ASTRONOMY

Foresee New Astronomy

A satellite carrying a 300-pound payload that could provide important information on the sun, stars, planets and the earth itself is possible within two years.

➤ STUDYING the universe, and particularly the sun, from earth-circling artificial satellites to obtain an unobstructed view 24 hours a day will be possible within a year or two.

Dr. Leo Goldberg, director of the University of Michigan Observatory, predicted that astronomy from satellites is just around the corner in the 25th annual James Arthur Lecture at the Smithsonian Institution.

A payload of only 300 pounds, believed "certainly feasible" within two years, would be sufficient for instruments needed by the solar satellite, Dr. Goldberg said. Plans for such a satellite, which would orbit at a height of 400 miles in a path from pole to pole to obtain continual sunshine, have been drawn by a St. Louis aircraft manufacturer.

The biggest problem of present-day solar observations is that much of the sun's radiation, including the ultraviolet, is absorbed by the earth's atmosphere. The visible light reaching the earth's surface does not tell the whole story of the sun's voluminous outpourings.

Dr. Goldberg said that the satellite's 300-pound instrument package would include a stabilization and control system for precision pointing of the instruments at the sun, power supply, and equipment for recording data and transmitting the information on command from earth.

Because the delicate instruments would have to withstand the severe shocks and accelerations of launching, Dr. Goldberg reported that intensive laboratory experiments would be needed to prevent damage.

Studies made so far with high-flying rockets give only a brief glimpse of solar events. A large satellite would give long-period information not only about the sun but about the entire universe.

Dr. Goldberg said solar studies should have the highest priority for the following three reasons:

1. The sun is such an intense source of radiation that instrumental problems would be at a minimum.

2. The influence of the sun upon all of earth is of very great interest to geophysicists and meteorologists as well as astronomers.

3. Observations from the earth's surface in the past have made it clear what to look for in scanning the sun.

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PHYSIOLOGY

Temperate Zones May Be Man's Limits for Cold

➤ MEN LIVING in the temperate zones had better not leave home for colder climes.

The areas between the Tropic of Cancer and the Arctic Circle and between the Tropic of Capricorn and the Anarctic Circle represent the limits as far as their cold endurance goes, a scientist reports in *Nature* (Oct. 25).

Persons can adapt to artificial or naturally hot environments relatively easily, says Dr. R. K. Macpherson of the division of human physiology, National Institute of Medical Research, London. However, when they are transferred from a temperate climate to a cold one, there is no comparable adaptation.

This puzzling behavior can be understood if man is considered as an animal, without clothing, fire or shelter, Dr. Macpherson explains.

The critical temperature for naked man is 25 to 27 degrees centigrade or about 77 degrees Fahrenheit. His scanty hair provides little insulation, yet he has an "unequalled ability to sweat" and a capacity for extreme dilation of the skin blood vessels, both of them good mechanisms for heat loss.

Further evidence that men in a temperate climate are approaching the maximum adaptation to cold is found in Europeans' adjustment to life in the tropics. After about 18 months, their ability to work in the heat is as great as that of the natives, Dr. Macpherson says. Exposure to artificially higher temperatures indicates they have an even greater heat tolerance.

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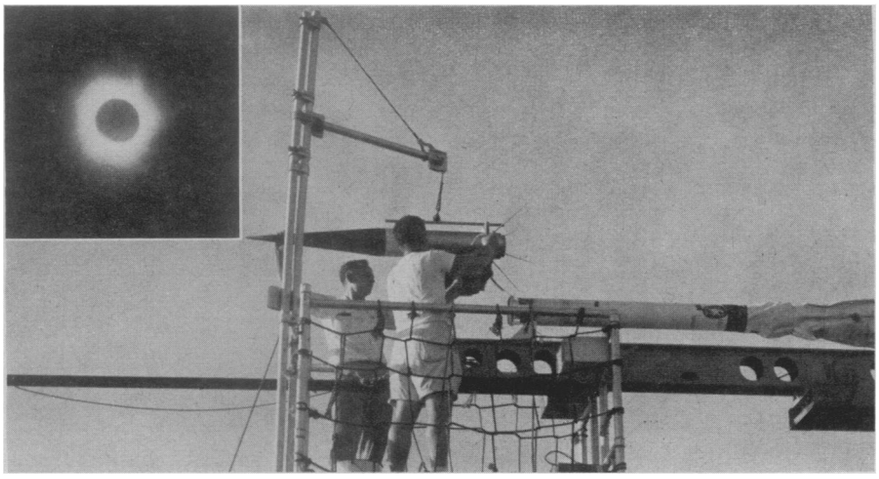

TOTAL SOLAR ECLIPSE—U. S. Naval Research Laboratory scientists William A. Nichols (left) and J. J. Nemecek place the instrumented nose section of a rocket in position prior to its launching during the Oct. 12 solar eclipse. The sun is shown in the inset during the exact moment of total eclipse.

ASTRONOMY

X-Rays From Sun, Found Source of Ionosphere

➤ THE FIRST proof that X-rays bombarding the earth's atmosphere to form certain layers of the ionosphere come from the sun's corona has been obtained by rocket studies made during a solar eclipse.

Dr. Herbert Friedman of the Naval Research Laboratory said the sun's X-ray emission continued undiminished during the eclipse, thus showing the radiation is emitted by the huge halo of glowing gas surrounding the sun's visible surface.

Dr. Friedman said the rocket studies opened up a new era of rocket astronomy, as important an advance as the use of photography was when it was introduced.

The measurements were made during the total eclipse on Oct. 12 by six Nike-Asp rockets fired during and after the event from the U.S.S. Point Defiance cruising near the Danger Islands group.

The eclipse expedition was part of the Navy's participation in the International Geophysical Year.

Five rockets were fired during the eclipse, two during totality. The sixth, launched the following day to get a background count of X-ray, ultraviolet and Lyman alpha radiation, was fortuitously aloft at the time of a solar flare.

The eclipse measurements showed that ultraviolet and Lyman alpha radiation disappeared almost directly in proportion to the geometric area of the solar disk exposed. This confirms that this radiation is emitted by the sun's visible surface or photosphere.

The flare measurements showed that Lyman alpha radiation is not increased by this tremendous activity of the sun, although previously it had been thought that Lyman alpha was responsible for the immediate effects of the ionosphere following flares, which result in blackouts of short-wave radio reception.

Solar activity is of particular interest during the IGY because of the vital part the sun plays in meteorology, oceanography and glaciology, as well as in ionospheric physics.

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