

ASTRONOMY

New Objects in Sky

Five supernovas, two comets and a possible new asteroid have been discovered so far this year, and one comet with a known orbit was seen again—By Ann Ewing

► THE YEAR 1965 will go down as a banner year in astronomical discoveries if the record set so far in spotting new objects in the heavens is maintained.

Five supernovas, two comets and a possible new asteroid have been discovered so far this year, and one comet with a known orbit was seen again on its return trip to the sun's vicinity. There have also been cases of mistaken identity for newly found objects in the sky; both a reported supernova and a comet turned out to be asteroids.

Three of the five supernovas, which are stars that suddenly explode with the brilliance of a billion suns, were spotted by Dr. Fritz Zwicky of Mt. Wilson and Palomar Observatories, which is operated jointly by California Institute of Technology and Carnegie Institution of Washington. They are so far away, in galaxies millions of light years from the Milky Way in which the sun and earth are located, that their blazing light is too dim to be seen except with extremely large telescopes.

The two new comets are named Tsuchinshan 1 and Tsuchinshan 2. This name translates into English as Purple Mountain Observatory, the Mainland China institution in Nanking where they were found. New comets are usually named after their discoverers, not an observatory.

Both the Tsuchinshan comets are also too faint to be observed except with very large

telescopes. The paths they are taking through the sky have probably been calculated on an electronic computer at the Purple Mountain Observatory. Their orbits are quite similar and pass quite close to the giant planet Jupiter. The two comets could be the result of a fission of one comet that was originally a member of Jupiter's family.

The possible new asteroid is known only as Object Andrews, being named for its discoverer, D. Andrews of Boyden Observatory, Bloemfontein, South Africa. This may be the only name it ever will have, since Object Andrews, which is receding from earth, may be lost.

The other two supernovas were discovered by Enrique Chavira of Mexico's National Astronomical Observatory and by the astronomer Balazs of Konkoly Observatory, Budapest.

Another astronomical discovery of the year is the finding of a star, also extremely faint, with a ring surrounding it. This object is of interest because it is close to the position of an intense source of radio waves. The 17th magnitude star was located in a search for the remains of a supernova believed to have occurred in 1006.

Although communications with Mainland China range from erratic to non-existent, scientists there do receive reports from the United States and Europe. Evidence of this is the fact that the Chinese notification of

the comet discoveries was sent to the Smithsonian Astrophysical Observatory, Cambridge, Mass., in the new astronomical code. This code became effective on Jan. 1.

Information concerning use of the new code by International Astronomical Union's worldwide clearing house at the Smithsonian was not sent out until mid-December. Both comets were discovered in early January.

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ASTRONAUTICS

Moon Still Mysterious After Ranger Photos

► WHEN THE FIRST astronauts set foot on the moon, will they sink out of sight in a cloud of rock dust? More than 11,000 close-up photographs of the moon have not answered that question.

There are as many theories now about the lunar surface as there were before Rangers 7 and 8 took their one-way photo tours of the moon. Dr. Thomas Gold of Cornell University, Ithaca, N.Y., maintains that the surface of the moon is covered with a deep layer of fluffy "fairy castles," caused by continuous bombardment by micrometeorites.

As each tiny particle from space strikes the surface, says Dr. Gold, thousands of particles from the surface fly upward, and then settle back into a fragile, lacy ash-like substance with only little internal strength. At a depth of about nine feet, however, the weight of the moon dust is great enough to pack down the lower layers like a gravel pile.

Other scientists believe that such a layer of dust could only build up to about an inch, while still others estimate depths of over a hundred feet.

Another much disputed lunar feature is the crater. While many authorities hold that the craters were caused by huge meteors striking the surface unimpeded by any atmosphere, Dr. Patrick Moore of the British Astronomical Association believes that they originated as volcanoes.

Dr. Moore has said that the first astronauts may well find "definite evidence for traces of mild, perhaps volcanic, activity on the moon."

The photographs from the Ranger cameras have not settled these disputes, but the next major space mission in line, Project Surveyor, may provide the answers. The unmanned Surveyor spacecraft, of which there may be as many as 17, will actually land on the moon, laden with instruments to collect, analyze, and describe to earth scientists samples of the lunar surface.

Instruments called penetrometers will thrust into the dust layer, measuring its strength and perhaps its depth. Samples of dust and rock will be broken down into their basic elements by mass spectrometers designed to work nowhere but in the vacuum of space or on the airless surface of the moon.

Each Surveyor will also carry TV cameras similar to those on the Ranger spacecraft, but since they will be directly on the surface of the moon, the pictures will be much clearer and more detailed.

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General Dynamics

SPACE VIEW—A would-be astronaut gazes out "windows" of a manned orbital laboratory simulator which are actually television screens showing computer-driven views. The laboratory is part of an advanced system being built by General Dynamics Corporation, San Diego, through which scientists hope to gain a better understanding of the requirements for crew systems and spacecraft design.