



U.S. Coast Guard

*Oil spill: Two million sticky gallons.*



Boeing

*Radioactive wastes, packaged and destined for disposal in the depths off the Aleutians.*

POLLUTION

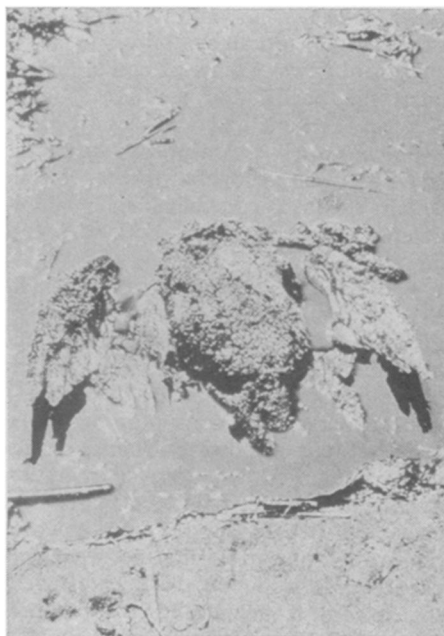
# Rumblings from the deep

**The sea's capacity to absorb pollutants is showing limitations**

by Jay Chamblin

The lakes and rivers are thickened with a burgeoning mass of pollutants—acids and heavy metals from industries, fertilizers from farms, garbage and sewage spilling out of overburdened dumps and cesspools. Polluters have always regarded nature as amazingly self-cleansing: Another day will surely bring a freshening wind to sweep the sky clean and the rain will come to flush the river sewers into the bottomless, infinite, distant ocean.

But even were this so, to those for whom the ocean is not remote or unknown—to the sport fisherman, to the man who makes his living from the sea and to the scientist—the ocean is beginning to protest.



FWPCA

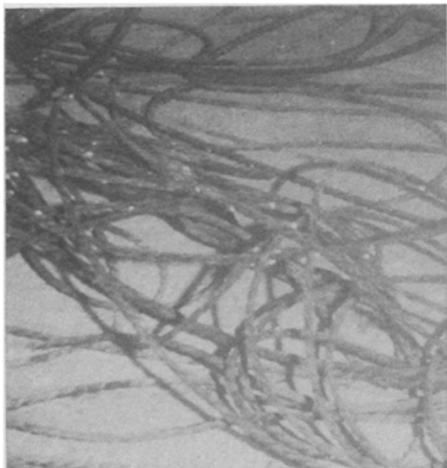
*Oil-soaked birds dead and dying: Yorktown, Va., left; Santa Barbara, right.*

Scientists are just beginning to realize that the ocean is not at all the bottomless receptacle for trash, chemicals and effluents it was once thought to be. But its sheer size and complexity—the very factors which make it a handy disposal—frustrate any attempts short of rigorous regulation to come to terms with the problem.

**Sometimes** the ocean blushes crimson, which shrimp fishermen off the Florida coast recognize as the ominous herald of death in the sea. The red tide is an overgrowth of particular kinds of dinoflagellates, microscopic organisms which produce a nerve poison that paralyzes the nervous systems of fish. Entire schools of mullet can be seen

thrashing in a death frenzy that gradually subsides—fish after fish floats belly-up until a long windrow of floating carcasses signifies the extinction of another school of fish. This appears to be a natural phenomenon, though man plays a part.

Or the ocean can suddenly become threatened directly by human activities gone awry, as it was two years ago when 36 million gallons of crude oil poured from the Torrey Canyon (SN: 4/8/67, p. 328). Within three days, the chocolate-colored raft of sludge covered over 100 square miles. The drifting quagmire captured seabirds by the thousands, befouled the coastlines of two countries and stimulated the cur-



U.S. Navy

*Ocean bottom litter: Capacity limited.*

rent concern for the ocean's pollution.

The red tides and the oil spills have been around for a long time. One represents a quite natural phenomenon, albeit an increasing occurrence owing to the artificial enrichment from inorganic fertilizers washed into the sea from farms and suburban lawns. Oil spills originate as human accidents, or carelessness, or in disregard for the oceanic environment, and all are on a startling increase in both frequency and magnitude. In addition, new forms of ocean pollution appear regularly.

**Earlier this year**, at a meeting of the United Nations' 34-member Food and Agriculture Organization, delegates described the increasing pollution problems of the seas around their respective countries. The evidence prompted Dr. Sidney I. Holt of FAO to comment, "Pollutants are increasing almost faster than our ability to get information on them."

Delegates from Poland and Finland told the committee that pollution in the Baltic Sea continues to get worse because of industrial wastes and the shallowness of the coastal waters. The Spanish delegation complained about the continued dumping of radioactive wastes in the Iberian Trench 200 miles off Spain and Portugal. Nigeria warned of the effect on fisheries of shock waves from underwater detonation in oil explorations on the continental shelf. Representatives from other African countries expressed concern that industrialization threatens to make Africa the newest theater of marine pollution. The British described new effects of pollution from pesticides.

**Clearly, the problem** is a growing menace. The U.S. report to the U.N., even though the most comprehensive of all the reports, revealed a fragmented picture. Little quantitative information

exists for all the substances poured into the Great Lakes and coastal waters, around which 75 percent of the population is amassed. It was estimated, however, that more than half of the sewage flowing into the Hudson River is untreated; beaches along the rivers and estuaries of the U.S. are now closed to bathers because of high bacterial counts; in 1963, 9 million fish died en masse in the Potomac River, 38 million in San Diego Harbor the year before; massive shrimp and shellfish kills were traced this year to industrial discharges in Pensacola, Fla.; half of South Carolina's blue crabs have died off with no scientific or other explanation.

The Committee on Pollution of the National Academy of Sciences has compiled a long list of pollutants which enter the watercourses of the U.S., all of which have at least laboratory proof of their potential hazard in both freshwater and marine environments. Outside of the laboratory, only the acute and more direct effects of contaminants upon the health and welfare of man are well documented and described.

**For example**, scientists and commercial fishermen recognize three ways in which shellfish can become contaminated, depending on the kind of pollution present:

- Biological contamination of shellfish by municipal waste is well known: From inadequately treated sewage, human pathogenic bacteria, and perhaps viruses, frequently render this important food unfit for consumption.

- Paralytic shellfish poisoning of humans is caused by another pollution problem: Excess plant nutrients and even well-treated sewage can enhance the growth of certain marine organisms capable of producing toxic substances that become concentrated in the tissues of shellfish. Consumption of such contaminated mollusks is often fatal.

- And shellfish can become toxic when they accumulate excess environmental supplies of zinc or copper in concentrations several million times the amounts of these metals present in the water around them.

However, the pollution story more often lies hidden in such obscure statistics as the records of commercial fish landings over a period of years. For example, the Bureau of Commercial Fisheries reports that 10,000 tons of New England haddock will be caught this year, down from 50,000 tons in 1963. Marine biologists say that haddock has suffered from exceptionally poor spawning in the past few years. They say pollution may be a factor.

And well it might. Sewage and other oxygen-demanding wastes, infectious

agents, pesticides, detergents, petrochemicals, lethal heavy-metal salts, acids, silt from land erosion, radioactive substances and heat from industrial and power plants, all help befoul the ocean, challenging even its enormous capacity to dilute and mix.

The Federal and state governments are among the biggest polluters of coastal waters surrounding the U.S. Earlier this year, during a Congressional investigation into the military's plan to dispose of surplus poison gas in the Atlantic, a high-ranking Defense Department witness testified that the military had always regarded the ocean as a kind of "Davy Jones Locker . . . where things could be put and forgotten (SN: 5/24, p. 499)." And in an effort to circumvent pollution of rivers and estuaries, coastal cities are planning to build pipelines in which millions of gallons of industrial waste and municipal sludge can be sluiced directly into ocean waters beyond the continental shelves.

The hundreds of shorter sewage outfalls which already exist are proving problematic in coastal waters.

But the Government is also in the antipollution business.

The Federal Water Pollution Control Administration, Department of Interior, was created in 1956 when Congress passed the first Water Control Act in order to give the Federal Government a greater hand in the pollution problems of lakes, rivers and estuaries. It has been only recently that coastal waters have also received FWPCA attention. The morbid condition of the Great Lakes, once regarded as too vast for any serious pollution problems, adds ominous meaning to the scattered, seemingly isolated bits of evidence appearing in the ocean. T. A. Wastler, a specialist of estuary pollution with FWPCA, says, "We can't afford to wait until it's obvious to everybody."

**Protection of the marine environment** can only be approached on an international scale. In 1970, a world conference on ocean pollution will bring countries to a forum of the Intergovernmental Oceanographic Commission, and other agencies of the U.N. which work to promote cooperation in ocean exploration and development. It is expected that each nation will be asked to examine its own contribution to the degradation of the quality of the ocean.

Dr. Jack Pearce, a marine biologist with the Stony Brook Marine Laboratory on Long Island, states the problem simply. "Science cannot solve the problem," he says. "We've just begun. It is time to introduce a subjective element—to speak out and say that we need control—now!"

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