

INSTITUTE OF MARINE ENGINEERS
INCORPORATED.

SESSION



1894-5.

President :

SIR THOS. SUTHERLAND, K.C.M.G., M.P.

INAUGURAL ADDRESS

DELIVERED AT THE

O P E N I N G

OF THE

EXTENSION OF PREMISES

58, ROMFORD ROAD, STRATFORD

ON WEDNESDAY, 24TH OCTOBER, 1894.

PREFACE.

58, ROMFORD ROAD,

STRATFORD,

October 24th, 1894.

A Meeting of the INSTITUTE OF MARINE ENGINEERS was held here this evening, presided over by Sir THOS. SUTHERLAND, K.C.M.G., M.P. (President), who delivered his Inaugural Address on the occasion of the Opening of the Extension of the Premises of the Institute.

Previous to the formal meeting, the President was shown over the premises by those appointed by the Council to discharge this duty.

The original building purchased on behalf of the Institute has been considerably added to and improved during the summer, the eastern portion having been raised to admit of a Lecture Hall and a Billiard Room of adequate dimensions, being made available for meetings and the accommodation of members.

A report of the proceedings, including the President's address, will be found in the following pages.

JAS. ADAMSON,

Honorary Secretary.

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WEDNESDAY, 24th OCTOBER, 1894,

BY

SIR THOS. SUTHERLAND, K.C.M.G., M.P.

(PRESIDENT).

GENTLEMEN,—I need hardly say that I feel very great pleasure in coming here to-night, and as this is the last time that I may have the honour of addressing you in the capacity of President of your Institute, I must thank you once more for the honour you conferred in appointing me to fill that office. As you are aware my duties have been merely of a nominal character, but at the same time I am sure you will believe me when I say that if I had been called on to devote more personal attention to your affairs, I would have done my best to meet your wishes in that respect—(cheers). But your affairs are so well managed by yourselves that the duty of the President appears mainly to consist in coming to the front on social or festive occasions, or if he has any business to transact it is that of signing the diplomas of new members, which, I am happy to say, have been sufficiently numerous during my year of

office to demonstrate the steady growth of the Institute—(cheers)—not only in London, but in other places where it has successfully taken root. I congratulate you on this result. The extension of your premises, the opening of which we celebrate to-night, is another satisfactory proof that you are progressing and determined to go ahead. Most sincerely do I trust that you will pass many social and intellectual hours in these rooms, and it will be to me a pleasant recollection that I have been privileged to take a part in their inauguration to-night. In my youthful days I “sat under” (as we say in Scotland) a worthy minister, who, after he had duly enlarged on the three heads of his sermon and enforced the “Application,” used to warn us of the coming conclusion by saying that he must now draw to a close. Having thanked you for appointing me your president, and for bringing me here to-night, I should now like to omit the three heads and the application, and quietly draw to a close. But your indefatigable secretary has warned me that I am expected to deliver something in the nature of an address, a task for which I have but little aptitude, especially in comparison with my eminent predecessors, Lord Kelvin and the Chief Constructor of the Admiralty, who represent in their respective spheres the embodiment of the foremost scientific knowledge—(hear, hear). To men like your former presidents it is an easy task to interest such an audience as this, for they are amongst the pioneers who are ever striving to solve new problems, and to achieve higher success in the application of principles already well known. Men like myself fill a humbler *role* in that great

BUSINESS OF STEAM NAVIGATION,

in which all present here are so deeply interested. Ours is merely the administrative side of that work, but though our functions are less original and less intellectual than the work of the men of science, yet our skill and labour are no less necessary to the success of the great enterprises with which we are concerned. It

is doubtful, to say the least, whether the great genius of the inventor of the condensing engine would have borne the fruit which it did in his lifetime, if his discoveries had not been supplemented by the courage and administrative capacity of Matthew Boulton. Your share in the work which we carry on in common is in some respects perhaps even more important than ours. No inventive power, however great, no enterprise, however sagacious, would be productive without the skilled labour which you bring to the common fund. It is the combination of these resources of inventive power, administrative enterprise, and practical skill by which the triumphs of steam navigation, such as we see them to-day, have been secured — (hear, hear). Other conditions have no doubt aided Great Britain in attaining the position of owning three-fourths of the carrying trade of the world. Her insular position, her supplies of coal and iron, her Colonial Empire, have stimulated the mechanical and commercial genius of the country, and thus materially contributed to place us at the head of maritime enterprise throughout the globe. Nor should we forget that political factors have also played no inconsiderable part towards this result. The complete freedom of our commerce, the entire absence of prohibitive tariffs which obtain to so large an extent in other countries, have ensured supplies of cheap food and abundance of raw material at low prices, and have been thus largely instrumental in promoting that economy of production and of transport which is one of the most striking features of the present day, and is, in fact, so remarkable that it excites perpetual surprise in the minds of those who are most familiar with the subject. Permit me then, as a layman in engineering matters, to glance for a few moments at some of the most striking features in the growth and improvement of steam navigation in our day. They might be mainly classified under four heads, viz.: speed, safety, capacity, and economy, and on each of these topics a volume might indeed be easily written.

SPEED OF STEAMERS.

Only the other day I read in the *Times* that the *Lucania*, the newest Cunard steamer, had completed

nine consecutive voyages from New York to Queens-town at an average speed of $21\frac{1}{2}$ knots, that is to say, at the rate of 25 statute miles per hour, or, in other words, at the rate of 600 miles in 24 hours. I presume that this is an unique record, although we know that it has been approximated by other steamers on the same ocean voyage. This represents an advance of fully 50 per cent. on the speed which obtained on the Atlantic some fifteen years ago. Nor has the measure of acceleration been less remarkable on the other great lines of ocean steaming, though nowhere else is the maximum speed equal to that of the Atlantic route, for the simple reason that only between America and Europe does a colossal passenger traffic exist to pay for the cost involved. I need hardly tell you that it is passenger traffic and not freight that pays for speed. Indeed, as regards freight, the demand is for lower and still lower rates, and if shipowners advance much further in the groove of cheap freightage, they will, I suppose, carry goods for nothing, and pay a bonus to the merchants for the privilege of doing their work gratuitously—(hear, hear, and laughter). As you doubtless know, the English mails have been conveyed between Charing Cross and Bombay in thirteen days, which brings India very near to our doors, and probably this record may be improved ere long. The run from Southampton to the Cape has been accomplished in some fourteen-and-a-half days. If any gentleman now listening to me happened to be in a great hurry to make the voyage round the world (as it is called), namely, to go *viâ* America to Japan, China, and India, returning thence to this country, he might accomplish the journey in, perhaps, less than fifty days, provided the steamers and trains dovetailed in point of time at the various ports of transhipment. I should not care myself to make the voyage under such conditions, but I mention the fact as illustrative of the rapid pace of ocean navigation nowadays. Nor does one imagine that the limit of speed has been reached. On the contrary, past experience leads to the conviction that a great advance will yet be made, provided that harbours and docks are

found large enough to accommodate vessels of huge dimensions, such as will be required to insure further progress. It is a matter of detail that there should be some prospect of success to future undertakings from the capitalists' point of view, for the immediate question of profit does not stand in the way of enterprise where shipowners are concerned. We are always on the alert to surpass our rivals—(hear, hear)—and in doing so we certainly run considerable risk, so far as financial success is concerned.

SAFETY OF LIFE AT SEA.

The development of steam navigation and the increase of speed on our ocean lines has happily been attended with the supreme advantage of increased safety to life and property—(hear, hear). A slight examination of records will prove this to be the case. Two years ago, in 1892 (the latest date to which we have complete returns), there were upwards of three thousand steamers on the British register beyond the number on the same register in 1878. There was, of course, a marked decrease of sailing tonnage during the same period. But in 1878 the entrances of British tonnage into our ports were only a little over seventeen millions of tons, while in 1892 the entrances amounted to twenty-seven millions—an increase of some sixty per cent. in fifteen years. This was our foreign trade, and during the same period we find that the coasting entrances increased from twenty-five to twenty-nine millions of tons—a growth of nearly twenty per cent. It is not possible to give any figures that would be capable of proof, as to the present mileage of British shipping as compared with what it was in 1878, but I feel satisfied that, after making a full allowance for the disappearance of sailing tonnage, the additional mileage performed by ships and steamers under our flag cannot be estimated at less than fifty millions of miles yearly, as compared with what it was in 1878. You may, therefore, imagine how vast is the additional sea-risk arising from this gigantic increase of navigation. You

must also take into account that there are about fifty thousand more persons employed afloat now than there were fifteen years ago. Bearing these facts in mind you will be gratified to learn that the absolute loss of life at sea is considerably less than it was in the earlier period to which I have been referring--(cheers). In the five years ending in 1881, the average annual loss of life was 1,985, while in the same period ending in 1891 (the latest date of which I have the record) the average annual loss of life was only 1,664, or upwards or sixteen per cent. less than in the earlier period. We have, therefore, this gratifying state of things presented to us, that while our foreign trade increased by sixty, and our coasting trade by twenty per cent., and while the annual mileage of our fleets is greater by, perhaps, more than fifty millions of miles, the loss of life, as shown on the average of five years, has very considerably diminished. But this is not the whole case, for while the figures of the loss of life to which I refer are made out for every British ship that sails or steams, the figures which I have given you as to the increase of our carrying trade only refer to that affecting British ports. If they could be extended to the work of our ships in connection with foreign ports the record of our enlarged commerce would place the comparative safety of life in a much stronger and more favourable light. Stated, however, in the imperfect manner in which it is alone possible to deal with the broad facts of the case, the result is one which must be highly gratifying to all concerned, whether in the building, the navigation, the engineering, or the management of the great fleets belonging to the mercantile marine of this country--(cheers).

CAPACITY AND ECONOMY OF STEAMERS.

Having thus adverted very briefly to the enormous advance in our carrying trade, to the increased speed, and to the measure of safety by which these twin results have been accompanied, let me touch for a moment on the capacity and economy of steamships as compared with what they were a few years ago.

As regards the first of these questions, I believe I am correct in stating, that if we compare the earning power of a steamer built some 20 years ago to attain a seagoing speed of say 12 knots (for you must bear in mind there were few ocean tramps in those days), with that of a steamer of the same speed in the present day, we shall find that the gain in the modern ship is something like 40 per cent. in weight-carrying capacity, in proportion to the gross register tonnage. I have compared some typical examples, and the result practically is that the steamer of the older date gave '96 in the ratio of tonnage, while the modern vessel gives a figure of 1.34, an improvement not only due to the difference of material, but to the improved adaptation of ways and means in construction embodied in the design and workmanship of steam vessels in the present day. The question of economy has of course a double aspect, that of construction and that in working. In large powered mail steamers the evidence of economy in first cost is not too clear, because, in almost every case in which we bring comparisons to bear, the modern vessel has so much greater power that the comparison on the basis of register tonnage is necessarily fallacious. In fact, looked at from that point of view, there would appear to be only a slight advantage in the cost of the modern mail steamer, whereas we know that if the additional power were to be accurately estimated, a considerable margin of economy would be apparent. To a certain extent any calculation of this kind is also disturbed by the cost of the more luxurious fittings, which have become part and parcel of every passenger steamer, so that on the whole I find it difficult to estimate the percentage of saving in the construction of mail ships, although I know it to be far from inconsiderable. But in dealing with purely cargo carriers we are on surer ground, and I imagine I shall be within the experience of most owners of such vessels if I say that, taking deadweight capacity as a basis, the cost of such ships in the present day is something like one half what it was 20 years ago. The contrast, therefore, which the mercantile marine presents now, to what it was some-

years ago, whether in extent, speed, capacity, or economy of construction, amounts to a revolution such has hardly taken place in any other industry on the face of the earth. (Hear, hear.) But this revolutionary process has been, as you are aware, intensified by a measure of economy in the use of fuel, which the most sanguine engineer would hardly have ventured to predict. It would be superfluous for me to discuss the fuel question in your presence. That would indeed be a case of carrying coals to Newcastle. You know better than I do that a pound of coal does three times the work in our steamships which it did about 20 years ago; and of all the factors which have ministered to the development of steam navigation, the economy of fuel must be set down as the most important and influential. In my mind, two great events stand out in conspicuous relief as having stimulated the growth of steam shipping in our day. The first of these being the opening of the Suez Canal, and the second that of the application of the compound engine in a reliable and practicable form. It is a curious circumstance that these two great factors of progress should have come into existence almost at the same time. The Canal was opened at the end of 1869, and the compound engine immediately rose into popularity, as the consequence in a great measure of the immense field of enterprise offered by the shortening of the ocean route to India by 4,000 miles. The Canal made the fortune of the compound engine, and the compound engine made the fortune of the Canal.

DURABILITY OF SHIPS AND MACHINERY.

On looking back at what I have said I find I have omitted one topic to which I might have devoted some space, I mean the durability of steamships and machinery. It is a matter of speculation whether the steel ships which we are now building will have the same durability as the fine iron ships which were built some years ago. The steam transport *Himalaya* was sold by the P. and O. Company to Her Majesty's Government upwards of 40 years ago, and if this

vessel is not still in commission, then she has but just been released from duty after this long period of service. Whether our present ships' hulls will last as long as the *Himalaya's* is a problem on which I doubt if anyone is competent to give a decided opinion; but we have every confidence in saying that the durability of engines and boilers is assured to an extent far beyond the experience of former times. (Hear, hear.) Twenty, nay fifteen years ago, shipowners had to look forward to the re-boiling of their ships about once in ten years, if they desired them to maintain the same pressure and the same speed. Whereas now, the span of life in a boiler is a problem which appears to depend mainly on the zeal and fostering care of the engineer to whose charge it is entrusted. We may assume boilers are now good to maintain their original pressure for 20 years at least, and how much longer they may last depends, I repeat, on the care taken of them, although they may become obsolete by reason of new discoveries and improvements, which no zeal and affectionate care on the part of our marine engineers will impede. And while on this topic, let me add that the immunity from minor accidents and breaking down in machinery is one of the most marked features of our present experience. (Cheers.) There are steamers which, as you know, run year after year, their 70 or perhaps 80,000 nautical miles without hitch or hindrance of any kind. When the ship gets into port the engineer appears to give his engine only a sort of "rub down," just as a trainer gives a racehorse, and away she flies again, probably for another five and twenty thousand miles. The era of broken shafts, of loose propellers and stripped driving wheels has come to an end—(hear, hear)—and the safety with which our machinery works nowadays at more than double the piston speed we were accustomed to a few years ago, reflects credit alike on those who construct and those who watch over the efficiency of these powerful engines. (Cheers.)

COMPETITION AND PROGRESS.

The history of steam navigation is, without doubt, a most interesting and even romantic history. But the

achievements of the last 20 years far exceed the progress of the rest of the century, for it is now close on a century since the first steam craft navigated the Forth and Clyde Canal. That events have moved so rapidly is mainly due to the intelligence and perseverance of the engineers of the present day. Formerly, steam marched very slowly. The compound engine could hardly be said to have attained popular success before 1870, but you are doubtless aware that Woolf's patent for a double cylinder-expansion engine was taken out as far back as the year 1804. Nowadays we are on the alert. Intelligence is sharpened by competition, and ideas are no longer allowed to lie fallow for a long series of years. We have to be up and doing, lest we fall behind in the race, not only with our own countrymen, but against those who contend with us under foreign flags. As to the general shipping business of the world, there seems no reason to apprehend that we shall fall behind, but I have sometimes looked with a feeling of something like dismay (not perhaps altogether unnatural in my case) at the encouragement which is given by Governments such as those of France and Germany to contend for the services carried on under the British flag. Because the policy of these countries is not merely to advance their own commercial interests, but to grant specially favourable conditions to enable their national lines to contend with British ships for British trade. I hope and believe, however, that the latter will still be able to hold their own in this somewhat unequal contest.

MARINE ENGINEERS.

I am sure you do not require me to laud or magnify the profession to which you belong. I have spoken, very inadequately, of the improvements which have been effected in ships and machinery; but as most of those who listen to me are comparatively young men, you will not be offended if I venture to say that in my time there has been an improvement likewise in the stamp of our engineers. They may not handle the hammer and chisel with more dexterity and skill than

their ancestors, who lived in the days when there were neither steam hammers nor slide rests, nor planing machines, nor any of those other wonderful appliances which are multiplied almost daily in aid of the engineer's skill. But the education and general culture is higher than it was in days which some of us recollect, while, at the same time, I am sure the sense of duty is, if anything, keener even than it was before. This Institute will aid and strengthen the sentiment of *esprit de corps*, which ought to exist between men of all professions. (Hear, hear.) It will bring you closer together. But it is intended also to stimulate you, and especially the younger members, to do their utmost to raise the character and standard of your profession. We cannot all be men of genius. None of us, perhaps, would be able to construct an organ without any antecedent knowledge of music, or to shape a condensing engine out of an anatomist's syringe, as we are told was done by James Watt. We might not have the iconoclastic zeal of Nasmyth, which led him to melt the candlesticks over which his worthy father had had many a "crack" with Robert Burns, for the sake of the brass which they contained. But we may all of us be animated by a high ideal towards the profession of which we are members. (Hear, hear.) Your Institute will assuredly tend to foster and bring out this feeling. As you pursue your calling on distant seas, whether on the wide Atlantic, the Indian Ocean, or wherever it may lead you, I hope that you will think of this place, and that you will endeavour to bring home with you some contribution, in the shape of observation or personal experience, worthy of being discussed and recorded in the transactions of this Society. (Cheers.) A great master of the English tongue—I mean Ruskin—once wrote as to the building of a ship, that into that work "man put as much human patience, common sense, experimental philosophy, self control, habits of order and obedience, thoroughly wrought hand work, defiance of brute elements, careless courage and calm expectation of the judgment of God," as could be contained in any human work. These words apply equally well to your

profession and your duties. Even to those who are most familiar with our great steamships, there is that which deeply impresses the imagination, in the giant power and resistless energy which they display, the vast distances which they traverse, the enormous speed which they attain, and, not the least of all, the almost miraculous certainty with which they accomplish their allotted task. In such matters familiarity can never breed contempt. On the contrary, the most thoughtful minds will do the greatest honour to those who are instrumental in achieving the great results which I have so imperfectly traced, with a feeling of pride on my own part, that I, too, am associated with you in the mercantile marine of this country. (Cheers).

Dr. W. H. WHITE, C.B., the Director of Naval Construction, said it was his very pleasurable duty to propose a hearty vote of thanks to Sir Thomas Sutherland for his most admirable and interesting address. Sir Thomas Sutherland began by expressing a feeling of incapacity to follow his predecessors in dealing with the subjects of special interest to the members of this Institute. Those, however, who knew Sir Thomas Sutherland, and what he had done in connection with the great fleet with which he had been so long associated, also knew that such an apology would prove but the prelude to a masterpiece, and he (Dr. White) was sure that he spoke the feeling of every one present when he said that their "Transactions" would be enriched by the inclusion therein of such an address as that to which they had just listened. When he (Dr. White) last had the pleasure of speaking to the members of this Institute it was at the annual dinner in June, when, unfortunately, he was very unwell, and the first occasion on which he had come out again in any public way was to meet them that evening. He went to the dinner and he came to the present meeting with the same motive. He wanted first of all to show that his interest in the Institute was sure and fast, and he also wanted to show, as well as he could, his great respect and admiration for their present president. It might

be that the office of president of this Institute was titular to a great extent, although the attendance and address of Sir Thomas Sutherland that evening were assuredly proof that the office was more than titular in the present instance, but even if the duties were only titular, and consisted for instance in signing the certificates of membership, a president who occupied a position in the shipping world such as that occupied by Sir Thomas Sutherland, would be an immense advantage to the Institute. They were all most conscious that Sir Thomas Sutherland's connection with this Institute did it honour, and he believed that Sir Thomas on his part regarded it as an honour to be associated with an institution which had for its object the raising and improvement of those upon whom great responsibilities already devolved, and upon whom greater responsibilities would fall in the future. If the members only did their part they might depend upon it that the present president and those who came after him would not be found wanting. With the great field of possible members, and the encouragement given them by Sir Thomas Sutherland and others, there ought to be in the future a measure of success for this Institute far and away beyond that which had already been achieved; and if they went on keeping up the feeling of intercourse and common fellowship with the great object of improving their professional position, the Institute would have branches not only at Cardiff, Southampton, and Bombay, but all over the world.

The earlier years of an undertaking of this kind were always the most difficult, but nothing succeeded like success, and they had succeeded in this; while the building of the Institute was now nearly double the size it was when he saw it on a former occasion.

It was said all marine engineers were Scotchmen; he had looked into this, and found that the Saxon was not in it, for there were only the first president, Mr. Beldam, and himself who could be called Saxon. He hoped the members would not forget the predominant

partner, but in future, just by way of a change, occasionally have an English or perhaps a Welsh president.

Mr. F. W. WYMER (Vice-President) seconded the motion, remarking that having watched the progress of the P. and O. Company, from the first boat up to its latest addition, he had great pleasure in doing so.

The PRESIDENT responded to the vote of thanks proposed by Dr. White, and expressed himself as well pleased with the work and progress of the Institute.

At the request of the Secretary (Honorary) he had now the pleasure of presenting to Mr. A. Robertson (Graduate) a certificate and two volumes, being the Leslie award for meritorious progress in mechanical drawing during the last session.

The remainder of the evening was spent in a very pleasant fashion, the following musical programme being performed: Duet, "Excelsior," Messrs. G. Wiltshire and J. S. Gilchrist; song, "The Holy City," Mr. F. C. Blenkarn; song, "The Bonnie Banks o' Loch Lomond," Mr. C. Nicoll; glee, "The Happiest Land," Messrs. G. Wiltshire, H. Sharp, C. Sharp, and J. S. Gilchrist; song, "Anchored," Mr. W. D. Blair; song, Mr. J. Boyd; song (comic), "All Sorts of Songs," Mr. A. Wiltshire; part song, "The Three Chafers," Messrs. G. Wiltshire, H. Sharp, C. Sharp, and T. Sharp; song, "My Queen," Mr. F. C. Blenkarn; song, "True till Death," Mr. W. D. Blair; song, "The Village Blacksmith," Mr. Thomas Sharp; song, Mr. J. Boyd; glee, "Stars of the Summer Night," Messrs. G. Wiltshire, H. Sharp, C. Sharp, and J. S. Gilchrist; song, "Sailing," Mr. Nicoll; song, "The Beacon," Mr. G. Wiltshire; song (comic), "The Mother-in-law," Mr. A. Wiltshire; part song, "The Long Day Closes," Messrs. G. Wiltshire, H. Sharp, C. Sharp, and J. S. Gilchrist. Mr. W. G. Wiltshire presided at the piano.