

School of Medicine, Houston, where Dr. Robert Couch is vaccinating young adult volunteers. Blood samples are tested at New York-Cornell Medical Center for the presence of antibodies. Last week Cornell's Dr. Norman Senterfit telephoned Ohio: The vaccine is producing substantial amounts of protective growth-inhibiting antibody in a remarkably high percentage of persons who had none.

Experimental challenge will be the next step. Volunteers will have to be found who will accept both intramuscular vaccination with killed (formalin-inactivated) *M. pneumoniae* and subsequent injection with live disease-producers. If the vaccine protects humans against the pathogen as effectively as it has already protected experimental animals, it will be moved along to large-scale testing.

Although a half-dozen bacteria and a much larger number of viruses produce pneumonia, *M. pneumoniae* is the chief cause of the disease in older children and young adults. Young people pick it up when they are brought together in colleges and camps; as many as half the freshman classes of some universities have been hospitalized with this disease. Although antibiotics will knock out the infection, preventive measures are clearly needed.

Many tries at anti-mycoplasma vaccine have failed to elicit antibody response in more than half of experimental subjects. Dr. Somerson says the antigenic capacity of his experimental vaccine is the result of passage through only seven cultures (sometimes organisms are attenuated for vaccines by passage through as many as 100 cell cultures or other growth media in the effort to retain antigenicity—capacity to provoke antibodies—while destroying ability to produce disease).

The vaccine is produced from a strain never exposed to horse serum, a once-common culture nutrient now known to be one cause of the serious sensitivity reactions that have been a basis for occasional lawsuits against vaccine manufacturers.

The minute mycoplasma cluster thickly on the surface of larger tissue cells; the tightness with which they cling to the cells lining the lung is part of their ferocity as disease producers. This property is exploited, Dr. Somerson says, in producing the vaccine. Grown on broad glass surfaces in a nutrient broth, *M. pneumoniae* cling so tightly that they are easy to wash free of contaminants from the broth.

Pilot-test lots are being produced by Huntington Research Center, Baltimore, a division of Becton Dickinson & Co., under a contract with the National Institute of Allergy and Infectious Diseases.

OCEAN DUMPING

One small step



Lane—ESS

*"Is this nerve gas perch
or mercury perch?"*

The oceans have sometimes been viewed as man's last resort. An ever-growing population with a higher and higher per capita consumption of goods (at least in the developed countries) may finally have to turn to the oceans for most of its food, minerals and other staples of life, say some.

This view sometimes optimistically assumes that the oceans will be a perpetual bonanza. But it fails to perceive that the atmosphere, land and oceans are really a continuum and that whatever destructive things man does to his air and land are inevitably reflected also in the oceans. Persistent pesticides used on North Dakota farms eventually find their way via the Missouri and Mississippi Rivers to the Gulf of Mexico. Mercury from chlorine alkali plants eventually is carried by rivers to both oceans. The oceans, in fact, are a kind of ultimate sink, and most air pollutants, too, eventually get into the oceans.

President Nixon's announcement that he will recommend legislation to the next Congress to control ocean dumping of various classes of materials (SN: 10/10, p. 302) is encouraging in that it will be a major step toward eliminating a particular source of ocean pollution. But it would be folly to believe that such a step will in one fell swoop take care of the ocean pollution problem.

Mr. Nixon's proposals were based on a report by the President's Council on Environmental Quality. The report itself, in a chapter on the general effects of ocean pollution, makes few distinctions between the sources of the pollution, and its warnings could be taken to apply in a far broader area than just

ocean dumping: "Knowledge of ocean pollution is rudimentary, and generally it has not been possible to separate the effects of ocean dumping from the broader issue of ocean pollution," says the report. ". . . There is reason for significant concern. . . . If no action is taken . . . the long-term damage to the marine environment will be great."

Many kinds of damage are already known, and in some areas the mechanisms by which pollution is disseminated into marine ecosystems are understood at least in a broad sense. Floating pollutants, such as oil slicks, are transported great distances by current and wind; suspended particles, likewise, are rapidly disseminated, with the 500 square miles of the polluted New York Bight being exchanged and flushed about once a week, the polluted waters distributed to the Atlantic at large. Biological mechanisms are also broadly understood, with many pollutants—including pesticides and heavy metals—being concentrated by a factor of 1,000 as they move up the food chain from phytoplankton to large predators.

Some of the effects of these pollutants on marine life are generally understood, too. Copper concentrations lower than those found in the New York Bight, for example, killed soft clams in 10 to 12 days and polychaete worms in 4 days; these concentrations reduced photosynthesis in kelp 70 percent in 9 days. Chlorinated pesticides, besides inhibiting reproduction in large predators, as has long been known, also reduce the size and strength of mollusc shells and reduce the growth rates of various fish. There is now no doubt that they also inhibit oxygen production by phytoplankton (SN: 10/10, p. 296). Marine levels of pesticides continue to rise each year, according to the report.

If the recommendations of the report are followed, the new Environmental Protection Agency would have broad authority to prevent ocean dumping, a rapidly growing practice. In addition, and perhaps ultimately as significant, marine ecological and physical and chemical oceanographic research projects would be financed well enough to remedy the "serious information deficiencies" in these areas. In addition, marine research preserves would be established to allow baseline studies—so that man can learn how marine ecosystems work in their natural state.

Such research is already proving that man has already gone much too far in contamination of the oceans. Stopping ocean dumping is one step toward a reversal of this dangerous course. But the oceans will not be safe for life until the land and the air are also reclaimed. □