Nova Cygni 1975: Astronomers' busy weekend

Anything new in the sky excites astronomers. A nova, by definition something new, is a kind of stellar explosion in which a previously faint or invisible star suddenly becomes very bright. Over the last weekend in August a particularly bright one—unprecedented in its rise in brightness—blew off in the constellation Cygnus. A previously invisible star suddenly flared to millions of times its former brightness and was easily visible to the unaided eye in the nighttime sky.

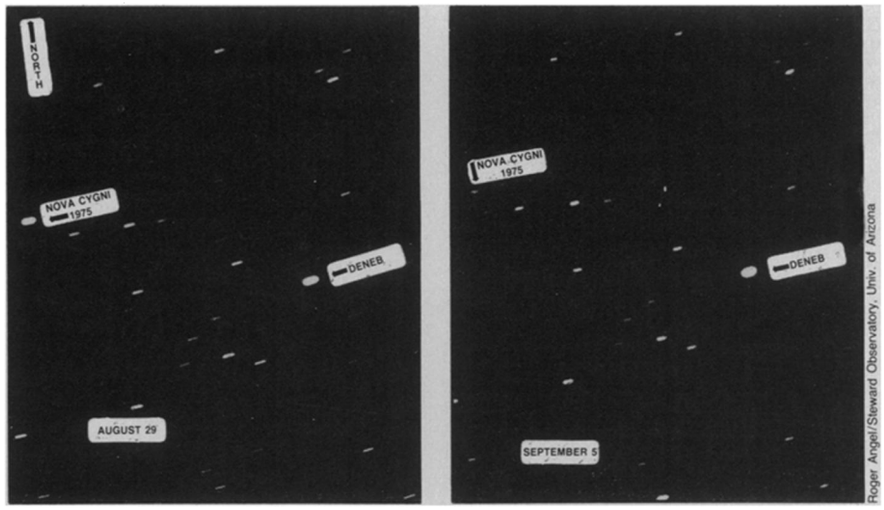
The first news of the nova came from Minoru Honda of Kurashiki, Japan. On Aug. 29 his report was cabled to the Smithsonian Astrophysical Observatory, which operates Astronomical Telegrams, the astronomers' express information network, by K. Osawa, director of the Tokyo Astronomical Observatory. Yet it should be remembered, as Brian G. Marsden points out in International Astronomical Union Circular 2826, that ". . . many hundred independent discoveries . . . must have been made of the nova during the 24 hours following its rise to naked-eye brightness . . . ."

But it was Osawa's telegram that started the wires humming, and in all the world's astronomical observing centers, telescopes were turned toward Nova Cygni 1975. By Sept. 2, when Marsden put out the first circular on the nova, dozens of reports had come in. Even as late as Sept. 5, Marsden told SCIENCE NEWS, "I've hardly had any rest since that nova blew off." Reports came from such far-flung locations as Dushanbe, capital of the Tadzhik Soviet Socialist Republic in central Asia; Norway; Tel Aviv; Saskatoon; Arecibo, and of all places, Thunderbolt, Ga.

The Cygnus object was unusually bright even for a nova. "It is certainly an unusual object," observes Roger Angel of the University of Arizona. It is so unusual that some early observers thought it might be a supernova (among them C. de Vegt, U. K. Gehlich and Lubos Kohoutek of the Hamburg Observatory), but spectra that were obtained by the second or third day of observation look typical of a nova. The nova reached a peak brightness better than second magnitude, brighter than Polaris, the Pole star. One observer, P. Tempesti of the Collurania Observatory in Teramo, Italy, put it at 1.79. This is brighter than all but 30 stars in the entire sky.

Attempts to detect radio emission at 10.6 gigahertz using the 46-meter telescope of Canada's Algonquin Radio Observatory and a look for X-ray emission by the United Kingdom's Ariel satellite found nothing significant.

Searchers of sky survey charts at the nova's location (right ascension 21 hours 9 minutes 52.85 seconds, declination +47 degrees 56 minutes 41.3 seconds) fail to find anything visible before the nova down to 20 or 21 magnitudes.



Nova Cygni 1975 and how it faded from peak brightness (Aug. 29). Compare Deneb.

Thus at peak brightness the nova had risen about 19 magnitudes and possibly more. This means it had flared to at least 40 million times its former brightness. (Each change of one magnitude multiplies brightness by 2.512.)

According to Luigi Jacchia of the Smithsonian Astrophysical Observatory, this is the greatest rise in brightness ever recorded for a nova. One which exhibited nearly the same change was Nova CP Puppis in 1942, which rose 16.5 magnitudes (4 million times) at least. Jacchia suggests that the great change in brightness indicates that both of these may be virgin novas, blowing off for the first time.

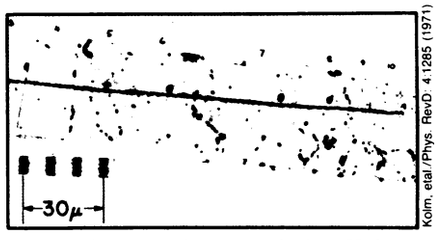
Unlike a supernova, which puts an end to star's life, novas may happen cyclically in the life of star. The theoretical picture, according to Jacchia, is that novas happen to stars in extremely close binaries, stars of the class named for W Ursae Majoris.

The two members of the binary are so close that they distort each other's shapes, and matter flows from one to the other. The star that becomes a nova is a dark star that has just about finished burning its supply of hydrogen. A new supply of hydrogen falls on it from its companion, but that hydrogen is on the outside, not in the middle as it should be for properly controlled burning. "God knows what can happen then," says Jacchia. "Suddenly the hydrogen can ignite, and that may cause an explosion."

The nova flares up and then settles back to roughly where it was. The 1942 nova settled back to about 14 magnitudes below maximum. Nova Cygni 1975 began dropping off at about one magnitude a day. By Sept. 5, a week after its first appearance, it was down to the limits of naked-eye sight, about sixth magnitude, but the fading rate had slowed to half a magnitude a day. It usually takes years for a nova to get back to where it started. When it does the cycle can begin again. The time period can range from a generation or so for novas that change only a few magnitudes to 10,000 or 100,000 years for those like Puppis or Cygni. □

Monopole claim: Storm of scrutiny

The four physicists who published a claim to the discovery of a magnetic monopole (SN: 8/23-30/75, p. 118) now find themselves the center of a raging storm of dubiety. They expected this when they published, and they meet it good naturedly. One of them, P. Burford Price of the University of California at Berkeley (the others are Edward K. Shirk of Berkeley and Weymar Zack Osborne and Lawrence S. Pinsky of the University of



Part of the emulsion track that Kolm once suspected might be a monopole.