Solar system's Canterbury pilgrims

Iste mirant stella (here they wonder at the star), reads one of the captions in the Bayeux Tapestry, that textile comic strip that celebrates William the Bastard's conquest of England. The appearance of a comet, probably Halley's, in the invasion year 1066 is thus noted. In a nearby panel is the figure of Archbishop Stigand of Canterbury.

The conjunction of comet and archbishop is not necessarily happenstance. In those days the clergy were the ones who recorded and attempted to explain unusual celestial happenings. A little over 100 years later another Canterbury cleric, a monk named Gervase, recorded that on a June night in 1178, "...the upper horn of the new moon seemed to split in two and a flame shot from it." On the basis of this report, Kenneth Brecher of Boston University and NASA's Goddard Spaceflight Center in Greenbelt, Md., proposes that a swarm of cometary debris, which he calls a new component of the solar system, be named the Canterbury Swarm. He spoke at the recent meeting in Baltimore of the American Astronomical Society.

This Canterbury Swarm seems to have made history on other occasions. Brecher credits it with the Siberian catastrophe known as the Tunguska event of 1908 and an unusual incidence of hits on the moon in 1975. The Canterbury Swarm seems to consist of objects up to about a kilometer in diameter amounting in total to a mass of 100 billion metric tons spread over a region about 15 million km long. The swarm shares virtually the same orbit with comet Encke. It has a period of 3.349 years, and when it comes near or crosses the earth's orbit, it tends to do so in June. The Tunguska event occurred June 30, 1908; the swarm of hits on the moon came between June 22 and 25, 1975.

Brecher hypothesizes that the Canterbury Swarm, comet Encke, two asteroids, a 1976 discovery now called 2212 Hephaistos and a more recent one, 1982 TA, and the meteor swarm known as the northern Taurids came from the breakup of a single progenitor. The breakup needs to have happened before 1178 and may possibly have happened a few thousand years ago. The swarm would be stable in its orbit for a few thousand years.

What Gervase and others who were there saw would have been a hit on the moon just at the point of the crescent. In 1976 J. Hartung found a young crater, now known as Giordano Bruno, in about the right location. The hit would have caused a libration or rocking of the moon — and indeed there is some evidence that traces of that libration still continue. The rocking would have given the appearance of the horn of the crescent breaking in two momentarily. The "flame" would have been debris thrown up by the hit. The event would have been the equivalent of a 10,000 megaton explosion.

The Tunguska event was an atmospheric explosion that knocked down trees for miles around a remote location on the Upper Tunguska River in Siberia. A meteorite or, *a fortiori*, an asteroid hit would have left an impact crater. There is none. Yet the argument against a comet has always been that, comets being mostly ice, one would never have gotten far enough down into the atmosphere to do the damage.

Brecher argues that since, by his hypothesis, one progenitor object yielded the undoubted comet Encke, two undoubted asteroids, a meteor swarm and the Canterbury Swarm, it must have been composed of some mixture of cometary ice and the rocky material of asteroids and meteors. Consequently the bodies in the Canterbury Swarm may be mixtures, and one of just the right composition to get far enough to do the Tunguska damage but not far enough to leave a crater is conceivable. He also points out that that night was "white" in northern Europe. The sky was bright as it would have been if a comet tail were passing close by. The geometry fits that of the Tunguska hit.

The Canterbury Swarm should pass within 30 million kilometers of the earth in June 1985. Brecher suggests optical and infrared searches for it. He also suggests looking for it in the data from the Infrared Astronomy Satellite. —*D.E. Thomsen*

Anomalous anomalon story: Back again

Anomalons are fragments of atomic nuclei that seem to have an anomalously strong propensity to interact with other nuclei. Their history is only a few years old, but it is quite a checkered one: Now you see them; now you don't; lately you do again. Evidence for them was first found by Barbara Judek, a physicist with the Canadian National Research Council in Ottawa. She had a hard job persuading other physicists, but eventually others found evidence, and anomalons became the subject of an international workshop last year (SN: 7/9/83, p. 20).

But at the beginning of this year, experiments failed to find them (SN: 2/25/84, p. 118), and anomalon debunkers said that proponents were revising their opinions. Now comes an experiment by Piyare L. Jain, M.M. Aggarwal and K.L. Gomber of the State University of New York at Buffalo that finds them again, and Jain says, "I stand positive that anomalons exist."

Anomalons seem to represent a previously unknown, highly interactive state of nuclear matter. This is of great scientific interest to nuclear physicists, and given the technological uses of nuclear matter, the importance of a highly reactive form of it does not need to be belabored.

Anomalons occur after atomic nuclei moving with high energies strike solid targets. The incoming nucleus strikes a nucleus in the target and breaks into fragments. It is among the fragments that anomalons are found, three to five percent of the time according to those who have found them. Anomalons betray their character by traveling much shorter distances than nonanomalous fragments before they interact with some other nucleus in the target material.

The experiment of Jain, Aggarwal and Gomber drove high-energy krypton ions (with 1.52 billion electron-volts energy per neutron or proton) against targets of nuclear emulsion. Nuclear emulsion is the same as photographic emulsion but comes in blocks rather than films. Particles make three-dimensional tracks in it. "After three negative results, it was a difficult and hard struggle to look at it again," Jain says, but the look found anomalons, he and coworkers report in the June 18 PHYSICAL REVIEW LETTERS.

Jain contends that the detectors in the negative experiments were too thick to see the actual anomalon interactions and could not identify them by their products if the change in electric charge of the primary projectile was small. He presents tables of events in which the anomalon flight path was only a few micrometers and the charge change small. He says his discussions with the negative experimenters have moved them to find ways to slim down their detectors. —*D.E. Thomsen*

Jails are last stop for mentally ill

In the past month a congressionally appointed bipartisan commission, a behavioral scientist and several mental health clinicians have all concluded that the nation's 3,493 local jails have become holding cells for large numbers of mentally ill citizens.

The Advisory Commission on Intergovernmental Relations reports that "in recent years, local jails have been used to house persons charged with no crime or simply petty violations." Anywhere from 20 percent to 60 percent of all inmates in jails are "mentally ill or disordered," according to the report.

Mentally ill inmates are often subject to physical, sexual and mental abuse, says the commission, and their condition is likely to deteriorate.

An estimated 600,000 mentally ill and retarded persons are now in jails in the United States, says Judith Johnson, director of the Washington, D.C.-based National Coalition for Jail Reform. For many, the mental hospital has been replaced by