

# The Canadian Engineer

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## The Canadian Engineer.

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### THE STEAM TURBINE IN MARINE WORK.

For marine service the first acquaintance of Canadian engineers with the steam turbine is in the work of the steamer Turbinia, which has been running between Hamilton and Toronto for a part of the season now closing. She has run daily without accident, and her engineers are highly satisfied with her performances. Her coal consumption has averaged 2.21 tons per hour under a speed of 23 miles per hour, or 1.48 lbs. of coal per indicated horse-power per hour, as compared with 1.58 lbs. with the best average results of the reciprocating triple expansion engine. The Turbinia is a vessel of 1,060 tons gross, and has engines of 3,400 horse-power. Passengers on the Turbinia are sensible of a vibration, but this is a vibration of a different kind from that due to the motion of the crank and piston of a reciprocating engine. It is caused in the case of the Turbinia by the rapid whirl of the propellers. It is not the racking sort of vibration of the old walking beam, or the present day compound engine, but a trembling less damaging to the frame of the boat, and less disturbing to the passengers. It is believed that this quivering can be greatly reduced by a special arrangement of the bearings of the propeller shafts.

Apart from economy of coal when running at high speeds, the chief points in which, in the opinion of the engineers of this boat, the turbine engine is superior to the reciprocating are: the smaller space required for engine and machinery, this leaving more room for cargo, coal, or passenger accommodation; greater simplicity of the parts of the engine and less liability to break-downs; reduction of weight of machinery; reduction in the staff of engineers, and no vibration of the kind to which a reciprocating engine subjects a ship. Two engineers run the Turbinia; but it is stated that the reduction on a larger boat would be greater in proportion to tonnage. An Atlantic liner of the modern type would require seventeen engineers with reciprocating engines against ten or twelve with turbine engines.

These are all important considerations, and the only serious charge against the turbine marine engine is that while it is more economical of coal at a high speed it is of relatively low efficiency at slow speed. This charge could be ignored in the case of a merchant steamer where constant high speed is the rule and quick time the thing aimed at in a long voyage, but in the case of a warship the lazy rate of progress in cruising or feeling for an enemy would be uneconomical with the present style of turbine. But it is practically certain that this defect of the turbine will be overcome in time; and when we recollect that in a hundred year's record of the reciprocating engine coal consumption has been reduced from 12 lbs. of coal per horse-power to say 1½ lbs., we should think it strange if improvements are not made in turbine engine practice in the near future. In fact two or three new types of turbines of recognized merit are now being tested, while combinations of the turbine and reciprocating engine are now being put into some new English boats. Since the turbine engine gets 127 expansions against 27 expansions in the reciprocating, and since there is less efficiency in the early expansions of the former than in the latter, the idea is suggested that the turbine might be used to replace the low pressure cylinder in a compound engine. In this combination, however, the simplicity and compactness of the turbine would be lost along with the more favorable use of super-heated steam, so that this hybridizing is scarcely likely to offer the best line of improvement.

The difficulty of reversing is a minor defect in the turbine. The Canadian Turbinia has three propellers, one a high pressure in the middle of the ship, and two low pressure, one on each side. The latter are reversing, the former non-reversing. The officers say this ship is easily handled when getting in and out of dock. An experiment in a combination of engines to deal better with the problem of reversing