

physical sciences

PLANETARY ASTRONOMY

Prediscovery observations of Uranus

Before the planet Uranus was discovered in 1781 by William Herschel, its position was measured on 23 occasions dating back to 1690 by astronomers who mistook it for a sixth magnitude star.

For a century, the count has stood at 22, but now another prediscovery observation has been found by Dennis Rawlins of the College of Notre Dame of Maryland in Baltimore.

The Uranus observation was made on Dec. 3, 1714, at Greenwich Observatory by John Flamsteed or his assistant. It is the third oldest known sighting of this planet, according to the January *SKY AND TELESCOPE*.

Prediscovery measurements of Uranus are of importance today because they provide one means of evaluating the mass of Pluto (SN: 11/23, p. 516).

X-RAY ASTRONOMY

New visible source

Dr. Charles C. Swift of the University of California's Lawrence Radiation Laboratory reports a new X-ray source in one of the closest galaxies to our own, the Large Magellanic Cloud. If the distance to the Cloud is taken as 150,000 light years, the new source would equal in intensity 100 to 150 sources like the Crab Nebula, one of the most intensely studied X-ray sources.

CHEMISTRY

Computer index to compounds

A computer derived comprehensive index of names, molecular formulas and principal sources of published data for some 33,000 chemical compounds of importance in foods, drugs, pesticides, cosmetics and related products is now available.

The index, which consists of six volumes totaling 5,300 pages, is being sold by the Clearinghouse for Federal Scientific and Technical Information in Springfield, Va. 22151, for \$100.

It was prepared by the American Chemical Society's Chemical Abstracts Service for the National Science Foundation, the National Library of Medicine and the Food and Drug Administration. Nearly 140,000 names are listed for the 33,000 substances covered.

PLANETARY GEOPHYSICS

Moving flame causes rotation

A bunsen flame rotated under a cylindrical ring-like structure filled with liquid mercury forces the mercury to rotate in a direction counter to that of the moving flame. Rotational speeds up to four times as high as the source have been measured, Drs. Gerald Schubert and J. A. Whitehead of the University of California at Los Angeles report in the Jan. 3 *SCIENCE*.

Their observations provide one explanation for the high velocities of apparent cloud formations in the upper atmosphere of Venus observed in ultraviolet photographs. These observations suggest that at least the

upper layers of the atmosphere of Venus are moving with speeds of 300 kilometers an hour relative to the planet's surface.

The overhead motion of the sun would provide the periodic, traveling heat source, and the zonal flow induced by this motion would be in the direction of cloud motion, which is some 20 times faster than the overhead speed of the sun.

The idea that periodic heating of the earth's atmosphere might cause it to acquire a net angular momentum was originally suggested nearly 300 years ago by Edmund Halley, for whom Halley's Comet is named.

ASTROPHYSICS

Clustering of pulsars more pronounced

Five new pulsars discovered in the past few weeks show the same still unexplained clustering toward the plane of the Milky Way galaxy, as the 21 previously known did (SN: 12/14, p. 592).

An exception is pulsar PP-0943, the first discovered by radio astronomers of the Lebedev Physical Institute of the USSR Academy of Sciences in Puschino. Instead of being near the galactic plane, it has a latitude of plus 42 degrees. This places it close to the one of the first four pulsating radio sources discovered, CP-0950, which has a galactic latitude of 45 degrees.

This pairing, or perhaps tripling, of pulsars, as well as the concentration toward the galactic plane, is noted in the Jan. 4 *NATURE* by three scientists of the Cornell-Sydney University Astronomy Center in Australia. Dr. A. E. Vaughn and his co-workers report discovery of three more pulsars—MP-0940, MP-0959 and MP-1747—and the possibility that their clustering is associated with supernovae (SN: 1/4, p. 9).

The fifth new pulsar is PSR-2218, which also lies within ten degrees of the galactic plane. The tendency of most pulsars so far discovered to lie within this region, although not along the galactic plane itself, is confirmed by the most recent discoveries, as is the tendency to concentration south of the plane.

SOLID STATE PHYSICS

The laser as a yardstick

A laser device that promises to be as much as 1,000 times more reproducible and stable than the present international standard of length has been developed by two scientists at the National Bureau of Standards Laboratories in Boulder, Colo.

Reproducibility and stability are critical factors in measuring length with light waves. In 1960 the orange-red radiation from a lamp made of the isotope krypton 86 replaced the meter as the international standard of length because this light was highly stable and accurately reproducible.

Now, using a helium-neon laser, light from which passes through and saturates methane vapor to emit radiation at a wavelength of 3.39 microns, a length-measuring device even more accurate than the krypton lamp is possible. Drs. John L. Hall and Richard L. Barger report details on their development in the Jan. 6 *PHYSICAL REVIEW LETTERS*.