A record year for comet discoveries

The Reverend Leo Boethin lives in a remote part of the Philippines, away from big-city lights and industrial haze, and the night sky over his house is dark indeed. Thus it was that, using only an eight-inch telescope, he was able to spot one of the faintest comets ever discovered without the aid of a photographic plate, possibly as dim as magnitude 12. Never before observed, it was also the first comet reported in 1975, and it now bears his name.

The dark hours of Oct. 5 must have been amateur night for comet-watching in Japan, where no fewer than five avocational astronomers were independently involved in the discovery of two new comets only one hour and ten minutes apart. One of the five, Hiroaki Mori, caught sight of both objects and became the first person ever to be officially credited with discovering two comets in a single night (SN: 10/11/75, p. 229).

The year 1975, in fact, turns out to have been a record year for comet discoveries. The Central Bureau for Astronomical Telegrams in Cambridge, Mass., world clearinghouse for such information, registered 13 new comets during the year, six of which (also a record) were periodic comets, predicted to recur at intervals ranging from 6.1 to 11 years. In addition, four previously known periodic comets were seen making their expected returns, the longest-recognized of which has made a dozen appearances since it was first reported in 1884 from Heidelberg Observatory by Max Wolf, pioneer in the photography of asteroids. The only woman on the 1975 list, T.M. Smirnova, is also an asteroid watcher, working at the Crimean Astrophysical Observatory.

The total number of 1975 sightings now on the books of the International Astronomical Union could have been even higher. There are always observations that go unreported or that lack sufficient data for confirmation, but in addition, there were two periodic comets, both known since the 19th century and due in 1975, which pointedly failed to show up. Comet Westphal was seen in 1852 and 1913 and, says Brian Marsden of the Smithsonian Astrophysical Observatory in Cambridge, should have appeared again last year. More perplexing is Comet Perrine-Mrkos, with a period of 6.5 years. First recorded in 1896, it was missed once, then showed up again in 1909, after which astronomers failed to find it until 1955. It reappeared obligingly in 1962 and 1968, but not, apparently, in 1975.

As the National Aeronautics and Space Administration's Stephen Maran tried vainly to point out during the disappointing approach of Comet Kohoutek in 1973, "comets are fickle." They change their paths, split or disappear completely. Comet Wolf, says Marsden, was orbiting the sun about every 6.8 years when it was discovered, but a close pass by Jupiter in 1922 stretched its path by some 19 months. Marsden and a colleague, in fact, warned last year that not even venerable Halley's Comet is fully trustworthy (SN: 6/7/75, p. 367). When it comes around in 1986, they said, differences in the earth-sun-comet geometry may make Halley as many as four magnitudes dimmer than when it lit up the skies in 1910.

The IAU now lists nearly 1,000 appearances by 635 comets (thanks to the 105 periodic ones—Encke, for example, has been seen 50 times), from observations over the last 2,000 years. □

1975 COMETS

Comet	Name	Period
1975a*	P/Boethin	11.0
1975b*	P/West-Kohoutek-Ikemura	6.1
1975c*	P/Kohoutek	6.2
1975d*	Bradfield	
1975e*	P/Smirnova-Chernykh	8.5
1975f	P/Wolf	8.4
1975g*	P/Longmore	7.0
1975h*	Kobayashi-Berger-Milon	
1975i	P/Churyumov-Gerasimenko	6.5
1975j*	Mori-Sato-Fujikawa	
1975k*	Suzuki-Saigusa-Mori	
1975l	P/Harrington-Abell	7.2
1975m	P/Arend	7.8
1975n*	West	
1975o*	P/Gehrels 3	8.3
1975p*	Bradfield	
1975q*	Sato	
*new	P periodic (in years)	

A new antisickling agent

Sickle-cell anemia, an inherited disorder of hemoglobin molecules in red blood cells, is largely, although not exclusively, a black problem. During a sickle-cell crisis, not enough oxygen reaches a person's red blood cells locally, such as those in the heart and brain, and the red cells take on a sickle shape. The sickled cells then clog blood vessels, causing excruciating pain.

In the past six years, investigators have been vigorously searching for a drug that would prevent these crises. The initially promising drugs have not panned out. After two years and some millions of dollars invested in the clinical testing of urea, for instance, the National Institutes of Health showed that it was ineffective, at least in the dosages and mode of administration used (SN: 2/16/74, p. 104). Sodium cyanate looked good two years ago, but clinical trials have since shown that it has deleterious effects on the central nervous system. As for carbamyl phosphate, it has still not emerged from animal studies. "We don't have any drugs for sickle cell disease undergoing clinical trials now," says Clarice Reid, chairman of the NIH Sickle Cell Branch. "We could do with anything that seems promising."

The drug that scientists have been looking for may now have been found. It comes from an exotic tree in West Africa and goes by the name of DBA (short for 3,4-dihydro-2,2-dimethyl-2H-1-benzopyran-6-butyric acid). The compound efficiently reverses sickling in the test tube and has no acute toxic effects in mice, according to a report in the Dec. 25 NATURE.

The investigators are Donald E.U. Ekong, Joseph I. Okogun and Victoria U. Enyenihi of the University of Ibadan, Nigeria; Valeria Balogh-Nair and Koji Nakanishi of Columbia University, and Clayton Natta of Columbia University College of Physicians and Surgeons and the Sickle Cell Center at Harlem Hospital.

Lam is a small tree with shining aromatic leaves common to coastal areas of West Africa. The roots, which have a strong, spicy taste, are used in Nigeria as chewing sticks to clean teeth. Sickle cell victims in West Africa who chew these sticks were noted to have fewer sickling crises than victims who did not. When chemists examined the roots for a compound that could be used as an antisickling agent, they came up with xanthoxylol.

In preliminary bioassays, A. Isaacs-Sodeye of the University College Hospital, Ibadan, found that it seemed to possess antisickling activity. Then Ekong and his team modified xanthoxylol to DBA and tested it for antisickling activity. They incubated DBA with suspensions of sickle cells and found that it completely inhibited sickling. The oxygen pressure to which the test blood was half-saturated did not change significantly from control blood. The pressure did change with other antisickling agents. These results, the investigators say, "indicate that there may be no interference with the delivery of oxygen to tissues." What's more, DBA seems to act differently from other antisickling agents in its mode of attack. Whereas they bind covalently to sickling hemoglobin, DBA binds noncovalently, or interacts with the red blood cell membrane.

The investigators then injected DBA into mice and found that it had no acute effects. In view of this discovery, and DBA's antisickling ability, they conclude that it might well be an effective and safe sickle cell drug.

They will now try to learn more about its mode of action in the body—how it is metabolized, excreted and so on. Then they'll try it on patients. "We hope it won't have the same side effects that some of the other agents have had," Natta told SCIENCE NEWS. □