

ASTRONOMY

'Needles' Bar Space View

Astronomers, charging that a strong band of tiny copper needles orbiting the earth interferes with space observations, call for an end to further belts—by Ann Ewing

► THE 400 MILLION radio-reflecting "needles" now orbiting earth have been spotted photographically by astronomers at three observatories.

They called for a stop to further space launchings of communications "screens" of this kind because stronger bands would seriously interfere with astronomical observations and could be "disastrous."

Two astronomers at Mt. Wilson and Palomar Observatories also called for stopping such tests because "no nation has the right to contaminate space" on its own.

Optical detection of the hair-thin "needles," known as Project West Ford dipoles, was accomplished from Palomar Observatory by Drs. Allan Sandage and Charles Kowal using a 20-inch telescope.

The orbiting "red hairs" were spotted with five telescopes having reflectors ranging in size from 69 inches to 21 inches by Drs. W. G. Tift, W. M. Sinton and J. B. Priser of Lowell Observatory and Dr. A. A. Hoag of Flagstaff Observatory, both in Flagstaff, Ariz.

They charged that if brighter bands of orbiting hair-like radio reflectors were placed around earth, they would "seriously affect observations" made from satellites in low orbits. Such bands, the Flagstaff astronomers warn, would also "seriously interfere with astronomical observations" from earth's surface.

The Palomar astronomers called for the U. S. or any other nation to stop cluttering up space with dipole belts without international consultation and agreement.

The copper needles are spread out in a belt circling the earth and are much too faint to be seen by the naked eye. They are actually more faint than a starless patch of night sky. Nevertheless they can be detected because their time of passage can be correlated with an increase in the number of light photons gathered by the telescope's reflectors.

Each of the copper needles is only a third the thickness of a human hair and three-quarters of an inch long. They were launched secretly into a polar orbit last May despite an international furor over a previously unsuccessful attempt to launch such a communications belt.

Although the present West Ford test belt has been harmless to ground-based astronomy, future experiments of a similar nature with a larger payload may not be so lucky, Drs. Sandage and Kowal reported in *Science*, 141:797, 1963.

If a West Ford operational belt is established with 100 times the present payload, the belt would be four times brighter shortly after launch than the natural night sky radiation which would begin to be serious for certain types of astronomical observations.

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Westinghouse

SUNBEAM RIDE—This huge telescope heliostat is the beginning of an 800-foot sunbeam ride within the new solar telescope at Kitt Peak National Observatory in Arizona.

ASTRONOMY

Comet Found Near Sun During Solar Eclipse

► A BELGIAN ASTROPHYSICIST, Dr. Francois V. Dossin of Liege, working at the National Aeronautical and Space Administration Goddard Space Flight Center, discovered a faint comet near the sun during the total eclipse over Maine July 20.

Faint comets have never been detected before near the sun because the tremendous brilliance of the visible solar disk prevented ground observations of the space where such comets brighten sufficiently to become visible. However, when the moon passed in front of the sun this summer, observations were possible to within a few degrees of the sun.

Some scientists have suggested that there are many such faint comets as yet unseen to observers. If this is correct, detection of them will be an important contribution to understanding comets and their role in the formation of the solar system.

Since total solar eclipses are infrequent, satellites and sounding rockets equipped with instruments to occult the sun's disk and photograph possible comets could be used in future research programs.

Dr. Dossin made seven camera plate exposures of the comet from a hilltop at Pleasant Pond, Maine, during 60 seconds of total eclipse darkness. He used a blue-green filter on the camera lens to bring out the light of carbon molecules in the comet. Microscopic examination of each of the developed plates, which had exposure times from three to 18 seconds, showed a diffuse image that was strongly emitting the light of molecular carbon.

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GEOPHYSICS

Earth Distances Measured

► NEW AND MORE correct measurements of the distances on earth, extremely important for launching rockets to a target, will now be possible using a theory worked out by a Danish scientist.

The theory deals with errors in measurement due to such factors as reflections from bodies of water and meteorological effects, including humidity and temperature.

Dr. Einer A. Andersen, director of the Royal Danish Geodetic Institute in Copenhagen, told *SCIENCE SERVICE* that when the new theory is used for correcting systematic errors from data collected with an electronic tellurometer, it is possible to get accurate measurements of 60-mile distances in five minutes.

These measurements can be made from one high point to another, whereas an earlier method capable of the same accuracy could be used only on level ground. The older method using invar wires was also very slow and laborious, about ten days being required to measure six miles.

Dr. Andersen, chief delegate of Danish scientists to the International Union of Geodesy and Geophysics meeting in Berkeley, Calif., said the theory was worked out by a scientist on his staff, Knud Poder.

The rapid and correct distance measurements now possible will also be important for many civilian purposes, among them flying by radar when it is most important to know an airplane's location at all times. To know this, correct ground measurements are essential, Dr. Andersen said.

Dr. Poder explained to *SCIENCE SERVICE* that he is now working with data from Danish locations where relative distances are known. He is analyzing this information from tellurometers with the help of his theory and a Danish-built computer.

From this he believes he will be able to spot error distribution and types of errors in geodetic networks. The tellurometer was developed by a South African scientist a few years ago. It makes very good measurements, but does not eliminate certain errors.

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