environmental sciences

POLLUTION CONTROL

Expenditures slim

Big words are not being backed up by money spent for pollution control, the August ENVIRONMENTAL SCIENCE & TECHNOLOGY reports.

The magazine bases its conclusions on reports of earnings of companies which make pollution-control equipment. The Industrial Gas Cleaning Institute, whose members make 75 percent of the air-pollution abatement equipment in the country, reports 1969 earnings only two percent higher than 1968, considerably lower than the increase in the gross national product. This is an indication that the nation is not even keeping up with new problems that are developing, let alone solving the old ones, says the magazine. Figures for 1970 earnings of equipment manufacturers are no more encouraging, it reports.

NONPOLLUTING POWER

Geothermal fields offer potential

A study by scientists at the University of California at Riverside, confirms the vast potential of geothermal fields under California's Imperial Valley (SN: 2/1/69, p. 113), reports Dr. Robert Rex, leader of the UCR geophysical research team. The resource will probably be further studied by the California State Geothermal Resources Board.

As much as 20,000 megawatts of electrical capacity might be harnessed by drilling wells into the field, says Dr. Rex. There are also possibilities for supplying heat and refrigeration to food processing industries and for desalting water.

The 20,000 megawatts would be enough to meet most of southern California's power needs. However, a geothermal system would not be able to respond to fluctuating power demands. Also, utilities say they are hesitant to consider it a reliable resource.

Power production from the field would be virtually nonpolluting, although there would be some loss of heat to the atmosphere. But such thermal effects are created by all existing means of power production, except hydroelectric plants—and there are few suitable sites for new hydroelectric plants.

AIR POLLUTION

Tokyo monitoring system

One of the first steps in controlling air pollution is the difficult one of measuring it. A Japanese monitoring system installed by the Tokyo Shibaura Electric Co. in the 1,200-foot Tokyo Tower is an elaborate advance over existing monitoring equipment.

The system, for example, will measure sulfur dioxide concentrations at elevations of 100, 450 and 700 feet, correlating these concentrations with wind direction, wind velocity and temperature. The effects of inversion layers and other meteorological conditions will also be studied.

The new system will serve not only for research into air pollution problems, but also as a center for disseminating air pollution information to the public.

Data from each piece of air pollution monitoring equipment will be converted into digital quantities for computer processing. Simple instruments—such as a bar graph indicator corresponding to the three levels of SO_2 measurement—will enable operators to learn of air pollutant levels at a glance.

The National Air Pollution Control Administration says no system so elaborate exists in the United States. NAPCA researchers have measured urban SO_2 vertical differentiation, but never continuously or to such heights as the Japanese system.

MONITORING

Algae growth observed

The rate of growth of algae is an index to the effects of nutrient levels in bodies of water and one of the parameters for gauging the degree of eutrophication (SN: 7/4, p. 17). A common device for this measurement has been to determine photosynthetic activity by the rate of uptake of carbon dioxide that has been labeled by carbon 14.

A different approach has been reported by Dr. James T. Staley of the University of North Carolina. It involved actual microscopic examination of algae in the body of water (a Michigan pond), a technique that had not been tried because of the technical difficulties involved.

The microscope was enclosed in plastic material so that the only part exposed to water was the instrumental stage. An assembly of microscope, 35-millimeter camera and light source was placed on a table in the study pond. Then a period was allowed for natural attachment of algae to a previously sterile glass slide. A microscopist sat on the immersed stool to observe algae growth and take the photomicrographs.

Algae growth rates were clearly detectable with this system. Researchers also observed that most algae growth occurred during the day and most cell division at night. The technique will be used to determine differences in growth rates of algae in ponds with various levels of nutrients.

DECONTAMINATION

Mist removes plant pollutants

Radioactive fallout and other environmental contaminants can be removed from food plants through leaching with a fine mist of water, reports a Cornell University scientist.

Working under Atomic Energy Commission grants, Dr. H. B. Tukey Jr. has experimented since 1960 with the mists. Although the work is aimed specifically at removing radioactive isotopes—cesium 137 and strontium 89 were used in the experiments—Dr. Tukey believes it is applicable to other kinds of pollutants. The Sr-89 was used instead of the more feared Sr-90 because of Sr-89's much shorter half-life.

The success of decontamination by leaching depends on many factors, especially the portion of the plant used for food. Leafy vegetables are much easier to decontaminate than root vegetables. Root vegetables tend to absorb contaminants from the soil, and fruit-bearing crops such as tomatoes tend to become more seriously contaminated if the contamination occurs during flowering and fruit development.

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