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THE ORIGIN, EVOLUTION, AND FUTURE OF THE PERSONNEL OF THE BRITISH ROYAL NAVY.

By Commander H. ORPEN, R.N.

Friday, November 28th, 1902.

Admiral Sir N. BOWDEN-SMITH, K.C.B., in the Chair.

ANY consideration of the *personnel* of a sea-fighting service, and therefore of a modern ship of war, must be accompanied by the entire elimination of non-essentials. In other words, individuals and departments, having little or no bearing on the general efficiency of His Majesty's Navy as a sea-fighting service, although ministering somewhat to its general comfort and convenience, must be in the first place disposed of.

To do this, it is necessary to separate the essential from the non-essential—defining as essential the Medical Department, the Executive Officers and Ratings, and the Engineering Department; and as non-essential the Corps of Royal Marines, the Accountant Department, and the Chaplains.

NON-ESSENTIAL.

The Corps of Royal Marines.

The Accountant Department, and the Chaplains.

THE CORPS OF ROYAL MARINES.

This Corps, employed principally in the days of the bounty and press-gang for disciplinary purposes, has long since ceased to perform any duty which could not be, and is, equally well performed by the seamen class. This especially applies to guard duties of every description, which should be considered a necessary item in the training of the modern seaman.

The seamen, however, perform many functions unassisted by the marines, who, from want of training are ineligible, this applying in an exaggerated sense to the officers, who, being military officers pure and simple, are not qualified in any way to take part in the ordinary working of a ship.

The Corps of Royal Marines could, therefore, and should be removed from the sea-service altogether, additional executive officers and ratings being entered and maintained to fill the vacancies thus made. Under these circumstances this corps should be either largely

augmented and given the entire charge of the naval bases both at home and abroad; or it should be abolished, the officers and men being absorbed in the land service of the Crown, with the exception of those men who were willing to be transferred to the seamen class of the Royal Navy for training and future employment.

THE ACCOUNTANT DEPARTMENT AND THE CHAPLAINS.

Obviously, neither of these two has any direct bearing upon the general efficiency of His Majesty's Navy as a sea-fighting service. Nor would this be affected by the employment of the executive in the Accountant Department, where the work is purely clerical and the life very sedentary. For executive officers thus employed would of necessity deteriorate under the influence of such surroundings, and would eventually retain few, if any, of the characteristics and qualifications necessary for and peculiar to the sea officer. Superannuated executive officers might nevertheless be employed as accountant officers, who would be available for duty in their own ships in cases of emergency.

No further reference will therefore now be made to either of these non-essential bodies, and although several pages might be added in support of their total re-organisation or abolition, the matter, being of a secondary nature, will not here be further discussed. The subject having been introduced solely with a view to perspective, and to render unnecessary any future reference to these departments, which might obscure in any way the points at issue.

ESSENTIAL.

The Medical Department.
The Executive Officers and Ratings.
The Engineering Department.

THE MEDICAL DEPARTMENT.

Although this department but indirectly affects the efficiency of the sea-fighting service, as such it is nevertheless indispensable to that efficiency and to the general well-being of His Majesty's Navy.

As, however, the general working of a ship, or the fleet, is not interfered with in any way by the medical department, and as the pay, privileges, and general conditions of service of this perfectly distinct profession, are very rightly, to all intents and purposes, arranged independently, this department will not be further considered.

THE EXECUTIVE OFFICERS AND RATINGS.

It is impossible to consider the attributes, qualifications, and functions of the executive, or, to be equally correct, the military branch of His Majesty's Navy, without some reference to its origin and evolution. Fortunately, however, in the case of that most ancient of fighting services, the British Royal Navy, we are able, starting from practically first principles, to quite easily trace the evolution of the seamen and the sea-fighting classes of the earliest days, into the

executive, or military body, which now controls the modern ship and fleet.

In the oar-propelled war-galley three distinct classes of men were employed: The rowers, who propelled the vessel; the soldiers, who represented the offensive and defensive force; and the seamen, who directed the motion, and were entirely responsible for the safety and general management of the whole, as a ship.

The introduction of the sail was gradually followed, as would be expected, by a large increase in the size of the vessels, and the absolute extinction of the oar as a means of propulsion, this development automatically reducing the crew of the sail-propelled war-vessel to the soldiers representing the offensive and defensive force, and the seamen. To the duties of the seamen of the galley days had, however, now been added the actual and manual working of the sails, necessitating their employment in large numbers.

And this increase in the number of seamen employed in each vessel was the natural and direct cause of the evolution of the sea-officers and their various subordinate ranks.

No change, however, took place in the general scheme of control and responsibility. Those qualified to direct the motion and to manage the ship as a whole, being obviously the direct successors of the seamen of the air-propelled galley, and also the only possible officers under the new regime.

The development of the sail and the introduction of ordnance, gradually, as the number of guns increased, brought about the abolition of a separate class to work the armament, there being no accommodation in a ship for the large number of men required to work both separately.

This compulsory amalgamation, or rather absorption of the soldier element, by the sea-officer and ratings put the finishing touches, as it were, to the military qualifications of the seamen class, the sea-officer and ratings now assuming the entire direction and manipulation of the armament, in addition to their military responsibility for the formation of the various ships forming the fighting force, and for placing each unit in the most advantageous position.

The soldiers pure and simple, who were not amalgamated with, and absorbed by, the seamen class, were, from this time forward, relegated to the position of sharp-shooters, and need not be further considered.

From this period the development in the *personnel* and *matériel* was extremely slow; but admirals, captains, commanders, lieutenants, midshipmen, navigating officers and various subordinate ratings were eventually evolved, side by side with the well-known two and three-deckers, frigates, and smaller craft. The introduction of steam, and the consequent abolition of masts and yards, led, however, to the absorption by the executive, or military body, of the navigating officers, whose military qualifications were alone represented by their ability to manœuvre the fighting unit, without any reference whatever to the armament.

From the beginning, therefore, the hard logic of facts has, as in other cases, placed its impress upon the evolution of the sea-service. The absorption of the soldier by the seaman, whose military function as manœuvrer of the whole unit, dominated the minor military considerations of the attack at close quarters, being a simple exposition of

the truth that the whole is greater than the part. And to this simple fact was due also the abolition of the navigating class.

The introduction of steam, originally an auxiliary to sail-power, secondly in superiority to the sail, and finally, as at present, as the only method of propulsion, did not materially affect the functions of the executive. It did, nevertheless, enable the ships in a fleet or squadron to cruise in closer formation, to proceed in any desired direction, and to carry out many complicated movements. This did not, however, in any way lessen the charge and responsibility of the executive, who were now called upon to keep the fleet order with almost mathematical precision under all circumstances; and, in addition, to moor, dock, and berth their ships, of whatever dimensions, regardless altogether of the conditions governing and controlling the possibility of these operations in the days of the sail.

Steam, as originally employed, cannot, however, be considered as a means of propulsion alone, for the steam-engine not only replaced manual labour of almost every description, but it also directly influenced the development of armoured ships, guns, torpedoes, and hydraulic appliances, and indirectly the generation of electricity also these changes compelling a corresponding advance in the qualifications of the executive officers and ratings, without in any way reducing their responsibility.

For although steam had replaced manual labour in, for instance, the capstan engine and boat hoist, the process of mooring a ship or lifting a heavy boat in a seaway had in no way been simplified.

At the same time the armament had been much complicated by the advent of the large-calibre gun, worked by hydraulic power, and by the introduction of the torpedo.

No development in the armament could nevertheless outstrip the knowledge of the executive, who were, to all intents and purposes, the developers, as represented by the staff officers of the gunnery and torpedo schools, which had been established at this period, to meet the new conditions. Hydraulics, guns, gun-mountings, and small arms became therefore, of necessity, the peculiar function of the gunnery school, whilst electricity, first used for mining and other military work, together with the torpedo and explosives of all descriptions, were turned over entirely for development and application, to the torpedo school. To the gunnery school also was allotted the training as divers of all gunnery and torpedo lieutenants, gunners, and specially selected ratings.

The inevitable result of this natural evolution of the sea-officer and rating was to place entirely in the hands of the executive the practical development of the whole armament of a modern ship, including torpedoes and electrical fittings of every description; these officers also compiling the gunnery, torpedo, hydraulic and electrical manuals, and drill-books; and training the whole *personnel* of the fleet in the drill, management, and manipulation of the war *matériel*.

No adequate instruction in mechanical engineering has, however, at any time formed part of the training of the executive officer, in spite of the fact that steam and mechanical contrivances of all descriptions have altogether replaced the old order. It is difficult, therefore, to estimate how far the process of the absorption of the engineering department by the executive would have proceeded, had modern scientific training immediately replaced the traditional methods by which sea officers had been raised during the two

previous centuries. The extraordinary evolution of the executive in spite of all difficulties, points, however, to this inevitable absorption, thereby again uniting the production and direction of motion.

THE ENGINEERING DEPARTMENT.

The introduction of steam and its general application led naturally, at first, to the employment of a distinct and separate body of men, now represented by the present-day engineer officers and engine-room fittings of all descriptions.

At no period, however, has the *personnel* of this department received any instruction which would enable them to exercise executive or military control and responsibility of any description whatever, either as regards manœuvring the ship and squadron, or manipulating the armament. But this does not lessen their departmental importance as the generators of power in the modern vessel. The position of a power or motion producer is, nevertheless, absolutely subordinate to that of the executive or military body, who are alone responsible for the application of the power generated, whether represented by the direction and speed of a ship in a fleet, a fog, or pilotage waters; the working of a boat-hoist or capstan engine; or the practical manipulation of the gun and torpedo as weapons of destruction.

With the object, it must be supposed, of reducing the various classes of mechanics in a seagoing ship to a minimum and to counteract, as it were, the absence of mechanical training in the executive officers, the engineering department, as practical mechanics, exercise a joint care and maintenance responsibility with the gunnery and torpedo officers for the armament generally, without, however, receiving any corresponding education in the armament itself.

By this somewhat illogical and unsatisfactory arrangement is brought about the practical transfer of a certain portion of the armament in a seagoing ship from the care of the executive, who are alone responsible for its development, trials, and use, to the care of the engineering department, who have had nothing whatever to do with either its development or trials, and who have but a visionary responsibility for its behaviour as a weapon. Which arrangement not only adds considerably to the difficulties of the executive, but it also re-acts undesirably upon the specially trained armourer class.

This care and maintenance responsibility has undoubtedly, nevertheless, greatly influenced the demand for executive, or military rank and command. To comply, however, with this demand, is to create a caricature and to generate chaos. Besides which, to confer ranks or distinctive marks upon any persons of whatever position, who are not qualified to perform the duties appertaining to those ranks, not only lowers the whole prestige of those ranks, but it altogether fails to either alter the status or to disguise the calling of the class upon which such ranks have been conferred.

The functions and qualifications of the members of the engineering department are therefore, as ever, entirely those of the mechanical engineer, the practical application of mechanical knowledge to the hydraulic fittings, Whitehead torpedo armament, and dynamos, being secured by the institution of modified hydraulic, torpedo, and electrical courses.

THE FUTURE.

The future efficiency and well-being of the *personnel* of the British Royal Navy, or indeed of any similar organisation in which sudden changes are for obvious reasons impossible, depends almost entirely upon the steps taken in the present to meet the exigencies of the future.

This especially applies to the consideration of any radical alteration in the general arrangement of the *personnel*, here represented by the executive officers and ratings, and the members of the engineering department, the highly technical character of the education in either case rendering sudden changes impossible, and demanding, therefore, that prompt and enlightened action in the present shall guide the evolution of the *personnel* of to-day into a *personnel* adapted to future requirements. The present system will not, however, effect this object.

And the procedure governing the entry, training, and employment of the officer class should be entirely revised, and methods adopted to combine in each officer the mechanical qualifications of the engineer with the sea military knowledge of the executive.

The absolute absorption of the engineer in the executive will, however, be the inevitable result of this combination. For all officers, however employed, would establish their claim to advancement, in the satisfactory performance of their particular departmental or subordinate duties. And all would be legitimately intent on obtaining, in the first place, the charge of the ship, and, in the second place, the command of the squadron, which willing or unwilling, would relieve them of departmental responsibility of every description, such being entirely the care of the individual captain and of the departmental chiefs in each ship.

The recent amalgamation in the United States Navy of these two classes of officer, who had all entered the same academy on the same footing, and who had all received a somewhat similar education, is obviously a simple matter, when compared with the application of any such scheme to the British Royal Navy, in which Service the executive officer and the engineer are trained separately, the executive officer receiving no mechanical training whatever, and the engineer no instruction of practically any description in sea military duties. Hence, although the junior members of both classes might qualify and perform either duty, it is upon the entry, as one class, of a sufficient number to efficiently perform both duties, that the supply of the executive officers of the future must depend. For mechanical instruction, an absolute essential for all sea officers, grafted in, from the very commencement, with sea military training, will alone produce the class of officer suitable for service in the modern ship, whatever line be followed in attaining the position of command.

The general adaptation of the electric motor will eventually place the whole of the auxiliary machinery in the hands of the executive, as represented by the torpedo officer and the armourers. At the same time the functions of the steam department will be automatically reduced to dynamo and propelling machinery only. Unless, therefore, the executive receive sound mechanical training, their position must inevitably become one of great difficulty, for to the present electrical plant, of which, with the exception of the dynamo, the executive have the entire charge, will be added every conceivable

description of engine, from an air-compressing machine to a boiler feed pump. And although perfectly capable of managing the present armament and engines not driven by steam, a very different state of affairs is obviously introduced by the universal application of the electric motor.

The training of the future executive officer would of necessity occupy several years, but should not in all exceed the period now occupied in converting the naval cadet into a sub-lieutenant. The service of subordinate officers in sea-going commissioned ships should, however, be discontinued altogether, the gunroom and the naval instructor being abolished in consequence. A continuous course of professional instruction would thus replace the present system of interposing a long term of sea service between the opening and closing phases of the instructional period.

The advantages of the sea service system, adopted in the days of the sailing vessel are, however, altogether outweighed by the disadvantages attending its continuation in these days of steam and electricity. Sea service, the only argument in favour of such a procedure at any time, is now represented by three to four years' service in ships, which spend the greater portion of their time in harbour.

Night watches, unhealthy climates, inadequate accommodation, irregular exercise and insufficient leave, not only injuriously affect the general development, but they materially assist the drills, routine and boat-work, which interfere with the instructional classes at all hours, to return the acting sub-lieutenant to England for his final courses and examinations, practically ignorant of all modern science, and knowing little that he did not know when he left the "Britannia." He has, nevertheless, expended three to four of the most important years of his life in absorbing a limited quantity of gunnery, torpedo, steam, and seamanship; and he eventually emerges from college a fully-qualified commissioned officer, having been under instruction for nearly seven years.

This system undoubtedly handicaps the executive officers very severely, not only when dealing with the other branches of their own profession, but also when brought into contact with foreign naval officers of every description, none of whom have been trained on these principles. The extremely satisfactory manner, however, in which the British sea officers, when specially trained, have carried out any duty that has ever yet been allotted to them, is, nevertheless, an assurance that, if trained systematically, there is no function they cannot perform with very great credit to themselves and to the Service to which they belong.

In considering, therefore, the entry of cadets, who, when qualified, would eventually carry out the duties of the present executive and engineer officers, the number required to perform both functions and the length of the training required must naturally govern the number to be entered in each batch and the age of entry.

The total number required would, however, be much below the total of the two combined. For no officer would have anything whatever to do with the design, construction, and dockyard repairs of either boilers or engines, these being entirely in the hands of the Admiralty and dockyard engineering staff, who should be, like the Royal Corps of Naval Constructors, entirely civilian, and the very best men that could be obtained, either by special training in the Government establishments or by direct entry. A further large

reduction would also be effected by the employment of the artificer-engineer class in all small vessels, and in watch-keeping and other duties in all ships carrying one or two officers for engineering duties, who are now represented by the chief and senior engineers. And all officers being mechanical engineers, the number of ships in which it would be necessary to carry commissioned officers for engineering duties could be also considerably reduced.

The age of entry, as has been before mentioned, is governed by the length of the training required, and also by the age at which it is considered advisable to send the officer to sea. This, therefore, should not exceed thirteen years, which, allowing a period of seven years for the training in all branches, would send all officers to sea at twenty years of age, which is decidedly below, it should be noted, the age at which the present sub-lieutenants leave college. All cadets on entry should, however, sign an agreement, rendering them liable, *volens volens*, for service in the steam department, thus following the procedure adopted on the abolition of the navigating officers.

In arranging courses of instruction for present-day use, the coaching-day methods of education should be as far as possible eliminated. In those days the dead languages, Euclid, and various mathematical exercises, were the only known methods by which the brain could be developed and a standard of comparative individual merit arrived at.

Steam, chemistry, electricity, and a thousand other developments, have, however, of late years effected a complete revolution. And although the ancient standards are interesting as examples of the capabilities of man under peculiar circumstances, they are no longer possible, if time is to be devoted to even partially mastering the sciences which practically govern modern life, and which are in themselves not only most excellent and adequate brain developers, but also the very best test of the comparative abilities of the modern sea officers. These sciences being entirely part of and essential to the very existence of every modern Navy.

For these reasons academical instruction should be entirely governed by the extent to which each subject directly affects the various functions of the sea service.

This consideration obviously abolishes altogether the study of the dead languages, and limits mathematical research to the axioms, postulates, and enunciations of certain propositions in the books of Euclid; simple co-ordinate geometry; the quadratic equation standard of algebra; the navigation requirements of plane and spherical trigonometry; and the study of statics, kinetics, and hydrostatics, solely with relation to the flight of projectiles, and the construction, displacement, and stability of ships, torpedoes, and submerged bodies. The mathematical pulleys, wedges, and screws, the imaginary cones, which float beneath the surface of the text-book liquid in the academical tumbler; and the higher, or mathematical mathematics of every description, which are the particular function of the naval constructor, and of the designing and constructive marine engineer will be omitted altogether.

In submitting, nevertheless, any scheme of education, the accommodation and conveniences of the several colleges and institutions already in existence must of necessity be considered, with a view to the accommodation of seven or eight hundred officers now at sea in various ships, and the enlargement of the Dartmouth, Devonport, and Portsmouth colleges. By transferring, however, the gunnery and

torpedo training of the subordinate officers from Portsmouth to Devonport, the Portsmouth college could be abolished. And the erection at Devonport of a suitable college, with adequate recreation grounds in the vicinity of the new gunnery school, would enable the whole of the gunnery, torpedo, and mechanical instruction to be carried out in a first-class naval base, possessing unrivalled facilities for sea-training of every description.

The entry examination of cadets should be, of course, a direct introduction to the "Britannia" system of study. Physics, as represented by light and sound, replacing Latin as a qualifying subject.

After entry into the "Britannia," where all cadets should remain three years, seamanship, navigation, and heat would be introduced, to the exclusion of the more rudimentary subjects. Practical mechanical training, the study of steam and the steam-engine, electricity, chemistry, co-ordinate geometry and nautical astronomy being grafted in at the commencement of the third year. And the cadets would pass finally in mathematics at the end of that year, before proceeding to Devonport for the final courses of instruction, occupying four years.

On arriving at Devonport work would be at once commenced in the Royal dockyard workshops and ships, this practical mechanical training being supplemented by the more academical instruction in steam, chemistry, metallurgy, electricity, nautical astronomy, seamanship, heat, mechanical drawing, and the construction, displacement, and stability of ships. The final examinations in the whole of these subjects being held at the end of two-and-a-half years. Thus eighteen months would be available for six months' gunnery training, three months' torpedo instruction, a pilotage course of three months, and for six months' practical work in torpedo-boat destroyers and torpedo-boats manned by skeleton crews. During this period, each member of a class forming the crew of a torpedo-boat destroyer, or torpedo-boat, should spend one-half of his time on deck, manœuvring the boat and working the armament, and the other half below, on duty in the engine and boiler rooms. The whole manual labour should, however, be performed as far as possible by the class under instruction, who should also keep the boats in repair.

When considering the mechanical training of the officers, the mechanical possibilities of the ordinary ship must be taken into account, these possibilities altogether limiting their operations. Hence, three-and-a-half years has been considered sufficient training for sea-going purposes; for, regardless of the extent to which officers may be trained for the sea-service, all repairs beyond the scope of a ship are carried out of necessity by a Royal dockyard, or a private firm, and are therefore superintended in each case by men who are far more capable of performing such work than any sea service mechanics, who, whatever their original qualifications, have in all probability for years undertaken no mechanical work much above the capabilities of an ordinary fitter.

On the completion of the training at Devonport, commissions as sub-lieutenants would be granted to the successful candidates in the final examinations. the class of the certificate, as now, governing the promotion to lieutenant. The appointment of all officers who volunteered, or were selected, for duty in the steam department, or as navigating officers, should, however, as a general rule, be final, the officers selected for duty in the steam department receiving, if possible,

appointments in command of torpedo-boat destroyers for at least six months in every four years. The selection of officers for service in the gunnery and torpedo departments might nevertheless well remain as at present, but extra courses would in all probability be necessary, simply because the development of the war material, which is of little commercial value, depends very largely upon the efforts of the service specialists.

All officers employed in the steam department would thus obtain, under ordinary circumstances, from twelve to fifteen years' experience in steam-driven engines before promotion to commander, and from seventeen to twenty years' experience, if similarly employed after promotion to that rank. Either period is, however, sufficient to ensure a continual supply of perfectly competent officers for service in the engine and boiler rooms, who would in the natural course of events entirely replace the present engineer officers, the process being identical with that evolved when the navigating officers were abolished.

The employment of commanders or lieutenants in navigating, engineering, and torpedo or gunnery appointments, must depend, as in the case of the executive officers of ships and the commanding officers of small vessels, of necessity, upon the relative sizes of the two lists, and the arrangements for promotion. It is immaterial, however, who is employed upon any particular service, so long as the chances of advancement are affected, not by nature of the employment, but by the manner in which the work has been performed. For, given equal chances, the officers who obtain their promotion to captain through the steam department will be in every way as well prepared for the responsibilities of command as their similarly trained contemporaries who may have qualified for promotion in the torpedo and gunnery departments.

The enforced subordination in a sea-fighting service of the mechanical engineer who is not qualified under any circumstances to command the ship, taken in conjunction with the nature of the engineering work required, as regarded from the engineering point of view, must inevitably affect the class of candidate for service afloat.

And no concessions will ever attract into any sea service the class of men who, as engineers, willingly enter the great manufacturing firms. The Navy is not an engineering profession, although mechanical contrivances of every description are very largely employed. Ships and boats are not built as exhibition rooms for the latest type of engine, the engine being merely in position as the most suitable article for producing the required result, to be in its turn replaced by any invention which in the opinion of the executive will be either more reliable, or perform the same work in a more satisfactory manner.

Service in ships is of necessity a compromise, engineering afloat being complementary to sea-training. The rate of promotion in any department will however, alone affect the supply of officers volunteering for service in either. If, therefore, all officers be made eligible by training for promotion to the highest ranks, management alone will be required to ensure for the steam department the services of the best of the very able men who will always, it is to be hoped, compose the officer class of the British Royal Navy. Friction and professional jealousy will be thus reduced to a minimum.

And as charge pay, in addition to full pay, would represent the whole emolument of officers serving in this department a large saving

in the pay of the commissioned officers, which in some cases at present exceeds that of the officer in command, would also be effected, and to this would eventually be added the pay and pensions of all naval instructors not required for service in the shore colleges.

The re-arrangement of the officer class would not, however, necessitate any re-organisation of either the seamen or stokers, the number of artificer engineers alone being increased, to enable them to take over the watch-keeping and other duties now performed by junior engineer officers.

Stokers nevertheless, entered as boys, should reach warrant rank through the same number of grades as the seamen class, and should then be appointed to ships in the proportion of one to each or each pair of boiler-rooms. And boys, ordinary seamen, and second-class stokers, being to all intents and purposes trained alike, their periods of service on deck and below should be altogether dependent upon the number required in either place without reference to their rating.

Electricity, the particular function of the executive officers and ratings, is rapidly altogether replacing the steam-driven engine in the general internal economy of the modern ship. Yet combustion and the generation of steam are still necessary for the propulsion of the ship, and for the production of electrical energy. The installation of the electric motor and of transmitted electrical energy of every description will, however, greatly reduce the work and responsibilities of the steam department, and at the same time render imperative the training of the executive in mechanical engineering, this again automatically still further decentralising the mechanical charge in a ship and adding considerably to the value of the *personnel* of the Gunnery and Torpedo Schools as experimentalists.

Now, therefore, at the parting of the ways, and in anticipation of the inevitable, is the opportunity for again confiding the whole functions of a war-ship to one body of officers united in a common origin and animated by similar ambitions.

Vice-Admiral the Right Hon. Lord CHARLES BERESFORD, C.B., M.P.:—Sir, I should like to congratulate the writer of this paper very warmly on its boldness, and I am sure he will forgive me if I criticise certain parts of it. The idea that seems to have dominated him when writing the paper is that we have arrived at a time in the Navy when we have to institute a different class of training entirely for our officers, if we are to maintain the Service in that state of efficiency in which all want to see it. With regard to the first part of his paper, I notice that he eliminates from his proposals a class of people whom he deems as non-essential, and he mentions the Royal Corps of Marines; and he says that they have little or no effect upon general efficiency. In that part I cannot agree with him at all. The Marines have never been found wanting whenever they have been called upon, whether on shore or afloat. They are, as far as efficiency goes, and in their general bearing, second to none in the United Kingdom. I rather think his argument is wrong in another way. It is not a case of the blue-jacket being able to do what the marine can do, but what we are now rather coming to is, Cannot the marine do all that the bluejacket can? I can illustrate that by my late experience in the Mediterranean. Undoubtedly the marines are hard to beat. They often beat the blue-jackets hands down, and in most ships they are second, or third, or first in the art of gunnery as good shots, and I should be very sorry to see

the marines abolished or in any way removed from the Royal Navy, as I consider they are an integral part, and one of the grandest parts we have as a community in the Royal Navy. I agree with the lecturer when he says the officers are not treated properly. Their merits are not recognised as they should be, and there is no doubt they always fall between two stools—they fall between the Navy and the Army. If the marines are wanted ashore the officers are not employed in those high positions which they merit. And I think we could make a great deal more use of the officers and their ability than we do. In many ships they are the best signalmen in the ships, and the late Commander-in-Chief of the Mediterranean Squadron employed two of the marine officers on his intelligence department, when the work they did was perfectly excellent. Some of the captains of the ships used a marine officer on their intelligence staff. I did so in my flag-ship, and the amount of knowledge useful to me and of use to the ship generally found out and exemplified by these officers was perfectly excellent. There are plenty of positions of that sort in which we might use marine officers, and I dissent very warmly from the lecturer in his idea of abolishing the marines, or varying the conditions in which they are employed in the Royal Navy. He also eliminates the clerical department. It is possible that might be done, but there is one thing the naval officer can very rarely do, and that is, write a letter. The accountant officer always can write a letter; and there are moments when the wording of a letter may be of most material importance to the Fleet, or even to the country. Therefore I think we should keep the accountant officer for that purpose alone. But there is also a great deal of work in the secretarial department which I do not think executive officers are half as well qualified to carry out as are the accountant officers. In war they were very useful in all sorts of positions; and I dissent from the lecturer again in wishing to get rid of them. He does not give any reason why he wishes to get rid of the chaplain. I do not know whether he is a free-thinker; but I have a strong objection to getting rid of the chaplain. I am sure my brother officers in the room will agree with me in this, that both in the Navy and the Army, a good chaplain is of the greatest benefit in a regiment and in a ship. He is a go-between between officers and men, and he often keeps things smooth which otherwise would not be so smooth. And also there is a time in the Services when you may meet with your death, and, for myself, and I speak for many of the men too, I would rather be comforted by a man who is, I may say, accredited to God, than the ordinary officer or man, who might be friendly to me. With regard to the proposals that are based upon the old days, I am perhaps rather radical, but I never will agree that we learn very much from the old days. I will take the greatest man we ever had—Nelson. If we were to go into action as he did we should be absolutely smashed. He went into action with a long line, and generally broke the line of the enemy. What we want to do is to get in the line the enemy was in, so as to cross his T, and have our ships so that he cannot fire a broadside into them. So I do not think we can take the old days as applicable to what might occur now. The part which I heartily agree with in the paper is this difficult question of new training. How we are to combine the mechanical qualifications of the engineer with the seamanship knowledge of the executive officer, will be a very difficult thing to decide. But because it is difficult is no reason why it should not be faced, and I entirely agree with the view of the lecturer that this thing has got to be grappled with, in order for us to have a Navy suitable for modern requirements, as far as knowledge on the part of the officers goes, although I do not quite agree

with all the suggestions which he makes. Still, I know him well enough to feel assured that he puts the suggestions forward so as to make us think, and to provoke discussion, which is so good for the Services. He quoted the case of the United States. I was over there the other day, and I went thoroughly into the position of the United States' engineers and executive officers. At present it is not at all satisfactory, because they have only one engineer officer in the ship, and if that engineer officer happens to get ill there is nobody between the captain and the senior engine-room artificer to do the work. I do not think that is a very good plan. I think the lecturer's plan should at any rate be tried, of joining all the young officers—boys—in one batch, and let those who like go into the engine-room profession, and those who like go into the executive profession. But perhaps his idea is best, namely, to make them all go through both. But I do not think you will get a man who is equally good in the engineering profession and in the art of managing men in the executive profession. He should have some knowledge of it, unquestionably; but I do not think you will be able to say that every officer is as good for an admiral as for an engineer, or *vice versa*. There is a question which he suggests as to young men going to sea as young men. Here I am afraid I must differ from him altogether, because the principal part of the Royal Navy that affects the efficiency when it is suddenly called upon to act is the art of administration—the administration of officers and men; and I am quite certain you will never get men to pick that up as quickly as boys. May I exemplify that? A midshipman goes away in a cutter, when quite a lad. He cannot go continually to the officer in command and say, "I cannot manage my boat's crew; this and that is troublesome"; he has got to do it somehow. In other words, he has got to use tact; he has got to use the art of administration, and he can only get that as a boy. It is most essential we should send our officers to sea quite young, as we do now, and get them to learn that art of administration which, after all, is the whole basis of governing the Fleet, whether it be at peace or war. The lecturer, at the end of his paper, speaks of the parting of the ways. I agree with him that we have arrived at a parting of the ways. I congratulate him most warmly upon the boldness of his paper, which will provoke discussion and make us all think. But I would ask those present, my brother officers especially, to be careful that we do not go the wrong way.

Captain Sir JOHN COLOMB, K.C.M.G. (late R.M.A.), M.P.:—I would not occupy the attention of the Institution before so many others here more competent to deal with the question, were it not that I am anxious to say something upon it, and I am obliged to leave early. I have been to some extent anticipated in my remarks by my noble friend Lord Charles Beresford; but I would thank the lecturer on behalf of those whose interest is in the Naval Service, and whose duty it is to uphold everything which makes for the good of the Navy, for giving us the benefit of his practical technical knowledge by coming forward and reading this paper. I would also congratulate the Institution upon having a naval paper at all. I only wish we had more enlightenment, through the instrumentality of the Institution, on naval subjects than we have. Old fossils like myself are out of touch with the technicalities of the time, and with the thoughts prevailing in the minds of the younger officers, with whom the future lies. Therefore we are under great obligation to the Institution, and to the lecturer, for his kindness in reading this paper. I will say one word about the gallant

officer's views put forward in the paper in respect of the origin and causes of the evolution of the naval force as we know it now. Nobody in his senses would set to and create a Navy, as regards *personnel*, composed as it is now, if he had a clean sheet. But I differ from the lecturer in so far as I think he attributes far too much to changes in methods of water propulsion as being responsible for what the Navy is to-day, and too little weight is given to other causes. The real truth is, that while no doubt the changes in water propulsion had a commanding influence, there were a whole series of causes which have produced the Navy as it is now, and which he so desires to reform. I may just run through some of these other causes. There were constitutional exigencies, political expediency, commercial instincts, professional rivalries, sentiments, and even jealousies, which produced what we have to-day. We must remember that. I cannot stop to give instances justifying this contention, but I will point out to him one thing: Anomalies that exist in the constitution of the British Navy are not present in the French. If his contention was correct, that what we see to-day in our Navy is merely due to the influence of changes of water propulsion, we ought to find exactly the same conditions prevailing in the French Navy as in ours, which is not so. The constitutional system and the administrative systems of France have always differed from those of England. Therefore we have never produced a great naval statesman like Colbert. The history of our Service has been a series of make-shifts. It is the resultant of a conflict between the forces of fact and necessity, and the power of tradition, which has produced that composite body, the Royal Navy of to-day. For example, that special branch in the Navy, the accountant branch, is an anomaly. It does not exist in the Army. The gallant lecturer would not surely try to show me or anybody else that the evolution of this separate and very extensive branch of the Navy is entirely due to changes in water propulsion. And with regard to the marine forces as we see them to-day, I think my gallant friend the lecturer does not know that the origin of the marine force in the Fleet of to-day is due to the resistance on the part of a monarch of England to be cheated any more by captains and pursers. I have said sufficient to caution my hearers against assuming that changes in water propulsion are the direct and only cause of the difficulties we are placed in to-day. My noble friend in front of me has differed from the lecturer in regard to the Marines. I decline to deal with any Service, especially with the Navy, from the point of view of the grievances, or the position of any particular branch of officers. We have something far higher and more important to look to, namely, the general interest of the whole of the Service and the great naval machine. Although it is rather a repetition, I wholly and absolutely differ from the position taken up by the lecturer, that the Marine force of to-day, whatever its defects are, is a conglomeration of units only ministering to comfort and convenience; and I agree with my noble friend in what he has said. I am bound to say I think the gallant lecturer does not sufficiently appreciate the fact that it is physical and mechanical conditions which have approximated the seaman to the marine. It is not the marines which have changed; it is the situation and circumstances which have, as far as functions go, put the seaman and the marine on the same level. I see the lecturer himself does not quite believe in the theory he propounds, for I observe he says that if these units of the Marine Service are willing to change their name and their dress, and to receive higher pay, then they would become the seaman class, they would cease to be ministers to convenience and comfort, and become efficient elements, and a sea-fighting class! I think what you have

to realise is the fact that physical conditions have produced a certain state of things, and in regard to the officers and the men of the Marines it is simply a question of the training which you choose to give them. I now come to the final point which I would like to make an observation upon. I think, as far as the Marine branch of the Navy goes, the policy to be pursued is to set your mind on alterations in the system of training for the gradual absorption of the Marines into the Navy, and so unify the Service. I agree with that, in regard to the officers and all. And the difficulties are not so very great. When the gallant lecturer came to the engineer and the engine-room artificer and their unification, he astonished me by the process by which he proposes to accomplish it. He proposes to take all officers for the sea service, and submit them to mechanical, scientific, and mathematical training, to take them as boys, and not to send them to sea for a first time until they are about 20 years of age. If my gallant friend's proposal is that, I repudiate it, and I share the opinion of my right honourable friend here. If it be practicable, why not take the young marine artillery officer, try the experiment, and see if you will make an executive officer at all equal to the officers who have had early sea training. I do not believe you can get the qualities for which our naval officers are distinguished—adaptability, appreciation of a position suddenly changed, a sense of responsibility, fearlessness in doing what he thinks best—unless you give them early training, unless you take them to sea while they are young. With regard to the engineer question, I would only say this: I myself am entirely of opinion that we are more than at the parting of the ways on this question, and the sooner the Admiralty make up their minds what they are going to do, the better for the Naval Service. I think at present we are in great confusion, and the matter has to be faced. My own view is that the first step is to give the present engineer officers opportunities for learning those executive functions as far as they concern the ordinary handling of groups of men as fighting units. I think that is the first step, and I doubt very much if you will ever be able to get in one man all the qualities necessary for a scientific engineer and all the aptitudes and requirements necessary for an executive deck officer. I think it will be a very long time before you can put on one and the same man the duties of the bridge and the duties of the engine-room. I again thank the lecturer for giving, and the Institution for having secured, a paper which is of such incalculable good as throwing light, and very clear light, upon those problems which are pressing for solution now.

Commander FREDERICK K. C. GIBBONS, R.N.:—Starting with the Marines, I think there is another way in which we may look at the doing away with them. It is not so much the question of the officers not being used as they ought to be, although that is a very important point, especially as, after a good many years of experience as gunnery lieutenant, I have found many of our best officers are to be found among the Marines. The difficulty comes in in getting your recruits. There are a large class of men whom wearing red coats or other causes attract, and you can get those men in large numbers, and I doubt if you could get them to enter as bluejackets. You must look at it from that point of view. They are also cheaper. With regard to the midshipman's training, I have a good many friends among American naval officers, and I was once speaking to the first-lieutenant of a ship, which was lying alongside of us. He said, "I admire your midshipmen. My fellows come from college when they are about 18 or 19, and they think they

know as much as I do." With regard to the engineering department, I think that question is practically already decided on. I do not agree at all with the idea that one man and another should go right through both departments. It would be better to take them both as cadets and give them two or three years of their training, and then say, "You go to the engineering department," and "You go to be trained as a midshipman," both having had a common basis to start from. But even then, I am afraid, you would find that the best men would like the executive. I doubt if it would answer that way, unless you forced them to choose early. With regard to fixing a separate rank of warrant officer engineer, who is to do all the watch-keeping duties, we shall have the whole question raked up again in a few years' time. These people would say, "We are doing the responsible watch duties of the ship, and ought to have rank." Also, a better class would come in to do it, and would be backed by a trade union, who would agitate, also bring Parliamentary influence to bear, and the whole question would be opened up again. Harking back to the marines, I think it would be a good thing if we followed the American plan, where the system is to take the officers for the marines from the midshipmen who have done two years' training at sea. At the end of that time they can go in for the marines if they like, but they do not get the same chance as before. It is better pay to start with, and good for people who do not like watch-keeping. Except for actually keeping watch he is a very useful man at signalling and boat-pulling, and he instructs his own men, and he is a good fighting unit.

Major CECIL Q. HENRIQUES (1st Middlesex R.E.) (Vols.) :—I am here as a Volunteer officer, but I wish to address the meeting as a mechanical engineer. I am a director of one of those private firms which have been mentioned, and I would say a word about the Engineer question. I was very pleased to hear Commander Orpen's remarks, because, what I gather is, that he wishes to amalgamate everything, Marines, Executive, and Engineers. In the Army and also the Volunteer Service, to which I have the honour to belong, we have Royal Engineers, having the same standing as the artillery, cavalry, and infantry. What I feel, Sir, as a civil engineer and as a mechanical engineer, is that I cannot advise my friends to send the best class of boys into the Navy as Naval Engineers, knowing that they take such a secondary position at present; and that they are always beneath the Executive. If anything could be done on the lines of this paper to improve the position of the mechanical engineer, in the Navy, I, as a member of the public and of the Engineering profession, should welcome it most heartily. I think the Navy is more dependent on the mechanical engineer than the naval officers seem to admit. They do not seem to recognise the importance of the engineer in the battle-ship. The machinery in a battle-ship is the heart of the ship, for the manœuvring; and the guns are also the heart of the ship. Without the guns and engines we are nowhere. If you could do anything to train executive officers and make them *competent* engineers, not *amateur* engineers, I should welcome it with great delight. There is another thing which the lecturer has mentioned about electricity in moving the auxiliary machinery of the ship. My firm (John H. Wilson and Co., Limited) have made a great many auxiliary engines for the Royal Navy (nearly 100), and they were all steam, and we also do a great deal for the merchant service. We have consulted with some of the most eminent shipbuilders about electricity for the merchant service for working auxiliary machinery. The deck machinery of a big cargo boat in the merchant service takes about

1,000-H.P. It would be a very big thing indeed to put in an electric generator of 1,000-H.P. in a ship, and for everything to be dependent on that dynamo not going wrong. That is one of the difficulties which merchant-ship owners raise. They will not at present have electric auxiliary machinery, when rough usage and damp are very much against it. That has kept me back from going in for electric machinery for merchant-ships. I believe the Navy has done it, but whether they will adopt it as a permanent thing is very questionable. The Navy wants something which will stand *anything*, which will not break down at a critical moment, and I therefore thought I might venture to bring this matter before the meeting.

Mr. W. S. CLAYTON GREENE (Barrister-at-Law, late Assistant Engineer, R.N.):—Perhaps I, too, am something of an outsider here, as my name does not now appear in the Navy List. But I have had a little naval experience, and so I make bold, even in the presence of so many senior and distinguished naval officers, to express my view here. I think confusion arises from this constant repetition of the expression, with regard to the engineer, that he is “*underneath the Executive*.” Confusion arises because it must be admitted by every rational person that there cannot be more than one person in command of the ship. You cannot have two men in the conning tower. It is not the engineer’s contention that he ought to have the position of an executive officer in the highest sense of that expression. He does not ask, and never has asked, for command of the ship. What he does ask for is recognition. It is recognition of his work in his own sphere, not only in the matter of military rank and command in accordance with his official status, but also for the titles properly attaching thereto which he cries out for, and I submit he deserves to have it, and sooner or later he must have it. There is a great cry for this executive rank. Commander Orpen has criticised that, not very kindly. In his innuendo as to the engineer’s desire to “disguise his functions,” there is contained an expression which Commander Orpen will, I think, live to regret having made use of. The engineer officer does *not* want to “disguise his functions”; what he wants is to have an appropriate position in his own sphere. Commander Orpen has alluded to the chaos which is to follow upon the bestowal of executive rank upon the engineer. I ask, Sir, is not the existing state of things a veritable chaos? I can illustrate it simply. Let us suppose you have a first-class battle-ship in action, and the lieutenant in the barbette has been killed. The machinery there is probably hydraulic, perhaps some of it is electric, and it has broken down. The gun is disabled. You have no other commissioned officer in the place. It is eminently a case for high intelligence and resource. The engineer officer, if present, would know what was best to do, and he would not be far away. Now that officer cannot give a single “executive” order in that barbette, as matters stand. It is true that what he says may be listened to, and possibly in some cases with respect; but he does not command, and a self-sufficient petty officer, on whom the actual command devolves, can completely overrule him. That is only one illustration of the disadvantage under which an engineer officer to-day goes to his work, and, taken alone, it is, in my opinion, sufficient to put opposers of the engineers’ claims completely out of court, though I could enumerate many others. Sir, I think the suggestion which you will see I make, that the engineer officer should have executive rank and titles, is not very impossible. The able lecturer advocates the introduction of the lieutenant into the engineer’s sphere. You can put it the other way, it comes to the same

thing, viz., assimilation or amalgamation of the two branches. The engineer, whether he be dubbed "combatant" or "non-combatant," has got to have control—absolute control—over men; his word must be obeyed in engineering matters by both seaman and stoker. What, then, is the harm in giving the engineer officer, as he is found to-day, that executive control? Why not? Is he not an educated man? I do not suggest for a moment that he should ever study tactics, or anything of that kind, which, of course, is the proper department of the executive officer *par excellence*; but I do urge that he be given a better position in the way of rank and prospects than he at present has. The need for it is obvious; the dwindling of candidates for Keyham College, and the almost entire absence of outside men properly qualified, is a very bad state of things. It is because you cannot get educated gentlemen to submit themselves to the present conditions of service. And you must get them. Educated gentlemen only can do the work. The executive officer is very clever, no doubt; he can, if he likes, master all that the engineer knows. But he has other functions, and I think that has been very properly put to-day by a previous speaker. He has wide administrative functions, and he cannot well be down below in the engine-room. It would be interesting to know if it is the lecturer's idea that his ideal engineer executive officer is to be below. There must be a commissioned watch-keeping officer below. On these grounds I do venture to think that a case is made out for a radical improvement of the engineer's position. I say so much in all humility. I confess at once I am not a naval officer now. I hope I have not seemed over-confident in the presence of so many officers of high rank in expressing my views.

Rear-Admiral W. F. S. MANN :—Sir, I should like to ask one question. Did I gather that if the lecturer's scheme is carried out, it will be quite possible for an officer to be practically all his time in the engineering department up to captain's rank, and on attaining that rank to take command of a ship?

Commander ORPEN :—Yes.

Rear-Admiral MANN :—There is much in the paper that I agree with, it having been in my mind for some years that officers should have more mechanical training, but I cannot at present bring my mind to that. All who have been through the Service know that we are drinking in something all the time, so that when the time arrives for us to stand on the bridge and manœuvre the ship, we do it intuitively from knowledge picked up. I cannot think that is possible for a man who has spent all his time in the engine-room—it wants a long training. I believe the time has come for all officers to be more or less engineers, but there must be a period in their training when it shall be decided which goes for command, and which for the engineer department. I think most officers believe that going to sea young has assisted towards making the naval officer what he is. But, if continued, how are you to give the mechanical education which I feel is necessary for officers of the present? You cannot make a midshipman a schoolboy—we all know that "going to school" on board seagoing ships won't do it. I know I got but very little knowledge that way. I loved the deck work—most boys do. You could at one time go to sub-lieutenant with but little education. We have to recognise that things are different now. When you have to manage a great machine—as a ship is—you must have mechanical knowledge and training. Can you give them this training at sea, sending them as you do now, or must we have

them trained as the lecturer suggests? Then, as to the Royal Marine Corps, I did not take the lecturer to mean—and I am sure he did not—that our R.M.A. and R.M.L.I. are not most serviceable men. Nobody could have but one opinion of our gallant Joeys. They are intelligent and splendid. What I understood was, that in his opinion it would be preferable to have, in a ship, naval lieutenants, seamen gunners, and mechanics in their place. If necessary, sentiment must give way to efficiency, but such a change requires careful consideration. I do not know the name of the gentleman who spoke up so bravely for the engineer department. That question has also been in my mind for some years. I see no reason against our engineers having so-called executive rank; why should you not call the engineer officer “Commander” R.N.E., “Lieutenant” R.N.E., etc., giving him rank and authority such as executive officers have now? I believe it would work well. Although now on the retired list, I feel it a duty to give expression to such views as come to me.

Commander ORPEN, in reply, said:—I think, Sir, that Lord Charles Beresford was mistaken in supposing that I intended to disparage the Corps of Royal Marines. I merely insist that their functions do not necessitate their retention as a separate corps; in other words, that most inefficient of all arrangements, an organisation within an organisation. The senior officers, also, invariably fall between two stools. They are not qualified for naval command, and no steps whatever have as yet been taken to demonstrate to the War Office the superiority of service in a ship, over field training, for a soldier. Touching the points raised by Major Henriques, I would point out that it has been my privilege to attend quite recently, in an official capacity, the trials of the first electrical boat-hoists in the Navy, which, for speed and general efficiency, compared most favourably with their steam predecessors, the outcome of years of development. Nothing, in my opinion, can possibly prevent the displacement of the steam auxiliary machinery by the electric motor, and the consequent ruin of the makers of such, who are either unable or unwilling to commence the manufacture of the electrical substitute. It has been stated that as the engineer officers have no power of punishment, they have therefore no control over their men. This is, however, an absolute fallacy, for they have precisely the same control as the gunnery and torpedo officers, who, never being officers of the watch, have never the power to administer any punishment whatsoever. But the gunnery and torpedo officers would be greatly surprised to hear that they had no control over their men. Admiral Mann seems to doubt the advisability of entrusting the command of our ships and squadrons to officers who had qualified for promotion in the engine and boiler rooms. With his contentions I do not, of course, agree, and in addition to my remarks on this subject, already made by me, in my paper, I would add that to close the Flag List to these officers must inevitably lead either to officering the steam department with officers of inferior quality, or to considerable discontent, if service in this department is made compulsory. It is quite possible, undoubtedly, to evolve a “commanding” class ignorant of departmental work. You would do this, however, at the expense of the departments, which would automatically attract men of inferior ability only. It is expedient, therefore, to make the commanding ranks the reward for efficient departmental work, but no department should be excluded. I wish to thankfully acknowledge the very kind reception given to my paper. We all have the interests of the Navy at heart, and it was in the best interests of the Service, as viewed from my standpoint, that my paper was written.

The CHAIRMAN (Admiral Sir N. BOWDEN-SMITH, K.C.B.) :—In bringing this interesting discussion to a conclusion, I would ask your kind indulgence while I say a few words before conveying our thanks to the lecturer for his paper. I quite understood, when the lecturer spoke of the marines, that he did not mean to disparage them or their splendid services. What he meant to say was, that whereas the marines were a necessity to us in years gone by, when our seamen were not disciplined, they are not now required for disciplinary purposes. As regards our shooting on board ship, I understand that the best shot in the Navy at present is a marine artilleryman on board the "Ocean," in China. With regard to the accountant officers, he says they are non-efficient, and he would throw them overboard. I would have thrown them overboard long ago, not because they are inefficient, but because they are unnecessary. Of course, we should retain the writers, ships' stewards, and assistants; but the accountant officers might be taken from the executive in this way. In the smaller ships the navigating officer would do the accountant work, in addition to his own, with increase of pay. In the larger ships, I would let a lieutenant do the accountant's work, and have extra pay for it, but not until he had served eight or ten years as lieutenant. There are some officers, who, after eight or ten years' service, lose their nerve, or who are, from other causes, not so fit for deck work as they were; and I believe there are many officers who would gladly take up accountant duties after ten years' service. It would be an outlet for officers who no longer felt themselves as fit as they were when younger. With regard to the so-called executive and engineer branches, which is the main question brought before us to-day, I do not myself feel disposed to go as far as the lecturer in the complete amalgamation of the two branches. I see no great objection, however, to entering all officers as cadets through the "Britannia," but after the age of 21, or when fairly embarked in their separate careers, it would be more conducive to the efficiency of the Service if the deck officers, and those told off to the engineer department, should continue to carry out those duties. All, however, would be executive officers, and the fact that an officer had served principally in the engineer department should be no absolute bar to his attaining flag rank. I am of opinion, however, that a radical change is necessary in the education of our naval officers, and that the continued presence of naval instructors on board sea-going ships should be rendered unnecessary. It is a fact that in the United States Navy, at the Naval College at Annapolis, all their cadets are brought up under one system, whatever branch of the Service they are going into, but from what I gather they do not approve of the amalgamation of the two after they have gone on board ship. I cannot believe that any officer who has spent from 12 to 15 years in the engine-room department before arriving at the rank of commander, or 17 to 20 years before arriving at the rank of captain, can be an efficient officer to command a ship or a squadron. I agree with the lecturer that with regard to ordinary seamen and boys, everyone who now enters the Service as a seaman should come into the Navy on the understanding that after the age of 19 he would be liable to serve in the stokehold whenever required to do so. It should not be a question of volunteering. At present, if men are wanted in the stokehold, volunteers have to be called for. They should go when required as a matter of course, receiving, however, additional pay whilst so employed. With regard to the scheme put before us, the age of 13 is too early for the State to take charge of the education of the cadet, and would add to our present heavy Navy Estimates. It is too early an age for competitive examination, as boys develop very differently, and if the age limit is con-

fined to 13, or even 14, we shall shut out many youths who would make good naval officers. Moreover, boys of 13 persistently catch every sort of infectious complaint that happens to be going, especially when they are crowded together on board ship or in schools, causing the loss of valuable time. I do not think it would be wise to return to that early age, but, taking into consideration the great change in the Service brought about by the use of steam and electricity, the education should be more practical, or, as my friend Commander Orpen puts it, more mechanical. A great deal of practical work could be taught young officers on board ship if they came to sea a little later, and were distributed about all over the Fleet. At present they are crowded together in large ships to enable them to have the advantage of the naval instructor, where they cannot all learn their profession. If they were more distributed they could learn their work under their own officers. An officer should serve at least three years in a sea-going ship before he should be qualified to take charge of the deck, and it is advisable that every executive officer should do navigating work for at least six months before qualifying for lieutenant. Navigating a ship is different to doing navigation on paper. According to Commander Orpen's proposals, as I understand them, an officer, except when serving on board torpedo-boats or destroyers, would not go to sea before 20 years of age. I think that is too late to go to sea. A course of instruction for young officers in destroyers on leaving the "Britannia" would be admirable; but I do not agree with his suggestion that the whole of the cleaning work of the boat should be performed by the instructional class. Doubtless the repairs and maintenance of our ships, with their various appliances, should be carried out as far as possible by our own people on board the ships, with their own resources. Since the final abolition of masts and yards, a great deal more attention has been paid to gunnery and good shooting, and to competition in coaling ship than formerly. Even when a ship is alone the quantity of coal taken on board each hour is carefully recorded; and may we not hope that in the same way there will in future be a healthy rivalry among ships in endeavouring to make good their own repairs as far as they can, not only for the sake of economy, but in order to keep them efficient when on service, or in the presence of the enemy? And if all our officers received a more practical and mechanical training they would be better fitted to insist on such repairs as were possible being duly carried out. For this reason I welcome Commander Orpen's paper, and I feel sure all present will join with me in giving him a hearty vote of thanks.