environmental sciences

ATMOSPHERIC POLLUTION

North Atlantic particulates increase

Electrical conductivity in the atmosphere is a measure of its purity; the less the conductivity, the higher the load of particulate pollutants, the dust particles, suspended sulfates and aerosols that modern industry and such natural events as volcanic eruptions contribute to the atmosphere. Conductivity decreases with higher particulate loads because of the absorption of small ions. This conductivity was measured for various points over the world's oceans by the Carnegie Institution in 1909 and 1929.

William E. Cobb of the National Oceanic and Atmospheric Administration reports that recent measurements show conductivity over the North Atlantic has decreased some 20 percent since the Carnegie measurements. Conductivity at 35 degrees north over the Atlantic is 40 percent less than that at the same latitude south.

Cobb attributes the increased North Atlantic particulate load to the high degree of industrialization in countries surrounding the North Atlantic, to the lack of exchange of atmospheric air between the Northern and Southern Hemispheres and to the fact that the region around 35 degrees south latitude is one of natural subsidence and is therefore a natural cleansing basin.

BIOLOGICAL CONTROLS

Juvenile hormones synthesized

Insect juvenile hormones offer a possible means of biological control of insect populations because they prevent the development of young insects into adults. A problem, however, has been the need for complex purification processes to isolate the hormone from related compounds after the usual methods of synthesis.

Two Harvard chemists, Dr. E. J. Corey and Hisashi Yamamoto, report they have synthesized two Cecropia moth hormones without the formation of the troublesome related compounds.

Dr. Corey reports that the hormones are still more expensive than other insecticides and that their ecological effects are not yet well researched. It is therefore premature, he says, to discuss large-scale manufacture and use for insecticidal purposes. But, he adds, radioactively labeled hormones could be highly useful for study of biological processes in insects.

NUTRITION

Chickens convert nitrogen

It has long been known that certain ruminant animals—cows and sheep, for example—can convert nonprotein nitrogen compounds into proteins. Two Cornell University scientists say they have shown that chickens can also manage the conversion, and they have discovered how.

Drs. Robert Blair and Robert J. Young report that experiments with chickens and Japanese quail show the animals are able to convert diammonium citrate into glutamic acid, a basic subunit of most proteins, through the action of a liver enzyme, glutamic dehydrogenase. The two researchers say the work indicates that diammonium citrate could replace part of the protein in the birds' diets and that the birds would provide protein yields for human consumption as high as birds fed a normal protein diet.

TRANSPORTATION

Offshore terminals a possibility

Terminals placed in the oceans offshore could provide a variety of benefits, including pollution reduction, says U.S. Maritime Administrator A. E. Gibson, who recently called for proposals for detailed studies.

The terminals—they might be artificial islands constructed of the solid wastes that are becoming increasingly difficult to dispose of—could serve as sites for nuclear power plants. This would allow wider dissemination of the waste heat that sometimes is detrimental to more restricted ecosystems.

In addition, they might serve as terminals for extra-large ships. This would obviate the need for dredging existing harbors, a practice that is damaging to ecosystems and creates pollution.

WATER CONSERVATION

Eliminate the phreatophytes

Removal of phreatophytes—deep-rooted desert plants such as mesquite—could make large quantities of water available for other uses, reports a U.S. Geological Survey hydrologist.

Unlike other plants that tap only soil moisture, the phreatophytes go deeper and tap water sources in natural storage far beneath the surface. Richard C. Culler, who studied Arizona areas where the plants are plentiful and where they had been removed, says they take up the subsurface water as though they were small wells. Then they release much of it to the atmosphere through evaporation and transpiration.

Removal of the plants from a 1,700-acre area along the Gila River resulted in saving about 3,400 acre-feet of water annually, reports Culler.

FOOD RESOURCES

Alga could utilize pollutants

An alga that grows naturally in an acid medium in hot springs could be cultivated in certain industrial wastes and become a significant new source of protein, says Dr. Vern McMahon of the University of Wyoming. The alga would make use of the waste heat discharged by power plants and other industrial installations and the acid wastes from paper processing.

Dr. McMahon says a team he headed experimented with *Cyanidium caldarium*, an alga that contains 60 percent protein and a good balance of essential amino acids. The alga grows rapidly on several carbon sources, including some types of sugar. The sugar-containing acidic waste water from paper processing appears to be a good medium, says Dr. McMahon. Waste heat from power plants could heat the culture medium to temperatures at which the alga thrives. Small-scale laboratory tests indicate a possible yield of 100 tons of the alga per acre per year, he claims.