

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 (Fe_3O_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-



Jessie Cohen/Natl. Zoological Park

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-

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intermediate levels of PCB can be disposed of in EPA-approved landfills or an approved high efficiency boiler. However, liquids with more than 500 parts per million PCB must be burned in an approved incinerator—but there are none available for commercial use in the United States. Two incinerators have undergone trial burns of PCB and may be approved in the near future. □

Cookies, caramels and cavities

Cream-filled chocolate cookies are more damaging to the teeth than is pure sugar, and potato chips are as bad as caramels, according to a study done with rats at the National Institute of Dental Research. The findings are the first reported for a new test of the decay-causing potential of specific foods. In the procedure, developed by William Bowen and colleagues, rats are fed nutrients by stomach tube, so only the test food touches their teeth (SN: 12/8/79, p. 397). An automatic feeding machine provides the test food as a powder to each animal 17 times a day.

Chocolate cookies with a soft filling, sugared breakfast cereal and sugar-coated chocolate candy, as well as pure sucrose, were at the top of the cavity-potential list. Potato chips, caramels and chocolate bars were somewhat lower. Unsweetened cereal, starch and sucrose mixed with dicalcium phosphate caused the fewest cavities. In addition, Bowen reports that as the number of daily "sucrose meals" goes down from 17 to 3, the number of cavities drops almost 60 percent.

"It is clearly difficult to extrapolate the results achieved in animals directly to humans, but neither can such results be ignored," Bowen says in the May JOURNAL OF THE AMERICAN DENTAL ASSOCIATION. "We think that the approach used here can establish differences in the cariogenic potential of foods in a simple, unequivocal and reproducible manner." □

No challenge on chemicals

The company that was to begin manufacture of six new plasticizers has changed its plans in the face of a recent Environmental Protection Agency decision (SN: 5/10/80, p. 294). In its first exercise of "premanufacture" regulatory power, granted under the 1976 Toxic Substances Control Act, the agency banned production of the six phthalate esters until the chemical company supplied data demonstrating the products' safety. The firm, which requested anonymity, told the EPA that it was not aware of the unpublished report linking a similar chemical with cancer and that the testing EPA requested would be too expensive. The company chose not to appeal the EPA decision. □

Dormant ribosomes and senile dementia

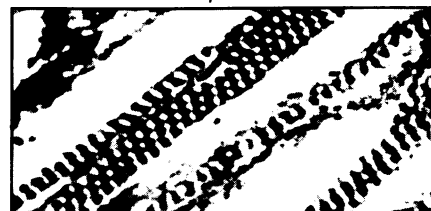
The cause or causes of senile dementia remain unknown, but clues to the brain pathology involved have been identified. Plaques (abnormal proteins), tangles (twisted fibers) and Hirano bodies (crystalline inclusions) without or in brain neurons may be responsible for some of the symptoms of senility (SN: 10/1/77, p. 218). Now, study of the composition of Hirano bodies leads researchers to suggest that those structures may be storage units for dormant ribosomes (material used for translating RNA molecules into proteins). If so, senile dementia may be the result of abnormal protein synthesis inside neurons, which could underlie the serious memory problems seen in senile patients. The research, done by Laura O'Brien and Alexander McPherson of the University of California at Riverside and by Kirk Shelley and Javad Towfighi of Pennsylvania State University at Hershey, is reported in the April PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

O'Brien and her colleagues maintain that Hirano bodies are strands of endoplasmic reticulum dotted with ribosomes. (Endoplasmic reticulum is the structure on which ribosomes normally sit in cells.) Use of several techniques led to this conclusion. Fluorescent dyes, which stain only RNA molecules, helped to determine that Hirano bodies contain RNA molecules. An electron microscope, microdensitometer and computer helped to show that the particles making up Hirano bodies have a distinct asymmetrical shape similar to that of ribosomes.

Interestingly, Hirano bodies (like plaques and tangles) are predominant in the hippocampus—a brain region believed to be involved in consolidation of



Hirano body (top) and closeup showing ribosomes on endoplasmic reticulum.



Photos: O'Brien et al./PNAS

short-term into long-term memory. One of the more pronounced symptoms of senile patients is that they retain long-term memory (can describe events or sustain skills learned prior to the onset of disease) but have impaired short-term memories. "Thus," O'Brien and her team conclude, "it does not appear unreasonable to suggest that the disability of short-term memory could arise because the ribosomes required for synthesis of memory-associated proteins have entered a dormant state and have been stored in a quiescent form resulting in the appearance of the crystalline Hirano bodies."

The final steps in confirming that Hirano bodies are truly ribosomes, O'Brien explained to SCIENCE NEWS, will be to put antibodies against ribosomes in the presence of Hirano bodies to see whether the antibodies react with the bodies, and then to isolate Hirano bodies and chemically analyze them. Although O'Brien says she can't see their research leading to any quick treatment for now-incurable senile dementia, she points out that ribosomal storage can be reversed, at least under certain conditions, in lower-life forms. □

Dialysis for schizophrenia: A washout?

It has been several years since renal medicine specialist Robert Cade and psychiatrist Herbert Wagemaker first reported surprising improvements in chronic schizophrenic patients who had their blood cleansed periodically by renal dialysis (SN: 7/8/78, p. 29). Laboratory analysis indicated that the procedure may have worked by filtering out an excess of an unusual compound called leucine-endorphin from the blood; Cade suggested that too much leucine-endorphin may be "a cause of some schizophrenia."

In the aftermath, follow-up research has yielded mixed results. And two of the most recent studies, presented at the annual meeting of the American Psychiatric Association, appear to cast serious doubt on the effect of dialysis in treating schizophrenia. At the National Institute of Mental Health, William E. Bunney and his col-

leagues used the "identical equipment" and treatment frequency—one dialysis session per week—that Wagemaker and Cade first reported using. After treating eight schizophrenic patients with both "sham" dialysis, where the blood is not actually cleansed, and real dialysis, the NIMH group reports it has "found no patients who responded to this intervention [with] a significant diminution of psychosis."

In the second study, John A. Caudle and his colleagues at the Charlotte (N.C.) Memorial Hospital and Medical Center tested four chronic schizophrenics with real and sham dialysis. They report "no therapeutic effect of renal dialysis on chronic schizophrenia." One patient, in fact, improved on the sham but not the real dialysis, and another patient first improved then got worse after real dialysis. □