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WANTED—A MARINE ENGINE GOVERNOR.

The accident to the engines of the "St. Paul" calls to mind the more serious disaster which several years ago overtook the "City of Paris," when she was running in the service of the Inman and International Line. There is this difference, among others, between the two engine room wrecks, that while the predisposing cause in the case of the "St. Paul" is said to be well known, in the case of the "City of Paris" it will always remain a matter of doubt. It is supposed that the propeller shaft of the "City of Paris" gave way, and that the consequent racing of the engines caused the most extraordinary smash-up of cylinders, bed-plates, and reciprocating parts which ensued. According to the published reports of the officers of the ship, the wrecking of the engines of the "St. Paul" was due to the loss of the propeller and parting of the shaft as the result of an encounter with a derelict. If the propeller did not strike a submerged wreck, it is quite possible that, as the ship is reported to have been driving into a head sea, the sudden submersion of the propellers, when the engines were racing, may have set up sufficient strain to cause the fracture of the shaft. In any case, whatever was the predisposing cause, the immediate occasion of the wrecking of the engines, both in the "Paris" and the "St. Paul," was undoubtedly the running away of the engines, due to the sudden removal of the load.

The recent accident serves to emphasize once more the crying need that exists for the introduction of a marine engine governor that will govern: some device which will not merely act when the propeller is lifted clear of the water, but which will immediately check the speed when, by the total loss of the propeller or the parting of the shaft, the load is entirely and permanently removed. We believe that it is the common consent of steamship men that a perfectly satisfactory governor of this kind has yet to be designed. We say this with a full knowledge of the fact that some very ingenious governing devices have been tried and are being tried, and that as far as they go some of them are doing very good work. The trouble with most marine governors is that they fail to act with that anticipatory effect which is necessary properly to control any form of marine engine, and doubly necessary to govern the modern multi-cylindered engines of the triple and quadruple expansion type.

In the days of the simple high pressure or of the single-expansion condensing engine, the common form of centrifugal governor, acting on the throttle, was fairly effective. Steam was cut off the instant that the engine commenced to race, and beyond any temporary acceleration, no excessive and prolonged racing was possible; but with the introduction of triple, and, later, of quadruple-expansion engines, the problem has been greatly complicated; for even if the supply of steam is cut off from the high-pressure cylinders at the first instant of racing, there are still, in the case say of a six-cylinder engine, four large cylinders full of steam which are free to exert their power on the shaft, and it will take three or four revolutions before this steam has passed through the engine and been condensed at the condenser. Evidently a marine governor to be effective must anticipate, by three or four revolutions of the engines, the moment when the propellers will be lifted from the water. It has been the object of some cleverly designed governors to secure this action. One of the best known of these consists of a well opening through the floor of the vessel and located some distance from the stern, in which the water rises to the same level as the water on the outside of the hull at that particular part of the vessel. Within the well is a float which acts through suitable mechanism upon the throttle valve; and the theory of the device is that as the trough of the wave passes aft, and before it reaches the propeller, the sinking of the water in the well will cause the steam to be throttled a few moments before the trough of the waves reaches the propellers. By this device it is sought to empty all the cylinders of the engine before the load is removed from the propellers. Another form which has met with some measure of success is a governor which acts directly on the reversing gear and throws the valve motion into the center, thus controlling all the cylinders of the engine at once.

The chief engineer of one of the fastest of the Atlantic liners recently informed us that although his engines are equipped with one of the best types of governor, he is so far distrustful of its efficiency that during a spell of heavy weather he guards against disaster by letting the steam run down considerably in the boilers. While this precaution is a wise one, it is after all but a compromise. The fact of the matter is that with the extraordinary increase in the weight and horsepower of marine engines which is now taking place, the governor problem assumes increasing importance. The captain who finds himself in command of a big ship with an extraordinary reserve of power in its engine room is tempted to make use of it and drive his ship at full pressure in heavy weather, and we shall see more of this as the time goes by and the competition for record passages grows keener. The demand for a device which will allow these engines to be driven to their maximum capacity against a head sea grows more pressing with every high-speed liner that is floated.

THE SEA ROUTE AS A COMPETITOR OF THE SIBERIAN RAILWAY.

There seems to be a decided division of opinion in the Russian press as to the part which the Trans-Siberian Railway is to play in the carriage of freight between Europe and Asia. The optimistic press believes that the scheme will attract to itself a large portion of the freight which is now carried by sea between European and Asiatic ports. On the other hand, we find the Novosti declaring that all hopes of any considerable revenue accruing to the road from this source are based upon a misunderstanding of the situation. It contends that the Siberian Railroad can never compete successfully, either in point of time or cost, with ocean-going steamers, for the reason that it takes forty-two days to carry freight from Irkutsk to Moscow by rail, and that the steamers are making the same rate of speed at the present day. The question of time, however, is not so serious as is that of the cost of transportation, and the Novosti claims that in this respect also the railroad will find itself to be at a serious disadvantage. Thus, it is assumed that if the carriage of freight between Hamburg and Port Arthur, a distance of 6,000 miles, costs only about one-two hundredth part of a cent per pood of thirty-six pounds per verst of two-thirds of a mile, then the freight per pood between these two ports will amount to forty-five cents. As against this rate by rail it seems that the rate by sea from Hamburg to Vladivostock is only eighteen cents per pood of thirty-six pounds. It is claimed that although this difference between the rail and sea rates is so great, the steamers are carrying freight at a fair profit, while the Siberian road is carrying freight at less than cost, even when making the higher charge of forty-five cents as mentioned above. From this comparison it is concluded that for the present, at least, the railroad cannot figure as a competitor with the steamers which are already engaged in the trade. The field for the activity of the railroad lies in the direction of developing the more or less local traffic, and in promoting the settlement of the country and upbuilding its industries.

CALIFORNIA'S BIG TREES.

The Forester of the Department of Agriculture, Mr. Gifford Pinchot, has just written a most interesting account of the "Big Trees" of California, and the dangers which menace them. Before the glacial period the genus called Sequoia flourished widely in the temperate zones of three continents. There were many species, and Europe, Asia, and America had each its share. But when the ice fields moved down out of the North, the luxuriant vegetation of the age declined, and with it the multitude of trees. One after another the different kinds gave way, their remains became buried, and when the ice receded just two species, the Big Tree and the Redwood, survived. Both grow in California, each in a separate locality, the Redwood occupying a narrow strip of the coast ranges ten to thirty miles wide and extending from Oregon to the Bay of Monterey. The Big Tree (Sequoia Washingtoniana) is found in small groves scattered along the west slope of the Sierra Nevada Mountains. There are ten main groves or groups of trees, and the number of specimens figures up some thousands, but only about 500 are remarkable for their size.

The Big Trees are unique; they are the oldest living thing, and are the most majestic of trees, and are extremely interesting from a scientific point of view as being the best living examples of a former geologic age. Their vitality is remarkable, the fungus is an enemy unknown to it, and the best specimens have been found to be sound at heart when felled. These great natural curiosities have only been able to hold their own by reason of favorable climatic conditions. The Mariposa grove is the only one which may be said to be entirely safe, and most of the other groves are being destroyed. The finest of all, Calaveras Grove, which has the tallest trees, has been bought by a lumberman. The Sequoia and General Grant National Parks are eaten into by private claims. In brief, the majority of the trees are owned by men who have the right, and in most cases the intention, to fell them.

The Calaveras Grove was discovered in 1841 by John Bidwell, and by 1870 the majority of the big trees had been located. One of the largest examples in the Calaveras Grove was cut down in 1853; the bark was 15 to 18 inches in thickness, and after stripping this off, the diameter of the trunk was found to be 25 feet at a height of 6 feet above the ground; it was 302 feet high. It was found to be impossible to fell it by ordinary means, so the trunk was bored by pump augers of large diameter. This occupied twenty-two days, five men being employed, and at the conclusion of their labors it was found that the tree would not fall, so two and a half days were consumed in driving in wedges; the men then retired for dinner, and a gust of wind blew it over, Nature apparently wishing to prevent the hand of man from consummating this last act in a great tragedy of the forest. The bark was used to form a room in the old Crystal Palace, at South Kensington. A cotillon party of 32 persons danced on the stump. Another tree, called "The Mother of the Forest," was 321 feet high and 137 feet to the first branch. It is estimated that there were 537,000 feet of sound inch timber in the tree. The "Father of the Forest" was about 400 feet high when standing, and its circumference at its base was 110 feet. A number of the living trees have been named, and most of them are marked with marble tablets.

There are 1,380 Big Trees in the Stanislaus or South Calaveras Grove, including "Smith's Cabin," in the charred hollow of which a trapper lived for three years, and where he occasionally also stabled his horse.

The "Canal Boat" is a decumbent tree. The upper side and heart have burned away; in the bottom thousands of young big trees have started. In the Mariposa Grove is a tree through which a road has been cut.

Unfortunately, the Big Trees are exquisitely proportioned and are the noblest specimens which the botanical world can offer, and for this and by reason of their extreme age they ought to be protected from vandals. Many of the Big Trees are estimated to be 3,600 years old, and 4,000 rings have been counted. Under the most favorable conditions these giants probably live to be 5,000 years old, and even more. They seldom die natural deaths; they seem to be exempt from the diseases which afflict other trees. Their worst enemy is man, then comes fire, lightning, storms, and the giving way of the ground on which they stand.

Fossils show the Big Tree to be the remnant of a once numerous family; it is a direct or collateral descendant of ancient species. Their ancestors formed a large part of the forests which flourished throughout the Polar regions, now desolate and ice-clad, and which extended into the low latitudes of Europe. The natural reproduction of the tree is slow, and the preservation of the race is dependent on maintaining the present groves intact. The big tree rejoices in five names which have been given to it at various times; Sequoia, Washingtoniana, however, which was proposed in 1898, will probably be the name under which it will be known. The big tree has been introduced into England and the Continent, and while it has done well it shows that the existing climates do not suit it, and the Sierra forests need fear no rivals. It has been occasionally cultivated in the Eastern United States, where it does not flourish. There are two trees 35 feet high in a nursery at Rochester, N. Y.

The lumbering of the Big Tree is very destructive. The enormous size and weight of the tree naturally entails considerable breakage, and the brittle trunk is liable to be smashed by any inequalities in the ground. The loss from this cause is great, but it is only one of the sources of waste. The great diameter of the logs, notwithstanding the lightness of the wood, causes their weight to be so enormous that it is impossible to handle many of them without breaking them up. For this purpose gunpowder is used, and the fragments are often of wasteful shapes, and unless great care is used in preparing the blast, a great deal of the wood itself is scattered into useless splinters. At the mill, where waste is the rule in the manufacture of lumber in the United States, the big tree makes no exception. This waste added to the other sources of loss makes a total probably often considerably in excess of half the total volume of the tree. The big tree also stands as a rule in a mixed forest composed of many species, and the destruction caused by the fall of one of the enormous trees is in itself great, but the principal source of damage is the immense amount of debris left on the ground, a certain source of future fires. This mass of broken branches, trunks and bark is often 5 or 6 feet thick, and necessarily gives rise to fires of great destructive power, although the Big Tree wood is not specially inflammable. The devastation which follows such lumbering is as complete and deplorable as the untouched forest is unparalleled, beautiful and worthy of preservation. Fortunately, much of this appalling destruction has been done without leaving the owners of the Big Trees as well off as they were before it began.