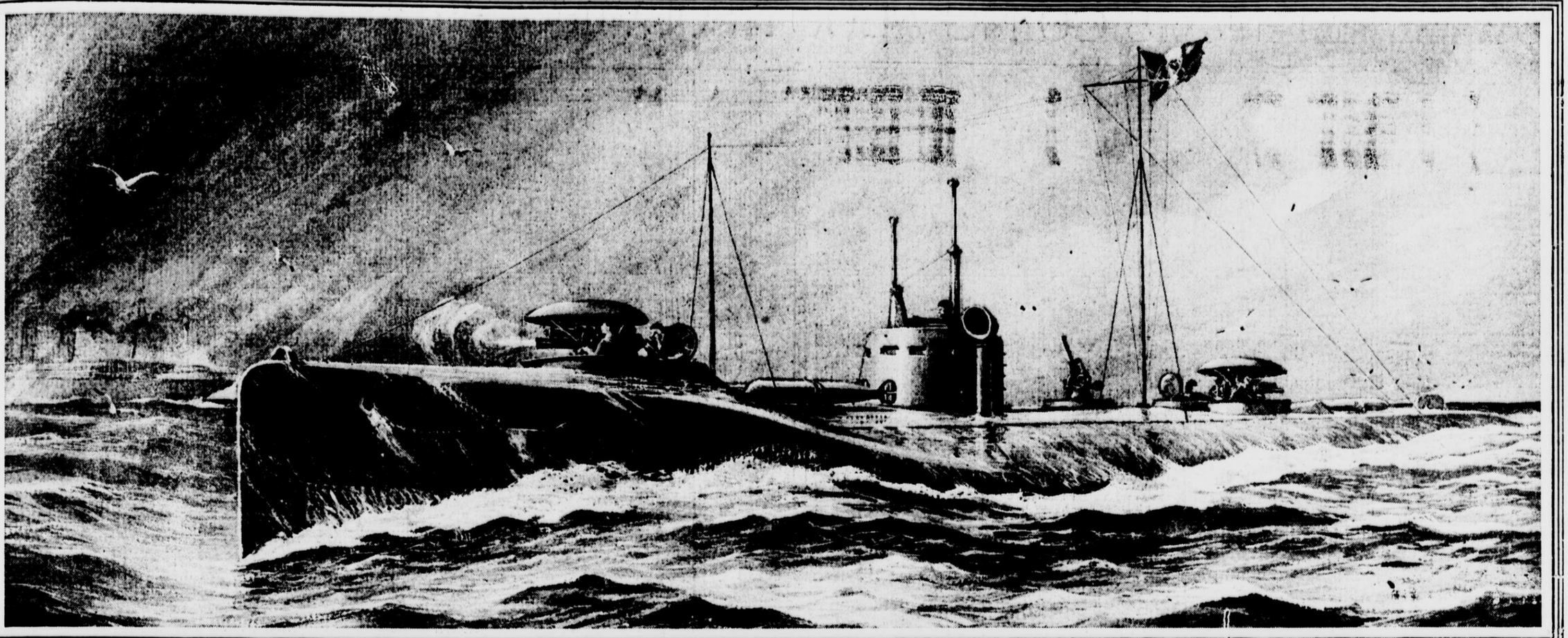


The latest development of the commerce destroying submersible.

MORE TERRIBLY DESTRUCTIVE SUBMARINES FORESEEN

U. S. Naval Men Look Forward to Development of a Vessel Capable of 25 Knots an Hour

Submersible of the Near Future Likely to Be Combination of Present Type and Surface Destroyer

"THE day of spectacular naval deeds is done. Never again shall we see the armored battle giants struggling for victory upon the surface of the sea. Hereafter the combatants will be hidden below the waves. The silent return of the victors to port will be the only evidence of the outcome." So thinks no less an authority than the French Minister of Marine, Victor Augagneur.

Possibly this is an extreme view, but certain it is that undersea craft have established their right to be. Naval men the world over are now wondering in what fashion these new fighting units are going to develop. It has even been said that possibly nobody has been more surprised by the achievements of these boats than the designers and builders themselves. Up to a point these technicists could plan and construct, but having finished their pet instrument it was for others to show what could be done with it when capably handled and manned by men of courage willing to take desperate chances.

The knowledge which experience is bringing of the limitations and possibilities of submarines is of particular interest to Americans at present, because very shortly the Navy Department will open bids for the undersea craft authorized at the last session of Congress. The act providing for the increase of the navy made appropriations for two big submarines of seagoing type, to have, if possible, a surface speed of twenty-five knots or more, and for sixteen coast defence submarines of a smaller order.

Two of the greatest shipbuilding companies in this country have notified the Secretary of the Navy that it is their intention to engage in the construction of underwater craft. These yards will submit bids for constructing boats of foreign types. Already the navy has a submersible of Italian design, built here, and there is reason to believe that the best ideas of England, France and Italy will be offered in competition with submarines of American design. This will bring to the United States navy from abroad the fruits of war time service and experience. The art hereafter in this country is bound to be bettered.

Unquestionably a seagoing submarine capable of making twenty-five knots an hour would be a novelty, and success in this matter of speed depends entirely upon the development of a satisfactory heavy oil engine patterned upon the Diesel principle. Up to date no motor of this advanced order is extant here in the United States. The Navy Department recognizes the difficulties to be mastered, and for that reason granted the contractors for the twenty knot boat, authorized last year, a period of three years in which to build and get her ready for official trial.

It has been said that in this craft the American navy would have a vessel two knots faster than any submersible now in service abroad. This boast is of little value, even if true because long before this particular vessel is ready for commissioning European navies are likely to have a number of submarines of this character available and others of a more advanced type in course of construction.

Among well informed naval men it is known that the biggest boat planned for the German Government was finished not a great while ago in Italy. That craft has a surface displacement of something like 700 tons, and when completely submerged displaces nearly 1,100 tons. While required to make only eighteen knots an hour on the surface she had no trouble in doing nineteen knots. This, quite probably, is the so-called giant U boat that has been heard of recently in the waters south of England and leading into the Irish Sea.

She should have had no trouble in covering the distance between the place where she was built, near Spezia, and any of the German ports, skirting around to the westward of the British Isles en route. This submersible has a radius of action of something like 4,000 sea miles at a cruising speed of ten or eleven knots an hour.

The German Government probably had a twofold reason in ordering this boat from the Italian builders. The engineers of the fatherland have run upon more than one snag in building bigger and bigger Diesel propulsive units. Grand Admiral von Tirpitz, therefore, determined to seek elsewhere for big and reliable motors. At the same time the reputation for surface speed which the Laurenti boats had won for themselves from the very start also had its weight with the chief of the Imperial Admiralty. Hence, as the Fiat engine builders and the Fiat-San Giorgio concern, constructors of submersibles, were allied enterprises, it is obvious why this particular craft was ordered.

These facts concern Americans because there is good reason to believe that from this foreign source engines capable of supplying power for still higher speeds than those made by Germany's big U boat can be obtained. American builders of submarines have frankly said that the further development of their boats was contingent mainly upon the production of an efficient motor. Without such a motor the United States navy cannot be provided with submarines of the most modern capabilities.

"What," the layman will ask, "are these up to date possibilities?" The answer may be found in some of the performances of the German U boats.

In the beginning of the war nearly all of the damage done was due to the use of the torpedo. Even aboard the biggest of these undersea craft it is not possible to carry more than six or eight torpedoes. More could be carried if the tubes could be kept loaded from the start, but this is made impracticable because of the torpedo's inherent delicacy. It can not be kept damp or wet without inviting rust, and corrosion is a thing not to be tolerated in a weapon that is but little less sensitive than a watch.

Half a dozen of these steel sharks might easily be launched during one busy day and until the boat was supplied with others she would have no military value if her only power of offence were in this weapon. What, then, is the use of giving a submarine a wide radius of action only to oblige her to sneak home simply because all of her torpedoes had been spent? This was one of the first lessons the Germans learned, and thereafter the gun figured more and more in the destructive work done by their U boats.

Hundreds of rounds of ammunition can be carried aboard a large modern submarine, and for some purposes a single shot will answer quite as well as the far more expensive sacrifice of a torpedo. Accordingly, it is no cause for wonder when the records are checked up to find that the German U boats have sent far more vessels to the bottom by shell fire than by subaqueous attack.

Until recently the guns used were principally of two sorts, a rapid fire gun of small calibre that remained permanently exposed upon the deck of the submarine and a larger piece which was made to sink within the superstructure and out of sight when the hatch covers were dropped in place. This latter arrangement got the gun out of harm's way should a waterlogged timber or the like be encountered, and at the same time it lessened the resistance of the boat, thus avoiding any reduction in submerged speed. But in both cases it was needful for the crew to come out upon the exposed deck, and effective service in rough weather was well nigh impossible.

Further, the disappearing gun and the rapid firer upon its fixed mount were in direct contact with the sea water when the submarine submerged. This invited corrosion and made it very difficult to keep the weapons in proper condition. Indeed, both of these installations might rightly be termed makeshifts. Designers were really feeling their way and had then not grasped the important function that a rapid fire rifle might discharge as part of the armament of a submersible.

The well known British ordnance firm of Armstrong, Whitworth & Co. has designed an up to date installation for 4 inch rapid fire guns which makes it possible to house the weapons within the hull, so that they are exposed neither to the weather nor the sea except for the time they are in action. The guns are mounted upon an elevating, revolvable platform and are shielded overhead by means of a lightly armored dome or hood.

This cover seals the barbette within which the weapon crouches when out of service. The lower edges of this hood sink into a heavy gasket or rim of rubber, and when thus secured it is perfectly watertight. The two men operating the elevating and training gears of the gun take their stations from inside the boat, and rise and disappear with the rifle. The weapon is loaded by a third man, who stands within the opening of a separate hatch just back of the barbette.

A 4 inch rapid fire gun can hurl explosive shells weighing thirty-odd pounds and it was projectiles of that sort that are said to have been used by the big German U boat that chased and badly damaged but did not sink the large freighter Anglo-Californian, killing several of the merchant craft's crew during the pursuit.

A secondary purpose of the armored hood is to shelter the gun crew from aerial attack. This is an admission that aircraft must be reckoned with. As the cables have reported, a French aeroplane bombarded and sank the Austrian submarine U-11 recently in the Adriatic and a Russian air pilot was equally successful in destroying a German submarine in the Baltic.

But up to date designers of underwater boats are not content with passive defence. The latest big submersibles are being provided with anti-aircraft guns. The bureau of ordnance of the Navy Department announced that it has developed a satisfactory rapid fire gun for just this service. The experimental work was begun more than two years ago by Rear Admiral Twining, when the head of the bureau. It is said that this gun will be so arranged that it can be housed below the deck of the superstructure.

All of these things indicate the steady growth of the submarine and its widening fields of aggressive service. The two seagoing submersibles for which Congress provided will in all probability be boats of about 1,200 tons submerged displacement. Unquestionably this marks a big stride for the American navy, but nevertheless the United States is trailing behind and not leading other nations in the matter.

It is not generally known but it is true just the same that King Victor Emmanuel has building for his fleet underwater craft of 1,400 tons submerged. These boats are about 250 feet long and will easily do twenty knots an hour on the surface. Further than this, they have a fuel oil capacity which will make it possible for them to cover 5,500 nautical miles at cruising speed.

The French were the first to equip their submersibles with deck torpedoes. Simon Lake followed here, adapting for the United States submarine G-1 the apparatus devised by the celebrated Russian engineer M. Drzewiecki, whose initial effort was in the direction of a releasing device or drop collar. The latest foreign submersibles have three underwater tubes forward and two aft and carry upon their superstructure deck releasing gears for four other torpedoes arranged in tandem. These can be launched on either broadside, while the submerged tubes can fire only directly ahead or astern. More than this, the torpedoes provided are of the big 21 inch long range type.

It was not long ago that it was declared that the destroyer was the submarine's most effective enemy and fairly immune from the underwater boat's torpedoes. It was explained that the torpedo is set normally to run twelve or fourteen feet below the surface, and as destroyers are of somewhat less draught the torpedo was bound to glide harmlessly below the keel of the destroyer.

This was only half the truth, as the torpedo can be quickly regulated to run anywhere from two feet to fourteen feet below the waves. To make this correction in the case of a torpedo already in a submerged tube takes time. In the case of the deck torpedo arrangement the adjusting mechanism can be reached and fixed in a few moments. It is a fact that the newer German U boats have scored a number of times against British destroyers.

One of the principal stumbling blocks to increasing the size of the submersible has heretofore been that of furnishing means to handle quickly large volumes of water ballast. Take for instance a boat of 700 tons displacement on the surface and of 1,100 tons submerged. The difference of 400 tons means that so much water must be admitted to special tanks. Improved pumps of high power have been developed and the largest submersibles now in existence are able to pass from their light surface trim to complete submergence inside of six minutes.

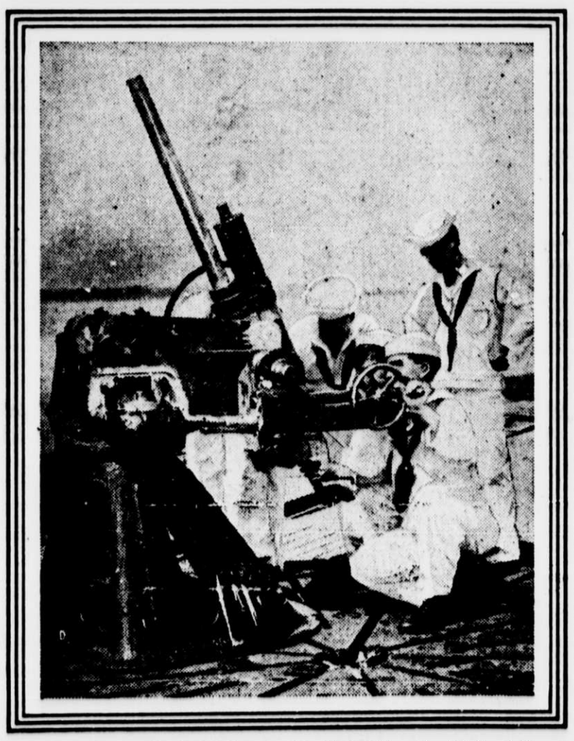
Possibly the Italians have shown greatest ingenuity in surmounting the difficulties of controlling water ballast while increasing the size of their boats. Their submersibles are of the so-called double hulled type, and the superstructure, when certain ports and valves are opened, automatically fills when the boat settles deeper into the water by the admission of ballast to internal tanks. Similarly the superstructure frees itself like a self-bailing lifeboat when the water in the internal tanks is expelled by compressed air and the submarine rises.

Running light, with its superstructure closed and dry, the large Italian submersibles have a reserve buoyancy equal to 50 per cent. of their surface displacement. With the superstructure valves and ports open, but without water in the ballast tanks, there is still a reserve of buoyancy of nearly 25 per cent. Even in this condition the craft are very weatherly and can be driven at full speed.

To submerge then all that is necessary is to open the valves of the internal tanks, permit the air in these to escape and the craft to settle speedily by the admission of the required measure of sea water. This is a very different thing from the earlier practice of mechanically filling and draining the superstructure space of double hulled boats.

Step by step the constructors and engineers have thus removed the obstacles that lay in their paths, and the submersible of 2,000 tons is already planned on the other side of the Atlantic.

The submarine of the near future is going to combine its own peculiar powers with some of the capabilities of the ordinary surface destroyer, and beyond all question the dreadnought has got to be radically modified below the waterline to neutralize or to reduce the menace of subaqueous attack.



The experimental air craft gun developed by the United States Navy.

THEATRE BORROWS COSTUMES OF SPORT

BASEBALL as a summer sport comes in for its share of recognition every season. De Wolf Hopper, if he happens to be anywhere within reach of the Polo Grounds when the games are on, always talks to his audience about them. Baseball jokes litter all the scenes of the wonderful musical plays that help to entertain the t. b. m. detained in town away from his family and forced to put up with such amusement as is to be found in the Follies or the Passing Shows instead of sitting on the piazza with his wife.

But baseball had a new use this summer. It has inspired the designer of the costumes at the Winter Garden; so Rosie Quinn as the captain of the team marches proudly down the runway and leads her forces back of her. Very attractive this nine is and so is its competitor which follows soon after. Perhaps the uniforms of these two nines differ from those of professional players in that they are, for one thing, without stockings. Sliding for bases their dainty limbs might be even more scratched than they are in the dressing rooms or in the scramble not to be late on the runways.

But the costumes make a delightful interlude in the Winter Garden show. They are not the only appropriate summer sports shown in the same scene of the play. Armed with fishing tackle a score of pretty girls throw their hooks into the audience. If they were strong enough to drag up some of the masculine spectators who seize them as the hooks dangle over their heads the stage of the Winter Garden might be filled with some of New York's well known young theatregoers on more nights than one.

Rosie Quinn leads a comely lot of ball tossers, and it is true of them as it is of all the girls in the Winter Garden chorus of "The Passing Show of 1915" that they are lovelier and younger than any delegation ever seen there. It is often a matter for surprise that so many girls at once so young and at once so pretty could have been assembled. But there is the whole of this broad land to collect them in. The Shuberts send their Winter Garden productions on the road after New York has enjoyed them. Wherever one of these companies is seen there is at least one stage struck girl who applies for a position and possesses sufficient beauty to measure up to Winter Garden standards.

Another sporting detail of the present Winter Garden spectacle is the polo. There are real swimmers at the closing of the review, but they have never been photographed. Perhaps it is because they would look too much like the one piece swimmer now barred at all beaches, or it may be that they are in their clinging tricot too much for the camera. But the polo girls shown on the field in approved polo uniforms are delightfully sportsmanlike looking.

Marilynn Miller in her polo suit.

Rosie Quinn can catch them too.

Rheba Stewart as a polo girl.