

ASTRONOMY

Huge Star Found to Consist Of Stuff Thinner Than Vacuum

Larger Member of Eclipsing Pair, Zeta Aurigae, 10,000,000 Times Size of Sun, is Very Tenuous Gas

OBSERVATIONS at Mount Wilson Observatory have enabled scientists to determine, for the first time, the size and physical characteristics of the only eclipsing stars in outer space in which astronomers are particularly interested. An eclipsing star is really a pair of stars that revolve around each other. An eclipse occurs each time one member of the pair passes between us and the other member.

The largest star in the eclipsing system, named Zeta Aurigae, is equivalent in size to about 10,000,000 of our suns, while the smaller is also much larger than the sun. The large star is approximately 20 times the diameter of the smaller, hotter star. The largest star in the system is a giant "K" type star.

Two Eclipses Watched

The most striking feature about Zeta Aurigae is that the large star is as dense as the vacuum of an electric bulb.

This new information about Zeta Aurigae is outlined by William H. Christie, noted Mount Wilson astronomer, who has observed the last two eclipses, in a leaflet published by the Astronomical Society of the Pacific.

The eclipse occurs every 973 days, the larger star passing before the smaller. The eclipse lasts about 37 days.

Mr. Christie explained that the reason for the great interest in the Zeta Aurigae eclipses lies in the fact that it is the only star known, other than the sun, in which man can actually measure the heights to which various elements constituting the atmosphere of a giant star extend.

The stars, fortunately, are equal in brightness in the photographic region of the spectrum, by which they are studied.

"The system of Zeta Aurigae," Mr. Christie explained, "provides us with the means of obtaining cross sections, as it were, of the atmosphere of a giant K-type star. Perhaps other systems, such as this, may eventually be found, but it is not likely that many similar systems exist that are bright enough to be

readily observed. However, if a number of such systems of different atmospheric characteristics are found, we shall obtain much valuable data as to the structure of stellar atmospheres as a whole."

The astronomer pointed out that although the eclipsing stars are immense, their mass is not so many times greater than that of the sun.

"The larger star of the pair turns out to be about 15 times the mass of the sun; the smaller, about eight times," said Mr. Christie. "Since these stars are very bulky it means that the matter of which they are composed is much more thinly diffused than in the case of the sun. The density, or amount of material per unit volume, is quite low.

"The smaller star has a density of about one hundredth, the larger but two millionths, that of the sun. The larger cool star is, then, on the average about as dense as the vacuum in an electric light bulb."

By the same reasoning, Mr. Christie expressed the opinion that the density of gases near the outer boundary of the star's atmosphere makes the vacuum in the electric light globe seem a solid object by comparison, for probably no vacuum producible on earth is as rare as these outermost layers.

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CHEMISTRY

Rare Metals Wasted Up England's Chimneys

RARE metals in large quantities go up Britain's chimneys in smoke, Dr. Gilbert Morgan and G. P. Davies of the Teddington Chemical Research Laboratory have discovered by analyzing many samples of soot and smoke. More than 2,000 tons of the element germanium, 1,000 tons of gallium, and comparable quantities of silver, indium, cerium, lanthanum, and vanadium are thus wasted.

These elements are present in small quantities in coal, and are lost up the flue when the coal is burned or coked to produce gas. Practical means for their recovery have not yet been suggested.

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ANCIENT SIAMESE TWINS?

Did prehistoric Indians in Chile marvel over the birth of Siamese twins to some Indian mother? That is what Chilean scientists would like to know, since they have found this stone statue, 17½ inches high, near the town of Angol. Stone images of human beings are extremely rare in Chilean archaeology, and nothing like this has been reported before. The image was made by a little-known prehistoric people who buried their dead in earthenware jars and made decorated pottery, the colors of which remain fresh today.

PHYSICS

Average American's Suit Is Poor Light Reflector

THE AVERAGE American male wears a "neutral gray suit having a reflection factor of about 4.5 per cent." It doesn't make too much difference what kind of light is the source of illumination.

No fashion note is this, but the result of a study by two Massachusetts Institute of Technology scientists endeavoring to determine the visibility of the average male pedestrian on a road at night. It means that he isn't too visible against a dark pavement to the man behind the wheel.

Cloth samples to the number of 229 were tried by Prof. Parry Moon, student of lighting, and Dr. M. S. Cettei, they report in the current issue of the *Journal of the Optical Society of America*.

Work such as this is part of the increasing study being devoted to highway and motor vehicle headlight illumination, one of the most important angles of the safety problem.

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