# physical sciences

STELLAR ASTRONOMY

## An eclipsing binary stops

A binary star system consists of two stars bound together by gravitational forces and rotating around each other. Many of the binary stars are so-called eclipsing binaries: One of the elements is more or less dark and periodically passes in front of the brighter companion obscuring all or part of its light.

Since 1949 the star CV Serpentis has been known as an eclipsing binary. Dr. L. V. Kuhi and F. Schweizer of the University of California at Berkeley set out to do some spectroscopic studies of CV Serpentis. But when they looked, they discovered that no eclipses seemed to be occurring at all. "The system has stopped eclipsing!" they report in ASTROPHYSICAL JOURNAL LETTERS for June.

Their suggested explanation of the cessation of eclipses is that the eclipses were caused mainly by a dense, gaseous envelope surrounding the darker star. For some reason the darker star blew off this envelope, and without it, the star is too small to obscure the light from its brighter companion by any observable amount. They suspect that the darker star of the pair may grow a new envelope and begin eclipsing again, and they urge continuing observations to see whether this does happen.

STELLAR ASTRONOMY

## Bright knots in hydrogen clouds

The radio brightness of the ionized hydrogen cloud W 51 has been mapped at a wavelength of 11 centimeters by Drs. G. K. Miley, B. E. Turner and B. Balick of the National Radio Astronomy Observatory at Green Bank, W. Va., and Carl Heiles of the Arecibo Observatory in Puerto Rico. On this map they have discovered two bright spots that are no larger than six-tenths of a second in diameter.

Many astronomers have suggested that stars form in such ionized hydrogen regions, and in ASTROPHYSICAL JOURNAL LETTERS for June, Drs. Miley, Turner, Balick and Heiles suggest the possibility that these knots may represent the beginnings of stars.

On the other hand, instead of material contracting into stars the spots may be clouds of very hot gas expanding into a vacuum. If the temperature of the gas is greater than 100,000 degrees K., as the observation seems to show, then the clouds would expand at a rate greater than 100 kilometers per second and would double their diameter in less than a century. Deciding whether either of these explanations fits the knots depends on finding out more about them, especially determining their spectra in detail.

GALACTIC ASTRONOMY

## Quasars and intergalactic clouds

On the way to the earth the light from certain quasars apparently encounters other occupants of the universe.

Evidence for this is seen in the observation that something is absorbing certain wavelengths from the light of a number of quasars. The red shift of these absorption patterns, which indicates their distance from the earth, is different from the red shift of the emission patterns attributed to the body of the quasar itself. Therefore, some astronomers conclude that whatever is doing the absorbing is not associated with the quasar but is something encountered by the light on its way through the universe.

In the ASTROPHYSICAL JOURNAL for June, Dr. Joseph Silk of Princeton University suggests that the absorbing agents may be intergalactic clouds of gas analogous to the interstellar gas clouds observed in many parts of our galaxy. He suggests that such clouds are formed of gas left over after the galaxies in any particular cluster have condensed.

PLANETARY ASTRONOMY

## Jupiter's atmosphere

The best known component of the atmosphere of the planet Jupiter is ammonia, which appears in the form of clouds of solid ammonia crystals. The presence of other substances has been suggested, however, and now there is evidence for some of these, according to a report in the July 31 SCIENCE by Drs. John S. Lewis and Ronald G. Prinn of the Massachusetts Institute of Technology.

Infrared observations have shown that local temperatures in Jupiter's north equatorial belts range as high as 310 degrees K. The temperature of solid ammonia clouds is only 168 degrees K.

Furthermore, visual observations show that the same regions of the planet have changed color to a distinct orange brown. They suggest that in this region ammonia clouds have drifted away, allowing the sun's rays to reach hydrogen sulfide, which is also present in the atmosphere. The effects of the sun's rays on the hydrogen sulfide and whatever ammonia may be left in the neighborhood causes formation of hydrogen polysulfides, elemental sulfur and ammonium polysulfides. All of these compounds are yellow, orange or brown in color. They float at levels of the atmosphere, between 10 and 30 kilometers lower than the ammonia clouds.

PHYSICAL CHEMISTRY

## Anomalous water and silicic acid

Since the Russian chemist N. N. Fedyakin discovered that a strange liquid appears when water vapor condenses in minute capillary tubes (SN: 3/21, p. 289), chemists have argued over the nature of this condensate. The question has been whether it is a strange form of water or whether it is a solution of impurities from the tube or some substance created by the reaction of the water vapor with the tube.

Another argument against an unusual form of water is presented in the July 25 NATURE by Drs. V. V. Morariu, R. Mills and L. A. Woolf of the Australian National University at Canberra. In their experiments they first prepared a sample of anomalous water and studied its physical properties, such as its resistance to evaporation, its physical appearance and its refraction of light.

They prepared a solution of silicic acid in water and found that its properties matched those observed for the anomalous water. They conclude, therefore, that anomalous water and the silicic acid solution are identical.