

Zeolite—potent mimic of asbestos

Five years ago, Y. Izzettin Baris and Mustafa Artvinli were looked at askance for proposing that mesothelioma — the unequivocal asbestos disease—need not be caused by asbestos (SN: 7/15/78, p. 41). The Turkish researchers from Hacettepe University in Ankara noted that 11 deaths from the rare cancer (affecting membranes lining the chest and abdominal cavity) had occurred in an asbestos-free Turkish village. Baris and Artvinli suspected erionite, a form of zeolite, was the culprit. Since then, several other research teams have shown that any fiber with physical dimensions resembling those of asbestos' microscopic needles can cause the cancer, provided the fibers do not dissolve in tissue. Baris and Artvinli, meanwhile, have probed the zeolite-mesothelioma connection further.

Returning to the village studied in 1978, and two other agricultural villages where mesothelioma incidence was high, they found erionite in air samples, in rock samples taken from the homes of sick residents, even in lung samples of villagers. More important, their studies "failed to show any asbestos," they report in *ARCHIVUM IMMUNOLOGIAE ET THERAPIAE EXPERIMENTALIS* (Vol. 30, No. 3-4 for 1982), which was just released. (The volume contains proceedings of a conference on epidemiological, immunological and genetic aspects of asbestosis, held in Wroclaw, Poland.) Moreover, the Turks report, in tests where animals had fibers inserted into their lung tissue, the zeolite proved "more potent than asbestos in producing mesothelioma."

Asbestos—the mutagen enhancer?

Though asbestos' ability to cause cancer is well-known, whether it directly alters DNA remains a question. Two immunologists from the Institute of Immunology and Experimental Therapy at the Polish Academy of Sciences in Wroclaw now report that though the fibers do not appear mutagenic by themselves, they enhance the mutagenicity of benzo(a)pyrene (BP), a suspected carcinogen found in coal tar, cigarette smoke and combustion byproducts.

Initially, K. Szyba and A. Lange had found "asbestos fibers lacked any intrinsic mutagenic potential." In research they reported at the Wroclaw asbestosis conference, they performed Ames mutagenicity tests teaming up asbestos and BP. When the two were simply added together and tested in the presence of rat enzymes in an Ames system (which looks for mutations that correct a specific defect in a bacteria gene), they detected no mutagenicity beyond that associated with the BP alone. But when the BP was absorbed onto (not merely added along with) asbestos fibers, they found a doubling or tripling of mutagenicity over what would have been expected from the BP alone. And their results showed "the amount of BP absorbed onto asbestos was related to the number of [mutations]."

Szyba and Lange suggest the asbestos fibers somehow make the BP more readily available to the rat metabolic enzymes. And, they speculate, it may be that asbestos works in some similar way to account for the observed amplifying effect of cigarette smoking on the lung cancer incidence in asbestos workers.

Shipyard to offer asbestos-hazard pay

Employees exposed to asbestos while working on nuclear submarines at the Portsmouth Naval Shipyard in Portsmouth, N.H., will begin receiving an eight percent bonus daily. The hazard pay, which could cost the yard \$20,000 a day, results from a safety grievance filed by the Metal Trades Council union on behalf of its more than 5,000 members there. John McCrory, the federal arbitrator who made the award, justified his decision by saying that although the yard meets the federal exposure limit, "there is no safe level of asbestos exposure."

Tuning in to short-range forecasting

In the not-so-distant future, it may be possible to tune in to your local cable-TV station and receive localized information about the weather for the coming hour. At present though, even where cable-TV is available, highly accurate short-range weather forecasts are not. Research meteorologists from nine nations met recently at a workshop, sponsored by the World Meteorological Organization, in Boulder, Colo. In general they agreed that predictions of weather 12 hours to several days ahead is "quite good." The more immediate challenge, they said, is to upgrade forecasts for the very short term—zero to 12 hours.

Two areas where improvement is necessary and possible are actual observations and assimilation of data, says Donald W. Beran of the National Oceanic and Atmospheric Administration in Boulder. Widely used satellite data reveal existing weather conditions, rather than the wind field, temperature, and humidity measurements that can be used to predict when and where storm systems will develop. As an example of a technological advance that will enhance short-range prediction, he described the new ground-level remote profiling system devised at NOAA's Wave Propagation Laboratory. The automated profilers observe wind, temperature and humidity every five minutes over much smaller areas than presently covered by balloon-borne instruments called radiosondes. The radiosondes make their observations twice a day, and are useful only for forecasts that cover wide areas. The automated profilers will eliminate most labor expenses, Beran says, and the savings can be applied toward purchase and operation of more of the instruments, allowing more localized and detailed coverage.

The World Meteorological Organization is pushing for "centers of activity" where research in short-range forecasting will be focused. Sweden and Czechoslovakia have agreed to operate such centers; Great Britain, Canada and the United States are considering participation. The centers would concentrate on advanced radar technologies, data dissemination and processing, and basic research. The main goal of the international effort, Beran says, is to encourage freer exchange of information among the many nations that desire improved short-range weather forecasts. Beran estimates roughly that in the United States alone, about \$2 billion is lost each year to weather-related causes and that 30 to 40 percent of these losses could be avoided with better weather information.

... and climate theory

The second of two Experimental Climate Forecast Centers has been established at the NASA Goddard Laboratory for Atmospheric Sciences in Greenbelt, Md. The center will study theories of climate prediction and forecasting techniques using numerical models of the earth's ocean and atmosphere system. The center is mandated by the National Climate Program Act, which calls for two such research programs. The first of the centers, at Scripps Institution of Oceanography in La Jolla, Calif., uses statistically based methods in its climate forecast investigations.

Exposing plant problems with lasers

Researchers at the U.S. Department of Agriculture (USDA) Research Service in Beltsville, Md., are exposing greenhouse plants to beams of laser light that is just within the infrared, or invisible, part of the light spectrum. The lasers cause the leaves of different plants to fluoresce at specific wavelengths. The lasers may enable crop scientists to detect nutrient imbalances that inhibit photosynthesis because when a plant is deficient in specific nutrients, its fluorescence in response to the laser decreases. James E. McMurtrey III of USDA and colleagues from NASA Goddard Space Flight Center reported their findings at the recent meeting of the American Society of Agronomy in Washington, D.C.