

NEW NAVAL TERROR.

Submarine Boat Octopus, Which Will Operate Beneath the Waves—Her Part in the Naval Manœuvres—Details of Construction Expected to Make Her Formidable—Observing an Enemy's Approach and Telephoning from the Ocean's Bottom.

THERE will be launched at Bridgeport, Conn., in a few days, the new lake submarine torpedo boat Octopus, and from the moment she leaves the ways she will be ready for active service. Work has been hastened on the craft with the intent of having her participate in the joint army and navy manœuvres, but, owing to the restricted scale of those evolutions, the Octopus will have to be tried later by the navy alone and in competition with the Holland boat Adder.

The present boat is the fruit of years of practical experience. In 1894 Simon Lake built the Argonaut, Jr., and with that modest craft he made a series of practical experiments that led, in 1897, to the building of the second Argonaut. The primary purpose of that boat was submarine wrecking and the construction of subaqueous foundations, breakwaters, and the like. After two years of useful work and commercial profit, this second Argonaut was hauled out on the building slip and considerably remodeled and manifestly improved.

Since 1900 this boat has been actively engaged in wrecking operations in Long Island Sound and has recovered eight cargoes of coal sunk in the very treacherous waters of Hell Gate, New York. Both the present boat and the same craft in her original form have traveled hundreds of

the room becomes really a big sounding box, and messages can be heard distinctly without putting the ear to the telephone receiver. This at once increases the range of the telephone.

All of us have read of how divers are killed by pressure long before reaching a depth of 150 feet—in fact, we lost a man from one of our warships during the war with Spain who was killed by being lowered too suddenly to a depth of only a few fathoms. The secret of deep-sea diving lies in going down slowly. It is not always possible to take the time in descent needful to insure safety.

In the Octopus, however, this can be done easily. The diver steps into the diving compartment, where the pressure is gradually increased, and the blood vessels are given time to accommodate themselves to the added load, thus avoiding sudden death, or what is pretty nearly as bad, general paralysis. As the pressure grows, the diver, from time to time, turns on a cock in the manhole plate of the bottom outlet. At first the water spurts through violently, then less so, and finally, when the air pressure and the water pressure are equal, none comes.

Then he lets the trap door fall and there, as though by magic, the seawater halts at the rim of the manhole, and out on to the bottom of the sea drops the diver. Lanky,

that a diver would go into it up to his waist.

Offensively, as a torpedo boat, the Octopus will be equipped with three torpedo tubes, each carrying a big eighteen-inch Whitehead automobile torpedo. Two of the tubes will be in the bow and one in the stern, and they will be aimed by pointing the boat at the target. Picture the havoc such a craft could effect by deliberately entering an enemy's harbor, night or day—running in on the bottom and coming to the surface when the shadows of the hulls above them told the positions of the foe-man's ships. The possibilities of such work as this, even more than the ability to run nearly submerged on the surface or totally submerged at a predetermined depth, are startling and original enough to make the type a very formidable fighting machine, while actual performance has shown it to be absolutely and certainly practical.

HER DIMENSIONS.

The boat will be nearly 70 feet long, will have a maximum beam of 11 feet, and, submerged, will have a displacement of 170 tons. Her surface buoyancy, owing to her peculiar form, is such that she can face any sea, while the direction of her righting effort, because of the nature of her buoyancy, is such that she will always lie on an even keel even when diving. The advantage of this is that she will run no danger of poking her nose in the mud or turn a somersault after discharging a torpedo through the failure of compensating mechanisms of any sort.

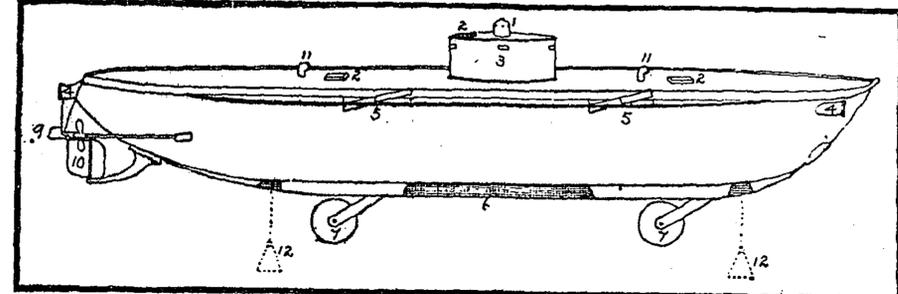
The boat will be driven by engines working twin screws. When running on the surface gasoline engines will do the propelling work; when running submerged the boat will be driven electrically. All of the gasoline, of which there will be carried enough to send the boat 1,500 miles, will be stowed in the ship-shaped superstructure without the main body of the hull. This at once removes all danger from explosion within the hull, as happened recently to one of our other submarines. The surface speed will be about 11 knots, with a submerged speed of 7 knots.

The boat will have comfortable accommodations in the shape of Pullman car bunks for a crew of six persons. Enough air is stored in the tanks to supply the crew for more than sixty hours' submergence, and it is further possible to draw air from the surface even when the boat may be running submerged. The Argonaut in contradistinction to every other submarine boat extant to-day has facilities by which every member of the crew may reach the surface alive in case of the total disablement of the boat when on the bottom or when traveling submerged within depths not exceeding 150 feet. She also has a patented device by which it is possible to tell exactly how far she has traveled under water when running on the bottom.

The obvious advantage of this is that the boat can feel her way into any charted harbor without coming to the surface to correct her bearings, it being found that the compass, when compensated for local attractions, is as reliable under water as above. The moderate weight of the boat when traveling on the bottom in smooth water is such that should she strike any obstruction over which her nose could pass she would rise clear of it just as a fish would. It has been found by actual experience that the Argonaut could steer a long and correct course submerged. The Octopus has several improvements in this direction, and because she is intended to run, if necessary, between the bottom and the surface, there will be an automatic control of submergence.

There is not a single desirable feature possessed by any other submarine boat that the Octopus has not, while she has the possession of a goodly number of characteristics that place her way and ahead of anything else yet extant. We shall possess in her, for the Government will undoubtedly buy her, a very unique instrument of warfare, and her forthcoming manœuvres are looked forward to with much interest by some and with no small concern by others.

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- 1—Small conning tower.
- 2—Hatches.
- 3—Turret.
- 4—Torpedo tube.
- 5—Horizontal slide rudders.
- 6—Weighted keel.

- 7—Wheels for resting on bottom.
- 8—Aft horizontal rudder.
- 9—Vertical rudder.
- 10—Ventilators.
- 11—Weights as anchors.

miles on the bottom of our neighboring sea-bed; have been submerged for many hours at a time; have taken down large parties of guests on some of the trips and have fed them there with the fish and sea food caught and taken in their presence through the medium of the diving compartment; and, not the least by any means, have coasted without convoy of any kind for hundreds of miles in rough weather and have crept right upon our mine fields and under the guns of our fortifications without being detected.

The Octopus is the Argonaut class improved, being not only a submarine mining and countermining boat, but a torpedo boat as well, with a radius of action and a scope of operation and usefulness beyond any submarine torpedo boat extant to-day. The boat is protected by more than 200 patents in all the maritime nations, and the bulk of these patents are based on the best proof of the amount of originality compassed by them.

NAVY DEPARTMENT'S ACTION.

Last year Mr. Simon Lake presented the plans of his new boat to the Navy Department for inspection. The Board on Construction was loud in its praises, and while conscious of all that has been claimed for other boats built in this country and elsewhere, was seriously impressed by the radical practical departures that Mr. Lake had accomplished. Mr. Lake asked in turn only that he and his company might build at their own expense a boat along the lines shown with the understanding that if it proved itself superior to any existing type the Government would purchase her.

The Octopus is the result of that agreement, and her forthcoming performances are looked forward to with a vast deal of interest—especially as the Lake Company has been approached by several foreign Governments, to whose overtures Mr. Lake has declined to listen until he has received the verdict of his own Government.

The submarine boats heretofore built in this country of other designs have, at the best, proved themselves questionably reliable only in smooth water. None of them has steamed at sea except for very short distances, and then under very favorable weather conditions. They have been commonly towed from port to port, and they have, even then, proved themselves very uncomfortable and hard to control.

In our land-locked rivers and in certain other still waters where special courses have been expensively dredged for them, they have performed with some measure of success and without loss of life; but not one of the several buildings for the Government has yet been accepted, and that because of failure to fulfill the contract requirements.

The Octopus is designed not only for harbor defense in its wider application, but it is intended to go many miles out to sea where it will observe the approach of an enemy's fleet, and, within a few moments' time, report the foe's approach, direction, and speed to the nearest land observatory. This will be accomplished by a system of telephonic cables—the positions of which will be known only to the submarine, which will lead ashore to convenient stations having in turn direct communication with our batteries and other military forces.

THE 100-FOOT LINE.

If one will take a map of the coast lying beyond Sandy Hook and trace out the 100-foot line, one will find that it runs on an average of from fifteen to twenty miles seaward from New York City. As we go south along the Atlantic Coast, this 100-foot line is generally carried even further out to sea. Now the Octopus is designed to submerge to a depth of 150 feet—leaving, at our 100-foot line, a margin still of 50 feet in case of need.

The method of operation will be simple. There are two pyramidal anchors carried—one at each end, to which steel cables will be fitted, which, in turn, will be wound upon electrically driven drums or winches. When the boat is ready to descend at a given point on the outer line of observation, she will make for the buoy marking the spot. Her buoyancy will be gradually decreased, until only the armored hood of her sighting top is above water. The two anchors will then be dropped, and the boat pulled down by winding up the cables again.

When the bottom has been reached, the diver will be let out through the diving compartment forward, and connect the telephone in that compartment with the junction box on the seabed, and communication will be at once established with the shore. Owing to the air pressure in the diving compartment—which must equal that of the water without, so as to prevent its admission through the open manhole in the bottom of the boat—it has been found that

long-necked men of sober habit are the ones that nature has fitted for this work. No matter at what depth the boat is submerged within its limit of safety, the people elsewhere in the craft are not under pressure as are the firemen in our fire-rooms on shipboard when running under forced draught, for there each man bears an additional load of fifteen pounds upon every square inch of his body.

ON THE BOTTOM.

The Octopus travels, or will travel, upon the bottom on two wheels, one behind the other on the centre line. When running on the surface the wheels will be drawn up. The pressure on these wheels, i. e., weight of the boat, will be regulated to suit the nature of the bottom, so as to insure sufficient hold to offset the effect of currents and that heavy ground swell common to the coast after a storm. This weight or pressure will vary all the way from a pound or two to as many hundred.

Used as a submergible picketboat, the Octopus and her type would be distinct novelties, while widening our field of observation by many miles, and that when and where the foe will least expect. With deck awash, the sighting hood would be something over six feet above the water, which would insure a radius of observation of quite ten miles seaward. Such a small object could not be detected at that distance, while within three seconds all but the armored hood could be submerged, and total submergence could be effected instantly at any time after that.

To submerge, all that is necessary is for the boat to have headway and that the forward tips of the hydroplanes should be dipped. This would force the boat under at once, and having buoyancy enough to bring her to the surface at all times. When running other than on the bottom, it would be necessary only to reverse the dip of the hydroplanes and up she would come. This is one of the marked features of safety.

To bring the boat down to a submergible condition, water ballast tanks are used. Should anything fail to exhaust these tanks when the boat is running on the bottom and it is desired to rise, there is an emergency device in the shape of a drop keel, weighing many hundreds of pounds, which can be freed at a moment's notice, leaving the boat to rise by reason of a newly acquired buoyancy equal to the load just dropped.

Apart from its use on the picket line, the Octopus, either alone or with a companion boat, could sweep an enemy's mine fields and render them completely useless; or, traveling along the bottom, she could deliberately enter an enemy's harbor, rise, make all needful observations with only her armored sighting hood above water, sink, and then join an attacking fleet miles distant with accurate information as to the enemy's forces present within the port. In traveling on the bottom, the Argonaut found it easy to travel along a bottom so soft, sinking her wheels but six inches,



COLLECTIONS UNDER DIFFICULTIES.

—From The Minneapolis Journal.