

Physical Sciences Notes

SPECTROSCOPY

Potassium flare from matches

Astronomers at the Haute-Provence Observatory in southern France are presumably smoking less now but enjoying it more.

The roots of their decision go back to 1962, when two staff members reported the appearance of a potassium flare on an otherwise normal dwarf star.

Two years later, the same investigators recorded a second such flare on another star, according to the November *SCIENTIFIC AMERICAN*. A third was observed in 1965.

Because these stars seemed otherwise normal, a systematic search was made for other stars with this strange flare by astronomers at the University of California at Berkeley, Calif. Although no definite potassium flares were observed, the Berkeley group came up with a suggestion as to the origin of the bright emission lines. Their suggestion has been confirmed as possible by tests at the French observatory.

Berkeley's explanation: light from matches struck near the telescope's focus.

PHYSICAL CHEMISTRY

Ultraviolet forms hydrated electrons

A new, low-cost device for experiments in radiation chemistry has been developed at Argonne National Laboratory for studies of the hydrated electron.

The hydrated electron, produced in water under irradiation, is an intermediate chemical fragment that lasts between a hundredth and a millionth of a second, depending upon the other chemicals present in the solution. It is so named because of its strong attraction to water molecules.

Drs. Edwin J. Hart and Klaus Schmidt of Argonne designed the device, using a brief flash of ultraviolet light instead of radiation from a linear accelerator or large cobalt 60 source to produce the short-lived hydrated electron. It is small enough to be operated on an ordinary laboratory table, presents no radiation hazard and costs only about \$2,500.

MATHEMATICS

Systems charted

A chart of mathematical systems has been developed to provide a greater understanding of the relationships among mathematical concepts.

Dr. Preston C. Hammer of the Pennsylvania State University worked the chart out by analogy to Mendeleev's periodic table of the elements, which arranged in a logical order on the basis of their atomic weights all the elements known at the time. Although atoms have subsequently been split into even smaller units, the periodic table is still basic to the study of chemistry and, as extended, to physics.

The basic components of Dr. Hammer's chart are selected mathematical systems that are not easily reducible. The resulting patterned view of mathematics, presented as an organizational chart, shows how ele-

mental units combine to form more complex systems, as well as how the various branches of mathematics are related to the theory of sets developed by Georg Cantor.

PHYSICS

Atoms for Peace Awards

The 1967 Atoms for Peace Awards have been given jointly to a Columbia University Nobelist who conceived the first international nuclear research laboratory, Dr. I. I. Rabi; the director of foreign relations for the French Commissariat on Atomic Energy, Dr. Bertrand L. Goldschmidt; and the senior vice president for science, Atomic Energy of Canada, Ltd., W. Bennett Lewis.

Each will share equally in an honorarium of \$90,000. The awards were established as a memorial to Henry Ford and his son, Edsel, and are granted "solely on the basis of the merit of the contribution, wherever found in the world and without regard for nationality or politics." Presentation was made in New York Nov. 14.

HIGH ENERGY PHYSICS

Serpukhov accelerator operates

The Russian accelerator at Serpukhov, a proton synchrotron (SN: 9/30), operated at full energy in mid-October. The machine, designed for 70 billion electron volts, actually accelerated proton beams to 76 Bev.

Serpukhov, therefore, has the highest energy accelerator in operation in the world, besting both the U.S. machine of 33 Bev at Brookhaven and the 30 Bev of CERN at Geneva. The Russian accelerator will not be surpassed in energy until the U.S. 200-400 Bev proton synchrotron goes into operation, scheduled for mid-1972 (SN: 9/23).

ASTRONOMY

Ancient observatory in Armenia

Soviet archeologists have been digging since 1965 at a site on the bank of the river Metsamor, about 20 miles west of today's Yerevan in Armenia. Some results of possible astronomical significance have emerged, according to Miss E. S. Parsamian of the Burakan Observatory.

Three ancient man-made platforms, all with a north-south orientation, are located on a rocky hill near where a city existed nearly 5,000 years ago. One of the platforms is triangular, with its apex pointing due south. Near the eastern face of this rock, four stars are carved, inside a trapezium that indicates an azimuth of 20 degrees.

Miss Parsamian points out that this is the direction for the rising of the brightest star, Sirius. Her calculations indicate that, as seen from a Metsamor city in 2800 B.C., Sirius rose on June 22 at about four in the morning.

She suggests, according to the November *SKY AND TELESCOPE*, that inhabitants of Metsamor observed and worshipped Sirius. Excavations are still at an early stage; there are hopes of finding other traces of megalithic astronomy (SN: 11/4).