

The Sea

Pollution of Oceans Is Enormous Threat, But Few People Care

Scientific Uncertainty Adds To the Problem; 'Business as Usual, Pending Annihilation'

How Dangerous Is Oil Slick?

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It is the last pollution.

Last to seep into public consciousness; last to be treated by the rule of law; last to be analyzed by science.

It is the last pollution because it is into the oceans—the ultimate sewer—that all the wastes of man that aren't piled or buried on land must find their way. And it is the last pollution because if the oceans—source of most oxygen—are poisoned, life on earth as we know it cannot go on.

The enormity of the prospect has led some to statements like these:

Sen. Ernest F. Hollings: "We are killing the great oceans of this planet, and unless we stop

This is the fourth of a series of articles on the sea.

this madness, mankind itself may perish from the face of this earth. And that would be the irony of all ironies—man having evolved from the oceans, only to die because he has killed the very source of all life."

And Jacques Cousteau, ocean explorer: "I think if nothing was done today, maybe 30, 40 or 50 years would be the end of everything."

These are momentous predictions. Yet the soothsayers are being shunted aside by governmental unconcern, public unawareness and scientific uncertainty over their prognostications. Sharing the Riches

There is a "brick wall of indifference" toward ocean pollution at meetings leading to the coming United Nations-sponsored Law of the Sea Conference, says John Hussey, an expert on the Senate Commerce Committee staff. "Everybody wants to share in the riches of the ocean," he says, "leaving protection of ocean resources off in a corner."

The public seems unaware of ocean-pollution issues, despite the upwelling of interest after a few dramatic oil spills. Organized environmentalists have taken until this summer to address the problem, in the form of a last-minute Sierra Club attempt to influence the Law of the Sea talks.

"People had too many things to look at all at once when the environmental movement hit," says Gene Coan, the Sierra Club official directing the effort. "Ocean pollution is tough to get hold of. It is an order of magnitude more complicated than any pollution problem confined to national boundaries."

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Behind the indifference and unawareness of most people and many governments lies the most unfathomable difficulty: a great gap in scientific knowledge about pollution of the seas. A gush of research following oil spills of the 1960s barely has begun to lay the groundwork for decades of study needed before people can know just what pollutants are in the sea, how much there is of them, where they go once there and what effect they eventually will have on life in the oceans and on land.

Panoply of Pollutants

"Despite broad general consensus about the contaminants which represent the greatest threat of global pollution," says Robert M. White, head of the National Oceanic and Atmospheric Administration, "knowledge of their full extent, their fate and their impact on the ocean ecosystem is scanty at best."

What is known is that in the most intense instances of contamination around coastal areas, pollution kills. The evidence is clear enough from the quick death of marine life after larger oil spills, the fact that 30% of this country's clam and oyster beds are fouled by human wastes, and the near absence of life in harbors stricken by a panoply of pollutants.

The body of knowledge is growing steadily, fed by platoons of scientists in dozens of government, university and industry laboratories. But every new revelation seems to open a Pandora's box of questions and contradictions.

Even basic statistics on the amount of oil entering the sea via spills have varied wildly. Now those unreliable estimates are themselves being upset by fresh suggestions that a huge percentage of oil pollution comes not from spills but from airborne anti-exhaust emissions drifting to the ocean surface. Here again, there aren't any numbers to trust. The best estimates, says Mr. White, "are still tenuous."

The Ubiquitous Chemicals

Breakthroughs are being made in the discovery of new forms of pollution far out to sea. The most celebrated revelation has been that a chemical family called polychlorinated biphenyls, used in paints, inks and plastics, can be found in virtually every organism in the North and South Atlantic, at depths up to 11,000 feet.

But how these chemicals—as well as plastic particles and the propellants in aerosol cans—have become so widespread is a mystery. How dangerous they are, in small doses over the long run, is another enigma. (In large doses they can change behavior and reproductive patterns in the same manner as DDT, another almost universal contaminant. Monsanto, the only U.S. producer, has stopped making the polychlorinated biphenyls.)

Bostwick Ketchum, Associate Director of the Woods Hole Oceanographic Institution, adds that "a variety of synthetic organic chemicals, including other pesticides, detergents and pharmaceuticals are also undoubtedly reaching the marine environment with impacts that are virtually unknown."

Scientific advances are sometimes softening earlier fears of ocean hazards. Not long ago, it was thought that the crown-of-thorns starfish was destroying coral reefs because of some man-induced perversion. Now, evidence indicates the starfish's unfortunate appetite is a natural one. Mercury contamination was believed to be a great modern threat until the Smithsonian Institution found comparably high levels of the metal in fish that had been preserved for thousands of years.

Backtracking like this, however, only demonstrates how limited knowledge is about pollution of the sea, and, as in many an unpolished science, conflicts crop up between the results of separate investigations. In the ocean-pollution field, though, the stakes can be high. A donnybrook of major proportions is growing around questions about the long-range effect of oil in the oceans. The petroleum industry argues that oil degrades, or breaks down biologically, in the sea and therefore isn't harmful for very long. Other researchers, with evidence to the contrary, say damage from a single oil spill can be felt for decades.

Max Blumer, a senior scientist at Woods Hole, is conducting an exhaustive study of the effects of a relatively small oil spill that took place in Cape Cod's Buzzard's Bay in September 1969. Long after the visible presence of oil has gone, small amounts are persisting in a surprisingly wide area around the site of the spill. Among Mr. Blumer's conclusions to date is that "oil degrades slowly only in marine sediments, and it may be completely stable once it is taken up by organisms."

Extremely low concentrations of oil and other pollutants may have "seriously damaging biological effects," Mr. Blumer warns, adding that "our general ignorance" of the details isn't an excuse "for complacency if such effects aren't immediately obvious in gross observations of polluted areas."

With its own army of petroleum chemists, the oil industry is squaring off against the conclusions of the Woods Hole study. "Oil is messy and ugly and gets on people's feet," says Arne Gabrud, director of environmental affairs for the American Petroleum Institute. "but it's nowhere near as insidious as ocean dumping of garbage or heavy metals, or so serious as to justify interminable delays in needed projects like the Alaska pipeline."

The institute is spending \$500,000 a year on oil-pollution research. It has financed a study, still unpublished, that Mr. Gabrud says will show that marine animals contaminated by oil "cleanse themselves" when placed in clean water. Mr. Blumer doesn't doubt the findings. He only asks that they be "placed before the scientific public" for scrutiny.

Other scientists, however, complain of feeling pressured by the industry's public-relations front. "You can really catch hell trying to publish a paper on petroleum in the sea," says another Woods Hole scientist. "They try to deny everything you say, attack your analytical methods and completely discredit you."

Nevertheless, the U.S. Congress has taken steps to curb the most obvious oil spills. Legislation applying to all the nation's waterways went into effect in 1972 outlawing any spill that forms a visible sheen on the water. Civil penalties were provided and a fund of public money established for cleaning up spills when those responsible can't be found. The results apparently have been substantial. "I used to be able to go up Arthur Kill and see an oil slick almost any time," Richard Dewling, an Environmental Protection Agency surveillance director, says of a notorious New Jersey estuary. "I can't do that any more."

Further legislation calls for new safety standards in tanker construction and a harbor traffic control system. Solid waste also has come under federal supervision with a 1972 law setting up a permit system for ocean dumping.

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But there are problems. Environmentalists and others accuse the Coast Guard and the EPA of foot-dragging on enforcement. The administration has impounded funds on another bill intended to improve planning of coastal development. Technology for cleaning up big spills remains backward. (At August hearings on its proposed \$350 million refinery off the Maine coast, Pittston Co. admitted a spill in a four-knot current couldn't be contained.)

Perhaps the most telling problem, though, is the one that distinguishes ocean pollution from the earth's other environmental ills: Pollution of the sea is an international phenomenon that can never be controlled by the laws of a single nation, no matter how forceful they are.

"Refuse dumped inside the Peruvian territorial waters equals refuse dumped around the shores of Polynesia," Thor Heyerdahl, the anthropologist, told a Senate committee after seeing globs of oil throughout his drift across the Atlantic in a reed boat. "Refuse dumped inside the Moroccan territorial waters equals refuse dumped inside the Caribbean sea."

International controls plainly are the only means to deal with the problem because "territorial" seas are perpetually mixing. The threat, moreover, can only grow worse as oil shipments multiply and offshore development of superports and refineries becomes a reality.

There already are a few controls, among them three international conventions dealing with prevention of oil pollution from tankers and liability for spill damage. Critics including the Sierra Club attack them as unenforceable. Last November, 91 nations endorsed international controls over ocean dumping by ships and aircraft. The rules are stronger than dumping legislation adopted in the U.S., but they don't touch at all on questions of land-source pollution.

It remains for the Law of the Sea Conference, convening in New York in November and then in Santiago next May, to draft genuine international ocean-pollution controls. Yet the prospects seem dim. "It is as though ecology... and Stockholm (the UN Conference on the Human Environment of last year) had never happened," says Brian Johnson, a British authority on international law. "It looks like business as usual, pending annihilation."

At this stage, the conference seems unlikely to create an independent pollution regulatory authority, provide any significant enforcement capability or impose any controls over ocean pollution that originates on land. In the newest and potentially most competitive area of deep-sea mining, the conference isn't expected to ask for "impact statements" or to separate the agency that will encourage mining from the one that will regulate it.

The Sierra Club is outraged at the situation. On the mining issue, the club maintains, the conference may throw away a rare chance to proceed cautiously before any environmental damage is done. Companies intent on mining the seabed, on the other hand, are itching to get started. They insist damage won't result from what they plan to do. Perhaps they're right, but the potential for pollution by deep-sea mining—which has never been attempted on a grand scale—is substantially a scientific unknown. Nobody has proven that it might be harmful, and until that is done, it seems unlikely that an international conference worried about commercial considerations and minerals shortages will endorse tough rules to control it.

As with pollution by oil and plastics and solid wastes, the issue of mining pollution is again hamstrung by the dearth of fundamental scientific knowledge. "The root of all these problems is that we don't even know what to predict will happen in a natural ocean environment, much less in a polluted one," says Richard McGrath, a young marine biologist.

Mr. McGrath is one of the legion of scientists doing the tedious work of gathering "baseline" information about the character of the sea. He is working on one small project for the National Oceanic and Atmospheric Administration. His job is to find out what is alive at the bottom of Raritan Bay, a triangular funnel through which pollution from the factories and refineries that dot the shores of New Jersey's Arthur Kill pours into the Atlantic.

On his 50th excursion in nine months, the waters of Raritan Bay are smooth and green-gray as the oceanographic agency's converted Army tugboat glides through the garbage at the leading edge of New York harbor's ebb tide. For seven hours under a steamy sun, Mr. McGrath and several college-student helpers grab samples of the black, oily muck from the bottom of the bay in the jaws of a small, spring-operated dredge. Each sample is sieved, and each living worm, clam and crustacean is saved in a bottle.

Back at a laboratory on New Jersey's Sandy Hook, every animal in every sample will be picked out, identified and counted. It can take one researcher two weeks to finish work on a single bottle. The purpose is to provide some touchstone for future measurements of the effects of pollution in the bay and efforts to abate it.

"After a while, every worm begins to look the same," says Barry Trotsky, one of the student aides. "It isn't the kind of work you dream of when you hear the word 'oceanography,' and it may take 50 years for the results to be appreciated or understood. But it's the work that has to be done."

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