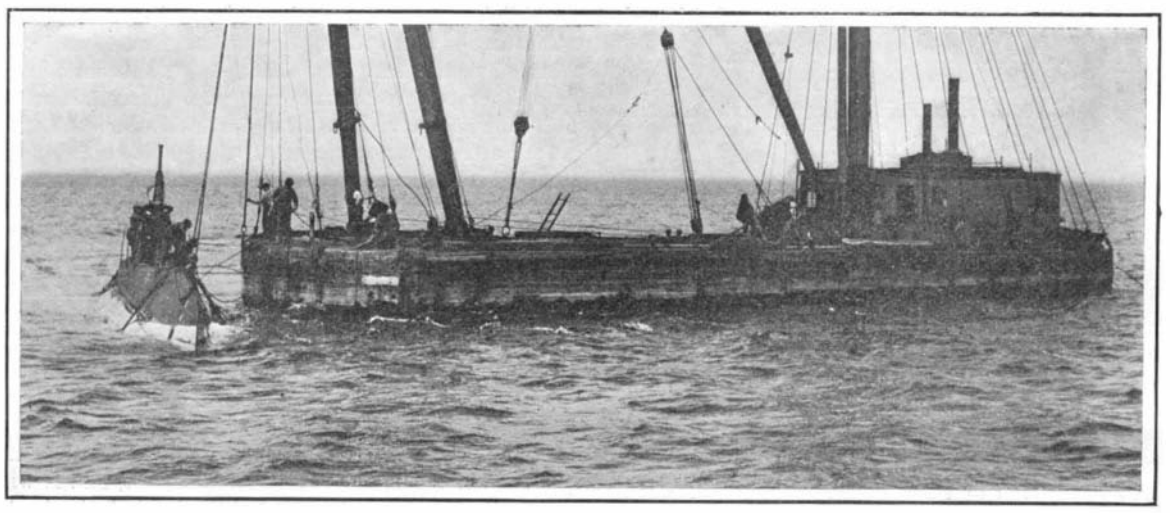
THE GOVERNMENT TESTS OF SUBMARINES.

Particular interest attaches to the government tests of submarines, which have been carried on during the past few weeks by a board of naval officers of which Capt. Adolph Marix is president. Not only are two distinct types of submarine, larger, faster, and in every way more efficient than their predecessors, being put through a series of tests far more searching than any previously attempted, but upon the result of these trials depends the placing of contracts for the construction of as many new boats of this type as can be built for three million dollars—the sum of money appropriated for this purpose at the last session of Congress. The principal firms that tendered at the opening of the bids last month were the Electric Boat Company, of New York, the Lake Torpedo Boat Company, of Bridgeport, Conn., and the Burger Subsurface Company, also of New York.

The Electric Boat Company, which has constructed the only submarines which are in actual service in the United States navy, submitted bids for two types of boats similar to the "Octopus," which is now in commission, and is at present being used in the competitive tests above referred to. The Lake Torpedo Boat Company submitted bids for five different sizes of boats, ranging from 235 tons to 500 tons displacement, and costing from $193,000 to $450,000 each. The Burger Subsurface Company proposed to construct a 250-ton subsurface boat, with a maximum speed of 19 knots, at a cost of $250,000, and pledged themselves to have the vessel ready within twelve months. This company, however, was not prepared to submit a vessel of their type for test, but were permitted by the Navy Department to enter in the trials a large model built to a one-fourth scale.

The Electric Boat Company's submarine, the "Octopus," is of the same general type as the Holland boats now in service of our navy, which are 63 feet long, 12 feet in diameter, and have a submerged displacement of 120 tons. The "Octopus" is one of four sister boats which have lately been completed, the others being known as the "Cuttlefish," "Tarantula," and "Viper." She is 105 feet long, 13.5 feet in diameter, and displaces 200 tons. In the design of the "Octopus" are embodied the lessons which have been learned in the operation of submarines, both in our navy and abroad. Particular attention has been paid to structural strength, and both in scantling and in plating she is a very much stiffer and stouter boat than her predecessors. It will be remembered that in the fatal accidents which have occurred in the French and English navies, where the submarines have sunk to great depths, the hull structure has shown signs of failing under the enormous pressures developed, the hulls becoming distorted, and leaks developing, both at the seams and at the outlets of pipes and other openings.



The "Octopus" Being Lowered by a Lighter Derrick to a Depth of 205 Feet.

One of the most severe tests to which the new submarines were subjected was that of sinking them to a depth of 200 feet, and allowing them to remain at that depth for a specified length of time, to determine whether they were sufficiently stout and watertight to endure the great pressure of the water. In one test the Lake torpedo boat voluntarily sank to the bottom at a depth of 138 feet, and remained there for a short while with her crew aboard, returning to the surface in about five minutes after disappearing from view. While resting on the bottom she was subjected to a pressure of 52 pounds to the square inch at the axis of the boat, and she is said to have withstood this enormous pressure perfectly. One of our illustrations shows a similar, but even more severe, deep-water test of the "Octopus," when she was lowered to the bottom of the ocean to a depth of 205 feet at a point five miles northeast of the Boston light. After all openings had been carefully closed she was swung upon chains from a lighter, and with her ballast tanks filled with water, was lowered slowly to the bottom, where she was allowed to remain for ten minutes. Although the total pressure at this depth, over the whole surface of the boat, must have amounted to about 15,000 tons, it was found by the members of the Board, who made a careful examination after she had been hauled to the surface, that her structure had suffered no damage, and that there was no evidence of leaks having developed.

The "Octopus" is of what is known as the "diving" type, and the "Lake" as the "even-keel" type of submarine. When the "Octopus" is to be submerged, water is taken into the balance tanks until she has a reserve buoyancy of about 800 pounds. Then with the propellers in motion, and the ballast tanks loaded until the boat has an inclination of about 8 degrees from the horizontal, the horizontal rudders are inclined, and the vessel dives. To maintain submergence after reaching the desired depth, the vessel maintains a downward inclination of about 3 degrees.

The "Lake" is 85 feet long and has a submerged displacement of 250 tons. Unlike the "Octopus," she submerges without changing her horizontal trim. Water is admitted to the ballast tanks until the craft is awash, and then the hydroplanes or horizontal steel rudders at the sides of the vessel are tilted to the desired angle, when the water, impinging upon them, serves to drive the boat under.

In the speed tests on the surface and submerged, the "Octopus" in a series of runs on the surface, averaged 11.95 knots with her 500 horse-power gasoline engines, and when submerged she made 10 knots with her electric motors of 230 horse-power.

The "Octopus" Making 12 Knots Under Her Gas Engines at the Surface.

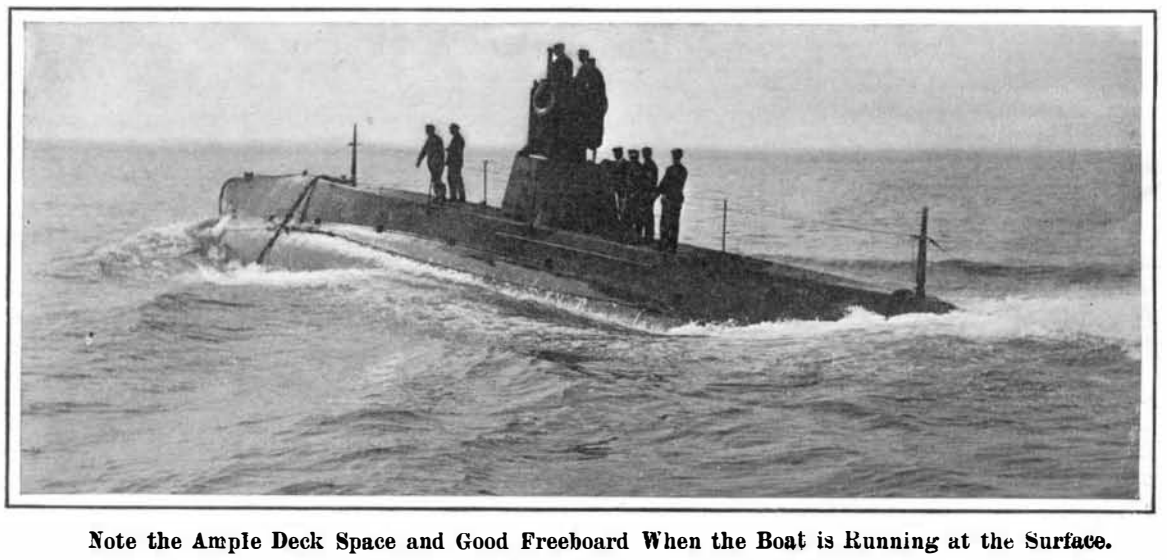
Scientific American Medal.

The SCIENTIFIC AMERICAN medal which is to be awarded annually for safety devices under the direction of the American Museum of Safety Devices and Industrial Hygiene, is almost completed and a reproduction of the same will be given at an early date. The jurors thus far requested to decide upon the awarding of the medal and who have accepted are John Hayes Hammond, president of the American Institute of Mining Engineers; Samuel Sheldon, president of the American Institute of Mechanical Engineers; H. H. Westinghouse, and Stuyvesant Fish. All of these gentlemen are pre-eminent in their professions and it is very gratifying to know that the award will be made by such highly competent jurors.

A New Wall Covering.

A new wall covering called "metaxin" has been invented in Germany. This new wall paper has the appearance of a silk fabric, and has some similarity with the Tecco and Salubria wall papers, but through the peculiarity of its manufacture much greater effects can be obtained, especially as regards the silky appearance and brilliancy. The fact that through forcing dissolved wood pulp through fine openings and afterward drying it in a certain manner a substitute for natural silk can be manufactured, forms the basis for the making of the new wall covering "metaxin." The threads surpass in brilliancy natural silk. For several years the experiments were carried on, but for a long time without success, the result being not artificial silk, but very shiny paper. The great importance of the newly-discovered wall covering, however, lies in the serviceable qualities of wood pulp. The stuff is laid upon a material specially suited for wall paper, such as paper, cotton, and such like, and it soon forms a firm layer which has a bright silky gloss and is so thick that one cannot distinguish the material underneath. The silk layers adhere firmly to the material they are put on, and cannot be scratched or rubbed off. It resists the effect of soda or any other acids or alkalies; like all wood pulp it is absolutely proof against wet. The "metaxin" takes any color. It is little or not at all affected by the heating apparatus, never turns black, and having an entirely closed surface, "metaxin" has the advantage of not harboring dust or germs of diseases.

The Periscope, Conning Tower, and Hatch.



Note the Ample Deck Space and Good Freeboard When the Boat is Running at the Surface.

THE GOVERNMENT TRIALS OF THE NEW U. S. SUBMARINE "OCTOPUS."