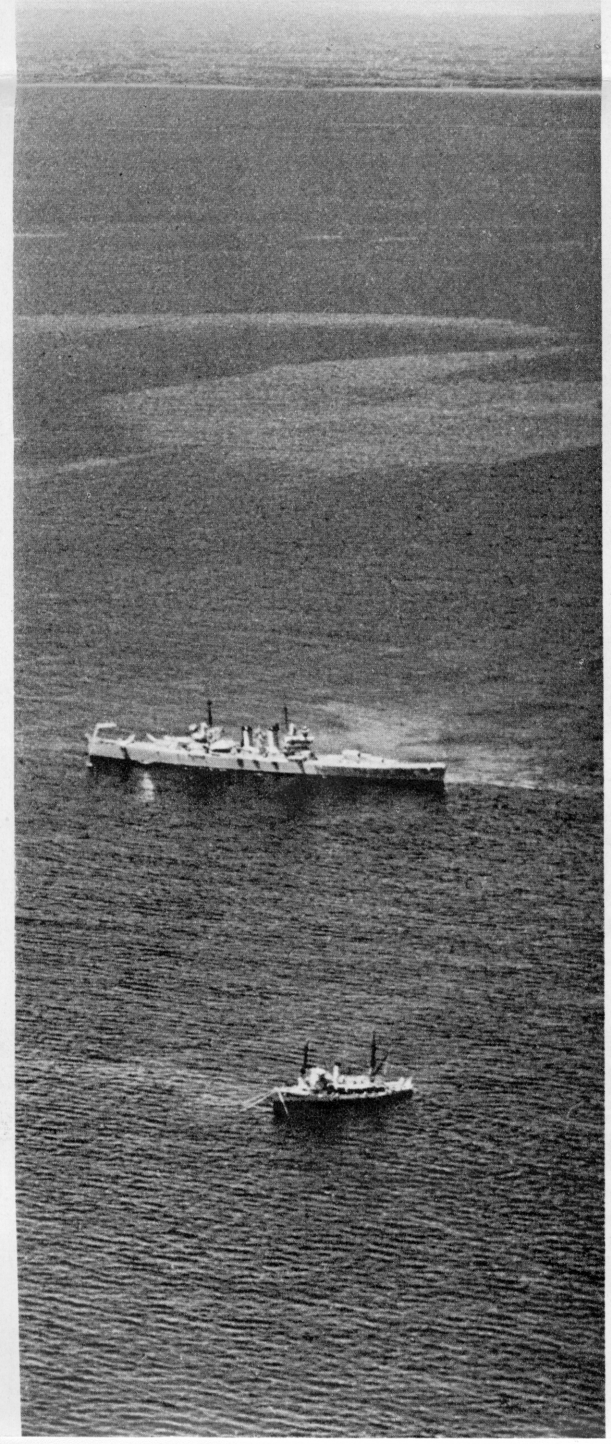
A smoke bomb, released from the "Squalus"

40 fathoms below, shows the "Falcon"

where the sunken submarine lies

The "Sculpin," sister ship of the *Squalus,* was the first craft to communicate with the distressed submarine. Like the *Squalus,* the *Sculpin* is 299 ft. long and displaces 1,450 tons. It carries eight 21-in. torpedo tubes and probably 20 17-ft.-long torpedoes. On its deck it mounts a 3-in. gun and two 50-caliber machine guns for anti-aircraft use.



THE RAISING OF THE "SQUALUS"

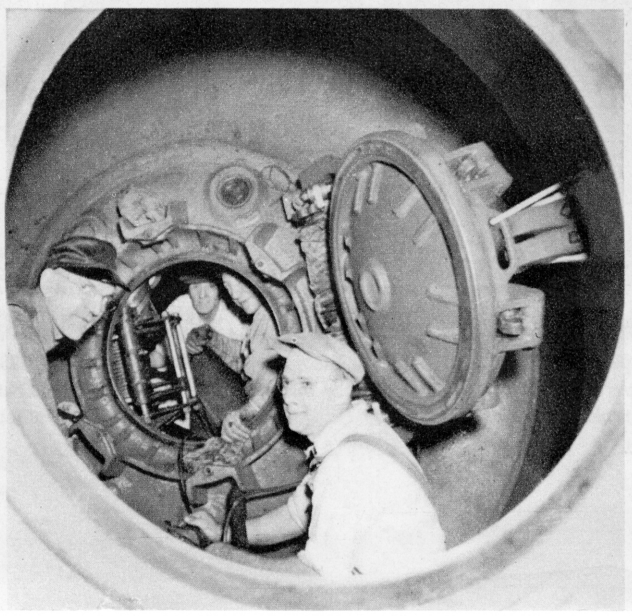
Rescue accomplished, the Navy prepares to salvage sunken submarine

Nine and a half miles off the shore of New Hampshire, two Navy ships floated on June 1, anchored over the spot where, ten days before, the submarine *Squalus* had sunk. The aerial photograph at left shows the small salvage ship *Falcon* and the light cruiser *Brooklyn* on the smooth sea. In the background is the shore near Hampton Beach, 13 miles south of Portsmouth from whose Navy Yard the *Squalus* sailed on May 23 to make a fast test dive.

The Navy, having quickly and heroically rescued 33 of the *Squalus'* crew of 59, began the long job of salvage. The brand-new submarine, commissioned only three months ago, cost $5,000,000 and the task of raising it without damaging its black hull was tough and ticklish. The method the Navy seemed most likely to use is described on the next page where also will be found diagrams of the *Squalus* and of the now-famous rescue bell.

The fact that the *Squalus* sank did not diminish the Navy's confidence in this type of underwater craft. A few days after the disaster, the Navy opened bids for three similar submarines. The *Squalus* is a medium-sized ocean-going submarine, belonging to the "100-class." The Navy likes it because it is a good fleet submarine. Its speed of 20 knots enables it to keep up with a battle fleet. Its big cruising range—it can cross the Pacific and come back again without putting into port—gives it staying power needed for prolonged scouting duty. Its medium size makes it both economical and maneuverable.

The rescue bell, twice damaged, was repaired in Portsmouth. This shot looks into it from above, shows upper and lower compartments.



Salvage pontoons which will raise the *Squalus* from the bottom are 32 ft. long and 13 ft. in diameter.

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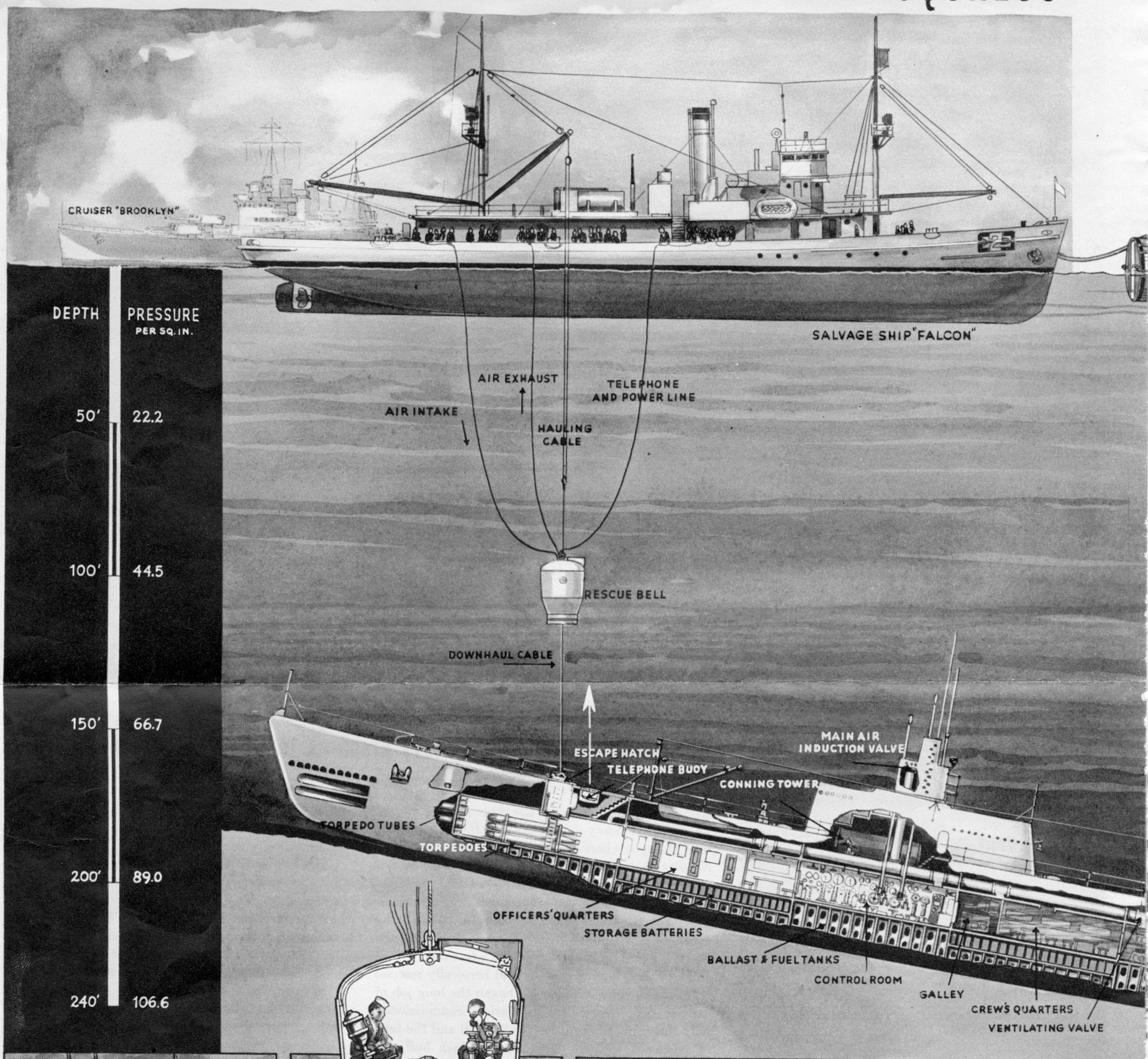
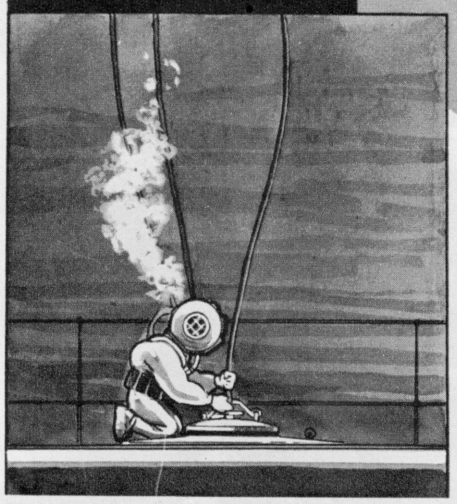
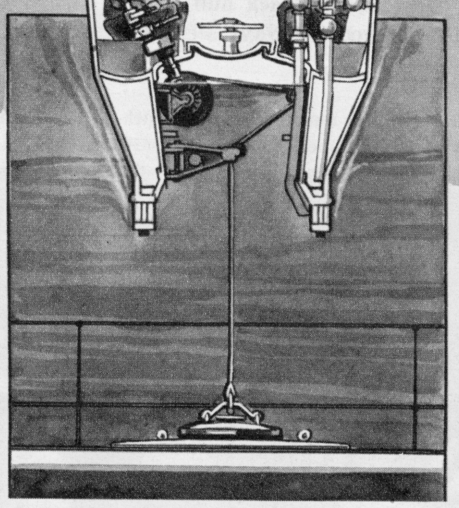
THE RESCUE AND SALVAGE OF THE SUBMARINE "SQUALUS"

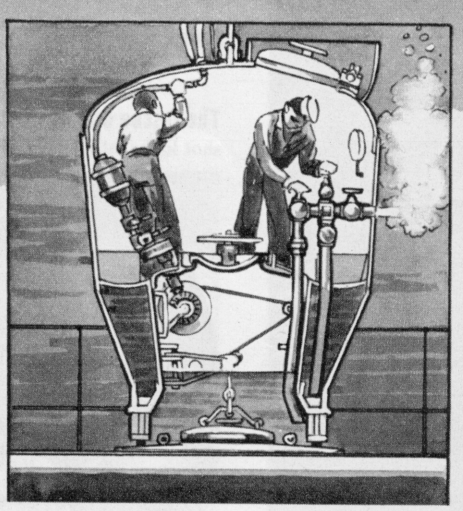




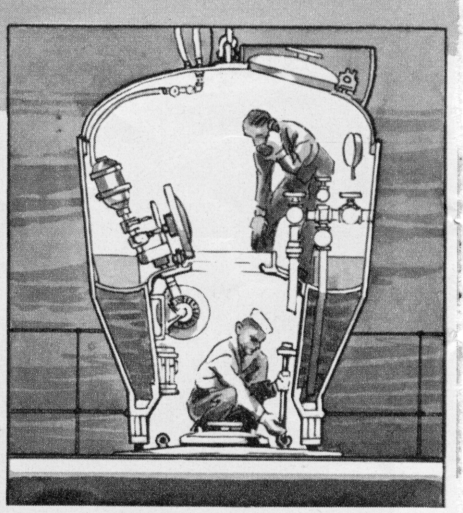
Downhaul line from rescue bell is fastened to sub's escape hatch. Breathing helium-oxygen mixture, diver can work longer under pressure.



Bell pulls itself down on downhaul line. Lower compartment is full of water but the big ballast tank (*see diagram at far right*) is empty.



Bell rests on "Squalus," sealed to sub by gasket on bottom. Ballast tank is filled with water. Water is blown out of lower compartment.



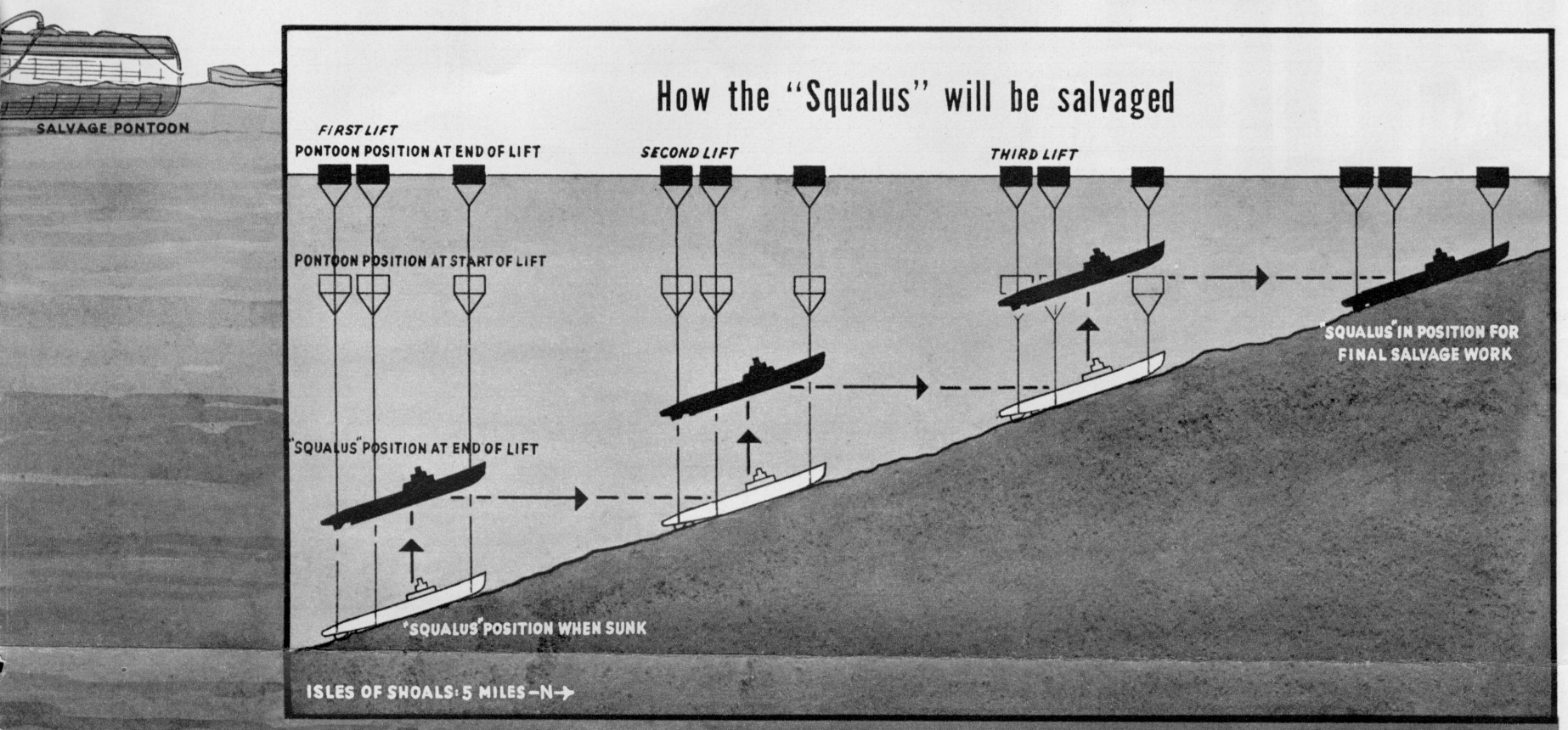
Bell is fastened to the *Squalus* with bolts. The hatch between compartments is open. Crew keeps in touch with *Falcon* by phone.

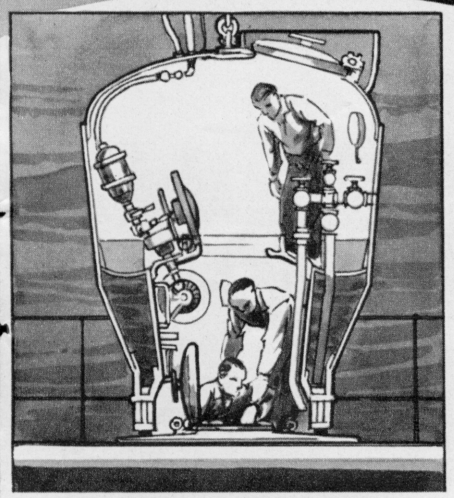
The U.S. Navy is very secretive about its *Squalus*-type submarines. The diagram shown here is probably the most complete and accurate description of the ship yet published. It shows the most likely reason for the flooding of the rear end of the *Squalus*.

The main induction valve, which shows over the conning tower, is used during surface cruising to ventilate the boat. Most of the air taken in rushes aft for the Diesels in the engine rooms. The ventilating valves in the engine rooms are bigger than those anywhere in the boat. Hence, when water instead of air flooded into the induction valve, it poured most quickly into the engine rooms aft. Smaller valves in other compartments were quickly shut off by hand. The door between galley and control room was shut, kept the flood aft. While awaiting rescue, the survivors stayed either in control or torpedo room. They avoided the officers quarters because these are directly over the storage batteries which, when flooded, give off deadly chlorine gas.

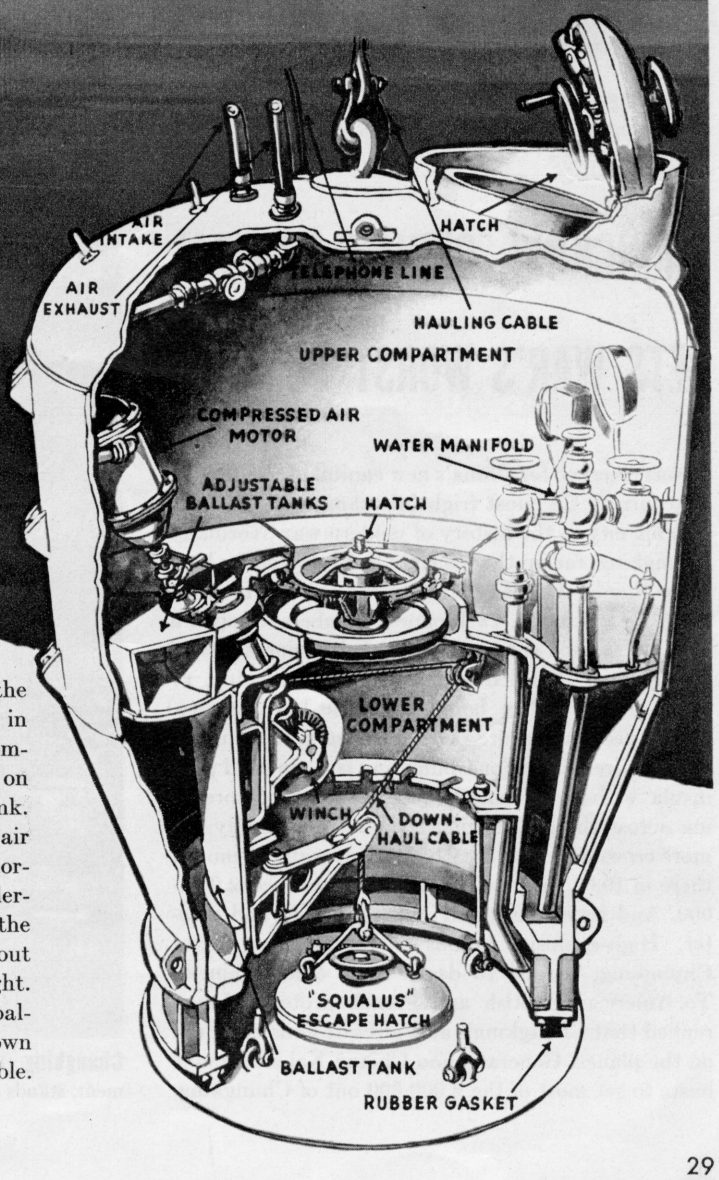
Two methods of salvaging the *Squalus* were first suggested: 1) to blow air in and water out the rear end of the *Squalus*, let it rise of its own buoyancy; 2) to raise it in crabwise steps by use of pontoons in rear, air in front. These plans were abandoned because they are very delicate operations. Any slip might cause the *Squalus* to rise too fast, get out of control, up end and slip to the bottom again. Divers cannot work efficiently at such great depths, under great pressure and in near-freezing temperatures which numb their hands and congeal their airlines. A third method, which the Navy will most probably use, is demonstrated below.

The *Squalus* lies five miles from the Isles of Shoals. Plan is to haul the *Squalus* to shallower water in three stages. Pontoons would lift submarine. When they reached surface, the *Falcon* would tow them and *Squalus* toward Isles of Shoals. Because the ocean bottom slopes upward, *Squalus* would run aground. Then pontoons would be readjusted, the lift and tow operation repeated until the *Squalus* lay in shallow water where work could proceed more easily.





Crew of "Squalus" comes into bell through opened escape hatch. They have climbed to hatch from torpedo room (*diagram above*).



These diagrams show how the rescue bell works. When the downhaul cable is attached to the submarine, the motor in the bell's upper compartment operates the winch in lower compartment which reels in the cable. When the bell is in place on the submarine deck, water is let into the big ballast tank. Then the water in the lower compartment is forced out by air coming through an air manifold. Pressure inside the bell is normal atmospheric pressure. Suction, created by great underwater pressure, seals the bell's rubber gasket hermetically to the submarine. As rescued men come into the bell, water is let out of the adjustable ballast tanks to compensate for their weight. When the bell is filled (capacity: 12), water is blown out of ballast tank, let into lower compartment. The bell rises of its own buoyancy, the motor being reversed to act as brake on cable.