

Poisoning the Seas

Chance oil spills and the "deep sixing" of sludge, sewage, and atomic waste may well convert our life-abundant seas into trackless graveyards of civilization.

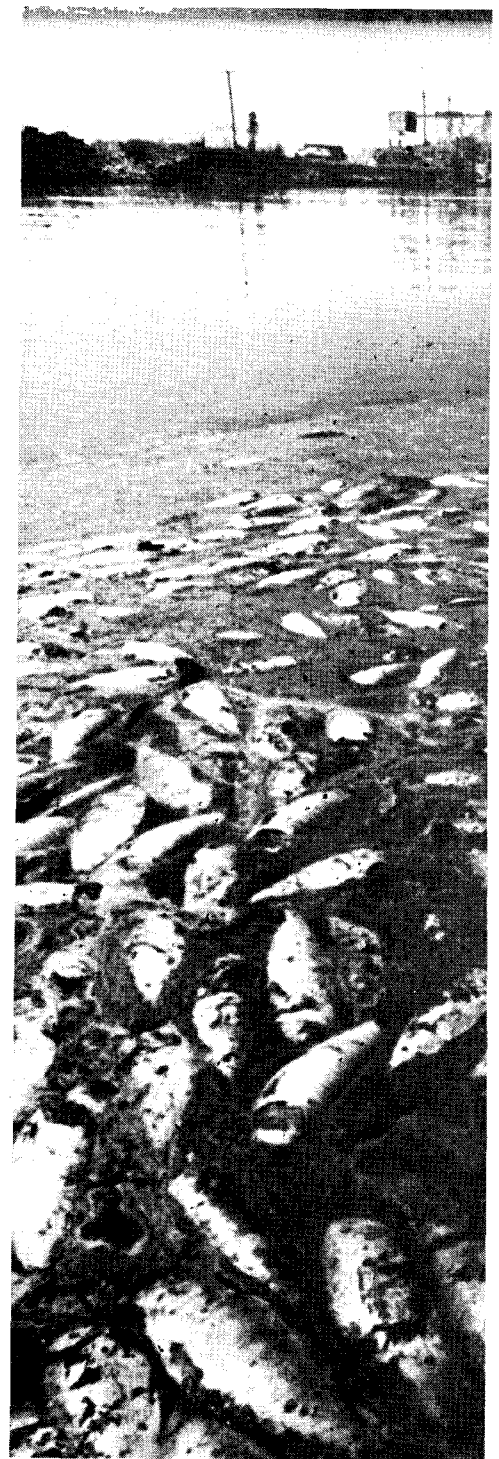
By Richard Bernstein

Two years ago yacht basins on Oyster Creek, along the New Jersey coast, were unaccountably attacked by wood-destroying organisms. Pilings that supported the docks were weakening; yacht hulls were developing spots of rot. After several months it was apparent that the wharves might well eventually collapse into the creek. For generations nothing had ever happened to these facilities; so the discovery of the source of the trouble came as something of a surprise to the marinas' membership: Embedded in the hull of a boat, like Blake's invisible worm, were specimens of Terebinthidae, otherwise known as shipworms or pileworms, a type of wood-boring clam. The area, it turned out, was infested with them.

Found often enough along the U.S. coast, the various species of the teredo are common harbor pests known to have demolished entire piers. But they do not survive in upstream fresh-water areas like Oyster Creek. How they got there illustrates how subtle a matter the pollution of the coastal waters is. The fault, explains Dr. Ruth Turner of the Harvard Museum of Comparative Zoology, lies with the Oyster Creek Nuclear Power Plant. Built just the year before at the headwaters of Oyster Creek and Forked River, the plant had produced environmental changes that transformed the creek: Where it had been forbidding, it was now congenial to the wood-boring pests. The changes came about in this way: Needing vast amounts of water for its cooling system, the plant reversed

the flow of the Forked River, drawing in through the river channel salt water from the nearby sea. Later the used water was discharged, warm and still salty, into Oyster Creek at the rate of about 400,000 gallons each minute. In this way three environmental changes were brought about, all of which were favorable to the teredo. First, the creek became salty. Second, the addition of large amounts of water to the creek reduced the concentration of humus (i.e., decomposed plant and animal matter), which is an important inhibitor to the spread of one type of larva. Third, the warm wastes flowing into the creek raised the water temperature, thus enabling the marine borers to grow more rapidly and to breed more frequently, while at the same time protecting them from the winter kill-off that normally would have kept the population under control. "The whole life cycle was accelerated," says Dr. Turner. "Birth, growth, reproduction, and death were all speeded up by the warm water." Before the plant was built, only an occasional teredo was found near the mouth of the creek. Now, inadvertently, almost ideal circumstances for the proliferation of the pest had been brought about.

We can expect similar occurrences elsewhere. By 1986 the utility companies of New Jersey and Pennsylvania plan to install forty-two power plants along the Delaware River and its tributaries alone. At current rates of growth there will be in the year 2000 one nuclear power plant for every ten miles of coastline. And wherever these plants or other warm-water sources are built, variations on the Oyster Creek theme can be expected. Each nuclear reactor will affect



Gordon Alexander

Thermal Pollution—An East Coast nucle

only a few square miles of coastline; it will not create a global problem. Ecologically, some say, this is a small price to pay to satisfy our energy requirements. But considering that there is only so much coastline, we cannot afford to turn our oceans into a huge warm-water sink without at the same time having to pay a gigantic ecological price.

POLLUTION OF THE SEA is difficult to assess, precisely because of its frequently localized nature. A ruined dock here, a fish kill there—these are not pleasant

Richard Bernstein writes for Time magazine.



Seaweed plant with its harvest of dead fish.

to hear about, but they do not inspire worldwide alarm. Who, after all, can estimate the requirements of the human advance? If every death or environmental dislocation were allowed to stop progress, mankind never would have arisen from the Stone Age. Even now, marine biologists are reluctant to talk of anything except local effects. "The fact is that we don't understand what happens to the ocean when we pollute it with anything," says Dr. Guy McCloud of the New England Aquarium. Though there are some, like Jacques Cousteau, who

warn that it is only a matter of decades before we ruin the oceans unalterably, most scientists remain unwilling to return any cosmic verdicts on the ultimate fate of life in the sea.

Still, the data coming in from various scientific sources during the past couple of years has begun to paint a more alarming picture. Investigations of the effects of various contaminants are beginning to reveal problems of a far wider scope than heretofore realized, regarding not only the sheer volume of marine contamination but its extremely poisonous effects on the environment as well.

Oil provides a graphic example. Ironically, though the most visible and highly publicized form of marine contamination, oil traditionally has been thought by the scientific community to have little harmful effect on the marine ecosystem. As late as their 1971 meeting in Rome, the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) concluded that "a single heavy contamination of the flora and fauna of the intertidal zone has a negligible effect [on marine life]." Most studies of oil spills rely on subjective visual measurements or else on statistical analyses of adult fish; this has led to the belief that spills do little biological damage to the seas. Indeed, since oil spills do seem to disappear after a couple of weeks, many scientists have concluded that a combination of evaporation and biological degradation of the oil rids the water of contamination after a very short period of time.

More recent, sophisticated studies have effectively challenged this view. At the Woods Hole Oceanographic Institution, for example, an interdisciplinary group of scientists has studied over a period of almost four years a small oil spill that took place in Buzzards Bay, Massachusetts. Studying not adult fish but the subtidal organisms that live in the marine sediments and cannot swim away from the contamination, the Woods Hole group established three important findings: The oil persisted in the environment far longer than had been thought possible, it continued to spread over the ocean floor months after the accident, and its toxic effects on wide varieties of marine life lasted not for days or weeks but for months or even years.

The immediate kill in the heavily affected area of Buzzards Bay was, as expected, virtually complete. Some 95 percent of the fish, crabs, lobsters, clams,

and other invertebrates were dead within hours of the spill. What was unexpected was the spread of the oil in the sediments beneath the surface. Immediately after the accident, a control station was set up beyond the area of expected contamination. Within three weeks oil was found at this station, along with a lot of dead marine organisms. A second control station twice as far from the shore was then established, and it, too, was overtaken by oil spreading on the ocean floor with still another kill of bottom-living animals. Eight months after the spill, the polluted offshore area had grown to ten times the area initially affected, eventually covering twenty-two square kilometers of offshore water, tidal river, and marsh.

Thus, although shortly after the accident the area returned visually to its former state of natural beauty, chemically and biologically the ill effects of the spill still were present over a large area of the shore line. A year of evaporation and bacterial action on the oil did not remove many of its most highly toxic components. Young blue mussels that were affected by the spill in 1969 were sterile in 1970; oysters that had been contaminated by the oil were kept in clean, running sea water for six months; yet a substantial residual component of fuel oil remained in their tissues at the end of that time. In all, the evidence added up to a far more incriminating picture of the problems of oil than had been envisaged.

Still, the scientists at Woods Hole steer clear of anything resembling an apocalyptic judgment. "Our understanding of this problem is very meager," says Dr. Howard Sanders. "It's extremely dangerous to make these self-satisfied and assured statements that are way out. It may even be that the economic aspects of this are of overriding importance. But we still have to find out what the effect is. That's the important thing."

BUT ONE NEED be no prophet to see that the problem threatens to get worse, not better. Already signs are evident that certain types of contamination are becoming global in scope. Golf-ball-sized pieces of tar, formed from the heavier, more viscous components of oil, have been found in massive proportions throughout the Atlantic Ocean, affecting some 665,000 square miles of surface water. Last summer, widely scattered research vessels on duty between Cape Cod and the Caribbean repeatedly found their

plankton-collecting nets fouled by thick clumps of oil. Half the plankton samples gathered from surface areas proved to be oil contaminated. Similarly, tiny plastic spherules, each half the diameter of a pinhead, have been found throughout the American continental shelf, in the Caribbean, and in the open Atlantic. These have been identified as polystyrene "suspension beads," the kind of material that goes into insulation and such common items as disposable coffee cups. In one study, conducted by Dr. Edward Carpenter along the coast of southern New England, they were found in the stomachs of eight of fourteen species of fish collected. While it is unclear whether tar balls or plastic spherules will have severe harmful effects on the environment, their presence in large concentrations throughout such vast tracts of oceans indicates, if nothing else, that some forms of contamination are far from local problems.

Also, the spread of certain heavy metals and potentially dangerous insecticides is now reaching alarming proportions. The Rome meeting of GESAMP reported that something in the range of 40 to 60 percent of all organochloride pesticides (like DDT) manufactured each year ends up in the sea, carried there primarily by air currents. Similarly, GESAMP has found that enormous quantities of lead are being introduced into the marine environment. Used as an anti-knock agent in motor fuel, lead is released into the atmosphere in exhaust fumes and then rained into the sea, as much as 2×10^5 tons annually. Though man will suffer no known ill effects if he eats fish whose tissue has absorbed lead

from the water, "the rapid increase of the level of lead in the marine environment," the GESAMP report concludes, "... must be viewed with alarm."

The list of globally significant pollutants could go on indefinitely. PCBs (polychlorinated biphenyl compounds) are believed to be as widespread in the seas as DDT and other organochloride compounds. About 4000 to 5000 tons of mercury are dumped into the ocean each year in the form of industrial waste; an equal amount is released into the atmosphere by the burning of coal and oil and later washed into the oceans. Not all forms of mercury are harmful to man, but methyl mercury, which can be formed in the sea from the decomposition of other mercuric compounds, is the substance that killed forty-one people in Minamata, Japan.

LIKE OTHER FORMS of pollution, that of the oceans is a by-product of economic growth and thus to an extent inevitable. Most of man's waste products directly or indirectly pollute the ocean. Sewage, automobile exhaust, industrial waste, warm water, the grease that mechanics wash from their hands at the end of a hard day—all of these contaminate the seas. And, as long as most nations continue to be committed to further growth, the danger increases that our oceans will be converted from inexhaustible treasure houses into trackless graveyards of civilization itself.

What then can be done? What is being done?

An ambitious and comprehensive undertaking is being planned at the United

Nations. A conference on the Law of the Sea, now in the planning stages in New York, will consider a wide-ranging marine pollution convention. This legislation envisages a combination of global, regional, and national controls that, it is hoped, will comprise a complete pollution-control package. Globally, minimum standards would be set for the preservation of the marine environment; regional and national provisions then would deal more specifically with special situations in the various parts of the globe.

But the number of conflicts that any effective legislation would create ensures that the process of coming to international agreement will be at best a slow one. There will be problems of jurisdiction and enforcement, themselves related to divergences in national interest. There will be innumerable local, practical problems. If discharges are to be regulated (they will not be prohibited), the question arises, Who is to discharge how much, when, and where? There will be problems relating to national strategic interest. Will one nation, for example, be able to restrict the passage of nuclear subs through its coastal waters because an accident would be disastrous to the environment? Might pollution controls be used as a pretext to cause inconvenience to the shipping, military or commercial, of rival states?

Perhaps the most serious problem concerns economic competition. Pollution control costs money, and spending money creates competitive disadvantages. Particularly to the less-developed world, already suffering from serious disadvantages in other spheres, the prospect of pollution control may prove less than agreeable. After all, the industrialized nations enjoyed the luxury of development without expensive environmental concerns. Now the majority of mankind that lives in the rest of the world is being asked to dispense with the same luxury. They may not be very willing.

This is the real crux of the issue. Like all environmental concerns, marine pollution boils down to a question of austerity—global austerity. It's a problem of willingness to make do with less. Two cars in every garage, even only one, means continued pollution of the seas. Or, as one marine biologist in Boston put it, "The solution is really very simple. You've just got to be prepared to walk to work." □

(Second in a series on problems concerning the use of the seas.)



"Write about me as I am, warts and all."



The painting that made a marriage legal

Not one person in a thousand suspects the real meaning of this famous double portrait by Jan van Eyck. Actually, it portrays a wedding, and all the fascinating details are symbolic references to the sacrament of marriage.

As John Canaday points out in the first portfolio of the Metropolitan Museum Seminars in Art, the little dog symbolizes faithfulness; the discarded sandals, humility; and the single candle, the presence of God. Above the mirror, which signifies purity, is an inscription meaning, "Jan van Eyck was here, 1434," written in script proper to a document. For the painting really is a document: a painted marriage certificate!

If you had come across this painting in a museum, would you have understood what the artist was trying to tell you? Or would you have missed the hidden meanings?

A surprising number of otherwise cultivated persons have a blind spot so far as painting is concerned.

Visiting a museum, they stand before a respected work of art and see nothing but its surface aspects. It was to help such persons that New York's Metropolitan Museum and John Canaday, art critic of *The New York Times*, created the Seminars in Art, a unique program of assisted self-education in art appreciation.

Each seminar comes in the form of a handsome portfolio, the core of which is a lecture devoted to one aspect of painting. Each is illustrated with many black-and-white pictures and contains twelve large separate full-color reproductions of notable paintings. As you compare these masterpieces side by side, Mr. Canaday's lectures clarify their basic differences and similarities, and so reveal what to look for in any painting.

Soon paintings will be more than just "good" or "bad" to you. You will be able to talk knowledgeably and form your own educated opinion when you visit a gallery or museum. And parents will find themselves sharing their understanding with their children, there-

by providing a foundation for a lifelong interest in art.

Examine the first portfolio without charge

You can study the first seminar by mailing the card facing this page to the Book-of-the-Month Club, which administers the program for the Museum. You will receive the first of the twelve portfolios, *What Is a Painting?*, for a two-week trial examination. Subsequent portfolios, sent at the rate of one a month, are devoted to realism, expressionism, abstraction, composition, painting techniques, and the role of the artist as social critic and visionary.

If you choose not to continue, simply return the portfolio and your subscription will be canceled. There is no further obligation. But if you are convinced of the program's worth, you pay only \$5.50, plus a charge to cover mailing and handling expense, for this and for each of the remaining portfolios you accept.

**Metropolitan Museum of Art
Seminars in the Home**

The Eleventh Movement

TEMPORARY KINGS

By Anthony Powell

Little, Brown, and Company, 280 pp., \$6.95

Reviewed by Roger Starr

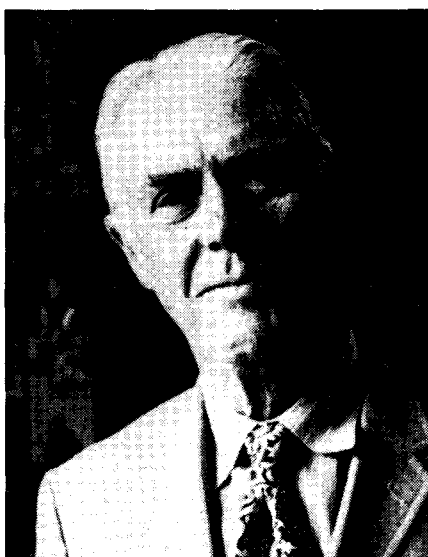
Temporary Kings is the eleventh volume in Anthony Powell's twelve-volume masterwork entitled *A Dance to the Music of Time*. Ultimately, indeed, one must discuss *Temporary Kings* as one panel of a quadruple triptych (the American publisher is issuing the volumes in groups of three). In the meantime, however, this disclosure should not trouble the casual reader any more than learning that the stranger in an adjacent airplane seat, with whom conversation has in fact been quite satisfactory, is Charles Chaplin or Alexander Solzhenitsyn. For though the reader must enter *Temporary Kings* through a sudden shower of unfamiliar and unintroduced characters, a shower that may dampen his enthusiasm as he passes the gate, the novel is in and by itself an interesting, sardonic, witty, and original book.

The book opens in the dining room of a hotel in Venice, circa 1955, where guests are being entertained by a Neapolitan balladeer. This balladeer may or may not be the same man who sang the same song ("*Funiculi, Funicula*") at the same hotel when the novel's narrator, Nick Jenkins, had first visited there forty years earlier, as a child in the custody of his parents. And the novel ends with the imminent death of the narrator's friend, a composer and conductor whose final illness began when he was "advising" for a charity performance of Mozart's *Abduction from the Seraglio*. Thus, in keeping with the overall title of the masterwork, this volume is framed by music. Between the Neapolitan song and the Viennese opera—both of which are concerned with the question of seduction—the novel's action originates and flourishes.

To the frame of musical references is added a second type of symmetry—two references to, of all things, early motorcars. Just as the narrator is reminded by the rendition of "*Funiculi, Funicula*" of

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the futurists' early awe and rapture over the immense power of the first automobiles, so, after leaving his dying friend's bedside at the end of the book, is he stopped on Waterloo Bridge by a parade of these very same cars, now fifty-odd years older; what were once harbingers of unimaginable change in the human condition have now become the objects of nostalgic amusement. This shift in attitude toward the same physical object serves a double purpose: In addition to framing the action of this particular novel, it emphasizes, on a smaller scale, the change in attitude toward familiar



Anthony Powell—"Witty, sardonic . . . master of unflinching coincidence."

things that marks the passage of time in human affairs throughout the masterwork.

And lying on his deathbed, surrounded by books and commenting with equanimity on poetry and cars, the composer, Moreland, is made to embody another of the major themes of the work. He suggests that the only attitude capable of sustaining the changes of life is an informed Stoicism, nursed on observation and irony, on scholarship and art.

The action in *Temporary Kings* begins at the opening of an international congress of intellectuals held in Venice in the postwar years, probably during the mid-Fifties. As is usual in Powell's work, the exposition of ordinary detail is practically omitted; what the reader learns he feels he has learned by his own efforts, by careful attention to the conversation. Sometimes he is aided by an occasional reminiscence of the narrator, itself consisting largely of remembered conversation. Those who demand a literal rendering of facts—who want to know, for

instance, who sponsored the intellectuals' congress and what its purpose was—must find themselves uncomfortable in Powell's world. So also must those readers who crave some statement of an inner truth of consciousness, subconsciousness, or unconsciousness. The characters' feelings must be inferred by narrator and reader from their observations of the characters' acts in much the same way that the objective background, if there is one, must be inferred from the conversation. What we know about the congress we learn mainly from a snatch of dialogue in which Jenkins is invited to attend the meeting and become, as he himself puts it, a temporary king, briefly crowned and then destroyed like the carrier of the Golden Bough. This information is enriched by a brief report about the appearance of one of the characters before a congress audience: "Shuckerly . . . won applause by the artlessness and modesty with which he emphasized the many previous occasions on which he had made his now quite famous speech about culture being the scenshifter to ring up the iron curtain." What more need be said to characterize indelibly such a congress and its delegates?

Essentially the novel is the story of two Americans whom Jenkins, the narrator, meets in Venice. One, Russell Gwinnett, a distant, collateral descendant of a signer of the Declaration of Independence, is collecting data for a book about the late X. Trapnel, a mysterious British writer who happens to have been an acquaintance of Jenkins.

The pursuit of Trapnel echoes a theme familiar to readers of Powell's earliest (pre-*Dance*) books, *Whatever Became of Waring?* and *Agents and Patients*: the search for the connection between artistic reality and the person of the creator. In the earlier work this research was treated as farce, but here Gwinnett's search for Trapnel is treated more gravely, as comedy, although there is a scene in a rooming house in London, involving a naked woman and the blind father-in-law of the landlady, that contains the flammable elements of farce, to which Powell chooses not to put the match. Yet, in the end, the search is tragic. Gwinnett is in some sense destroyed by the woman who had previously destroyed Trapnel himself.

The other American is Louis Globber. Along with the narrator and Gwinnett, Globber might be numbered among the temporary kings. He is a playboy-tycoon of Jewish origin, marvelously facile and