger of the boats will be lumbered up with engine, torpedo-gear, besides the chance that before the fatal moment when they would be wanted to save life, they may themselves succumb during the dangerous experiences which they are upon to go through now, both at picket or on aggressive torpedo boats. Truth is, that the inventive mind has been late in devising the best (by best, one of course means the surest means of destroying life, that there has been no time left, to contrive how best to save life. How to burn, sink, and has occupied too much time to allow leisure to look at the picture. In our old paintings of sea fights, we see boats about picking up the crews of sinking ships; in the Russo-Turkish however, in the few cases in which the Russians destroyed ships, the opposite has been the case; the Russians have been save the Turkish crews. Of course the most strenuous effort made to save their enemies' lives, but, alas! without success! remains, however, that the Turkish ships not being supplied ready means of saving life went down, and their crews went. What I propose, and what I wish discussed is, the best method of supplementing our boats with life-saving apparatus; I don't mean apparatus to support a man for an hour or two. Admiral Jellicoe and other gentlemen have suggested such means; but what I should see supplied to our ships is such equipment, in the shape of would suffice to carry their crews, and at the same time necessary amount of subsistence to support the rescued men until time. We have read in history how hastily constructed rafts the means of carrying shipwrecked crews across large tracts of the men eventually being saved. We judge then what such constructed and well-supplied rafts might do on emergency.

I have examined the models of several of our ships to ascertain capacity for carrying rafts without materially interfering with efficiency. I find that the "Rupert" could carry a raft on the mainmast, and the "Wivern" rafts on poop, fore-castle, and I would propose that vessels possessing poops and fore-castles have rafts on the top of them, constructed of air-tight cells or compartments, forming "flying" poops and fore-castles. The "Prince Consort" class could carry rafts in the main-castle, the "Achilles" and "Agincourt" the same; "Monarch" on the main-castle, and from after-turret aft. The "Devastation" class the hurricane deck divided into rafts. The "Invincible" class carry rafts upon the upper deck; in fact I don't think there is one vessel in the Navy in which some place cannot be found for the purpose. Our broadside ships might, also, carry

¹ The lecturer here showed a model of a raft (see Figs. 9 and 10) another composed of mattresses attached by a framework of wood.

falling-out davits, similar to the paddle-box boats of also suggest that boats be supplied in frame which might the place of any that may be lost.

The only vessels carrying extra boats are the troopers, Berthon's collapsable boats, which hang up like barn the ship's sides, and which would speedily be riddled. contrary to the usages of war (strange as it may seem) to bullets, might not some arrangement be come to as to the of torpedoes, say—I know the idea is Quixotic—to limit within a certain distance from the land? The people Paul's ship, on broken spars and fragments of the wreck, land; but in this 19th century many of our ships don't and as the fragments of the others would not float, it have some part or parts of the wreck capable of floating doubt that our seamen and marines would go into ac same pluck, energy and devotion as heretofore; but the more confidence if they knew that, if, through the fo their ship was to sink, they at any rate had a chance of b

I must apologise for trespassing so long upon your question is a most important one, and I trust that the evening may be fruitful of good results. Of course the rafts on the decks of ships and on their poops and forec rather cumbersome, and would add something to their top I defy anyone to spoil the beauty or add to the ugliness of and I should hope that our naval architects are capable of an arrangement of the weights as will allow of these s being carried. As it is a question that comes more seaman, and on which he is as well capable of judging, builder, it is to be hoped that our naval Officers will be the matter. Perhaps it is not too much to hope that the Admiralty may appoint a Committee to inquire into the our ships carrying either the life-saving gear I propose, c means for rescuing the crews of our ships.

The CHAIRMAN: I have now to invite discussion upon this subject wide one, and likely to be a very interesting one. If gentlemen would mind that our ironclads are, as has been said, much more likely to during an action, as we have seen in the case of the "Vanguard," were before, it will be seen how necessary it is to provide means for s our men. We have provided many means of offence, but we have in providing any means of defence under water. . . This raft (Fig at least of mitigating the enormous loss of human life which we have to regret.

Commander GILMORE: I may state that Sir William Mends, at the Transport Department, has a pontoon raft formed from the pont large vessels, but it is not a ready means of safety. I think I m Roper to explain his apparatus; it is a most ingenious invention.

Mr. ROPER: I was not under the impression that I should have to to-night. This raft (Plate XVII, Figs. 11, 12, 13) takes up the position captain's bridge would occupy in a merchant ship. Instead of hav for the captain to stand upon, I put a floating power under, on the c either with a flat bottom, a corrugated bottom, or a round one, as models, subdivided into lengths as a protection against foundering.

terfere with my floating power at all. The raft carries the necessary provisions, signals, stores, masts, compass, and everything that is required, all above time of emergency the contrivances are so arranged that there is nothing there are no lashings to cut away, but the raft can be immediately lowered. The weight of the raft is four tons; its length is 40 feet beam, 20 feet aft, and it will take about 58 tons to sink it. The cost would not be £200, or £250. We come much lighter and much cheaper than ordinary rafts. We have two rather strong forgings which keep the raft in its position, throwing down a lever we let go a tumbler, similar to letting go an anchor. The raft would fall by its own weight, and you lower it down by tackle or by any simple arrangement on either side of the ship. The launching Mr. White's boat is a plan of my own. It is Mr. White's boat, my system of launching, given to Mr. White about fourteen years ago by Hurst through myself.

The CHAIRMAN: The weight of the raft, you say, is 4 tons? What does she draw?

Mr. ROPER: Seven inches light; and loaded it would take about 58 tons; it would carry about 400 men with the load on board; the draught 2 feet. It would leave about 1 foot freeboard. The cubical contents are 100 feet, and the thickness of the material used one-sixteenth of an inch, steel. A raft of this kind, fitted on a large man-of-war, of 60 feet beam, and 20 feet aft, would carry something like 900 or 1,000 men. I have here a raft, built on the corrugated principle, that will carry two 16-lb. field pieces, horses, and about 150 men.

The CHAIRMAN: Is that model to scale?

Mr. ROPER: Yes; and it is built on the fluted-bottom system.

The CHAIRMAN: You trust to the fluted bottom largely for strength?

Mr. ROPER: Yes; and for a passenger ship, where she would not be picked up immediately, and you might have to navigate the raft, it is better to windward, either upon this principle or the tubular principle, than the flat-bottom system. The whole depth of the raft is 3 feet, but 3 or 4 inches or perhaps 6 inches, could be added, or it might be made less than according to the size of the ship. My raft could be lowered on the deck of a ship in action and shielded behind armour, and the cells could be filled with stop-riple bullets, which is a part of my patent, and if half the cells were filled it would carry all the people that could get on it; the flying and ordinary war ships also could be built upon my system.

Admiral RYDER: I should like, Mr. Chairman, to ask whether, considering the importance of the subject and the very short notice naval Officers have to-night, it would entertain the idea of continuing the discussion to-night understanding that there will be an adjourned discussion later in the season. It is an understood thing it would shape the remarks of some Officers here like to wait until that adjourned discussion or might prefer to deliver to-night. I ask you whether, considering the importance of the subject and the very short notice that has been given, it would be possible to have an adjourned discussion to-night.

The CHAIRMAN: That must be a question for the Council, it can be decided now. I shall feel it my duty to put the case before them as you put it. For the present I think we may go on with the discussion.

Admiral RYDER: The question is a very important one; as you state it is a very large question, and divides itself into many branches. Commander particularly devoted himself to one branch of it—viz., the *larger* question of the raft, which is a very important one in itself. Various descriptions of rafts have been proposed from time to time by different persons who have thought the subject out, but besides that, there is the subject to which I have paid particular notice, namely, the *smaller* question as you may perhaps call it, but it is the one which has been thrust upon our notice during the last few years by two or three instances, namely, the case of the "Bomby," that ship was burnt by fire, and when they came to muster all hands after she was burnt nearly all the Marines and a large number of boys were drowned. The commander of the "Thunderer," was the commander of the "Bo"

communicated with him on this subject years ago before I went to C me full permission to use his name, and I have no doubt he would had had the opportunity of writing to him on the subject. His sta was this, that if the hammocks of the "Bombay" had been buoyant have been lost. That is a simple way of putting it. Just picture to it means. We all know as seamen where the hammocks are stowed in are not down below, they are not secured, so that there is no difficulty them; they are in the nettings and perfectly handy, and though perh might not be able to get his own hammock, still if there are 400 men mocks, it does not much matter whether a man gets his own or not, hammock itself is buoyant. Now picture to yourselves the loss of the The weather is fine; she is run into by the "Iron Duke," and sank than an hour. Fortunately, as I say, the weather was fine; fortun that ran into her stuck close to her, and the men were able to b ordinary way by boats. But if it had not been so, if there had been and she had sunk more quickly than she did, there would have been a in getting the boats out, for there is much greater difficulty than ther getting boats out that are stowed amidships, a fact which is familiar to have been in our ironclads lately. Picture to yourselves the loss of have been incurred owing to the absence of any means provided at pre the lives of the men if the boats cannot be got at. Buoyant hamme case would do this; they would not do a great deal for you, but they, viz., enable the men to float in the water for perhaps a few hours—if sea running, then for nothing like so long a time—but long enough to by any vessel in company with them. If that could be gained it w point.

In future actions we shall have intentional collisions, and ships will six minutes, as the "Re d'Italia" did in the action at Lissa, whic minutes. There is no time to get out the boats in five minutes, bu for a man to fasten his hammock round him, and if the hammock is b be floating. I hope the result of this discussion will be to press this attention of the authorities. If they like, let them have rafts fitted t all events let us have such a simple measure as this taken of having made buoyant. There are various ways of doing this, and it would necessary to select the simplest and most economical as long as it investigated the matter rather closely some few years ago, and I b this way. It struck me when I was second in command in the (watching a particular evolution in which the two lines interlaced one v and passed very close, what would happen if the man at the wheel let a particular instant. Undoubtedly we should have had a collision; at 8 knots; we should have struck one another at the rate of 16 kn both have sunk, probably in ten minutes, and there would have been the water. It occurred to me then that a *buoyant hammock* for each m resource left to us. Commander Gilmore was pleased to say that I w of the cork mattress. I do not know that I am the inventor of anyth mattress has been long known. It is used on certain lines of p America constantly. All that I had to do with it was to press upon t the Admiralty the importance of making hammocks buoyant, and their Lordships to have cork mattresses. Their Lordships allowe of the "Valorous" to try some experiments. The first thing was mattress *buoyant*, and then *comfortable* for the men, for Jack like mattress to lie upon; he will not put up with what the Russian is with, viz., a very loose bag of ticking, in which the cork slips about fr the other. Our men are not content with that, and therefore the mat prepared with internal partitions to prevent the cork from slipping ab said they were still not comfortable enough, the mattresses were rat although the pieces of cork were very small they were not comfortab was found necessary to put some hair on the upper part of the mattr that ran up the expense of the mattress to a certain extent. Bu reached this point, viz., that the Admiralty four years ago gave direct

of these mattresses should be made, and that an experiment on a much larger scale should be entered upon; unfortunately, a change took place at the Admiralty counter-order was given. The cork mattress was exposed to this test, saying it was an improper test, but at any rate it was a peculiar one. It was said that a cork mattress with hair should be sunk six feet under salt water for to see what would happen to it. Of course it never entered my mind that it would be necessary to sink it in that way, therefore it was not an experiment I suggested myself. It was ordered, however, by proper authority, and tried the mattress was hung up for 21 days, and a log was kept of its proceedings at that time, which were these: The weather was alternately damp and dry the mattress indicated different weights on different days, varying some few pounds, and at the end of the 21 days it was not dry. I do not know whether any of the gentlemen present have noticed that their sponge is not dry when it comes out of the sponge-bag in which they may have placed it, if the orifice is closed the same reason it is not natural that cork should dry if left in so thick a space as the tick of a mattress. Owing to its having been immersed in salt water it behaved very like a monkey jacket at sea after it has had a thorough drenching; it is heavier one morning than it is on another, because the salt absorbs the water one day and then when the day is dry the jacket becomes lighter. However, it was considered sufficient to condemn the cork mattresses, because it was thought it would be highly inconvenient if they behaved in that way. That being the case I turned my attention to a waterproof cover for the mattress, or a waterproof sheet. It occurred to me if their Lordships would not have a cork mattress, the thing was to place a waterproof sheet 8 feet by 4 between the hammock and the mattress; the sheet being lashed up inside, would oppose a great deal of resistance in the way of the hammock sinking. I tried the experiment to satisfy myself in this way. The hammock with the sheet in it was lashed up, and I put a tank with the weight of a man under water attached to it, viz., 20 lbs., and after 48 hours I found it had not sunk, nor had the water forced its way into the hammock in any degree. Of course, in the open sea among the waves, the floating buoy would not be in quite so favourable a condition as it was in a tank. If the man who is attached to the hammock, and wants to be sustained by it, climbs up and forces it under water to some distance, the water may find its way into the hammock amongst the hair of the bed, and the hammock would sink. No doubt that men who have been at sea have seen how hammocks fall overboard and float away; they are lost in the distance if they are not picked up, but if there is nothing in the hammock the water will gradually force its way into the hair and the hammock will ultimately sink. I know, however, by the experiments I have made, that a waterproof sheet of sufficient size interposed between the hammock and the mattress will just enable the hammock to keep one man floating for a few days. After that I do not think many men floating in a rough sea would have a chance of living with their bodies immersed in the water. I believe that a hammock can be made of stout, strong calico for about four shillings a piece which is cheaper in the dockyards.

Captain P. H. COLOMB, R.N.: It seems to me in these matters you must think of general convenience. Humanity is constructed of that stuff which will not submit to a permanent inconvenience, however good the ultimate result may be. If you propose to supply life-saving apparatus to a ship, to come into use when that ship is sinking, you must consult the convenience of the crew on board that ship, and the convenience of the purposes for which the ship is constructed. Now I own that between the question of rafts as supplied for use in war, and the question of an arrangement for making the hammocks buoyant seems to me to be a very distinct line of demarcation. It is quite conceivable that making the hammocks buoyant, say, by means of a waterproof sheet, is no inconvenience to anybody, but, as Admiral Ryder has just pointed out, it is of great convenience to the crews of our ships. On the other hand, it seems to me difficult to place anything on the raft principle in such a position and under such an arrangement on board our war ships as shall not cause very considerable inconvenience. The weight carried by ships of war is cut so exceedingly fine that the position of those weights is so very accurately distributed, that even a

four or five tons carried at a height above the deck, would be a consid-
 would to some extent embarrass the naval architects. But on the ot-
 weight involved in making the hammocks buoyant is of course not to
 for a moment. Neither is the expense. And, speaking from the man
 of view, what we really do look for is immediate safety, not that we sh-
 to make a voyage on a life raft after the ship is sunk, but that we sho-
 ship sank under our feet, be able to save ourselves, float ourselves
 minutes, the ten minutes, the hour, or the two or three hours that we
 an action before steps were taken to pick us up. There again it seem-
 the buoyant hammock is the proper plan. I have thought for some
 less on the subject, and I find I always reverted to the buoyant hamm-
 the most easily arranged and the most useful for the purposes of the w-
 the merchant ship we have not the hammock, and there I fancy tha-
 ment of the life raft comes nearer to the ideal of what would be req-
 indeed the crew cannot depend upon being picked up in a matter o-
 hours; there indeed it is necessary for them to have the means o-
 themselves afloat for perhaps days, or it may be weeks, and therefor-
 for the merchant ship the life-raft principle is one to be aimed at,
 man-of-war I think that the buoyant hammock is the object of our
 the lecturer reverted to a point which I hope may be taken into cons-
 is adjourned to a future occasion, that is, to the question whethe-
 system of warfare which strikes a man "below the belt" is a fair syst-
 help observing here and there in different quarters, a feeling growin-
 employment of arrangements for sinking and destroying ships is s-
 similar to the arrangement for using explosive bullets. In former c-
 an attack upon a ship in her port, you boarded her, "cut her out," an-
 away a prize without injuring human life more than was absolutely ne-
 possession of the ship. Now, on a dark night, with disguised language
 dresses, you sneak out alongside the war ship. You pretend to be tl-
 are not, and you explode certain kegs of powder under her bottom,
 her and all on board to the bottom; and then you think you have d-
 ingly valiant action. I own that I hope the time will soon arrive wh-
 national arrangement may be come to limiting the use of weapons whi-
 without gaining anything like commensurate advantages, for I am qu-
 combatant who goes in, cuts the ship out, takes her away and maint-
 of her, does very much more for the country he serves than that c-
 goes and simply sinks her and destroys the lives of those on board.

Admiral R. V. HAMILTON: I was in hopes we might have hear-
 the Merchant Service speak on this subject, for it is certainly
 importance to them. For my own part I must say I quite a
 lecturer on the main subject which he has brought before us, ho-
 from him on one or two points. And first in his attack upon
 our ironclads, for that is a point upon which, having commanded t-
 for three years, I differ, having always thought her a very hand-
 revert to the main point, however, she carried 700 men, and h-
 held 250, therefore it is very certain that those boats ought to hav-
 mented by something in the way of rafts. No doubt ships ought
 additional means of saving life, and so far as I have heard, I certa-
 the hammock system as being almost the only one applicable for men-
 is also another advantage resulting from the use of the waterproof s-
 know the unpleasant result of having a hammock saturated with sal-
 being covered with this waterproof sheet, the comfort of the men we
 increased, as the bedding could not be wet. All the Cunard steamers
 according to the number of passengers. On one occasion I remembe-
 getting ashore on the coast of Newfoundland, and they were afraid
 down, and such was the excellent organization on the ship, that every
 his life-buoy. There was one man in such a state of panic, that he p-
 on feet foremost, so that if he had gone overboard, he would simp-
 head downwards. It is only by good organization in the hour
 you can meet the demands of the time of sudden emergency. I

wrecks in my life; I never wish to see another. In the one case went to pieces in five minutes, and every soul was drowned. The other near Portland in the month of November. A large ship came on shore at fire in the evening; it was pitch dark, and blowing a heavy gale, but on organization of the Coastguard, and the way the rockets were got on board past seven that evening 62 lives were saved, owing also to our having good luck a very large supply of blue lights and tar barrels on shore.

Admiral RYDER: Commander Gilmore spoke of making a raft of mattress cork mattress will only float 60 lbs. weight, that is, three men in the their shoulders just awash. By his raft of mattresses to support the whole of course means to have the men *on* the mattresses, so that taking a small weight, say, 120 lbs., it would require two mattresses to support him out of although one mattress will support three men in the water—this has been overlooked. Rafts of mattresses would be out of the question if there is one mattress to each man.

Rev. JOHN GILMORE: Although a clergyman, I was during a long position which gave me a special interest in the question of life-saving at many years I was stationed at Ramsgate, and was very much interested in boat work that went on in that port, and have thought much and long and over the various considerations suggested by that most important question of at sea. With reference to the subject of the lecture, I cannot help thinking are, as a nation, very apt to be content to live in a "Fool's Paradise," some part of our duty, to ignore some evident danger, and we are aroused from our apathy by some great and sudden calamity,¹ and then we realise how foolish we have been to have remained in such circumstances. Every imaginable appliance that ingenuity can suggest or money provide suggested and provided for the sake of the destruction of our enemies, means have we taken in proportion with reference to the saving of our lives. Undoubtedly we must feel that as we hope our extensive armaments are to destroy the ships and lives of opposing foes, so we must not forget that the armaments of those opposing foes are also sufficient to sink our ships, and the lives of our friends. In this possibility have we attempted any preparation to meet such a contingency? We must say, we have not. I conceive that both the suggestions made by the lecturer and by Admiral Ryder are essentially necessary. We shall require means for ensuring safety for the during moments of immersion, and also means for the safety of the man possible long period of exposure in the sea. It seems, perhaps, almost impossible on my part to suggest it, but I think if this waterproof sheet as shown supplemented by a purse at either end, into which the ends of the hammock be inserted, it would enable the hammock to be wrapped up much more so protect it from the water, and it would also have its uses on shore. The suggestions made by Admiral Ryder are very valuable. I was very much some years ago when my attention was first drawn to the raft suggested by Mr. Roper; really one almost feels inclined to think that the great reason these means of life-saving have not long since been provided, is this fact, that we can only be drowned once; and sailors are tempted as it were to take their chance of this once. If it were possible for a man to be drowned some twelve times the tenth time or so he might perhaps become urgent for the providing means of safety in the case of fresh danger for saving himself. But, seriously, not the sailors, who run the risk of being drowned, who have the organs of these matters on shore. We on shore should see to it that twelve men should not be drowned if we can help it, although one man cannot be drowned twice. Speaking as one associated with the sea and seafaring men all my life, expressing the spirit and feeling of, I most fully believe, the country at large for the Navy and sailors, I do believe any amount of reasonable and unreasonably expensive expenditure would be popular with the nation, that would

¹ Since this discussion took place, the dreadful loss of life by the fouling of the "Princess Alice" on the Thames has occurred. It is to be hoped that attention will now be fully given to this most important question.—Ed.

the idea that our fleets are provided with that machinery which sha of safety in the possible contingency of a ship being struck by a torp huge shots that are now prepared to be fired at them. Mr. Roper's i ingenuity absolutely a ship in itself—an empire within an empire. construction, and although an objection has been suggested as to the its weight on deck, yet true philosophy knows this well and always see it, namely, that in almost all cases in life, there is no such thing as : We have to weigh possible evil against possible good, and I cannot considering the immense weight of our vessels, that the centre of gra be elevated to a very disproportionate extent by a top-hamper of fo and that that could not be a strong argument against the expedien plan as that which Mr. Roper proposes. I imagine the lecturer ha own raft as a modification of that plan, where the bridge-raft of Mr. be accepted, and as something to place at any part of the ship on greater simplicity. With reference to the hammock and waterproof s would ask why should not it at all events be carried out? Supposing the horsehair mattress instead of the cork, the hair mattress in would itself have an immense power of buoyancy. If the water wer would be nearly as efficient as the cork, and by means of this water the water can be kept out. I must apologise for obtruding my opin meeting, but the deep interest I take in everything connected with ou be held as my excuse.

Captain LINDESAY BRINE, R.N.: In lieu of a raft of this descripti think that it would be more useful to try a system which would answ purposes; and I would ask why should not the bridge on board mos be so fitted as under certain conditions to be able to be used as an or landing or embarking troops, or for the ship's own purposes. It se this plan of Mr. Roper's is more fitted for merchant ships. If the objection, there is no reason why it should not be made half the si then still be able to carry a large number of men. I should lik objection, beyond that stated by Admiral Ryder, has been made to t the waterproof hammock? No doubt the lecturer's attention has bee these points, and perhaps he can give us some information.

Commander GURDON: I should like to ask one question. Has Com considered what will be the effect of artillery fire upon these rafts? day you find that your boats are absolutely riddled in five minutes. between the "Shah" and the "Huascar," the Peruvian ram's boa rigging were cut to pieces in five minutes. Have you calculate artillery fire on the rafts? ¹

The CHAIRMAN: The shortness of the notice has prevented the pra who take an interest in this subject; but before we close I should words, to strengthen what has been said rather than to critici indubitably, at present objections to the carrying of any more very above, in a man-of-war. When you come to understand that some of have a margin of safety which might be reduced to 17 degrees of he ranging between 30 and 40, and that these proposed additional heavy the extremity of the lever, if carried so high up, one can easily see wh as at present designed, the question of carrying more weights highl which naval architects watch with the most jealous care. I hope abandoned sooner or later in favour of guns carried lower down, an we may attend more to the life-saving question; but at present we c

¹ I fear that the concussion from the heavy guns carried in turret that any raft or boats carried, as Commander Gilmore proposes, w rendered unseaworthy; and in sparred vessels it is *absolutely neces* decks clear to work the ropes and spars. The only solution of the see, is to carry boats of prepared canvas in frame, that would fold line, taking up no room, with rowlocks of wood fitted in, shoes of w stern ready to fit in stem and stern posts, and a fitted keelson of wood in

in this manner. In a naval action, just at the time when it might be contrivances such as those brought before us could contribute most to the life, it would be found that they were extremely open to any mitraille or shot probably would be rendered useless long before the ship herself was sunk. regard to our passenger steamers, few people understand what is the between the requirements of the Board of Trade and actual practice. I across the Atlantic several times in 6,000-ton vessels, carrying actually to 2,000 passengers, capable of carrying with ease 3,000 passengers, probably boats on board, in case anything happened to the ship, which carried from 200 to 300 passengers, supposing all those boats had been water without damage (which is a thing you can scarcely expect from disciplined crew and still less disciplined passengers), and supposing precaution had been taken. Is it not then time for the British which travels so much by sea, to turn its eyes to the possibility the very unsightly structures which compose the upper decks and modern large steamships available for a purpose so useful as that of In order that this should be done, a great many persons have devised species of rafts to be put together in case of necessity. I need not a bridge-raft supersedes all these in its immediate applicability,—that of carrying provisions and water, and many other things which must not It may indeed be used as a bridge; but it is fitted really for the purpose saving, and is in a place where it can easily be got at if the ship should go very suddenly. It has in principle great advantages for that purpose, to see it closely studied and very largely adopted. As to our men-of-war take our service in the Navy with the understanding that a great man are to be run by everybody embarking on board the man-of-war than in the case. We are quite content to run those risks, and we ask for no the Navy, but to be allowed to make them (what the naval architect does make them)—seaworthy; to make them capable of being fought with possible risk, which the naval architect does not always understand; and also, a possibility of saving as much life as possible when the ship is destroyed. Those are the conditions we ask to be allowed to fulfil; and Officers of high rank come forward with ideas such as these of buoyant life any other form by which life may be saved, and certain disabilities may be removed from seamen, I think it should receive not only the appreciation of the authorities, also the appreciation of the British public. Unless the nation demands that seamen shall be protected, it is hopeless to expect that the subject will be So soon as the British public takes a question up, it is attended to in the House of Commons, and the House of Commons makes it necessary for the authorities to it closely also. The spirit of resistance to the introduction of new is not an unnatural one. It arises simply from the fact that no man in of a high official can possibly attend to these things, and the British public do good by inducing the formation of scientific bodies of men to whom they can go with confidence for the appreciation they have not themselves give. An Institution such as this does a great deal of good in this way together a great number of conflicting opinions; it gives everybody an whether a civilian or a professional man, of having his ideas discussed; it may be of increasing utility to the public services in that way. I should to see more attention paid by professional men to these lectures; but even a man, after eight or nine hours of office work to come here and sacrifice you ask him for a great deal more than most men are willing to give. to what has been said about the double use of the waterproof sheet the fatal enemy has ever been met by the British soldier or sailor than a bullet does not kill in any war, one-tenth of the number of those who die of disease. It has been found that sleeping at night on the ground is productive of almost all those diseases; and if by having this arrangement the hammocks at sea you can save life in the case of disaster, and only for our sailors, but also for their comrades in the army who are in larger numbers, a protection against the seeds of disease on ships prevent a diminution of the lamentably small number which we receive

active forces, we shall have done a great thing for the public service. mine can overrate the importance of the attention which must be subject, whether it be in the shape of hammocks for men-of-war, merchant steamers. We have arrived at a time in the history of which many go to and fro, and knowledge of these points certainly correspondingly increased.

Commander GILMORE: I am much obliged to you for your kind call my paper particularly "The best method of carrying Life-Saving board our Men-of-War." Of course anything that would tend to board a man-of-war would equally tend to save life on board a ship. Admiral Ryder alluded to the difficulty of getting out boats in these cases. A vessel has to get her boat out by tackle from mast to mast, 150 feet, the strain on the tackle is very great. My proposition obviates the propose that the beam boats shall come down under cover, and be protected would be no difficulty in putting on tackles; the tackle can always be and the boats ready for being turned out. The question of the construction of the beam boats to add a few pounds to the upper deck of our large ships seems to me unnecessary for Mr. Roper's raft, and you might taper some of the iron to remove one if there was any necessity, and so make allowance for weight. My raft, as Captain Colomb said, is a supplementary one. It was not intended to be carried on the bridge, but in such parts of the deck as may be found convenient. This raft would lie between the bridge and the bulwark; it would be plated so as to protect it from mits of cylinders would be packed with cork, which if perforated would not destroy the structure. (Figs. 7, 9, 10.)

There cannot be the least doubt in the world as to the great value of the mock as proposed by Admiral Ryder. It is very well for a man to be in two or three hours if there is a chance of being rescued at the end of the world in the case of a naval action, it would very likely be the case of Kilgobbin again, and no friends or enemies might be left to pick them up, and almost charitable to let him put his hands above his head and get rather than for him to be floating about for two or three hours with sinking at the end. The raft must come into play if you want to. If a vessel is at hand to pick up the men, well and good, if not, a small expense and without very great inconvenience, have the means of saving crews.

Mr. White's boats are something on the principle of Mr. Roper's that he was the introducer of the principle to Mr. White. Mr. White's are on the bridge and are launched from the bridge, but they have a tag on over any ordinary boats. In the case of a merchant vessel, and the possible boats, the rush of passengers in nearly every case capsizes several of them; but it is impossible, however much they rush on to or capsize it. The raft cannot be capsized by any action of the waves driven by the waves along the surface of the water without any being turned over.

Mr. ROPER: With regard to lowering the raft, my raft can be lowered by the iron plating on to the deck, and elevated again for launching lowered on deck and launched as the ship rolls. About the top-ham should come much lighter and much cheaper if you would dispense with the beams. If you were to adopt the hammock principle you would come to the same thing.

Commander GILMORE: Hammocks must be carried.

Mr. ROPER: But then the waterproof sheeting, and the cork for the bottom would come to five tons.

Admiral RYDER: I was not speaking of cork, I proposed the raft weighs 4 lbs., or 500 will weigh 2,000 lbs.

Mr. ROPER: But your sheet won't float you.

Admiral RYDER: The mattress in a waterproof bag, or in a sheet that remains impervious, will float six men.

Mr. ROPER: A cork mattress?

Admiral RYDER: No, no cork at all, a hair mattress; the buoyancy mattress, if made impervious to water, is over 120 lbs., which will float with their heads and shoulders out of the water, but the indestructible buoyancy cork is the only reliable buoyancy.

Mr. ROPER: My raft, to carry 400 men, weighs scarcely 4 tons. Had the "fleet" had a raft of that kind, with a raised cabin in the centre, holding to 200 women and children, all would have been saved, and where you lie and forecastle to your vessels, you could have an extension of those deck raft principle; they would carry all the people on board, and come very much better than the boats.

The CHAIRMAN: It only remains that I should propose a vote of thanks to the lecturer for the paper which he has read to us. I am sure the meeting will derive great pleasure in complying with that, and also in thanking Mr. Roper for his explanations.

Monday Evening, 6th May, 1878.

ADJOURNED DISCUSSION.

REAR-ADMIRAL JASPER H. SELWYN in the Chair

Admiral RYDER, who had moved the adjournment, having preferred to further remarks to a later hour of the evening,

SEÑOR DE LA SALA said: I had not the pleasure of hearing the interesting paper by Commander Gilmore in March last, on the subject of "Life-Saving Appliances—Men-of-War," but on reading a report of it in the newspapers, I was in sympathy with some of his views, and also with those of other gentlemen present on the occasion, because they touch very closely upon some ideas of my own on the subject, consequently I had the honour of bringing them under the notice of the meeting. It seems to me an abnormal state of things that the minds of men should be mainly directed to the study of the most effective means of destroying ships, instead of thinking of the far more noble and important of the *saving of life*. England possesses the finest fleet in the world, and in the cost of her modern men-of-war, it is but right that every means should be taken to ensure their safety. England also possesses the finest and most experienced seamen, or, as the First Lord of the Admiralty said two days ago at the Academy Banquet, "the most magnificent of crews;" surely, then, on the part of thoroughness and logical consistency, no expense should be spared—left untried of protecting their lives from the many dangers to which they are exposed. It has now come to be generally understood that something more must be done in the way of producing more effective life-saving apparatus than is at present in use. In the production of this, some important considerations are involved, of which are, cost, bulk, capacity, and readiness for use. Keeping these in mind, I have endeavoured to construct something which I believe embraces these considerations. In the small models which I shall presently have the honour to submit for inspection, you will see the principle upon which, what I would call folding life-boats are constructed (see Figs. 3, 4, 5). This is a combination of thin strips of pine and cork, covered by waterproof canvas, and arranged in such a manner that from their folded and flat condition they can, by a simple handling of cord, be turned into the form of a boat ready for use. Another advantage is, that it is easy to pull the structure into the shape of a boat before dropping it into the water, for it can be thrown into the sea in its folded condition, and there turned into a boat by any one who can swim. Being adapted either for use as a life-boat, or to remain flat, it is thereby a great economizer of space—a very impor-