# environmental sciences

FRESHWATER CRUSTACEAN

## Crayfish successfully transplanted

Swedes are fond of crayfish, a small freshwater crustacean. But the native crayfish fishery in Sweden's lakes has been reduced by about 50 percent by fungus disease. So last year, California Fish and Game Department officials furnished the Swedish Government with crayfish from Lake Tahoe.

Dr. Sture A. A. Abrahamsson, a Swedish aquatic ecologist, reports that some of the Tahoe crayfish are already established in Swedish lakes, and that they are highly resistant to the fungus plague. The Swedes are attempting to breed the crayfish artificially so as to prevent the possibility of transporting the parasites between lakes.

This summer, Drs. Abrahamsson and Charles C. Goldman of the University of California at Davis are planning crayfish research at Lake Tahoe. One goal will be to compare breeding habits of the crayfish at Tahoe and in Sweden.

Another aspect of the research will involve lake eutrophication: Apparently, says Dr. Goldman, the crayfish thrive in eutrophic areas, and they are probably taking advantage of the extra nutrients there. This offers a possible approach to tying up the nutrients and reducing harmful effects of eutrophication, he says.

WATER POLLUTION

## Bay problem is toxicity

Lake Erie has been called a dead lake because of pollution and eutrophication. Disagreeing with what he calls this oversimplified and sensational view, Dr. Erman A. Pearson, a sanitary engineer at the University of California in Berkeley, says San Francisco Bay, in its own way, may be worse off than Lake Erie.

But he stresses that although both bodies of water badly need cleanup, it is less than objective to call them dead or to take an alarmist point of view.

While Lake Erie's main problem is eutrophication, the problem in San Francisco Bay is excessive toxicity, says Dr. Pearson. This toxicity, having its source in industrial and municipal sewage, has put stress on the ecology of benthic (bottom-dwelling) organisms, phytoplankton and zooplankton.

Conventional pollution parameters show higher levels of pollutants in San Francisco Bay than in Lake Erie, says Dr. Pearson. Included among these are coliform bacteria, nitrates and phosphates in the water, and organic carbon, nitrogen and sulfides in the sediments.

AIR POLLUTION

## Resistant plants sought

Air pollution causes an estimated $500 million damage annually to plant life in the United States. Assuming that major abatement is not an immediate prospect, plant physiologists and pathologists at the U.S. Department of Agriculture's Beltsville, Md., laboratory are identifying resistant and nonresistant plants so that crops can be planned for air pollution areas.

To do this Drs. Howard E. Heggestad, Chong W. Chang and Robert K. Howell are now studying the effects of photochemical oxidants. These are toxic chemicals formed by action of sunlight on nitric oxide, nitrogen dioxide and reactive hydrocarbons that are characteristic of smog-type pollution.

Susceptibility to the chemicals varies with species and varieties within species, the researchers report. Some plants do nearly as well in polluted air as in unpolluted air; examples are juniper, arborvitae, tomato and some varieties of cotton. But some strains of tobacco and potato plants show yield increases of almost 100 percent when grown in pure air.

ENVIRONMENT

## Campus microworld

Universities all over the country have been involved in activities protesting the degradation of the environment. The University of California at Santa Barbara is concentrating on its own back yard.

University Chancellor Vernon I. Cheadle has announced a number of programs aimed at assuring that the university makes the best possible adaptation to its own environment, a beautiful natural setting on the Pacific Ocean.

In a recent action, Chancellor Cheadle asked the California Highway Commission to defer construction of a major boulevard designed to be a traffic artery to the campus.

He announced that 91 acres of the west campus are now designated as a natural preserve. Ecology research will be done on one side of a lagoon on the main campus, which has been similarly designated.

In other programs, propane fuel systems are being installed on three university vehicles; use of electrically driven cars is being investigated; organic fertilizers are being used for most purposes on campus; hard pesticides have been virtually banned, and the campus architect is preparing studies for a long-range ecological planning guide.

MARINE LIFE

## Whales produce songs

It has been known for many years that whales produce sounds of various kinds. Dr. Roger S. Payne of the New York Zoological Society has recorded the sounds made by humpback whales, and he and Scott McVay of Princeton University have analyzed the sounds and discovered them to be elaborately patterned and song-like.

Dr. Payne's main interest was in discovering the role of the sounds in the behavior patterns and life cycles of the whales.

"It would be so nice to think they talk to each other," he says. "But many other creatures, including bees, communicate at some level. There is no evidence the whales are philosophical creatures of the deep."

In fact, Dr. Payne adds, the songs—which a number of musicians have ranked as music of some quality—are repeated monotonously, even though the total repertoire of a single whale may last 7 to 30 minutes.

He speculates that the purpose of the songs is to allow different whales to recognize one another and keep contact as they migrate in the Atlantic.