

ASTRONOMY

Bright Comet Nears Sun

► A COMET PREDICTED to be one of the most spectacular in this century will be on brilliant display Oct. 20.

Comet Ikeya-Seki, discovered on Sept. 18 by two amateur Japanese astronomers, Kaoru Ikeya and T. Seki, will come closest to the sun on the night of Oct. 20, and it will be brightly visible in the early morning sky.

For a few hours, the elongated tail of the comet will stretch high into the sky above the western horizon and will appear to move slowly from left to right as the dazzling object whips around the sun. Comets are often termed "dirty snowballs," since they are a mixture of ice and dusty interplanetary debris.

When Comet Ikeya-Seki is closest to the sun, or at perihelion, it will pass within 300,000 miles of the solar surface. Its total brightness is then predicted to be magnitude minus seven, much more brilliant than the brightest planet, Venus, which has a magnitude of minus four. Even very bright stars have a magnitude of only zero or plus one, and are therefore much fainter.

After its perihelion passage, the comet will head farther out into space, becoming increasingly fainter until it disappears from view sometime in 1966, the Smithsonian

Astrophysical Observatory in Cambridge, Mass., predicted.

Dr. Fred L. Whipple, the director, identified Comet Ikeya-Seki as one member of a sun-grazing family. Historically, comets of this family have produced spectacular displays when they reached the sun's vicinity, many attaining visibility during even the daylight hours.

Dr. Whipple based his identification on the comet's preliminary orbit, determined by data from the Smithsonian's worldwide network of Baker-Nunn cameras.

Comet Ikeya-Seki was visible to the naked eye in the constellation Hydra on Oct. 8 and it will continue to brighten until Oct. 20 when it will display its most beautiful fireworks over the western United States. However, the comet will be only slightly less brilliant in the eastern states.

Observers in the Southern Hemisphere are in the best position for viewing until perihelion. Telescopic observations now show a short tail, the brightness and length of which is gradually increasing as the comet approaches the sun.

The comet is moving at an approximate rate of two degrees per day.

• Science News Letter, 88:246 October 16, 1965

COMMUNICATIONS

Satellite TV Predicted

► THIRTY-THOUSAND-WATT satellites transmitting radio and television directly into homes without the need for ground stations are the prediction of Radio Corporation of America board chairman David Sarnoff.

For the United States, a synchronous satellite would be placed over the equator just west of South America, with a second one hovering next to it in case of emergency.

To maintain continuous commercial service, a third satellite would be kept ready on the ground.

Such satellites could handle three TV and three radio channels at once, with little modification necessary in present home antennas.

There is a "compelling need" for global satellite communications, Gen. Sarnoff told the Conference on World Peace Through Law in Washington, D. C., but the political problems are tremendous.

"When we can communicate instantly to everybody, everywhere," he said, "we will set in motion a force whose ultimate political, social and economic impact upon mankind cannot be calculated today. . . . When, for example, a Russian satellite can broadcast directly to a Kansas farm, or an American satellite can broadcast directly to a Hungarian collective, what will be the reaction in both countries?"

At present there are no international agreements covering censorship, overlap of

channels, or jamming of incoming broadcasts, Gen. Sarnoff said. "Ideally, there should be agreement among all nations to operate on standards that would enable television sets everywhere to receive broadcasts from any part of the world. That ideal is far from realization, but it is within the collective power of the nations of the world to achieve it."

It would be "a travesty on the hopes of humanity" he said, for a global communications system "to be subverted to narrow national ends, or become discredited by the failure of nations to agree upon its beneficial uses."

Gen. Sarnoff listed five areas "in which we might achieve some form of understanding" before direct-broadcast satellites make international cooperation a necessity. Cultural exchange and true worldwide news (such as the first man on the moon) are two possibilities, along with mass teaching of millions of people simultaneously.

Summit conference could be held, using coded transmissions and closed circuits, similar to today's Washington-Moscow "hot line."

Finally, the United Nations could be shown at work to people the world over. "It might not always be a placid picture that humanity would view," he said, "but it would mirror society through the only world forum where all ideas are publicly exchanged and debated."

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PHYSICS

Gemini Pictures Show Glowing Layer of Air

► EARTH HAS A LAYER of glowing air about 12 miles thick, rising from an altitude of about 57 miles above the surface, clear night photographs from earth-orbiting manned flights of Gemini 5 and MA-9 show.

The MA-9 photographs, taken by Astronaut Cooper when the moon had not yet risen and the earth was still dark, show distant lightning strokes on the horizon. The airglow layer has a sharp line on top and rather diffuse illumination below, report Drs. E. P. Ney and W. F. Huch of the school of physics and astronomy, University of Minnesota, Minn.

Airglow, one of many kinds of nearby light seen in earth's sky, is permanently suffused over the sky, day and night. Scientists believe it comes from air molecules and atoms when they are excited by energy from space, presumably from the sun.

Photographs also portrayed another glow, called the zodiacal light, which is the visible manifestation of dust grains in orbit around the sun, the scientists reported in *Science*, 150:60, 1965. This faint triangular light in the sky is best seen from middle northern latitudes in the west after dark during spring, and in the east before dawn during autumn.

Another light is the gegenschein, or counter glow, a faint elliptical nebulous light opposite the sun. This glow may result from a cometary-like dust tail of the earth, but Drs. Ney and Huch report there was no evidence of a westerly displacement of the light, which might be expected if such were the case.

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CHEMISTRY

Another New Isotope, Fluorine 22, Discovered

► A NEW ISOTOPE, fluorine 22, has been discovered at the Lockheed Research Laboratories at Palo Alto, Calif. The physical sciences laboratories of the Lockheed Missiles and Space Company in which the discovery was made are engaged in researches on radiation in space, properties of the upper atmosphere, X-rays from stars and other fundamental areas requiring investigation to further man's knowledge of space and the problems that arise in its conquest.

Evidence of the new isotope, produced through the action of 15 million electron volt neutron bombardment of neon 22, was observed by a team of physicists consisting of F. J. Vaughn, R. A. Chalmers, L. F. Chase Jr. and S. R. Salisbury. The half-life of the new isotope is about four seconds.

Fluorine 22 is the second isotope discovered by members of the Lockheed Missiles and Space Company nuclear physics group within a year. Previously, a team of physicists composed of L. F. Chase Jr., H. A. Grench, R. E. McDonald and F. J. Vaughn announced the identification of nitrogen 18.

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