INSTITUTE OF MARINE ENGINEERS

INCORPORATED.

SESSION 1903-1904.

President—SIR JOHN GUNN.

Local President (B.C. Centre)—LORD TREDEGAR.

ANNUAL DINNER,

HELD ON

WEDNESDAY, OCTOBER 14th, 1903.

THE ANNUAL DINNER of the Institute was held this year in the Liverpool Street Station Hotel. The President occupied the chair, and was supported by the following gentlemen: Agents-General Sir W. Peace, K.C.M.G. (Natal), the Hon. Sir H. Tozer, K.C.M.G. (Queensland), the Hon. W. P. Reeves (New Zealand), H. A. Grainger, Esq. (South Australia); Sir Geo. B. Bruce, Sir John Jones Jenkins, Sir John Glover, Engineer Rear-Admiral W. W. Chilcott, C.B., R.N., Engineer Admiral H. J. Oram, Captain C. H. Stockton (Naval Attaché U.S.A. Embassy), Walter J. Howell, C.B. (Assist.-Sec. Board of Trade), Lieut.-Col. A. C. T. Boileau, R.A., J. H. Wicksteed (President, Institution Mechanical Engineers), Robert Caird, LL.D., W. Garnett, M.A., LL.D. (Technical Education Board), H. J. Cornish and J. T. Milton

(Lloyd's Registry), Robert Clark, G. E. Abernethy, C.E., H. N. Malan (Registrar General of Shipping), Edwin O. Sachs (Fire Prevention Committee), and the following Past-Presidents: Asplan Beldam, John Corry, J.P., D. J. Dunlop, J.P.; the office bearers and Council, also the Vice-Presidents were well represented.

THE PRESIDENT: By a time-honoured custom the first toast in our list is that of "His Majesty the King." Since his accession to office we have appreciated even more than ever we did before the valued services and the experience he gained under his beloved and esteemed mother, and now we can well say that he has done his duty nobly and well.

"GOD SAVE THE KING."

THE PRESIDENT: The next toast on our list is that of "Her Majesty the Queen, and their Royal Highnesses the Prince and Princess of Wales, and other Members of the Royal Family." We all know and appreciate the fact that Her Majesty, since she first landed on our shores, has thoroughly identified herself with the welfare of the people at large. It is not the mere formality of a royal wish, but a personal interest, following the noble example of her late predecessor, our esteemed and beloved Queen Victoria. I trust, and believe, that Queen Alexandra will follow worthily in her footsteps. Of the Prince and Princess of Wales and the other members of the Royal Family it will be unnecessary for me to speak beyond a word. His Royal Highness the Prince has in this City shown that he promises to be a worthy successor of the King, and although we hope the day may be far distant, yet when he is called upon to do so he will prove a worthy successor to his distinguished father and no less distinguished grandmother. We all realise that the duties appertaining to these high offices are no mere matter of form. We desire and delight to know that our Royal Household is interested in all that concerns the welfare of the nation

as a whole. I ask you to join me in drinking the health of Her Majesty the Queen, the Prince and Princess of Wales, and all the other Members of the Royal Family.

"God Bless the Prince of Wales."

Sir Walter Peace, K.C.M.G. : Before I address myself to the toasts which have been entrusted to me I have a few personal remarks to make, and those are that I wish, as this is the first opportunity I have had, to tender to the Council and to the members of the Institute of Marine Engineers my most grateful thanks for the honour they have done me in electing me to be an honorary member of the Institute. I am not a marine engineer by profession, but, seeing that during the last twenty-three years I have had so many steamships built under my personal order on behalf of the Government I represent, I have learned sufficient of the marine engineering profession to appreciate all the more the honour which you have done me. I have to propose a toast which is a very familiar one, "Our Imperial Forces." Well, I will first allude to the Navy, for that must always be the especial favourite of the marine engineers, as it is to their skill that we have got a modern Navy of steamships such as were not dreamed of fifty years ago. I need not dwell on the fact that the marine engineering science has altered the conditions of the whole world, has bridged oceans, and brought nations which were far distant from each other close together. Well, I always think that excepting on an occasion like this the toast of the Navy and also of the Army should be one which is proposed from the chair, because it is a Royal toast, properly considered. There is one reason, however, why I think we may accept the present rule, and that is that we always look upon the gallant officers who are called upon to respond for the Navy and Army to tell us a good many things we did not know before, and it also gives those officers an opportunity of suggesting something to their superiors that they would not like

to put on a minute paper. If I had the ability and knowledge of our North Country poet, Sir William Allan, I should be able to discuss the Belleville boiler with the gallant Admiral who will respond to this toast, and if I had the ability of a gallant general who has just embarked for India I might say whether the Royal Artillery or the Naval Artillery arrived up at Ladysmith just in time to save it. But knowing none of these particulars, and remembering that we are under the shadow of a great sorrow, the sorrow that we all feel in reading the report of the War Commission, I do not feel that I can dilate upon the honours due to the War Office, but I do feel that we all acknowledge all the more the gallantry of our soldiers who, in spite of their superiors, win our battles for us. Now I will not detain you by going over again the claims which the Colonial troops of His Majesty's forces have established in our minds. But when we talk of our Imperial forces I would like to remind you of one force which is greater than any of those to which I have previously referred, and it is only a sentiment, but if we once can arrive at the day when the whole of His Majesty's subjects agree in that sentiment we shall be one people. Then you will have a force that will make itself felt and carry you for generations. There is no name down for any gentleman to respond to the word "Imperial" in this toast, but in connection with the Navy I have the pleasure of coupling the name of Engineer Rear-Admiral Chilcott, and the name of Lieut.-Colonel A. C. T. Boileau with the Army and Reserve Forces. I have no doubt they will make up for any deficiencies in alluding to the particular points that they wished to see emphasised. But who shall respond for the toast as a whole, "Our Imperial Forces?" I reckon that we ought to be included amongst the Imperial Forces, but the one man who might most adequately respond for this toast and most fittingly do so is not present to-night because, as you know, our great Imperialist has got the gout. I have pleasure in proposing this toast for your acceptance.

"Our Imperial Forces."

Engineer Rear-Admiral Chilcott: I rise on behalf of the Navy to thank Sir Walter Peace for the kind allusions he has made to the Navy. His position as the distinguished representative of the most loyal of the South African Colonies reminds us at once that the Navy is not only the British Navy but the Imperial Navy. I have also to thank you, Sir John Gunn and gentlemen, for the hearty manner in which you received the toast. I think it is a toast which certainly appeals, as Sir Walter Peace has just said, to this scientific society of marine engineers. He has alluded to the amount of work which is done by marine engineers, and the progress which the Navy has to thank them for far better than I can. But you have only to look at the programme, at the names of the past presidents of this Institute and at the names of the Members of Council. Look through the roll of members and you will quite understand that the toast, "Our Imperial Forces," is one very personal to this Institute of Marine Engineers. It has been my privilege to be present when the Mediterranean and Channel fleets joined, and a very powerful, mighty powerful, fleet they looked and were. I have seen this fleet divide and engage in mimic battle—a good job it was mimic—carefully and skilfully led at high speed, and I can assure you that if you had seen that fleet as I have seen it you would be surprised at the amount of discipline, preparedness, and skill, all awaiting the day, which we may hope is very far distant, when need should arise. Should the unfortunate necessity arise for that fleet to put forth its strength, I am sure we shall emulate the glorious traditions which have been handed down to us from our fathers. It only remains for me to thank you all for the kind way in which the toast has been proposed and received.

Lieut.-Colonel A. C. T. Boileau (Royal Artillery) regretted, he said, that there was not a more distin-

guished or superior officer present that evening to respond for the Army, although he did not know of anything in the regulations that said that the Army should not be responded to by any officer under the rank of general or field-marshal. On the present occasion they had "War" following "Peace." It was usual in experience for peace to follow war. He thought, however, that the order was immaterial. Sir Walter Peace's able remarks had only added to his confusion and diffidence, because he had insinuated that the service members were about to make some important disclosures on service matters and had alluded to the War Commission. He had not the least intention to talk of the report of the War Commission, any more than he had to talk of the *Encyclopædia Britannica*. The toast of the "British Army" was rather a large one for a novice to reply to, and he would therefore confine himself to speaking of that part of the Army of which he knew most, the Royal Artillery, which was the largest regiment in the world, consisting as it did of 2,800 officers and 53,000 men, and also of the Royal Engineers. There was a well-known saying attributed to Marshal Saxe—not Napoleon, although most of those sayings were put down to him—who, he thought, had said that "an army marches on its belly," by which, of course, he meant that without proper food supplies an army could not get along. He would not go so far as to say that an army on the present day "marches on its head"—(laughter)—but he would like to say that he thought the time had arrived when it was pretty well known that brain and mind played just as important a part in the Army as feeding. It might not be known to them all that there was a certain portion of the Army who were students in every sense of the word. Young gentlemen who wished to join the Artillery or the Engineers were educated at the Royal Military Academy, Woolwich, where they received more than primary education, higher mathematics being included in the entrance examination. Those young

officers commissioned for the Royal Engineers were taught engineering in several branches, electricity, and other subjects in the School of Military Engineering at Chatham, where also is the School of Submarine Mines. In the Artillery at Shoeburyness the School of Gunnery perfected officers in scientific gunnery in all its branches, and in the Ordnance College at Woolwich officers put in a course of one or two years, and were taught steam, mechanics, hydraulics, electricity, and mathematics. There were facilities in the Army for advanced study, and he did not think the whole army were "numskulls." There were in the Army a considerable number of officers of scientific disposition and education, and those officers were able by their education to conduct the training of those under them in the same way, and they were able to appreciate and understand the work and importance of that great Institute of Marine Engineers whose guests they were that evening. He assured them that personally he had followed all their proceedings and lectures with the greatest interest, and he might be excused if he stepped aside from the toast to express his great thanks to the Council and Secretary of the Institute of Marine Engineers for the advice and information they had always been willing to give him, especially Mr. Adamson, on any questions which were mutual. He begged to thank them exceedingly for having included the Army in the toast, and also for having done him the honour of allowing him to return thanks for it.

Robert Caird, Esq., LL.D. : I am deeply sensible of the honour your Council has done me in asking me to propose this toast. I only wish I felt confident of doing justice to it. But great as is that honour it is not the greatest that you have done me. When I received your invitation to come here to-night I felt I should be quite incorrigible indeed did I not immediately set aside the reluctance that possessed me to undertake a task so much beyond my power,

and place myself unreservedly at your service. I am proud to belong to a profession which numbers in its ranks the members of this Institute. I shall not attempt to trace the steps of your corporate progress or to adduce figures to show its rapidity or its extent. Your excellent and genial honorary Secretary will, I presume, as usual gladden your ears with a flood of encouraging statistics. But this I will say, that in the course of a very few years, fourteen in all, the youngest of the great professional societies of the Empire has advanced to an honourable place in the very first rank of those societies; and here let me say that place you have won fairly and honestly not only in virtue of your contributions to the literature of engineering in your discussions, by virtue of the assistance you have given to the development of the mechanical arts, by the improvements you have made, and most of all in virtue of the work and character of your members. That the marine steam engine of to-day occupies the place it does for efficiency and economy amongst all motors in existence, and that notwithstanding great disadvantages inherent in the conditions under which it must be operated, is due to the inventiveness, ready resource, and constant care and study on the part of the marine engineers in charge. And never, I suppose, in our history had we greater need of these qualities developed to the highest degree. The gradual but continuous increase in speed in running has brought into prominence the inherent difficulties of the reciprocating engine, and great ingenuity has been displayed of late years to overcome those difficulties by more or less complicated systems of balancing. A humourous son of the craft has styled one of these systems "an arrangement of cranks." Well, gentlemen, there is, I think, a general agreement that the limit of piston speed has been reached. It seems as if the abolition of the reciprocating parts altogether and the universal adoption, at any rate for vessels of high speed, of some type of turbine is at hand. But here, again, we have to thank a marine engineer for finding a solution of

that problem. If ever man deserved success that man is Charles Parsons, and I tender him in your name a tribute of admiration for his brilliant scientific attainments, for his high courage, steadfast faith and patient, unremunerative labour extending over long and anxious years. It will be a crowning triumph for him if, as we have some reason to hope, the "blue ribbon" of the Atlantic is brought back again to the old country by a steamer driven by Parsons' turbines. And now, Sir, I propose, with your permission, to abuse the trust you have reposed in me, in the first place, by offering a piece of advice to the members of this Institute, and in the second place by making an appeal to their generosity. The ever-growing complexity of engineering problems forces upon our attention a matter very vital, I think, to the continued well-being of this Institute, and that is the training and education of the engineers of the future. Is it fair to turn young engineers out into the world with nothing but a workshop training? Our workshops no longer profess to give complete training. We are forced to specialise, and we can only teach our apprentices, even if any teaching is attempted, a mere fraction of what they should learn. Most of you have learnt by bitter experience exactly where your training has been deficient, and I think I may venture a shrewd guess that ninety per cent. of you will say that it is in practical mathematics. Mathematics used to be taught in my young days on the assumption, as Professor Perry says, that students had the knowledge and the reasoning power of an Alexandrian philosopher, or, I will add, of a Macfarlane Gray. But a beginning has already been made to bring the higher branches of mathematics well within the compass of every earnest student possessed only of commonsense and application by discarding metaphysical abstractions and centering the attention upon the practical applications of the science to particular crafts. Teaching of that sort cannot, of course, be undertaken in the workshops. The whole question of apprenticeship is under review,

and the advice I wish to give to this Institute is that they should throw the weight of the wide and valuable experience of its members and of its great authority on the side of radical reform in the training of marine engineers based upon a due admixture of theoretical with practical faith. It is only thus, I am convinced, that you will be able to retain the proud position of supremacy you now occupy, and be able to adapt yourselves to the ever-changing conditions of a profession so progressive as engineering. And now I should like to make an appeal to the generosity of the members. When Mr. Carnegie was in Greenock a year ago (I dare say you can imagine what his mission was—he was opening a library) he remembered that Greenock was the birthplace of James Watt, and he conceived the idea of erecting a memorial to the great inventor on the actual site on which the cottage stood in which Watt was born. Mr. Carnegie was willing to bear the whole expense himself, but on reconsideration he decided, and I think wisely, that a tribute of the kind would come better from all those of the English speaking race who had benefited—and who has not?—by the discoveries of the high priest of steam. An appeal for subscriptions is being prepared with the intention of collecting a large number of comparatively small amounts. Whenever that appeal comes before you I hope it will evoke your sympathy, and that you will one and all be glad to co-operate in marking for all time the birthplace of James Watt in such a manner that shall be worthy his great name and will, at least, show to posterity that the engineers of to-day are not forgetful of his imperishable achievements. I might have dwelt on many other topics, some perhaps of greater propriety than those I have chosen, but in the words of our missionary statesman "What I have said I have said." It now only remains for me to give you the toast that stands in my name, "The Institute of Marine Engineers," coupled with the name of the President, Sir John Gunn.

Sir JOHN GUNN: After the excellent and

eloquent speech from Dr. Caird to which you have just listened, I think I shall best consult your wishes by making my remarks as brief as possible. First of all I beg to thank him for the kind way in which he has spoken of this institute and of the work that it has accomplished. I feel that with the distinguished array of past presidents I am occupying a somewhat false position. Unlike Dr. Caird, I have the misfortune of not being a born engineer, not even a trained one, but I have been closely identified with engineering work for more years than I care to think about. I have been closely associated with developing, and in some measure originating engineering work, which has redounded in no small profit to engineers as well as to the public at large. Speaking of this Institute, perhaps I ought to say that its growth has not been abnormal, but it may be, as we know in natural science, the slower the growth the longer it lasts. The growth of this Institute has been steady and sure, year by year progressing. I am not going to trouble you at this late hour with figures. I am simply going to announce to you the gratifying fact that the Institute is in a better position numerically, financially, and otherwise, than it has ever been before. You all know that that is due to a limited number of devoted men who give up their own spare time, frequently their very spare time indeed, for the advancement of knowledge amongst their fellows, it may be at the club or at their own homes, preparing papers to be read before others and to be criticised by the Institute as a whole. Such work, although not acknowledged by the public at large, brings its due reward to those faithful men who for so many years have been associated in promoting this excellent work. I certainly cannot sit down without referring to them, particularly the excellent honorary secretary, Mr. James Adamson. He is known to you all, and I am sure respected and appreciated by you all, as he is by myself and by all who have come into contact with him and his excellent work. I will not detain you, gentlemen. There are

some speakers to come who will do ample justice to the toasts that follow. I thank you for the cordial manner in which you have received this toast, and I am delighted to see so many here to-night to encourage those workers who are doing such good work not only for those ashore, but for those who come into port and are welcomed by the members of the Institute.

The President then said he was sorry they had received intimation that several of their friends who would have been delighted to have been present were unable to attend, particularly Sir Thomas Sutherland, who was confined to his house, Sir W. T. Lewis, Sir Fortescue Flannery, Colonel Denny, Dr. John Inglis, and several others. He merely made that announcement to show that the programme, so far as they were concerned, had been carried out in perfect good faith. He was delighted to know that they still had some volunteers. They had been favoured by their old president, Mr. D. J. Dunlop, who had been good enough to step into the breach and propose the next toast.

Mr. D. J. DUNLOP (Past President) said he wished to express his regret that Sir Thomas Sutherland was not with them that evening. It was a matter of regret to him that he was not there to give the toast. They missed his presence. He was always a host in himself, a welcome guest of the Institute of Marine Engineers. The toast of "Kindred Institutions" was one that was deserving of more thought and of more patience than he had been able to devote to it. They knew very well that they were all joined together as specialists in their own different lines, to further in their own way some special work they had taken up. Each institution in the country did its work in its own direction, and, like themselves, they thought they did well. He thought they might say of all the institutions with which they were associated that not one of them had fallen short of the standard that they should keep, in growing. There

were three institutions in London with which they were more particularly concerned, viz.: the Institution of Civil Engineers, the Institution of Naval Architects, and the Institution of Mechanical Engineers. On previous occasions the president of the Civil Engineers had been with them, as well as presidents from the other institutions, and as occasion followed they again had been asked as guests to the tables of those different institutions. With civil engineers they, as marine enginers, had very little to do, but they must often have been struck and astonished at the invention and amount of work that the civil engineers took up. Problems that seemed to be almost impossible they sometimes set for themselves and carried out. Think of the undermining of London with tubes—work which was hidden. It never could be appreciated by the outside world. The work of the civil engineer was with one special object, the betterment of the circumstances of his fellow men. Where they had great docks, or great bridges, there they had the civil engineer. The Forth Bridge, in Scotland, stood as a monument of civil engineering work. It was a great monument, and possibly one that might not be followed, although there was one somewhat similar in India, he believed. Still, that bridge remained as a great monument of the enterprise of the civil engineer and his determination to overcome whatever difficulties presented themselves. For themselves, as marine engineers, their duties brought them more into contact with the Institution of Naval Architects and the Institution of Mechanical Engineers. The naval architect first marked out whatever class of vessel it might be, whilst the mechanical engineer put life into the hull, and the marine engineer taking the two when they were handed over to him worked out the combination to the best advantage he possibly could, sometimes under very great difficulties. Still, it was his duty to work out that combination, and to do his part of the work, thus making up the trio that went to settle the question of navigation under steam. There was,

at the present time, a very interesting problem before the naval architect, and that was the construction of those immense steamers which the Cunard Company proposed to have built. He knew something of the difficulties that had to be gone through in proportioning those vessels and bringing them up to a standard of construction that would make them safe for their enormous size in all conditions of weather in the North Atlantic. Great credit was due to all concerned in the designing of those vessels, but no less credit was deserved by the gentleman on his immediate left, Mr. H. J. Cornish, the principal shipwright surveyor of Lloyd's Register. The building of those boats was possible, as after it was finished it was recognised that the building of the Forth Bridge was possible. They would turn out all right, but before they have proved themselves a success they had to deal with the marine engineer. There was the problem, which was really a difficulty. A difficult one it would have been a few years ago, but it was rather more difficult now because of the competition of what they might call the old reciprocating engine and the turbine. Which class of machinery were they going to use to drive those big ships? Mr. Caird had paid a well-deserved compliment to Mr. Parsons for his perseverance in bringing the turbine to the perfection he had brought it in the short time he had been working upon it. They would remember the old-fashioned engine with its jet condenser. What time had elapsed between the days when they were satisfied with that old type of engine and the days when they first had the compound engine? They rubbed along all right and were satisfied, and then they made another stride, and a long stride, and their contentment was complete in the compound engine. Afterwards they went on to the tri-compound three-cylinder engine. To talk of that period they had only to go back about fifty years. They had only got what they might call an improvement, not altogether perfect, of the steam engine under high pressures of steam. He thought it was

about ten or twelve years ago that he fitted one of the first turbines to drive electric lighting plant. Look at what was being done to-day with the same style of propelling engine. But whether the problem of the propulsion of those enormous steamers would be solved one way or another remained to be seen—they would have to await the result of the inquiry that was being held. If those steamers were being built for him he would not put in turbines alone, for he thought that with the centre engine, a reciprocating engine and the wing engines, turbines they might get a combination that would lead to great success and do away with one of the objections that at present existed with regard to the turbines, the impossibility to reverse them, except by means of separate and auxiliary turbines of lesser power and effect on the motion of the vessel. With 60,000 or 70,000 horse power, as those vessels would have, they would still have 20,000 horse power to exercise on the middle propeller for going ahead or astern. Those were points that he only referred to in offering the toast of "kindred institutions." He hoped that the relations that had always existed between those institutions would last for ever. He could promise on behalf of the Marine Engineers, that so long as the naval architects did their duty, so long as the mechanical engineers did their duty, the marine engineer would do his. It fell to all of them to do the best they could. He had thought that politics might be barred that night, but somebody had mentioned the name of Mr. Chamberlain. If they simply called that gentleman a chief engineer, well, he was doing his duty—he wanted to see the inside of the old boiler that had been working for sixty years without having had the man-hole door off. He thought that as they had now got the man-hole door off it might not be put on the old boiler again. At any rate, the example of that chief engineer was one they should all follow. Let them take hold of a thing they thought to be wrong, work it out if they could, and put it right. He was extremely sorry to

hear that Mr. Chamberlain had got the gout in Scotland. He had lived in Scotland a good many years and had never had the gout. He supposed he was acclimatised. He would advise them before coming to Scotland to know something of the weather, the atmosphere, and other circumstances and habits of the people. He coupled with the toast the name of Mr. J. H. Wicksteed, the President of the Institution of Mechanical Engineers.

The toast was heartily honoured.

Mr. J. H. WICKSTEED, in reply, said he felt extremely proud to be the responder to this toast. He felt extremely proud that the institution which he represented should be kindred to the Institute of Marine Engineers. It was somewhat of a surprise to him to find the existence of such a very strong institute. He thought such institutions were excellent in the country, and it was extraordinary what a large number of members were associated in such kinds of institutions. Without taking into account the art institutions, the Society of Arts, the Society of British Architects, or the Society of Chemical Industry, and speaking only of strictly kindred societies of scientific engineering, he thought there were at least 20,000 members belonging to these. That was a very great educational influence in the country, because to attend the meetings of those societies, and to hear the papers read and the discussions that followed, was an education to the young member. Afterwards the young member could prepare a paper to be submitted to the sharp ears of all the other members, and that was an education to the member who read the paper. He thought that one of the great advantages of belonging to such societies was that if anyone had found out something good, or had accomplished something better than had been accomplished before in any particular line it was only human nature that he should feel a desire to acquaint other minds with the discovery that he had made. Well, if he made that discovery and

put it into a form that he could properly impress on the minds of others, he was able, if he belongs to an institution of that sort, to command a sympathetic and critical audience for that paper. He did not know if anyone would care to advertise himself and collect an audience for a thing of that kind, but if he had got an organisation with permanent officials and with means of circularising the right sort of people to come and hear the paper he was able to get an audience, which was some reward and return to him for setting forth and giving away the knowledge that he had acquired by long, perhaps painful, experience. In that way things could not hang fire and be lost to the common weal, the common good. In that evening's remarks allusion had been made to the James Watt engine and to the Parsons turbine. It was a very curious thing in connection with the James Watt engine improvements that in those days, 100 years ago, engines were still put down on the old principle of Newcomen, after the improvements had been made by Watt of the separate condenser. That was not the sort of thing that was likely to happen now. At the time of Watt the crank was a new patent, and Watt was unable to use the crank because it had been patented by someone else. The moment anyone could supercede the crank by direct rotary motion, as Mr. Parsons was doing, it would be taken into account throughout the length and breadth of the land. One word that fell from Sir John Gunn had caught his attention, and that was an allusion to their club. He thought in that respect they had advantages that were not possessed by many of the other societies—that was to say, to have a meeting place which was open in the evenings. They had no such thing at the Mechanical Engineers. The officials were engaged by day, and it was difficult to keep them late hours in the evenings. Another difficulty was that the attendance might be very sparse and very fluctuating. With a dozen kindred societies having a membership of about 20,000, he thought if there could be some club that was com-

mon to all those kindred societies and which could be open at night it would be a very great boon to the members, especially visiting members, and members from the country and abroad. He remembered when he went over to America having the freedom given him of some club in New York. He went there and fell in with an American tool-maker, and had one of the most interesting conversations that he had ever had. No doubt they could not always hit off a man of that sort, but occasionally they might do so. Thus they might get sparks direct from the brains of others who were also in conversation at the club. He would assure them that he was exceedingly proud to have his name coupled with the toast.

Mr. JAMES ADAMSON (Hon. Secretary), in submitting the toast of "Our Guests," said: The toast I have the honour to propose is one which will commend itself to the institute as a whole generally, and to the members present particularly. The various Powers and interests represented by our guests show at once the widespread character of our views and sympathies, and while without, a social war is being waged as to how far our national cosmopolitanism should extend, we within, free in our protection, have been calmly discussing, with more or less relish, the good things set before us, questioning not the wherefrom or how of their providing, although it has been whispered in other scenes—where Scots do mostly congregate—that even the renowned haggis as to its elements and "innards," has been tampered with by piratical hands—nay, that the beverage associated with it by custom and mayhap a dire fear of future discomfort to the unwary and untrained has not escaped the manipulations of the enterprising Vandal. We welcome warmly the representatives of our cousins from the land of the setting sun, and from whom we have received several illustrated lessons. They have piped to us, to some of the tunes we have danced;

for others we have paid the piper, and by some our ears have been tingled; we have admitted the teaching—a visit to some of our up-to-date works and factories will show to what extent we have benefited. To the representatives of our neighbours, strangers within our gates, as to those who have partaken of bread and salt with us, we give greeting. May our association and interchange of ideas be for the advancement of the line of that higher civilisation which delights itself not in knocking down but in building up. We are pleased to see at our annual dinner representatives of our national defences, seaboard and inboard. May the changes and proposed changes in the forces tend to their advantage and the betterment of their internal relationship, to the undoubted good of the national weal. To those associated with us in the brotherhood of science, whose aims are akin to our own—the highest efficiency with the least expenditure—we offer our appreciative thanks for their presence. To our brethren in distant lands—the representatives of the outer circle of our Empire—we extend the right hand of fellowship, to hold us as we hold them in the bond of unity—they supplying us with the produce of the lands they have gone forth to till and cultivate; we supplying them with the wherewithal to do so most efficiently for our mutual good. To our public men—leaders of our enterprise, and of thought, of taste and sentiment, safeguarders of our national interests—we offer our tribute of welcome. May their noblest aspirations be realised, and the bulwarks of their building be above the reproach of kings and statesmen, elevated by the wisdom of the wise. To our private friends who are present, whose faces have sharpened our minds and hearts, keeping alive the traditions and sentiments of the best of all ages amid the hard issues of present-day life, we give a warm greeting. To the representatives of that time-honoured institution, Lloyd's Registry, we give hearty welcome. In reading over recently again what Horace sang to Maecenas in days of old, me-

thought how different are the conditions under which shipping is now carried on, the lines of the ode referring to the sailor showing, by contrast, the more excellent way, brought about largely by the society, the name of whose chairman, Sir John Glover, was to have been coupled with the toast, but he has unfortunately had to leave before our dinner is concluded. There is another institution, no less honoured, whose region of duty is both varied and extensive, one of whose functions, indeed, is to keep us all in order as to our boilers and machinery. The Board of Trade is represented among our guests, upon one of whom his recently conferred honour has been most fittingly bestowed. I am sorry Mr. Howell, Assistant Secretary Board of Trade, has been compelled to leave us early, but I am sure our best wishes and congratulations accompany him, as we have ever found him courteous and kind in the communications we had exchanged. Dr. Caird has referred to the cause of technical education. We ourselves, in our meetings and in our private conferences, have discussed and pondered over this question, especially as to how far practical work should be carried on and how far a purely technoeducational course should be followed. It is very difficult for us to know and forecast the future, so far as our own profession is concerned, and in knowing what should be done for our apprentices who are now entering the battlefield of life. There is not the slightest doubt that mathematics ought to stand in a very high place in reference to the technical education which a boy has to receive before he goes into the workshop. I hope that the words which have been spoken to-night by Dr. Caird will bear fruit in a paper on the subject and thereafter in a valuable discussion. I give you the toast of "Our Guests," long lives and prosperity to them; and I couple with the toast the name of Dr. Garnett, Secretary to the Technical Education Board of the London County Council.

Dr. GARNETT, in responding, said he thanked them most heartily, in the name of all their guests,

for their bountiful hospitality that night. He did not refer simply to the material foods that they had showered upon them: he referred also to that "feast of reason and flow of soul," and the melody they had all enjoyed. He thanked Mr. Adamson for the very kind terms in which he had proposed the toast, and he also thanked the members for the hearty manner in which they had responded. Lieut.-Col. Boileau had told them something of the education of the Army. He would like to say a word or two about the education of the civilian workers, for where would be their Army or their Navy if it were not for their engineers? Education had been very much in the front of late, brought so by legislation and other affairs. There had been many side issues introduced into the question, but the great issue over all others had only been working during the last ten years. The issue toward which all recent legislation had converged had been the unification of education. Up to 1899 they had separate Government Departments dealing with different parts, different sections, of education. There was the old Education Department at Whitehall, the Committee of Council on Education departments, all sixty or seventy years old, working along with their elementary schools, and the training of their pupil and elementary teachers. There was the Science and Art department, the chartered body of South Kensington, long after their instruction in science and art, and to some extent in technology, and there were secondary schools, so far as they were endowed schools, and were supervised by the Church Commissioners through their power of making schemes for instruction. Now, however, they had one great central government, one minister of education looking after all departments of education. The Education Act of 1902, and the London Act of 1903, tended to bring all departments of education also under one local authority. He was glad to see that when the London Act come into force the words "technical instruction" and "technical education" would be

wiped off the statute. They would then know nothing but "education." They would all be united under one central local authority and they would have education and "education" alone. He was remarking to a friend the other day that by these Acts there would be swept away all the bulkheads between the water-tight compartments. He said "If your ship has a slight accident you will go to the bottom." He felt that their ship of education had now entered into such smooth water and fair weather that she could safely afford to dispense with bulkheads, which had hitherto kept separate the holds of education and all the other branches of their education. They could now afford to sail in smooth water and with light winds, doing away with all deadweight, which had been so much hindrance in the past. And now they wanted to go a step further than Parliament could go for them, and they wanted the institutions to carry them that step. They wanted to bring the influence of the workers more directly to bear upon their schools and colleges. Mr. Caird had been telling them about the teaching of mathematics. Many of their students had been trying to get courses of mathematics specially designed for their engineering studies, so that they might obtain a thorough training in mathematics that would be of the greatest use to them in their after life. Two or three days ago he waited upon the principal of the London University to petition that the university would, in selecting a professor of engineering, attach mathematics to engineering studies. He had reason to believe that the embargo on the teaching of mathematics by teachers who were recognised in engineering would universally be removed. In that way they were doing something for the training of engineers in London. But they wanted to go a great deal further, and they wanted the assistance of those present, not only in bringing influence to bear on the schools to train boys on a scientific principle, and more usefully, but they also wanted them to make easier the progress through the

schools into the workshops. They also wanted to afford greater encouragement to their students to get the highest class of technical instruction available before they went into the workshops. Only the day before he was speaking to the London manager of an engineering works about apprenticeship, and he gave him a scheme which was in force in their works, whereby the apprentices were divided into three classes. First were the untrained apprentices who came in at the age of fourteen, next there were the school apprentices who had had a good secondary training and came in at the age of sixteen, and lastly there were the college apprentices who had been through a technical institute of university rank where they had had a training in the technology of engineering, and they entered the works at the age of eighteen years and upwards. Each of those classes were received on different terms and at different premiums so as to offer considerable inducement to boys and young men to get the best training possible before entering the works. He was not there, however, to dogmatise or offer suggestions, and as a guest he would only invite them to consider very carefully the question of the co-relation between the schools and the workshops over which they presided.

Sir GEORGE B. BRUCE said: I rise to propose the very important toast of the health of the president, Sir John Gunn. I have known Sir John for many years, and to know him is to esteem him and appreciate him very highly. There is, perhaps, some fitness in my proposing this toast apart from my personal connection with your President, in the fact that I was for two years (about fourteen years ago) the President of the Institution of Civil Engineers, and our friend, Mr. Dunlop, when he was speaking, said that you had not very much to do with the Institution of Civil Engineers. Well, now, we are the mother of you all, and it is a little unkind of Mr. Dunlop to repudiate us in that way. However, he did not mean it as repudiation, but I think it was

a misunderstanding to some extent as to the meaning of the words "civil engineer." "Civil engineer," as it is used by the Institution which I say is the mother of you all is not meant to distinguish one particular branch of engineering; it is simply the distinction between military engineering and civil engineering. In those early days there was the military engineer and after that there sprang up the civil engineer, that is to say, the civilian who exercises the power and control and does the work of the engineer in civil life, and the Institution of Civil Engineers is the old mother institution, and she claims you all. On behalf of that institution I should like to encourage the feeling that you have a right to be associated with it in every way and in every respect. We make no distinction between mechanical and civil in the Institution of Civil Engineers. It is just what I have said, the distinction which arose between military and civil engineering. I think our Chairman of to-night is a grand example of the men who have made this uneducated country—as people tell us it is—an educated country, the greatest in the world, made so by those men who had used the education they had. It may not have been very extensive what some of us got at school in our young days, but those men had used that education so as to teach themselves. Sir John Gunn is one of those men, and has sprung from small beginnings to take a great and important place in the work and mission of old England. I think this Institute ought to be proud of having a man like Sir John Gunn sitting in the chair, bearing as he has done all his life—and as other men who have become great have done—a great character for honesty and uprightness. I have much pleasure in proposing the health of my old friend Sir John Gunn, your President. Long may he be spared to do more work even than he has done in the past, and may he do it long in connection with this Institute and also in other spheres in which he makes his goodness and character to be felt.

The PRESIDENT: I am exceedingly obliged to you

for the kind reception you gave to the toast which was so eloquently proposed by my esteemed friend Sir George Bruce. I certainly do not claim to be in any sense entitled to the kind and pleasant things which he has said to you of me. However, I am exceedingly glad when associated with this Institute to do all that lies in my power to promote its interests. I am delighted to know that this Institute during the present year has made a departure which I think will be of permanent advantage. You have occasionally moved from the outskirts to the heart of the City for your meetings. I trust the day may come when you may find ways and means of there becoming affiliated with some central kindred institution in the city or have a chamber of your own to which you can repair at all times and so be accessible to members from all parts of the country. I know I am not broaching this to those who have not carefully considered it. Neither do I suggest that the step should be taken at once, but I do hope that the day is not far distant when you will seriously consider this, and I am sure it will add to the success of the Institute as a whole. The hour is much too late to detain you. I am more than pleased and gratified at the success of your meeting here to-night. I trust the Institute will go on and prosper, that its numbers may increase as it has done in the past, and if possible at a greater ratio in the future than in the past. In any case there can be no question as to the immense advantage to marine engineers in having a good place where they can meet and compare notes. I thank you sincerely for the way in which you have received this toast. I must also thank the Committee who have worked so hard, heartily and loyally in bringing this meeting to such a successful termination. There is one gentleman—perhaps I may mention his name, I do not think the Committee will consider it invidious. I mean Mr. W. I. Taylor. He has worked most indefatigably, and with the mathematical accuracy of which you have heard so

much to-night he has brought everything to a successful termination. I am sure you will join with me in according to him and his fellow workers who give of what little spare time and leisure they have to forward this Institute. I ask you to join with me in proposing to Mr. Taylor and his colleagues a very cordial and hearty vote of thanks for the excellent services they have rendered. The toast I give you is "The Reception Committee, coupled with the name of Mr. W. I. Taylor."

Mr. W. I. TAYLOR, replying, said: This is very unexpected, and, speaking on behalf of the Committee, I am sure that whatever trouble we may have been put to in bringing about this meeting to-night, we are amply repaid by the way in which you have come forward and supported our efforts. I thank you, Sir John Gunn, for mentioning the little trouble that we have been put to.

The proceedings closed about 11.15 p.m. by the company uniting in singing "Auld Lang Syne."

INSTITUTE OF MARINE ENGINEERS

INCORPORATED.

SESSION 1903-1904.

President—SIR JOHN GUNN.

Local President—LORD TREDEGAR.

BRISTOL CHANNEL CENTRE.

THIRTEENTH ANNUAL DINNER.

THE RIGHT HON. LORD TREDEGAR, President of the Bristol Channel Centre of the Institute of Marine Engineers, genially presided over the thirteenth annual dinner of the Centre, held at the Royal Hotel, Cardiff, on Saturday, October 31st, 1903. The company, which exceeded 150, included Sir John Gunn (President of the Institute), the Mayor of Swansea, the President of the Cardiff Chamber of Commerce (Mr. H. Wood-Davey), President of the Newport Chamber of Commerce (Mr. F. P. Robjent), Principal E. H. Griffiths, D.Sc., F.R.S., Colonel J. Owen Quirk, D.S.O., Mr. Alfred R. Newman (London), Mr. James Adamson (Secretary of the Institute), Mr. C. W. Murray (Member of Council, London), Mr. A. Ellis (Cardiff Borough electrical engineer and manager), Engineer-Lieut. Ernest D. Sydenham, R.N., Mr. C. F. Dovey, Mr. T. Jones-Price, B.A., F.G.S. (secretary of South Wales Institute of Engineers), Captain Rosser (Cardiff Railway Company), Mr. S. Thomas

(harbour-master Penarth), Mr. W. Waddell (Barry), Rev. J. W. Baker, Mr. W. Graham (Barry), Captain Sloggett (Board of Trade), Mr. J. A. Jones (Watts, Watts & Co.), Mr. W. H. Renwick, J.P., Mr. D. Radcliffe (Evan Thomas, Radcliffe & Co.), Mr. R. O. Sanderson, Mr. T. W. Wailes (vice-president), Mr. J. Chellew, Mr. T. Allan Johnson, Mr. Ed. Nichol, R.N.R., Mr. W. D. Rosser and Mr. Geo. Sloggett (members of committee), Mr. J. Fleming, Mr. A. E. Smithson (hon. treasurer B.C. Centre), Mr. John Geo. Walliker (hon. secretary B.C. Centre), and other members and friends.

The loyal toasts having been enthusiastically honoured,

Mr. W. GRAHAM, of Barry, submitted, in a vigorous speech, "The Imperial Forces," to which Colonel QUIRK was the first to respond.

Engineer-Lieut. SYDENHAM, who also responded, referred to Lord Selborne's scheme of naval education—a scheme, he observed, by which the naval engineering had mainly profited. At last naval engineering had been recognised as one of the greatest factors—if not the greatest factor—upon which the safety of the service depended. Every officer and man, except paymaster and surgeon, would be expected to use a hammer, file and chisel.

The CHAIRMAN, who is of the "Noble Six Hundred," on also rising to respond to the toast of the "Imperial Forces," received an ovation. He observed that Colonel Quirk had replied most ably for the Army and Lieut. Sydenham for the Navy. All that was left for him to do was to return thanks for the Marines.

Mr. ALFRED R. NEWMAN (London) gave the "Institute of Marine Engineers." He said the Institute had done yeoman service in promoting the welfare of the profession of marine engineering. The evolution of marine engineering had been remarkably rapid,

and it was almost impossible to adequately realise the possibilities of such developments as the steam turbine might effect.

The CHAIRMAN, responding, said he lived upon the banks of the Bristol Channel—or, rather, he might say, during the past few weeks he had lived under the Channel—and he had often reflected upon the changes which the Bristol Channel had seen in the character of the boats which had passed over its surface from time immemorial—from the obscure times of the quaint, rude craft of the Cambro-Celts and the triremes of the invading Romans to the leviathan cargo boats which steam up and down one of the busiest waterways in the world. He was glad to know that the Centre of the Institute which had adopted the name of the Channel was occupied in useful work, and that members of the Centre from time to time distinguished themselves. For example, the Denny gold medal, offered for the paper adjudged to be the best contributed to the "Transactions" of the Institute, had been won three times by gentlemen who belonged to the Bristol Channel Centre. He recognised that the Centre had much scope for useful work, and he, as its president, would be glad to do the little that lay in his power to help it in retaining the honourable position which it had for so long enjoyed. Something had been said about the steam turbine. Well, if someone would devise something to minimise the rolling of a ship, and thus prevent sea-sickness, he would deserve well of mankind, and he (Lord Tredegar) would at once become a sailor-man. What was the use of all these papers if they could do nothing besides increase the speed?

Sir JOHN GUNN, president of the Institute, also briefly acknowledged the toast. He said he was delighted to have the opportunity of saying how much they appreciated the kindness of Lord Tredegar in becoming the president of the Bristol Channel Centre. His lordship was always ready to serve

any good movement and to support anything that conduced to the welfare of the community and the nation. With regard to the toast, he admitted that he was astonished when he heard the parent institution had honoured him by electing him as its president. He warmly appreciated the honour. Although not an engineer he had been brought into close association with members of the profession all his life, and he knew something of their trials and successes, of their hopes and aspirations. He took pride in the progress of the Bristol Channel Centre, in the knowledge that it was keeping well abreast of the advance of applied science and modern developments. He hoped and believed that its career of usefulness would continue even in a greater degree.

Mr. J. A. JONES (Watts, Watts & Co.) proposed "Shipping and Commerce." He quoted Mr. Chamberlain's recent statement that, if there were in the whole country any trade or trades which could not be charged with want of capacity, it was our great shipping and shipbuilding industries. Our exports were increasing, though not rapidly. They could not expect that the great increase of coal exports from South Wales of the past twenty or thirty years could be continued in like ratio. In considering the proposed departure in fiscal policy, they would have to carefully weigh its probable effects upon shipping and the export trade. They had been told that certain parties in this country would have to make sacrifices. He was sure they in South Wales were quite ready to make sacrifices if it was shown that it was for the benefit of the empire, but what they had to carefully consider was whether those sacrifices would be disproportionate to the advantage gained by the country at large. He was keenly awaiting Mr. Chamberlain's visit to Cardiff, when he hoped the right hon. gentleman would indicate the probable effects of his proposals upon the Welsh steam coal trade. This trade was suffering not only from keen,

but unfair, conditions of competition. For instance, whilst a tax of 1s. per ton had to be paid upon all coal exported, even to our colonies and for the use of our own ships abroad, American and German coal, destined for those colonies, was free of any such tax.

The MAYOR of SWANSEA first replied to the toast, and referred to the dock extensions going on at Cardiff, Newport, Bristol and Swansea for the reception and accommodation of the modern steamer.

Mr. WOOD-DAVEY (president Cardiff Chamber of Commerce) also responded. He spoke of the unfair conditions placed upon British shipowners in competition with the foreigner, and expressed his gratification that prominent Ministers of the Crown had taken up commercial matters. Whilst a British ship could not trade between one port and another—say in America—whilst it was debarred from taking a freight from New York to San Francisco, in England we allowed any foreign ship to come and take any freight it liked from any one port to any other port in the United Kingdom. And this altogether apart from the question of shipping bounties.

Mr. F. P. ROBJENT (president Newport Chamber of Commerce), after referring to the splendid geographical position and natural resources of Newport, prophesied that when its dock extensions were accomplished Newport would prove a formidable competitor to any other port in the Bristol Channel. Rivalry undoubtedly existed, but good feeling also, in an equal degree, and no doubt fair competition was good for the town and port as well as the individual. The great inquiry which is now being made by the commercial community is showing us that, in technical and scientific education especially, we have fallen far behind our competitors, but John Bull is still capable of great things when aroused and we can look forward to renewed prosperity as the result of that awakening which usually precedes activity, and

the shipping interest had no reason to be despondent of the future.

Mr. T. ALLAN JOHNSON proposed "Kindred Institutions" in a characteristically humorous speech. Man, he said, was passionately fond of forming institutions consisting of creatures of his own kind —engineers, both civil and uncivil, mechanical engineers, and all sorts and conditions of engineers, architects and naval architects. They could not all be lords and right honourables, or worthy mayors, but they could form an institution and have presidents and vice-presidents, secretaries and treasurers, and members of council—the latter a most useful body. When a member became a little too difficult to deal with they did not get rid of him to go and form another institution—no, they made him a member of council, when he became a decent citizen, a credit to himself and all the rest of them. It was no use going into a row without a thick stick, and it was absolutely no use becoming a member of any institute if they had a thin skin. It did not matter if they had a thin skull, because ideas would get there quicker.

Principal GRIFFITHS, in the course of an interesting speech in reply to the toast, said he believed the secret of our being overtaken in the manufacturing race by foreign countries was that in this country in the past there had been too great a divorce between theory and practice—words he disliked, preferring "principles and their application." The application of science to the ordinary industries of life seemed to be a secret of which our rivals, the Germans, and our cousins, the Americans, had a firmer grip than we. He believed, however, that business men in this country were awaking to the necessity of technical education in its true sense, and that ere long the divorce between theory and practice would have ceased. In emphasis of his point, the Principal quoted from a letter which Sir Donald Currie had addressed to the Council of the British Association in connection with

the proposed holding of the meeting of 1905 in South Africa. In consenting to the substantial reduction of 30 per cent. in the ordinary return fares for official delegates, and a reduction of 25 per cent. for ordinary members and their families, Sir Donald said while he laid no claim to having personally taken any part in scientific research, it had fallen to his lot to be connected with steamship enterprise and mining work, in which he was largely interested, and he had always benefited by the lessons in practical science which the exertions of scientists had developed. He was, therefore, bound to do all he could to assist any such scheme as that contemplated—to enlarge the scope of the aims and operations of the British Association, and he forwarded a cheque for £500. He had quoted from Sir Donald Currie's letter in order to enforce his argument that the study and the workshop are allied, that they are not on opposite sides of the street but open from one another.

Mr. A. ELLIS (Cardiff Borough electrical engineer) also responded, and mentioned, in reference to the remarks that had been made to the steam turbine, that he served his time in the drawing office of the Hon. C. A. Parsons. There was no doubt the turbine was going to be a great thing, and he regretted that Mr. Parsons, after having devoted so much time and spent so much money on the development of the steam turbine, was not likely to reap the full fruits of his inventiveness by reason of the expiration of the protection period of his patents. But so far as marine engineering was concerned, he believed that by the time he was an old man turbines would be a thing of the past. He had no hesitation in saying that in the time to come ships would be devoid of any form of engine. Mr. Edison, the most eminent man in the electrical profession, was perfecting his batteries and accumulators, and he did not see why the space occupied by coal bunkers should not be occupied by storage batteries, which could be charged when the ship was unloading or

loading with sufficient power to drive it the length of its voyage. Then the application of electricity to auxiliary plant on board ship was rapidly coming to the front. There was no reason why a central electrical station should not be placed on board any ship and the power distributed from that station to all parts of the vessel for driving winches, cranes, etc. Electricity had made great advances in the past few years. Not long ago it was impossible to store electricity, and sufficient plant had to be put down in central stations to meet the maximum demand when it was required during a comparatively short period. The result was that enormous plant lay idle for a considerable portion of the day. At the Cardiff electrical station had been installed a large battery which by the ordinary running could be charged with a surplus power to be utilised when the heaviest load came on. By the use of this battery he would be enabled to shut down the large power stations and save the running of heavy engines, of which they had two of 2,500 h.p. He would be able to shut down the boilers for at least eight hours in the twenty-four, and, in addition, the use of the battery would enable him to shut down the power station on Saturday at midnight and allow the workmen to rest all day on Sundays.

The other toasts were the "Healths of Mr. James Adamson and Mr. Walliker," proposed by Mr. E. NICHOL, R.N.R., to which the Secretary of the Institute and the Secretary of the Bristol Channel Centre duly made acknowledgment, and the "Noble Chairman," given in graceful terms by Mr. T. W. WAILES, and enthusiastically received and responded to.

The proceedings concluded with the singing of the National Anthem and "Auld Lang Syne," and with three cheers for Lord Tredegar.

An attractive musical programme was rendered during the evening.