

OCEANOGRAPHY

Conquering Inner Space—Oceans

A new U. S. emphasis in exploring and solving the secrets of the oceans promises to yield many benefits for mankind, Vincent Marteka reports.

See Front Cover

► THE OCEANS blanket nearly three quarters of the globe, yet scientists still know less about the oceans than the moon.

Although a bathyscaph has bumped bottom in the deepest part of the ocean and oil-well drilling rigs now dot the offshore shallows, scientists still know very little about the huge area between the ocean's edge and the deepest portion.

U. S. scientists are now trying to plug this gap by planning extensive programs to chart the huge ocean expanses, plumb the ocean depths and sample the ocean bottoms. Their purpose: to push back the long-ignored oceanographic frontiers, solidify the defense of U. S. shores, and extract the wealth of minerals and food from the oceans.

Teeming fish life and untold mineral wealth lie waiting in the ocean depths for man's use, as shown in the picture on the cover of this week's SCIENCE NEWS LETTER.

A man standing on Mars would see the earth as a watery planet with the continents floating like islands on a salty sea. Yet man still thinks of the earth as land.

The ocean bottom lying underneath 1.5 billion tons of water is a huge uncharted tract seldom touched by man's probing instruments. Although oceanographic surveys have discovered major mountain ranges, deep ocean trenches and isolated mountains, only two percent of the ocean bottom is adequately charted. Much of it was mapped during the International Geophysical Year.

Most of the underwater mapping has been limited to the continental shelf, an underwater lip of land skirting the continents.

The swirling currents and teeming sea life of the ocean depths still pose a large mystery to oceanographers. Last year Swiss scientist Jacques Piccard plunged in a bathyscaph nearly seven miles into the deepest part of the Pacific Ocean and found, to the surprise of scientists, that fish could live at such depths.

Influence Climate

The extensive oceans also greatly influence the earth's climate. The oceans store huge quantities of heat, acting as a huge heat engine that drives the circulation of the atmosphere. By learning more about the relationship between the oceans and the atmosphere, man may one day control his climate.

With the threat of Russian nuclear-powered submarines slipping through outmoded U. S. defenses, scientists must develop sophisticated instruments that can

"see" the enemy subs, and also chart "road-maps" of the ocean bottoms for U. S. submarines. The U. S. Navy, realizing the military importance of making the seas transparent, recently announced a 10-year, \$1 billion oceanography program to build more oceanographic ships and to learn more about the "shape and nature" of the oceans.

By conducting oceanographic research, scientists can find currents and layers that either muffle, stop or conduct sound waves from sonar instruments.

One of the most promising sonar systems, Artemis, evolved from oceanographic research. The system, currently being tested at sea, uses huge ship-borne sound-makers lowered to depths where sound travels best. The sound waves would bounce off submarines trespassing a vast network, and the waves would be picked up by underwater phones and radioed to shore.

With the crowding of land by a skyrocketing population, man may soon count on the sea for food. About one-tenth of the food consumed in the United States comes from the oceans. Besides this, some 2½ billion pounds of fish used as animal feed and oil indirectly benefit humans.

To Increase Harvest

In order to increase the potential harvest, more studies are needed not only on the whereabouts and movement of fish, but also the distribution of water temperature, salt content and the fish's food supply.

"Until such studies mature, man must be hunters rather than farmers, searching out the game and capturing them, rather than raising them as done on land," Dr. Harris B. Stewart, chief oceanographer of the U. S. Coast and Geodetic Survey, told SCIENCE SERVICE.

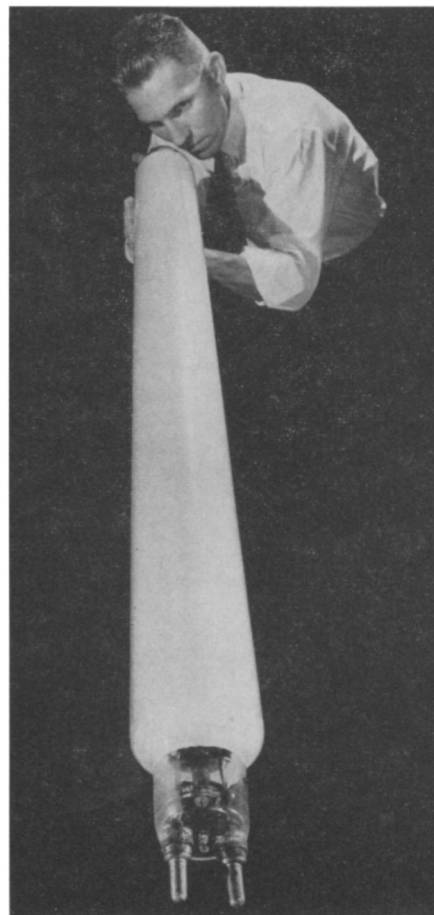
The ocean bottom and the waters themselves hold rich storehouses of minerals. Since the oceans first formed a few billion years ago, the mineral resources of the land have been eroded and washed into the seas by rivers. Huge chunks of rich manganese-cobalt-iron "ore," some as large as grapefruits, are strewn along many ocean bottoms. Some scientists believe they are the work of microscopic organisms that can concentrate these minerals in an unknown manner.

Although the oceans are looked upon as a possible cure-all for many of the world's future problems, care must be exercised as to the proper use of this expanse of no-man's land. Past history has taught how man abuses his resources by stripping the forests, indiscriminately using up the mineral resources and polluting lakes and

streams. Already, the oceans are being used as a dumping spot for the radioactive wastes of the nuclear age. Scientists must first learn more about the silent ways of ocean currents, for they could spread the contamination and curtail the use of the oceans for thousands of years.

The new emphasis on oceanography has captured the imagination of layman and scientist alike. Scientists predict that oceans in the near future will be criss-crossed with defensive, meteorological and oceanographic networks. Automatic weather stations bobbing on the surface will constantly chart the changing sub-surface currents, temperatures and salinity, so that "weather maps" can be issued for underwater travelers. Remote-controlled robots housing a TV "eye" will pick up samples of the ocean floor while nuclear-powered "pods" filled with passengers or commercial goods glide by on the way to distant ports.

In the shallower basins, sea "farms" will



RECORD LAMP—This five-foot-long lamp is believed the largest mercury-fluorescent lamp in the country. Four inches in diameter, it produces as much light as 400 household bulbs and is intended for large-area floodlighting.