ASTROPHYSICS

Hydrogen Aids Star Study

A third emission line of hydrogen sent out by sources in the sky has been discovered and will aid astronomers in their studies of the stars in the Milky Way galaxy.

➤ A NEW WAY of studying the stars using the radio waves that sources in the sky send out has been discovered at the National Radio Astronomy Observatory, Green Bank, W. Va.

Two radio astronomers there have found another frequency at which hydrogen, the most abundant element in the universe, broadcasts its presence. Dr. Bertil Hoglund, a visiting astronomer from Sweden, and Dr. Peter G. Mezger detected the third known emission line of hydrogen.

It was spotted at a frequency of 5009 megacycles during July in the Omega nebula, which is a hot cloud of ionized hydrogen located in the constellation Sagittarius, the archer. Radio waves at the same frequency have since been detected from the Orion nebula and several other sources of ionized gas.

The discovery will permit astronomers to study the motions and physical conditions of gaseous nebulae in the Milky Way, the giant pinwheel of multimillions of stars in which the sun and its planets, including earth, are located. Analyzing radio waves of the new hydrogen line will be particularly valuable for distant nebulae that cannot be photographed by optical telescopes because too much interstellar dust intervenes.

A Soviet scientist, N. S. Kardashev, pointed out in 1959 that it should be possible to detect the hydrogen emission line just discovered. Last year, two Soviet groups announced observations of this and one other hydrogen radio emission.

"Their published results were marginal and needed confirmation," it was reported in Sky and Telescope, 30:127, 1965.

The National Radio Astronomical Observatory scientists achieved their results using the 140-foot radio telescope in Green Bank.

Ever since radio astronomers in 1951 first measured hydrogen radio waves at a wavelength of 21 centimeters, the possibility of detecting other emission lines of cosmic hydrogen has been explored. An important difference between the 21-centimeter line and the 5.99 centimeter line (5009 megacycles) is that the former is produced by the nuclei of hydrogen atoms as the nuclear spin changes, while the latter results from an electron falling from the 110th to the 109th orbit.

• Science News Letter, 88:179 September 18, 1965

GEOLOGY

Natural Earth Satellite Collided 6,000 Years Ago

➤ LARGE CHUNKS from a disintegrating natural satellite, a second "moon" of earth which existed only briefly, hit this planet's surface nearly 6,000 years ago, evidence uncovered in northern Argentina suggests.

Columbia University

ARGENTINE CRATERS—The light circular formations are two meteorite craters, about one third of a mile apart, in the Argentine Campo del Cielo crater field. The radiating pattern around the crater in the foreground was made by cattle converging on the crater which serves as a water hole during wet weather.

The chunks left nine meteorite craters that extend in a northeast-southwest line for more than ten miles in the Campo del Cielo, or Field of the Sky, region of that South American country. A field of small meteorites extends for a distance of more than 45 miles close to the crater line.

Discovery of the fragments, possibly cast off by a natural satellite breaking up during its final orbits around earth, was reported in Washington, D.C., by a group of scientists led by a Columbia University geologist.

"The great extent and extreme narrowness of both the crater field and the meteorite-strewn field make this a unique occurrence," the scientists stated in Science, 149: 1055, 1965.

They suggest that meteorites found earlier in northern Chile contain materials similar to those found in Argentina and were, therefore, caused by fragments of the same natural earth satellite.

Interest in the Campo del Cielo site stems from stories told by South American Indians to the earliest Spanish explorers about a large block of iron reported to have fallen from the sky. In the years since 1576, when the first expedition visited the site, many large and small meteorites have been found in the region.

Radiocarbon dating of charcoal found under one of the Argentinian crater rims indicates that it is 5,800 years old.

Dr. William A. Cassidy, research scientist at Columbia University's Lamont Geological Observatory, Palisades, N.Y., has led three expeditions into the semi-arid, extremely flat area during the last three years, with support from the National Science Foundation.

Accompanying Dr. Cassidy on the expedition in 1964 were Dr. Luisa M. Villar of the University of Buenos Aires, Theodore E. Bunch of the University of Pittsburgh, Dr. Truman Kohman of Carnegie Institute of Technology, Pittsburgh, and Dr. Daniel J. Milton of the U.S. Geological Survey, Menlo Park, Calif.

• Science News Letter, 88:179 September 18, 1965

PHYSICS

Nuclear Reactions Make Extremely Soft Noise

➤ THE NOISE NUCLEAR reactors make as each atom inside undergoes its miniature explosion is like that of an extremely soft whisper.

This noise has not previously been detected because it is so soft that other sounds around the nuclear reactor easily mask it. The whisper is most intense in the audible range, Dr. T. M. Snyder of General Electric Company, Vallecitos Atomic Laboratory, San Jose, Calif., reported in Honolulu.

Analysis of a reactor's sound frequencies gives clues to processes taking place inside, Dr. Snyder told a joint meeting of the American Physical Society and the Physical Society of Japan.

He has developed equations for the frequency distribution of the generated noise. Although the intensity is low, the noise increases in proportion to the reactor's power.

• Science News Letter, 88:179 September 18, 1965