equator a telescope of some size is necessary. It will be called Johnson's comet.

The astronomical location of the presumably new comet is right ascension one hour and south declination 51 degrees three minutes, which means that it is in the southern constellation of the Phoenix. Its brightness is reported as 10.4 magnitude, whereas an object in the sky must be sixth magnitude in order to be seen by keen, unaided eyes.

News of the discovery, made late Tuesday night, Jan. 8, was reported to the central bureau for astronomical information at Copenhagen, whence astronomical news is cabled to the observatories of the world. The comet is moving about a degree a day southward but more observations and extensive computations will be necessary before astronomers can say whether it will grow brighter, when it is likely to return, or how long it will remain with us at this time.

Science News Letter, January 19, 1935

ASTRONOMY

End of Earth Foreseen When the Sun Explodes

THE end of the earth may occur when the sun suddenly explodes, Dr. Fritz Zwicky of the California Institute of Technology suggested in a statement prepared for Science Service.

Discussing the gigantic outbursts of stars that are "the most colossal catastrophes of matter which man has ever been privileged to witness," Dr. Zwicky pointed out that our sun may some day become what is called a super-nova.

Should the sun explode, Dr. Zwicky explained, "this friendly planet on which we live would shortly be nothing but a cloud of hot gases drifting in space."

Until we know more about what makes stars explode, Dr. Zwicky explained that we are still in the position of the lady who anxiously asked a famous astronomer:

"How long, professor, did you say the sun would last?"

"A few billion years at least," answered the astronomer.

"Thank heaven," exclaimed the lady, "I thought it was only a million years."

Stars to the ancients were symbols of the eternal and unchangeable, Dr. Zwicky said. Now it is known that changes are occurring among the stars and one of the major problems of modern astronomy is to unpuzzle the origin, existence and death of stars.

One of the great star explosions occurred on Nov. 7, 1572, when the famous Danish astronomer, Tycho Brahe, saw a strange new star in the constellation of Cassiopeia. It could be seen in the daytime and outshone all the others for several weeks. Then it gradually waned to such dimness that not even with the largest of modern telescopes can astronomers discover its remains.

Dr. Zwicky estimates that relatively small telescopes watching the great stellar systems, called nebulae, outside our own Milky Way should be able to locate occasional super-novae, and that if a thousand nebulae were observed, about one super-nova a year should be discovered. Only with very great luck is there a chance of observing one of these stellar guests in the Milky Way during one lifetime.

The "new star" or nova that blazed forth near Vega last month, visible to the unaided eye even now, is not the type of stellar guest, as Dr. Zwicky calls them, that deserves the name of super-nova. It is one of the more frequent common novae. Studying with Dr. W. Baade of Mt. Wilson Observatory the super-novae recorded in history, Dr. Zwicky concludes that they originally were quite ordinary stars, that the amount of radiation that is given off when they explode results from the annihilation of a great part of the star's mass, that the explosions represent a sort of grand finale converting the stars into bodies of high density and small diameter, that cosmic rays may originate in these super-novae.

Dr. Zwicky discussed these stellar guests in a nation-wide radio talk over the Columbia Broadcasting System under the auspices of Science Service.

Science News Letter, January 19, 1935

Woolen roads are no joke—some road facings are being made of wool and tar mixtures.

PHYSICS—MEDICINE

Experiments Compare Value Of Radium and X-Rays

NEW scientific tools for investigating how well radium rays and X-rays act on the human body have just been developed by the National Bureau of Standards.

The apparatus, using blocks of wax instead of the human body to scatter the rays, and a mixture of three fluids having atomic patterns similar to the body tissues to absorb the radiation, may prove useful in helping to decide the old question of when to use and when not to use radium in treating deep-seated cancerous tissue.

Often radium rays work better than X-rays but frequently the opposite is true. Physicians, in the past, have only been able to determine this fact by actual body therapy. Now, it is hoped, a laboratory test can decide the problem in advance of clinical treatment.

Lauriston S. Taylor, of the X-rays standardization section, and Dr. F. L. Mohler, head of the atomic physics section of the Bureau, are the developers of the new ray-measuring equipment.

"While it has been possible," Mr. Taylor said, "to measure separately the ionization of radium and X-rays it has not been possible to compare accurately the results of two such tests and decide definitely when and where each may be most efficiently utilized.

"Any suitable method of measuring these rays must be carried out under conditions which physically are the same as those encountered by the radiation when it enters the body.

"To accomplish this we have constructed apparatus which measures the radiation in liquids instead of gases. These liquids have the same atomic properties as the body tissues." The fluids, he added, are carbon bisulphide, tetrahydronapthalene and a fluid known as ligroin.

A fine, screen-like mesh of wires properly insulated is immersed in this combination liquid and the ability of the rays to ionize atoms by knocking off electrons is measured.

Below the ionization screen, Mr. Taylor explained, are a series of wax blocks which scatter the rays backward after the fashion of the human body in radiation therapy. These wax blocks are known as "phantom" bodies and take the place of a body in tests.

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