

environmental sciences

WATER POLLUTANTS

Sublethal ecological effects

Two California researchers are disturbed by subtle and heretofore unrecognized effects on stream ecology caused by pollutants in streams and rivers in California's Central Valley and nearby Sierra Nevada Mountains.

Drs. Allen Knight and Robert Brocksen of the University of California at Davis report that levels of pollutants not high enough actually to kill certain organisms are enough to inhibit reproduction by requiring higher use of energy for more rapid respiration. One and a half years of experiments in laboratory-simulated streams have convinced them that the lower down the food chain the greater the damage, with midge larvae, May flies, stone flies and zooplankton suffering the most. These organisms are required by fish for food.

"We are getting gradual and insidious reductions of populations of these organisms at sublethal levels of pollution," says Dr. Brocksen.

The experiments have simulated actual stream pollution levels for pesticides, thermal pollution, acids of the sort that come from pulp mills and salinity. There are synergistic effects from combining the pollutants, but Dr. Brocksen says he and Dr. Knight are particularly concerned by salinity effects on fresh-water shrimp that are food for juvenile striped bass, an important game and commercial fish.

PEST CONTROL

Birth control for pigeons

Pigeons are a nuisance in many American cities. The cities provide habitats, such as vacant buildings and trestles, and pigeons have proliferated. They are a public health problem and carry germs to pets and people.

The Food and Drug Administration recently approved use of a chemical, 2-ortho, 25-diazocholesterol dihydrochloride, as an antifertility agent for use against pigeons. Dr. Stephen L. Beckwith at the University of Florida in Gainesville reports he has developed bait in the form of kernels of corn covered with the chemical. The substance works with birds other than pigeons, but the size of the corn kernels generally would prevent smaller birds from eating it, Dr. Beckwith thinks. "There is evidently no effect on mammals, at least rodents," he adds.

He says the chemical works by lowering cholesterol levels in egg yolks, a different mechanism from the one operating with human birth-control chemicals.

SEWAGE TREATMENT

Pennsylvania moves against phosphates

Pennsylvania has announced a new policy for removal of algae-nourishing phosphorus compounds from municipal wastes released into the lower Susquehanna River. Increased algae growth due to phosphorus creates an oxygen demand harmful to fish, as well as taste and odor problems.

New sewage-treatment plants on the lower Susquehanna, and plants undergoing major renovation, must include phosphorus-removal facilities under the new policy, says Theodore Clista of Harrisburg, assistant director of

the state water quality division.

Phosphorus compounds—about 50 percent of which come from household detergents (SN: 12/27, p. 591)—are removed through chemical or colloidal precipitation, the exact process depending on the point in the total sewage treatment process where the removal takes place. Estimated cost is five cents per thousand gallons, but exact figures are not available because of lack of experience. States established similar policies for Great Lakes watersheds last fall, but plants have not yet been built.

The Susquehanna drains into Chesapeake Bay after passing through a reservoir on the Pennsylvania-Maryland border.

Clista says that the Pennsylvania action is partly in anticipation of plans of the Federal Water Pollution Control Administration to require clean-up of all waters entering Chesapeake Bay.

OIL SPILLS

Chemical containment of oil

Current techniques for collecting or dispersing oil spills on bodies of water have disadvantages. Collection cannot be put into operation quickly enough to prevent spreading of oil over a wide area; emulsifying agents disperse the oil to a greater depth, but emulsions can later break up and oil can be freed again.

Naval scientists have been looking for compounds that spread to a one-molecule-thick film around an oil spill and thus contain it and make collection easier (SN: 2/22/69, p. 183). William D. Garrett and William R. Barger of the Naval Research Laboratory think that esters of sorbital may be the answer.

Criteria include cost, nonmiscibility with both oil and water, nontoxicity and high spreading pressures. The esters appear closest to meeting all the criteria, Garrett says after laboratory tests.

A number of compounds, including some proposed for use on reservoir surfaces to prevent evaporation, were tried before the esters were chosen as most likely.

ENVIRONMENTAL EDUCATION

Environmental workbooks

The Scientists Institute for Public Information in New York wants to help close the gap between environmental scientists and the public—especially young people.

The nonprofit group was established in 1963 and is supported by the Sloan Foundation and others. Currently it is preparing a series of eight workbooks on environmental problems to be released before the teach-in on the environment, scheduled for April 22 at universities across the country (SN: 12/20, p. 575). Workbook topics are air pollution, water pollution, pesticides, environmental costs of electric power, environmental education in 1970, environmental effects of weapons technology, hunger and nuclear explosives in peacetime.

The workbooks each have an introduction by Dr. Barry Commoner of Washington University in St. Louis, and suggestions for further reading. Dr. Margaret Mead of the Museum of Natural History in New York is president of SIPI—which also has local chapters.