ASTRONOMY

Evidence Obtained that Space Between Stars Not Transparent

Absorption of Stellar Light by Matter May Make Stellar Distances Seem too Great, Says Astronomer

FROM A STUDY of far-away nebulae, some of the most distant objects that can be observed by astronomers, Prof. Edwin F. Carpenter, of the Steward Observatory of the University of Arizona, has obtained new and additional evidence that space between the stars is not entirely transparent.

Speaking before the meeting of the American Astronomical Society, in session at the Perkins Observatory of Ohio Wesleyan University, Prof. Carpenter told of his latest researches. Previously Dr. R. J. Trumpler, of the Lick Observatory, and Dr. Piet Van de Kamp, of the McCormick Observatory, found indications that part of a star's light may be absorbed during its journey through space.

The Milky Way system, or the Galaxy, includes the sun and all the stars that we can see. It is shaped like a grindstone, and we are not far from the center. As we look towards the edge of the grindstone, we see the stars more concentrated toward the sides, and this causes the Milky Way, which is shown by even a small telescope, to consist of myriads of stars. Beyond the limits of our Galaxy, however, are other similar systems, the so-called "extra-galactic nebulae," and these are what Prof. Carpenter has studied.

Would Afford Check

Dr. Trumpler's researches upon the absorption of light in the inter-stellar space led him to suppose that through the middle of our Galaxy there extends a layer of material that stops a portion of star light passing through it. Prof. Carpenter decided that the extra-galactic nebulae would afford a check upon such a theory as this.

When we look at these nebulae beyond the sides of the grindstone, their brilliancy would be scarcely affected, because their light would have to penetrate but a very small thickness of the absorbing cloud. No such nebulae can be seen in the actual direction of the Milky Way, but those near it would seem somewhat dimmed, because their light would have to come through a considerable amount of the absorbing stuff. In a similar way, the sun appears fainter at sunset. The earth's atmosphere is the absorbing cloud. When the sun is close to the horizon its light has to penetrate much more atmosphere than at noon, and so it does not look as bright.

Prof. Carpenter found that the extra-galactic nebulae do show this effect. With measures of the diameters of these nebulae made by Dr. E. P. Hubble at Mt. Wilson Observatory, and of their total brightness by a European astronomer named Holetschek, he computed their apparent surface brightness. It was found that a nebula of a given size near the Milky Way is fainter than one of the same size in the part of the sky farthest from the Milky Way, the galactic poles.

"At 20 degrees from the Milky Way," said Prof. Carpenter, "where we should be looking through some three or four times as much material as there is in the direction of the galactic poles, the brightness decreases by nearly 40 per cent."

If such a layer of absorbing matter exists, it means that previous measures of distances in the direction of the Milky Way are much too great. Prof. Carpenter explained the reason. "When we know a star's actual candle-power," he said, "we use its apparent faintness as a measure of its distance, but if a part of the faintness must be attributed to the dimming cloud, the star's real distance must be less than formerly supposed."

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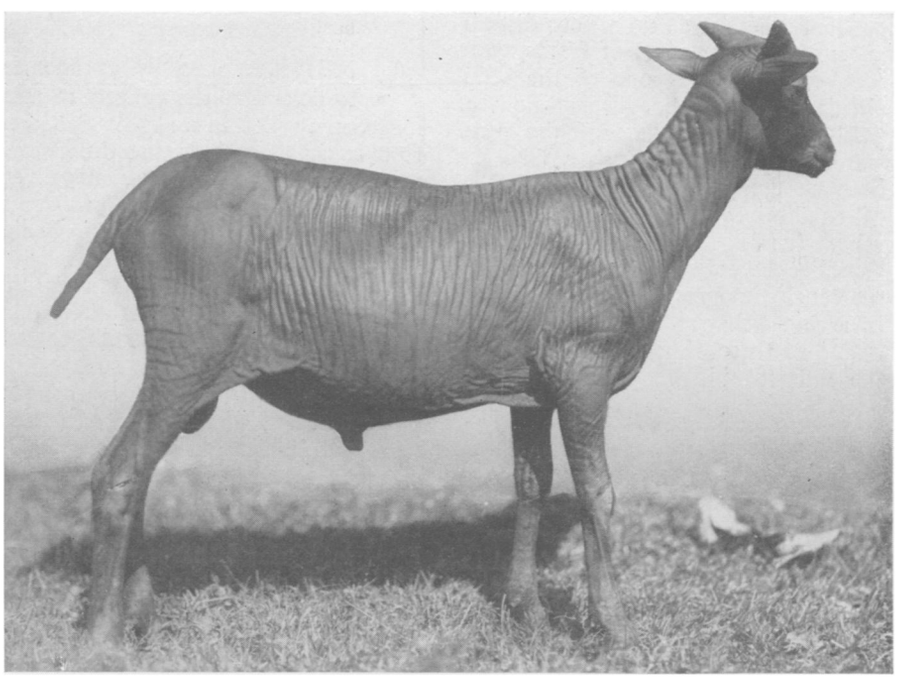
ENGINEERING

New Photo Tube Measures Temperature in Furnace

A NEW "photo tube" which looks into a furnace and measures the heat, has been described by Dr. L. R. Koller of Schenectady, N. Y. A current is set up in the tube by the light it "sees." The brightness of an object varies sixteen times as fast as its temperature; therefore the photo tube current



BAREBACK *Journal of Heredity*

This wool-less sheep from Russia represents an interesting twist of heredity. Many mammals have hairlessness in their hereditary equipment—generally as a recessive character. That is, it is frequently overshadowed by the stronger "dominant" tendency to grow hair and only makes itself known in that small percentage of cases when it is inherited from both parents.