

Physical Sciences Notes

ASTRONOMY

Supernova Discovered

A supernova, a star that suddenly blazed forth with the brilliance of some 20 million suns, has been discovered in the northeast sky.

The year's first supernova was spotted by the Mexican astronomer Enrique Chavira of the National Astronomical Observatory, Mexico City, on Jan. 14. Despite its high brightness, the supernova is too faint to be seen except through very large telescopes because of its great distance of millions of light years.

The exploding star is in the constellation of Leo, which now stands in the northeastern sky. News of the supernova's discovery was telegraphed to astronomers around the world by the Smithsonian Astrophysical Observatory, Cambridge, Mass., international clearing house for astronomical information.

The study of supernova is of great interest to scientists since their occurrence marks one kind of limit in the evolution of stars. The reason why some stars become supernovas while the vast majority do not is not known. One theory is that the gigantic explosion is triggered by the collapse of the stellar core, followed by the sudden release of gravitational energy or the sudden ignition of nuclear fuel in the envelope.

PLANETARY ASTRONOMY

Venus Theories Revised

Venus, long thought to be invisible behind an all-covering blanket of clouds, may not be so well hidden after all, judging by two space photos of earth. One picture was taken by the first Lunar Orbiter when it was close to the moon; the other by the Applications Technology Satellite from 22,000 miles above the earth. They indicate that earth might look just as cloudy as Venus if it were photographed with the same clarity, or lack of it, as present Venus pictures.

To see if Venus has earth-style holes in her cloud cover, therefore, the next spacecraft scheduled to go to Venus, probably in 1972 or 1973, will be equipped to photograph that planet's cloud blanket.

● ● ●
A halo effect around Venus would indicate definite proof that ice was present in the planet's cloud layer. In the December *Astrophysical Journal* graduate student Brian T. O'Leary of Kitt Peak National Observatory reports preliminary observations of such a halo, thus tentatively confirming the presence of ice in the atmosphere of Venus.

Earth's atmospheric halo effect is readily observed; it consists of a luminous ring about 22 degrees from either the sun or the moon, caused by hexagonal ice crystals in earth's atmosphere.

METROLOGY

Measurement of 'G' Improved

A new absolute determination of the acceleration due to gravity, called "g," has been made by the National Bureau of Standards. It is 9.801018 meters per second per second, with a possible error of only three-tenths of a milligal per second per second.

The acceleration due to gravity is a pivotal quantity

in several areas of precise measurement, such as the determination of the ampere as an electrical force and for calibrating load cells that measure rocket thrust. It also enters directly into standards of fluid pressure, where it is needed to express the pull of gravity on the mercury in a precision barometer in terms of length, mass or time.

Geodesists studying the size and shape of the earth are especially interested in how "g" varies from one place to another, since this tells them something about the way earth's mass is distributed. The NBS experiment involved time and distance measurements on a freely falling body.

ELECTRON MICROSCOPY

Advanced Electron Microscope

A one-million-volt electron accelerator to be used with the most advanced electron microscope yet designed is being assembled at the University of Wisconsin. It will be incorporated into a microscope that has high resolution capabilities for the examination of substances ranging from relatively thick metal to living cells.

The high precision of the new instrument is made possible by the stability of the high voltage power supply used to accelerate the electrons, voltage stability being one key to high resolution.

ASTRONOMY

Variable Star With Shortest Period

A variable star with the shortest period yet found has been discovered in a faint star known only as HR 8494, which is located in the constellation of Cepheus, now in the northern sky. The light variability of HR 8494, discovered on Sept. 4, 1966 by M. Bregier of Lick Observatory, Mt. Hamilton, Calif., is reported in the December *Astrophysical Journal*.

The light from the star varies only three-hundredths of a magnitude every 61 minutes, believed to be the shortest known period.

REACTOR PHYSICS

Uranium 233, One Plutonium Rival

Uranium 233, a man-made nuclear fuel, will be the rival of plutonium 239, also an artificial element, and naturally occurring uranium 235 in ultimate importance to man as energy sources, Dr. Glenn T. Seaborg, Chairman of the U.S. Atomic Energy Commission, believes.

The key to the vast base of nuclear power is the breeder reactor, now in the early stages of development. The breeder will produce not only electricity from plutonium 239 or uranium 233 but more nuclear fuel—plutonium 239 or uranium 233 from plentiful uranium 238 or thorium 232—than it burns while producing the electricity.

The creation a quarter century ago of the two man-made nuclear fuels, uranium 233 and plutonium 239, within one year of each other at the University of California, Berkeley, constitutes one of the most impressive payoffs on basic research in history, Dr. Seaborg said in Berkeley ceremonies marking the discovery of uranium 233 on Feb. 2, 1942.