

## OCEANOGRAPHY

# Oceanographers Need Ships

**Especially designed research ships are needed to permit oceanographers to probe a frontier whose importance to man far exceeds the meager knowledge he has of it.**

By RICHARD LITELL

THIS COUNTRY is in urgent need of ships equipped to probe the secrets of the sea.

The Federal Government is spending millions of dollars and a great deal of time in an effort to explore and conquer outer space, but man has a "space" of his own right here on earth that he dare not neglect.

Less remote, more definable, but just as much in need of exploration, this "space" is the vast body of water we call the oceans—329,000,000 cubic miles of salt water.

The oceans cover 70.8% of the earth's surface and man's knowledge of them is indeed meager when compared to their importance to him. It has been claimed that only two percent of the ocean depths have been mapped and that we know more about the surface of the moon than we know about many areas of the oceans.

Ocean movements play a major role in regulating climates, but we have yet to determine the structures of currents at all depths. Knowledge of the ocean floor can tell us much of the earth's history and composition, yet we need to know much more about ocean-bottom topography and sediments and the nature of the bedrock beneath the ocean floor.

Much must still be learned about chemical constituents of sea water and how they influence life in the sea. We must learn more about the interchange between ocean and atmosphere, productivity of sea life and many other areas.

Oceanic research has military implications as well. Submarines, for example, cannot function properly in strategic areas without adequate knowledge of currents, bottom topography, the velocity of sound in water, ocean temperatures and weather.

Missiles and satellites are needed for scientific advancement—but so are research ships. Yet disproportionately more money and effort is going into rocket production than into the construction of research vessels.

This is a serious shortcoming in view of a report by the Committee on Oceanography of the National Academy of Sciences-National Research Council, which stressed that neglect in the area of ocean research might well result in this country being placed in a precarious position from the scientific, technological and military points of view.

In contrast to our meager fleet of about 45 research ships, the Russians are reported to have some 105 ships of various kinds presently engaged in oceanic research.

They started by converting ships origi-

nally designed for other purposes, but have graduated to specially constructed research ships such as the 5,960-ton Mikhail Lomonosov, commissioned in 1957.

The United States, on the other hand, has only one vessel originally designed for research purposes, although the inadequacies of conversion for scientific work have long been recognized. This ship is the 298-ton R/V Atlantis of the Woods Hole Oceanographic Institution in Woods Hole, Mass., which was built in 1931. All other U. S. research ships, located at several oceanographic institutions and laboratories along both coasts, are conversions from yachts, warships, tugboats and fishing vessels.

The situation is not as bleak, however, as a comparison of total ships and total tonnage would indicate. Actually this country has accumulated a more impressive store of knowledge in the field of oceanography than any other nation. This is no doubt due to the higher caliber of U. S. ocean-



**R/V ATLANTIS—This 142-foot ketch, built in Copenhagen 28 years ago, is the only research vessel in the United States originally designed for that purpose. It belongs to the Woods Hole Oceanographic Institution. One of the ships scheduled to be replaced within the next ten years, the Atlantis accommodates nine scientists, has a crew of 19 and a range of about 4,000 miles.**

graphic institutions and the interest shown by the U. S. Navy.

Whereas the Russian effort in the marine sciences is concerned largely with extensive, detailed, exploratory surveying, American efforts represent essentially the verification of hypotheses. That is, our scientists plan certain experiments with a good idea of what the results will be. Then they go out in ships to gather the critical data in the hope of confirming their expectations. They generally do.

All things considered, the United States seems to hold the lead in oceanographic research. But it is rapidly losing that lead because of foreign advances in the building of research ships. Only the construction of new research ships can allow us to maintain our advantage.

The NAS-NRC Committee's report on the current status of the marine sciences in this country contained a series of "minimal" recommendations for the improvement of oceanographic research. It urged the Government to expand its support of the marine sciences at a rate which would result in at least a doubling of basic research activity during the next ten years. It also urged that this increased support be accompanied by a new program of ocean-wide surveys, requiring a doubling of the present research effort.

Neither of these recommendations can be carried out without an increase in the number of research ships available for exploration.

With specific regard to ships, therefore, the Committee further recommended that a shipbuilding program be started, aimed at replacing, modernizing and enlarging the number of ocean-going ships now being used for research, surveying and development.

It proposed increasing the present fleet of about 45 ships to 85 ships during the next decade. Taking into account the replacement of ships that must be retired during that period, this means that 70 new ships should be constructed at a total estimated cost of \$213,000,000. The Committee discouraged meeting recommended requirements through the conversion of vessels originally designed for other purposes. Conversion represents a compromise on requirements, which can only lead to a compromise on research.

The ideal research ship should provide for quiet operation, efficient crew-to-scientist ratio, high maneuverability at slow speed, suitable arrangement of laboratory space and living quarters, the ability to remain at sea for extended periods in all climates, the ability to allow work to be done in high seas, and adequate deck, office, berthing, mess, helicopter and sonar spaces.

For acoustic experiments, auxiliary equipment must be at least as quiet as the noise of the sea at sea state one. (Sea states are graded from one to nine, in order of severity. Most landlubbers tend to become seasick at sea state four.)

The ratio of crew members to number of scientists should be about one to one. That is, there should not be more crew members than scientists. This is economically unsound.

The ability to maintain headings at very slow speeds requires a carefully considered main propulsion system and possibly some sort of bow propulsion.

A good ship, stabilized with antiroll tanks and with the proper lines to minimize pitching, should permit work to be performed in a sea of state five.

Only especially designed ships will meet all these requirements and facilitate efficient oceanic research. And it is these requirements that the Committee's specific recommendations are designed to meet.

Of the total fleet of 85 ships the Committee believes could be available by 1970 (70 new ones and 15 existing ones), 22 would be basic research ships for use by private laboratories with Government support, 20 would be military research and development ships serving the various Navy laboratories, 29 would be survey ships used to map the oceans, and 14 would be resources and fisheries ships, which would also be designed to be able to catch fish.

Of the 70 to be built, 31 should be in the 500-ton class, 28 between 1,200 and 1,500 tons, and 11 larger than 2,000 tons, the Committee specified.

It also recommended that five separate groups finance the new construction—the Navy, the Coast and Geodetic Survey, the National Science Foundation, the Maritime Administration, and the Bureau of Commercial Fisheries.

In our enthusiasm over the new frontier of space, we must not neglect an as yet unconquered frontier on our own globe. The oceans are indispensable, and our reliance on them can only increase. Marine scientists need hardware as much as space scientists do. And their basic hardware is the research ship.

Science News Letter, September 19, 1959

## Questions

**BOTANY**—What influences the attachment of giant kelp plants? p. 180.

**GENETICS**—How many chromosomes does a male chicken have? p. 179.

**MEDICINE**—Which diseases have been found to inhibit fingernail growth? p. 184.

Photographs: Cover and p. 186, U. S. Navy; p. 179, Stanford Medical Center; p. 183, U. S. Air Force; p. 192, Kier Products Co.

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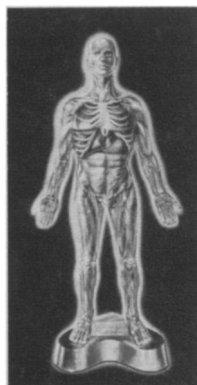
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