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“The Maritime Defence of England, Including “Offensive and Defensive Warfare” Part I.—The Organization of Our Maritime Forces

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LECTURE.

Friday, June 16, 1876.

ADMIRAL SIR HENRY J. CODRINGTON, K.C.B., in the Chair.

"THE MARITIME DEFENCE OF ENGLAND, INCLUDING "OFFENSIVE AND DEFENSIVE WARFARE."

PART I.—THE ORGANIZATION OF OUR MARITIME FORCES.

By Captain R. A. E. SCOTT, R.N.

the short space which has elapsed since I commenced the paper now in your hands, the manly and vigorous policy of our Ministry following up their purchase of a vested right in the great highway to India and the East, has for the moment vindicated our national position. The rapid changes, however, which have been truly marked by the money-market barometer, show what is still in the air, and prove the wisdom of the proverb, "If you wish for peace, be prepared for war."

If my paper should call greater attention to this necessity in a country the wealth of which is mainly a floating capital—our maritime trade, according to the *Morning Advertiser*, amounting annually to the enormous sum of 700,000,000*l.* sterling—I shall be amply repaid for the time spent in its preparation.

Before commencing from the stand-point of a few days since, I wish to remind you that the Mutiny in India happily found us with the veteran soldiers of the Crimea ready to our hands, and that on the other hand, the French, proud of their laurels there, and at Solferino, were never more confident of success than when they marched towards the German frontier.

We at the commencement of many a former war, have paid dearly for our own over-confidence, and have had to sacrifice not only vast sums of money, but also the far higher treasures of human life, before the pluck and dash of our soldiers and sailors, backed by the energy of our people at home, enabled us to pull through all obstacles with ultimate success.

The present time is ours; and I venture to think that at a very small outlay, we may *at once* make our preparations so complete, as not only to place our country in security, but also to make her so strong (by uniting her vast resources) as to preclude attack.

Were this done, our country would be enabled to maintain her position as the arbiter of Europe, and to use manfully the strength with which the "Giver of all" has so richly endowed us for the benefit of weaker nationalities.

I find that it is impossible in one lecture to go fully into the question of naval attack and defence, and to show the improvements which could be easily effected, and might be quickly carried out so as to double the fighting capabilities of our existing ships. I also wish to indicate the requirements of *future* war vessels from a sailor's point of view, having *due regard* to the full utilization of our present iron-clads and unarmoured cruisers. I therefore trust, that the Council of this Institution will permit me to bring these matters before you within a few days, and thus enable you to judge as to the necessity for initiating in the work-shop and drill-shed, and in carrying out other needful preparations, the vigour just shown in handling that national weapon, the British fleet.

In stating that we are a maritime people, and that we cannot maintain our position among nations if we suffer our naval force to decline, I lay myself open to the charge of uttering truisms, but they are truisms of such vital importance to us, and their truth is so constantly ignored in our measures, that I believe they cannot be too constantly dinned into our ears.

It will appear incredible to our descendants that it was left to a young Officer of the Guards publicly to point out to the English people that some, twenty years, previously we had voluntarily waived those maritime rights which constituted our only real defence in time of war. As Mr. Ross-of-Bladensburg states, "This, in a nation like "our own, could only have become possible when a veil of forgetfulness "and ignorance had dimmed the vision of the real cause of our former "success;" but how are we to account for the fact that whilst acknowledging as truisms the statements with which I have commenced my paper, we have done our best, and still strive after the unattainable position, of vieing with continental powers in maintaining *large* military forces? If anything could convince the nation of its folly, it would be the lecture of the young Officer who called our attention in this room last week to our "neglected maritime rights;" and I am glad to follow up that interesting lecture with a few words of caution on our "maritime defences."

Such words were never more needed than at the present moment. The political position of affairs is becoming more complicated, and an explosion may at any moment be looked for when all the conditions for a discharge of war-tension are so favourable as at present. Germany already possesses an active army of 1,200,000 men, and has, according to Count Moltke, an additional territorial force of 1,000,000 soldiers as a reserve. Russia has a force which, as Lord Derby tells us, "could be made up to exceed those numbers," governed by "the "most peaceful of monarchs" (see the *Times* of 28th January last), and yet "as great a conqueror as Alexander, Cæsar, or Napoleon "forced by an instinct stronger than his will, which drives his people "southward and eastward to take possession of a territory three times

"the size of Germany." France is already repossessed of immense wealth, and is eager to recover her lost prestige, and these and other nations are all anxiously looking to what recent events in Turkey may force upon them.

How unreasoning we are! We admit all these elements of danger; we admit that our "very existence" as a nation depends upon our Navy; whilst urging the superiority of our fleet to that of other nations, we are obliged to confess that a reverse on the seas is *possible*, and that if a continental army once landed on our shores, we should run a chance of being blotted out from amongst the great powers. When we know on good authority that we are dependent even for the food of half our people upon a maritime trade passing over sea, and therefore particularly exposed to destruction in war time, we at once feel the truth of the observation, and yet we fail to make our ships, including their armament, as efficient as they may be made, or their number as great: we neglect to use the means which offer themselves for manning and maintaining them efficiently; we voluntarily give up our powers of destroying the commerce of our enemies; and we content ourselves with protecting our coasts with torpedoes which are almost as dangerous to ourselves as to our enemies.

Let us look at the first point I mention for a moment—the efficiency or inefficiency of our ships. I do not here propose to examine this critically. I wish merely to call your attention to one or two national characteristics, pluck and dash, which indicate the nature of the armament most suitable for us.

Before, however, entering upon these points, I must allude to one requisite in a good ship of war with which we cannot dispense, viz., "unsinkability." Unless a vessel can be kept afloat, of what use can be the finest crew, the most powerful weapons, and the highest speed? The "Captain" was a capital fighting machine as long as she could be kept afloat; and both the "Ré d'Italia" and the "Vanguard" were powerful engines of war, but what did this avail them in the hour of trial? I would therefore premise that this all-important requisite is a point in which some of our present ships would appear to be deficient, and that in my opinion the under-water deck, excellent as an additional means of defence, is not calculated to remove the defect. I hope, however, to be allowed to go into detail on this and other important questions in a future lecture.

The next point is that her weapons of offence should be such as our men would be likely to wield with success. Amongst such weapons I would almost, if not quite, give the first place to the ram. The nerve, coolness, and resolution of our seamen is proverbial among nations, and the ram is a weapon which could only be used with advantage where pluck and coolness go hand in hand, and where the resolution is well supported by the skill to direct the blow—yet several of our vessels are not armed with it, and of those which have it, some are too weak in the bottom to support the shock of impact with an opposing vessel of heavy weight. If, again, we look to the guns, we are not quite in such a position as I should like to see us.

We have at this moment only four 35-ton guns at sea in one ship,

the "Devastation," and two 38-ton guns nearly ready, with two more 35-ton guns, the sole armament of her sister ship, the "Thunderer;" but before we have at all assured ourselves that we have obtained from them the greatest results of which they are capable, we jump at once to 80-ton guns for no other reason apparently than to outdo the Italians, who first talked of 60-ton guns, and then to outstrip our 80-ton guns in size went to 100-ton guns. Will it not surprise some at least of my hearers, to be told that no 38-ton gun has yet been tested up to 100 rounds, or even a third of that number in quick firing; and that, so far as our experience goes with guns of heavy calibre, the metal of which the projectiles are composed, will not bear the pressure which it is necessary to put behind them in order to get up a moderate velocity. The shot of the 80-ton gun show a sensible enlargement of diameter, arising from the compression in the direction of the shot's length.

Whilst, however, we have waded into unknown depths in the direction of big guns, we perpetuate known defects in respect of those of smaller calibre. We know that an 18-ton gun will pierce the thickest armour-plating afloat, we equally well know that a 12-ton gun will not do so, and yet the "Sultan" and "Hercules" are the only two broad-side ships afloat which carry guns of the former size.

We adhere to cast iron for our projectiles. We found chilled shot the best thing known at one time, and we adhere to them, regardless of the superiority of steel. The result of this is, that the round form of front has to be adhered to; for, were the front *flat*, the projectile would break up on impact. But, as the flat-headed shot will bite at about 66° from the perpendicular, whereas the round-headed shot fails to do so above about 33° from it, the loss we may suffer from our backwardness in introducing improvements is only too evident. The Germans, however, as usual, being more apt than ourselves in "appropriating new forces" (to use the expression of the Chief Constructor), have manufactured flat-fronted steel projectiles for their 56½-ton gun. Even the Brazilians, with their little experience in naval warfare, are ahead of us in this. In the matter of gun-carriages, by dint of constant pressure, I succeeded, some few years since, in introducing improvements which met with the hearty approval of the Service; but these have never been fully completed. Without dwelling upon the sad end of the inventors of many of the improvements recently utilized for our naval armaments, viz., Norton, Lawrence, Chalmers, and Snider, I will refer only to the inventor of the Harvey torpedo (the very weapon for our sailors), and himself, the man of all others qualified to teach them to use it, who had to appeal to foreign countries to recoup the expenses he had been put to. With such an instance as this of our backwardness in using the mechanical skill of our people, we cannot feel surprised at the statements in the public prints, that inventive talent is languishing, to the great detriment of our national wealth.

When we turn from the weapons to those who are to direct and wield them, we find our preparations equally backward. This great country possesses rather less than 20,000 naval seamen; it has no

reserve, except old Pensioners, and no plan for supplying the large number of men that would be needed in a prolonged struggle. The so-called Naval Reserve force, expected to number 20,000 enrolled men this summer, could not be removed from the Mercantile Navy without destroying our trade; and the number of Coast-guard men who could be advantageously sent from their stations on shore, is much too small to supply the gaps in our trained men in time of peace, and would prove but a drop in the ocean in time of war.

The Royal Marine force has been reduced to the number which is sufficient only for ships in commission, and very recently it was proposed to abolish it altogether. Really the lessons of former wars appear to be wholly thrown away upon us! Here is a force to which we ought to look for keeping up the supply of trained gunners, with "sea-legs and sea-stomachs" (as Captain Wilson expresses it), a force of infinitely more importance to us than troops of the line, consisting, as it does, not only of soldiers but of skilled naval artillerymen, and we quietly contemplate supplying their places with raw recruits obtained at enormous cost in times of danger, and, when obtained, likely to require nurses to look after them, until the time of sea-sickness is got over. Marines, on the other hand, on being embarked, are at once at home, adding to the power and discipline of our ships while they remain on board, and ready at a moment's notice to land and show themselves, as they have ever done, enduring, reliable, and loyal soldiers, and hold tenaciously such of our dependencies or coaling stations, as it might be of vital importance to us to keep fast hold of during a European struggle. We have not, however, yet made as much out of them as can be made. In the commencement of our Peninsular war, the Duke was constantly thwarted by the want of trained artificers to carry on the operations of a siege, and the corps of Royal Engineers was created—a corps which has since been as eminently useful to us in peace as it proved itself able in war. Our future naval operations will require mechanical skill, and a readiness of expedient, to repair our gun-carriages and other weapons, such as can be obtained only from early training. On talking over this matter lately with Captain Wilson, he suggested the question: Why not create from our Marines a corps of Royal Naval Engineers? The idea appears to me well worthy of our earnest consideration. We have had, only recently, too many costly instances of the want of mechanical knowledge. To look to the Merchant Service to replace our valuable trained men is, I repeat, a serious mistake. To attempt to remove the so-called Royal Naval Reserve men, who are the backbone of the Merchant Navy, would entirely upset its discipline. We should have innumerable repetitions of such massacres as those which have recently startled us, and our commercial lines of traffic would be thrown into hopeless confusion. The maintenance of our foreign trade is a first necessity, and to touch its *personnel* would quickly bring about that which Admiral Porter points to in case of war with the United States—the destruction of our commerce.

The rising sailor boys, as I have repeatedly pointed out for several years past, instead of being trained in the use of machinery and in

that practical gunnery which they will hereafter be called upon to employ, are still drilled to run about with handspikes and tackles; and, by-and-bye, when past the age at which the eye and hand can be taught to act in unison, will be required to exhibit the thoughtful and steady precision needed for working guns by steam-power. This is not the way to ensure that each of our costly bullets shall reach its billet, and do its full work upon an enemy.

This leads me naturally to the next point of our mistaken policy. We are not only prepared to risk the destruction of our own commerce, but have voluntarily given up the power of destroying that of our enemies. "His Majesty," writes Lord Heytesbury, in 1802, "will never consent to place out of his hands, in a treaty of peace, those means which may be necessary for the security of his dominions in time of war." We have since been fatuous enough to do so, and the possible consequences have been so clearly pointed out in Mr. Ross's able paper, to which I have already alluded, that I need say no more on this point.

Finally, no steps have yet been taken to unite and organize the large forces of which we could make available in time of war for the defence of our coasts. Thus, with a numerous sea-coast population, possessed of every attribute necessary for waging successful warfare against all comers, with maritime resources far superior to those of any other nation, we may, by some unfortunate combination of circumstances in these days of rapid movement by steam—when invasions, to quote Lord Mansfield, are always ready organized,—find the command of the seas about England in the hands of our enemies, and our country at their mercy.

At the present moment our first line of defence consists of a few small turret-ships and gun-boats, which would be unable to keep the sea in heavy weather. It will take months to fit out another sea-keeping ironclad squadron, and long before the fleet on which we pride ourselves could be brought from the Mediterranean, a combination of two or more hostile powers might send to our shores a fleet and an army which by a sudden and unexpected blow would do us incalculable damage.

And now for the remedies I would propose. I will commence with the last defect I commented upon—the absence of an organization of the *personnel* of our maritime resources. This is perhaps the most important point, and it is the one which should be first attended to. We have in our veteran coast-guard men the best possible nucleus for a defensive coast force. These men have been trained as gunners, have been long accustomed to judge distances at sea, and are familiar with the powers of their guns.

Next there are our yachtsmen, consisting of the pick of English sailors and fishermen, and numbering not far short of 5,000 men, who might all be trained with advantage to themselves as well as to the country to the use of guns and the working of gun-carriages of the newest type.

Then again we have at all our sea-ports, numbers of fishermen and boatmen, as intrepid and bold as heart could desire, who would by

trifling encouragement be made to swell this reserve force, and to find pleasure in learning to fire well.

The dockyard men, or some of them, could be trained to be stokers, so as to be available as a reserve of stokers in time of war; their places being supplied by naval pensioners, who should, as far as possible, be employed when extra hands are required at our dockyards and arsenals, so as to know this work when called upon to perform it.

Lastly, there is our large body of Volunteer artillery and infantry, who have already made themselves skilled marksmen, either with large guns or rifles, and whose natural aptitude for shooting might be kept up and increased by periodical competitions and drills under the direction of our Admiralty and Naval Commanders-in-Chief.

Wherever, therefore, landing-places exist on our coasts, and at all these, coast-guard stations are to be found, I would have stations to which the above-mentioned forces should be told off, and these stations should be provided with suitable guns, and be connected with London by telegraph, and with each other by good roads and railways, as well as by telegraph wires and other modes of signalling.

These forces should be practised as far as possible afloat as well as on shore; and both for purposes of drill and defence, gun-boats mounting plate-piercing guns should be stationed at all our sea-ports and off our principal landing-places.

The fast river steamers should, in time of war, supplement these gun-boats by acting as torpedo-craft, whilst our steam-tugs, acting as rocket-vessels, should be in readiness to ram and run down the enemy's transports and boats. If the whole of our available craft of these descriptions were told off to the stations nearest the places where they ply, they would easily, under the skilful commanders of these river-vessels, and united under the flag of a dashing Commodore, throw a hostile force into confusion and render a landing impossible. The addition of a fire-ship, or an explosive vessel or two, would complete their work upon the fleet which brought over the forces intended for our destruction, and the result would be such as to leave us in security from a similar attempt for many years to come.

I have thus briefly indicated how England's defence can be insured by local means, and that the requisite forces could be provided from local sources without materially interfering with our manufacturing people, which is a point of the utmost importance to us; without drawing upon the seamen of our Mercantile Marine, which is of still more vital importance to us; and without detaining on our coasts the war-ships needed for their protection, and for destroying the fighting ships and ruining the commerce of the enemy.

I will now proceed to show how the last can be supplemented with other forces at our disposal, and enable our trade to be successfully carried on by our merchant navy.

The Mercantile Marine comprises numerous swift ocean-keeping passenger steamers,¹ which in war-time would doubtless become the carriers of a large part of the most valuable portions of our merchan-

¹ Efficient despatch vessels could always be selected from these.

dise, as well as of the munitions of war required at our more distant naval stations. Such vessels would, if war were now to break out, owing to the absence of organization, be dependent for safety on speed alone, and become a source of weakness rather than of strength to our fighting ships. What seems to me to be required is, to arm them with light guns, torpedoes, and Congreve or Hale rockets, and to enrol the men who will have to handle these weapons as part of the Royal Naval Reserve, and by appropriate rewards to induce them to take an interest in their drills, which should be taught them at the expense of the nation. Provision should be made by the arrangements at all our ports as already indicated for imparting the necessary instruction and for exciting interest in the work without interference with their ordinary duties, and the effect on their *morale* would be very great. Whilst waiting for another engagement, the better class of our seamen would hail any employment of this kind with satisfaction, and their feelings would influence others.

These drilled men should be divided, first, into two classes or more, the lower to be called gunners, and the higher class marksmen, both classes to be given suitable badges and also a small retainer in the shape of pay, and pensions when wounded in action. The badge would be a public recognition of their skill, and show them to be militant, and this honourable mark of England's appreciation would render them more patriotic and more eager to perfect themselves in the use of the weapons they would have to handle should war (as it undoubtedly will) come upon us.

Vessels manned in part by such men would soon become permeated by law-abiding principles, and being provided with proper arrangements at the Government expense, and with a subsidy to cover the increased insurance in war, would become a very cheap and efficient force, fully making up by speed and numbers for the lightness of their armament, and rendering the further addition of lightly gunned royal cruizers "needless."

Secondly, with regard to foreign seamen in our Mercantile Marine. The Danes, Swedes, and Norwegians are of the same stock as that whence we sprang, and have so nearly the same sympathies and interests as ourselves, that I believe we should do right in giving them all the privileges of English citizenship, so as to bring them into closer relationship with our own sailors, who would, I believe, benefit by their temperate habits as much as they are now deteriorated by companionship with the sailors from the mixed seafaring populations of the Mediterranean. Were this to be done, and the chance of prize-money or bonus superadded, I think the necessary supply of reliable merchant seamen could, if wished, be readily obtained from our natural allies.

The Mercantile Marine would by these means strengthen the Royal Navy, and could continue to do its work of providing supplies during war, for its *personnel* would be kept up to a thoroughly effective strength.

I have only to add that the merchant navy, thus organized and commanded by its own officers, duly trained for such work and

rewarded by honorary rank as lieutenants and captains, would when moving within certain pre-arranged parallels, be enabled to defend itself against privateers, and would likewise be enabled to act as a medium of communication or connecting link between our war cruisers, stationed to protect them against ironclads or heavy war vessels.

This protection against the enemy's war ships can only be secured by powerful cruisers; and, looking at the vast water frontier and the extended possessions which England has to protect, with a naval force of under 20,000 trained sailors, the question as to what class of vessel will be most useful, *i.e.*, good at all points, becomes very important. The strength of the metals of which she would be built is measured by their tenacity at the weakest part, and this simple rule is not inapplicable to so vital a matter as England's maritime defence. She cannot afford to run the risk of a serious wound to her commerce, even at her most distant possessions; and, therefore, every individual ship built for fighting should contain within herself every element of offence and defence. The size of this vessel must be greatly influenced by cost, for there is a necessity for the employment of a large number of such ships, for, as the *Times* informs us, and I think it wise to repeat the statement, "that the most powerful of ships could 'only be at one place at a time,' and that, allow me to add, would be just the place a wary adversary would steer clear of.

As already stated, the immediate duty of fighting cruisers would be the protection of our commerce against the enemy's war ships, and therefore they would be spread out along the lines of traffic, keeping up communication one with the other by means of electric lights at night, fog horns of great power, and other pre-arranged signals; and gathering intelligence from the merchantmen passing them. It appears to me that these war ships could be coaled and provisioned at sea by means of suitable extemporised rafts, which their crews should be practised in putting together and in using for landing their men; and I think these cruisers or sea-watchers might be often anchored in mid-ocean. Very light telegraphic lines could perhaps, in many cases, be laid down, with buoys and flags to mark anchoring stations; a plan which, if as successful as similar devices in the Crimea were, would place England, the flag-ships of her Commanders-in-Chief at the principal foreign stations, and the sea-keepers in mid-ocean, in close communication. Should such an arrangement be found too difficult for achievement at the present time, a telegraph ship or two and a station on shore might be provided for the more important points.

Before concluding my paper, I desire again to urge the necessity which exists for the better organization and teaching of our crews, and for giving every facility, both to Officers and men, of acquainting themselves thoroughly with the handling of our newest weapons, under all the varied conditions of maritime warfare.

Our ships now abound in engines for destroying life, which require long and careful training to use with that steady coolness and precision which lead to victory.

Nelson, Cochrane, and others, like Alexander, Cæsar, and Napoleon,

were themselves masters of the art of war, and hence could inspire their followers with confidence; but what commander could inspire an untrained crew with the knowledge and skill needed to manage the machinery of a ship, and to work her 80-ton or other guns by steam machinery?

The devotion of German Officers and men to mastering their duties is now proverbial, but it is not so well known that the French Government has recently published plans of all foreign ironclads, for the instruction of its Naval Officers. May we soon follow the example thus set us, and stir up such of our Officers—as have the requisite mechanical knowledge and are able to impart it—to teach our Navy the relative values of the different guns and armour used by all maritime powers.

If the preparations which I have mentioned as essential to our maritime supremacy be postponed, owing to our self-gratulations at the immediate results of our recent unexpectedly vigorous policy, it is to be feared that our pre-eminent pluck and dash may not prevent our being landed in disaster, when opposed to the better disciplined skill of more painstaking nations.

If, however, the organization of our maritime forces be at once undertaken, and the strength and nerve of our seamen be utilized as they should be; and if full advantage be taken of our mechanical skill in improving our armaments; I, for one, should have no fear that we should lose that empire of the sea which we have so long and so gloriously maintained.

THE CHAIRMAN: If any gentleman feels inclined to give us further information, we shall be very glad to hear him. I hope there will, by permission of the Council, be a further opportunity of hearing the second part of the subject from Captain Scott. I should like to remark that the question of laying down telegraphic lines in mid-ocean has been tried, but hitherto unsuccessfully. I have a recollection of a floating vessel, the "Brisk," being moored in the chops of the Channel for that purpose, and it was found rather an impracticable thing, not merely as a mercantile speculation, but also as to certain mechanical difficulties. I do not say these difficulties cannot be got over, but we should like a little more information with regard to the mechanical part before we can agree as to its feasibility. I did not quite understand how the extemporaneous rafts for coaling are to be used at sea, and I should like to know that from Captain Scott. Many years ago, the idea was advanced of utilising large merchant steamers for carrying naval artillery, that is to say, preparing them so as to put heavy guns into them if we should require their services in war. I rather think a certain number were thus fitted, but the plan came to nothing nationally, because it was found that the alterations requisite for converting them into vessels capable of carrying what were the heavy guns of that day (though their weight would be trifling as compared with the ordnance of the present day) were so great as to materially interfere with their passenger capabilities.

THE EARL OF DENBIGH: I wish to ask Captain Scott if he has heard of a plan which I met with not long ago. A gentleman who has given a great deal of time and consideration to the defences of our country, told me that he had made drawings of a plan, which had much interested Sir William Wiseman, for utilising the merchant vessels, or rafts, or any floating craft which you might be able to lay hold of, at a few hours' notice in case of invasion. He would have a sort of built breast-work, shot proof, something on the circular principle, like the "Popoff," which should surround any such craft. A temporary deck might then be thrown across of sufficient power to bear the guns. He would also have a built dome that would work in sections over this, sufficient to turn ordinary shot. The advantage

was that he would be able to get a steady deck to fire from. I only heard of this in conversation, but when he told me he had submitted it to Sir William Wiseman, who thought highly of it, and that it might be worked out, I was anxious to take this opportunity of asking Captain Scott, or anybody else present, if they had heard anything about it.

MR. SCOTT RUSSELL, F.R.S. : I feel it to be my duty as a shipbuilder to say that I feel highly gratified at Captain Scott having put to us a problem, which I am anxious sailors should put to us, as to whether we can do what they want. He says that he distinctly wants to have unsinkable ships. Now, I venture to answer him in one word that it only needs that sailors should wish to have unsinkable ships, and they can get them, not only without practical inconvenience in the use of them, but with great practical convenience in the use of them, and with great addition to the security of the ship, and the managability of the ship and the gun batteries. I hope, therefore, that in the next paper he will give us, not only his views as to the extent to which he desires to have these unsinkable ships, but will also go further, and let us shipbuilders know what are each and all of the other qualities he desires, to make his war-ship fit for his sailor's purpose. May I just make one suggestion to him for the next paper? I should like him to say the degree to which he desires his ships to be handy and clever at backing, manœuvring, stopping, and turning, because I can tell him that ships far more handy than those we have now in the Navy have been made already for other purposes, and might most easily be adapted to the Navy, if the sailors wished; but if they won't say what they want, how can they expect us to force them upon them? On one point I hope the author of this paper will dwell in his next paper, for I have been much delighted with his allusion to the subject. As I am not a sailor, I only speak to you from the engine-room; that is my department. Now, speaking to you from the engine-room, I venture to make a suggestion to the members of the profession, which my experience in the engine-room makes me think of great value. I think that all the Officers on board ship should, as much as possible, be trained to the knowledge of the others' business, in order that they may know how to co-operate. For example, I think a sailor should know as much as possible of the engines, of the engine-room, and of the boilers; for I think without that knowledge, the captain on the upper deck, steering his vessel, may make very great blunders. I have often myself steered vessels. It was my good luck as a boy to be trained to the sea before I was trained to the engine-room, and to get sea legs, and all that sort of thing, before I took to shipbuilding, and I have always been grateful for it. But I have seen from the Captain's signal-room most erroneous and most injurious signals sent down into the engine-room; signals that could not only not be fulfilled, but if they had been at the time, and in the succession, and in the way in which the Captain gave the orders, they would have destroyed the engine. And why was that? Because the Captain on the deck knew nothing whatever of the engine-room to which he was speaking, and he therefore gave orders which were contradictory, impossible, and most dangerous if attempted to be carried out. I would insist on all engineers being good, well-trained seamen, who would not be unwell, nor have bad sea-legs, nor anything of that kind when they went to sea; and I would insist on all commanding Officers knowing thoroughly everything that would be going on in the engine-room after they had given a certain order. Now I carry this a great deal further. I would like you to train sailors to be good stokers when they are wanted; I would like you to train sailors to do everything to help us in the engine-room when we are in a difficulty, and we are often in a difficulty; and I should wish in like manner that sailors should know everything about our pumps, and our pipes, and all the communications that run out from the engine-room, in order that when mischief happens, they should each of them know what to do to help us, instead of going and doing what hinders us. They should know how to keep water out of our engine-room, instead of going and sending the water into the engine-room, which they often do with the best possible intentions. I therefore have to entreat you, as gentlemen of your profession, to try and extend the education of all men who serve on board a ship to a knowledge of the work of others to a certain extent. I hope you will not think me impertinent if I say, for example, that I think there are occasions when a great gun or a gun-carriage has suffered a little from shot, when it may be useful

for you to call the engineers and fitters out of the engine-room to help to make good your gun-carriage, and to help to put it in order again. I think it would be well that you should before-hand take these men and drill them to know what a gun was, and what a gun-carriage was, and how to be able to come to your assistance when you want them. In short, Gentlemen, I have hitherto looked upon a British sailor as the most capable of mechanics, as the most admirable of labourers, and as the most capable of workers when I wanted one. When I wanted land-work cleverly done with a few hands, I have been in the habit of employing, not landsmen, but retired sailors to do my land-work, and I found them do it much more cleverly than landlubbers. Therefore, I entreat you to consider all the inmates of a ship as one great family of clever fellows, each with a speciality of his own, and try and drill them, and train them, and educate them, so that every one of them should be able to give help to the other when there is a difficulty.

Captain J. C. WILSON, R.N. : Being a sailor, I must answer what Mr. Scott Russell has said, because it might lead to a wrong interpretation of what our duties are. The duties of those in a man-of-war may be compared to those which have to be performed in a town of considerable size. Now, I would like to ask whether it is practicable or possible that every person in a small township could be able to do his neighbour's work? With all due deference to Mr. Scott Russell, a little knowledge is dangerous, and every man should stick to his own work. Let every sailor know his duties as a sailor, every stoker know his as a stoker, and let engineers do their duty, and I have no doubt the executive part of the Navy will not be found wanting. It is a piece of impertinence for me to question what such an authority says, but such are my views, rightly or wrongly. To fall back to the very instructive and interesting paper which the gallant lecturer has read, as he has been good enough to refer to me by name once or twice, I should like to answer a few of his remarks. In the first place, I will say the root, the kernel, of the whole question is, "The Declaration of Paris," as was so clearly shown in the lecture read on it in this theatre by that very talented young Officer, Mr. Ross. Without that lecture it would have been nonsense to have discussed the paper before us. I am speaking, of course, with reference to that part touching the question of the protection of trade. If "The Declaration of Paris" is allowed to remain as it is, it presents to us one phase of the question; if it is done away with, which the bulk of us hope it will be, it brings the question before us in a totally different light. With "The Declaration of Paris" in existence, the bulk of the trade of England must pass to neutral flags whenever war is declared. We should, therefore, not then require such a number of cruisers, nor such an extensive system as we should otherwise do. I do not say our trade would pass to neutral flags from want of proper protection, for no doubt they would be as well cared for as possible, but, as was shown in a letter in the *Standard* the other day, the war premiums on insurance must drive the bulk of our commerce to neutral flags. I will divide our commerce under two heads: the ships that are insured would pass to neutrals, and those uninsured, which will probably remain under our own flag so long as they receive tolerable protection. These latter vessels I will again divide into two classes. But before we proceed, let us for convenience suppose that "The Declaration of Paris" is done away with. We should then, I think, divide our trade into two classes, viz., ships of 12 knots and upwards, and ships of less speed. The ships of 12 knots and upwards would probably rely on their heels, and be lightly armed, as suggested by the gallant lecturer, to defend themselves, and to fight their way if need be. They should be protected by cruisers, stationed, say, at 24 hours' intervals from each other on the principal lines, such as between England and America or the Brazils. We should, besides, require squadrons to protect our coaling depôts and narrow channels, such as the chops of the Channel, the Gut of Gibraltar, the Straits of Magellan, the Straits of Malacca, Hong Kong, &c., &c. Then we come to convoying. Convoys, I should say, would include all our coal and grain-carrying vessels, our timber trade, and generally vessels of about 8 knots speed, carrying on the heavy trade of the country. These vessels would have to be convoyed by very strong squadrons, probably with an ironclad at the head of each, and a certain number of frigates and armed merchant ships, as auxiliaries.

To man all these ships would require a very large number of seamen. And now we come to another point, which I purpose touching on very lightly—the *personnel*

not only of the Navy but of the Merchant Service. We have had papers read in this theatre, and some of the most intelligent members of Parliament, shipowners and others, have spoken on this vital subject, and the conclusion come to is, that the Merchant Service is now in the most lamentable state, and that England does not possess more than 20,000 or 25,000 skilled British merchant seamen. That certainly is a very small number. We require 50,000 skilled seamen to carry on our trade, besides others who are not skilled, that is to say, ordinary seamen and boys, stewards, cooks, and all the numerous callings which now form a ship's crew. But we require 50,000 able-bodied, skilled seamen. Out of these we have little more than 20,000 who are English; the remainder are made up of foreigners, 15,000, Indians, 7,000, and about 5,000 negroes, and every year the number of English is getting smaller and smaller. When it comes to the tug of war, and we take the skilled seamen who belong to the Naval Reserve, from the Merchant Service, how are we to man our merchant ships? It is all very well to talk of our magnificent ships trusting to their heels, and, where compelled, fighting, but who is to fight them? You cannot do on board a ship without a certain percentage of sailors. Those who have been in an emergency know what a good seaman is. A good seaman is a good man anywhere, but a good sailor on board ship is better than any other man, however good he may be. You may possibly do with a smaller proportion of good seamen now than formerly, but you still require a certain proportion, and without that proportion you will never get on safely. Taking all the best men from the Merchant Service, we shall then only have enough men to man our war fleet, without the auxiliary vessels which we should have to call in from the Merchant Service. There is one point which Mr. Scott Russell did not touch on, though I hoped he would, and that is the fitting of merchant ships to carry guns in time of war. I heard from very good authority—an authority which I am not at liberty to name, though you would all respect it—that when building these large ships of 12 and 13 knots speed, if Government chose to subsidise them by paying 3 or 4 per cent. on the value of the hull, the shipbuilders are prepared to build them of such a scantling that they will be able to bear a good armament, a chase gun beside broadside guns, and thus be available in time of war to be turned into cruisers. The sum would not be very large, as the engines would not be included in the cost.

As to the organization and training of the Navy, that is a subject upon which I have already read a paper, and I think our men in the Navy are about as badly trained and as unfitted for their work, taking them all round, as any first-class naval power would dare to have its seamen. The men themselves are fine fellows, physically fine, with some education and a considerable amount of discipline, as compared with olden times, but they are imperfectly instructed as fighting men, and very inferior as sailors. Whenever they reach a certain age, they desert if possible.¹ The average age of the men in the Navy now is very young; they are mere boys. I remember going with a French captain to see the ironclad ship "Ocean," and when we came away he said to me, "Why, Wilson, that ship is not manned at all, she is only boyed." And sure enough she was; and I ask any gentleman here in connection with the Navy to go on board any of our ships and look at the seamen. Three-fourths are boys, or youngsters under 20 years of age. I say this is unsatisfactory, and every year it is getting so. We have no reserve to fall back upon, because the merchant seamen, however good they are as such, are unskilled in the use of arms, or so partially so that they are unworthy of being classed as a reserve of fighting men. They are also undisciplined, and what is more, their career in life is such as to make them more undisciplined than ordinary landsmen. Another point that the gallant lecturer spoke of was the number of non-

¹ It was stated by the First Lord in a recent debate that the desertions were so few, being only 4 per cent., as to show no discontent on the part of the seamen in the fleet; but he did not explain that but a very small proportion of the men are so placed that it is possible for them to desert, for, of course, they cannot do so in the Persian Gulf, China, South Seas, African station, or North Pole, and, in fact, only in England to a limited extent, Australia, California, and the south-east coast of America. But where they can escape they go, not in the proportion of 4 per cent., but more nearly in that of 20 per cent.—J. C. W.

combatants, only partially disciplined, if at all, and untrained to the use of any arm on board a man-of-war. This is a most serious matter, and I cannot understand how members of Parliament, knowing such a state of things to exist, can listen to people who say the Navy is as it should be. At this present time, when there is the prospect of a war in the East, there is a ship fitting out, the "Hotspur," at Plymouth, to join the Mediterranean squadron, with 57 per cent. of her crew non-combatants! Now, I ask soldiers, civilians, or anybody else, can any one believe that the Navy in such a state is satisfactory? The number of non-combatants varies from 30 per cent. in vessels of the "Sultan" class to 57 per cent. in the "Hotspur" class. With her crew of 200 odd men she will go out say to Salonica, with but 43 per cent. of men used to arms. If there is an outbreak, and she is required to land 50 men, a valuable ship will be left in the hands of those who are wholly untrained to the use of arms, and who do not know whether shot or powder goes in first? And, mark me, such is the case in time of peace, but what state would she be in time of war? In war-time she will not have 43 per cent. of fighting men on board, because she will be filled up with a certain proportion of Naval Reserve men and others, trained only partially to arms. Now, I cannot for the life of me understand why all our crews should not be as well trained as fighting men, and disciplined as marine artillerymen; nor can I understand why our stokers, carpenters, cooks, stewards, all the present non-combatants on board a man-of-war, should not be as much fighting men, and as highly disciplined, as those of the Royal Engineers. The number of men we have in the Navy is, as far as I can see, ample, and the number of our reserves would be so too if they reached a proper standard of excellence, and had passed through a man-of-war. But they do not reach that standard, nor are they men-of-war's men in any sense of the word; they are inferior in training to men in foreign navies, and certainly in time of need we should find ourselves placed at great disadvantage. Material we have lots of, qualified men-of-war's men we have not in any numbers.

LORD RANELAGH: When answering the questions, will you have the goodness to gratify my curiosity, and give some information as to that curious-looking thing before us, which I understand from you is Hale's rocket, and has a very considerable penetration under water, and will you have the kindness to tell us what that penetration is?

ADMIRAL SELWYN: I rise to give a very cordial and almost entire approval to Captain Scott's paper, read with his accustomed clearness and perspicacity. There are, perhaps, a few points in which I may strengthen his argument; but very few indeed in which I can say anything to contradict him. The question of the food supply which this country would have to face in the event of war is pressing more strongly than ever before, in consequence of the efforts of Captain Ead's to open up the Mississippi mouths. This, when effected, to Europe gives the command of the whole of the corn of western America by water carriage capable therefore of being transferred at a price one-third of that which is now paid for the transport of corn coming from that country.

It is perfectly clear that the longer war is continued, the less probability there is of any great food supply being found in this country. The more easily corn can be brought from America, the more we shall rely upon external supplies, and the more our farmers will devote themselves to the raising of meat-food instead of corn. The supply from the east might become precarious, because the commerce of the Mediterranean, which would enable us to rely on the production from the Danube, might at any time be interrupted. With regard to fast river boats, I presume for torpedo-work principally, to which Captain Scott has referred, I have just seen with the greatest pleasure in Mr. Thornicroft's yard, a torpedo boat at last made for the English Government. The Austrian Government had two of 18 knots an hour, and the French Government one. We are now having one built, but at the same time there is a statement in a morning paper that other firms are running boats of 24 miles an hour, and will engage to make a contract for 30 miles. With regard to the organization at each port, which I have always strongly supported as the best means of guarding our coasts, I disagree with Captain Scott just to this extent, that I think the present state of the Navy may lead us to expect enough active young Officers, thoroughly trained and disciplined, to do all the teaching required. These men would be fit to teach a considerable number of untrained levies, and it

would be vain to expect the Officers of the Mercantile Marine, however zealous, to have the modern knowledge and practical experience which could alone make them fit to train these men. I therefore think I might ask Captain Scott to reconsider his views on that point. As to the coastguard's men being relied on in war, I can only say if they have deserved their name, not being now much employed in protecting our shores from illicit commerce, their chief value would be as a nucleus of organization, round which all the coast levies might be accumulated in the case of war on the ocean, and of the abolition of that extraordinary Declaration, the wisdom of which has been so ably confuted in this theatre by Mr. Ross-of-Bladensburg. I quite see with Captain Wilson that we should have to divide our merchant ships into classes, of which some would necessarily be convoyed, and others would trust to their heels for safety. But what is the use of attempting to convoy when your carrying vessels carry ten days' coal, and your convoy only three? Can you expect to diminish your dangers by enlarging the time during which the danger lasts? Would it not be better to consider the manner of enlarging our fuel-supply by some recent inventions? We have done a great deal of late years by the introduction of high pressure into the Navy, but we are a very long way from having considered the importance of the economy of fuel, and that is the life of a warship to-day. Sea telegraphs were observed upon as being difficult, but they have only failed because a vessel which was fit to ride under sail or steam at sea was put to do the duty of a light ship. Mr. Scott Russell's observations were so ably combated by Captain Wilson that I have very little to say on the subject, except that I do not think that you can ask or expect men to be thoroughly trained in every pursuit. It is utterly out of the question. A thoroughly good stoker may not make a good man to go aloft. Even our marines, zealous as they are, object occasionally to go as high as the mainyard, and they are better trained than we could hope our stokers to be. But there is more than that. As long as I was serving actively, I never knew a case in which an appeal from the engine-room was not met with a ready response by the Officer of the watch; and, indeed, in many cases additional pay has been given to induce the men to do the stoking work. I should be very much astonished to hear that the knowledge of steam machinery has fallen off among our Officers since my day. I could myself go through an engine-room with any engineer, and should be sorry to know that with the increased facilities for instruction, our Officers are less acquainted with that subject than they were. But I do not think it advisable that the Captain should be boatswain, gunner, carpenter, and engineer. He must rely on that due subordination which has been the essence of our success, viz., every man knowing his own duty and doing it thoroughly, and then, whether it is the Captain doing the duty of the head, or the men doing the duty of the hands, the work will be thoroughly well done. Only one word more with regard to the possibility of arming merchant ships; I have passed over the Atlantic during the last few years, backwards and forwards, in the largest and best ocean steamers. There is no difficulty whatever in those ships carrying guns if you consent to let them carry them as they can. If you insist on broadside ports they cannot do it. If you give them centrally disposed guns with proper carriages, calculated not to strain their frames, they can carry them with very little preparation. It is a question of a comparatively small weight, and I am quite sure that a very little solicitation on the part of the Government, a very little attention paid to the question, a little patriotism appealed to, would induce provision to be made for such a purpose in the event of war breaking out. I do not think that the nation could fairly be called upon to pay an armed subsidy during peace, either for guns or for fighting. Our merchant ships in the old wars put their very highest pride in being able to beat off the enemy's men-of-war, and I do not think Britons have so degenerated that the Mercantile Marine would fail in this work in any future war.

MR. SCOTT RUSSELL: One word in explanation. I did not mean that one man was to meddle with another man's trade. What I meant was, that each man should thoroughly master his own trade, and then know enough of the duties of every man about him to be able to give him thorough, cordial, intelligent help. More than that I should be very sorry to say.

MR. PAWNCE: I think I have overcome those difficulties that have been spoken of

by my patent for unsinkable ships, patented in 1874, No. 1174. It consists of a double ship, and the inner ship is capable of supporting the outer ship if she is penetrated in any part whatever. My unsinkable ship is constructed in longitudinal as well as transverse sections, so that if a shot penetrated one section, and had not force enough to reach the inner ship, she would not sink. Had the "Vanguard" been built in that way, she would never have sunk. I have also a patent for armour, No. 4030.

Captain PRICE, R.N., M.P.: There is one topic which has not been touched upon here this afternoon, but it is one which I think any naval Officer, and I am sure both the gallant lecturer and yourself, Sir, will expect us to give some consideration to, namely, the question of the guns. Naturally when we are considering the strength of our Navy, and of the ships which compose it, we must go very considerably into the question of the armament of those ships. I won't say that Captain Scott has given us alarming information, because I do not think he has come here with any pessimist views, but amongst other incidental points to which he has called attention, he has made this remark: "It will be astonishing to my hearers perhaps to be told that no 38-ton gun has yet been tested up to 100 rounds, nor even to one-third of that in quick firing." I am sure that remark was not introduced without having the object of implying to a certain extent a doubt as to the power of these guns. He naturally meant, I take it, that if these guns had been tested to such an extent very likely they might not have been found capable of enduring that test. Well, as I have myself thrown doubts on this subject, I should like to say one or two words about it. From returns which have been presented to us of the different tests to which these guns have been subjected, I have found not only that no large gun of this kind, 35 tons or 38 tons, has been subjected to such a test as 100 rounds fired in such a way as they would naturally have to be in an action, but in the tests that they have been subjected to, I have found that no gun of such a weight has fired as many as sixty rounds without requiring repairs. I do not mean to say that the gun has shown signs of bursting, or that it has become entirely disabled, but the gun has been rendered *hors de combat* for the time being. It has been said that such repairs as were necessitated by this amount of firing might be performed on board ship. Well, no doubt if the implements and artificers were supplied, they might be under certain circumstances, but I confess I am very much inclined to doubt that they could be carried out in the face of an enemy, or whilst the operation of blockading an enemy's port was going on. I have taken the opinion of naval officers, gunnery officers, who are capable of giving an opinion on the subject, and they certainly tell me that such repairs could not be carried out. But whether they could or not there is this to be said, that the necessary implements have not been supplied to those ships which carry these large guns, so that on the principle that the strength of a chain must be tested by the strength of its weakest link, we may say that the strength of Her Majesty's ships "Devastation" or "Thunderer," apart from her ramming powers or the torpedoes which she may carry, must, among other things, be calculated by the strength of the vents in their guns. On one occasion, in another place, I was answered by a very high authority, one to whom the nation looks for an opinion upon points of this kind, that even admitting, for the sake of argument, that these large guns might not be capable of firing more than fifty or sixty rounds without being obliged to be sent home to England for repairs, really, as a matter of fact, that ought to be considered quite sufficient. The actual words, I think, were, "People might think it necessary that the guns should be revented after every fifty rounds; but if they fired fifty rounds in action, there would probably be very little left for them to fire at." I am rather inclined to doubt that. At all events I should like to see the thing tried. It is all very well for us to brag about our maritime forces; it always calls up a cheer; but I think we ought to look steadily into the facts of the case, and with that idea I have always advocated, and shall continue to advocate, a really practical test of our guns. I want to see these large guns of ours tested exactly under the same conditions as they would have in an action at sea. It is very difficult really to say how many rounds we might expect the "Devastation" to be obliged to fire in action at an enemy of similar build, and of course we must always pit our best ships against the best ships of the enemy. The only really practical test which we have

ever seen our large guns submitted to was one in the year 1870, when our three largest ships, the "Captain," the "Monarch," and the "Hercules," were sent out from Vigo Bay to fire at a large mark. I have the numbers here in a lecture given in this theatre by Captain Colomb, and I am taking the figures from his lecture. The ships were sent out to fire at a rock distant about 1,000 yards. I was in Vigo Bay at the time, and saw the experiments. The day was almost absolutely calm; at all events there was not the slightest motion I think on board any of the ships. The rock was 600 feet long and 60 feet high; that is to say, twice as long, and four times as high as a ship. That is the chief point to which I would call the attention of naval gunners,—that the rock was four times as high as a ship, because that is where the accuracy of firing at sea is more particularly required. The "Hercules" fired seventeen shots, of which ten hit; she was armed with 18-ton guns. The "Captain," armed with 25-ton guns, fired eleven shots, and made four hits. The "Monarch," also armed with 25-ton guns, fired twelve shots, and made nine hits. I won't follow out the argument which Captain Colomb so ably brought before us, but I will just go to the results that he gives. By a simple argument he reduces those results to the results that would naturally be obtained had the vessels been firing at a target representing the side of a ship, and, putting it into an interrogative form, he asks, "Is it really then the case that at a moderate range of 1,000 yards under the most favourable circumstances a 'Monarch' can only expect to hit a sister vessel from twice to fifteen times out of every 100 shots?" that is to say, from one to seven and a half times out of the fifty shots that we are told would be quite sufficient to smash all our enemies. He also says, "In six minutes from the opening of her fire on the sister ship at 1,000 yards, she will have fired 12 shot." There is another thing that we have to consider besides the accuracy of our guns. I have no wish of course to detract from the capabilities of our seamen gunners; the fault does not lie with them: it lies partly with our artillery, and partly with the elements which we have not as yet been able to overcome. We have this to look at, that as the size of our gun increases, so we must expect the accuracy of the gun to decrease. If the "Monarch," carrying 25-ton guns, can only make this amount of accuracy in firing, we must of course expect our 33-ton gun and our 81-ton gun to be even less accurate in firing at sea. Then comes the point, supposing that this single shot, or these half-dozen shots, if you please, out of the fifty fired before the vessel becomes disabled, strike, we have to consider where they would strike, and what damage would be done to the ship that was struck. To say that those half-dozen shots would be quite sufficient to sink our enemy, I think is going a very long way towards saying that all the ships that we have been building hitherto are really so much money thrown away. We have been endeavouring to build our ships, if not absolutely unsinkable, at all events in watertight compartments, and with appliances and means for keeping them afloat. Mr. Scott Russell has told us, that if we only say we want it, he will build vessels for us actually unsinkable, and I believe that is perfectly within his powers; unsinkable I take it, he means, not only from the shot of an enemy, but from the blow of a torpedo or the ram of a vessel of similar size. Therefore, I am at a loss to conceive how we are to satisfy ourselves that we shall be able to do the necessary amount of damage to the enemy with the half-a-dozen shots with our big guns before they are disabled. I do not wish to take any alarmist view of this matter, but so far as I can see, I am really within the mark when I say, that after a very small number of rounds from one of our big guns, the possibility is that the gun may become for the time disabled; and that for the time is everything, because if we have to send our "Devastations" home from Sebastopol, or whatever other fortress they may be next employed against, to this country, or to Malta, or some other arsenal, to replace their guns, or even to revent them, which amounts to the same thing, I think we shall be in a very awkward position indeed. I have made these few remarks, because I think this question of the guns has been put very prominently before us, and is not by any means the least important feature of the lecture.

Mr. ROEBUCK, M.P.: I came here entirely ignorant of anything you (Captain Scott) were going to say. I came for the purpose of instruction, and I must say, I have been instructed to this extent, that I have been much alarmed. The gallant gentleman has proved to me by his lecture, as far as in a short time could

be proved, that we are in an utterly indefensible position, and one thing of all others which has struck me most, has been that the Navy which we have now, is not fully nor properly manned, and that it cannot be manned. Now what I should wish to learn in a succeeding lecture from the gallant gentleman is this. He points out certain defects in our Navy arising from want of men. Now has he any means to propose by which men could be obtained, because Government ought to be instructed by professional men upon professional subjects, and sailors, conversant with these matters, as the gallant gentleman is, are just those to whom we should look for instruction? Now I, as a legislator, should be very glad to learn what he would propose as to the means of manning our Navy, and rendering our men efficient for the purposes for which men are selected to be sailors; and teaching them what ought to be taught to each particular class of men, and how that particular class of men ought to be raised. If he would take that into consideration in his next lecture, and tell us what we ought to do for the purpose of manning the English Navy, I should be very much obliged to him.

Captain WILSON: I have read two papers on the subject in this theatre, which, if you will allow me the honour, I shall be very glad to send you; they will answer the question you have been good enough to raise. I know that it is out of order, but I omitted to touch on one point of the lecture which I hope I may be allowed to refer to now. I wish to say that I think Captain Scott did not give sufficient credit to the usefulness of young marines, and places too much importance on the old marines. Young marines are as good for fighting purposes as older men, in my humble opinion. In the old wars it must be remembered we had often soldiers on board our ships, who proved quite as good in every way as our marines. Sir William Napier states in his "Life," that he was embarked for some years on board the "Bellerophon" with his men as marines, and at the battle of St. Vincent, Lord Nelson, when Commodore in command of the "Captain," was helped on board the "San Joseph" by one of the soldiers of the 68th Regiment, who was one of the boarders. In those olden times, if we read naval history, we find soldiers spoken of in as high terms as the marines of the present day.

The CHAIRMAN: With regard to what has been said about the Officers knowing the duties of all the men on board, the idea always has been in our service that the Captain and superior Officers, although they may not be personally practised in the particular duties of the engineers and of the stokers below, would be worth nothing in their positions, if they did not know all about the duties of those over whom they have the charge. A Captain, I conceive, is no serviceable Captain in a ship if he is not himself personally able to judge of the duties of every man under his command, be those duties what they may. I may give one instance in support of the necessity in superior Officers of a practical knowledge of certain details. We may all recollect the Niger Expedition, which was an expedition up those rivers in Africa in a very bad, unhealthy climate. The loss of life from illness was very great indeed; so much so in the case of the engineers of one, if not of both of the steamships, that in order to get the vessels down the rivers, the surgeons (from the want of engineers) had to start and work the engines, in order to get the steamers out to sea.

Captain SCOTT: Commencing at the remarks made by Captain Wilson, I beg to say that I have not gone into the question of the relative values of young and old marines, because I have only dealt with general principles; but I shall be glad to go more into details on another occasion. Next time, and in continuation of the paper I have just read, I hope to put before you our war-ships, their needs, and the means of supplying them: I am quite sure that if we could stir up a little national enthusiasm, we should have a different feeling at our seaports from what now exists. We have already most valuable *nuclei* in Sailors' Homes for bringing together our seamen and coast volunteers. These Homes, which many now present have helped to establish, have been the means by which the *morale* of our men has been much improved, and their sobriety greatly encouraged; if we were to extend the use of those places, and to draw men together, giving them occasional papers and suitable readings, I think we might in a very short time provide our naval and mercantile seamen and our coast population with a strong patriotic feeling. Unless we, as a nation, are all firmly united with our seafaring coast population, we

should do little in war. Look at the Army, how very united it is on every essential point. We are proud of our Army, and one always finds that Army men are the very first to forward the best interests of the Navy; really, without such aid we should be nowhere. As to our defences, Captain Wilson has told us that when soldiers, in times past, have been embarked in our war-ships they have made very useful men, but the duties of sailors now are very unlike what they were then. Formerly the work greatly depended upon muscular strength; now it depends more upon skill, and therefore we must have well instructed men. We must not run the hazard of having to fight our battles with undrilled men. Remember, in the American War, how our vessels were sent off with untrained men, and were captured by the Americans. When and how was the tide turned? When the "Shannon," commanded by Captain P. Broke, and manned with a disciplined crew, who thoroughly understood their work, and would have followed their Captain anywhere, appeared off the Chesapeake River, then the "Shannon" took the frigate "Chesapeake" in a very short time. Happily, that war ended, as we all know, by our American cousins gaining their independence, and well it is for the freedom of the world that it was so. I only allude to this to show the mistakes we have made through want of preparation for war. I think that the Honourable Member of Parliament, who asked for information, will find in Captain Wilson's and Mr. Brassey's pamphlets, and in the discussion on Captain Noel's and other papers in this theatre, all the information he requires; but, with reference to his further remarks, I am going to show the insufficiency of our naval armaments, and how these armaments can be greatly improved, and I also hope to indicate the qualities required in our future fighting ships. At the present time we hear much about the need for building light, unarmoured vessels; but of what use will they be to oppose heavy war-ships, for our enemies will send their heavy war-ships to attack our commerce? Not long since, some of the most influential Frenchmen, speaking of what they would do in case of war with England, said that (despite the Declaration of Paris) they would leave our war-ships alone, and send *their* war-ships to destroy our commerce. I now beg to turn to Lord Denbigh's question, as to arming our merchant vessels. I think it of importance that we should utilise all the resources we have, but we should not attempt to put in the merchant vessels, guns which are so large that they cannot be carried without considerable alterations. I believe officers were sent round to ascertain whether our merchant steamers could carry heavy ordnance, but I do not think they were instructed to find out what extent of light armament such vessels could easily carry, and consequently they came back with the report that the vessels were unsuitable for carrying guns. As to making the necessary preparations for utilising our Mercantile Navy in time of war, there are very few men who have the technical knowledge of gun-mounting, and of the other appliances for warfare, to be able to grasp the subject,—to do so, and to efficiently carry out such preparations, you must have specially qualified persons. As respects the proposal to build circular superstructures, for the purpose of protecting heavy guns, I fear they would prove cumbersome, and would not keep out shot, because if the shot struck at even a very small angle, they would go right through. As to the question of unsinkability, there is no doubt but that it could be secured by means of cellular subdivision; and as to the value of the fish torpedo, the Austrians, who were the first to buy it, now consider that the ram is a far more efficient weapon. This seems the opinion of their Naval Constructor and their Minister of War, and I mention it by way of throwing light upon what we and other nations are doing. Lord Ranelagh asked about this sub-marine rocket. At the time that Mr. Hale brought it forward, the explosive effects of gun-cotton were unknown; but now we have every day fresh improvements in the manufacture of gun-cotton. The advantage of the Hale rocket is that whereas the fish torpedo requires careful launching, and the charge is exploded on impact about four feet away from the vessel struck by it, you may in Hale's rocket put gun-cotton or the strongest explosives in its front. (Lord RANELAGH: What distance would it go?) That depends on the size and weight. [The rocket was here let down its tube, and struck a shelf piece some feet off with great force.]

Captain BURGESS: You light the fuze in the rocket at first merely to start it.

Captain SCOTT: So you do in the case of the fish torpedo, and a very delicate operation it is.

With respect to the guns, Captain Price is perfectly right as to their insufficient endurance, and we have been continuously making alterations in them for some time past, and were an inquiry to take place, I am quite sure it would greatly benefit England by leading to the improvement of her war material. I have heard it said that the Committee of the House of Commons that sat on the guns have not done any good. We were, however, going on in a wrong groove, but, owing to that Committee, there was a complete change, and what progress we have made, is owing to their inquiries. The Committee that sat on the construction of ships have also done great good. Such inquiries awaken deeper interest in naval matters, and by bringing to light errors, enable us to go on in a sounder groove. Captain Price has done a great deal of good by bringing naval questions before the House, and not being a gunmaker, or having any personal interest in the matters he is endeavouring to push forward, his opinions are entitled to and do receive much respect. I venture to add that when I was employed by the Admiralty it was a pleasure to see the trouble that he took in instructing the guns' crews to use their new weapons. It has been asked elsewhere, Where are you to get thoroughly instructed Officers from? I do not think there are sufficient inducements to cause them to devote their time to professional work. If their time were thus spent, it would be much better for the interests of the Service. Our present system is to teach a few only of our Officers in the "Excellent," and the men are drilled to use the weapons in her; but they may have a weapon given them that they have not seen before. In times past, I have known loss of life to occur owing to being new to their weapons, and consequently uninstructed in their use. In one case a man took off the break, not knowing that it was intended to control the gun in a seaway. At night quarters another man was actually attempting to run the gun out while the Captain fired it. Were greater inducements held out, I feel sure a sufficient number of Officers would soon get the requisite instruction, and would come forward to teach all the men, including reserves and volunteers, thoroughly. I do not think that seamen, who are necessarily imperfectly educated, can ever teach modern gunnery properly. The work of gunnery teaching, combined with that of First Lieutenant, would give an Officer confidence when commanding his crew in action. To prepare for this he should always drill the crew at quarters, and not allow another voice to be heard, unless he gave a special order for some separate work. Every manœuvre should be performed under his direction alone; to do this well requires a Captain who knows precisely what the power of his guns and other weapons is, and what his vessel really can do under steam. To command and fight a vessel efficiently in these times requires a special and very high class of practical education; and we can only hope that our Officers and seamen will hereafter be as much distinguished by their superior skill as they have been in times past for their dash and seamanship.

The CHAIRMAN: I think we need not wait till his next lecture to thank Captain Scott for the very instructive paper he has given us. He has given us something to think about. Some of us may think that everything is not quite so black as has been represented, and may not despair of the present; but, at all events, nothing can be better for us than to know the very worst that can be thought of us so that we may think the remedies out, and be perfectly well aware of our difficulties, and thus learn the best means of overcoming them.