environmental sciences

CARBON MONOXIDE

Criteria issued

Carbon monoxide, most of it having its source in vehicle exhausts, has been implicated in several kinds of impairment of human functions. The National Air Pollution Control Administration said last week that the evidence is good enough to issue criteria which states will use in air quality programs.

The criteria will not, however, set the actual limits; instead they will list levels which NAPCA says have been harmful in various ways. States can use the criteria for guidelines in setting air quality standards, and later can aim at achievement of the quality goals with emission standards for stationary fuel-burning installations and, perhaps, used cars. The Federal Government will set new car standards.

Carbon monoxide has been shown to cause impaired time perception and psychomotor activity in humans. But data on the amounts required to cause reactions of varying severity is still inconclusive, with different scientists reporting different results (SN: 1/17, p. 59).

PESTICIDES

Concentration process explored

Natural slicks on the ocean surface concentrate chlorinated pesticides—including DDT and dieldrin—and make them more available to organisms for biological concentration, two Florida researchers say.

Dr. Eugene F. Corcoran and Dr. Douglas B. Seba of the University of Miami report concentrations of up to 13 parts per billion of chlorinated pesticides in natural slicks in Biscayne Bay—contrasted with concentrations of less than one part of the pesticides per trillion in surrounding water.

Dr. Corcoran says the slicks are made up of organic fatty materials (along with some inorganic materials), which converge because of wind action or the joining of two water masses. The pesticides are far more soluble in the fatty materials than in water.

The slicks form rich nutrient pools that attract phytoplankton, fish and birds. The pesticides are further concentrated biologically through transfer from the fatty tissues of one organism to another, finally reaching a point where they damage reproductive materials, which are primarily fatty. Dr. Corcoran says the decline of pelicans in Eastern coastal waters of the United States can be attributed to this mechanism.

Man-made slicks from sewers or oil spills probably work the same way, he says.

TRACE ELEMENTS

Metals in fish

Argonne National Laboratory researchers have found trace amounts of a number of elements in fish taken from Lakes Superior, Michigan and Erie, about a dozen of which are biologically active. Researchers say the contaminants are not now at toxic levels, but they do not yet know the effects on the total ecology.

Drs. David N. Edgington and Henry F. Lucas discovered copper, zinc, mercury, cobalt, uranium, selenium and several other elements. Fish samples were irradiated with neutrons; each element gives off characteristic radioactivity that can be measured.

Dr. Edgington says he was surprised by the fact that the differences between the three lakes in amounts of trace elements were often insignificant. It had been expected that Lake Erie, which is highly polluted, would have larger amounts than Lake Superior.

Some of the elements occur naturally and are necessary to life. But some elements in larger than normal amounts appear to speed up life processes. And some tend to be concentrated up the food chain, says Dr. Edgington; the researchers are now looking at these effects.

The work was part of a study of the total chemistry of the lakes and the effects thermal discharges from nuclear power plants might have on this chemistry. Next step will be analysis of lake water itself as well as water from streams that enter the lakes. The metals come from industrial and agricultural sources, the researchers say.

WATER POLLUTION

Blue-green algaecide sought

Unbridled growth of the thousands of species of algae lumped under the designation blue-green algae is one of the more widespread and unpleasant aspects of lake eutrophication.

Some blue-green algae clog lakes with foul-smelling scum and others are toxic to men and animals. Decay of algae generally creates oxygen demands that choke out other organisms, including game and commercial fish.

The Dow Chemical Co. has been awarded a Federal Water Pollution Control Administration contract to find an algaecide specific for three of the more common species of blue-green algae.

If a chemical is found—Dow has already screened 80,000 and is now intensively testing 20—it will be no panacea for the eutrophication that is being caused in large part from increasing levels of phosphates in municipal wastes.

The chances are that some other species of algae will take over if the blue-greens are killed, says Dr. Charles T. Lichy, Dow biologist. But FWPCA hopes that zooplankton that prey on algae, but reject the blue-greens, will find the replacement more palatable.

AIR POLLUTION

Lead levels rise

Levels of lead in San Diego's air are increasing at a rate of five percent a year. Dr. Tsaihwa J. Chow of the Scripps Institution of Oceanography says the lead comes from auto exhausts.

Downtown levels have been as high as 8 micrograms of lead per cubic meter during temperature inversions, Dr. Chow reports. The American Industrial Hygiene Association has set a recommended limit of 10 micrograms.

Analysis of the airborne lead shows that it comes from a source that supplies most of the lead for gasoline additives, says Dr. Chow. Lead from different parts of the world varies according to the proportion of stable isotopes it contains.