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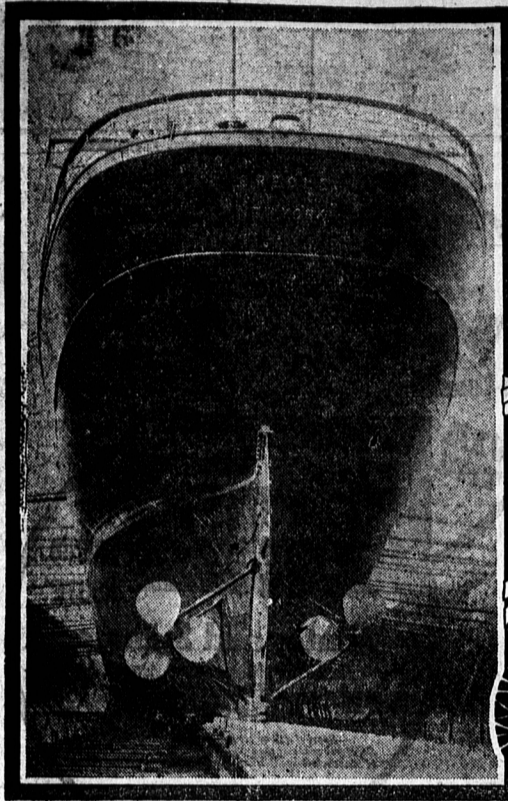
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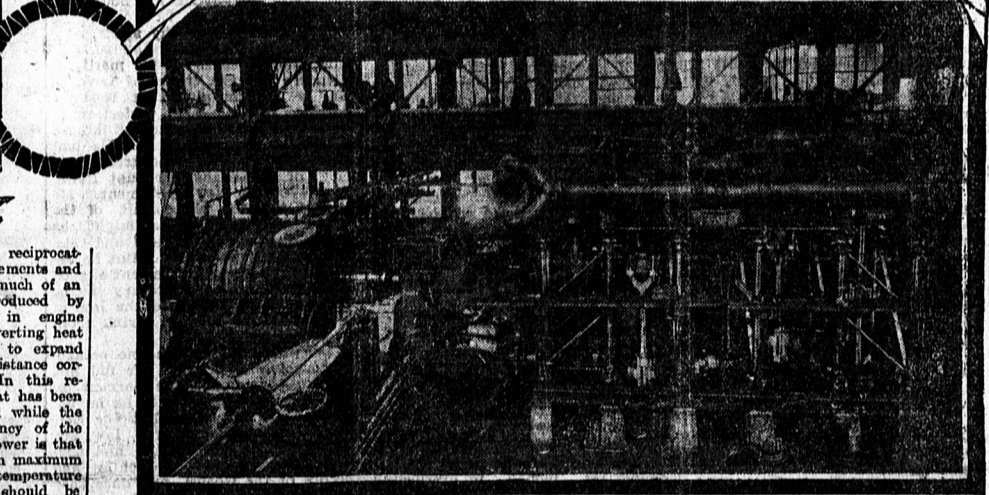
GENERAL VIEW OF THE COLCHESTER STEAM ENGINE, SHOWING THE POSITION OF THE CYLINDER AND THE VALVE GEAR.

Marine Turbines, the New Power

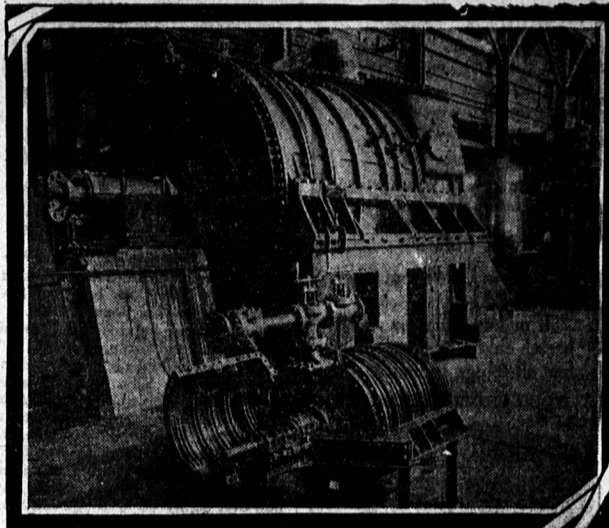
BY THOMAS WILLIAMS



THE 3,000 HORSE POWER TURBINE OF THE U.S.A. BAKER AND THE 2,500 HORSE POWER RECIPROCATING ENGINE OF THE U.S.A. TROOPSHIP.



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THE 3,000 HORSE POWER AND A 2,500 HORSE POWER MARINE TURBINE, THE SMALLER MODEL BEING PART OF THE COLCHESTER ENGINE.

It is a far cry from the simple steam engine of the Clermont, the first vessel to be propelled by any power other than sail to the new American turbine steamers. Yale, Harvard, Governor Cobb and Creole, all of which have been built within the past year or so, are a mark of another evolution in the development of the application of steam to do the work for mankind.

by marine engine builders, the reciprocating engine, with all its improvements and increased efficiency, is not so much of an advance over the engine produced by James Watt. This pioneer in engine building had the idea of converting heat by energy by allowing steam to expand behind a piston against a resistance corresponding to the pressure. In this respect he formulated a rule that has been applied by every inventor and while the theory giving the ideal efficiency of the process of conversion of heat power is that steam should be expanded from maximum to minimum pressure and temperature and further, this expansion should be adiabatic. As is well known, however, this cannot be obtained in practical operation for the losses in the ordinary engine are largely due to the initial condensation resulting from the alternate heating and cooling of the cylinder walls; losses due to clearances in the cylinders and valve chambers, and to the heat rejected in the exhaust. In addition there is leakage, conduction, radiation and incomplete expansion, all of which will help to swell

the total loss of from 40 to 50 per cent. of the steam used. These figures apply to the better class of engines, for with old machines the loss is much greater. Besides this thermal loss, there is considerable friction to be overcome in the ordinary type of even the

very best engines that can be made, while there is of course much individuality among engines, some are more economical than others by reason of their type or where they are used, the percentage of friction will vary from 6 to 16, yet 10 per cent. is probably a fair average.

This being the case, the heat units utilized as work on the piston amounting to say 50 per cent. of those available in the steam supplied, the total effective power delivered on the shaft would be about 45 per cent of that available in the steam. In view of these defects, and with a

full appreciation of the standard of excellence and efficiency of the modern reciprocating engine, was it any wonder that scientists have declared that there has not been much improvement during the past century or more?

Power, mechanical and personal, has been sought in all ages and for the past hundred years the development of the reciprocating engine has received the attention that it has become generally believed to be the ideal power despite the faults named above. Electricity, too, has been taken up and developed to a remarkable degree, but it has remained for Mr. C. A. Parsons, of England, and Mr. Curtis, of this country, to bring out a new application of an old, old theory and to produce what promises to be the coming power for merchant and naval vessels. This new power is the marine turbine engine, wherein one has the direct application of steam to "wheels within wheels" attached directly to shafts for the turning of the propellers.

The most remarkable feature of the turbine is that it is not nearly so tall as the standard type of marine engine and thus it might be said to hang close to the centre of gravity of the ship. For instance, this table of dimensions will demonstrate:

EXPANSION ENGINE.	
32 1/2 inch x 33 inch x 11 inch x 11 inch stroke; 120 revolutions per minute.	
Length, over all	33 Feet.
Width, over all	11 Inches.
Height	11
Center to center, end bearings	25
Weight	153 tons

By this there will be seen that there is with these two types of engines of about the same horsepower considerable in favor of the turbine, owing to its taking up less space in a part of the ship where every extra foot counts for much, for it means additional bunker room.

The first turbine was a land engine—that is to say, it was developed for land uses, and the first inventor was Hero, of Alexandria, several centuries ago. These followed the use of the turbine, with water and gas as a propelling power, but for a number of years it was not deemed suitable for vessels, and there was but little interest shown in it by naval architects.

There is no doubt but what the reciprocating engine for high-class passenger and freight steamers and warships has come to its end, and that the power of the future will be the turbine. This engine comes about as close to the theory of the adaptation of steam to mechanics as many scientists ever expect to get, though there will always be men of brains at work, who will seek to not only develop the ideas of Messrs. Parsons and Curtis, but to discover something that will eclipse them as they have eclipsed others.

The World's Greatest Oyster Fisheries

By B. J. HYDE in The Windsor Magazine.

The pioneer of systematic oyster cultivation in Europe was one Sergius Orata, who, according to Pliny, established oyster beds at Baiae, the great Roman seaside resort, and about the year B.C. 95, and, incidentally, made a fortune out of his brilliant idea. So important did this old Roman industry become that an artificial channel was constructed in order that the famous oyster beds in Lake Lucrin should be provided with a constant supply of fresh sea water. Later on, the native oyster spread to Rome, and about A.D. 78, Agricola sent the first consignment of Ruppertians from the shores of Kent. Their superiority over the oysters of the Mediterranean was speedily recognized, and native oysters became, and have remained ever since, an important commercial asset to our country.

An old Norman-French proclamation dated as far back as A.D. 1285, made by the rulers of Colchester, sets forth that the Colne river oyster fisheries had even at that time belonged to the town of Colchester "time beyond memory." How, and by whom, the actual cultivation was inaugurated, history does not relate, though it is most probable that it was instituted to meet the demand of the luxurious Romans for the far-famed oysters without which no feast of any importance was considered complete. It is a curious but undoubted fact that every kind of aquatic creature is found to attain a distinct superiority in some particular locality or other, certain rivers or areas in the sea being apparently specially adapted to certain species which thrive there abnormally owing to the presence of some local food, or to some peculiarity of the water itself, which is exceptionally favorable to certain organisms.

That the Pyefleet is pre-eminently adapted to the production of the finest possible oysters has been common knowledge for centuries, yet the exact reason for its superiority still remains more or less a matter of conjecture. By some authorities this superiority is held to be due to the presence of a strictly local water-weed that exists only in the Pyefleet. Curiously enough, this weed is not even to

be found in the Colne itself, of which the Pyefleet is a branch, or any of the neighboring creeks. The theory is that the oysters feed upon minute animalcules that frequent this weed, and thus attain abnormal plumpness and succulence. On the other hand, though oysters have been cultivated for so long, beds have been in existence in China for over two thousand years, comparatively little is really known as to their life history. It has not even been definitely established upon what, or in what way, an oyster actually does feed. Another section of experts holds that the water and natural surroundings alone are responsible for the excellence of the oysters taken from the Pyefleet. Whatever be the true reason, the fact remains that no more ideal situation for an oyster-fishery could be found in the world than Pyefleet and the Colne. The fisheries cover a total area of eighteen thousand acres of water, at the bottom of which are countless millions of oysters in all stages of maturity, from the "spat" that is only visible under a magnifying glass up to "well-fished" six-year-olds reposing on the fattening grounds, fit and ready for the tables of epicures. Some idea of the extent and value of the property may be gathered from the fact that during the last fourteen years no less than fifty-eight thousand pounds was divided among the members of the company out of the profits. The fisheries are worked by about four hundred oyster-dredgers, each of whom has to serve a seven years' apprenticeship to a member of the company before he becomes what is known as a "freeman of the Colne," and, as such, entitled to a share in the profits in addition to the wages received for the work done for the board on the dredgers or elsewhere. During the fishing season a large fleet of independent dredgers also find remunerative employment dredging in the open sea beyond the boundary line, the presence of a continuous supply of oysters in the sea, other than those of the Colne being undoubtedly due to the spat, which annually drifts seaward from the millions of oysters in the river, otherwise the outside grounds would

What The Union Jack Stands For

Lord Rosebery Tells an Assemblage of Boys and Girls.

In Edinburgh recently, Lord Rosebery took the principal part in an interesting ceremony, of which the Edinburgh branch of the Victoria League were the promoters. This was the presentation of Union Jacks to 53 scholars representing Board, Episcopal, Roman Catholic, and normal and day industrial schools in Edinburgh. Lord Rosebery, who was received with loud cheering, began his address by explaining to the children what the Union Jack, which he unfurled, represented. How do we come to have St. Andrew's cross in Scotland? he proceeded then to ask. "In old days," he said, "the countries of Europe all liked to have a saint under whose special protection they placed themselves, and some, where between 700 and 800, learned people tell us, Scotland chose St. Andrew. Why they chose St. Andrew, I cannot tell you. He was a fisherman, and, perhaps, the great fishing industry of Scotland made them want a fisherman as their saint. Anyhow they took St. Andrew, and I rather think that Russia took St. Andrew, too—we shall never come to blows with Russia on that point—and somewhere in the south of Italy, where he has got moored by some mysterious process, I have seen the tomb of St. Andrew. Now that you know the mechanism of the flag, what does that flag stand for? Of course, it stands for the United Kingdom and the British Empire. But if the United Kingdom was like some kingdoms, and if the British Empire was like some empires, we should not take the trouble to give you that flag to

day. It is because, as we think, it stands for justice, good government, liberty, and Christianity that we honor that flag. It has spread all over the world. The British Empire is a greater Empire at this moment, not merely than has existed in the world before, but greater than has ever been dreamt of in the world before. You may travel all the way, as I have, from London to Australia, I dare say you can tell me how many thousand miles it is—it is either 13,000 or 15,000—but it is the longest journey I suppose you can take in the world from one point to another. Whenever we stopped on that journey we stopped under the British flag (cheers). We went from London to Gibraltar. Here was the Union Jack. We went from Gibraltar, through the Suez Canal, touching in Egypt. There was a British flag. We went on by Colombo island of Ceylon. There was the British flag. And then we ended our long journey at the westernmost port in Australia, and there was the British flag. And so we knew, whatever we saw this flag flying—even in Egypt which had been misgoverned for countless centuries—we knew that we should find liberty, justice, good government and equal dealing between man and man.

"That is what the flag means to all the world outside. There are few people who hate Great Britain so much as not to know that that flag stands for what I say it does throughout the world; but for us—you children, and all of us—it stands for a great deal more. What do you feel about that flag? In the first place we know this; that under no circumstances whatever must its unity ever be disturbed. It must never be the Union Jack. I dare say Scotland has been a very troublesome neighbor to England some times, and England has been rather arbitrary to Scotland sometimes, and Ireland has been a little troublesome to both sometimes. But we are quite clear on this, that, as a family, where brothers and sisters are apt to quarrel a little without disturbing their essential unity, that unity must be preserved. "There is another point we must remember about this flag. It is not

taken ashore in boats. Those not required for immediate packing are thrown into one of the numerous oyster-ponds by which the packing shed is surrounded, there to await the arrival of orders. Inside the shed the packers count and place the oysters in barrels of various sizes. In order that the public who purchase these oysters from the Colne Fishery Board may have a guarantee that the oysters are genuine and in a perfectly healthy condition, a certificate to this effect is enclosed in each barrel, and the barrels are branded with the borough arms (Continued on page 3.)

Often as many as twenty or thirty