

ASTRONOMY

Faintest Star Discovered

A million like it would be needed to equal the brilliance of our sun. Finding will help astronomers understand the nature of such stars.

► THE DISCOVERY of a star of such extremely low luminosity that a million stars like it would be needed to equal the sun's brilliance has been announced from the McDonald Observatory of the Universities of Chicago and Texas.

This important contribution to astronomical observations follows closely upon the heels of the finding at the same observatory of an atmosphere of methane around Saturn's largest satellite. (See SNL, Jan. 29)

The present discovery was made by Dr. G. Van Biesbroeck of the Yerkes Observatory when comparing two plates taken at the prime focus of the 82-inch McDonald Observatory reflecting telescope. On these plates the star known as "BD plus 4 degrees 4048" is found to have a companion star at a distance of 74 seconds of arc away.

The companion is identified by the fact that it shares the apparent motion of the brighter star across the sky; the companion itself is of the 18th magnitude as seen on the plate.

In order to determine the intrinsic brightness of this star, however, its distance from us must be known; this is of course practically the same as that of the primary star. This star happens to be rather close to the sun as astronomical distances go, its distance being about six parsecs, or $19\frac{1}{2}$ light years. In other words, light traveling at some 186,000 miles per second requires nearly 20 years to reach us from that star.

However, the nearest star is no nearer to the sun than one-fifth of this distance. The faint companion star's intrinsic luminosity comes out very faint; it is expressed by astronomers as being of absolute magnitude 19 on red plates. This makes it three magnitudes, or about 15 times, fainter than the faintest star previously observed, Wolf 359, which has a red absolute magnitude of 16.

Wolf 359 is only eight light-years away, so its earlier discovery is not surprising. The sun is on the order of a million times as bright as the new faint star.

In making his announcement, Dr. Van Biesbroeck calls attention to the fact that

if this star and Jupiter were placed at the same distance, Jupiter at its brightest would still be seven magnitudes fainter than the companion of the star known as "BD plus 4 degrees 4048." This is a factor of about 600 times and makes it fairly certain that the faint star is shining by its own light rather than reflecting light from its primary; whereas Jupiter shines only by reflected sunlight.

Jupiter is the largest planet in the solar system, so it is also one of the brightest even though it is five times as far from the sun as the earth is. The new faint companion star, however, is some 440 times the earth-sun distance from its principal star which makes it quite certain that its light is not reflected. At present nothing can be said about the mass of this newly found faint star but it must evidently be rather small unless it is some unusual sort of highly condensed star. Ordinarily the mass of a star is closely related to its luminosity.

The importance of this problem is its relation to that of the recently discovered stars of very small mass such as the invisible companion of 61 Cygni. This latter star discovered by Dr. K. Aa Strand of Swarthmore has a mass only 16 times that of Jupiter but Dr. Strand's observations reveal nothing of its brightness. The small star is invisible, and is detected by its gravitational effect on the primary star around which it revolves.

Is Van Biesbroeck's new star of as small mass as Dr. Strand's? If that question can be answered considerable light will be thrown upon whether to call such small and faint objects stars or planets. Astronomers are at present undecided which term ought to apply, but discoveries such as Dr. Van Biesbroeck's are rapidly clearing up the matter. It is possible that the distinction between planet and star may some day almost cease to be plausible.

Included in the information supplied to the Harvard clearing house by Dr. Van Biesbroeck for distribution to American and foreign astronomers is that the position angle of the faint star is 150 degrees; that the common proper motion is 1.45 seconds toward 204 degrees; that the parallax is 0.17 seconds and the pro-



NOT THE DEVIL—But a restoration of a Hopewell Indian with a ceremonial deer-antler headdress of copper. These mound-building Indians left objects of copper, mica, stone and silver, showing great skill and artistry. Part of the exhibit in the new Hall of Indian America at the Chicago Natural History Museum. (See also page 86)

jected separation is 440 astronomical units.

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AERONAUTICS

Sound-Proofing of Aircraft Needed to Protect Crews

► SOUND-PROOFING military aircraft, to a reasonable extent, has been found highly desirable to protect flight crews from progressive deafness and from physical fatigue and nervousness caused by exposure to excessive noise and vibration, declared Albert A. Arnheim of the Solar Aircraft Co., San Diego, Calif., at the New York meeting of the Institute of the Aeronautical Sciences. The high degree of sound-proofing mandatory in commercial airliners is out of the question in warplanes.

"The main sources of noise on an airplane, in the usual order of their magnitude, are: propellers, exhaust, en-