ASTRONOMY

Finding Faint Star Details

Photoelectric photometry has been improved so that the light intensities of even the sixteenth magnitude can be measured.

➤ ASTRONOMERS have an improved method for learning details about faint stars, on which even the most powerful telescopes bring only vague information. The method, called photoelectric photometry, enables scientists to measure weak light intensities with unprecedented accuracy.

Dr. Gerald E. Kron, assistant astronomer in the University of California's Lick Observatory and a leader in developing the improved technique, says photoelectric photometry permits operation of the 36-inch refractor at Lick as effectively as a 100-inch instrument could be operated by usual methods.

With this refracting telescope Dr. Kron has observed stars of the fourteenth magnitude, and stars of the sixteenth magnitude are within reach. The brightest stars observable with the 36-inch instrument by previous methods have been of the tenth magnitude.

Photoelectric photometry was pioneered in this country by Dr. Joel Stebbins of Washburn Observatory, the University of Wisconsin. Dr. Kron's refinement of the technique depends primarily upon the invention, just before the war, of an efficient electron multiplier.

Light gathered in a telescope lens from a star is made to fall upon a photosensitive surface, which is in effect a photocell. The electrons emitted from this surface are amplified by the electron multiplier. The instruments are so sensitive that a few hundred electrons per second can be measured.

Dr. Kron has already applied the technique to the study of stellar atmospheres, and has verified a unique theory of Harvard astronomers about the make-up of the atmosphere of one of the rare Wolf-Rayet type stars.

The Wolf-Rayet stars are unusual primarily because of their thick atmospheres and because they are two-star planetary systems, the stars eclipsing each other twice in each revolution.

Because of these eclipses the light coming from these stars is constantly changing. Dr. Kron's systematic studies of a Wolf-Rayet star through several revolutions disclosed that the thick atmosphere absorbs light independently of its wavelength, unlike the differential absorption with wavelength by the gaseous atmosphere of the earth.

Dr. Kron says that the peculiar behavior of light emanating from these stars can be explained on the basis of the theory propounded by the Harvard astronomers that the atmosphere of the Wolf-Rayet stars is made up of a cloud of electrons. He has also found that many stars which appear to have a uniform brightness over the whole surface actually have decreasing brightness toward the edges.

Aside from bringing out new fundamental facts, photoelectric photometry greatly speeds up astronomical research in problems where it can be used. In 10 seconds Dr. Kron took a reading on a fourteenth magnitude nebula which ordinarily would have taken about 10 minutes to record on a photographic plate.

Several lifetimes of new research have been opened up as a result of the application of the refined photoelectric photometric technique to astronomy, Dr. Kron says.

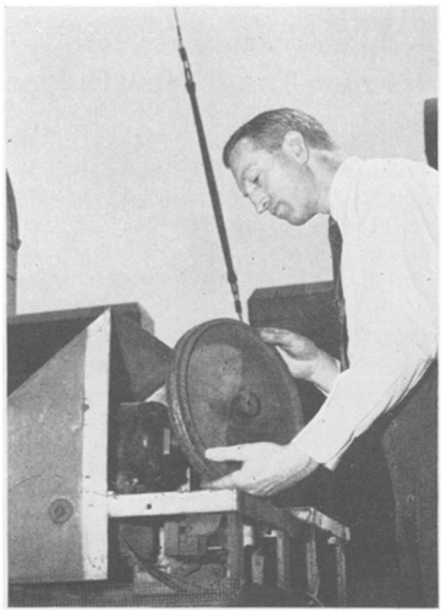
Science News Letter, August 2, 1947

ELECTRICITY

One in 365,000 Chances Of Death by Lightning

➤ YOUR CHANCES of being struck by lightning this summer are one in 365,000. Some 400 persons will probably be killed during the year in the United States. It is a small number, however, when compared with the probable 40,000 who will suffer death from automobile accidents.

The estimate is that of E. L. Harder, Westinghouse lightning engineer, whose primary job is the development of instruments and devices to protect homes, factories and electric power lines from lightning damage. As an example of accomplishments, modern protective devices now cut power interruptions on power lines almost to the vanishing point, although every 50 miles of such lines are hit some 50 times every year.



LIGHTNING HISTORIAN — Lightning writes its own history on the wheel of this "fulchronograph". Striking a tall mast, the lightning sets up an electric current which magnetizes small slices of steel inserted in the slots on the rim of the wheel. By measuring the amount of magnetism, engineers can determine the strength and duration of the thunderbolt.

He explained a Westinghouse "trap" that virtually picks lightning from the sky, shuttles it about, and makes it take its own picture on an automatic camera. It makes "fingerprints" on high-speed and low-speed wheels within the instrument, which is called a "fulchronograph," making records, which along with the photographs, can be studied at leisure.

These "traps" are exposed in elevated positions, one being 535 feet from the ground on the roof of the University of Pittsburgh's Cathedral of Learning. Here lightning strikes a steel mast from which it is channeled through various protective devices to test their efficiency.

Information gathered over a period of years has catalogued thunderbolts so thoroughly that engineers can forecast with reasonable accuracy when and where they will strike on the average, and what their force will be. It is on the basis of this knowledge that the probability of death from lightning is estimated.

Science News Letter, August 2, 1947

Large male *otters,* including their heavy tails, are sometimes four feet in length.