

## GENERAL SCIENCE

# Sealab, Gemini Similar

The astronauts and aquanauts of Gemini and Sealab are both connected to and supplied by their respective crafts by means of 'umbilical cords.'

► THE GEMINI SPACECRAFT and the underwater Sealab 2 provide similarly womb-like environments for their respective inhabitants, even as far as providing "umbilical cords" to crewmen who go outside.

Astronaut Edward White's cord was a two-way model, bringing air to him from his Gemini 4 vehicle as he floated in space last June 4, and carrying electronic data signals back to the spacecraft where they were transmitted to earth.

Sealab 2, however, 205 feet below the surface of the Pacific Ocean on the continental shelf of California, satisfies a different need—warmth.

While doing maintenance work that keeps them in the dark, frigid water for several hours at a time, Sealab's aquanauts need a source of continuous warmth that present portable battery packs are unable to provide. The solution, being tested in La Jolla, Calif., for the first time, may be a nylon and rubber suit impregnated throughout with tiny flexible wires like capillaries.

A flexible rubber-covered cable connects the suit with Sealab's main power supply. A current passes through the cable to the suit wires, which heat up like an electric blanket, cutting the ocean's chill.

For short-term jobs, up to half an hour, each aquanaut carries a silver zinc battery

on a belt around his waist. Although its lifetime is limited, the battery leaves the swimmer unencumbered and free to move about at will, which could be an important advantage in the presence of sharks or other predators.

For this reason, the "umbilical missions" are performed from within a shark-proof cage.

The cable-equipped suits, consisting of a hooded parka, pants, gloves and boots, are worn under a high visibility lemon yellow tunic for safety. The suits are constructed sandwich style, with a layer of stretch nylon on the inside, then a layer of rubber, then the heating wires, and finally a sponge rubber outer coating.

Flushing the suit with an insulating gas before use provides "significant conservation of heat."

U.S. Rubber Company developed the suit and its umbilical cord.

In the future, however, such ties with the "womb" will probably be eliminated, both in space and under the sea. The next astronauts to venture outside their spacecraft may well have no connecting cable at all, and long-life space stations harboring a wide range of human activities will make free movement a must.

Even now, the only reason for Sealab's

umbilical cord is the lack of a suitable battery. A wide range of new developments, many of them growing out of space research, should fill this need in a few years.

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## PUBLIC HEALTH

## Free Flu Shots Urged For Those Unable to Pay

► FLU IS EXPECTED to be prevalent, possibly in epidemic proportions, during the coming winter season, the U.S. Public Health Service warns.

Persons on public assistance rolls should get shots without charge.

Those who have not had an influenza vaccination since July 1963 when the last major change was made in vaccine composition, should receive two doses approximately two months apart.

Fred H. Steining of the U.S. Department of Health, Education and Welfare, said in Washington, D.C., that where no immunization program is available for welfare groups, "we recommend that the service be provided through the public assistance medical care program."

Many persons in the high risk groups—those suffering from chronic debilitating diseases, persons over 65, pregnant women and those living in crowded conditions—are receiving public assistance.

The last major epidemics of type A influenza occurred in 1962-63 in most of the country. Because outbreaks come in two- to three-year cycles, the coming season is expected to produce increased flu cases if not an actual epidemic.

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## ASTRONOMY

# Light Prevents Mars Life

► STRONG ULTRAVIOLET LIGHT on Mars would prevent any earth-type life from existing on the planet's surface, information gathered from a rocket flight indicates.

This is but one of the findings, reported in Science, 149:969-978, 1965, which include the discovery of two new minerals, new facts about Saturn's ring and Jupiter's satellites, and the use of a light beam in a radar-like fashion to take pictures of clouds.

The ultraviolet radiation of Mars was measured from an Aerobee rocket flown from White Sands Missile Range last March. The radiation measurements showed that the planet has an atmosphere of nitrogen, carbon dioxide and argon, with a very low surface pressure. The fact that it has such an atmosphere would mean that most of the intense ultraviolet radiation from the sun would reach the Martian surface, enough to kill all known types of tiny earth-like life forms.

One of the new minerals, calcium chloride hexahydrate, has been named Antarcticite. It was found in the Don Juan Pond, Victoria Land, Antarctica.

The other new mineral, found in a few meteorites, is a compound of potassium,

sodium, iron, magnesium, silicon and oxygen. Its name is Merrihueite in honor of the late Craig M. Merrihue of the Smithsonian Astrophysical Observatory.

Infrared observations of Saturn's ring show that it is covered with frost, possibly even composed of ice. This finding by Dr. Tobias Owen of the University of Arizona's Lunar and Planetary Laboratory, Tucson, supports a suggestion to this effect originally made by Dr. Gerard P. Kuiper, director of the laboratory.

Dr. Owen also observed the three largest satellites of Jupiter and determined a new upper limit for the amount of methane that might be present if these satellites have atmospheres.

Light detection and ranging, the optical counterpart of radar, was used successfully by Dr. Ronald T. H. Collis of Stanford Research Institute, Menlo Park, Calif., to take pictures of clouds. At optical wavelengths, very much smaller atmospheric particles can be detected than at radar wavelengths. A laser serves as a power source from which very intense pulses of monochromatic light are beamed through a lens.

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Grumman Aircraft

**ORBITING ASTRONOMER**—Through the Orbiting Astronomical Observatory (OAO), scheduled for launching early in 1966, astronomers will be able to study cosmic phenomena such as the X-rays, ultraviolet and infrared rays normally obscured by the earth's atmosphere. It will orbit at an altitude of about 500 statute miles.