

Oil spills are not for the birds

Even tiny amounts of fuel oils can hinder reproduction in a variety of birds. Researchers report in the Feb. 25 *SCIENCE* that petroleum oil, in quantities too small to obviously harm the adult birds, interferes with normal egg production. The changes observed in formation of quail, chicken and geese eggs may be useful for monitoring oil pollution of wild birds.

C. Richard Grau, Tom Roudybush, Joan Dobbs and Jeanine Wathen of the University of California at Davis gave female quail single doses of fuel oil. For several days after oil ingestion, the birds laid fewer eggs than did a control group, and a smaller fraction of the eggs hatched. The birds also often produced eggs with thin shells, which were easily cracked. For 24 hours after oil ingestion, less than the normal amount of yolk was deposited in eggs, and the yolk's chemical properties were altered. In contrast, pure mineral and safflower-seed oil did not affect egg production. The effect of the petroleum oils was clearly different from that of other environmental variables the researchers examined, which included food and water deprivation and calcium deficiency.

Asbestos harm: A matter of charge

Asbestos fibers of different shapes and chemical compositions are all harmful to human lungs. Yet in laboratory studies, the hollow cylindrical asbestos fibers do more damage to cells than do the stacked fibers. William G. Light and Eddie T. Wei of the University of California at Berkeley suggest that the amount of electrical charge on the surface of the fibers determines their power to destroy cells and perhaps to cause cancer in humans.

In an article in the Feb. 10 *NATURE*, the researchers report that in the presence of a solution similar to body fluids, the surface charge on the fibers gradually changed. The cylindrical fiber lost some of its positive charge, while the stacked fiber became more positively charged. The biological activities were also altered. The cylindrical fibers became less destructive to red blood cells, and the stacked fibers became more destructive. In the body, the researchers conclude, surface charges could be altered so that the activities of the fibers would converge. "This phenomenon could explain why the two classes of asbestos fibers, although different in their short-term *in vitro* effects, are not clearly different in their long-term toxicities," they write.

Magnetic field turns birds

Migrating birds react to low-intensity electromagnetic fields during nocturnal flight, two Rockefeller University biologists report. Ronald P. Larkin and Pamela J. Sutherland used radar to track birds flying 80 to 300 meters above the suspended antennas of the Navy's Project Seafarer at the Wisconsin Test Facility. They found that birds changed direction and altitude more frequently in the presence of the alternating current than when the antennas were off. Direction changes were most frequent when the current of the antennas was changing.

Because the magnetic field created by the antennas is less than 1 percent of the earth's magnetic field, the data indicate "a heretofore unsuspected degree of sophistication in the birds' use of magnetic fields in orientation," the researchers write in the Feb. 25 *SCIENCE*.

On the basis of their data the researchers are unable to predict whether the much larger Project Seafarer proposed for Michigan would seriously affect the flight of resident or migrant birds. The changes that Larkin and Sutherland observed over the Wisconsin facility included both minor alterations in a bird's pathway and major turns sending the bird in a new direction.

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Beyond Gutenberg: Electronic journals

Rising costs of publishing scientific journals and the rapid proliferation of articles a scientist must survey to find information he needs may lead to a revolution in scientific communications, says George K. Chacko of the University of Southern California. The alternative to paper journals would be an electronic system to deliver the results of the current research in carefully preselected fields. Chacko described to the AAAS an ongoing study of this issue conducted by King Research of Rockville, Md., under NSF sponsorship.

The cost of scientific and technical communication now runs to \$8.5 billion a year, Chacko says—fully a quarter of the total U.S. R&D budget. The average cost of an individual subscription to a scientific journal has risen from \$5.27 in 1960 to \$20.88 in 1974, leading scientists to use library copies for about 30 to 40 percent of their reading. A switch-over to an electronic system would require an initial investment of between \$870 million and \$1.25 billion, Chacko says. But it would have the added advantage of encouraging informal person-to-person contact, which accounts for the bulk of the most influential technical communications.

Health standards: Methods challenged

Public health standards for new electrical power plants are presently based on acceptable levels of pollution or radiation. Studies of these agents on other mammals and extrapolations of these results determine the safety levels. Do these kinds of studies really tell us everything about the effects on humans of pollutants in the environment?

No, says Jerzy Neyman of the University of California at Berkeley in the Feb. 25 *SCIENCE*. Neyman argues that there is currently no reliable methodology available which can estimate how many more diseases will result from the operation of an electrical power plant. Current methodologies fail to account for several phenomena important in the transmission of disease, Neyman says. These phenomena include the rate of the dosage of the harmful agents, the geographic and meteorological variability of the agents in the atmosphere and the difficulty in comparing data from one animal to another. In addition, Neyman points out that these studies ignore the problem of "competing risks" where the absence or addition of any one variable can alter the outcome of the tests. To account for these phenomena, Neyman calls for large multipollutant, multilocal epidemiology studies requiring the combined efforts of several different disciplines and government agencies.

Environmental protection scores one

Environmentalists breathed a sigh of relief last week. In a unanimous decision, the U.S. Supreme Court upheld the Environmental Protection Agency's claim that it could issue industrywide regulations for the discharge of pollutants. Seven chemical companies argued that the pollution control act only gave the EPA authority to provide broad descriptions of effluent limitations and that the actual limitations should be set on an individual plant-by-plant basis. The EPA claimed the descriptions were actual limitations for all plants in a certain class.

Had the EPA been made to issue separate sets of regulations for each plant in the country, its already limited resources would have been strained. The court ruled that the law still allowed the issuance of variances for polluting plants not in compliance with the industrywide regulations by 1977 and 1983. Not surprisingly, EPA administrator John Quarles found the ruling a "very important victory" and that the agency's effort to clean the water had been strengthened.

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