



**LIFE UNDER THE SEA**—Rockfish, gorgonians and sea-cucumber are shown in this underwater photograph by Frank Haymaker taken at a depth of 110 feet.

More accurate charting of the location and velocity of ocean currents far out of sight of land has been made possible chiefly through the use of war-born Loran. This radio-navigation aid is particularly good in giving an accurate picture of a vessel's changes in position as she drifts or sails along. By tacking in and out of the edge of a current, an oceanographic vessel can determine the course of a current.

A trick used by oil geologists on land has been adapted to the sea. The thickness of the sedimentary carpet underneath the ocean can be determined by exploding a small bomb astern the ship. The first weak echo of the explosion is returned by the top of the sediment, the second strong one comes from the firmer rockbed beneath. Since sound is assumed to travel through the sediment 4,500 feet a second, the thickness of the sediment can be estimated by recording the time interval between the two echoes.

**Bottom Surprisingly Rough**

The bottom of the ocean is surprisingly rough, with many flat-topped sea mountains rising steeply from the surrounding muddy plains. In fact the plains are proving to be rather rare. In some places the sedimentary deposits are thousands of feet deep, in others the bedrock is practically nude. Findings such as these pose many questions to oceanographers.

Since oceans cover some 71% of the earth's surface, knowledge of their actions is important in peace as well as in war. The Oceanographic Division of the Hydrographic Office, Department of the Navy, has been set up as a clearing house for

such material. On Naval expeditions planned for other studies, the office sees that someone with a knowledge of oceanography goes along. If something new is reported about the ocean, those who may best use the data are notified.

Step by step men are being trained to explore various phases of the ocean. Advanced courses in oceanography are given at Scripps Institution of Oceanography of the University of California, Yale University's Bingham Oceanographic Laboratories, the University of Washington at its Oceanographic Laboratories and New York University. Numerous scientists come each summer to the Woods Hole Oceanographic Institution for specific research.

Problems on underwater acoustics are studied at the U. S. Naval Electronics Laboratory at San Diego, the U. S. Navy Underwater Sound Laboratory at New London and the Naval Research Laboratory at Washington, D. C. The U. S. Fish and Wildlife Service specializes in biology of the sea.

Gradually the shape and character of the ocean bottom, and the action of the waters within the seas, are being revealed. Some day we may know much more about the history and origin of the earth because of studies of that larger portion of the earth hidden beneath the waves.

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*Vermiculite*, a mineral that expands greatly and permanently by heat treatment, is widely used in making light-weight concrete; it is found in several places in America, but the principal supply comes from Montana.

INVENTION

**Foul Ball Indicator Will Mechanize Close Decisions**

➤ **BASE** hit or foul ball? In a few weeks now, fans will be advising umpires to go and have their eyes examined, after calling a close one just inside or just outside the foul line.

To take this wrangle-causing uncertainty out of baseball a Washington inventor, Allen K. Nelson, has devised what he calls a foul-ball indicator. It consists of a post, to be set at the far end of the outfield on the foul line, with a pair of cross-arms from which a series of free-swinging rods are suspended. Half the rods are thus in "fair" territory, the other half in "foul".

Electrical connections from the rods are so arranged that if a batted ball hits one of the rods on the "fair" side it will cause a green lamp to light up, while if the impact is against a rod on the "foul" side a red stop-signal will be flashed to the batter—and he'll have to wait for a better one to take a bite out of.

U. S. patent 2,461,836 has just been granted on this invention.

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