

A Tale of (Perhaps) Two Novas

Novas are not terribly rare astronomical objects. About half a dozen a year are seen. At the moment three rather ordinary ones are under observation, one in Aquila, one in Scutum and one in Perseus. But Nova Cygni 1975 was the star performer of recent decades, unprecedented in its change in brightness and intrinsically the brightest nova in at least 40 years (SN: 9/13/75, p. 164).

Among unusual transient stellar objects Nova Cygni 1975 shares the spotlight with a possibly stranger object, the X-ray source in the constellation Orion designated A0620-00, which is beginning to look like a nova too.

According to theory a nova occurs when a dark star receives an influx of thermonuclear fuel that it can't handle properly from its companion in a close binary system. The result is an unstable system that can explode in a blinding thermonuclear flash. Chemical elements are synthesized in the explosions, and so novas "may be part of the key to understanding the evolution of all matter from the simple hydrogen which it is theorized constituted all matter when the universe was created," says Harlan J. Smith, director of the McDonald Observatory.

As Nova Cygni 1975 continues gradually to fade, reports continue to come in, filling in detailed data about its behavior. At peak it was as bright or slightly brighter in infrared than in visible light (about 1.79 magnitude at 2.7 microns), but no radio or X-ray emission could be found.

Spectra taken by Ch. Fehrenbach and Y. Andrillat at the Haute Provence Observatory indicate the presence of hydrogen, oxygen, nitrogen, silicon, calcium, sodium, iron, titanium and manganese. A series of spectra taken by A. Burnicki, Wilhelmina Iwanowska, S. Krawczyk, A. Strobel and A. Woszczyk at the Toruń Observatory in Poland trace the evolution of the shell of matter driven outward by the explosion. The explosion velocity grew rapidly from 1,100 kilometers per second to 2,250 km/sec where it stabilized from Sept. 1 to Sept. 4. J. C. Kemp and R. J. Rudy of the University of Oregon found some splittings of spectral lines that look like magnetic effects that would require fields in the kilogauss range. "This seems impossible if the outgoing shell has reached a radius of 100 million kilometers, unless the shell is concentrated in lobes," they point out.

A periodic brightness fluctuation that seems to be superimposed on the gradual decline was noted by P. Tempesti of the Collurania Observatory in Teramo, Italy. It had an amplitude of 0.1 magnitude and a period of 3.2 hours.

Unlike Nova Cygni 1975, A0620-00 is an extremely strong X-ray source, and it began to create excitement when it rose to five times the brightness of any other during the second week in August. By Aug. 15 weak radio emission had been observed by at least three observatories (Arecibo, Nançay, Jodrell Bank). By Aug. 22 the radio source had decayed to about a sixth of its Aug. 15 brightness according to reports from the U.S. National Radio Astronomy Observatory.

By Aug. 15, also, an optical star had been identified as a counterpart to the X-ray source (SN: 8/23-30/75, p. 122). The first spectra taken of that star showed a very unusual featureless continuum, but by mid-September lines were appearing in the spectra that led some astronomers to think it might be a nova. Furthermore Lola

J. Eachus of the Smithsonian Astrophysical Observatory found from a study of old Harvard plates that the same star erupted in 1917.

So it is beginning to look as if A0620-00 may be an example of a recurrent nova whereas Nova Cygni 1975 is taken for a virgin nova, blowing off for the first time. Why a recurrent nova should be a strong X-ray emitter while a virgin nova has no apparent X-rays at all is not known. This would be the first recurrent nova to appear since there has been X-ray astronomy, so there is nothing to compare it with. In fact many of the observed details are not well understood at present. As they are fitted into the theoretical models, they are likely to increase significantly the understanding of one of astronomy's fastest-changing phenomena. □

Oldest shipwreck yet discovered

"It's as though you took the ship and her cargo, mixed them all up in a cement-mixer, then laid them out on the seabed and poured a couple of feet of concrete over everything." Such an unseemly mess is what may be the oldest shipwreck ever discovered. The "concrete," explains archaeologist Peter Throckmorton, is the accumulation of approximately 4,500 years worth of sediment and marine encrustation.

The wreck, discovered by Throckmorton in 75 feet of water off the Greek island of Dhokos, is believed to have been a Cycladic trading vessel. During the early Bronze Age, when the Greeks were beginning to create artistic pottery and statuary, the Cyclades islanders prospered as exporters of pottery, vases and carved figurines. They were among the first voyagers of the eastern Mediterranean. The Dhokos ship is expected to yield the greatest amount of Cycladic pottery ever found in one place.

Throckmorton, an advisor to the Hellenic Institute of Marine Biology, made his discovery while taking part in a survey of ancient shipwrecks in the Mediterranean. (The survey is being made by the Hellenic Institute with a grant from the National Geographic Society.)

Fragments of large storage jars, along with jugs of many shapes and sizes used for eating and drinking, suggest that the ship was a trading vessel, explains George Papatanasopoulos, president of the institute. Preliminary examination of some of the recovered pottery indicates that the ship sank sometime between 2,700 and 2,200 B.C.

The ship itself has long since decayed,

and nothing of it has been recovered. But, explains Throckmorton, "We found all these broken pots lying on the bottom near the shore. They were cemented together in four or five massive lumps, each roughly the size of an office desk." Underneath and around the pottery were round ballast stones from the ship. The archaeologists plan to concentrate on surveying the wreck in the near future so that complete excavation can begin next year.

Until now, a 3,300-year-old shipwreck discovered off Cape Gelidonya on the southern coast of Turkey was the oldest wreck ever found. That wreck was also discovered by Throckmorton. □

Ford and science: Honors, warm words

It was good day for science at the White House last week. President Ford spoke glowingly of the virtues of scientific research, 13 prominent scientists and engineers personally received the National Medal of Science from the President, and Vice President Rockefeller predicted passage of the bill to reinstall a science adviser in the White House.

In the awards ceremony before about 200 persons in the East Room, Ford referred to the men and women of science as "true movers and shakers of human events" to whom "we owe a profound debt."

"The whole spirit of science, one that urges us here in the United States to innovate, to explore the unknown, to answer the unanswered, is the true spirit of