

earth sciences

OCEANOGRAPHY

Another ship on the way

A new oceanographic research ship, described by the U.S. Coast Guard as "the most advanced . . . of modern times," has been approved for construction, to be completed in 1972.

The 387-foot craft will be equipped with laboratories for studies of marine biology, geology, geophysics, chemistry and meteorology. An automatic ocean data collection system will be aboard, for unattended monitoring of water temperature, salinity, current rates and other characteristics.

Known so far as the U.S.C.G. High Endurance Cutter WHEO-701, the \$14.5 million ship will have a top speed of 20 knots. Facilities will be provided for 14 to 16 scientists.

SEARCH AND RESCUE

Mock search four miles down

Using a simulator formerly confined to practicing tasks such as landings on the moon and rendezvous in space, four men have spent 34 hours in a mock search for objects 20,000 feet under the sea.

The imaginary quest was part of research into a deep submergence search vehicle, now being designed for the Navy by Lockheed Missiles and Space Co. in Sunnyvale, Calif. The submarine is planned to make more than 90 percent of the ocean bottom accessible to manned exploration.

In the test, the four subjects sat in a mockup of the craft's spherical pressure hull, viewing a television image of a continuous rubber belt carrying ridges, crevasses and other features of deep ocean terrain. At unspecified times, a technician out of camera range would put model objects, spherical and cylindrical shapes, on the moving belt. Inside the simulator, the objects appeared to rest on the bottom, 50 feet below the submarine.

Without previous training or knowledge of the targets, the crew correctly identified 24 of 33 targets, as well as 38 of 57 false targets. However, the men did not know the total number of targets, and due to the roughness of the bottom, they also identified as man-made objects 63 natural bottom features. More detailed mission simulations are planned.

RESEARCH FACILITIES

Training tower for mini-sub

An underwater tower 55 feet tall is being built on the ocean floor off California's Catalina Island as a test and training site for a miniature submarine.

The submarine is North American Rockwell's Beaver IV workboat, designed for such tasks as underwater oil drilling operations at depths down to 2,000 feet.

The tower, anchored in 180 feet of water 200 yards off shore, is intended for use both in training personnel and in helping with practice of planned work operations. A docking ring atop the tower will let the submarine move in a complete circle, or nose in at any angle.

A dry capsule will be used for practice in personnel transfer, including carrying them from the surface to an

experimental work area. Facilities will later be provided to simulate oil field equipment so that operators can practice using the mini-sub's manipulator arms in tasks such as plugging in connectors and turning valves.

GEODESY

Ocean bottom marker emplaced

A precisely placed geodetic marker more than a mile below the Pacific waves is aiding the search for a practical way of pinpointing ocean locations.

The marker, emplaced in December, originally consisted of three acoustic beacons, arranged several thousand feet apart in an equilateral triangle about 130 miles southwest of Los Angeles; one has since been recovered, as planned, for study. When activated by an incoming sonar signal, the beacons respond with an answering pulse that can be timed precisely to indicate the distance from the beacon.

The marker's exact location, determined by coordinated measurements from sea, air and known land points, will be refined over the next few months to correct for such error sources as drift and navigational accuracy by researchers at Battelle Memorial Institute in Columbus, Ohio. They expect accuracy of within 100 feet, compared with 600 to 3,000 feet achieved by other shipboard mapping techniques.

SEISMOLOGY

Map shows earthquake risks

A seismic risk map, showing areas of the conterminous United States most vulnerable to earthquakes, has been issued for the first time since 1952.

The map divides the country, with the exception of Hawaii and Alaska, into four zones in which earthquake damage is expected to be either nonexistent, minor, moderate or major. A two-year study of 28,000 U.S. quakes was used in defining the areas.

Developed by a team of geophysicists at the U.S. Coast and Geodetic Survey in Washington, D.C., the map is a revision of one first issued in 1948. It was revised in 1951, but withdrawn a year later because, says an official, it was "subject to misinterpretation and too general to satisfy the requirements of many users."

The map, which does not list earthquake frequency but only general long-term risk, is intended to offer guidance in planning for construction and land use.

AGRICULTURE

Radiation measures moisture content of soil

Extremely minute changes in the water content of soil are measured with a beam of radiation, using a device developed at the British Agricultural Research Council's radiobiological laboratory in Berkshire.

The device consists of pads of absorbent nylon which are buried in the soil, with a source of beta radiation on one side and a Geiger counter on the other. Increases in the mass of the pads, caused by water absorbed from the soil, cause corresponding reductions in the amount of radiation reaching the counter.

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