

## ASTRONOMY

# Star Measures Distances

An artificial star is helping in the development of a more precise measuring stick of stellar distances. The lamp will aid in the determination of the color of stars.

➤ AN artificial star, carried from one mountain peak to another and observed as though it were a star in the distant heavens, is playing a leading role in a project to develop a more precise yardstick for measuring stellar distances.

The "star" is a tungsten filament lamp. It is enclosed in a box, in which a small hole has been drilled to allow the right amount of light to escape. When it is placed on a peak 1,000 to 3,000 feet from the University of California's Lick Observatory it looks like Betelgeuse or Arcturus, which are among the brightest of stars.

Developers of the artificial star are Dr. Joel Stebbins, the founder of photoelectric photometry and recently retired as director of the University of Wisconsin's Washburn Observatory, and Dr. Gerald Kron, associate astronomer in the observatory at Mt. Hamilton, Calif.

They hope their lamp will enable them to perfect the system of determining the colors of stars, a system used by astronomers to determine the absolute magnitudes of stars and their distances from the earth. Now that the 200-inch telescope at Palomar is searching deeper into space, where magnitudes are increasingly difficult to determine, improvement of the system is a matter of growing importance.

The two scientists, after making some preliminary observations, have sent their lamp to the Bureau of Standards for precise calibration of its temperature, which is approximately 3,700 degrees Fahrenheit. This is in the temperature range of red

stars, such as Betelgeuse, which has a temperature of 3,000 degrees.

After the "star" has been calibrated, photoelectric observations of it with one of the observatory's telescopes will permit a determination of just how red the lamp is. Then when they observe real stars which fall in precisely the same place in the spectrum, they will know they have the same temperature and color as the lamp.

Then it will be possible to tell how far away the stars are and their distances from the earth and absolute magnitude. Distances and magnitudes are determined by the colors of the stars, the color being determined by temperature. Blue stars are the hottest and brightest, white stars come next, and red stars are faintest.

When the temperature is known, astronomers can tell how much light a star is giving off. Then the amount of light actually received in the telescope is determined. Knowing how much light is lost traveling a given distance through space, it becomes possible to determine how far away the star is.

Drs. Stebbins and Kron hope to use their artificial star as a starting point of a scale which can be used for stars of all temperatures. Such a scale would permit the calculation of stellar distances with greater precision than has been possible previously.

The project which Dr. Stebbins is heading is sponsored by the Office of Naval Research and assisted by grants from the American Philosophical Society.

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## ASTRONOMY

# Large Galaxy Clouds Found

➤ NEW information about the distribution of "island universes" in space and the discovery of clouds of interstellar particles drifting in space have been reported by astronomers at the University of California's Lick Observatory.

The results were reported from a detailed study of three regions of space by Dr. C. D. Shane, director of the Observatory, and C. A. Wirtanen, observer.

The astronomers found two great clouds of galaxies, or extra-galactic nebulae, larger than any heretofore known. The discovery of these galaxies may lead to a new concept of the distribution of such "island universes."

On the basis of the work of Dr. Edwin Hubble, of Mt. Wilson and Palomar Ob-

servatories, it has been supposed that the nebulae are distributed at random in space. The Lick astronomers confirmed that this holds true if the whole sky is considered without attention to detail.

However, the picture is different if sections of the sky are examined in detail. In two of the three regions examined some of the nebulae were concentrated in two great clouds, with sub-centers in which the nebulae were extremely dense. In the third region the distribution was random.

The largest of the two clusters contains more than 1,000 nebulae, is over 60 million light years away, and extends over a distance of 10 million light years. For purposes of comparison, the solar system is a minute part of the Milky Way, which it-

self is a stellar system similar to the thousands of nebulae.

Further studies will be made to determine if such clustering is the exception or the rule in distribution of nebulae. The results may explain much about the construction and origin of the universe.

The clouds of interstellar particles were found when the scientists attempted to count nebulae in some parts of the sky. No nebulae were to be found in some places, indicating that visibility was blocked by clouds of particles detached from the Milky Way and floating in space. Such clouds long have been known to occupy space between stars of the Milky Way.

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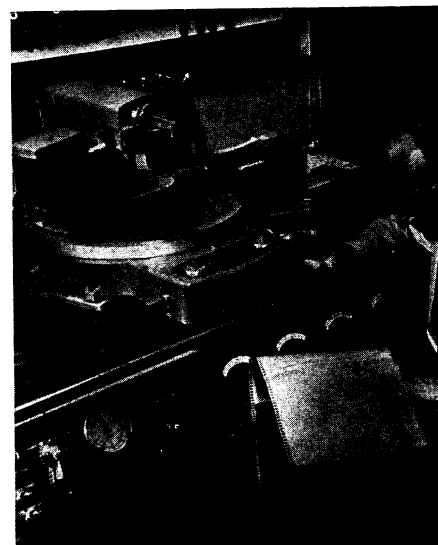
## MEDICINE

## Rotation Treatment Saving Cancer Patients

➤ SOME patients with cancers too far advanced to be helped by surgery can be saved by a rotation treatment, Dr. Theodore R. Miller of Memorial Cancer Center, New York, declared at the meeting of the American Cancer Society in New York.

Rotation treatment is done by rotating the patient during X-ray treatment, while the X-ray beam is kept pinpointed on the cancer. As a result, the cancer gets much more of the destructive X-rays than the surrounding normal tissues. Dr. Jens Nielsen, Copenhagen, Denmark, developed this method.

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**"X-RAY SPECTROGONIOMETER"—Dr. David Harker of the General Electric Research Laboratory studies a record of an unknown chemical sample, drawn automatically by the machine on which his hand rests. The machine makes it possible to determine in a few minutes the chemical content and arrangement of atoms in a chemical sample.**