OCEANOGRAPHY

Aid Undersea Exploration

A new charter service, supplying undersea equipment and experts, will aid the study of ocean characteristics such as salinity, temperature and flow.

➤ NEW SOURCES OF AID are offered oceanographers to see what is going on under the ocean and to discover new seascapes, new water creatures, new dark rivers.

With increasing interest in exploring unknown depths of the ocean, a new charter service for searching the sea has been announced by the Westinghouse Electric Corporation.

This service will lease research diving vessels, ocean-going equipment, technical advice and personnel to such organizations as private industry, Federal and state government and the military who want to survey the salty seas that make up 71% of the earth's surface.

Called the Westinghouse World Wide Charter Facilities, the new service offers a variety of assistance to underseas missions engaged in measuring salinity, flow of water, temperature, internal waves and in observing many other factors of the oceans, explained Thomas Horton, a member of the underseas division of Westinghouse Defense and Space Center, Balitmore, Md.

The charter service has been in use since February 1964, with a program off the coast of Southern California and Baja using the French-built Diving Saucer, forerunner of the deeper diving Deepstar.

The Deepstar-4000, which will be completed at Marseilles in mid-1965, will be capable of diving to 4,000 feet under the ocean's surface. Manned by three people, this ship will be equipped with devices such as an arm to collect sea samples, lights to shine in the dark sunless depths, and sonar. Another Deepstar has been designed and fabricated to descend to 12,000 feet, and a third Deepstar to operate at 20,000 feet.

An oceanographic surface ship is already in operation with a hydraulic crane to lower and raise the diving vessels, Mr. Horton explained. The charter also has an eight-man team of underseas experts ready to provide engineering support and advice. Westinghouse is prepared to train personnel and maintain advice to be sure everything is operating properly.

"When you are putting human beings at the bottom of the sea," said Mr. Horton, "you don't fool around with that ocean. We need to take all precautions that no life is lost and that extreme care and safety are observed for all programs."

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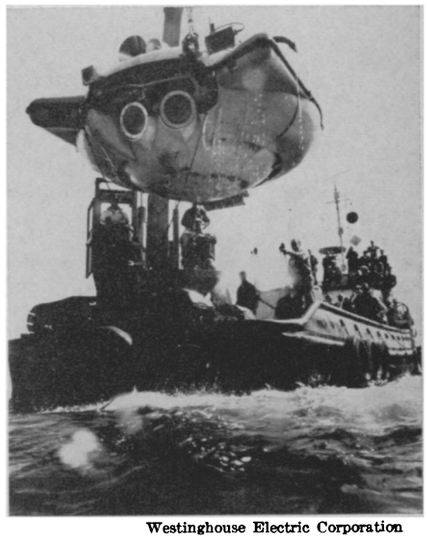

Westinghouse Electric Corporation

PROBING THE DEPTHS—The undersea vehicle Diving Saucer is shown here being lifted from the water during operations off the California coast. The Saucer is part of a Westinghouse program to provide charter facilities for ocean exploration.

PHOTOGRAPHY

Pictures Without a Lens

See Front Cover

➤ BETTER PICTURES without a lens are being made by a new image forming device. Cheaper microscopes, telescopes, space optics and lasar optical systems are possible because of the develoment of highly precise Fresnel zone plates by the Bausch and Lomb Optical Corporation, Rochester, N.Y.

A small wafer of aluminum-coated glass only about 3/10-inch in diameter is used instead of the complicated conventional lens. Into its microscopically thin aluminum surface are cut many very fine concentric open areas or zones, the center one of which is opaque.

After the very precise ruling engines that are available at Bausch and Lomb produce the first master zone plate, copies can be made in much the same way phonograph records are pressed.

The central portion of the zone plate, magnified approximately 50 times, is shown on this week's cover.

It forms the image because light going through the open areas has its direction changed by diffraction.

The zone plate has many advantages but one trouble is the fact that it will work with only one color or wavelength of light. This makes it of little use in the ordinary camera, which must take pictures with white light that contains many colors. Scientists would like to get around this problem.

The zone plate does something the conventional lens cannot do. It can form several different images at varying magnifications. A zone plate that has a normal 3-inch focal length (the distance from the plate to the point of focus) can form an image 1/3, 1/5, 1/7 and 1/9 of that distance behind the zone plate. This allows a microscope to be made which, without changing the optical system, can form different sized images. A "fixed zoom" effect can be achieved.

The magnifying power of such a microscope would be increased by factors of 3, 5, 7, or 9 simply by moving the object being viewed closer to the zone plate.

Actually if one color of light is used, the image is better and sharper over a larger field than most complex lenses now used in microscopes. It can be made to equal a fast conventional lens in speed. A zone plate of f/1 has been made. The zone plate will work as well with the invisible rays such as ultraviolet and X-rays as it will with visible light. These abilities plus its light weight, simplicity and ease of production give it a combination of capabilities.

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Undersea Laboratory Aids Space Research

➤ PROBLEMS of man's survival in outer space and under the sea are so similar that researchers find the ocean a laboratory for investigation of conditions common to both.

Both astronauts and aquanauts face the same basic problems. One is the change in pressures in which they must live and work. In the case of the aquanauts, the problem centers around bringing man from the multi-atmospheric pressures of extreme depths to the normal pressures of the earth's surface. Astronauts face the problem of how to function in the relatively lower pressures of the space capsule, and how to move into the vacuum of outer space itself.

Studies are being conducted into these and other problems by a team of scientists in Sunnyvale, Calif., under the supervision of Dr. J. A. Kraft, assistant manager of the bioastronautics organization of the Lockheed Missiles and Space Company.

Spacemen and underwater explorers also face the common danger of anoxia. The studies also include impact of psychological phenomena.

Reaction to complete isolation is a key area of research. This reaction can be readily observed under the ocean and can assist researchers in conditioning man for an extended life in space.

Also, in the environment of both space and underwater, man can become disoriented and literally not know which way is up or down. In both areas there is also a torquing problem arising from lack of a firm or fixed point, against which man can brace himself to use many types of tools.

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