

# environmental sciences

## 'Natural' toxins

In an apparent attempt to counter the growing influence of various "health food" practitioners, the National Research Council has just prepared a book on *Toxicants Occurring Naturally in Foods*. According to advocates of "natural" foods, fertilizing and spraying crops and artificially preserving prepared foods add potentially harmful chemicals that are passed on to the consumer. But many toxic substances already occur naturally in foods. Pepper, mace and nutmeg, for example, all contain an oil that can cause liver damage if taken in large doses. Thus there is "no absolute safety or security," says Frank M. Strong, chairman of the NRC subcommittee that prepared the book.

The point to remember, he says, is that just because a substance is toxic does not necessarily mean that eating it in small quantities in food is harmful. By maintaining a properly balanced diet, the amount taken of any one substance will be relatively small and its toxic effects may well be diminished by the presence of some other substance.

The book also takes a swipe at megavitamin partisans. Too much vitamin C, it reports, can cause kidney and bladder stones, and too much vitamin E produces headache, nausea and blurred vision.

To such criticism, health food proponents have generally replied "Yes, but scientists still haven't come to grips with the question of how much *extra* toxic substance can be added to food before it becomes dangerous to eat or how much modern society has removed sources of natural vitamins." The two sides surely agree with one conclusion of Strong, however: "In the United States today, the chief food hazards probably result from overeating."

## Reclaiming strip-mined land

The U.S. Department of Agriculture and the Maryland State Forest Service have announced successful testing of new methods of reclaiming strip-mined land using commonly available waste products. The main problems in re-establishing vegetation on mine spoil—land left after strip mining—include overcoming the acidity caused by unearthed minerals and finding a means to replenish lost nutrients. Applying rock phosphate, investigators found, helps both to neutralize soil acidity and return to the ground two elements vital to plant growth, calcium and phosphorus. Dolomitic limestone was also added to further the neutralization process, and nitrogen and potassium were used to aid fertilization. Some kind of surface mulch is also necessary to prevent formation of a hard crust on the spoil. Since some paper mills produce 90 tons of waste paper pulp a day, researchers decided to try this material as a possible mulch. Finally, adding three percent sewage sludge to the brew, they succeeded in obtaining good germination and "dense, lush soil cover."

## New swats at pests

A University of West Virginia post-doctoral fellow, Timothy P. Yoho, has found that flies fed certain dyes are quickly killed by exposure to light. A fly's body is relatively translucent and chemical changes in the dyes, caused by penetration of light, apparently render them toxic.

\* \* \* \*

Plant pathologists at the University of California, Riverside, have discovered that deadly "stubborn disease," which afflicts citrus trees, is apparently carried by a variety of insects called "leafhoppers." Controlling the disease may now be a simple matter, involving control of the insects.

# biomedical sciences

## The gut of gene control

During the past 15 years or so, molecular biologists have discovered that gene expression is subject to rigorous controls. A set of functional genes (an operon) is controlled by a strip of DNA next to it (an operator). When a protein (repressor) sits on an operator, the neighboring genes cannot be transcribed. If the repressor hops off, the genes can be transcribed.

Recently two Harvard University biologists reported that an operator in a particular virus binds to multiple operon sites, not just to the usual one site (SN: 12/1/73, p. 342). Now researchers at Harvard and at the University of Cologne, Germany, report in the December PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES that they have determined the chemical sequences of an operator and a repressor. Both operator and repressor are from the *E. coli* bacterium and control the genes that make enzymes that control the use of lactose in the bacterium. So they're known as the "lac" operator and repressor.

Walter Gilbert and Allan Maxam of Harvard have determined the nucleotide sequence of the lac operator. It is 24 base pairs long. Konrad Beyreuther and his colleagues at Cologne have unraveled the amino acid sequence of the repressor. It contains 347 amino acids on one peptide chain. Using these findings scientists should now be able to learn precisely how a short stretch of DNA and a protein interact to control the expression of adjacent genes.

## Psyching out low back pain

Miseries in the lower back can have a lot of different causes—poor posture, slipped disc, congenital defects, infections, arthritis, pregnancy, aging and hormonal changes, tension. If tension is the cause, the physician wants to know it so he can then direct treatment to the patient's psychological stress.

A computerized personality test can now be successfully used to determine whether low back pains are of psychological origin, C. Robert Lincoln of Watts Hospital, Durham, N.C., and Richard A. Hopkins of the Duke University Medical Center reported this week at the annual meeting of the American Academy of Orthopaedic Surgeons in Dallas. The Durham orthopedic surgeons have found that the computerized test is a better predictor of successful treatment than the physicians' evaluation of patients' complaints.

## Chinese herb counters infections

The current back-to-nature trend has prompted many Americans to buy herb gardens for their kitchens or to stock up on herbal teas as home remedies. But the American medical community, for the most part, is reluctant to pick up where grandmother left off.

Not so in China, where herbs have long been, and continue to be, prescribed by many physicians. The Chinese are now evaluating scientifically the medicinal value of many of these herbs. One of the latest to be confirmed of medicinal value is *Senecio scandens* (also known as "moccasin," and prescribed by some Chinese physicians in the United States).

The Chekiang Provincial Coordinating Group for Study of *Senecio scandens* in Hangchow gave the herb to 1,300 patients with 30 different diseases. As they report in the CHINESE MEDICAL JOURNAL (No. 10, 1973), the herb was effective against many infections, from upper respiratory tract infections to tonsillitis and eye diseases.