

Bad effects of chemicals: Mostly self-imposed

Have you ever wondered which chemicals in your life pose the greatest threat to your health? A panel of the President's Science Advisory Committee, set up in 1970 to review many issues concerning chemicals and human health, now has the answer, more or less. It reported its findings last week in Washington, at a National Science Foundation press conference. Its findings are also contained in a 200-page report, "Chemicals and Health," issued by the NSF.

Cigarette smoking, the panel has found, caused 17 percent of all chemically linked deaths among Americans in 1967; a poor diet, anywhere from zero up to 20 percent of such deaths; alcohol abuse, 3 percent; unknown factors that act as initiators or promoters of cancer, 3 to 8 percent; adverse reactions to medication, 4 percent; addictive drugs, 0.6 percent; occupational airborne particles, 0.5 percent; suicides involving chemicals, 0.25 percent; accidents with chemicals, 0.01 percent; birth control pills, 0.01 percent.

In other words, the overwhelming threat of chemicals to the health of Americans is self-imposed, largely resulting from smoking, poor eating habits and drinking: Doing something about these dangers is largely up to the individual.

On the other hand, the panel stresses, the Government is responsible for protecting Americans from those chemicals they do not wish to be exposed to. And it suggests accelerated research, more flexibility by Government agencies in carrying out laws designed to

protect Americans from chemical hazards and better communication between these agencies and the public. It particularly recommends a larger role for the National Institute of Environmental Health Sciences.

The panel claims that some of its recommendations regarding better communication with the public by government health agencies and including the public in decision-making have already been implemented. The NIEHS now holds public conferences. The Environmental Protection Agency and the Food and Drug Administration have created advisory committees composed of scientists and the public. And the FDA is taking "frank steps" to make available to the public much of its scientific information.

But these agencies have a way to go yet before the American public really feels it is participating in decisions about chemicals and health. Recently a SCIENCE NEWS reporter was kicked out of an FDA advisory committee meeting discussing a particular class of drugs on the market. (The committee was comprised entirely of scientists.) She talked with the general counsel to the FDA and also to a Health, Education, and Welfare official who has been charged solely with improving health agency-public communication. Both agreed that closing the meeting might well have been illegal under the Freedom of Information Act of 1967 and the Advisory Committee Act of 1972. The HEW official said he would look into the matter. He has never called her back. □

and William E. Roy (D-Kan.), both physicians. Back in September Alexander McMahon, president of the American Hospital Association, declared, "The AHA recognizes the HMO and other concepts as essential ingredients in an emerging new health care delivery system." The American Medical Association, however, fought the legislation. □

Sahara's far-flung dust dims Atlantic sunlight

You can see it in the skies. Aircraft come back covered with the stuff, and it even shows up in the photos taken by weather satellites. Dust—vast clouds of it—whirled into the skies from the parched lands of Africa and blown in vast sheets across the full expanse of the Atlantic to the balmy climes of the Caribbean.

For nine years, scientists in the Caribbean have monitored dust from the Sahara. At first, the concentrations of the dust changed little, rising in the summer, falling in the winter, but growing only a small amount from year to year. But in 1969 the far-flung motes began to show the influence of the bitter drought that has now been plaguing Africa's sub-Saharan grasslands for half a decade (SN: 9/29/73, p. 197). In a single year, from 1972 to 1973, the summer African dust count measured at Barbados jumped 60 percent, reaching three times its 1968 pre-drought level of eight micrograms per cubic meter of air.

A microgram is tiny—less than a twenty-eight-millionth of an ounce. Yet multiplied by the tremendous volume of the winds, the dust has now reached such concentrations that it is dimming the very sun, with possible implications not only for air quality, but for the weather itself.

Toby N. Carlson, of the National Oceanic and Atmospheric Administration's National Hurricane Research Laboratory in Miami, is one of those concerned about the rapid escalation of the annual dust-drop on the Caribbean side of the Atlantic. "The effect of these increases," he says, "has been to increase atmospheric turbidity (or decrease atmospheric transparency) to the point where the typical marine conditions one normally finds there have been transformed into the hazy conditions of urban industrialized regions of North America."

"The difference," he points out, "is that the 'pollution' consists of natural soil particles, and is concentrated much more at 10,000 feet than at the surface." Airborne though it be, says Carlson, the dust has grown so thick since the drought began on the other side of

Era of the HMO: Health care by the year

Probably the biggest boon to American health care during the 1960's was Medicare, the Federally financed health insurance for older Americans. The biggest boon to emerge so far during the 1970's appears to be the Health Maintenance Organization Act of 1973, signed into law by President Nixon Dec. 29.

The act authorizes Federal expenditures of \$375 million over five years to expand or develop health maintenance organizations. HMO's are prepaid comprehensive health care programs for a specific geographic population. As an alternative to the traditional fee-for-service system in which the patient is charged for each separate item of care, an HMO member pays a fixed annual fee, usually on a monthly basis. In return he or she receives outpatient and inpatient care ranging from routine checkups to major surgery. HMO's stress preventive medicine. Coordinated, easily available medical care replaces expen-

sive emergency room and inpatient care whenever possible. So plan members tend to spend less time in the hospital, have fewer operations and pay less for more services than the rest of the population. One study showed that eight million Federal employees who had prepaid comprehensive coverage were hospitalized 52 percent less often and had 45 percent less surgery than those who did not belong to the plan.

Two years ago there were some 40 HMO's in the United States. Now there are 60 or so. The best known include the Kaiser Foundation Health Plan in California, the Health Insurance Plan of Greater New York and the Group Health Association of Washington, D.C. GHA predicts that some 40 new HMO's will be started or expanded in 1974 as a result of the new act.

The HMO legislation was strongly endorsed by Sen. Edward M. Kennedy (D-Mass.), Rep. Paul Rogers (D-Fla.) and by Reps. Tim Lee Carter (R-Ky.)

the ocean that it has blocked out as much as 15 percent of the solar energy reaching the surface of the tropical Atlantic.

The heaviest concentrations come in summer, usually from late May through September or October, says Joseph M. Prospero of the University of Miami. He has been monitoring the dust from a station on Barbados, and collecting data from ships and aircraft. The summer dust is characteristically reddish brown, apparently from an area encompassing southern Algeria, Mali, Mauritania, Senegal, Spanish Sahara and Niger. The much smaller winter load is ash grey or black, probably from the more verdant lands south of the Sahara.

The dust layer seems to have a pronounced effect on clouds. Because it is heated so much while it is still over the African continent, once at sea the base of the layer forms a warm inversion with the cool, moist trade winds closer to the ocean surface. This inhibits the development of cumulus clouds, and, says Carlson, may affect the growth of tropical disturbances into hurricanes.

Both Carlson and Prospero will be studying how the Saharan dust layer interacts with tropical weather systems this year as part of the Tropical Experiment of GARP—the long-running Global Atmospheric Research Program. There are other dust transport systems over the world's oceans, but if the killing African drought continues, the Saharan layer could lead the list. □

On the track of Pacific whales

Though the enormous size of the whale makes it an easy animal to spot in water, and thus an easy prey for the hunter's harpoon, scientists have great difficulty mapping their migratory patterns and gathering general behavioral data. The animals roam great distances; some can travel more than 4,000 miles in a year. In the past, stomach content and skin parasites, as well as tagging, provided clues to the whale's wanderings. But these are only moderately successful methods. Only about 7 tags in every 100 are ever returned.

Now scientists from the University of California in Santa Cruz have devised a new system of tracking the whale's every move. This month, they will go to Magdalena Bay in Baja California to test their ideas.

The experimenters hope first to lure a young Grey Whale away from its mother and bring it to shallow waters. There, they will fit the whale (by harness) with a data package containing a tape recorder, a radio transmitter and sensors which will record heartbeat,

temperatures (of the water and skin) and pressure on their bodies during dives. The harness is made to expand with the growth of the whale. (A Grey Whale grows about 60 percent of its full length in its first year.) At some point, the harness will fall off and be retrieved by scientists. During the first experiment, the whale will be tracked for two

or three weeks by boat. Eventually, the signals will be recorded by satellite.

Future tracking experiments will include such sophisticated techniques as having the whale swallow a biomedical device—a radio transmitter pill that can record the temperature in a whale's stomach and thus tell researchers when it has eaten. □

Orbis Scientiae: a scientific Macedonian salad

The ancient Romans had a monitory proverb: *Ne sutor ultra crepidam*. It comes down to us in English as "Cobbler stick to thy last." It might have formed a motto on the coat of arms of the conscientious scientist. He was supposed to stick closely to his specialty and declaim in public only on topics in which he was expert. There have always been exceptions to the principle, but they were often treated as people who didn't know what they were talking about.

Now attitudes are changing. "Interdisciplinary" is the word that may mean the day of the polymath is about to dawn again. As different scientific specialties drive toward more and more fundamental causes of their phenomena, their edges rub together. The transport of matter across membranes is a question that unites biology, chemistry and physics. As the sciences come closer to fundamentals they begin to discover a unity in diversity. Physicists invented quantum mechanics. It is already a long time since chemists adopted it gleefully because it explains so many things they used to have to consider empirical. Soon, it seems, molecular biology will have to adopt quantum mechanics. Already the question of the absorption of oxygen in the blood has come to depend on the physics of the hemoglobin molecule. When biologists see the handwriting on the wall, it traces out mathematical symbols.

The traditional type of scientific meeting is rather ill equipped to handle these cross connections. Experts give their latest results in a form that only people working on the same topic are likely to understand fully. Outsiders get lost. So how about a meeting designed for cross-cultural communication, to fill outsiders in on research trends in interdisciplinary questions? Such was the resolve of the Center for Theoretical Studies of the University of Miami when they planned the *Orbis Scientiae* or World of Knowledge meeting that was held on the university's campus in Coral Gables, Fla., last week.

It was a success with certain qualifications. A disappointment was the smallness of the group. Some of those who had been invited declined to come. Whether they were home sticking to

their *crepidae* or whether they had other reasons is not clear.

Among those who did come there was a good deal of interdisciplinary interest. An electrical engineer present was seeking connections between engineering and biology. Two physicists-turned-biologists were heard at breakfast discussing the statistical problems of economists. An economist, Nicholas Georgescu-Roegen of Vanderbilt University, pointed out that economists will now have to take some attention from psychological matters such as supply and demand or the tendency to spend money versus the tendency to hoard it and consider the physical and chemical limitations on energy and resources that are beginning to affect the economy.

There was interdisciplinary communication: Physical scientists discussing the energy crisis prefaced their remarks with economic background and appealed to economists in the audience for help in answering questions. P. A. M. Dirac gave a talk on unified field theory and cosmology that drew from a nonphysicist the comment: "You can really learn from this guy. He makes it clear."

And there was interdisciplinary criticism. A chemist commenting on an economist's attempt to make a mathematical model of an economic situation said it was like applying quantum mechanics to the distillation of gasoline—too fine a model for the grossness of the fact.

Edward Teller of the Lawrence Livermore Laboratory performed one of the neatest tricks of the week in reducing one of the pressing technological problems of the energy crisis, the production of fuel-saving cars, into a question of vertebrate behavior by invoking a mythical dog of his student days, the *Salathund*. A *Salathund* is a dog that won't eat salad until it sees another dog eating salad. Then it goes and eats. Where economical cars are concerned, says Teller, Detroit is a *Salathund*. The problem is providing the first dog.

Might it not also be that where interdisciplinary communication is concerned, most scientists are *Salathunde*? Perhaps meetings like *Orbis Scientiae* may provide the first dog. □