Mysterious flasher in Perseus

The human eye is astronomy's oldest data gatherer. It is "a cheap, wide-field, high-time-resolution device which can be rapidly mobilized in great numbers . . . ," says the Aug. 1 ASTROPHYSICAL JOURNAL LETTERS. Thanks to just such a mobilization, a group of Canadian amateur astronomers has found a mystery that expensive astronomical electronics so far has missed: bright, quick flashes of light coming from the direction of the constellation Perseus. The exact sources of the flashes appear to be a mystery.

According to the report in the journal (by Bill Katz and 11 others of the North York Astronomical Association of Toronto and Alex Fullerton, Ron Lyons and Marshall McCall of the University of Toronto's David Dunlap Observatory), such a flash was first noted on Aug. 13, 1983, at 7:24:44 universal time by Kai Millyard observing from Mt. Forest, Ontario. The flashes characteristically last less than a second; the brightest one so far recorded has been about −2 magnitude (about as bright as Venus).

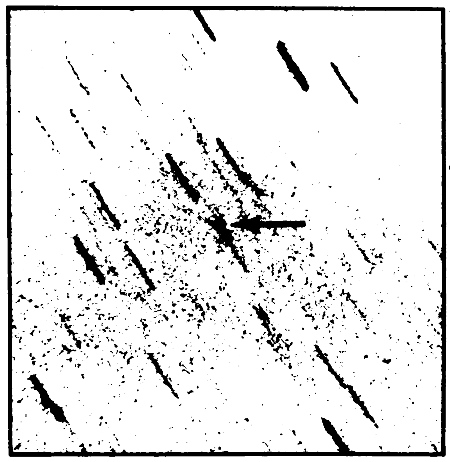
After more flashes were seen in the summer of 1984, the North York Astronomical Association began a systematic survey that lasted from October 1984 until July 1985 and involved observers at several locations in Ontario and one in Edmonton, Alberta. By the end of the survey these observers had counted 25 such flashes in the targeted area, which is centered between the Pleiades and Algol. Other observers in Canada, the United Kingdom and the United States have seen 13 more.

One flash – one of two observed on March 19, 1985 – has been photographed. It appears as a dot in the image reproduced here. This is a three-minute time exposure, and so stars, which are continuously "on," make short trails as the earth turns during the three minutes. The flash was too short to make a trail. A spectrum of this image matches that of the sun.

McCall says this spectral coincidence means that the observers cannot entirely rule out flashes of reflected sunlight from a satellite. However, a satellite should flash repeatedly in a fairly short time. The observed flashes average about one in 12 hours, and they have no apparent periodicity. The observers believe the flashes are not likely to be associated with meteors, local biological processes or celestial gamma-ray burst sources. According to McCall, a survey by the EXOSAT telescope directed by Walter Lewin of Massachusetts Institute of Technology did not find a celestial X-ray source in that location.

Nobody seems to have any positive ideas about the source of the flashes, or at least any they are willing to tell in public. An important outstanding question is whether the origin is local or distant. If not satellite reflections, the flashes could somehow result from an ongoing earth-based experiment. McCall says a group of observers in Santa Barbara, Calif., plans to set up small telescopes with video recorders at various locations to try to get a single flash from different locations. If they can get one that way, parallax between the images should tell whether it is local or distant. A nearby source should show a sizable parallax.

The few professional astronomers who have so far followed up on these observations have reported no sightings. However, one of those professionals, Enrico Kindl of the University of British Columbia in Vancouver, told SCIENCE NEWS he has so far done only 20 hours of looking for the flashes. With so short an observation period, no conclusions about the reality or unreality of the flashes can be drawn, he says. Kindl uses a Questar telescope with a video recorder attached. A computer searches each frame of the video tape for flash images, thus ruling out human error or bias, he says.



Arrow points to flash recorded on March 19, 1985.

At present Perseus is too near the sun for observations. Later in the year, when the sun is no longer blocking Perseus, work will start again. McCall stresses that people who may want to observe should know how to determine the location and time of a flash fairly precisely. Just looking up from the street and seeing a flash is not enough.

– *D.E. Thomsen*

Homing in on animal magnetism

If "Hansel and Gretel" had been written by a salamander, there would have been no story at all. Bread crumbs or no, the little newts would have followed the variations in the earth's magnetic field homeward . . . poor wicked witch. That, at least, might be the scenario according to recent work on magnetoreception, which for the first time provides clear evidence of a magnetic component in a terrestrial vertebrate's ability to navigate.

It is widely accepted that birds use the earth's magnetic field for general orientation on long migratory flights. But the role of magnetoreception in true navigation has been unclear. "There's a good bit of evidence that, at least on their first migration, birds just head south and fly a certain distance," says John Phillips, who reports his work in the Aug. 15 SCIENCE. "For that kind of orientation behavior, all you need is a compass. But if you're trying to home and you're in unfamiliar territory, you don't go north unless you're south of home; you need to have map sense as well." The earth's magnetic field, the researcher says, might provide some of that information.

Phillips, who did this research at Cornell University, worked with migratory salamanders known to have two orienting responses: In their home pond, they orient according to the shore, while away from their home they navigate toward the pond itself. He kept the newts outdoors, exposed to the local magnetic field.

On the day of the test, he raised the temperature of some of the holding tanks in a single sharp step to motivate the newts to get out of the water. When he moved those newts into the magnetically controlled laboratory for testing, they headed in the same direction as the shore in their home pond. This is a compass response: In the wild the newts stay in a closely bounded area of the pond, so the shore is always in a given direction from the water.

But other newts were exposed to a period of widely fluctuating water temperatures before the testing began; these newts oriented not in the direction of shore, but as though they were trying to return to their home pond. This, Phillips says, indicated that the newts had a map sense, an awareness of where the laboratory was in relation to home. Both responses had a magnetic component, since both could be altered by manipulating the experimental magnetic field.

Such a map sense would put much tougher demands on a magnetic receptor than does simple compass orientation. An animal using the magnetic field as a clue for close-quarters navigation must be able to cope, Phillips points out, with the fact that "if you go a kilometer across the earth's surface, the magnetic field changes only about one one-hundredth of a percent." – *L. Davis*