

physical sciences

CLOUD PHYSICS

Convective clouds formed by Saturn V firing

Towering cumulus clouds have been formed downwind from static firings of the first stage of the mammoth Saturn V that on Dec. 21 lifted three astronauts on their epic voyage around the moon and back (SN: 1/4, p. 7).

Only a few short-lived clouds were formed during the actual launch because the heat and moisture liberated during firing was not confined as it is in a static test; it trailed out through the atmosphere as the giant craft hurtled toward space.

Convective clouds during static tests of the Saturn V booster at the Mississippi Test Facility of NASA form within a few seconds after firing. Their size, behavior and formation of rain are controlled by the environment, David G. Morris, now at Weather Bureau Forecast Center in Fort Worth, Texas, reports in the November BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY.

The man-made clouds offer meteorologists a chance to study cloud physics when environmental conditions are better known than they are in natural thunderstorms (SN: 11/9/68, p. 480). In order for towering cumulus clouds to form during booster firing, the lower troposphere must have sufficient moisture and low vertical wind shear, among other factors.

GEOPHYSICS

Ground movement along fault predicted

Researchers have discovered that episodes of movement along California's San Andreas fault occur quite regularly. The motion is called creep, the gradual movement that may occur along a fault, usually during a period of several days. It is not the sudden, violent displacement associated with earthquakes.

Creep motion that occurred along the San Andreas in August and December was successfully predicted by seismologists at California Institute of Technology. The scientists further forecast that there will be another movement along the fault next spring, probably in the first eight days of April.

The August event occurred within one week of the predicted time. The December motion had been forecast for around Christmas Day, due to an error in a field report, but the creep occurred in the first week of December.

The periodic episodes of creep along the San Andreas fault began with an earthquake of 5.6 magnitude in April 1966. Since then, the western side of the fault has moved north about 25 centimeters in relation to the eastern side. This motion has become very regular, about two millimeters every few months, according to Drs. Stewart W. Smith and C. H. Scholz and graduate student Max Wyss.

NUCLEAR PHYSICS

Research Corporation Award to Gell-Mann

One of the most baffling problems of high energy physics is the plethora of nuclear particles, usually called

elementary. For contributions to the understanding of elementary particles, particularly the theory known as the eightfold way, Dr. Murray Gell-Mann of California Institute of Technology will be presented the 1968 Research Corporation Award. The award will be made on Jan. 23 in New York.

The theory, also advanced independently by Dr. Yuval Ne'eman of Tel-Aviv University, provides a scheme for classifying certain nuclear particles into several families of eight or ten members each, based on such characteristics as spin, parity and electrical charge.

When the known particles were arranged according to this scheme, a family that should have had ten members had only nine; a team of 33 scientists at Brookhaven National Laboratory searched for the missing particle, and found the Omega Minus, having precisely the properties predicted by Gell-Mann.

INFRASONICS

Sound waves affect behavior

Infrasonics, the field of very low frequency sound waves having periods of oscillation in the range between 1,000 seconds to one-tenth of a second, is an area of acoustics that has thus far been little explored. These waves are produced during severe storm activity, such as high winds and tornadoes, as well as by earthquakes and volcanoes.

J. E. Green, now at Bell Telephone Laboratories in Naperville, Ill., and Dr. Floyd Dunn of the University of Illinois have made an initial attempt to determine whether infrasonic waves generated by storms of distant origin affect local human behavior. They used automobile accident rates and absenteeism among 1,500 grade school children in the Chicago area as criteria.

The first 28 days of May 1967 were selected for study because the weather conditions were mild around Chicago although severe storms were occurring in other regions of North America. The researchers suggest in the November 1968 JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA that a relationship exists between the presence of strong infrasonic waves generated by distant natural phenomena and an increased frequency of automobile accidents. They also found a similar relationship with the absence rate of students.

GEOPHYSICS

Suggestion of a geoelectric field

Evidence that the earth may have an electric field as well as a magnetic one is reported by Drs. Ludwig Katz and Paul L. Rothwell of the Air Force Cambridge Research Laboratories in the Dec. 23 PHYSICAL REVIEW LETTERS.

During a period of high solar and geomagnetic activity between May 22 and 25, 1967, an instrument flying at an altitude of 5,000 kilometers found a flow of energetic protons rising from the earth in regions whose magnetic latitude was greater than 70 degrees. Because the flux peaked along magnetic field lines, Drs. Katz and Rothwell postulate that the protons may have been moving under the influence of an electric field directed radially away from the poles of the earth.