ASTRONOMY

New Comets Cross Sky

➤THE YEAR 1965 has been a good one for finding new celestial objects and rediscovering old ones.

Astronomers around the world are now keeping an around-the-clock watch on a recently discovered, eighth magnitude comet. This magnitude is too faint to be visible to the naked eye, but Comet Ikeya-Seki can be seen through most binoculars or telescopes. Sixth magnitude is the limit of naked eye visibility.

The comet is named for its Japanese discoverers, Kaoru Ikeya and T. Seki. Since it was first spotted, the comet has developed two short tails, which were photographed on Sept. 23 at the Smithsonian Astrophysical Observatory's Oregon Pass Station in New Mexico.

One tail is believed to consist of gases pushed by the solar wind, while the other is thought to be made up of dusty cometary debris. Comet Ikeya-Seki is moving about one degree a day, thus keeping pace with the sun.

It can be seen telescopically as a faint point of light in the southeastern sky about an hour before sunrise near the brightest star in the constellation of Hydra, the water monster. Neither its orbit nor the chance that the comet will brighten to naked eye visibility can yet be predicted. Comet Ikeya-Seki is the third new comet discovered this year.

Ten days later a fourth new comet was spotted in the northwestern sky.

Named Comet Alcock, also known as 1965-H, it is too faint to be seen except through a telescope six inches or larger. It is in the constellation of Hercules, which sets shortly after sunset.

The tenth-magnitude object is diffuse. Nothing about a tail was reported by its discoverer, G. E. D. Alcock of England. Its position was confirmed by M. P. Candy, comet reporter for the British Astronomical Society.

The fourth periodic comet, one with a predictable orbit, was spotted by Dr. Elizabeth Roemer and Richard Lloyd of the U.S. Naval Observatory, Flagstaff, Ariz., the Smithsonian's Central Bureau for Astronomical Telegrams in Cambridge, Mass., told SCIENCE SERVICE.

Comet Giacobini-Zinner (1900-III) has been seen during seven of its returns to the neighborhood of the sun and earth, the last being in 1959. It is notable for the showers of meteors, or "shooting stars," it produced in 1933 and 1946, although there is not much likelihood of a meteor shower resulting from it this fall.

Its magnitude is 20, so that this faint comet can be photographed only with the very largest telescopes. The three other periodic comets rediscovered earlier in the year were only slightly brighter.

The other two new comets of 1965 are named Tsuchinshan 1 and Tsuchinshan 2, a name than translates into Purple Mountain Observatory, the Mainland China institution in Nanking where they were found. These were also too faint to be seen except with very large telescopes.

Twelve supernovas, stars that suddenly explode with the brilliance of a billion suns, have been discovered so far in 1965. They are so far away that they can be seen only with extremely large telescopes.

Three novas, which are also exploding stars but much less brilliant than supernovas, were also spotted during 1965.

Of the four unidentified objects discovered early in the year, the two known as Tomita and Andrews are not likely to be seen again. Astronomers had such a fleeting view of them that they not only could not tell exactly what they were but could not predict their future paths.

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PHYSICS

Space Static Helps DEW Line Protection

➤RADIO STATIC from outer space, a scientific curiosity that can at times interfere with radio reception, has been harnessed to assist the Distant Early-Warning (DEW) Line which protects the North American continent's northern boundaries.

The DEW Line is a 6,000 mile chain of vital radar and communication stations strung out above the Arctic Circle from eastern Greenland across Canada to the tip of Alaska.

Once each day, the radio communication beams of the DEW Line "looked" at the noisy center of our galaxy. This readily available and constant noise source was used to check the sensitivity of DEW Line receivers for a day-by-day comparison.

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PHYSICS

Neutrino Identified

➤THE PHANTOM PARTICLE of physics, the primary cosmic neutrino, is believed to have been identified, nuclear physicists of Catholic University of America, Washington, D.C., report.

Until now, nuclear physicists have detected only laboratory versions of the neutrino, produced both in accelerators and in large nuclear reactors.

Primary neutrinos, the particles that Dr. Clyde L. Cowan and his associates are now 99% confident they are detecting, come directly from the blazing cores of stars. They carry information on stellar processes and could be the basis of a new astronomy.

The particles are detected at Catholic University by observing the products of their interactions, one of which is called the muon. Dr. Cowan reported his findings in London at the Biennial Interconference on Cosmic Rays.

The work reported is a continuation of a search Dr. Cowan conducted earlier at Catholic University with other equipment, with which neutral particles were first detected in 1961. The new data strongly support Dr. Cowan's previously announced view that the particles probably come from stellar objects and are probably neutrinos.

Because neutrinos have no measurable mass or charge, they cannot be observed directly. A products of their interactions, the muon, is observed at Catholic University by a detector with a special shielding system ensuring that only muons created within the detector are recorded, Dr. Cowan said.

A characteristic dual muon pulse is photographed from the face of an oscilloscope, a TV-like picture tube. Waiting time between each photo of a "neutrino event" is also recorded. A graph of waiting time revealed that fluctuations of neutrino events are not random.

Another graph indicated that they correlate with sidereal or star time. For instance, for the observations from May 11, 1965, through Sept. 6, 1965, the greatest number of events was recorded between 2000 and 2200 hours, star time. These times corresponded to a two-hour period when an arm of our galaxy was directly above the observation point.

Dr. Cowan said that a new detector, hopefully the first neutrino telescope, was designed to resolve individual stellar sources. It is a combination scintillation counter and spark chamber of novel design. To confirm the neutrino hypothesis, the team will also try to calculate the rest mass of the neutral particles, Dr. Cowan reported in London.

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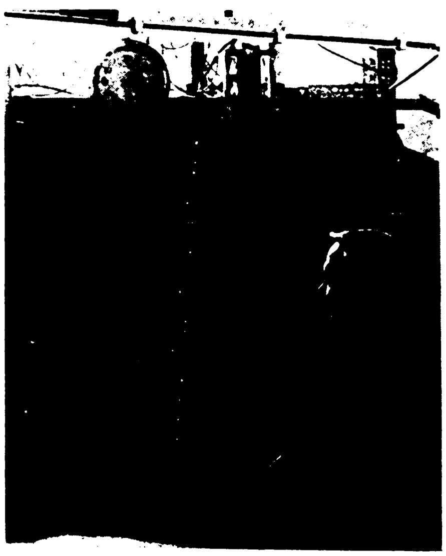

Catholic University of America

NEUTRINO DETECTOR—Dr. Clyde L. Cowan of the physics department of the Catholic University of America is shown with the neutral particle detector near campus. The timing of particle tracks (vertical white sparks on the scintillation plates) indicates the nature and origin of the particles that cause them.

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