

unbuffered fixative might react with any magnetic material present. Dissection was done with glass knives to prevent contamination of the specimens with ferromagnetic particles that might come from ordinary metal knives.

Magnetism associated with the birds' heads seems to be diffused over the skull, Presti and Pettigrew report, and, contrary to some earlier reports, they could not find any specific magnetic material there. They did find it in the necks. They found diffuse patches of black magnetic material embedded in the tissue or surrounding fascia of the complexus muscle. From the black color and the magnetic remanence it exhibits, they think this is magnetite or common lodestone ( $\text{Fe}_3\text{O}_4$ ).

The sensory mechanism they propose involves a coupling between such tiny magnets and the spindle fibers of the muscle, which are very sensitive to stretch. Changes in the geomagnetic field would cause torques on the magnets. These would be communicated to the spindles, and the bird would feel the geomagnetic field in its muscles.

Not only birds, people too. The phenomenon of dowsing has puzzled observers. Presti and Pettigrew suggest that the deflections of the dowser's rod may be amplifications of minute movements of the dowser's muscles in response to changes in the geomagnetic field caused by the presence of water. □

## Panda predicament at home and abroad

The recent announcement of the artificial insemination of the National Zoo's giant panda Ling-Ling reminds zoo director Theodore Reed of the old Italian post-marital-night custom of hanging a sheet out the window "so the neighbors would be able to know that... breeding had taken place." Although Reed now can "hang a sheet" for Ling-Ling, he is quick to point out that the successful injection of sperm extracted from her mate Hsing-Hsing does not necessarily mean conception has occurred: Washington zoo officials must wait four and a half months (panda gestation period is about five months) before they will know whether to expect a 5-ounce cub addition to their panda house.

Should the artificial breeding of Washington's panda pair result in a surviving cub, it would be the second one of its kind — the only other surviving panda born of artificial insemination belongs to the Beijing (Peking) zoo in China. A new cub also would be a much needed boost to the morale of panda lovers distressed by the Chinese panda population decline.

More than 10 percent of all giant pandas have died of starvation or been killed by earthquakes since 1975, says Lee Talbot of the World Wildlife Fund (wwf) Swiss Con-



Repeated failures of the natural breeding attempts of male Hsing-Hsing (left) and female Ling-Ling prompted National Zoo veterinarians to artificially inseminate Ling-Ling. Reproductive success would be a brightener in the otherwise gloomy international panda picture.

servation Branch. This population decline has prompted a collaborative effort between wwf, Chinese scientists and the New York Zoological Society to gather data about the 300-pound bear-like creature and its relationship with its natural habitat.

To collect such information, researchers "are going to have to overcome great obstacles," says William Conway, zoological society director. The black and white giants live in rough terrain — the mountains of central China — and have no permanent dens. An attempt will be made this fall to overcome these obstacles, though, when George B. Schaller of the zoological society assists in leading an expedition to survey the Chinese panda reserves. Schaller and colleagues recently completed a week-long, preliminary fact-finding stint in the Wolong reserve — about 150 miles west of the provincial capital of Chengdu — to prepare for the fall expedition.

One panda perplexity Schaller and co-workers hope to unravel is the role of bamboo in the panda diet. Even though the panda population decline has been attributed partially to the sudden death of two bamboo species, "Nobody knows how

much of the panda diet is composed of bamboo," says Conway.

Bamboos, members of the grass family, differ from their relatives in that they flower only after many years, says bamboo specialist Thomas R. Soderstrom of the Smithsonian Institution. In fact, umbrella bamboo (*Thamnochlamus spathaceus*) and another, as yet unnamed, bamboo — two species that pandas feed on — bloom only once at the end of their approximately 100-year life span.

The flowering phenomenon was observed in 1976 by Chinese researchers in the panda region. A rare treat for botanists, the nearly centennial flowering is a natural handicap for the giant pandas — although the bamboo flower produces seeds, it takes several years for the new bamboo plants to ripen for panda nourishment.

Researchers, therefore, are interested in learning how the panda survives the massive loss of bamboo. Conway theorizes that pandas living during the 1880s — the approximate time of the penultimate bamboo flowering — may have fared better because of a wider range in which to forage. □

## PCB ban in food production proposed

Equipment containing the toxic chemical PCB is to be removed from food and animal feed production facilities and agricultural chemical plants, according to rules proposed jointly by the Environmental Protection Agency, the Food and Drug Administration and the Department of Agriculture. Since 1971 there have been at least nine separate incidents of accidental PCB contamination of human food supplies, including the Billings, Mont., leakage from a stored electrical transformer. That incident contaminated millions of pounds of food (SN: 10/6/79, p. 228).

The proposed rules, published in the May 9 FEDERAL REGISTER, would require that within a year no food, feed, fertilizer or agricultural pesticide production facility maintain liquid PCB's in excess of 50 parts per million. The FDA estimates that approximately 685 million pounds of fluids containing PCB's are in use in trans-

formers and capacitors in the United States. A consultant to the EPA says electrical equipment manufacturers have developed non-PCB equipment that performs adequately in almost every application.

The EPA estimates that 1,200 PCB-containing transformers and 31,000 PCB-containing capacitors covered by the ruling (capacitors with less than 3 pounds of PCB's are exempted) were in agricultural chemical facilities in 1979. Removal of that equipment is expected to cost the owners approximately \$44 million. The agency points out that the clean-up costs from the Billings contamination ran into millions of dollars. It expects the cost of removing and replacing the PCB equipment to equal the projected clean-up costs for potential accidents over a 20-year period.

The PCB's to be removed from the food, feed and chemical facilities will pose a disposal problem. Some liquids with in-

*Continued on page 330*