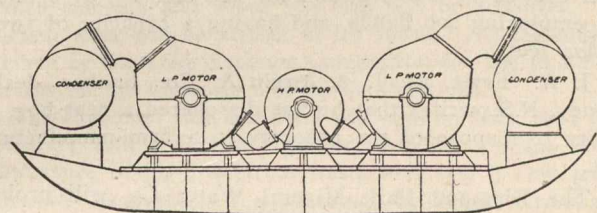


high qualities of steadiness and stability, as well as a capacity for speed, which could hardly be excelled. Before she took the water people viewed with interest her three propellers—a novel feature in an Atlantic liner.

For a considerable time it has been debated whether the turbine would be practicable as a means of propelling the giant ships that carry our cross-Atlantic passenger traffic, and while other great shipping companies were looking for more light and hesitating to plunge into a practical experiment that might involve heavy loss, the Allan Company boldly assumed the responsibility of giving the lead. They lost no time either. Twelve months ago the keel of the *Victorian* was laid, by Workman, Clark & Co. Now she has been successfully launched, and before the end of the year it is expected she will be ready for sea. Her trial trip will of course be the crucial test, and upon it much will depend. For it may be taken for granted that other important companies which have decided to adopt turbine engines for new liners will watch with attention the earliest performances of the *Victorian*.

Originally, the *Victorian* was designed to be driven by reciprocating engines, but after some progress had been made with her hull, Messrs. Allan decided that she should have turbines instead. Workman, Clark & Co. made the necessary alterations in her structural design, and at the same time undertook what was a far more difficult and delicate task, the construction of the great turbines—the largest ever made—which are to drive her. This was by arrangement with Parsons & Co., for it was the Parsons turbine that was decided upon. A high-pressure and two low-pressure turbines will drive the three propellers of the ship, which, by the way, strike one as being unusually small to drive a monster possessing a cargo capacity of more than 8,000 tons, besides accommodation and equipment for upwards of 1,300 passengers. These propellers, however, revolve at very high speed—from 270 to 300 revolutions per minute. The central one, arranged as in



Cross Section Showing Arrangement of Turbines

a single-screw vessel, is worked by the high-pressure turbine, the others, which are arranged as in a twin-screw ship, by the low-pressure turbines. The two latter have each a reversing arrangement which enables them to be driven full speed astern, either together or independently. Thus the ship will be as easily and effectively manoeuvred as regards turning or backing as an ordinary twin-screw. This disposes of the objection which has sometimes been urged against turbines, that they are defective with regard to reversing motion.

The principle of the steam turbine is less generally understood than that of ordinary reciprocating engines. Briefly, a turbine engine is a fixed cylinder upon the inside surface of which are mounted rings of brass blades projecting radially inwards. Inside this revolves a drum armed on its outer surface with similar rings of blades set at an angle to the fixed blades, and arranged so that they are "sandwiched," so to speak, between those of the fixed cylinder. Steam is admitted at one end of the turbine, and passes through longitudinally in a zig-zag path, being deflected from the fixed rows of blades in the turbine casing against the rows of blades on the drum, causing the latter, which is built on the propeller shafting, to revolve, and thus drive the propeller. The "fixed blades" (those in the cylinder), act as guides to deliver the steam with proper direction and velocity against the "moving blades" (those on the drum). Thus the full power of the steam is utilized, and in a direct and continuous way.

The term "blades," when used in connection with the machinery of an ocean liner seems to suggest a screw propeller or something equally formidable. But these turbine blades are surprisingly small—no larger than a lady's little finger. Their number, however, is prodigious, there being no less than a million and a half separate pieces used in the blading of the three turbines of the *Victorian*.

It may be easily imagined, when the principle of the steam turbine is grasped, that everything depends upon the proper "set" and inclination of the two sets of blades. Hence the difficult and delicate character of the constructive work. The manufacture of the turbines is well forward. Workman, Clark & Co. have a special engine shop, equipped with the necessary plant devoted to them, and C. E. Allan, one of the members of the firm, personally superintends their construction. It will, however, require some weeks longer of skilful and arduous labor before the turbines are ready to be fitted in the *Victorian*.

The energy of the steam is used up to the last ounce in its passage through the turbine. But economy of power and room are not the only advantages which the turbine promises in connection with ocean traffic. There is a complete absence of the unbalanced forces which cause vibration in an ordinary steamer, and which is thus reduced to vanishing point. Then there is very little fear of breakdown, because there are no moving parts to break or get out of order. It is usually the breaking of a crank shaft, or connecting rod, or some such appliances that cause trouble on a modern steamer. Here the steam acts directly, driving the shafts of the ship with an even turning movement, enormously reducing the stresses to which the moving parts of ordinary engines are subjected. Indeed, it is claimed for the turbine that there is a saving in weight, space, attendance, up-keep, to say nothing of a considerable increase in speed.

Owing to this economy of space the builders have been able to provide accommodation on board the *Victorian*, such as is probably not to be equalled by any vessel of her size afloat. They have utilized the saving not to increase the number of passengers carried, but to give every possible comfort and luxury to all three classes of passengers. The *Victorian* will be emphatically a comfortable ship so far as the perfection of appointment can make her so. Care for the humble steerage passenger has always been a leading point of policy with the Allan Line; in the *Victorian* it is exemplified in a remarkable degree. Even in their unfinished condition, the music-room, dining-room, and other special accommodation for this class challenge admiration for their roominess and completeness of equipment.

The steam to drive the turbines will be generated by eight large boilers.

The length of the *Victorian* is 540 feet; her breadth, 60 feet; her depth 40 feet 6 inches. She is divided by bulkheads into eleven compartments, and with the sub-divisions of her double-bottom she has twenty watertight spaces. She is built to the highest class of the British Corporation Registry of Shipping, and her hull has been specially strengthened above the requirements of the Corporation in order to make her doubly secure against the heavy weather of the North Atlantic. The first-class accommodation, which, as usual, is amidships, is of the most complete and approved order. Perfectly heated and ventilated staterooms, and suites of rooms, a spacious and well-fitted dining-saloon, an elegantly appointed music-room, and a luxuriously equipped smokers room are some of the features. Not less comfortable proportionately are the second-class quarters, and, as already indicated, third-class passengers are catered for in the most liberal manner. Electric light throughout, a complete printing outfit, and an installation of Marconi's wireless telegraphy are among the arrangements for the comfort and convenience of passengers.

As regards facilities for the handling of cargo, the ship is as perfectly fitted as possible. She has ten steam winches and derricks for working the holds, and she is provided with insulating chambers and refrigerating plant so as to enable her to carry fruit, dairy produce, etc., from Canada.

The *Victorian* will take her place on the Allan Canadian mail and passenger service from Liverpool, to be followed by her sister steamer *Virginian*, now building on the Clyde.

These steamers, with the *Bavarian* and *Tunisian*, will land to land provide a service which by reason of the shorter mileage of the route, will compare in length of voyage favorably with the swiftest of the other Atlantic mail services, and as much of the voyage is in land-emcompassed seas, the Canadian route cannot fail to become increasingly popular with that great section of ocean travellers to whom a short and smooth sea voyage is an attraction.