

PHYSICS

Natural Mars Satellite

THE NATURAL satellite that circles close to Mars could serve as an ideal observation platform from which to view that planet, the American Physical Society meeting in Washington, D. C., was told.

Dr. S. F. Singer of the University of Maryland said this inner satellite, known as Phobos, acts as a "sweeper" to wipe out dangerous radiation in a region around Mars. He believes that both Mars and Venus are surrounded by natural radiation belts, as the earth is.

Astronauts on trips to Venus or Mars may have to face the hazards of such belts not only when leaving the earth but when landing on other planets.

Dr. Singer said the discovery of the earth's natural radiation belts indicates that any planet with a magnetic field and an atmosphere must possess radiation belts. His calculations showed that the inner belt of Mars or Venus would be just as "undesirable a place to be as the inner radiation belt of the earth."

Since the solar particles causing the outer belt thin out through space, Venus will receive twice as many particles as the earth, while Mars intercepts less than half this amount.

For this reason, he reported, the maximum of the outer belt will be some 16% farther from the Martian surface than the outer belt of the earth, while the outer belt of Venus is slightly more than 10% closer to the surface.

In 1956 Dr. Singer predicted the existence of trapped particles in the earth's magnetic

field to explain some puzzling features of auroras and magnetic storms. Magnetic storms are violent disturbances in the earth's magnetic field that can be detected by such instruments as a sensitive compass needle. They are produced by an electric current flowing outside of the atmosphere.

This and later predictions were verified by the United States Pioneer and the Russian lunar rockets. Recent measurements have shown that the earth's outer belt is quite complicated, Dr. Singer said, and consists of several varying layers.

Dr. Singer reported that the measured intensities in the earth's inner radiation belt agreed so well with theory that they are now being used to give information about the atmospheric density in a region never previously available to direct measurements.

Science News Letter, May 7, 1960

Insight on Living Matter

A NEW KIND of nuclear reactor that works at extremely low temperatures may give biologists a new tool for studying living matter.

Dr. Lyle B. Borst, chairman of New York University's physics department, told a news conference at the American Physical Society meeting in Washington, D. C., that such a reactor could be built with only a few ounces of uranium-235, instead of the more than two pounds now needed. The reactor would yield a neutron stream for measurements of objects at wavelengths not

presently available for easy study. Such things as molecules, bacteria and viruses could be looked at with this new device, either in solution or in culture.

The reactor would consist of uranium-235 and ordinary water as ice kept at a temperature within eight degrees Fahrenheit of absolute zero, which is 459.7 degrees below zero.

Dr. Borst said he had successfully cooled neutrons to the eight-degree temperature for the first time.

At these low temperatures, most materials show nearly ten times the ability to capture neutrons as they do at room temperatures.

Using the very cold neutrons as a measuring stick means distances of a ten-millionth of an inch can be determined.

Dr. Borst said that the new kind of reactor would also be useful in laboratory studies of the operation of nuclear satellite power plants under emergency conditions. Such plants if built of presently used materials might conk out at the low temperatures found in outer space far from a star or in the shadow of a planet.

Science News Letter, May 7, 1960

GEOPHYSICS

Jupiter Explosions Equal H-Bomb Every Second

THE PLANET Jupiter is sending out radio waves showing the explosion causing them is the earthly equal of a 100-megaton hydrogen bomb exploded every second.

The radiation, however, is definitely not due to H-bomb explosions on Jupiter, scientists at the American Geophysical Union meeting agreed. Its exact source is still a mystery as well as a source of serious disagreement.

There are at least five main spots on Jupiter from which the radio waves have been detected, Dr. Roger K. Gallet of the National Bureau of Standards Boulder Laboratories in Colorado, said. The energy of these radio waves is only a millionth part of the total that must be generated on Jupiter because the energy transformation process is very inefficient. The total amount of energy on the planet is calculated to be the equivalent of 10 hydrogen bombs each second in each of at least five regions, or some 10 to the 24th power ergs.

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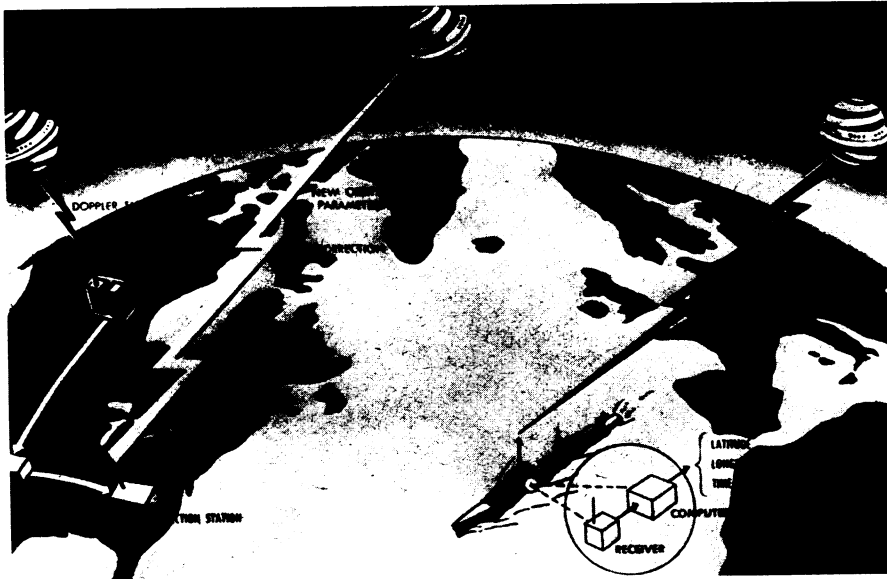
MEDICINE

Fungus Lung Disease Treated by Surgery

COCCIDIOIDOMYCOSIS of the lungs, a fungus disease resembling tuberculosis, may be treated successfully by surgery, an 18-hospital cooperative study by the Veterans Administration and the Armed Forces reveals.

The research shows that, with proper selection of cases and attention to medical detail, complications of surgery for pulmonary coccidioidomycosis are no greater than complications of surgery for TB of the lungs.

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TRANSIT NAVIGATION—Doppler signals from the navigational satellite Transit I are picked up (left) by receiving station which transmits them to central computer center. Future paths of the satellite are predicted from these data that are then relayed to injection station and transmitted back to the satellite (center). The satellite beams data back to earth (right). Ship navigators correlate the position of the satellite with current Doppler shift data to determine their position on earth.