Chesapeake Bay

"Queen of Bays" Is a Rich Commercial and Recreational Resource, but March of Progress Imperils Her Health

Early English settlers in Jamestown called the Chesapeake Bay "the noblest bay in the universe." Captain John Smith, who in 1608 became the first person to explore and describe in detail the islands, tributaries, and Indians around the bay, was moved to write: "Heaven and earth seemed never to have agreed better to frame a place for man's commodious habitation."

Today a new kind of exploration is required to keep the bay area fit for commodious habitation. Although the bay has long been a laboratory for marine scientists, no comprehensive plan has yet been developed to protect its bounty and order its progress. A recent report to the National Science Foundation (NSF) has outlined a research plan that it hopes will do just this. The report is noteworthy as one of NSF's pioneering efforts at stimulating research efforts that are directly applicable to the needs of society; it also supplies an example of how academic scientists can stumble when they attempt to set off down the path of coordinated, problem-oriented research (see page 827).

Since the days when it played a vital role in the development of Maryland and Virginia as a waterway for the colonial trade in tobacco, the bay has served a remarkable diversity of needs. It is the source of a $65-million-a-year fish and shellfish business for Maryland alone. It is a popular hunting ground for sport fishermen and duck hunters. And it is reputed to have the finest sailing waters anywhere along the continental east coast.

The Chesapeake is also important as a shipping lane for the Baltimore Harbor, one of the busiest in the country, which is visited by more than 5000 commercial craft each year. It must absorb floods of sewage, treated and untreated; silt deposits from shoreside construction; chemical effluents from industry and farming; oil and bilge droppings from motor boats and tankers; and, most recently, thermal pollution, as the age of nuclear power plants gets under way.

The bay extends 195 miles, from the mouth of the Susquehanna River to Cape Charles and Cape Henry, which mark the gateway to the Atlantic Ocean. For 10,000 years the bay has been the drowned estuary of the mighty Susquehanna, the largest river in the eastern United States, which rolls down through New York and Pennsylvania to supply over half the bay's daily inflow of fresh water.

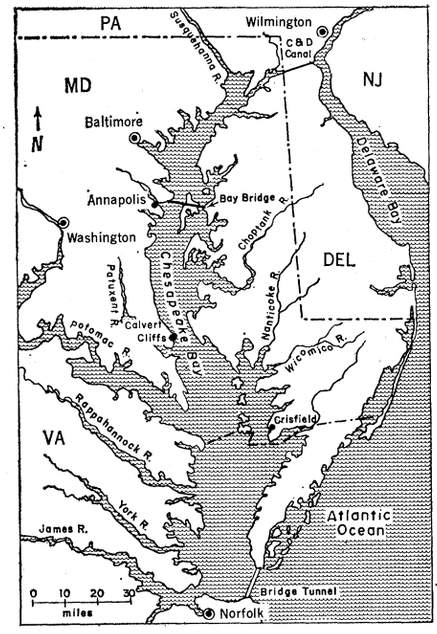
The bay is shallow, with a mean depth of 28 feet. Its accessibility to sunlight and the variations in its salinity (from almost no salt at the top to 30 parts per 1000 where it meets the sea) permit heavy growth of flora and a rich benthic community, which features the famous bay oyster, the blue crab, and the soft-shell clam. The marshy areas (wetlands) along the bay's shores are spawning grounds for most of its finfish populations.

The bay splits the state of Maryland. The western shore is in the path of the thickening eastern seaboard megalopolis, which starts in Boston and is creeping down to Norfolk, Va. Large industries like Martin-Marietta Corporation and Bethlehem Steel, as well as numerous military installations, from Maryland's Aberdeen Proving Grounds to naval shipyards near Norfolk, make heavy demands on the bay as a highway and dump.

The Eastern Shore, on the tri-state "Delmarva" peninsula, is, by contrast, primarily rural and agricultural, peopled by conservative farmers and fishermen. Because of their country ways —a tuna canning factory represents one of the largest industrial concerns —the Eastern Shore contains some of Maryland's most economically depressed areas.

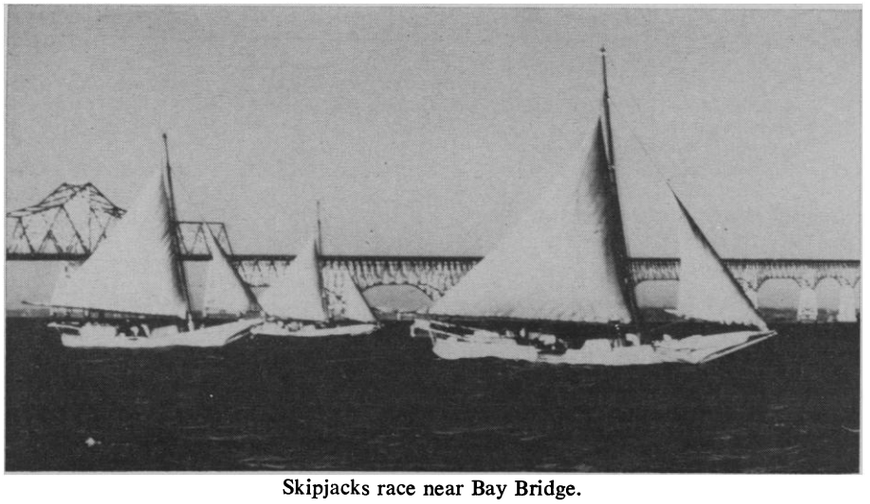
The wide range of entrepreneurial activities that must be accommodated by the bay can be illustrated by two of its most visible uses: the oyster business and the atomic power business.

The watermen of the bay, extolled in song and story for their picturesque and independent ways, now provide the most visible link to the past. In



the early years, when the tasty bivalves seemed inexhaustible, oystermen dredged the bay to their hearts' content. As the fishing population burgeoned in the last century, Maryland and Virginia attempted to put such curbs on oystering as residence and licensing requirements for dredgers, and the staking out of private fishing rights in tributaries. Thirty years of oyster wars, featuring bloody, armed skirmishes involving police, pirate oystermen, and legitimate dredgers, extended into the early years of this century. The watermen have been largely tamed by increased regulations, but the oysterman still remains an individual entrepreneur who believes at heart that no law should intervene between him and the riches God saw fit to put in the bay. Tonging is the only method now permitted for taking oysters in motor-driven boats, but some watermen still ply the trade in what remains of a fleet of skipjacks, sail-driven dredging boats unique to the Chesapeake Bay.

The supply of oysters has been severely depleted in recent decades, largely because of overexploitation. In the early 1900's, the annual take from 300,000 acres of oyster bars was between 8 and 10 million bushels. Now the harvest is between 2 and 3 million bushels. Some efficiency experts have urged Maryland to follow Virginia's lead in staking out oyster farms, a practice that they say could increase the production tenfold. But the old system, despite its inefficiency, supplies a livelihood for 9000 Maryland watermen (including crabbers, clammers,

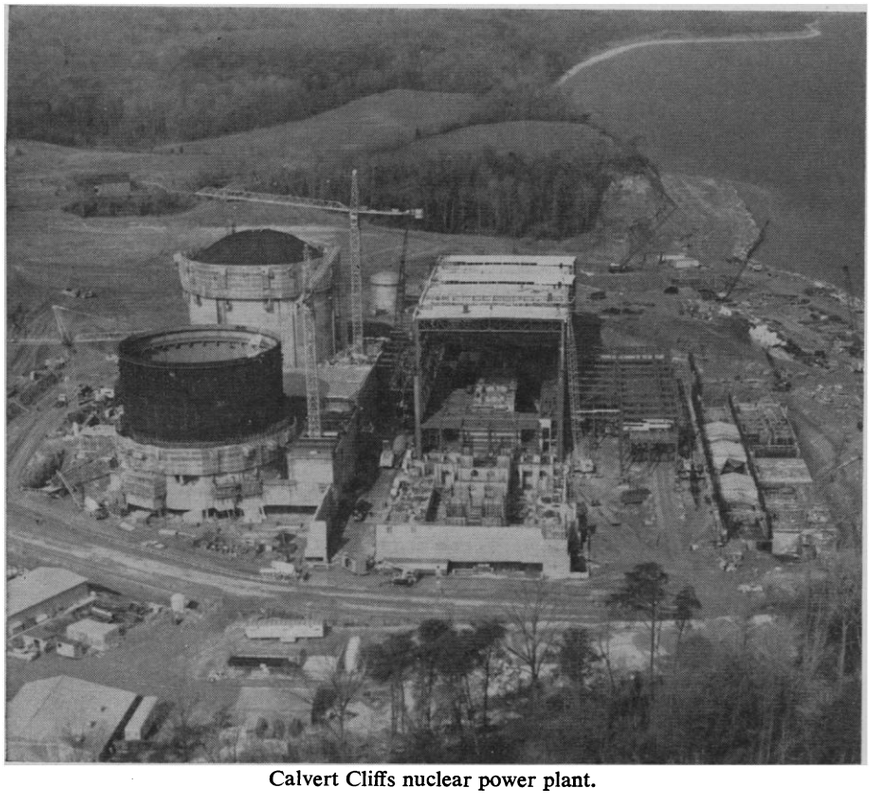


Skipjacks race near Bay Bridge.

and fishermen) and is unlikely, at present, to be changed.

Elsewhere, change is rapid. Perhaps the single most important issue forcing Marylanders to take stock of the condition of their bay has been the construction of a controversial nuclear power plant at Calvert Cliffs. When plans were announced in 1966, a public outcry, sparked in large part by faculty members at the Johns Hopkins Medical Center, grew up around the unknown menace posed by Maryland's first atomic power plant. Court orders, appeals, hearings, and reports flew back and forth. In the end, Baltimore Gas and Electric got its plant, a two-unit $398-million plant that will double the company's present output of electricity, starting in 1974.

But both the state and conservationists made significant gains. The company agreed to postpone construction for 2 years so that archeologists could explore the cliffs, which are known to geologists and paleontologists around the world as a rich deposit of 20-million-year-old marine fossils from the Miocene age. A power line scheduled to run through a historically valuable section of Anne Arundel County was diverted.



Calvert Cliffs nuclear power plant.

Most important, the state has passed a law giving it strict control over the siting of future plants and, to govern emissions from nuclear plants, has passed rules that according to the state's Department of Water Resources, are "the most stringent from every standpoint" in the country. The radioactive emissions allowed are 1 percent of the maximum permitted by the Atomic Energy Commission (AEC).* Standards specify that the temperature of the cooling water released into the bay may not exceed bay temperature by more than 10 degrees and may never exceed 90°F. (The Environmental Protection Agency, however, says they do not meet its recommendations, which prescribe a maximum temperature rise of 4°F.) If the state radiation standards hold, they may have a significant impact on efforts elsewhere to apply limits more stringent than those of the AEC. Two nuclear plants are now under construction near Virginia bay tributaries, and a governor's task force in Maryland has predicted a need for as many as ten 3000-Mw plants (each having almost twice the capacity of the 1800-Mw Calvert Cliffs reactors) in the bay area within the next two decades.

Another issue that has turned bay dwellers into environmentalists has been the question of the treatment of its wetlands, which have been subjected to heedless dredging, filling, and alterations by commercial developers. The wetlands controversy began 2 years ago with a scandal in Ocean City, Md., on the Atlantic Ocean, involving a real estate developer who was purchasing wetlands from the state for a pittance, filling them in, and selling them for $12,000 per lot. Conservationists reacted by forming the Maryland Wetlands Committee, which, after vigorous lobbying, has helped push through a law that outlines a policy for protecting the ecology of state-owned wetlands and requires public hearings and licensing procedures for alterations of privately owned wetlands.

The Maryland law, if strongly enforced, will be an important step in the state's assertion of proprietary rights over those of riparian landowners who, like the oystermen, have strong feelings about individual freedom. Virginia is not so lucky. In the absence of wetlands laws, private conservation groups

* Baltimore Gas and Electric agreed to comply with the state standards before a Minnesota federal court struck down similar standards set by the Minnesota Pollution Control Agency. No challenge has so far been mounted against the Maryland regulations.

are frantically trying to halt developers who are gobbling up valuable marshland at an alarming rate.

Water-borne commerce presents another big challenge for the bay. Both the Baltimore Harbor and the Chesapeake and Delaware Canal undergo periodic deepening to accommodate ever-larger boats. Noxious dredge spoils from the harbor are dumped into a deeper part of the bay, smothering marine life and spreading industrial poisons. The widening of the canal, currently in progress, poses an additional threat: because the water level of the Chesapeake is slightly higher than that of the Delaware Bay, fresh water is diverted into the canal, thus allowing an increase in the salinity of the upper bay during times of minimum estuary flow.

But sewage is the major scourge of the bay. It emanates from numerous inadequate treatment systems, as well as from leaky septic tanks belonging to shore dwellers who are not hooked up to municipal systems. Maryland has embarked on an ambitious program to construct treatment plants and has devised a system to clamp down on septic tank violators. But the state has no control over the behavior of federal installations, or over the variety of undesirable products that float down the Potomac River from Washington, D.C.

While Maryland has finally come to grips with many of the problems that have been building up on the bay—15 environment laws were passed in the 1970 legislative session—it does not have a clear policy for dealing with some future developments that will require a sophisticated balancing of the conflicting needs of the population. For example, a heavy-industry complex has been proposed for the port of Crisfield on the Eastern Shore. Crisfield is in Somerset County, the most depressed county in the state and badly in need of a new economic base. But conservationists say the depth of the bay and its flushing action are insufficient to support a deepwater port. The project now seems to be at an impasse—an official of the state Department of Natural Resources (DNR) says something is badly needed in Crisfield, but no one dares study the matter for fear of being ambushed by packs of conservationists.

No strategy has yet been unveiled to handle the intense pressures for recreational development on the Eastern Shore that are expected to result from the construction of a second bay bridge. The new span, being built adjacent to the existing one, which crosses the bay just above Annapolis, is expected to be completed late next year.

No one is sure how serious the bay's problems are. The five-state Susquehanna River Basin Compact, ratified last year, gives Maryland a strong hand in decisions about planned diversions from the bay's main artery, but the machinery of the compact is yet to be activated. According to the Chesapeake Bay Foundation, which was set up 5 years ago to "save the bay," it is "on the ragged edge of becoming badly polluted." Ominous signs may be read in seasonal fish kills, oil spills, the closing of Baltimore area beaches, and the 28,000 acres of oyster beds and 39,000 acres of clam beds that have been closed due to pollution.

On the other hand, the Chesapeake is in far better shape than her dirty smaller sister, the Delaware Bay. A DNR official points with pride to the fact that the prized bay oyster is still eaten raw—despite the fact that the oyster's filter-feeding system tends to pick up whatever pollutants exist in the surrounding water. Boating, swimming, and sport fishing are on the increase, and no significant loss of species has occurred from pollution.

Is the bay dying and if so what can be done to save it? Decisive action will have to await more detailed understanding of the bay. But the Chesapeake can't wait forever—geomorphologists say that in 50,000 years or so shore erosion and silt from its estuaries will have turned it back into dry land.

—CONSTANCE HOLDEN

NSF Prods Scientists to Coordinate Bay Research, but Academic Rivalries Snag Badly Needed Studies

Why isn't more known about the Chesapeake Bay? Despite more than 1000 published studies of winds, tides, flora, fauna, and the effects of pollution in the bay, many questions about the impact of man's activities remain unanswered. One reason seems to be that too much of the research has been fragmented, specialized, or restricted to one small portion of the bay.

Actually, the jumble of reports and studies that confronts anyone seeking information about the bay only reflects the institutional complexity that characterizes the region. One step in the right direction was the formation 2 years ago of the Maryland Department of Natural Resources, which pulls the state's environment-related activities under one roof. Even so, two sets of state agencies, from Maryland and Virginia, and a variety of federal agencies, ranging from the Bureau of Commercial Fisheries to the Army Corps of Engineers, all have some claim to oversee activities within the bay. The resulting jurisdictional tangle leaves no single agency with either the authority or the incentive for bay-wide planning and management.

Things are hardly better as far as research on the bay goes, with only minimal overall coordination among almost a dozen different institutions. The "Big Three"—the Chesapeake Bay Institute (CBI) of the Johns Hopkins University, the Chesapeake Biological Laboratories (CBL) of the University of Maryland, and the Virginia Institute of Marine Sciences (VIMS)—dominate bay research to the point where some of the other institutions that deal with the bay or its surrounding lands have felt excluded.* Despite some evidence that cooperative research programs and an awareness of the need for a comprehensive approach are on the upswing, the Chesapeake Bay Research Council, the most recent bay-wide attempt at coordination by the Big Three, is by all accounts so inactive as to be practically defunct.

It is against this discouraging background that a new report to the National Science Foundation (NSF), *The Chesapeake Bay*, grapples with the problem of coordinating research on the bay. The report, which was written by a 13-member committee of scientists for the Johns Hopkins University, the University of Maryland, and VIMS, proposes an ambitious information system, a bay-wide research program, and a new organization to coordinate the

* Other institutions active in research on or around the bay include a laboratory of the Bureau of Commercial Fisheries at Oxford, Maryland; a water quality laboratory of the Environmental Protection Agency; the Chesapeake Bay Center of the Smithsonian Institution; a research station of the Corps of Engineers, where a large hydraulic model of the bay is being constructed; the U.S. Geological Survey; Old Dominion University; Virginia Polytechnic Institute; and the University of Virginia.