

Magnetic navigation idea fails to fly

What was to blame when half the 12,000 homing pigeons released in Denmark didn't show up in Germany at the end of a race this month? "Solar flares," said a spokesman for the association that released them. His explanation that solar flares had disrupted the earth's magnetic field and interfered with the pigeons' navigation shows just how commonly accepted the idea of magnetic navigation in pigeons is. Yet newly released data from the scientist who started it all, published eight years after his death, show no support for the existence of magnetic navigation in pigeons.

In 1971, William Keeton of Cornell University in Ithaca, N.Y., taped magnetic bars to the backs of some homing pigeons and normal bars to others. He found that when the sky was overcast and the pigeons couldn't use the sun to guide them, the birds with magnetic bars often couldn't navigate well. Keeton proposed that pigeons use the earth's magnetic field to navigate, an idea that quickly caught on and has since been applied to other animals.

Keeton was perturbed, however, by what he called a "disturbing variability found in the results," and he spent the last eight years of his life doing experiments to account for that variability, even as the idea was gaining support in scientific circles. Keeton died in 1980 before publishing the results of these follow-up experiments, but his data were analyzed by researcher Bruce Moore of Dalhousie University in Halifax, Nova Scotia, and published in the July PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Vol. 85, No.13).

The only valid statistical inference that can be drawn from those data is that the magnets have no effect on the pigeons' navigation, Moore reports. "If [Keeton's] early conclusions now require reexamination, it is appropriate that it should be his own later findings that again call our attention to the problem," he says.

Theoretically, if pigeons were sensitive to changes in the magnetic field, they could tell something about their position because the earth's magnetic field changes with latitudinal position. "But detailed magnetic charts show no usable information, because there are variations in local magnetic fields," Moore says.

Many experiments similar to Keeton's conducted by other scientists over the last 17 years have produced conflicting results, and almost all laboratory experiments have been negative, Moore says. Nevertheless, there are many strong believers in magnetic navigation in pigeons, he says.

Even if pigeons don't sense magnetic fields, other animals may. The evidence of

bacteria sensing magnetic fields is "rock solid," while the idea that humans sense magnetic fields has been refuted by many researchers, Moore says. "For everything in between it's an open question," he adds.

And what about the pigeons missing in action over Denmark? "In most large races most birds get home, but in a big race it's not unusual for a large fraction of the birds to get lost," Moore says. Races in which many birds are lost are common enough to have earned the name "busts," and studies of such races have shown no correlation between birds getting lost and magnetic storms, he says.

— C. Vaughan

Panels revive sticky issues

Two controversial forms of medical research — transplantation of human fetal tissue and fertility studies based on *in vitro* fertilization — are receiving renewed attention from the U.S. government.

Following a temporary moratorium, in effect since March, on federally funded experiments involving transplantation of fetal tissue, the Department of Health and Human Services (HHS) announced this week that a panel of experts in law, medicine and bioethics will examine the difficult questions surrounding fetal tissue transplantation for the potential treatment of such disorders as Parkinson's disease and diabetes (SN: 4/23/88, p.260). The panel will address questions raised by Robert E. Windom, HHS assistant secretary for health, when he imposed the moratorium. These include whether the results of animal studies justify human research now and whether fetal tissue transplants, including those within families, should be prohibited. Scientists in several countries, including Mexico and Sweden, have transplanted fetal cells into humans, but such experiments have not yet been reported in the United States (SN: 1/16/88, p.40). The panel, which convenes in September, is expected to produce its final recommendations to the director of the National Institutes of Health six months later.

HHS also took the first step toward ending a *de facto* ban on federally funded research on test-tube babies. It reestablished an ethics committee, disbanded in 1980, to review applications for funding such research. The effect of the committee's dissolution was a moratorium on research in which an egg, removed from a woman, is fertilized and the embryo is then implanted in the woman's uterus. Although some 5,000 babies worldwide have been born via this procedure, it has a success rate of only about 15 percent. □

Climate influence on forest fires

Through the commanding figure of Smokey the Bear, millions of visitors to U.S. forests have learned that during dry times such as this summer, fire danger increases in the woods. But while forest managers understand how daily weather can raise or lower the chances of fire, scientists have little information on how long-term shifts in climate affect wildfire frequency. Now, using evidence of ancient forest burns, an ecologist has traced the year-by-year relationship between climate and fire in northwestern Minnesota for the past 750 years.

Results of this study, published in the July 21 NATURE, "establish the fact that the climate changes over the last few centuries have been accompanied by changes in the fire regime," says James S. Clark, now at the New York State Museum in Albany, who did the research while at the University of Minnesota. "It suggests that the influence of climate is very strong."

Clark found that during the relatively warm, dry 15th and 16th centuries, the forest in the study area burned roughly once every nine years. Over the next three centuries, during a cool period known as the "Little Ice Age," blazes were less frequent and less intense, occurring every 14 years. In light of predictions concerning the "greenhouse" warming of the climate (SN: 7/2/88, p.4), says Clark, "fires will presumably become more frequent in the future."

Previously, scientists had studied only the general relationship between fire and climate; they had not been able to resolve the frequency of fires occurring before human recordkeeping began. Clark constructed his chronology by measuring the amount of charcoal in sediments at the bottom of a lake in Itasca State Park. The lake he studied sets down an annual sediment layer, making it possible to trace fires to individual years and to identify cycles in the fire history.

This kind of information will help those who supervise forest lands, says Harvard ecologist David Foster. "If you're really going to manage an area, you have to have some idea of what the long-term frequency of fire was," he says.

Traditionally, people have attempted to suppress wildfires, but this practice often allows wood to accumulate on the forest floor, forming fuel for some future blaze, says Clark. "With continued fire suppression and the further [climate] warming, fuel buildup will result in more intense and/or more frequent fire," he says. In the last few decades, in areas such as Yellowstone National Park, forest managers have experimented with controlled burns, designed to emulate a more natural system.

— R. Monastersky