

EUTROPHICATION

Alum may combat algae

Sodium aluminate (alum) or similar chemicals have been proposed as precipitants for phosphates in sewage treatment.

But whatever is done to sewage, once some lakes become eutrophic with algae blooms they stay that way even when the source of nutrients is removed. Algae blooms die, but they pass their nutrient content along to a new generation.

A group of University of Wisconsin scientists tried using alum applied directly to the surface of the eutrophied Horseshoe Lake in eastern Wisconsin. The results are promising. Water clarity improved and winter fish kills were eliminated. Rainbow trout, stocked in the lake, showed no adverse effects from the alum.

The alum was added to the top two feet of water in the lake in May 1970. Particles of it settled like snowflakes, apparently taking phosphates along. There were no blue-green algae blooms in the summer of 1970, and calculations indicate that about 110 pounds of phosphorus were removed by the 11 tons of alum.

BEHAVIOR

Effects of environmental deprivation

Malnutrition alone can create long-term adverse behavioral changes. But when early environmental deprivation is added to malnutrition, the behavioral abnormalities are greatly worsened, says Dr. David L. Levitsky of Cornell University.

Dr. Levitsky put two groups of young nursing rats and their mothers on poor diets, with one group also in socially isolated environments. At the end of a three-week nursing period, he put the rats on a low-protein diet. Then both groups of rats received 10 weeks of environmental and nutritional rehabilitation.

Both groups showed significant behavioral abnormalities, such as excitation in open spaces, limited social interaction and apathy. But the 10 weeks of rehabilitation returned most of the environmentally nondeprived rats to normal behavior.

The abnormalities of the environmentally deprived rats were far more severe, says Dr. Levitsky.

He says the work, which he believes to be applicable to humans, gives further support to the belief that early environmental and nutritional factors can have "tremendous importance" in later adult behavior.

ACID MINE DRAINAGE

Bacterium may be answer

Iron pyrites associated with mineral deposits react with water and oxygen in surface and underground mines. The complicated reactions produce, among other things, sulfuric acid. The resulting acid water dissolves various metals, including iron, further polluting the water. When the water enters waterways fish are killed and piers, culverts and barges are corroded.

There is no single answer to the problem. Pre-planning of mines so that drainage water can be captured for treatment is a major approach (SN: 5/1/71, p. 297). The Federal Water Quality Office says treat-

ment should reduce both acidity and iron levels.

Dr. Harold Lovell of Pennsylvania State University says work with iron-metabolizing bacteria for treatment is promising. The bacterial method exposes the wastes to *Ferro bacillus ferro oxidans*, then circulates the water over common limestone to neutralize it. The method may be only one-fifth as expensive as the usual chemical treatment with lime.

The bacterium, isolated by Penn State microbiologists, oxidizes the iron. One unresolved problem is that the bacterium does not reproduce in water cooler than 45 degrees F. The microbiologists are trying now to develop a cold-weather strain.

ENERGY

Con Ed stops growth promotion

The doubling every 10 years of the nation's consumption of electricity is a major contributor to the energy crisis. Coal, fuel oil and natural gas for power plant boilers are in short supply. Brownouts are more common. Air pollution from power plant stacks and thermal pollution from power plant condensers are increasing.

Power companies have come under heavy fire from environment groups who say company sales and advertising departments encourage profligate and frivolous use of electrical energy and that the companies spend far more for advertising than for research into pollution abatement.

In a departure from this pattern, Charles F. Luce, chairman of New York City's huge Consolidated Edison Co., announced that the company has disbanded its sales promotion office and from now on will use advertising only to urge conservation of electricity.

Demand for electricity is nonetheless expected to grow so fast, says Luce, that in the 1980's the company may have to build power plants 10 miles out to sea in the Atlantic Ocean to get enough cooling water for condensers.

Luce, however, says he opposes a proposal to reverse the present regressive rate structure for electric power. Under the proposal the largest users would be charged more per kilowatt-hour than smaller users, to discourage consumption of large quantities of power.

AUTO EMISSIONS

Halides deactivate catalysts

Catalytic converters for oxidation of carbon monoxide and hydrocarbons in auto exhausts are a major approach by auto companies to reducing these two pollutants. But the catalysts are sensitive; tetraethyl lead additive deactivates them, as does excessive heat.

Monsanto Corp. chemist Dr. James F. Roth says his research shows that halides from the tetraethyl lead may do as much damage as lead to the catalysts.

But even without the tetraethyl lead, says Dr. Roth, the catalysts can be physically eroded by cyclic oxidation-reduction in the converter.

An earlier approach to this physical attrition was to use hard, abrasion-resistant support material for the copper-based catalyst. But this did not stop the erosion. Says Dr. Roth: High dispersion of the copper component of the catalyst can correct the condition.