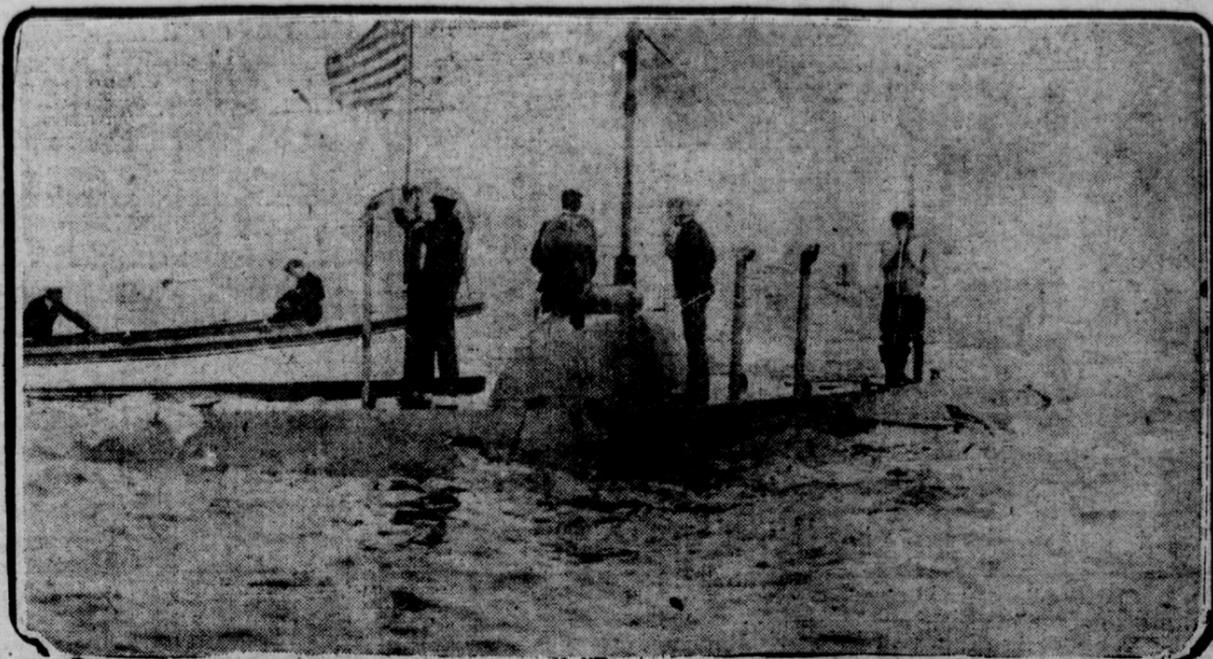


DANGERS THROUGH WHICH SUBMARINE SAILORS PASS

STROLL through the art gallery, and what painting first holds the glance? Is it not often the lifeboat crew pushing their craft through the breakers to the rescue of the men clinging to the rigging of the rock-riven ship? It is an illustration of heroism that gives the artist a chance to play upon one's sympathy and admiration. Yes, the man before the mast, the man on the bridge deck, is a hero in the mind of the passenger, even when he is performing his daily duty, for one knows that in the storm and the shipwreck he must be relied upon to save.

But how about the man whose work is below the waves; who, day after day, sometimes night after night, is as much out of the world as if dead; who sleeps, if he can sleep, huddled upon perhaps a blanket, perhaps the bare floor; who must breathe artificial air instead of the ozone of the sea breeze, and whose only light is that of the electric lamps. Such is another sort of sailor that the coming of the submarine-craft has created, says Chambers' Journal. In every modern navy in the world does this under-water mariner serve, for the boat that plies beneath the sea is considered as necessary to the war fleet as the battleship itself.



PLUNGER ABOUT TO TAKE A DIVE.



SUBMARINE BOAT "PORPOISE" ALONG SIDE A TORPEDO BOAT, DEMONSTRATING THE TINY NATURE OF FORMER CRAFT.

The steel tube the submarine can throw from its hull is filled with such power that the percussion cap or the electric spark makes it an engine of destruction that may be more menacing, that may be more death dealing, than the entire armament of the cruiser. Machinery does much to move and guide the submarine and to discharge its weapons; but behind the wheels and levers and pushbuttons must be men who know what to do when the time comes and how to do it.

In the harbors of Britain, perhaps in the stormy English channel and along America's Atlantic coast, you may see what looks like a pole moving through the water. From it flutters a tiny flag, but that is all that is visible. The lookout says the submarine is "running awash" just below the surface. The pole rises higher and higher, and finally you see what would remind you of the back of a huge black turtle were it not for a little, round cylinder with dead-light windows in it.

Now the craft is afloat, but so little of it is to be seen even at close range that a mile away the cylinder might be taken for a buoy or a bit of driftwood. Into the cabins and the berth decks of the warship the sun throws its morning rays; the sea breeze blows day and night into the vessel, purifying and invigorating the air. The crew perform their daily duties and go through their drills with plenty of room to exercise. Down in the hold is an ample store of food, in the galleys it is cooked, and seated at the long tables every man from quartermaster to stoker can eat his meal in comfort.

And the underwater sailor has to know more things than his mate up on the deck. He is trained in the use of many curious devices. Before he is assigned to a vessel he becomes quite an electrician. He understands how to run the air compressors, how the water tanks may be filled and so sink the craft, the operation of the electric pumps that, sucking the water from the tanks, cause the boat to rise.

Then there are gauges he must read so that when on watch at night he

can tell how much oxygen is pouring into the air purifiers, and if enough electricity is being generated.

Every man on board is responsible for the lives of all. If he is ignorant of the purpose of a tiny wire or forgets to open or close a valve, every human being may be suffocated from poisonous gases, or the boat sink to where the sea pressure will crush her hull like an eggshell because her gravity is too much for her buoyancy. A tiny hand moving around a dial tells the depth of the draught in water. It is the duty of at least one of the crew continually to watch that hand.

There are no stoves or steam in the submarine—no room for such things. In summer heat is not greatly needed, but with winter you may hear a sailor call his craft an "icebox." Officers and men say they prefer to be submerged in summer rather than winter. They would rather work under the sea stripped to the skin than swaddled in woollens. In winter, with little room to move about, the men of the crews are subjected to a cold storage temperature. They get all the chills of a sleigh ride party with the thermometer at zero, but none of the exhilaration. But when the snow appears the life below continues. The boats are usually out in the morning and in the afternoon, and sometimes longer.

In the American fleet, one of the stations most dreaded by the submarine crews is Newport, so far north that the winters are long and bitter. The wa-

ters off Newport form one of the principal cruising grounds, and the little fleet is kept at practice there until sometimes the ice covers the waters. Last winter they were kept until the ice cakes were in the harbor. Then the submarines were sent south. When the flotilla reached New York ice held the boats in the bay. They put out to sea, and the men in the little craft kept on bucking the tide and dodging ice cakes; and though forced once to come into port for repairs, finally got clear of the ice pack and reached their destination, the Virginia capes; going thence to Annapolis.

Not a murmur of complaint came from the men who went in their boats on the 400 mile journey, though for hours at a stretch the submarines kept their course with decks awash most of the time. At night they rode at anchor, and the stiff and cramped crews were taken aboard the steam tenders accompanying them, to "thaw out" and to get a bit of food and a few hours' sleep.

In cruising these undersea vessels are usually submerged to a depth of about 15 feet, or just far enough under water to be concealed and yet be able to use the periscope—that polelike appliance near the conning tower. By aid of a mirror in this periscope the commanding officer can see above the surface and guide his boat accordingly, but if it is necessary to sink entirely out of sight he must run by judgment, coming to the surface at intervals to

sight and then quickly sinking again. This operation is called by the Americans "porpoise diving" and is most spectacular as seen from the surface. Lying inert upon the surface, a submarine looks fishlike enough; but to see the craft rise and dive on long, slanting runs, its dull steel sides glistening in the salt spray, one has the impression that it is some sea monster at play.

When the vessel is running with conning tower and deck exposed, communication is by flags or wigwag by day and lanterns at night. When it is submerged officers have a system in which they use bells attached to the outside of the hull in such a manner that their sound is carried as clearly and distinctly as the dots and dashes of the wireless telegraph apparatus in air. Either the Morse or the army and navy code is used, and in this way the boats of a submerged flotilla taking orders from the commanding officer can keep in line.

It is even possible to communicate by means of hammer tappings against the steel hulls of the boats, and this is often done by officers who in practice wish to get in touch with some other boat operating in the vicinity or with the tender. The ingenuity of these submarine officers in rigging devices and repairing engines is typical of the resourcefulness of the American.

See these officers at their work in the docks, and it is easy to picture them at their post, when, with all lights out and ballast tanks full, and every man at his station, the submarine drops like a rock in the service test. How far they go only the man at the dial knows. This is what takes a strong heart and perfect self-control. It is the officer's only means of proving the nerve of his men, and the one unflinching test to discover the weak ones.

Day after day come these tests, and he who shows the least sign of fear never sets foot on an American submarine again. The reason is that down in the depths the man who loses his head is a menace to craft and crew. Failure to perform even a slight duty may be fatal to all. The United States naval experts believe that to this rule is due the fact that not a submarine boat has thus far been lost or sunk through an error of any of the men aboard.

The feeling that comes to one in a voyage in the under sea is thus expressed by the commander of a submarine:

"The first thing that you note is the smell. It isn't any different from being in the engine room of a battleship, except that you haven't room to turn around in. You are jammed into a hot, stuffy, uncomfortable hole. You don't see anything. You don't hear anything but machinery. You watch a pointer jumping on a dial, and move your hands according to clocks. You are a machine, and you are running a machine.

"When you sink on a level keel you don't feel any motion. When you dive you feel a gentle incline of the floor. If you look at the port hole a sea-green globe of glass confronts you. If you were about to attack a hostile ship you would see your mark only by means of the periscope or the conning tower of the porpoise dive.

"All submerging and diving have to be done slowly and gently for fear of spilling the chemicals in your batteries. But there is one time that we all feel happy: When on a fine day in rising we glance up through the deck and see the under surface of the sea. It is as if we were approaching one great shining mirror."

The very danger and hardship of the life seem to create an esprit de corps among the men and a confidence in their officers that, in the British and American service at least, have given the men of the submarine fleet a high standard of efficiency and discipline.

The Box and Cox of Birddom

Uncle Sam has bird experts just the same as he has tariff experts and money experts. The bird experts have been at work a good many years and have come to the conclusion that birds are the farmers' friends, not his enemies. These experts especially are trying to give a good reputation to hawks and owls, the most maligned of the bird tribe. Hawks and owls have always been supposed to live and grow fat on chickens and pigeons, and every boy in the United States thought it his patriotic duty to kill them. The experts are now telling the boy he is doing wrong and that in reality hawks and owls are

among the best friends a farmer has. Instead of growing fat on chickens and pigeons these two birds make their living and more than pay for any harm they might do by destroying field mice, grasshoppers, frogs, snakes and other creatures which otherwise would cause great damage to field crops. True, there are some bad rogues among hawks and owls, as there are rogues among policemen, but that must be expected in any large family.

These two birds have a sort of Box and Cox working agreement. The hawk hunts all day and the owl hunts all night, so one of them is ever on guard.