

physical sciences

SELENOLOGY

Search for lunar events negative

Three years of systematic surveillance of the moon have failed to detect such transient changes as the flashes and brightenings that have been reported by amateurs.

The lunar surveillance is conducted with a 24-inch reflector in conjunction with an image-orthicon tube by Justus R. Dunlap of Northwestern University's Corralitos Observatory near Las Cruces, N.M. The observer, sitting in a room below the telescope floor, sees the entire lunar disk in about 15 minutes at three wavelengths—3,900 Angstroms (violet), 5,500 (green) and 7,000 (red).

Since the program began in November 1965, more than 3,000 hours of surveillance have been logged, but no localized lunar events have been detected, Dunlap and Dr. J. Allen Hynek, director of Northwestern's Dearborn Observatory, report in the November *SKY AND TELESCOPE*.

ECLIPSE ASTRONOMY

Sounding rockets from Canada

Canadian scientists will fire a series of high altitude sounding rockets from a temporary launching site on the southeast coast of Nova Scotia during the 1970 total eclipse of the sun. This will be the first time sounding rockets have been launched from eastern Canada.

The solar eclipse will occur during the early afternoon of March 7, 1970. The path of totality will travel over the southeastern United States (SN: 8/3, p. 114), then move out over the Atlantic, brushing Nantucket and crossing both Nova Scotia and Newfoundland before ending in the mid-Atlantic.

Scientists from the National Research Council and the Defense Research Telecommunications Establishment will fire four Canadian-built Black Brant rockets into the upper atmosphere prior to and during the eclipse. Their instruments will measure changes in ionization of the upper atmosphere when the sun's radiation is blocked by the moon.

SOLID STATE PHYSICS

Energy decay in ruby lasers

The use of lasers in range-finding and other applications requires that the laser be capable of being fired many times without any substantial change in its output.

During repeated firings, the output of a ruby laser doped with aluminum oxide gradually lessens. Five Air Force Cambridge (Mass.) Research Laboratory scientists have now found this decrease is due to the formation of color centers within, or on the surface of, the ruby rod.

Defects or impurities present are converted into color centers in the aluminum oxide when it is exposed to the bright pumping light by which the laser is charged. The centers are formed when a displaced negative ion in the crystal is replaced by an electron (SN: 10/24, p. 430). A reliable indication of color center formation is an orange-brown appearance in the ruby.

Heating the rods restores part of the energy, Dr. C. Martin Stickley and his co-workers find.

ACOUSTICS

Identification of sex

Listeners can determine the sex of the speaker of voiceless fricatives when spoken without background noise, a series of experiments shows.

Fricatives include such sounds as f, s, x and h; they are characterized by a frictional rustling of the breath as it emerges from a greatly narrowed, but not closed, oral passage.

Dr. Frances Ingemann of the University of Kansas has found that the ability to determine a speaker's sex depends upon the fricative pronounced. It is easier when the speaker produces h or x than when he says f or s, for instance.

He reports in the October *JOURNAL of the ACOUSTICAL SOCIETY of AMERICA* that h is the most reliably identifiable.

ASTRONOMY

Sporadic pulsars discovered

Two sources of pulsating radio waves, whose emissions are so sporadic they may be the first in a new class of objects emitting radio waves, have been discovered using the 300-foot radio telescope at the National Radio Astronomy Observatory in Green Bank, W. Va.

The sources, which seem to be a pair, are located either in or very near the Crab Nebula. Because their radio signals are so sporadic, only an upper limit can so far be set on the periods: less than 0.25 seconds for NP 0527 and less than 0.13 for NP 0532.

They make the 14th and 15th pulsars now known, the 13th having been discovered by an Australian group in mid-October. The pulses from the Australian discovery, PSR 0833, occur once every 0.89 seconds, the shortest so far measured. These new observations support the theory that the regular radio pulsations come from a neutron star (SN: 10/12, p. 362).

GEOPHYSICS

Earth waves caused by sonic booms

Explosive sources in the lower atmosphere have been observed to produce seismic waves during several controlled experiments as early as 15 years ago.

Now three scientists have recorded the first observations of well developed seismic waves generated from sonic booms of jet fighter planes climbing at high altitudes.

The frequency of the generated waves, they find, is almost constant, increasing only very slightly with time from the onset of the booms. Their strength is comparable to that generated by a large pile driver about 200 feet away.

The experiments were conducted with acoustical and seismograph stations located at Cape Kennedy, Fla. Details are reported in the October *JOURNAL of the ACOUSTICAL SOCIETY of AMERICA* by A. F. Espinosa and W. V. Mickey of the Environmental Science Services Administration in Rockville, Md., and P. J. Sierra of Argentina's National Astronomical Observatory.

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