

# PHYSICAL SCIENCES

Dietrick E. Thomsen reports from the meeting at Rohnert Park, Calif. of the Astronomical Society of the Pacific

## As Mars turns

The motions of the planets have been watched for centuries. "Ephemeris," the word for a compilation and prediction of such motions, is derived from the same Greek word as "ephemeral." The motions may be swift and vanishing, but there is nothing ephemeral about the concern. When Gerard de Vaucouleurs of the University of Texas and his co-workers decided to compile a new physical ephemeris of Mars, they found 800 observations of passages of Martian albedo markings through the crosshairs of transit telescopes, 109 of them before 1878.

They reduced the observations to Greenwich Mean Time, then corrected them to Ephemeris Time and calculated corrections for the relative locations of earth and Mars in their orbits at the time of observation. Then they could see how a given spot appeared to rotate around Mars. If the currently accepted rotation period is in error, the longitude of the spot will drift.

They derived a correction of 7 milliseconds for the rotation period of Mars. This was then compared with the figure obtained from radio tracking of the Viking landers and found in "very good agreement." "Eighty or ninety years of ground-based observations and six months of spacecraft equal the same precision," de Vaucouleurs says. And the Viking data are still being worked. He concludes that such landers are an excellent way of determining the motions of planets.

## V861 Sco's UV flare

The binary star V861 Scorpii has been found to be an X-ray source; that is, X-ray detectors have found a source whose direction coincides with that of the visible V861 Sco. This im-

mediately suggests to some astronomers that there may be a black hole in V861 Sco. From optical evidence the system appears to consist of an ordinary star bound to a dark object. That object could be a black hole, and the X-rays could be generated by a flow of gas from the primary star to the black hole.

So far V861 Sco is like a number of other binary star black hole candidates, but it has done a very curious thing. It has produced a massive flare in the ultraviolet, visible principally in the lines of ionized carbon around 1,180 angstroms wavelength. The luminosity of this event was comparable to that of the total star.

"At the risk of becoming black hole flacks," says William Oegerle of Princeton University, "Ron[ald S. Polidan] and I decided to observe again." From the optical properties of V861 Sco they could determine an orbital period of 7 days. They figure that the mass of the primary star is between 20 and 50 times that of the sun. The unseen companion is between 7.5 and 13 solar masses. That rules out a neutron star or a white dwarf. Either ought to have much less mass. It is possible in theory to link the ultraviolet flare with an X-ray flare. X-ray flares are seen in these X-ray binaries, and they are explained by changes in the gas flow between the two objects. So it all looks good *provided* V861 Sco really is the X-ray source. There has now developed an argument over that. Says Oegerle: "If not, we are in trouble. We have to explain that UV flare."

## SS 433: Getting down to the disc(o)

The strange stellar object with the weirdly behaving spectrum designated SS 433 that lurks at the edge of our galaxy is widely believed to be some kind of compact object (maybe a black hole) rotating and spewing out two streams of ionized gas moving at a quarter the speed of light (SN: 4/28/79, p. 277). Holland Ford of the University of California at Los Angeles gave some details of how the spewing comes about. Around the central object is a disc of gas that rotates with it. The rotation is so fast that at the edges stuff continually flies off tangentially.

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