

## Cancer in asbestos workers' families

During the mid-1960's, it became clear from workers' health records that exposure to asbestos particles can lead to human lung cancers (SN: 10/31/64, p. 276). Irving J. Selikoff and colleagues at the Mount Sinai Medical Center in New York City, made the original finding and have been studying the health effects of exposure to asbestos ever since. As a result, stricter occupational standards have been instituted.

Now there is new evidence from Selikoff's laboratory that the families of asbestos workers are threatened by even the tiny quantities of dust that workers carry home on hair and clothing. In an ongoing study, the team has found a high incidence of lung abnormalities among relatives, and four cases of mesothelioma in persons exposed to asbestos production as children. (Mesothelioma is cancer of the membranes that envelope the lungs or internal organs, and its only known cause is asbestos.)

The team has contacted 210 family members of asbestos workers who worked at the Union Asbestos and Rubber Co. in Paterson, N.J., between 1941 and 1954. Forty percent of these relatives were found to have lung abnormalities common in asbestos workers.

Selikoff fears an "epidemic" of mesothelioma. Cancers from asbestos usually take 20 or 30 years to "incubate," and the many current cases were probably the result of exposure in the 1940's and 1950's when asbestos production was 10 times smaller.

Selikoff also fears that if cancer and disease can result from low-level exposure such as contact with a family member, the implications from environmental exposure may be great. Asbestos has 3,000 industrial uses and is found in hundreds of common household products. Asbestos fibers have also been found in the urban air, in water and in some foods.

## Immobilized cells: A sweet discovery

Due to the skyrocketing cost of sucrose (table sugar), attention is being focused on new ways to convert cheaper sugars into industrially usable ones. The most promising system thus far is enzyme immobilization, in which glucose from corn syrup is converted into fructose, a sugar with a much higher sweetening power. Glucose isomerase, an enzyme that naturally converts glucose into fructose, is harnessed to a substrate. Solutions passing over the surface are thus converted without the traditional (and expensive) chemicals and heat.

Rutgers University chemist Wolf R. Vieth now has developed an improved version of this system. He reported to the American Chemical Society meeting in Atlantic City that he attaches whole cells instead of just the delicate, naked enzymes. Vieth "spot-welded" *Streptomyces venezuelas* cells with tanning agents into a framework of collagen macromolecules from ground-up cattle hide. The resulting parchmentlike membrane is chipped and put into a glass column, and will work hundreds of hours longer than naked enzymes attached to a substrate, he says.

An immobilized enzyme system is being used commercially in at least one corn syrup conversion plant in Clinton, Iowa, and major beverage companies have expressed interest in switching from the use of sucrose to the use of fructose, which is sweeter.

Immobilization techniques are also being used in the production of certain types of drugs, and to replace fermentation in the production of monosodium glutamate.

## How sea snakes avoid the bends

Sea snakes are among the most poisonous reptiles known, able to attack above or below the surface of the tropical seas where they swim agilely—propelled by a flattened, paddlelike tail—and dive for sustained periods to depths exceeding 120 feet. How they can avoid "the bends" during such dives has remained a mystery, since nitrogen molecules are readily dissolved in the bloodstream at these depths and in other animals come bubbling out of solution during ascent, causing painful, and sometimes fatal, bends.

A zoologist at Australia's Monash University, Roger S. Seymour, believes he has found the answer, a lung bypass mechanism and high gas permeability of the skin, described in *NATURE* (Vol. 250, p. 489). Sea snakes, he says, have a "hole in the heart" defect similar to that which causes "blue babies." It allows blood to bypass the lungs, thus slowing the buildup of nitrogen in the bloodstream during diving. At the same time, the snakes' skin apparently releases nitrogen to the surrounding water at a rate that increases with depth. The combined effect of the two systems is a slow buildup of blood nitrogen, quickly dispersed.

## Ten percent U.S. plants endangered

Botanists called together for a meeting in early September by the Smithsonian Institution, in accordance with a provision of the Endangered Species Act, drew up a list of endangered plants and estimated that some 10 percent of American floral species are in jeopardy. The list, containing more than 2,000 varieties of plants, represents the first organized attempt to catalogue threatened flora in the United States. The list will be published later this year.

Not surprisingly, the greatest number of threatened species occur in the lush tropical environment of Hawaii, where 266 plants have already become extinct and 1,267 more are endangered or threatened. But even in the nearly barren desert areas of the country, some varieties of cactus have become so rare that they fetch \$300 apiece in shops.

## Latest on marine mammals

In accordance with a provision of the Marine Mammals Protection Act of 1972, the Department of the Interior has just published a summary of the year's developments concerning several protected or endangered species:

- Pacific walrus now number about 140,000, some three times their population in the early 50's, and they seem to be increasing even with continued Eskimo hunting. The Atlantic walrus, however, has only about 25,000 members left, and the annual native kill approaches the replacement rate.
- The sea otter, within its present range along the northern rim of the Pacific, is probably more abundant now than it has been for centuries. Pressure is mounting from commercial fishermen to begin limited hunting to protect shellfish stocks, and restrict the otters to refuges.
- Of the two principle varieties of sea cow—manatees and dugongs—only the Florida manatee is holding its own. The dugong of the Indian and Pacific oceans appears near extinction. The meat is considered a delicacy in many parts of the world and poaching is a major problem.
- As a result of the Marine Mammals Protection Act, the annual kill of polar bears has dropped from several hundred to a few dozen for the last two years. Last winter, for the first time in a long while, the number of bears in Alaska was reportedly increasing.