

## PLANETARY ASTRONOMY

### Densities and origins

One of the current hypotheses of how the solar system began says that the planets condensed out of a cloud of gas surrounding the sun. But the wide variation of the densities of the planets leads to difficulties for this theory.

If one considers only those planets nearest the sun, the spread of densities runs from 3.34 grams per cubic centimeter for the moon to 5.51 for the earth. The differences, says Dr. W. H. McCrea of the University of Sussex in England, indicates different chemical compositions for the bodies. It is hard, he says, to see how they could all have been formed separately from the same raw material.

But the condensation hypothesis can be saved if the present bodies are not the original condensation.

Some time ago Dr. R. A. Lyttleton of Cambridge University suggested that the earth, the moon and Mars were originally a single body and Venus and Mercury originally another. In the Oct. 4 NATURE Dr. McCrea shows that if one adds up the masses of the two systems, the density of the earth-moon-Mars body comes to 5.27 and that of Venus-Mercury to 5.25. These could have come from the same cloud.

Dr. McCrea suggests that these two bodies did exist. They would have become rotationally unstable and split into pieces. But the splits would have taken place some time after gravity and rotation had separated light and heavy elements. Thus, the moon and Mars would have come from the lighter, outer regions of one body, leaving the heavier earth behind.

## X-RAY ASTRONOMY

### The Centaurus-Lupus object

Last summer Drs. J. P. Conner, W. D. Evans and R. D. Belian of Los Alamos Scientific Laboratory reported the discovery of an X-ray source at the boundary between the constellations Lupus and Centaurus (SN: 8/16, p. 130).

This object had suddenly appeared early in July while equipment aboard two Vela satellites was watching, and had flared up to a brightness twice that of the X-ray source Scorpius X-1, the brightest hitherto known.

Now the three discoverers report in ASTROPHYSICAL LETTERS for September that they have analyzed the data for several weeks after the discovery and found that the brightness declined. The object reached its peak brightness on July 11. By July 23 it was less than half as bright as it had been at its peak. Furthermore, say the Los Alamos investigators, the spectrum of the object has shifted gradually toward softer, that is, less energetic, longer wavelength rays, than at first predominated.

## MOLECULAR ASTRONOMY

### A second kind of formaldehyde

The discovery of clouds of formaldehyde in interstellar space was reported in the spring of this year by Drs. Benjamin Zuckerman of the University of Maryland, Patrick Palmer of the University of Chicago, and Lewis E. Snyder and David Buhl of the National Radio Astronomy Observatory (SN: 4/12, p. 351).

The chemical formula for formaldehyde includes two

hydrogen atoms, a carbon and an oxygen. The formaldehyde reported earlier was of the most common kind, made with the most common isotope of carbon, carbon 12. Now, in ASTROPHYSICAL LETTERS for September, the same group of astronomers reports discovery of a rarer variety of formaldehyde, that made with carbon 13.

The ratio of the carbon 12 formaldehyde to the carbon 13 variety appears, they say, to be lower for two sources near the galactic center than it is for sources outside the center. Since theories of stellar evolution predict that nuclear processes in stars would yield certain ratios of carbon 12 to carbon 13, this result implies differences in the history of the interstellar medium in various parts of the galaxy.

"These differences," say the four astronomers, "might be caused by local events, by variation in the formation or evolution of stars, or simply by differences in the extent to which the interstellar medium has been processed through stars."

## PULSARS

### A new one

During a general investigation of meter-wavelength radio sources, the radio astronomy station of the P. N. Lebedev Physical Institute at Pushchino in the U.S.S.R. found a pulsar at right ascension 9 hours 43 minutes 15 seconds and declination 8 degrees.

The new pulsar is called PP (for Pushchino pulsar) 0943. Its signal has been studied at frequencies between 70 and 90 megahertz, say Drs. V. V. Vitkevich, Yu. I. Alekseev, V. F. Zhuravlev and Yu. P. Shitov in the Oct. 4 NATURE. Its period is 1.093 plus or minus 0.003 seconds.

The brightness of PP 0943 is highly variable, say the Russian astronomers. Usually a succession of 5 to 10 pulses is recorded and then the signal disappears entirely for a while. The brightness can vary from one pulse to another by a factor of several times, they report.

## X-RAY ASTRONOMY

### A flare from Sco X-1

The X-ray star Scorpius X-1 is subject to sudden flare-ups in brightness that are puzzling to astrophysicists (SN: 5/17, p. 471). The latest report of such a flare appears in the Oct. 4 NATURE and concerns a flare that occurred on Dec. 22, 1968.

The data were taken by balloon-borne equipment that flew from a station in Hyderabad, India, and analyzed by Drs. P. C. Agrawal, S. Biswas, G. S. Gokhale, V.S. Iyengar, P. K. Kunte, R. K. Manchanda and B. V. Sreekantan of the Tata Institute of Fundamental Research in Bombay.

During a 90-minute observation period, they say, the brightness of Sco X-1 first dropped by a factor of three, remained constant for some minutes, and then shot up again by a factor of three before dropping a second time.

The flare was seen in the energy range between 29.9 and 52.3 kilo-electron volts. It did not appear in the energy range 20-30 keV, and this leads the investigators to conclude that the spectrum of Sco X-1 during a flare becomes very much harder, that is, concentrates more in the high-energy X-rays, than it seems to at other times.