ASTRONOMY

# Twinkling Stars Studied

ASTRONOMERS at the Mt. Palomar Observatory, Pasadena, Calif., have completed studies of twinkling stars which will help measure astronomical distances far more accurately than ever before.

For more than 40 years astronomers have based their measurements on the twinklers, pulsating stars known as cepheid variables. But the calibrations were not as accurate.

These stars have two unique habits that make it possible to use them as distance indicators. They dim and brighten in a rhythmic cycle, called a period, and the length of their blink period and their brightness are related. In other words, the longer the period, the brighter the star. Twinklers with half-day periods are 100 times brighter than the sun and those with 40-day blinks are 6,000 times brighter than the sun.

This means that if two cepheids of the same period are compared and one of them appears to be brighter than the other, the difference in brightness will be due entirely to the fact that one is farther away than the other. If one appears to be one-fourth as bright as the other. it means that it is twice as far away because brightness varies inversely with the square of the distance. If in addition the actual distance of one of them is known, the distance of the other can easily be calculated.

Astronomers found that a few cepheids twinkled irregularly and that others did not conform exactly to the period-luminosity relationship. Small differences in color were discovered in cepheids having the the same period.

A group of astronomers from Mt. Wilson and Palomar Observatories found that some of the cepheids were redder than others, due to thin dust clouds somewhere between the viewing telescope and the star itself. They also discovered that over a period of many years, a pulsating star loses some of its blueness and becomes yellower and cools off about 1,000 degrees Fahrenheit.

The studies indicate that the larger stars are more reliable as distance indicators. By correcting for the color differences, astronomers can now calculate distances as far as the telescope can see.

Science News Letter, April 2, 1960

CHEMISTRY

## Silicon-Boron Compound Resists Heat, Oxidation

LARGE QUANTITIES of the little known compound tetraboron silicide, $B_4Si$, can now be prepared for the first time.

Dr. Ervin Colton of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., reports in the Journal of the American Chemical Society, 82:1002, 1960, that this compound in reasonably pure form is obtained when a mixture of the elements boron and silicon is heated in an inert atmosphere at between 2,200 degrees and 2,500 degrees Fahrenheit.

Objects made from the powdered compound have been shown to be highly resistant to oxidation at 2,500 degrees Fahrenheit due to a protective film that forms on exposure to the air at high temperatures. It also showed excellent thermal shock resistance in that no cracks appeared when the objects were cooled rapidly from that high temperature to room temperatures several times.

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