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The Delaware River Basin

An Environmental Assessment of Three Centuries of Change

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The Delaware River Basin

An Environmental Assessment of Three Centuries of Change

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Preface

Most reports and studies by Federal agencies look at how a single issue or a narrow range of issues affects the entire Nation. The reader is often left with the task of applying the information to his own locale as well as with the dilemma of how the subject of the report relates to what else is going on in his community. This report is not like that. Instead it examines one geographic region of the country and shows how a broad range of issues—in this case the full gamut of environmental concerns—is expressed, discussed, and, it is hoped, resolved in light of their conflicts with each other and with other goals and policies at work in the same region. In taking this approach, we hope to provide insight for people everywhere about how environmental issues interrelate with, support, or conflict with the other things that our society is trying to do.

We chose the Delaware River Basin for a number of reasons. First, the region has been at the cutting edge of many of the environmental concerns facing America. Its water and air were among the first to be heavily polluted. It has some of our oldest cities, cities that were completely changed by 19th century industrialization, European immigration, migration of blacks from the South, and the growth of residences and industries in the suburbs. Its exclusive "Main Line" suburbs and its Levittowns were among the first of their kind in America. Its mountain areas are among the most severely impacted by the "recreation boom." And with the energy shortage, it is once again the Delaware River Basin that appears to be a prime candidate for the first of a new generation of superports, offshore oil operations, and associated industrial development.

The second reason is closely related to the first: Serious conflicts over limited land and water resources, similar to those that many other regions will face in the future, have already begun to hit the area. It is clear, for example, that all 7 million residents of the Delaware Valley cannot have vacation homes in the Poconos without destroying the environment that attracts people there. Likewise, conflicts being experienced along the Delaware Bay among petroleum-related industrial development, recreational development spurred by success in controlling pollution upstream, and the traditional life of farmers, villagers, and oystermen are precursors of the hard choices that many other coastal areas will be making in coming decades.

Another reason for studying the Delaware is that the environment is so varied. It has forested mountains, checkerboard farmlands, massive urban industrial complexes, extensive wetlands, and small fishing villages. The river itself varies from fast mountain stream to rural river to busy polluted waterway to expansive marsh and bay, all within 300 miles.

The final reason is that government and citizens in the Delaware River Basin are looking for solutions and are beginning to find some ways to turn around downward trends. Especially impressive are the scope and variety of new laws and institutions to coordinate and direct the efforts of the 4 States, 27 counties, dozens of cities, and at least 1,000 local governments that make up the area. Although not all the answers have been found, there are ideas and arrangements at work here that could and should be tried elsewhere.

When the Industrial Revolution began in the United States 150 years ago, Americans had a singular vision of their country's future: maximum growth. Today that vision is clouded, for a growing number of Americans are troubled

by the excesses that accompany uncontrolled growth. All around them they find the unanticipated (and unwelcome) consequences of development decisions. Industry was located near a river for easy transportation and a ready water supply, but as a result the river is unfit for fish and people. A major highway bypass cuts through a pastoral valley to avoid the city, but soon a shopping center grows up at the interchange, old barns are razed, and suddenly the beauty of the valley is gone. In each case, something was gained initially, but subsequently much—perhaps too much—was lost.

Our look at the Delaware shows that development goals continue to run headlong into environmental goals. With change occurring at a bewildering scale and speed, the challenge is to accommodate needed and inevitable development without ruining the environment or degrading the quality of our lives.

The purpose of this report is to point out the kinds of choices that will need to be made. The future of the Delaware River Basin—and of other parts of the country—will be shaped by the decisions that are made over the next few years. Particularly important are decisions about how we will use our land. Those decisions, as this report shows, dictate the other environmental effects. The message here is that time is running out.

Russell W. Peterson

RUSSELL W. PETERSON, *Chairman*

John A. Busterud

JOHN A. BUSTERUD

Beatrice E. Willard

BEATRICE E. WILLARD

Chapter I
A Good Piece of Geography

"What makes a nation in the beginning is a good piece of geography," Robert Frost once observed. From its earliest day, this Nation has owed much of its success to that good piece of geography drained by the Delaware River. With a good climate and ample resources and with its traditions of religious tolerance and political liberty, the Delaware has served the Nation well and has mirrored its growth from the days of Henry Hudson to the present.

The Lay of the Land

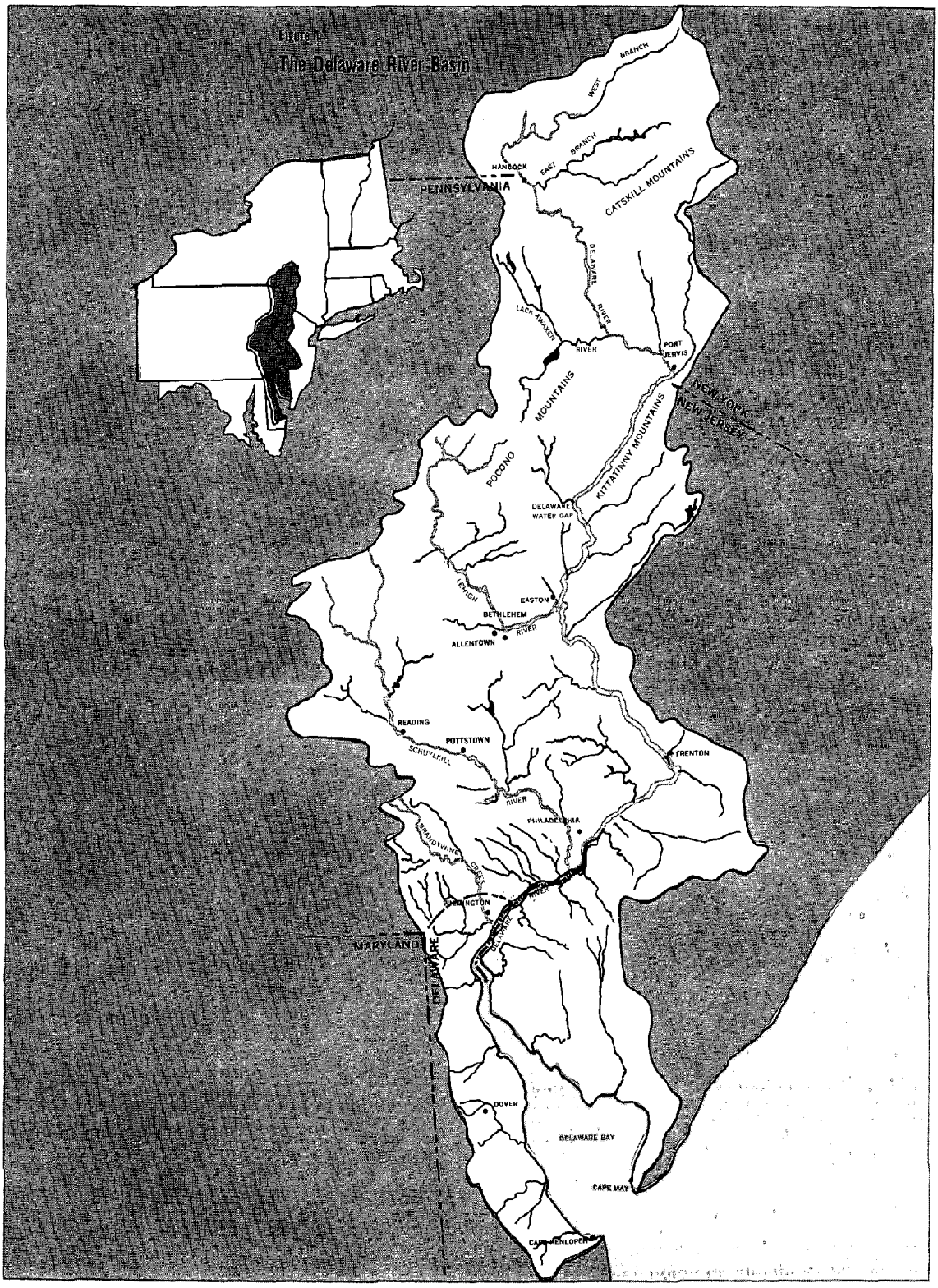
The Delaware is not one of our longer rivers. It rises in the Catskill Mountains of New York, only 270 miles north of where it empties into the Atlantic Ocean. The exact source of the river has long been the subject of local debate, with many landowners of the upper Delaware claiming that it starts from their own springhouse or barnyard pool. The headwaters form the east and west branches, which run out of the Catskills to meet near Hancock, N.Y. From there the Delaware meanders through the Poconos, turns to the southwest at Port Jervis, N.Y., breaks through the main ridge of the Appalachians at the Delaware Water Gap, and then enters the rolling hills and broad valleys of the Piedmont. The first major tributary, the Lehigh, joins the Delaware at Easton. The largest tributary, the Schuylkill, empties in at Philadelphia. Important cities and towns are located on these tributaries—Bethlehem and Allentown on the Lehigh, Pottstown and Norristown on the Schuylkill.

The fall line lies at Trenton, just below where George Washington made his famous crossing. (See figure 2.) This rough rock outcrop stretching from New York City to below Washington, D.C., separates the hard rocks of the rolling Piedmont from the loose sands of the level Coastal Plain. Here the Delaware River drops through rapids to near sea level. It now becomes an estuary, where the river's flow is altered by the tides. This is where the major ports and cities of the Delaware are located. Below Wilmington, the estuary widens into a bay surrounded by flat, marshy shore and finally narrows again to enter the Atlantic between Cape May, N.J., and Cape Henlopen, Del.

Much of the topography along the Delaware was formed during the great ice age. Beginning a million years ago, a series of four continental ice sheets advanced south into the United States, each time retreating as the climate warmed. They left behind the rocky mantle that is now the Poconos. As recently as 15,000 years ago, at the peak of the most recent advance, the glaciers completely covered the northern part of the Delaware River Basin. During the warming period, massive amounts of debris were washed into streams and were ultimately deposited as sand and clay over the coastal lowlands by the Delaware, the Schuylkill, and the Brandywine Rivers; at that time all ran parallel into the sea. Over time the Brandywine and the Schuylkill eroded toward the east to meet the Delaware. As the glaciers retreated

Figure 1

The Delaware River Basin



and melted, the ocean rose and flooded the lower estuary, giving the bay its present form.

Compared to the Mississippi, which drains 40 percent of the United States, the Delaware Basin is small, draining only 1 percent of the land. But these lands are varied in both appearance and use. In the headwaters and the Piedmont, above the fall line, the countryside is a checkerboard of rolling farmland and forest, and the river banks are lined with trees that give the overall impression of how the Delaware must have looked to the first settlers. Trenton, Philadelphia, Camden, Chester, and Wilmington form a huge and expanding urban area where the suburbs of nearby cities merge into one sprawling metropolitan region. Oil refineries, chemical plants, steel mills, warehouses, light industry, powerplants, piers, railroads, and highways dominate the waterfronts and the river is alive with freighters, barges, and tugs. To the south is the bay, lined with marshes and fishing villages, with narrow roads leading inland to flat, rural areas dotted with vegetable and poultry farms.

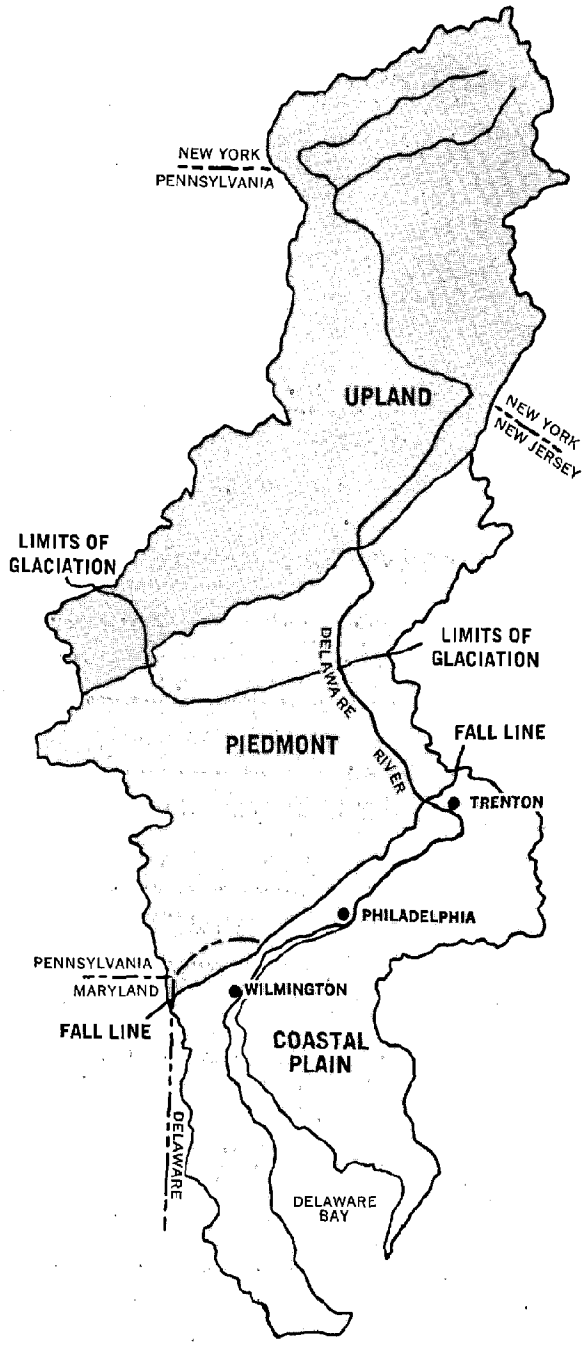
The Colonial Period

For centuries, Indian tribes lived along the shores of the Delaware. Prominent among them were the Lenni Lenape, a peaceful people who fished, hunted, and cultivated fields of corn, squash, beans, sweet potatoes, and a hearty tobacco. On a summer day in the early 17th century they may have seen Henry Hudson's *Half Moon*, the first European ship known to have sailed up the Delaware.

The *Half Moon* was a Dutch ship commanded by an Englishman. Hudson had been hired by the East India Company to find a northern passage for Dutch trade with the Orient. After unsuccessfully trying to reach the East through what later became Hudson's Bay, Hudson sailed south on the advice of his friend Captain John Smith. On August 28, 1609, he

Figure 2

The Geological Regions of the Delaware River Basin



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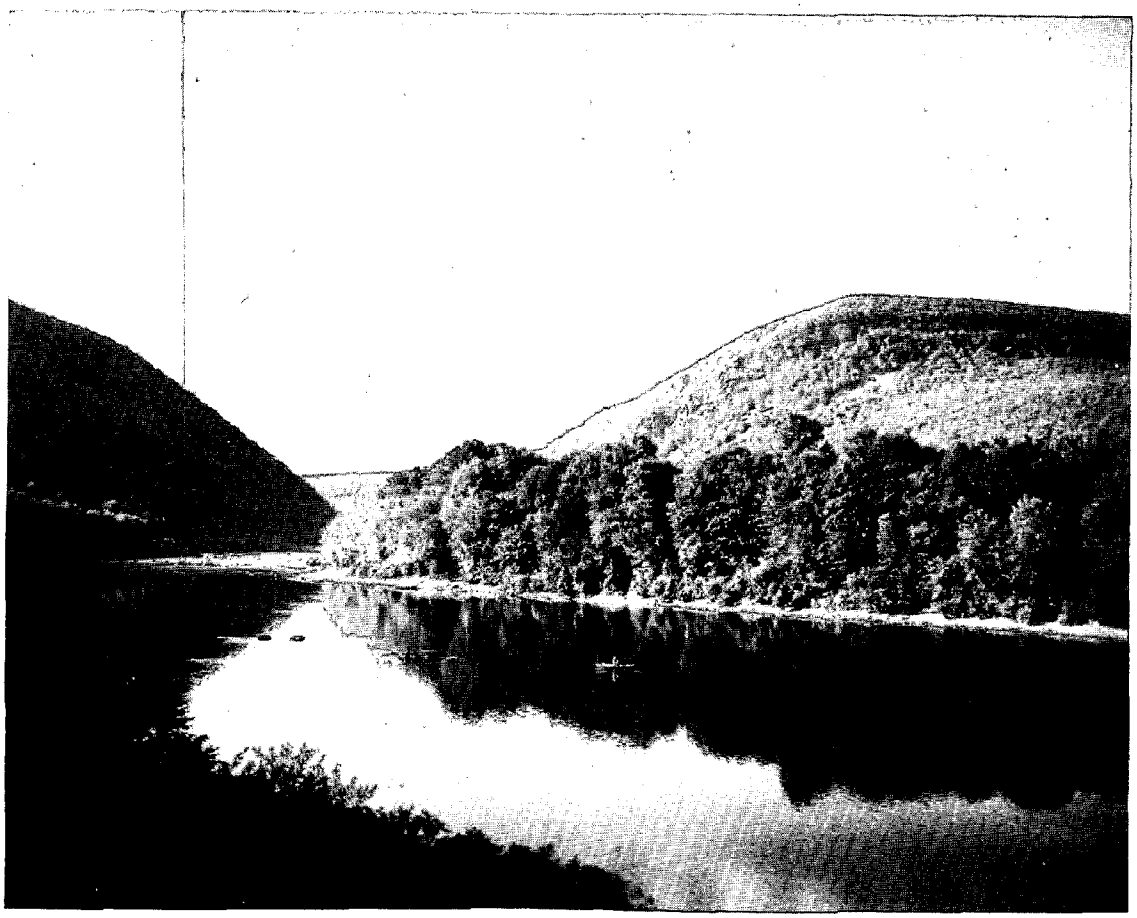


Although the Delaware River that most people know is lined by industries and cities, other parts remain much as they were when the first settlers came.

entered the Delaware Bay and sailed the river for several hours, giving the Dutch their initial claim to the area. Another Englishman, Sir Samuel Argull, later named the river after Lord de la Warr, the man who had rescued the Jamestown settlement from starvation.

Beginning in 1631, the Dutch settled along Delaware Bay. They were followed by the Swedes and the Finns, who founded their first colony in 1636 at what is now Wilmington. Under the stern leadership of their 400-pound Governor, "Big Belly" Printz, the Swedes were able to maintain an uneasy foothold on the Delaware for a number of years. But by the mid-1600's, Sweden was a strong European power and represented too big a commercial threat worldwide to the Dutch, whose fleet moved in and captured the Swedish forts in the New World.

The Dutch were not long in control. The English began to worry about the growing Dutch stronghold on the Delaware and took over both the Dutch and prior Swedish settlements in 1664.

The Dutch, the Swedes, and the English started the colonial history of the Delaware on a course of cultural and religious toleration that was important in attracting new settlers. The Quakers, seeking relief from religious persecution, arrived in 1677. A few years later, William

Penn, a Quaker convert, came to take title to the large amounts of land received from Charles II of England in payment of a debt owed Penn's father. Penn unified the Quakers in the Delaware Basin with other groups of settlers under a "holy experiment" based on religious tolerance, love, and charity. He laid out Philadelphia in 1682 with grid streets and parks that remain to this day.

Living among the Indians in a spirit of mutual cooperation and respect, the Quakers constructed the first tanneries, brickyards, and glass works. These early industries multiplied with subsequent European immigrations. Throughout the 18th century, new settlers came in great numbers—not only Quakers but thousands of Germans, who settled the rich farmlands of the Lehigh, Schuylkill, and Delaware Rivers. They in turn were followed by the generally less affluent Scotch and Irish, who settled on the frontier where land was cheap.

These growing numbers of European arrivals with their continued thirst for new land finally began to rupture the good relations that Penn had so painstakingly established with the Indian tribes. After his death, Penn's sons subverted the "walking purchase," a treaty with the Indians that allowed Penn to claim land into the woods as far as a man could walk in 3 days. With assistance from some fleet-footed frontiersmen, they made sure that the 3 days' walk was no leisurely stroll. The Indians felt cheated by the loss of their best hunting and fishing lands, and battles soon erupted with settlers all along the Pennsylvania frontier.

Throughout this early period of American history, most important issues were territorial—who owned what land. With primitive surveying techniques, slow communications, and imprecise records, there was often more than one claim to the same land. The boundary between Pennyslvania and Delaware was finally resolved by striking an arc on a 12-mile radius from the New Castle courthouse. It remains today the only circular boundary in the world.

The Industrial Period

In colonial times the Delaware Basin was a region of farms and towns and Pennsylvania was the center of trade with England. Stitched together in economic dependence and physical proximity, the communities were linked by the rivers and a few rutted roads. Craftsmen worked at home, usually alone.

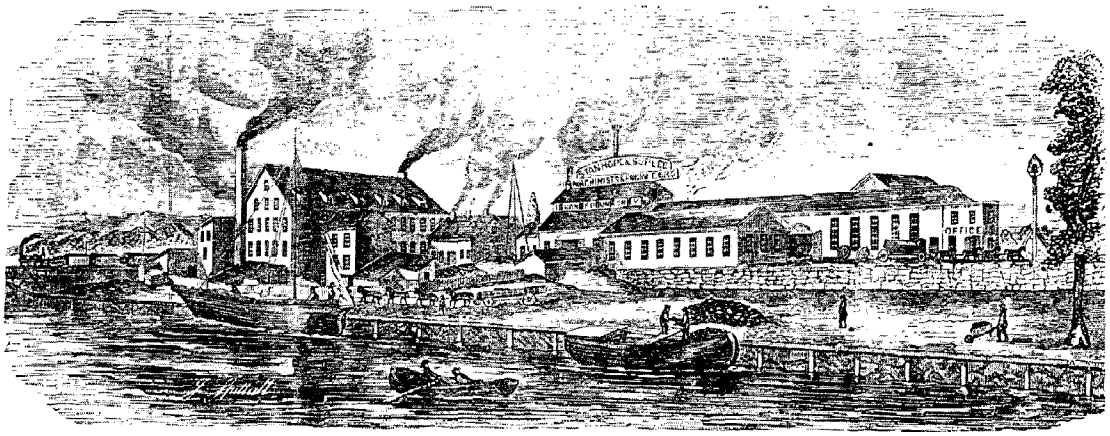
By the time of the Continental Congress, the Delaware River Basin was a major center of American commerce and industry. Flour, leather, textiles, and paper were produced in the Brandywine Valley just above Wilmington. The Delaware was also the Nation's shipbuilding center, with water transportation assured by an extensive network of ports along the upper estuary. Many towns on the bay were shipping points for wheat, rye, corn, tobacco, and livestock grown in the interior and for the burgeoning oyster business. In the upper basin and in many communities around the bay, the timber industry flourished, feeding raw materials to the paper mills and shipyards in the Philadelphia and Wilmington areas.

The 1800's brought major technological changes—the steamship, the telegraph, and the railroad. The Industrial Revolution was underway, and small shops and cottage industries began to disappear.

The factories changed not only the face of city neighborhoods, where work and residence had previously been united, but the social structure as well. Industrialization made craftsmen employees rather than masters. The most successful factory owners attained a level of wealth unmatched by the millers and merchants of previous generations. Many skilled jobs remained, but working conditions became more rigid, and skilled workmen had less control over their hours and methods of employment.

The Delaware had all the natural assets needed to spur this industrial growth. It was rich in the essential resources—water, coal, wood, and iron—and occupied a prime loca-

THE BRIDGEWATER IRON WORKS,
FRANKFORD.



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The Delaware River became the center of one of the most extensive industrial areas in the nation in the 19th century. Proud owners often had engravings of their factories done to impress prospective clients. Frankford, now a part of Philadelphia, is still a center of heavy industry.

tion that westward expansion did little to undermine.

Water remained critical; ships required safe, deep harbors, mills needed falling water from which to draw power, and industries needed process and cooling water. The Delaware River system provided all of these. Encouraged by President Jefferson, who wanted a domestic source of gunpowder for westward expansion and for defense against the British, a French chemist who had worked with Lavoisier, E. I. duPont, selected a site on the rocky, fast-falling Brandywine just above Wilmington in 1802. DuPont's powder mills were to grow into the massive chemical empire that still dominates industry in the estuary. When factories no longer had to rely on streams for power generation, they moved to the seaports, where plenty of water was available for manufacturing.

Abundant sources of iron ore provided the basis for manufacturing. The Durham furnace, near Riegelsville, Pa., fired cannons and cannonballs for Washington's army whose hardest winter was spent in a place along the Schuylkill named for its iron works, Valley Forge. One of the earliest U.S. patents was issued to Samuel Briggs of Philadelphia for his nailmaking machinery.[1] Iron became the prime raw material for locomotives built by Baldwin, for ships built at the yards in Philadelphia, Chester, and Wilmington, and for an almost endless variety of other products. Cables made by Roebling in Trenton suspended the Brooklyn Bridge.

As the Nation expanded westward, new canals and the railroad strengthened the valley's geographic advantages, although New York took an early lead by building the Erie

Canal through a series of relatively low passes in the Appalachian chain. The race between the canals and the railroads quickly linked Philadelphia to the Ohio Basin at Pittsburgh in the 1830's. At the same time, the Reading Railroad tied Philadelphia to the Schuylkill coal region and unlocked a new source of cheap power. The shift from wood- to iron-hulled ships brought even greater prosperity to the cities, which had ready access to iron and later to steel, although it accelerated the demise of small bay towns where shipbuilding had been a craft. The Delaware Valley began to take shape as one of the great industrial areas of the world.

Soon after the turn of the 20th century, the internal combustion engine began to bring about still another change in the character and lifestyles of the cities, towns, and rural areas of the basin. Pavement replaced dirt roads. Trucks appeared and took over the job of moving goods not just within cities but between them as well. New fabricating and assembly plants grew up near the highways. A more affluent population with access to fast, convenient transportation began to move out of the cities to settle in previously rural areas and to establish the basic development patterns in the basin today.

The Changing Environment

From the first Swedish adventurers through the vast European immigrations to the "baby boom" of the 1950's, the population in the basin has swelled. In the 30 years between 1830 and 1860, Philadelphia grew from 80,000 to 566,000.[2] By 1930, the city and its surrounding counties comprised nearly 2.9 million people, more than one-half of the basin's 4.6 million inhabitants. Today well over 7 million people live in the Delaware River Basin, more than two-thirds in the Philadelphia metropolitan area and almost half in its suburbs alone.[3]

But growth has not come without costs, and the people of the Delaware are beginning to worry about how to repair the damage that has been done and how to manage the additional growth that they foresee.

Pollution of the air and water was one of the first signs that the resources of the basin were being misused. Pollution is not a recent phenomenon; it has existed in varying degrees since colonial times. The air was probably at its worst in the 19th century when coal was used to make iron, to fuel industry, and to heat homes in the crowded cities.

Millions of shad once migrated up the Delaware. In early times people caught them with nets, baskets, and anything else big enough to hold a fish. But overfishing and pollution soon changed the shad runs from an annual event to material for old timers' stories.

Yet of all the environmental problems generated by the Delaware Basin's growth, none is more seriously out of hand and more difficult to grasp than the use of land. Like pollution, misuse of land was evident at an early time. By the late 19th century, hundreds of abandoned coal mines scarred the hills of the Lehigh. Timber was stripped from the uplands and coastal plains alike, creating runaway erosion. More recently, enormous amounts of land have been consumed by highways, industry, and homes, with little thought of the consequences and little provision for open space, access to mass transit, or concern over the character of old or new communities.

Public concern about what is happening to the environment is more alive now in the Delaware Basin. It may be because the changes are occurring so rapidly and on such a scale. Or it may be because the public is less willing to accept the historical rationale that any new development is a blessing. Whatever the explanation, the limits of the land are today more recognized and the potential harm from pollution more widely understood.

More than 3 centuries of growth has left the Delaware Basin a unique legacy. It is reflected in the area's prominent position in the Nation's

history, in the commerce and industry that grew up there and still characterize the region, in the ethnic and cultural diversity of the area, and in the wealth that its commerce and productivity have generated. But the legacy also has its darker side. Polluted waters, contaminated air, decaying city neighborhoods, sprawling suburbs, ruined wetlands, and subdivided mountainsides are a part of it too. The chapters that follow examine this legacy in some detail.

Chapter II
The River—Servant of Many Masters

From the headwaters to the bay, the Delaware River is called upon to perform many overlapping and sometimes conflicting tasks. It is a major waterway of world commerce, a sewer, a water supply, a fishing ground, and a recreation area. It is also an occasional flood threat and until recent times was a major barrier to land transportation between coastal cities.

In colonial times the many uses of the river coexisted. Sewage and other waste were readily assimiliated by the clear water running into the river and its tributaries from farms and forests. Fisheries thrived. Neither river traffic nor industry interfered with recreational use, and the water was drinkable.

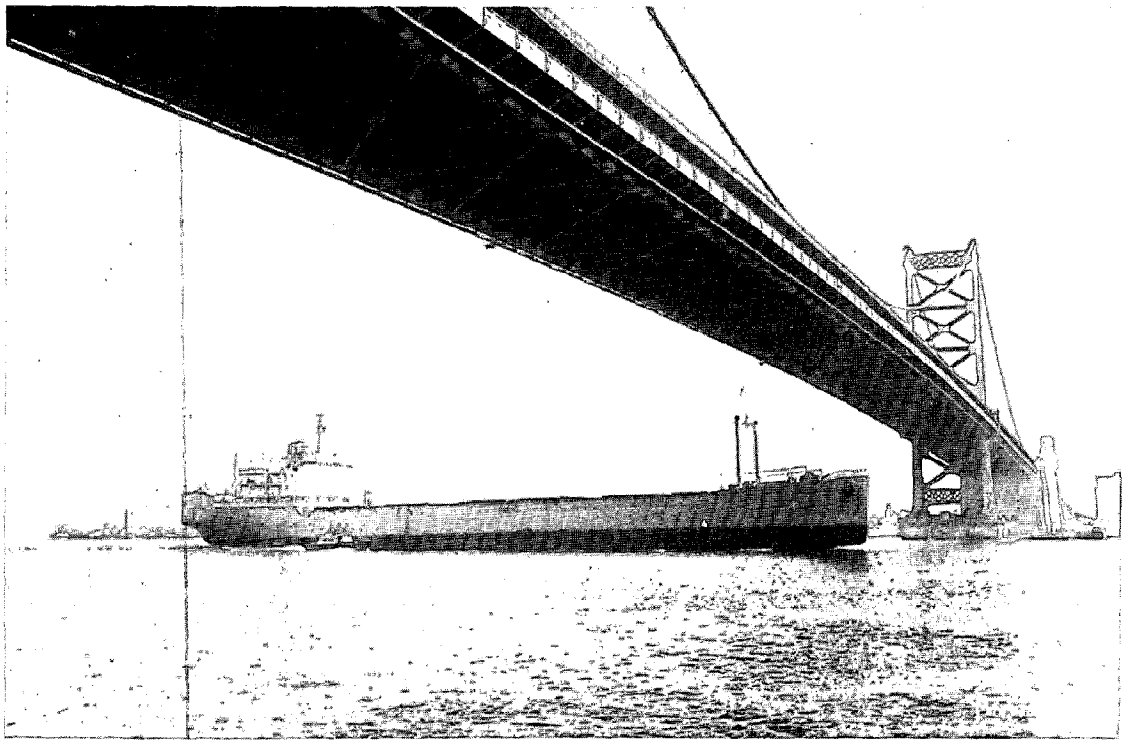
By the latter half of the 19th century, however, major conflicts began to appear as increased dumping of wastes from growing cities and industries overtaxed the water's assimilative capacity. Public access to the river was cut off by factories and railroad yards. Soon the stretch from Trenton to Wilmington lost its recreational and fishing values, and even the water supply became threatened. It is important to realize that this change was simply the result of many individual public and private decisions, for the most part individually insignificant, which were made as part of the economic growth of the region and the Nation and which only inadvertently threatened the continued use of the river for other purposes. It is this pattern of cumulative impact from many diverse decisions which still comprises the most serious threat to the Delaware River Basin.

Today the residents of the Delaware Basin continue to use the river and its banks for many conflicting purposes—pleasure boating, oil terminals, drinking water, waste disposal, fishing, powerplants, and more. It may be thought that the demands of a growing economy and a highly urbanized population split into dozens of jurisdictions would strain the river's capacities more than ever. However, new environmental values have at long last given public officials some guidance on what the public wants the river to be like; new technology has made it possible to hope for substantial reductions in pollution; and new institutional approaches may for the first time allow choices among conflicting uses to be made before the most destructive uses eliminate alternatives.

The River as Waterway

The ports of the Delaware are scattered for 100 miles from the Chesapeake and Delaware Canal north to Trenton. They serve one of the greatest concentrations of heavy industry in the world, including steel mills, shipbuilding facilities, distilleries, food processing plants, and the Nation's second largest complex of refineries and petrochemical plants. New port facilities to handle containerized cargo at Wilmington and Philadelphia have helped triple commercial ship traffic on the river since 1940. Philadelphia now ranks second to New York among U.S. harbors in the number of vessels handled.

Use of the Delaware as transportation artery



The Delaware is deep enough to allow passage of freighters and smaller tankers. Cutting a deeper channel to admit supertankers is more damaging than bringing the oil upriver by small tankers, pipelines, or even railroad from a deepwater port offshore.

and harbor has caused a variety of environmental conflicts. Discharge of wastes and spills from vessels are sources of water pollution (about 75 spills a year are reported by the Coast Guard).[1] Wakes from deep-draft cargo vessels sometimes interfere with pleasure boating. But the major impact thus far is from the constant dredging needed to keep open the ship channels. Disturbance of the bottom and disposal of the dredge spoil increase turbidity, disturb wetlands and areas where fish spawn, and cause aesthetic problems in natural areas.

The dredging issue has taken on new importance with the coming of petroleum shortages and the shift to supertankers for the transport of much of the oil from the Persian Gulf. So long as the Nation relies on imported crude oil, decisions will need to be made about how to handle tankers in the Delaware estuary.

As an alternative to dredging a channel upriver for supertankers, it has been suggested that a deepwater port be constructed in the bay or offshore in the Atlantic. A bay location has been criticized because it would require dredging and because of possible spills in transferring the oil. On the other hand, from an offshore location in the Atlantic, oil might be transferred from supertankers into pipelines or smaller tankers for shipment up the estuary. Extensive use of tankers for transshipment upriver would raise the probabilities of oil spills. In any case involving increased shipment of crude petroleum—including that from potential outer continental shelf oil and gas operations off Delaware and New Jersey—industrial development induced onshore will be a major issue. These issues are discussed in greater detail in chapter VII.

The River as Sewer

Writing in the *Half Moon*'s log in August 1609, Henry Hudson described the Delaware as "one of the finest, best and pleasantest rivers in the world." [2] Wastes with an oxygen demand of 1 million pounds per day are now discharged into the estuary from the cities and industries that line its shores. During the summer months when flow is low and temperatures high, oxygen in a 20-mile reach is often reduced by waste and sewage below the level that fish need to survive. Rainstorms cause the sewers of Philadelphia and other cities to overflow and bypass sewage treatment plants, pouring millions of gallons of raw sewage and the runoff of city streets directly into the Delaware.

The river is also repository of a large quantity of toxic wastes—heavy metals and organic chemicals from industry, from inadequate sewage treatment plants, from urban storm water runoff, and even from air pollution fallout. These accumulate on the bottom except when stirred up from time to time by dredging or by floods.

Food processing plants, urban sewage, and farmland runoff have overloaded the river with phosphates, nitrates, and other nutrients. Eutrophication might be expected to stimulate extensive growth of unwanted aquatic plants. However, suspended silt and other solid matter prevent most sunlight from penetrating more than a few inches below the surface, thus inhibiting the photosynthesis on which algae and other plants depend. Much of the silt comes from the farmland erosion and from runoff and sedimentation of new suburban development.

The city of Philadelphia was one of the first to realize that serious problems can develop from the pollution of waterways and aquifers. Storm drains installed during the early 19th century gradually evolved into a combined storm and sanitary sewer system. The untreated effluent from this collection system emptied directly into the Schuylkill and the Delaware. The city soon found that sewers without sewage treatment simply converted a domestic nuisance into a threat to public health. By the end of the 19th century, pollution threatened the city water supply.

In 1905 the Pennsylvania Legislature authorized the Commonwealth Department of Health to control sewage discharges by permit. In response, Philadelphia launched a study of the problem and opened its first small treatment plant by 1912. Not until 1923, however, did the city's first major plant begin operating, and the other treatment plants called for in the study never were built. Even into the forties, as much as 85 percent of Philadelphia's sewage was dumped into the rivers with no treatment.

Pollution problems were then at their worst. "You can stand on Broad and Chestnut Streets and smell the river," complained a local editor in 1944.[3] Microorganisms feeding on the sewage depleted the river water of oxygen, producing hydrogen sulfide and other gases that discolored houses and ships along the estuary, deprived ship crews of sleep, and sickened dockworkers. Waste clogged the engines of freighters in the harbor. The city's drinking water stank and tasted foul.

In 1946, the city launched an $80 million sewer improvement and treatment program financed by user charges and by revenue bonds which had been exempted from the Commonwealth's constitutional debt limit.[4] The northeast treatment plant, operating since 1923, was rebuilt to upgrade the level of treatment. New treatment plants in the southwest and southeast of the city were opened in 1954 and 1955, but these were designed only for "primary treatment," 35 percent removal of biological oxygen demand (BOD, the chief measure of water pollution). With this basic treatment plant structure Philadelphia entered the era of environmental concern that began in the late sixties.

Meanwhile, industry along the Delaware was contributing its share of pollution. Although the history of industrial wastes goes back at least as far as that of the cities and their sewage problems, public policies reflected a willingness

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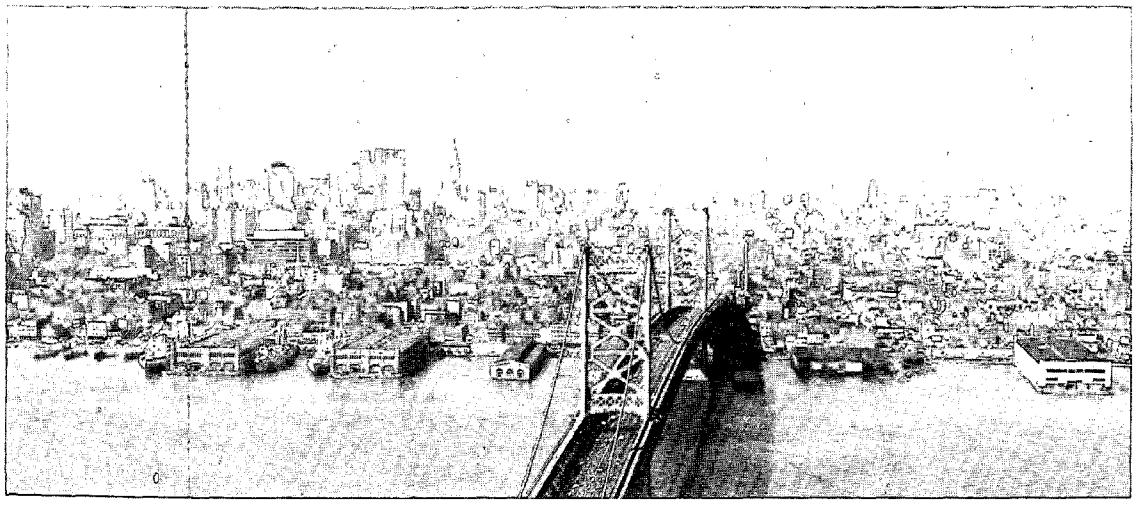


The growth of cities, more than any other factor, has increased the demands on the river to act as a sewer. Philadelphia is the largest city on the Delaware, and until recent improvements were made, the flow from its sewage treatment plants comprised the three largest sources of pollutants in the basin.

to endure the insults in return for the economic benefits of a healthy industrial base in the Delaware Valley. This attitude was not unique to the region; in fact it reflects what were the commonly held views about industrial pollution for well over a century. Industry, for example, was exempted from the 1905 Pennsylvania statute requiring permits for sewage discharge.[5] Not until 1937 were controls on industrial water pollution first enacted in Pennsylvania.[6] The following figures indicate the progress since then: in 1941, only 8 percent of the industries in Pennsylvania treated their wastes before discharging them into the rivers. By 1961, 71 percent did, and today virtually all treat their wastes either at their own facilities or at municipal plants.[7] Of course, to say that some treatment is given to these waters is not to say that it is adequate.

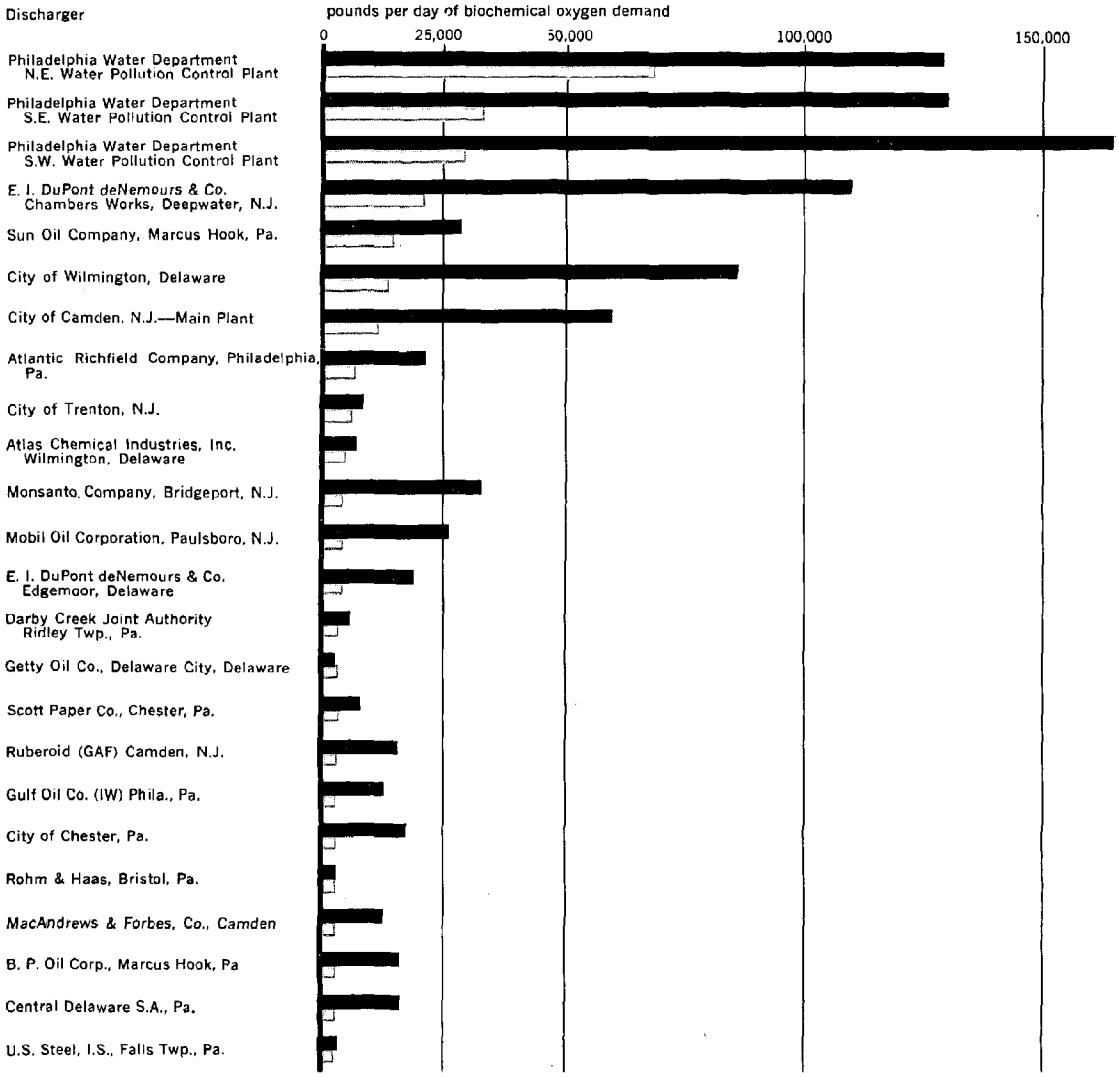
A key factor in the cleanup of industrial pollution was the realization that many industrial wastes could be handled in the same manner as sewage. The basic technology was there, and it allowed many industrial plants to connect to existing and new municipal sewage systems. In Pennsylvania, thousands of manufacturing plants discharge to municipal facilities.[8]

For both municipal and industrial water pollution, 1967 was a critical year. It was then that the new Delaware River Basin Commission (DRBC) adopted enforceable water quality standards. The Commission required an overall 88 percent reduction in BOD for municipal and industrial wastes discharged anywhere in the estuary. Separate standards were set for the tributaries and for the upper portions of the river.

DRBC's regulations to achieve these standards invoked a novel approach. The conventional practice was to assign a uniform level of treatment for major discharges on a river. Instead, DRBC regulations specified the maximum allowable wasteload in pounds of BOD for each of more than 90 major dischargers, with a 10 percent reserve to accommodate new facilities. (See figure 3.) Compliance schedules to reduce discharges were established by DRBC. Most called for upgraded treatment by 1973 and full compliance by 1975. The exception was the Philadelphia municipal sewage system—the

Figure 3

Wasteload Allocations for 24 Facilities Discharging Oxygen Demanding Wastes into the Delaware River



Source: Delaware River Basin Commission, Trenton, N.J.

Actual Discharge at time of Allocation (usually 1968)

DRBC Allocation—to be achieved in 1972–1974 in most cases, 1975–1977 in the case of Philadelphia

[1] There are more than 90 dischargers into the estuary, each with a wasteload allocation. This chart covers the 24 dischargers with allocations of 2,500 pounds per day or more. Together, they account for more than 76% of the total allocation of 322,000 pounds per day.

estuary's biggest discharger—which is scheduled to complete its major new facilities between 1975 and 1977.

The DRBC standards and compliance schedules are generally consistent with Federal law, specifically the Federal Water Pollution Control Act Amendments of 1972, which require that municipal plants provide "secondary" treatment (85 percent BOD removal) and industrial plants install "best practicable control technology currently available" by 1977.[9]

By September 1973, 62 dischargers had completed or were on schedule in constructing the required treatment facilities.[10] Thirty-six were behind schedule due to litigation, to reliance on proposed new regional facilities, or to lack of funds. Nevertheless, the DRBC estimates that all major dischargers, including Philadelphia, will be in compliance by 1977.

Success in water pollution treatment is creating another environmental problem—disposal of the sludge that results from better treatment systems. Until recently, Philadelphia and Camden barged their treated sludge to a dump site in the middle of the Delaware Bay. But in 1972, following disclosure of damage to marine life at this and similar sites, the Congress passed legislation to regulate ocean dumping.[11] As a result, Philadelphia and Camden are now required to dump their sludge 50 miles offshore and to explore other alternatives. Some are potentially beneficial. As Chicago has done in downstate Fulton County, Philadelphia could use its sludge for surface reclamation of Pennsylvania's vast strip-mined lands.

An additional remaining problem is pollution from surface runoff in both urban and rural areas. The cities along the Delaware have typical combined sewer systems into which storm waters as well as household and industrial wastes flow. During heavy rains the flow exceeds treatment capacity and a mixture of raw sewage and street debris flows directly into the river.

These untreated wastes seriously affect water quality. A recent analysis prepared for the Council on Environmental Quality suggests that in summer, storm-related discharges into the Delaware can reduce dissolved oxygen by about 2 parts per million over a 6-day period; 2 to 6 days is required for the river to recover its previous oxygen concentrations.[12] During summer both the river flow and its dissolved oxygen concentration are low, in the neighborhood of 5 parts per million. When summer storms occur, the sudden oxygen sag of 2 parts per million can kill fish, most of which need a minimum daily average of at least 3.5 parts per million dissolved oxygen to survive.

Urban runoff also contains toxic wastes that have accumulated on the streets—lead residue from the combustion of gasoline, zinc from tires, mercury from air pollution fallout, and other sources. There is considerable uncertainty about the environmental effects of these toxic substances, but their buildup in rivers cannot be ignored.

Some cities have sought to deal with urban runoff by constructing separate storm sewers. In existing cities this approach is very costly and extremely disruptive and the benefits limited. Although separate sewers prevent the treatment plant from being inundated by storm water runoff, they still result in direct discharge of street debris into the receiving waters. Attention has recently focused on "hold-and-treat" approaches, systems to hold the "first flush" of storm runoff (0.5 to 1.0 inch of precipitation), where most of the pollutants are concentrated. Runoff may be held in special reservoirs or within the sewer system for treatment after the storm.

In areas of agriculture or suburban development, rains sweep soil, animal wastes, and fertilizer into streams, creating turbid and nutrient-rich waters, which increase the silting of channels and support growth of nuisance algae.

Pollution from runoff is generally classified as coming from "nonpoint sources." It is obviously more difficult to address than pollution which can be collected from "point sources" and treated. For this reason, nonpoint sources

have received less attention from regulatory agencies than point sources. Under the Federal Water Pollution Control Act Amendments of 1972, rural and urban runoff are to be accounted for in State and regional water quality management plans.[13] As point source pollution is eliminated, attention will undoubtedly focus increasingly on these nonpoint sources.

The river as a sewer seems to be doing better. Although water quality in the estuary is still far from satisfactory, progress is being made to bring municipal and industrial sources into full compliance with water quality standards. But many problems remain—including sewage treatment plant overflows from storm water, urban runoff with its toxic components, and sedimentation and excess nutrients from farms and suburban development. To the extent that pollution can be abated by regulating point sources, the legal and administrative machinery now exists. But to the extent that pollution derives from nonpoint sources, including runoff, erosion, and sedimentation, the effort is just beginning.

The River as Water Supply

The streams and ground waters of the Delaware Basin have long been taken for granted as an inexhaustible source of water for drinking, household uses, commerce, and industry. During the colonial period, wells and water courses were freely used without treatment. Later, as industry and cities began to grow, the ground water became saturated with wastes and wells became unsafe in some areas; in the 1790's over one-third of Philadelphia's population fled the city when disease resulted from well contamination and killed thousands.[14]

As a result, Philadelphia and other cities built waterworks which drew water directly from the river. But as pollution increased with industrialization in the 19th century, even the vast river could not assimilate the wastes, and by 1900 plans were laid for the first sewage treatment plants.

Despite these increasing problems with the quality of the water supply, the waters of the Delaware were still considered so plentiful that in 1931 the Supreme Court allowed New York City to take water from the Delaware Basin for its own use.[15] New industries and powerplants continued to withdraw their supplies, and the growth of suburbia substantially increased the volume of water used by the average household. Communities continued to draw water from the ground while the larger cities expanded their intakes from the Delaware as well as the Schuylkill, the Brandywine, and other tributaries in the basin.

Then in the 1960's, drought hit the Northeast, and the wasteful practices had to be paid for. The drought in the Delaware Basin was aggravated by withdrawals for New York City, which had been guaranteed part of its water supply from the Delaware by the Supreme Court in 1954.[16] As water shortages intensified during 1964 and 1965, New York found its reservoirs running dry. In June 1965, the city refused to release any water downstream from its three impoundments in the Delaware Basin. Flow in the drought-depleted river immediately dropped sharply below the level that New York was required to maintain under the 1954 decree.

As a result of the low flow, Philadelphia's water intake was threatened by salt water advancing up the Delaware estuary. This rise in salinity had implications as well for ground water supplies in coastal regions and for fisheries in the bay. Because the reduced river flow in effect drained aquifers, the danger was that salt water from the bay would infiltrate the ground water system which supplies drinking water to New Jersey and Delaware towns along the bay.

Faced with these consequences from New York's diversion of Delaware water, the Delaware River Basin Commission declared a water supply emergency in July 1965.[17] New York

was ordered to release water from its reservoirs, restoring flow, although not to levels set by the Supreme Court in 1954. Further difficulty was relieved by March 1967 when rains again began to fill reservoirs in the Delaware Basin. Since then there have been no comparable shortages.

So long as ample rains fall, the New York-Philadelphia competition for Delaware water appears under control for the near term. Some benefits in water conservation will derive from installation of water meters in New York City, which surprisingly enough have never been installed on a large scale; Philadelphia did so 20 years ago. New York's excess water use is estimated at over one-half of the water supplied the city by all Delaware reservoirs.[18] Meters with charges based on consumption should reduce the wastage. In addition, New York now looks to the Hudson River as the logical source of additional water, and the Delaware River diversion is not expected to be altered from the 1954 Supreme Court decree.

Problems nevertheless remain. There is question of the continued purity of the ground water in some parts of the basin. Widespread use of septic tanks and cesspools in developing vacation home areas such as the Poconos, where soils are thin and water tables high, often precludes the assimilation of wastes into the surface soils. The resulting polluted ground waters not only endanger local water supply but drain into streams, adding to the overall pollution load in the drainage system.

The implications of ground water pollution and New York City diversion grew more significant in view of the projected demand for water from the basin.[19] Urban domestic water withdrawals were expected to double and powerplant cooling needs to increase sevenfold. This would have accounted for over one-half the withdrawals in the basin. These figures are likely to be revised downward in view of current population growth rates and greater efforts at energy conservation.

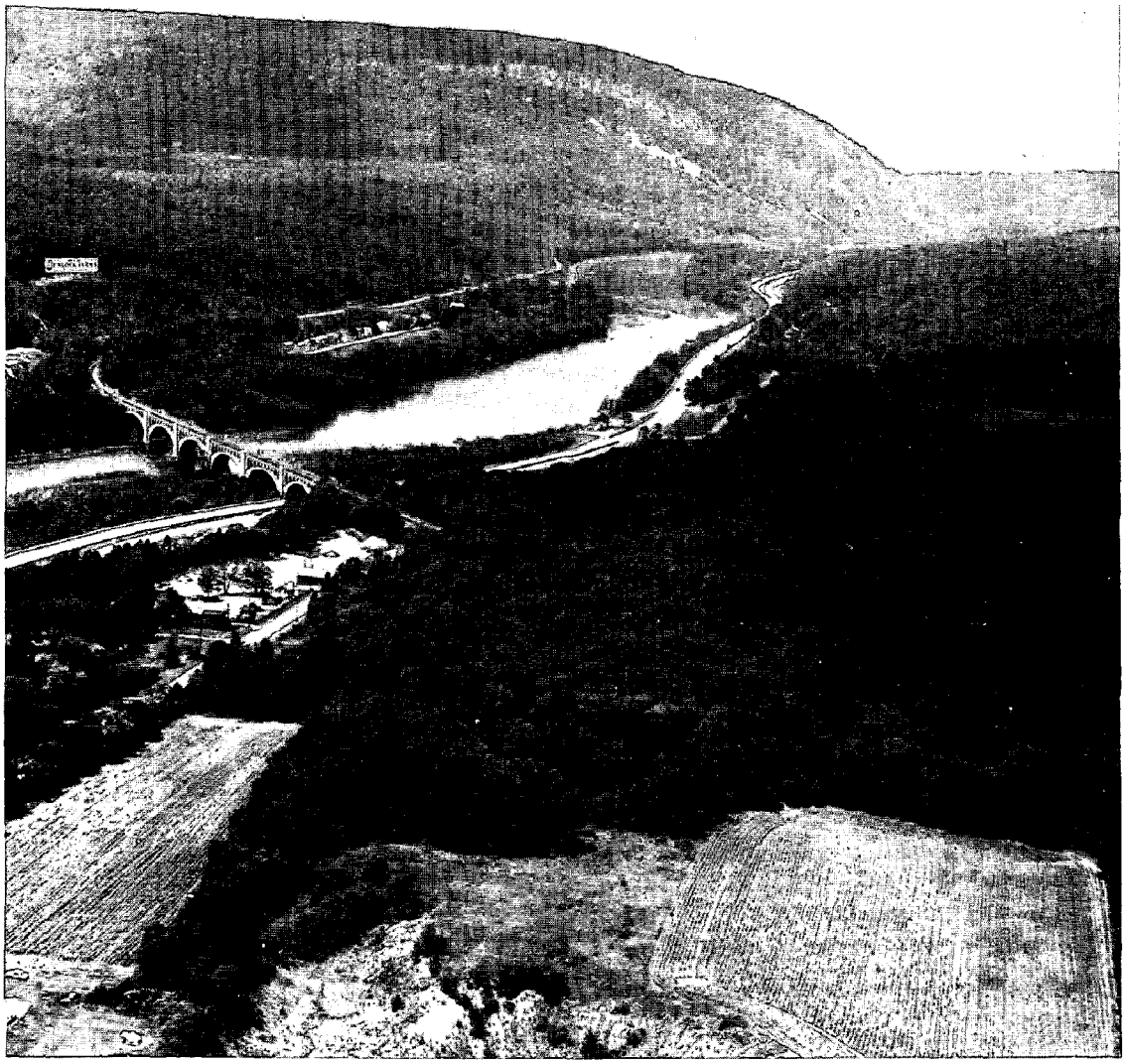
The demand for water poses a dilemma for those seeking to manage the river as a resource. A startling number of powerplants already dot the area. Their use of water for once-through condenser cooling raises the water temperature, destroying aquatic organisms and disrupting the ecological balance of the waters.

On the other hand, water recirculation increases water consumption through evaporation, thus reducing the river's flow. The result is a Hobson's choice between thermal pollution and low flow.

Overall, the volume of water taken from the river but not returned in any form is expected to double between 1970 and 2020, given present rates of population and industrial growth.[20] Users of water within the basin consume about 10 percent of the water that they withdraw and return 90 percent to the river and its ground waters.[21] None of the water withdrawn for New York City, of course, is returned to the basin.

Reservoirs also cause increased evaporation and lower water flows. Perhaps the most controversial reservoir proposed in the country in recent years is the Tocks Island Reservoir in the upper Delaware. Authorized by the Congress in 1962, the project would dam the Delaware just above the Water Gap, forming a lake of over 12,000 acres and extending 37 miles upstream. A National Recreation Area of 60,000 acres would surround the reservoir. The U.S. Army Corps of Engineers, chief sponsor of the project, has estimated that the reservoir could satisfy 50 percent of the flood control and 35 percent of the water supply demands in the basin.[22]

As with most statistics, many of the assumptions on which they are based may be questioned. Proponents claim that the project's flood control aspects will do much to protect human life and property downstream; opponents counter that the dam is not designed to control the most severe floods and that the damage of flood losses is diminishing as regulatory programs remove many uses from the flood plain downstream and prevent new ones. Proponents claim that the reservoir will guarantee a water supply for the cities of the basin. Op-



The controversial Tocks Island Dam Proposal would create a huge reservoir on the upper Delaware near the Delaware Water Gap. A new recreation area would be established, but opponents claim that fluctuating water levels and eutrophication will make the reservoir of less value for recreation than a free-flowing stream. Others are concerned about development impacts that would result from the project.

ponents say that 10 years without drought raises doubts about the net benefits of water storage on this scale and that problems of water quality and evaporation from the reservoir will further reduce benefits. Proponents claim that the recreation facilities at the reservoir will be used by millions of visitors yearly, including many lower-income families from New York, Philadelphia, and other cities. Opponents claim that water quality in the reservoir and large fluctuations in the water level will make it unsuitable for recreation and that equally beneficial recreation facilities can be built along a free-flowing river. Proponents cite the reservoir as a potential source of electric power. But opponents argue that the hydroelectric power potential is negligible because of the low natural flow of the river.

In addition, opponents raise two other important issues related to land use and water quality. Many fear the adverse effects of development induced by the existence of the reservoir and its recreational opportunities. They see a proliferation of seasonal home subdivisions and lot sales in an area already under severe development pressure, especially in the nearby Pocono Mountains. Most of this would occur in rural areas where little effort has yet been made to regulate land use or to assert controls over subdivisions.

The other problem relates to eutrophication. When uncontrolled runoff from poultry farms and fertilized fields upstream is added to septic tank seepage and inadequately treated sewage from towns and developments along the river, the reservoir could become filled with weeds and algal growth within a few years after the dam is completed. The Corps of Engineers identified eutrophication as a major unsolved problem in its final environmental impact statement on the project.[23]

At the request of the Council on Environmental Quality, construction of the Tocks Island Dam was delayed pending firm assurance that environmental safeguards would be operative by the time the reservoir is completed. The Council asked the Corps to wait until the Governors of Delaware, New York, New Jersey, and Pennsylvania give additional assurances that necessary waste treatment facilities and pollution enforcement mechanisms will be available before the reservoir is formed.

The Governors have not yet provided the requested assurances. New York said that it cannot afford to mitigate the effects of runoff from farms and other nutrient sources because the State stands to receive few direct benefits as a result. New Jersey has imposed more stringent environmental and financial conditions that must be met prior to approval of construction. As a result, the Congressional Appropriations Committees directed that appropriations for the project for fiscal years 1973 and 1974 be used only for land acquisition and that a thorough study of the project be undertaken. For fiscal year 1975, the Congress appropriated $1.5 million for a 1-year comprehensive study of the Tocks Island Dam project and alternatives. A Plan of Study and Detailed Scope of Work were then prepared by the Corps of Engineers and revised several times as a result of comments by CEQ, other Federal and state agencies, and the public.

In December 1974 the Corps let a contract for the study to a private consulting firm which is expected to complete the study by August 1975. After that, the states and the Corps of Engineers will recommend to the Congress whether to proceed with the present project, modify it, or rescind authorization.

The River as Fishing Ground

The abundance of sturgeon, shad, and other fish in the Delaware led to the establishment of extensive commercial fisheries in the 19th century. "By the mid-1820's," noted one report, "fish from the Delaware Basin were being exported by wagon and boat not only to places like New York and Baltimore, but also to inter-

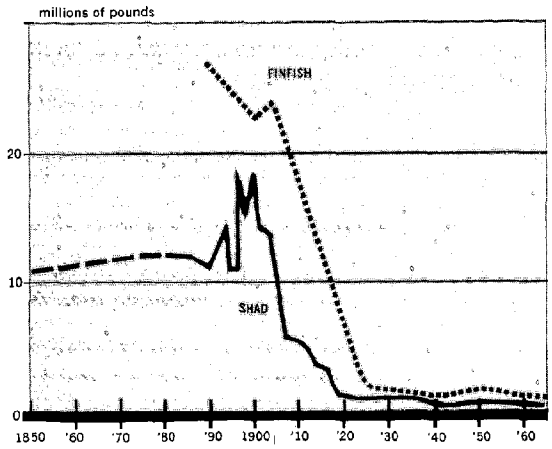
national markets as distant as China."[24] Shad fishermen became so numerous during the spring migrations that minor skirmishes erupted between those upstream and those downstream.

But the estuarine fisheries underwent a calamitous decline in the first two decades of this century. Oyster harvests dropped to one-fifth their former size. Annual finfish catches after 1930 were one-tenth or less the 1900 catch. Commercial shad fishing was virtually eliminated.[25] (See figure 4.) Although overfishing may have played a part, the major cause of the decline was the deteriorating water quality.

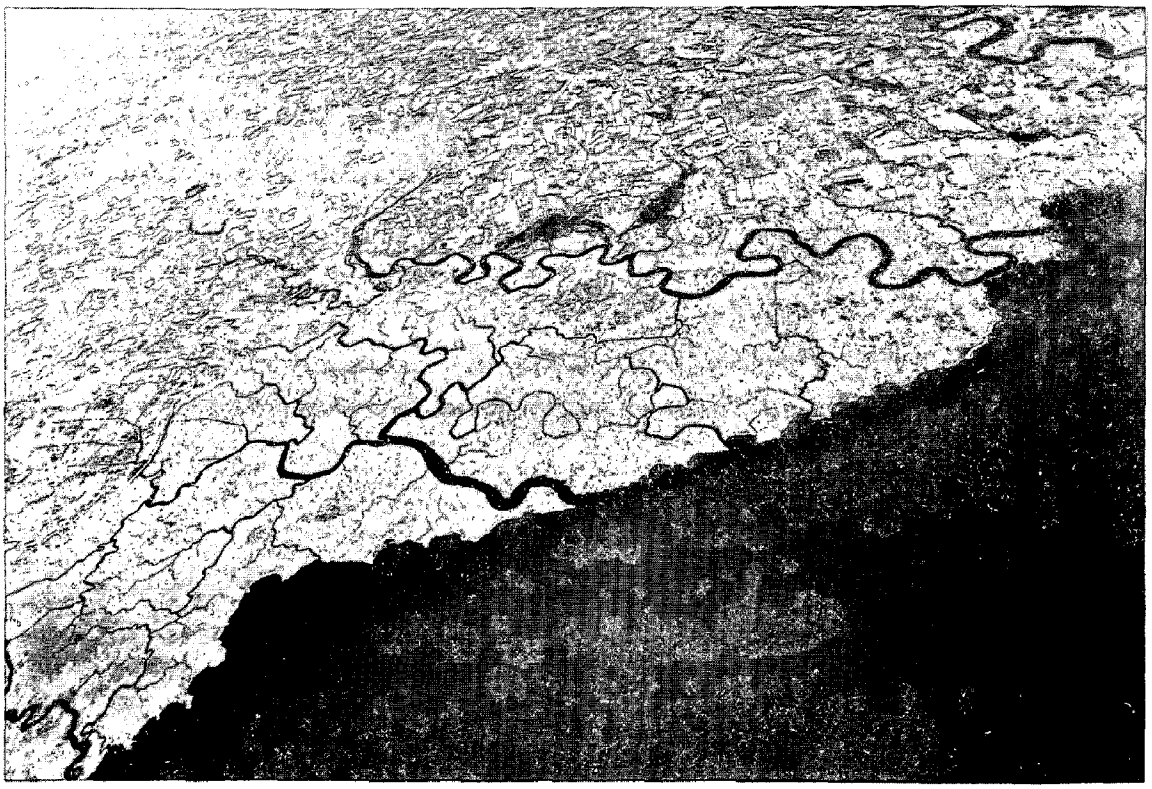
Estuarine waters are critical to fisheries, not only for those species which spend their lives there but for their role in the life cycles of many migratory ocean fish. It is estimated that 70 percent of marine fish depends on the estuary

Figure 4

Fish Catches in the Delaware River, 1850-1965



Source. U.S. Department of the Interior, Federal Water Pollution Control Administration, **Delaware Estuary Comprehensive Study** (July 1966), p. 50



The extensive wetlands along Delaware Bay serve as important spawning grounds and nurseries for many species of fish and shellfish and as major resting areas for migratory waterfowl.

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for a part of its life. Some species like the shad spawn in estuarine waters; others that spawn in the ocean depend on the estuaries for their food.

Pollution is not the sole cause of the drop-off in fishing in the Delaware. Dredging often disturbs spawning grounds and the organisms on which smaller fish feed; it also increases turbidity, which inhibits the growth of aquatic plants and interferes with feeding. Sedimentation from land runoff further disturbs spawning grounds.

Recent developments, however, could gradually lead to revival of the commercial fisheries in the bay. There has been a general effort to improve water quality in the estuary through better pollution controls and to assist the oyster industry by reseeding oyster beds in the aftermath of a crippling epidemic of an oyster parasite known as MSX during the late 1950's. Two of the best shad runs in years occurred in 1971 and 1972, and a 10 percent increase in the oyster harvest is forecast for 1974.[26] But there is yet no significant return to finfiishing on a commercial scale. Furthermore, as outlined in chapter VII, dredging to accommodate larger oil tankers could precipitate a new decline in the catch.

The River as Recreation

Much of the wildness of the Delaware was first replaced by a more pastoral beauty as the population grew and the land was cultivated. In the cities, where first commerce and then industry were paramount, wharves, warehouses, and small craft shops gradually preempted the waterfronts. Outside the cities, both river and

Much of the present recreation use of the river is located in its northern reaches, where the Delaware is a fast-running stream through rural areas.

bay continued to serve recreational and aesthetic needs throughout the 18th and 19th centuries. Fishing was popular and rewarding. Resorts and beaches on the river and the upper bay drew people by railroad and riverboat from Philadelphia and Wilmington.

As the Industrial Revolution accelerated, however, factories, refineries, and railroad yards blocked direct access to the water and made the waterfronts unattractive. Air and water pollution further degraded the scene. People stopped thinking of the river as a thing of beauty. It is a paradox that industry, which provided income and leisure to the residents of the cities along the Delaware, at the same time robbed them of the physical and aesthetic pleasures of the river.

Today the lower Delaware is little used for recreation despite its ready access to millions. Only 400 acres of park borders the 86 miles of river above the bay, and until recent times many cities along the river have been unable to preserve the few bits of public waterfront park that they did have. Just a few years ago New Jersey rebuilt Route 29 along the banks of the Delaware at Trenton, in the process decimating a lovely park designed by the Nation's most distinguished landscape architect, Frederick Law Olmstead.

Not all the signs are negative. For one thing, areas of the river above Trenton and of the bay below Wilmington are finding increasing use for recreation. Even in the cities new attitudes have arisen. The Schuylkill River in Philadelphia has again become an attractive boating area with the worst of its pollution abated. And the city's proposed Penn's Landing Development along the Delaware suggests possibilities for imaginative aesthetic and recreational use of the river. As water quality improves, the advantages of attractive riverfront parks may become more apparent. But recovery of the urban waterfronts for parks and people depends more on land use decisions than on water pollution abatement, for to enjoy the waterfront, people must have access to it, and much of the land on the river's edge is still owned by industries and railroads.

The recreation demand so long unmet in the cities along the Delaware has emerged upstream. Here recreation issues are also related to land use decisions, but the problems are different. The goal is to provide opportunities for recreation without overrunning the area with poorly designed and located development.

From just above Trenton to the Delaware Water Gap, Pennsylvania and New Jersey have created an impressive series of State parks that draw visitors on day trips. The Delaware Canal, with its old towpath and locks, is particularly lovely in the fall, and historic country inns are found along both banks. On many weekends, however, the traffic is heavy, and charming riverside towns like New Hope, Pa., experience traffic jams as frustrating as Philadelphia's.

Above the Delaware Water Gap, a major national recreation area has been created. Still pending is the 37-mile-long reservoir behind the proposed dam to be constructed at Tocks Island. Much of the controversy surrounding this project relates to the value of the reservoir as a recreation facility, given the likely fluctuations in water level and the degree of eutrophication that will occur. There is concern about uncontrolled, poor-quality commercial development that will accompany the influx of visitors. An estimated 4 million tourists are expected to visit the recreation area annually if the reservoir is built.[27] Although the number would be somewhat lower if the river were left freeflowing, the recreation area is designed to be usable regardless of the eventual decision on the dam.

The uppermost part of the Delaware from Madamoris, Pa., to Hancock, N.Y., is a striking contrast to the lower parts. It is already a major canoeing and fishing area visited by outdoorsmen from the entire Northeast. A Federal task force has recommended that before the pressures of second home development destroy its wilderness, this stretch be preserved in its

natural state under the National Wild and Scenic Rivers System.

The River as Flood Threat

As the Delaware Valley developed into a major population center, more and more settlement took place in the flood plains. Warehouses and shops were located near the major docks; roads and railroads were sited along the rivers, attracting settlement; and homebuilders, forgetful of the last flood or hopeful that another would not occur, built residences in flood plain locations that were inherently unsafe. As land became more scarce and its price rose, the incentive to ignore the hazards of the floods increased.

The consequences became clear in 1955, when two back-to-back hurricanes pounded the region. When the floodwaters finally receded, 99 people were dead and $150 million in damages was sustained in the basin.[28] Most damage occurred on the tributaries, particularly in the Lehigh and Schuylkill basins in Pennsylvania.

Response to the flood was the traditional cure-all—structural protection—rather than a thoughtful reexamination of policies that encouraged and permitted location of structures in the flood plains. The Army Corps of Engineers proposed construction of 19 multipurpose dams in the basin by the year 2010. It was claimed that they would provide water supply, recreation, and flood protection. Only eight of these projects were authorized, and only one, at Beltsville, was built. It cost $22 million, more than 45 percent above the original estimate.[29] Three of the remaining seven projects are now in various stages of planning, including Tocks Island. In addition, 39 small watershed projects are proposed in the upper reaches of the Delaware River tributaries. Most need to be reexamined in light of emerging land use policies and other nonstructural alternatives to construction.

Development patterns in the basin since 1955 have both increased and decreased the potential for flood damage. Along the Delaware itself, the risks have decreased. In cities such as Burlington and Trenton, where much flood damage occurred in 1955, industries have relocated away from the river. Urban redevelopment has created some open space along the banks, and buildings have been floodproofed.

However, in the watersheds of tributaries that pass through suburban areas, the threat of flooding has probably increased. Not only have the hazards of flood plain location been ignored for the most part, but the reduced absorption capacity due to removal of natural cover and to the increase of impermeable surfaces like asphalt and concrete has increased runoff, erosion, and sedimentation. As a result, many of the old stream beds have been converted to what are in effect open storm sewers subject to flash flooding.

The standard solution for such problems is to build dams and other flood prevention structures. But dams do more than simply protect existing occupants—the impounded water and "protected" flood plains often act as a magnet for further development, which in time creates the risks of even more significant flood damage and results in a call for more dams and protective structures.

The public has begun to realize the advantages of nonstructural solutions that rely on measures to restrict development in flood plains and that are often cost-effective compared with structural measures. Restricting development accepts the natural functions of a flood plain and uses it as open space, for wildlife habitat, or for agriculture, all of which can tolerate and in some cases even benefit from occasional flooding.

But people are not easily dissuaded from the attractions of flood plain development. Efforts by State and local governments in the Delaware River Basin to control new development in flood plains have brought mixed results.

After years of prodding, Bucks County has persuaded all but one of its townships and

boroughs to join the voluntary program of countywide flood plain zoning. But Bucks is the exception. The vast majority of local governments in Pennsylvania do not yet have flood plain regulations, and the Commonwealth has not acted on proposed legislation.

New Jersey, by contrast, enacted an important new law in 1972 that gives the State a major regulatory role over development in the flood plain.[30] It authorizes direct State control over development in the "flood way" of all streams and rivers and requires local governments to follow State criteria and standards to regulate development in the adjoining "flood hazard" zone. Extensive mapping is needed to identify the floodway and flood hazard boundaries for each river and stream, but the State has recognized the inevitability of floods and the viability of nonstructural alternatives to flood control dams.

Further support for this trend comes from the Flood Disaster Protection Act of 1973.[31] Under the law, Federal flood disaster relief will be made available only to those agreeing to insure their properties located in flood plains under the program. In order to participate in the program, communities must adopt adequate land use controls over flood hazard areas, including prohibited construction and required floodproofing. Assistance from Federal programs or federally insured lending institutions for structures to be located in the flood plain is contingent on community participation. The Corps of Engineers and the Geological Survey are assisting the Department of Housing and Urban Development in carrying out the program by mapping all flood hazard areas.

Institutional Responses

The first attempts to regulate water quality in the Delaware by State law were made as early as 1899 in New Jersey and 1905 in Pennsylvania.[32] Once the need to clean up the Delaware was recognized, a host of policy questions arose—how much treatment was needed, who should pay for it, and who should make the decisions. The answers were complex because many jurisdictions were involved and because the wastes of one community or industry lowered water quality of others downstream.

By the 1920's, the need for regional water management became evident, but it took an outside threat to get action. New York City's sudden bid in 1929 to build reservoirs on the upper Delaware was a major stimulus to the founding of the Interstate Commission on the Delaware River Basin, an advisory body.[33] INCODEL stimulated further State efforts to clean up the river, but it had no power of its own, and the States were slow to act.

After the massive pollution problems of the 1940's and the floods of the 1950's, the States finally moved to establish an interstate regulatory body with enforcement powers. The Delaware River Basin Compact of 1961 set up the Delaware River Basin Commission. By act of Congress, the States of Delaware, New Jersey, New York, and Pennsylvania and the Federal Government empowered the DRBC to establish a comprehensive plan for the development and conservation of the basin's water resources.[34]

One of the major achievements of the DRBC has been to establish water quality standards for the Delaware and its tributaries and to fix maximum discharges of pollutants for all major point sources so that these standards can be achieved. These actions were based on what has been described as a "path-breaking scientific analysis" of estuarine water pollution,[35] the *Delaware Estuary Comprehensive Study*.[36]

The study was conducted by the Public Health Service and the Department of the Interior (the agencies which then administered the Federal water quality program). It used a mathematical model which defined the relationship between pollution discharges and water quality for each segment of the estuary from Trenton to the bay. The model was concerned primarily with dissolved oxygen.

This model was the first major effort to simulate mathematically the interactions between pollutants and water quality. Tidal effects in the estuary presented a particularly difficult challenge. The model has been vigorously criticized, initially from dischargers and subsequently because of advances in modeling techniques. Whatever its failings, the study is recognized as a great achievement for its time—a milestone in defining the relationship between water quality and discharges of pollutants.

The Delaware River Basin Commission still shares responsibilities for water quality control with the State and the Federal Government. Some of the remaining institutional problems are well described in a recent report of a study commission of the New Jersey Legislature.[37] They include diffusion of efforts, ambiguity of goals, and overlapping responsibilities; misallocation of resources within an agency to overemphasize the review of engineering plans at the expense of monitoring; and failure by the State to follow through on administrative enforcement orders to define and enforce requirements for regional waste treatment.

The Federal Water Pollution Control Amendments of 1972 sought to resolve many of these problems, primarily by assigning more authority to the Federal Government. In the Delaware River Basin, as throughout the Nation, this new national water quality program requires many levels of government to blend their resources and harmonize their individual interests and outlooks in the common pursuit of improved water quality for the region. Although this goal is laudatory, its feasibility remains a question.

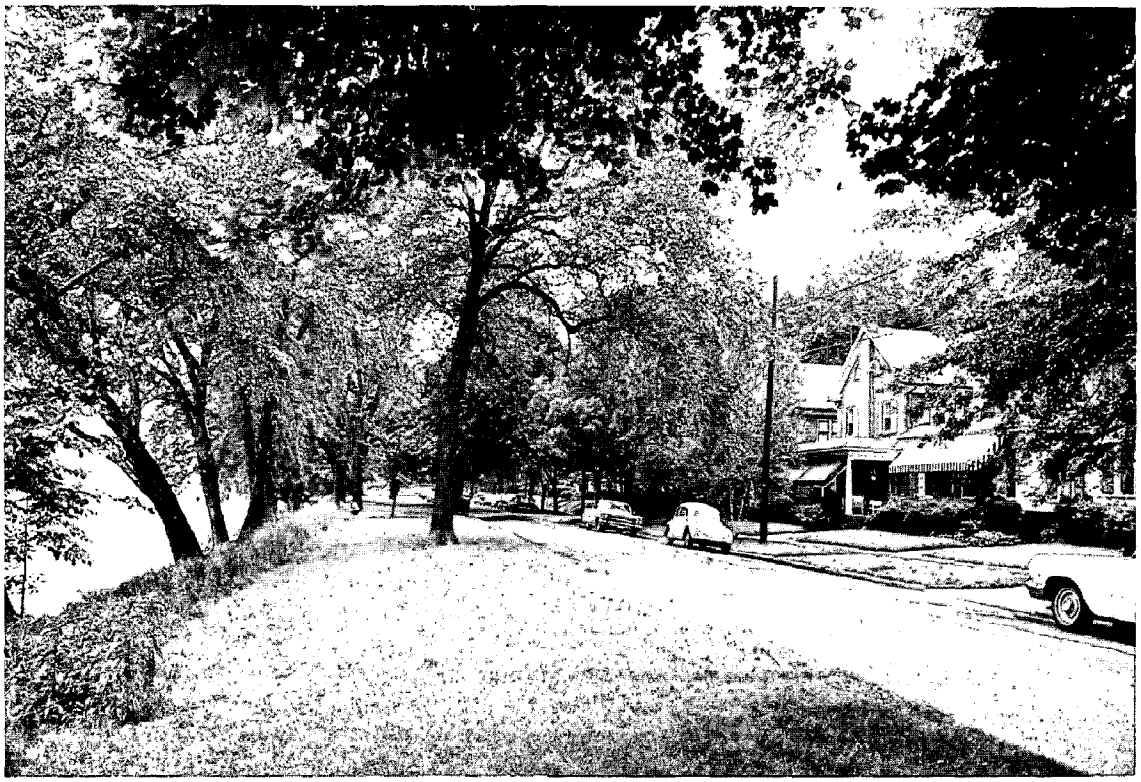
The River and the Land

Throughout the discussion of the river's many uses is a common thread—the close relationship of many water quality and water use issues to decisions respecting use of the land in the river basin. It is impossible to separate the solutions to the problems of pollution and depletion of the river from the reforms in land use planning and regulation that are being discussed throughout the region.

How and where to locate new petroleum refining capacity and related industries, a clear land use issue, will determine in large part the changes that may occur in the use of the Delaware as a waterway and as a fishing ground. Now that timetables have been established to reduce pollution from sewage treatment plants and industries along the river, the big water quality problem remaining is how to handle runoff. Although cities contribute heavy metals and farms contribute nutrients through runoff, the problem is also one of controlling land use in new suburban areas to prevent excessive sedimentation of streams.

Land use issues are also important to continued use of the river as a water supply. Land use policies related to the location of new powerplants and to the degree of controls on sewage disposal from development already underway in the Poconos will be important determinants of both the quantity and quality of the region's future water supply. Recreational use of the river, particularly in the cities, is tied to public access and to removal of conflicting uses and blighting influences from the waterfront, both land use issues. Further, the public is beginning to realize that flood protection is basically a land use issue, and the solution is not costly protection works but the removal and prevention of uses that conflict with the natural purposes of flood plains.

Often these issues of land use and water use become enmeshed in local debate over "no-growth policies" or in dire predictions of economic decay to be brought on by public control over previously unrestrained private activity. But these debates seldom lead anywhere. The fact is that the Delaware River Basin is likely to continue to grow in economic activity and in population. The important issues are related to



Many of the water use and water quality problems of the Delaware are related to how the land along the river and its tributaries is used.

how this growth and change are to be accommodated given the limits on land and water resources which are now recognized. No doubt some limits will need to be set on water use and related land use. The challenge is to make the ground rules fair enough to withstand legal challenge and command public support while assuring that they are tough enough to establish the necesary allocations, accommodations, and limits.

Chapter III
The Air—Progress in Philadelphia

The Delaware Basin, and especially Philadelphia, became a center for many major air polluting industries almost from the first years of the Industrial Revolution. Foundries, smelters, glassworks, stone and clay industries, slaughterhouses and rendering plants brought prosperity and growth, but their expansion of the economy and their degradation of the air proceeded hand in hand. Advertisements of the time brought the point home by associating the clouds of smoke over factories with sound and reliable products. The enthusiasm for industrial growth far overshadowed the occasional complaints of odor or smoke. The story of how all that changed and how public attitudes and laws made air quality a major social and environmental goal is told in this chapter. It focuses on Philadelphia because it was there that the greatest insults were committed, and it is there that great progress toward abatement of air pollution has been made.

Philadelphia now enjoys one of the most effective air pollution control programs in the Nation. But not until this century did efforts to clean up the air begin, and the first steps were quite limited. The city did not enact a smoke control ordinance until 1904, several years after other major U.S. cities.[1] Continued industrial growth soon overwhelmed the control achieved under that law.

Philadelphia's air quality reached its worst between the 1930's and early 1950's when increasing numbers of automobiles contributed to the pollution and coal was still the region's major industrial fuel.

Ironically, it was this new source of pollution, the automobile, which indirectly stimulated public support for tougher controls over all sources of air pollution. By the mid-20th century the automobile had enabled the middle class to live in the suburbs, away from the pollution of downtown and the factory districts. This separation of home and job—and the contrast between clean air and pollution—made the latter more noticeable and led the public to press for more effective controls.

In 1948 Philadelphia broadened its focus from smoke control to overall air pollution control.[2] A sophisticated Air Pollution Code,[3] passed in 1954 and supplemented with strict regulations, replaced the clumsy law of nuisance relied upon during the 19th century.[4] In 1969, legislative authority was further improved with the adoption by the City Council of the Air Management Code,[5] granting broad powers to the Air Pollution Control Board to regulate air contaminants. The new code requires licenses and permits for stationary sources of air pollution, provides for tests and inspections of emissions, and grants broad enforcement powers that include abatement orders, fines, and court injunctions.

The air of Philadelphia has changed color in recent years. The black from particulates and the blue-gray haze from sulfur oxides have given way to a yellow-brown hue from automotive emissions. This color shift illustrates both the success and the failure of Philadelphia's air pollution program. The reduction in pollution from coal- and oil-burning stationary sources—powerplants, incinerators, and factories—has

Philadelphia has a long history of trying to contend with serious problems of air pollution, first from industry and later from automobile exhausts. Much progress has been made in recent years.

been offset by increased pollution from automobiles.

A Word about Pollutants

It is important to understand a few basic facts about air pollution, including the major classes of pollutants:

- *Particulates* are solid or liquid particles produced during the combustion of fuel. Larger particulates are visible in soot and smoke; smaller ones can be seen only under an electron microscope. They can be removed from smoke before it is discharged into the air by filtering, washing, centrifugal separation, or electrostatic precipitation.
- *Sulfur oxides* (SO_x) are corrosive, poisonous gases produced from burning fuel (principally coal and oil) containing sulfur. Sulfur oxides are largely the product of powerplants and industries. They are normally reduced either by switching to low-sulfur fuels (typically those with less than 1 percent sulfur) or by scrubbing (removing) them from combustion gases.
- *Carbon monoxide* (CO), a colorless, odorless, poisonous gas, is produced by the incomplete burning of fuels used by both stationary sources (powerplants, other industries, etc.) and motor vehicles. Formation of carbon monoxide can be inhibited by supplying and mixing enough air to ensure complete combustion of the carbon in the fuel. It then forms carbon dioxide, a natural constituent of the atmosphere.
- *Hydrocarbons* (HC), like carbon monox-

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ide, represent unburned and therefore wasted fuel. Not toxic in themselves, they are important in forming photochemical smog. Motor vehicles are the largest single source of hydrocarbons.

- *Nitrogen oxides* (NO_x) result from burning fuel at very high temperatures in internal combustion engines and large electric power and industrial boilers. Nitrogen oxides from stationary sources may be controlled by careful adjustments of flame and stack gas temperatures. Controlling nitrogen oxides from automobiles is not so easy; in fact, their volume may rise as a result of reducing other automobile pollutants.
- *Photochemical oxidants* are a complex variety of pollutants formed in sunlight by nitrogen oxides combining with gaseous hydrocarbons. Together with particulates, these oxidants are catalysts for what is commonly known as smog.

Under the 1970 Amendments to the Clean Air Act, the Environmental Protection Agency has established primary and secondary national air quality standards for these widespread pollutants.[6] The law requires that states develop plans to achieve the standards. Primary standards are designed to protect public health by reducing the most hazardous pollution levels. The more stringent secondary standards are to protect aesthetics, vegetation, and materials.

Stationary Sources—The Early Offenders

The cleanup of Philadelphia's air has been achieved in large part by switching from coal to cleaner fuels. After World War II, some of the city's industry and home heating were converted from coal to the lower-cost natural and manufactured gas, which produced little or no sulfur oxides or particulates. Encouraged by stronger air pollution regulations and by economics, more industries later converted to low-sulfur oil. In 1969, the city limited the sulfur content of the most commonly used fuel oil to 1 percent after May 1970 and to 0.5 percent after October 1972.[7] It remains to be seen how current efforts to rely less on oil and more on coal nationwide will affect these results.

Also important in improving air quality was the phaseout of over 1,100 commercial and industrial incinerators.[8] Only 400 are reported still operating, 300 of which have adequate control equipment. The remaining 100, all with some controls, belong to the public school system and must clean up or shut down by 1975. City regulations forbid the construction of new incinerators for burning general refuse and waste.[9]

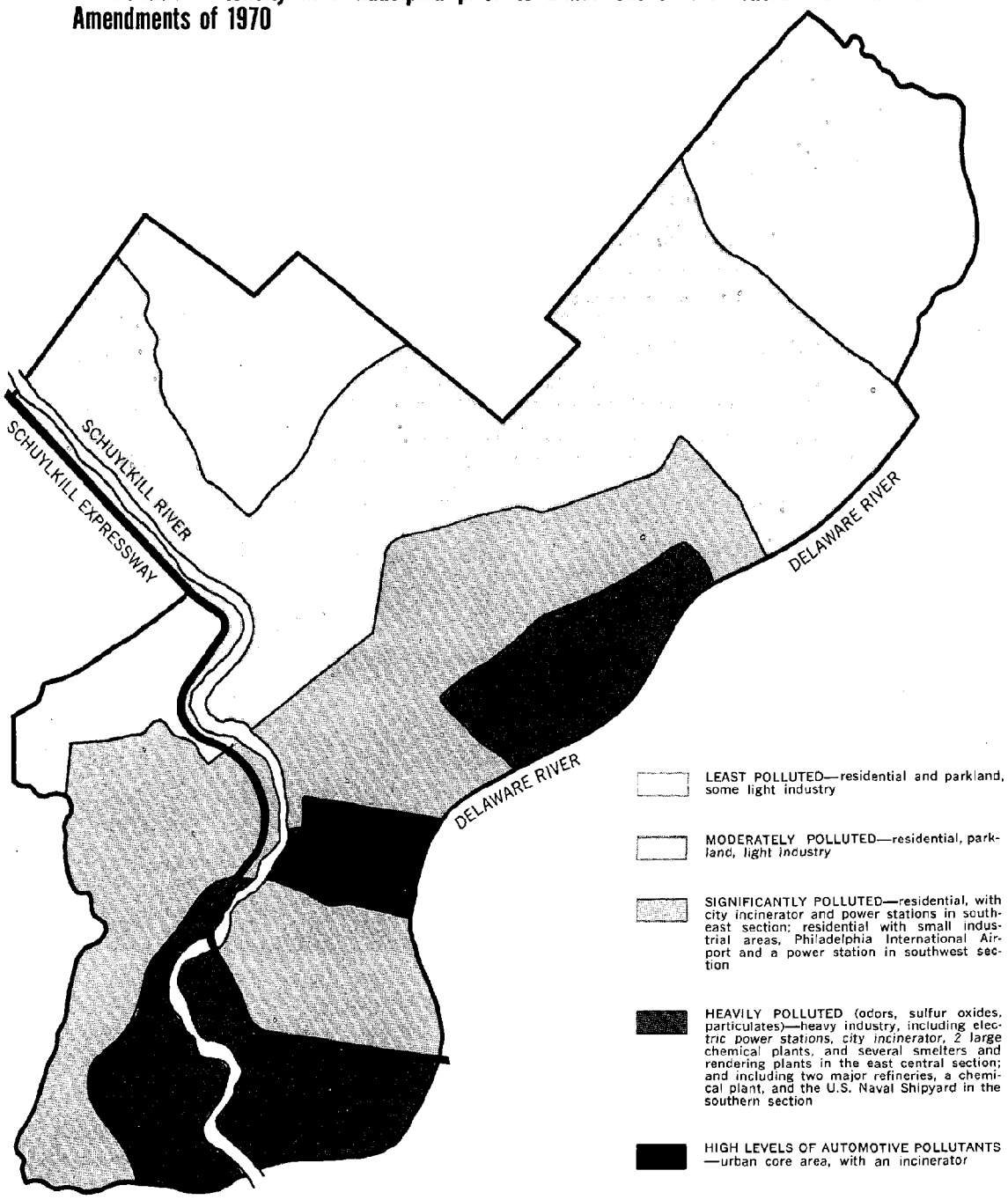
As a result of these steps, Philadelphia has recorded a continual decline in emissions of particulates and sulfur oxides, the major pollutants from stationary sources. City air pollution officials estimate that in 1973 Philadelphia was cleaner than is required by the EPA primary standard for sulfur dioxide and came close to the standard for particulates.[10]

To control air emissions from stationary sources, Philadelphia's Air Management Services has a large division that investigates citizen complaints, inspects emission sources, checks on compliance programs, and takes legal action in case of violation. Sixteen air pollution inspectors cover the city around the clock in radio-equipped cars. In 1970 alone, the division handled nearly 4,000 complaints, conducted over 12,000 investigations, ordered 2,745 corrections (of which 2,297 were made), and took 201 violators to court.[11]

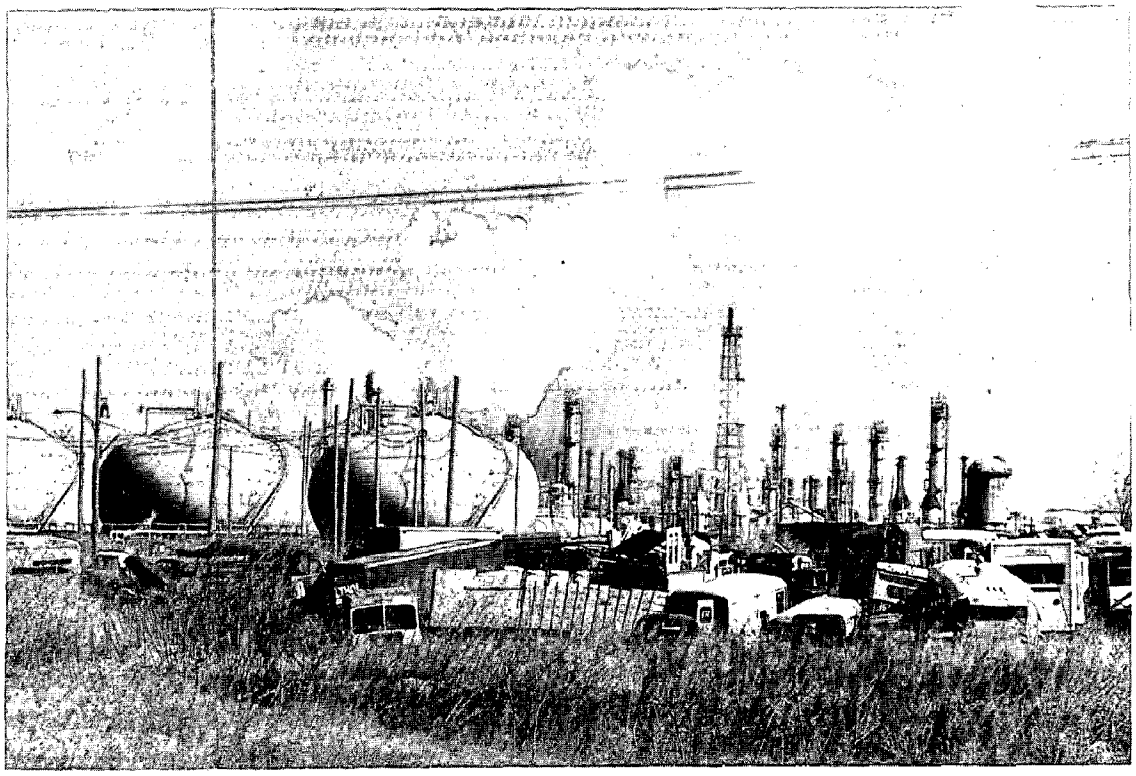
One of Philadelphia's remaining industrial air pollution problems is odors. Bad smells are offensive, yet often difficult to control. The city's worst offenders are chemical companies, refineries, and rendering plants. It is particularly difficult for chemical plants and refineries to control odors because of their intricate processes. With hundreds of miles of pipes, refineries find an occasional leak almost inevitable.

Figure 5

Air Pollution Intensity in Philadelphia prior to Enactment of the Federal Clean Air Act Amendments of 1970



Source: City of Philadelphia, Department of Public Health, **Ten-Year Plan for Air Management**, pp. 3-5, 14 (Sept. 8, 1970).



Although extensive programs to control stationary source pollution have been carried out in Philadelphia, the sheer size of the industry located there and the high proportion of refineries and chemical plants make the job difficult. Odors, for example, remain a serious problem.

Yet the smallest spill or leak can create strong odors. With respect to rendering plants, two of six in the city have now closed—one rather than install controls, the other condemned for a freeway. A significant remaining offender is the city's own Northeast Sewage Treatment Plant. An upgrading program will enclose the aeration tanks to control odors.

With emissions of particulates, sulfur oxides, hydrocarbons, and odors greatly reduced, Philadelphia's major stationary sources—chemical plants, incinerators, electric powerplants, and oil refineries—are no longer the primary source of air pollution. But Philadelphia's air is still worse than the national air quality standards for hydrocarbons and photochemical oxidants. The success of Philadelphia's air pollution program now hinges on reducing the emissions from motor vehicles.

Motor Vehicles—The Continuing Offenders

Like many other cities, Philadelphia is pervaded by fumes from congested traffic. Two methods to control these emissions are available: reducing the average emissions per mile from motor vehicles and reducing the number of miles traveled by the vehicle population. Both will be necessary if Philadelphia is to meet Federal air quality standards by 1976, as currently required by the Clean Air Act. Considerable controversy has been raised over proposals to reduce auto use in the city. To complicate matters, the Federal deadline coincides with the the Nation's bicentennial celebration, which will bring some 15 million additional visitors to the area of Independence Hall and other historic sites in the center of the city.

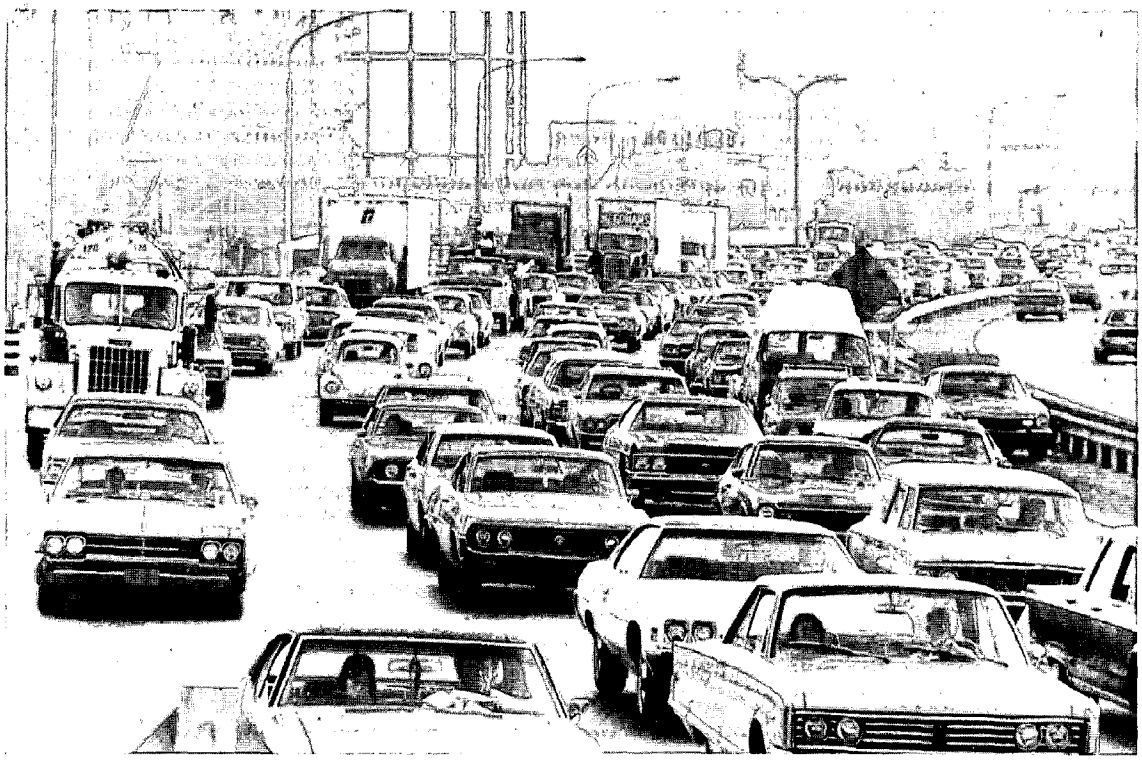
Limits of Emission Controls

The Clean Air Act of 1970 set a stiff target for reducing auto emissions—by 90 percent for carbon monoxide, hydrocarbons, and nitrogen oxides. Originally this reduction was to have been achieved by 1975 for carbon monoxide and hydrocarbons and by 1976 for nitrogen oxides. In 1973, largely because of the unavailability of adequate control technology, EPA granted the automakers a 1-year delay. As an outgrowth of the energy crisis, the Congress may extend the Clean Air Act deadline still further.

Over time, reduction in emissions from new cars alone could eliminate automotive air pollution. But automobiles manufactured before 1969 do not have any emission controls, and those on models for 1969 to 1974 are less than totally effective. Because the early vehicles will continue to be used for some time, cities might not achieve Federal air quality standards until the late 1980's or early 1990's unless they take special steps.[12]

An EPA study has determined that to meet the 1976 standard, the city must reduce CO emissions in the central business district by 55.5 percent from 1971 levels.[13] It is generally agreed that nearly three-quarters of the goal can be achieved by the progressive improvement in automotive emission controls. Thus the problem narrows. The search for ways to meet the remaining quarter of the goal centers on limiting emissions from older vehicles and on controlling auto transportation.

The question of transportation controls became a major political issue in Philadelphia during the summer of 1973. The previous April, Pennsylvania submitted its transportation plan for Philadelphia to EPA for review.[14] It called for improvements in mass transit and banning



Despite major efforts to maintain the already high levels of mass transit use by commuters, Philadelphia still has air pollution problems related to auto congestion, especially in downtown areas.

automobile use in some areas at some times if necessary. In addition, it proposed retrofitting older cars by requiring installation of pollution abatement devices.

In general, EPA reacted favorably to Philadelphia's plan. However, the state was asked to define more specific goals and promulgate the regulations to reduce automobile traffic downtown. EPA also recommended mandatory retrofit of older (pre-1968) automobiles, periodic testing of all vehicles for idle emissions, and establishment of exclusive bus lanes into the city to increase the speed and capacity of public transit.

The most significant EPA recommendation was for the state to require a 20 percent reduction in private automobile traffic in the center city. To achieve this, EPA suggested issuing a windshield sticker that would entitle a driver to enter the center business district only 4 days out of 5 without paying a penalty. To reinforce this vehicle strategy, EPA recommended that the state limit gasoline sales in the Philadelphia metropolitan region to the 1972 level.

The gasoline rationing and vehicle exclusion proposals brought a strong negative public reaction. At hearings on the transportation control plan, outspoken opposition to both proposals was expressed. This was reinforced by a large volume of unfavorable mail. Discussion ensued between the EPA regional office and the Mayor's Environmental Transportation Coordinating Committee. Philadelphia air pollution officials argued that the city could meet the deadline without resorting to measures as stringent as limiting gasoline sales or access to downtown. They said that the city's efforts to improve public transit, plus new policies on parking facilities, should suffice to encourage a leveling off or decrease in the use of private automobiles in the center city without putting the downtown at an economic disadvantage to other parts of the metropolitan area.

Faced with virtually unanimous opposition, the Environmental Protection Agency modified its suggestions. It dropped the proposed limit on gasoline sales and on auto access to the center city. Instead, EPA suggested that the State require permits for any new or expanded parking lot facility with a capacity of 50 or more cars. The permit applicant would have to prove that the new parking spaces would not attract more automobiles to the center of the city.

The Transit Incentive Strategy

Philadelphia and the State government have pinned hopes of meeting Federal air quality deadlines mainly on improvements in the speed, comfort, and convenience of the city's mass transit. Philadelphia is already ahead of many other cities in that only 20 percent of its rush hour commuters travels by automobile; the subway is used by 30 percent of commuters; the commuter railroad by 24 percent, buses by 18 percent, and the trolley by 8 percent.[15] Yet streets downtown rapidly fill with automobiles.

In an effort to limit automobile traffic further and to take care of anticipated growth, the city—even before the controversy over air quality controls:

- began a staggered work-hour program in 1971 that will affect 50,000 of the approximately 320,000 people who work in the center city [16]
- set up a center city traffic regulation program in late 1972 to improve traffic flow by relocating bus stops and cracking down on illegal parking
- began improvements for passengers in 12-subway stations as part of a multimillion dollar program to improve security, pedestrian access, and the attractiveness of the system; also planned are more security patrols on subway trains and buses between 6 p.m. and 6 a.m.
- bought 600 new buses in the past 3 years and made plans for another 300 by 1975. The average age of the buses will be reduced from 12 to 5 years
- planned major improvements to increase rail commute capacity by 80 percent, in-

cluding purchase of 144 new commuter rail cars by 1975.

Philadelphia's Air Management Service now believes that exclusive bus lanes would be a major step in making it possible for the city to meet national standards for carbon monoxide by 1976. The city plans a bus lane on Roosevelt Boulevard, the major artery into the city center from the northeast, and a network of bus lanes in the central business district.

The Bicentennial

Philadelphia's environmental and transportation plans are complicated by the 1976 American Bicentennial. The city's plans necessarily focus on Independence Hall and other center city historical sites. Because the traffic from this flood of visitors could paralyze downtown and severely impact air quality control strategies, the plan is to intercept visitors at fringe parking areas before they come into the city. Special buses and rapid transit cars, part of $34 million in transportation improvements for the bicentennial, will move visitors between parking areas and the city.

Philadelphia is also planning some major new transit projects to mesh with the bicentennial plans. Travel between the Philadelphia airport and downtown will be improved by a 9.4-mile, high-speed rail line paid for in part by a $35 million grant from the Urban Mass Transit Administration. Federal funding is also being made available for a new station and parking facility where the high-speed rail line between Lindenwold and downtown Philadelphia intersects Interstate 295 and the New Jersey Turnpike.

Getting Along with the Neighbors

As is true of water pollution in the river, air pollution in the Delaware Valley quickly spreads beyond the jurisdiction of the polluter. It generally moves up the valley on the prevailing southwesterly winds almost as revenge for the water pollution coming down the river from the northeast. As an EPA air quality region, the Trenton, Philadelphia, and Wilmington metropolitan areas are required to propose compatible air quality control programs. But despite Federal prodding, the governments of the Delaware Valley have been slower to cooperate regionally on air pollution than on water pollution. Philadelphia is the only local jurisdiction in the region with its own air pollution abatement program. Elsewhere air pollution abatement is the responsibility of the State governments—Delaware, Pennsylvania, and New Jersey—and these States have been slower than the city to act against polluters.

Philadelphia suffers from its neighbors' lack of comparable controls. Although the Eddystone plant of the Philadelphia Electric Co. is located outside Philadelphia's jurisdiction, the sulfur-laden emissions from its coal-burning boilers waft directly over the city. When control equipment is finally installed at Eddystone in 1975, as much SO_2 will be removed from the plant's smoke each day as is currently emitted by all other sources in Philadelphia.[17]

Philadelphia suffers not only the pollution of its neighbors but also the economic disadvantages of their laxity. The city is the only jurisdiction in the valley to control hydrocarbon emissions from solvents; printing plants within the city must comply with city regulations on drying ovens while those just over the city line do not. Another example is regulation of SO_2 emissions. The low-sulfur heating oil that the city requires costs about 8 percent more than the lower grade oil permitted under State regulation for apartment buildings and smaller industries.[18] Until Philadelphia can bring its neighbors along on a common approach, the city will remain at an economic disadvantage in attracting and keeping industry affected by pollution controls.

The three States and Philadelphia have joined to form the Delaware-New Jersey-Penn-

sylvania Interstate Cooperative Agreement on Air Pollution.[19] Under the agreement, an advisory committee of air pollution officials meets periodically to discuss common problems, coordinate responses to high pollution episodes, and exchange information on air quality measurement. But the agreement has far to go before it leads in fact to agreement on philosophy and practice regarding air pollution control in the Delaware Valley.

What's Ahead

Philadelphia has made considerable progress over the past 20 years in combatting its air pollution problems. Although the energy crisis has created new uncertainties about abatement schedules and availability of some types of fuel, emissions of sulfur oxides and particulates have been markedly reduced. Control of stationary sources has resulted in abatement strategy to emphasize transportation controls. It has also pointed up the need for regional cooperation so that communities with successful air quality programs do not lose economic activity to those with more lax regulations and enforcement.

The major challenge is control of pollution from the automobile. This requires more than emission control programs and efforts by the city to improve transit facilities for commuters. Efforts must also be made in the suburbs, where the typical development pattern continues to be low-density sprawl—which makes a mass transit system less viable and residents more dependent upon the auto. Like so many regional issues considered in this report, air pollution problems of the Delaware Valley will be determined in large part by the public policies that influence land use patterns as the region continues to grow.

Chapter IV
The Cities—Survival and Revival in Trenton

Trenton, Philadelphia, Camden, Chester, and Wilmington grew up around their waterfronts. By the 18th century their ports bustled with activity, and well into the 19th goods that required weeks to be transported by road could be moved by water in a matter of days. Taverns, markets, customhouses, and courthouses grew up in each city near the water's edge, as did the shops of ship carpenters, joiners, smiths, and sailmakers.

The 19th century industrial era changed the physical structure of the urban waterfront. Larger storage areas were built for the raw materials, fuel, and mass-produced goods awaiting shipment. Then rail routes were laid parallel to the river. Soon the shipbuilders and large manufacturers filled in the area defined by the river on one flank and by rails on the other. By the 1930's the big shipbuilders who had helped nourish the economies of Wilmington, Chester, and Philadelphia were either dead or dying.

After World War II, industry began to find space suitable for single-flow, one-floor processing in the suburbs where there was easy access by highway to a distribution system geared increasingly to the truck. Much of the waterfront land not already taken by the railroads was paved for highways. It made good economic sense to lay expressways along the natural corridors of the waterfront just as it had to build the rail lines there a century earlier.

As they appear today, the Delaware River cities are in large part physically designed for 19th century living. In Trenton, for example, many three-story tenements are too large for today's average-size families who may want to live in the city. The older, smaller row houses cover too much of their lots to allow adequate private outdoor space, and public open space is limited—only 3.4 acres per 1,000 inhabitants in Trenton, compared with 15 acres per 1,000 in surrounding Mercer County.[1]

Often the very best and irreplaceable assets of a city are destroyed in the name of progress. A waterfront park is lost to a highway; a row of handsome old houses is bulldozed for a bland high rise apartment; a farmers' market is replaced by a warehouse. Parking lots become the city's predominant open space.

That which is not destroyed is often left to deteriorate by those who have moved on. Many buildings occupying prime locations along waterfronts, beside canals, or on bluffs with panoramic views have been abandoned. But only rarely has the government or business sector of the cities along the Delaware encouraged their renovation and reuse. The result is self-defeating. Amenities are destroyed, and too often the needs of people are unmet as well. The quality of urban life declines, further encouraging new development in the suburbs and obsolescence in the cities.

Much of the burden of financing city services has been placed on a limited tax source, the land. In the past decade, city property taxes have become increasingly difficult to bear because the tax bases have declined, tax rates have increased, and the costs of needed services have soared. The result is a cycle of decline, with inadequate revenues leading to inadequate services and inadequate services fueling the move-

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Trenton is typical of the cities along the Delaware, with an underused waterfront, interesting older neighborhoods in varying states of preservation or decay, a downtown business district that has tried hard to reverse economic decline, and a serious shortage of municipal tax revenue to finance needed services.

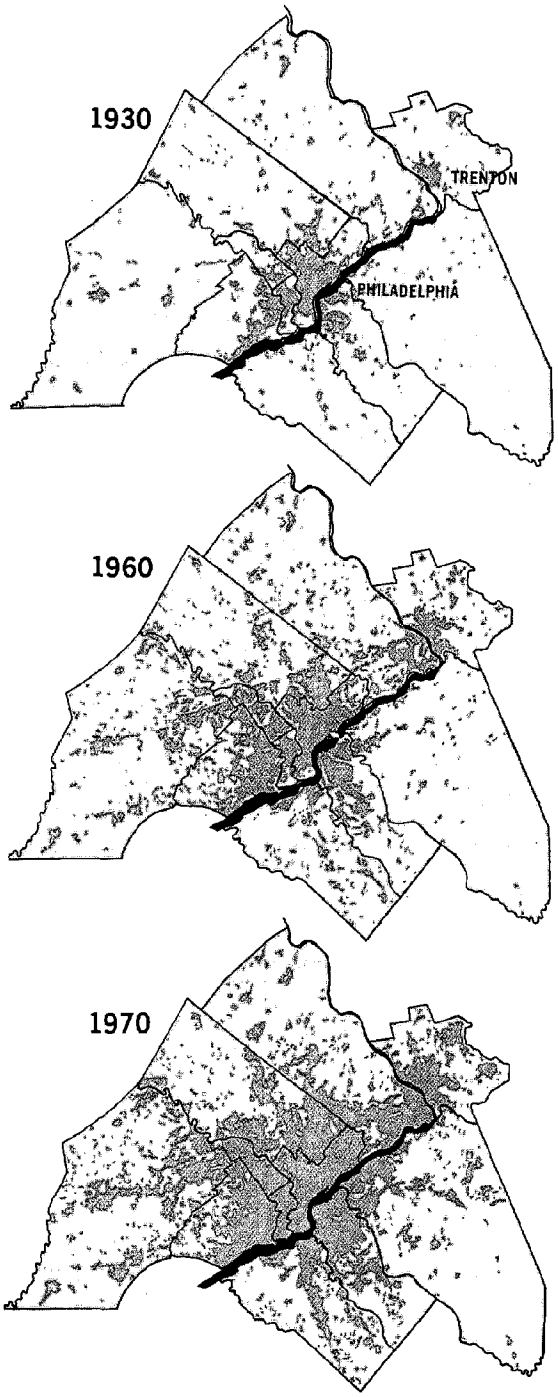
ment outward. Raising property taxes has not been a solution; it has simply made the property tax a major disincentive for businesses and the middle class to locate in the city.

But cities along the Delaware have problems far beyond the physical. Their people have changed. Once home to the wealthier citizens who financed or ran thriving industries employing the urban working class, the cities now house increasing numbers of poor people. Many of the poor and lower middle class who would like to leave are stopped by the exclusionary land use practices of the suburbs—large-lot zoning, which ensures that housing will be costly, restrictions and often prohibitions on multifamily dwellings, and refusal to build public housing.

The larger cities range in size from Philadelphia's 1.9 million people and 128.5 square miles to Chester's 56,000 people and 4.7 square miles. Each has a distinct character, but all share the problems of age, outworn land use patterns, industrial obsolescence, obstructed water access, hard-pressed budgets, fragmented jurisdiction, and concentration of the poor. Trenton provides an example of nearly all these plights and of efforts to overcome them. It is the focus of this chapter on the cities along the Delaware.

A sign on Trenton's railroad bridge over the Delaware proclaims, "Trenton Makes the World Takes," a statement reflecting an era when the city was proud of its manufacturing muscle. The decline was slow, with city industrial sites changing from one successively less industrial use to another as the major industries moved out to the suburbs. At a major Trenton landmark, the Roebling plant, where the cables for the Brooklyn Bridge were manufactured, the old headquarters is now a county office building, and the factories are being offered as low-cost office and warehouse space. Important industries like the Colorado Fuel & Iron Co. and American Bridge remain, but others, like Lenox China, have moved to suburban factories that dwarf their original Trenton sites.

Figure 6
Metropolitan Growth in the Philadelphia-Trenton Area



Statistics tell the changing story. Manufacturing accounted for almost 30,000 jobs in Trenton in 1950.[2] By 1960 the number had dropped to about 25,000 and by 1970 to 15,500.[3] The total number of jobs in Trenton covered by State workman's compensation laws fell from 52,274 in 1950 to 39,810 in 1970; manufacturing jobs accounted for 83 percent of the decrease.[4]

Despite the loss of much of its manufacturing base, Trenton is economically stronger than its urban neighbors in New Jersey. Although the State has the highest unemployment rate of any industrialized State in the Nation, Trenton has the lowest rate of its major cities.[5] The reason is the large and growing source of employment provided by State government in its capital. Between 1950 and 1970, State employment in Trenton increased from just over 7,000 to almost 17,000. Adding city and county employees, government jobs account for about one-third of Trenton's total employment.[6]

Increasingly, Trenton's workers live outside the city. In 1970, more suburban than city residents held jobs in the city. With many of the government jobs clustered near the downtown, stores do their best business during lunch hours from Monday through Friday. But the typical State employee's family does its big buying in the suburbs, where seven major shopping centers ring the city and more are planned.

The Downtown

Trenton's strong planning department has broader powers than most cities'. Its pursuit of the typical strategy of creating dramatic development of large enough scale to bring back business investment and the middle class to downtown and nearby areas so far has produced little but impressive plans and subsequent disappointments. More successful have been smaller, less monumental efforts.

One of the first plans never left the drawing boards. Trenton Mall was proposed as a shopping mall on 6.5 acres of prime downtown space near the main shops and State office complexes. Although its price was marked down for developers, the land, cleared over a decade ago for the project, is still vacant.

The plan was then altered and its name changed to Trent Place, a "full-time urban center" with housing, offices, public spaces, small shops, and ample parking. The first stage was to be a large office building. To minimize the developers' risk, the State government was going to take a long-term lease for 100,000 square feet of space.[7] This plan was in jeopardy until early 1974, when the State, after reviewing the relative cost of long-term lease versus outright ownership of its buildings, reluctantly signed the lease.

Another plan, a $35 million, 1,151-unit housing development known as Kingsbury, is also experiencing difficulties.[8] Located near the downtown shopping area and State offices, Kingsbury was intended to attract middle-income residents to a racially mixed community of studio, 1-, 2-, and 3-bedroom units in high rise and garden apartments. The main problem is that construction costs were far higher than originally projected. Despite funding under Federal urban renewal and interest subsidy programs, rents originally projected at $128 for one bedroom and $154 for two bedrooms are $255 and $310. Federal rent supplements would lower these rents to $160 and $195. Families with incomes not exceeding $8,384 (for one bedroom) and $10,360 (two bedrooms) would qualify for the subsidy. Kingsbury's intended market was the 3,000 families who work in Trenton and earn between $10,000 and $21,000, the maximum permitted. But most earn too much to qualify for the subsidy and too little to pay the rent. The units are only half rented.

One major effort downtown, Trenton Commons, appears a success. Near the end of 1973, the city, assisted by $1.2 million in Federal funds, closed a 2-block area to auto traffic and converted it into a mall for shoppers who may

walk freely among new shops and outdoor cafes. Officials hope that the brick paving, new trees, shopping promenade, and parking behind the stores can bring back life and character to the downtown. Merchants have made a commitment to refurbish store fronts and maintain their merchandise at the same quality as in the suburbs. Although shoppers are not easily drawn from suburban shopping centers, the more exciting sidewalk environment and shopping attractions of the Commons can reverse the falling sales downtown. "It may not help, but it can't hurt," commented a retailer on State Street. It seems to be working.

The success of the Commons—and of every other attempt to attract people back to the city—depends on making the downtown safe from crime. "Rich or poor, black or white, they tell us, 'I feel unsafe, I want the streets cleaned up,'" said a planning official. Responding, Trenton has embarked on a $5 million, 5-year crime prevention program.[9] One-half the money is being used to train and pay 60 foot patrolmen, who will walk beats in 13 neighborhoods ranging from stable to deteriorated. The other half will be spent to upgrade garbage and litter pickup and to install new lighting in high-crime neighborhoods. Although little of this will be of direct benefit to downtown, it may help to reduce people's fears of the city and coax them to come intown from the suburbs or downtown from their neighborhoods.

The Waterfront

As a consequence of its preemption by highway and industrial uses, the waterfront of Trenton is hard put to provide much else to the city. Most streets dead end at a guard rail along an expressway. Large buildings are half empty or vacant amid yards crisscrossed by long unused tracks. Through the grimy brick facades, great old names in shipbuilding, carriage making, and locomotive manufacturing are still legible. But by and large, the companies are gone. The chain fences rising out of the weeds are there less to protect the buildings—many of the windows are already broken—than to keep people from entering and hurting themselves.

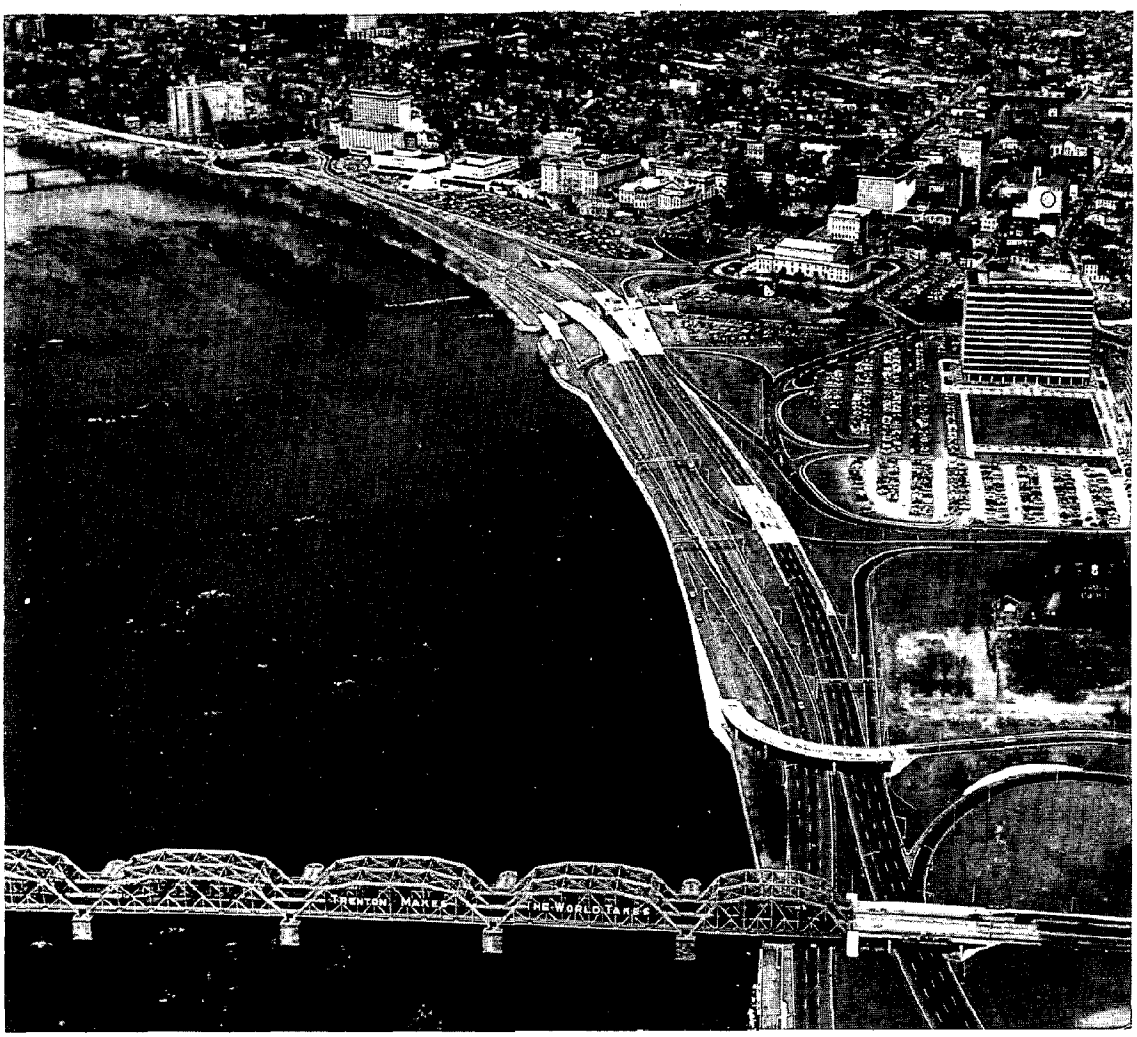
Trenton, like other cities on the Delaware, regards its waterfront more as a reservoir of industrial space than as a potential recreation area. The few parks along the urban waterfront are difficult to find and more often than not are neglected.

Yet waterfronts have the potential to enrich urban life, much as they do in Stockholm, Bonn, and other European cities. Although the industrial Delaware is not and probably never will be a gracious, quiet river, its waterfront is a potential picture of activity, an exciting and fascinating scene. It is this aspect that should be exploited, just as the Dutch have in the Rotterdam complex.

Instead, the cities along the Delaware have often given up the little public open space that they have on the waterfront. Trenton again provides an example. When Route 29 was built along the river through the western section of Trenton, it obliterated over 100 acres—more than half—of Mahlon Stacey Park, which had been established after a long campaign by prominent residents, including Woodrow Wilson.

Although there was some concern over the original route, a proposal to extend Route 29 has been more controversial. As planned, the extension will go south along the river, severing easy access to the last remaining shorefront open space in the area, a lovely tree-shaded walk across the street from a row of old homes. Planned before Federal and State regulations tightened procedures to prevent taking parkland for highways, the extension is now undergoing environmental impact review.

Trenton's mayor has lately been promoting the revival of the port, which has lain dormant for over 15 years. The city owns 40 acres of land near the old docks, half of which is a sewage plant that is being upgraded to tertiary treatment.[10] The large sewage lagoons will no longer



Indiscriminate highway construction has effectively severed downtown Trenton from the river. Plans to continue this road south along the Delaware are now undergoing extensive review.

be necessary with the new treatment system and could be reclaimed for combined recreation and industrial use, with both taking advantage of the water.

Another attractive and more easily converted waterfront lies behind chain link fences along the old Delaware and Raritan Canal, which winds through Trenton. A system of linear greenways could be created inexpensively along the canal, offering a combination of open space and water access.

Saving the Historic Past

Over the years, both public and private interests have found reason to raze Trenton's past. West State Street is Trenton's handsomest, with official State buildings on one side and stylish victorian row houses on the other. In earlier years, both sides of the street were lined with fine residences, whose rolling lawns dipped gracefully to the river. As State government grew, it bought the estates on the river side, first

using them for offices and later demolishing them for new structures. One especially fine house was razed in 1922 for a driveway to the expanded capitol. The baronial Tudor home of Washington Roebling was razed in 1948 to make way for a parking lot for State employees.

Trenton's famed Battle Monument, with rare bas relief sculptures by Thomas Aiken, is another victim of man's sometimes strange sense of progress. Located near an old gathering spot with coach stops and taverns, it now stands forlornly in a rundown, neglected urban renewal area.

The deterioration and destruction of Trenton's past have not been universal. The Trent House—home of William Trent, for whom the city is named, and considered by many the finest old residence in New Jersey—was patiently restored with WPA funds and is cared for by a private association.[11] The Old Barracks, one of five such houses erected in New Jersey during the French and Indian Wars and the only one remaining, was deeded to the State in 1914.[12] It is privately maintained as a museum and meeting place. Both have been registered as National Landmarks.

Several other sites are now being preserved as a result of stepped-up efforts by the Trenton Historical Society. The society is negotiating a dollar-a-year lease on the Old Eagle Tavern, acquired by the State at a tax foreclosure sale. The only remaining tavern dating back to the 1750's, the Old Eagle had a lively trade stemming from its location near county offices. There are plans now to restore it to a gathering place once again.

The city's Department of Planning and Development has begun to use selective restoration and rehabilitation on a neighborhood scale. The Mercer-Jackson area is one example; Victorian homes predominate, but some date back to the late 18th and early 19th centuries. They had become endangered by landlords dividing them for use as roominghouses.

A variety of renewal techniques have been employed to turn this trend around in Mercer-Jackson. Houses beyond repair have been razed. Others are being bought by the city, which either restores or sells them or auctions them at low cost to owners who will repair them. Housing inspections are enforced and low-interest Federal loans made available to the owners. Young professional couples have moved into the area along with the mayor and several other city and State officials. There are about 130 structures in the renewal area, about one-third already restored, one-third in progress, and one-third not yet begun.[13] New brick sidewalks have been laid and traffic rerouted to cut down congestion, pollution, and noise. A 7-acre area along the Assunpink Creek is being made into a park nearby, the first to be developed in Trenton's center city area for many years.

The Neighborhoods

Trenton is divided into four political wards—north, south, east, and west—and where one lives is a fairly good clue to his ethnic association. Twenty years ago Hungarians and Poles lived in the small row and semidetached houses in the south and north wards. White Protestants and Jews predominated in the west, Italians in sections of the east and north wards, and the Irish mainly in the Villa Park section of the east ward.

As blacks moved into the city in large numbers, they settled in poorer, older row houses in the east and north wards. The Italians and Irish moved on to other city neighborhoods, and the Protestants and Jews moved out to the suburbs.

The southeast section remains largely blue-collar white. There are still substantial numbers of Poles and Hungarians, but the residents are mostly Italians, who are concentrated in Chambersburg, a tightly knit community of modest, neatly kept rowhouses. Here and in the other south and east ward communities of Villa Park, Dutzville, and South Trenton, much of

The neighborhoods of Trenton range from old, stable areas, many of which still show a strong ethnic influence, to sectors of widespread decay and substandard housing, to elegant, restored historic districts. This housing is typical of that found in working-class neighborhoods.

the housing is owner-occupied. In the primarily black Model Cities area, which covers one-half of the north ward and part of the east ward as well, most residents rent, and their housing is old and deteriorating. As the blacks become more affluent, significant numbers are moving westward into the older neighborhoods with better homes, but even this seems to be a temporary step on the journey to the suburbs.

Since 1950 Trenton's racial composition has shifted markedly. The number of nonwhites rose from 11.4 percent in 1950 to 38.5 in 1970, while the city's population declined from 128,000 to 104,600. Trenton lost two whites for each black that it gained during the 20-year period.[14] But even these figures understate the impact of the influx of black residents. Because the families are larger and younger, for example, public schools are 70 percent black. Between 1967 and 1970, almost 60 percent of whites moving into suburban townships nearby was moving from Trenton.

Some sense that Trenton may now be experiencing a pause in the movement out. Much of it is due to economics, although there are indications that some people are choosing not to move. Most affluent people who wanted to have already made their move. The less affluent and the new, younger households are blocked by the high cost of housing and problems of financing in the suburbs. The conditions and policies at work in suburban Mercer County are quite similar to those discussed in chapter V on the suburbanization of Bucks County.

Property in the city until recently has gained little value. Homes may still be bought in stable, working-class neighborhoods for around $15,000. But there and in the better sections of

the west ward, houses are being bought more quickly now and prices are edging upward. Many homes in the Chambersburg section have been extensively improved, suggesting that people are staying there because they want to.

Housing

Most of Trenton's housing was built before 1900. City planning officials have come up with what is probably an overestimate, that about one-fifth of the city's housing is in poor or dilapidated condition. Most consists of dense row or semidetached housing with little yard space in older, inner city neighborhoods. But for the most part it is rehabilitable and might be usable if people can be drawn back to the city.

Trenton still suffers from a serious housing abandonment problem. In 1969, 135 dwelling units were abandoned by owners; this figure increased to 500 units in 1970 and 818 in 1971.[15] Later statistics may show how much was related to Federal subsidy programs that are no longer in effect but that caused widespread abandonment of shoddily rehabilitated units.

A building is usually abandoned when taxes, maintenance costs, and mortgage payments are no longer covered by rental income or, in the case of owner-occupied units, when income cannot cover carrying costs. The owner tries to find a buyer, but often there is none, so he simply walks away from his building.

In concert with colleagues from other New Jersey cities, Trenton city officials have been trying to change State policies that require the city to wait 4 years before acquiring abandoned structures through tax foreclosures. These laws were written to protect owners from losing their homes during the depression, but today they simply delay the takeover of buildings that blight neighborhoods and invite vandalism and fires. During the past 2 years, Trenton has auctioned about 125 abandoned buildings that were salvageable for prices ranging from $100 to several thousand dollars.[16] Owners are ordinarily given 1 year to bring the houses up to code standards. Officials report success with the program in that the houses are being fixed up and the taxes paid. Trenton may extend and formalize this program now to follow the lead of Wilmington and Philadelphia, which have begun programs of "urban homesteading," whereby such houses are given to qualified applicants.

The number of abandonments may be reduced by a recently enacted $160-per-year State property tax break designed for senior citizens.[17] The city is also urging the State legislature to permit a 5-year tax abatement for improvements to houses. Such policies may cause short-term harm to Trenton's precarious revenue situation, but it is hoped that they will work toward long-term neighborhood and fiscal stability.

The Problem of Revenue

A large service-dependent population means more government spending per person. The disparity between public expenditures for services nationwide and in Trenton reflects this fact. Trenton spends $47 per capita on public safety; the national average is $26. Trenton spends $12.78 per capita on health and welfare; the national average is $3.22.[18]

About one in five Trenton residents now receives some form of public assistance, more than double the number in 1966.[19] Although only 33 percent of Mercer County's total population lives in Trenton, 89 percent of county welfare recipients lives in the city.[20]

Much of the cost of these public services must be paid out of Trenton's property taxes. As a result, other municipal services, including schools, suffer. Three adjacent suburban townships spent about 62 percent of their annual budgets on education in 1971; with a higher

The diversity of Trenton's housing stock runs from total abandonment to total restoration.

tax rate, Trenton spent 42 percent.[21] Trenton, however, is aided by Federal and State education funds, especially those directed to disadvantaged children. The total 1971–72 revenue from all sources per pupil was $1,375, up considerably from earlier years and about average for the county. With funds from a new State program, the city recently built two new elementary schools, the first for many years. Public education in Trenton is increasingly regarded as an extension of city welfare for the poor blacks. An estimated 95 percent of school-age children in the predominantly black Model Cities neighborhoods attends public school, while 57 percent of school-age whites attends private or parochial schools.

Trenton has not always been in such fiscal trouble. In fact, in the early 1900's the tax dollar collected in Trenton not only covered Trenton's needs but also helped provide surrounding Mercer County's new roads and sewers. By the early 1960's, the loss of businesses and middle- and upper-income residents to the suburbs led to a pattern of increasing property tax rates being applied to property of decreasing value. The city budget, which had but doubled from 1910 to 1960, again doubled between 1960 and 1970.[22]

The total real value of Trenton's taxable real estate, appraised at $336.5 million in 1973, has steadily fallen from a 1955 peak of $387 million, although the rate of decline seems to have slowed in recent years. Between 1951 and 1961 the average annual real estate tax on a Trenton home valued at $10,000 rose from over $250 to $380 and in 1971 to almost $700. The average

tax on similarly valued property outside Trenton but within the metropolitan area is under $500.[23] At current tax rates, the Trenton homeowner pays for his home in taxes every 14 years.

Trenton's property taxes have already been stretched so far that the homeowner is generally already past his capacity to pay. The median annual income for a Trenton family in 1970 was $8,726.[24] Assuming that he and his family occupy a home valued at twice his annual salary, or $17,450, the average worker will pay either directly as owner or indirectly through rent $102 per month in property taxes, or 14 percent of his gross monthly pay of $727. In nearby suburban West Windsor Township, the comparable tax would be only $46.[25]

Trenton's tax revenues are limited partly by State ownership of over 1 million square feet of office space, most of it on prime downtown streets. In 1971, following an analysis by the city that valued the State's holdings at $57 million and the prorated benefits from city services at $1 million, the State payment to the city in lieu of taxes was increased from $60,000 to $560,000.[26] City officials intend to use another study now underway as the basis for requesting a further increase in the State payment.[27]

Can the Cities Change?

The Delaware River Valley cities have surmounted great problems in the past, but they have usually done so tardily and often under pressure. Public schools, water and sewer services, and professional police forces have invariably come only after long battles, outbreaks of disease, scandals, or other public crises. Typically, the cities have responded to troubles with minimal public expenditure, often only after prodding by civic groups, prominent businessmen, and professional leaders.

The cities are struggling to change again, this time with the help of renewed interest by many for life in the city after an uninspiring sojourn in the suburbs. The energy crisis, too, with its shortage of gasoline for commuters, may lend a hand. But these forces work against considerable obstacles in the form of outmoded institutions, deteriorated neighborhoods, and serious revenue and property tax problems. Although the downward spiral may be coming to an end, only time and enlightened leadership will tell whether the cities along the Delaware can bring back the activity that once made them attractive and exciting places to be.

Chapter V
The Suburbs—Growth and No-Growth in Bucks County

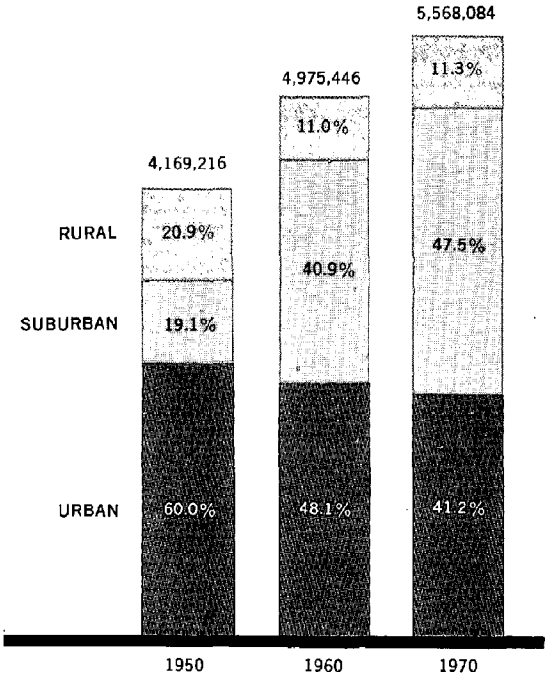
Urbanization in the Delaware Valley has long exhibited a voracious appetite for land. First, the cities themselves spread out and incorporated nearby farmland and open space. When this was no longer possible due to some of the strictest antiannexation laws in the country, suburbs developed and incorporated. Some of this development followed transportation arteries, but much was random, directed by developers' and speculators' investments and accommodating zoning boards. There was little concern for the land use patterns that emerged, for land was considered a nearly limitless resource. This chapter focuses on one part of the Delaware Valley, Bucks County in Pennsylvania, and describes how it has been changed by the processes of urbanization.

Located along the northern boundaries of Philadelphia, Bucks has been the fastest growing county in Pennsylvania since 1950. During the 1950's its population increased by 164,000, or 113 percent, in large part as a consequence of two major Philadelphia suburban developments—Levittown and Fairless Hills.[1] Population growth since then has slowed somewhat in total numbers, with about 10,000 new residents added annually, and they have been more spread out through the county.

Bucks County is diverse, with distinct southern, central, and upper sections. Nearest Philadelphia, the lower third of the county is substantially developed in postwar suburbs of moderate-income houses on quarter-acre and third-acre lots. Heavy manufacturing, which accounts for two-fifths of the county labor force, is concentrated in lower Bucks.[2] The central area includes considerable farmland, which is yielding to scattered development in expensive suburban homes. The upper portion of the

Figure 7

Patterns of Population Growth in the Metropolitan Areas of the Delaware Estuary, 1950-1970



Source: U.S. Department of Commerce, Bureau of the Census.

county is forested, rugged, and sparsely settled. Many of the great stone houses built there by Quakers and Germans in the 18th century survive today.

In some ways Bucks is representative of urbanizing areas everywhere, with sharply divergent urban and rural attitudes interacting uneasily. Local governments, organized long ago to preside over quiet rural areas, are now trying to manage growth while preserving the character of their communities.

Bucks has a large and proficient county-level planning staff, but the planners have little authority to implement plans. Instead, each of the 54 municipalities within the county enjoys exclusive regulatory power over land use within its boundaries. Not even Bristol, the county's largest municipality with a population of 67,500, employs a professional planner.[3] This centralization of planning and decentralization of land use controls have been the single most salient characteristic of the official response to the pressures for development faced by Bucks. In cyclical relationship, planning has had no effect on regulatory decisions, in turn undercutting public respect for planning as a solution to the county's problems, in turn encouraging still more unplanned development.

But lack of county authority is not the complete answer. In theory, the county could use its approval power over public works projects to dictate the location of roads, sewers, and water mains—and thereby the location of development. In practice, however, the county has traditionally responded to local demands nearly always made in the absence of broad land use policies to guide development. Thus the urbanization of Bucks County has tracked a typical course. Farms and vacant lands are bought for speculation and eventual subdivision, highway frontages are taken over by strip commercial development, and backroads and country lanes are turned into thoroughfares, not necessarily by design but as a result of piecemeal acceptance of development proposals.

As in most parts of the country, development approvals rest with the local board, usually composed of long-time friends and neighbors who serve part time as planning and zoning officials and whose occupations frequently provide an indirect economic interest in encouraging further development.

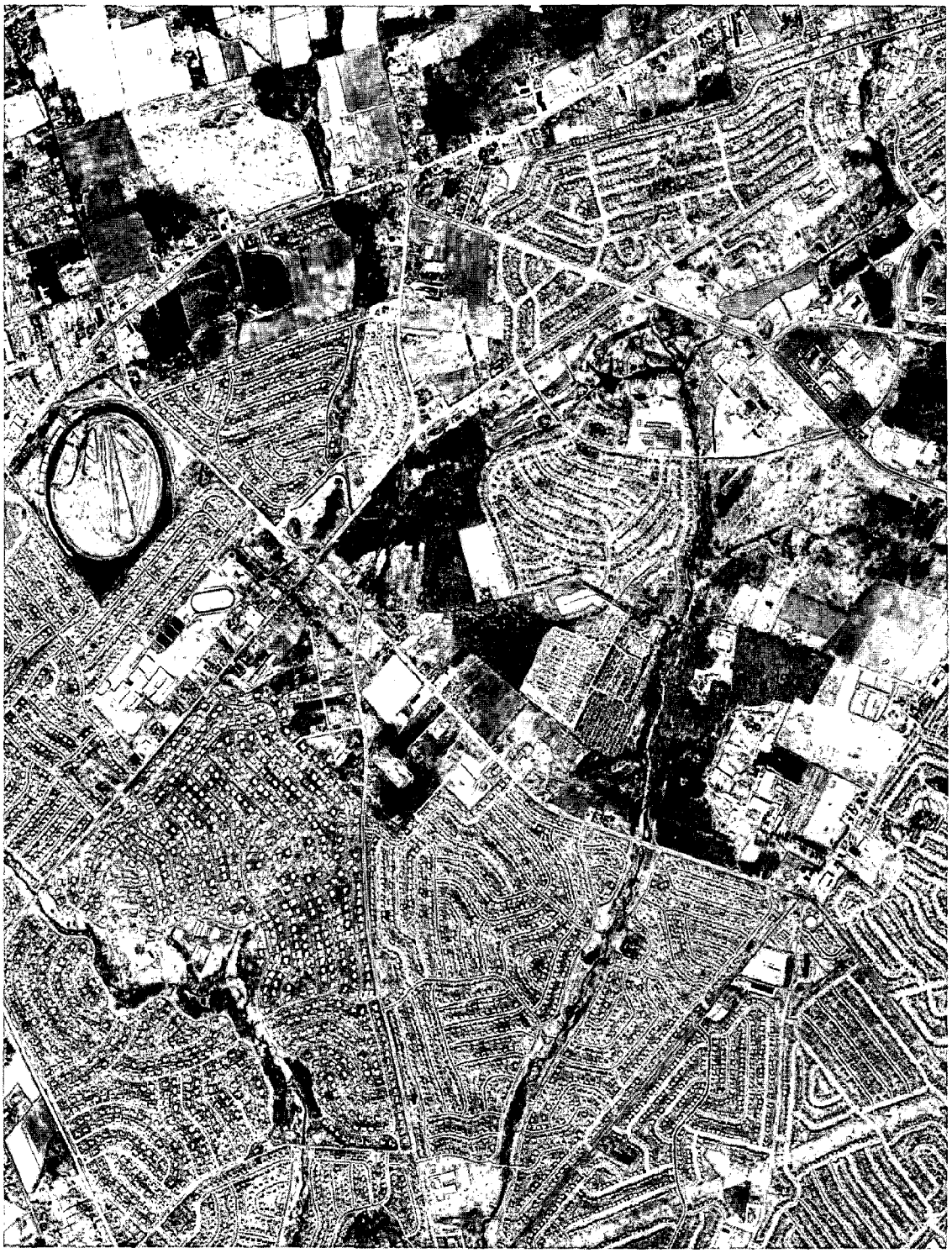
Nevertheless, in Bucks as elsewhere in the Nation, there is growing sensitivity to the real costs and long-term impacts of urbanization. The strongest sentiment is expressed by fairly new property owners who want to keep the area like it was when they arrived. Older residents are split between those who would like to keep the towns and farms as they always were and those who want to profit from recent increases in the value of their lands. As they work out their problems with each other, these groups will be wrestling with policies to guide future development. Chief among them—and especially important in Bucks—is how to protect the landscape.

Preserving the Farmlands

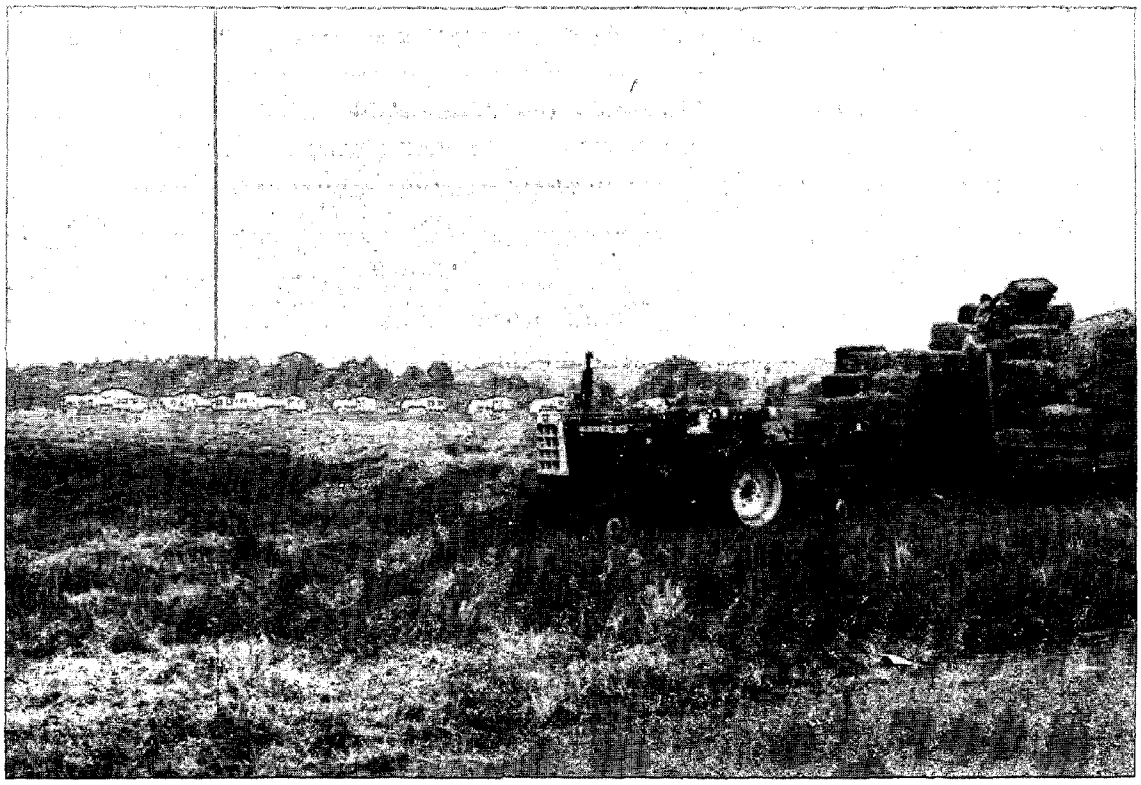
One of the most pleasurable aspects of life in Bucks County is its beautiful rolling farmland. Located in an arc in the eastern central part of the county, the farms are a scenic backdrop to the towns and villages and are a few minutes' drive from most built-up areas. About 30 percent of the land is agricultural, and the county often ranks first in the State in the value of vegetables and soybeans produced.[4] But as in any urbanizing area, the future of farming and the survival of the scenic landscapes are very uncertain.

As the urban fringe moves out from Philadelphia, it carries with it a striking increase in the value of open land. Land values rise rapidly, not because there is an immediate demand for housing but because the potential demand is large and because high profits are expected by the owners of far more properties than will ultimately be needed to accommodate the growth.

The process of urbanization in lower Bucks County is shown in these photos taken a few years apart when the area



was being developed in the late fifies.



How to preserve farmlands and the scenic beauty of Bucks County while accommodating the inevitable pressures for growth and new housing is one of the major dilemmas facing public officials and citizens there.

Prime agricultural land often commands the highest prices because it is well graded and drained and does not require the removal of trees, stumps, and roots.

Surprisingly, counties like Bucks have a very large capacity to absorb growth if they plan carefully. The Bucks County Planning Commission believes that in theory the county could set aside at least one-half its farmland, all its flood plains and steep slopes, and adequate recreational space and still have room nearly to triple its population without exceeding currently zoned densities in any municipality.

But development has not followed any such rational plan. Farmers have learned that depending on location and timing of their sales, they may realize far more from the capital appreciation of their land than they ever could from farming. A small farm in lower Bucks, which was worth $50,000 to $100,000 in 1950, can bring over $2 million on today's market. In central Bucks, where there is a market in farms for weekend retreats as well as for long-term speculation, it is not uncommon to pay 10 times the agricultural value for farmland.[5]

Two other economic factors hasten the Bucks County farmer's decision to sell. First, his income on investment has decreased in recent years to between 3.5 and 5 percent, primarily because of increased costs for labor, machinery, seed, and fertilizer.[6] He could get more by buying U.S. Government bonds.

The second factor is the property tax. With rising land values have come higher taxes that threaten to wipe out the profits from farming. For many years farm property was underassessed, if not in terms of its value for agriculture at least in terms of the price that the land

would bring at sale. But after a recent equalization of county assessments required by Pennsylvania law, farm taxes increased sharply, sometimes by 500 percent or more.[7] The taxes on one 100-acre farm in lower Bucks, for example, came to $9,500, prompting a legislator to remark, "The only way that farmer could make a living at those rates would be to grow marijuana."

Pennsylvania, like many other States, sought a solution through so-called preferential assessment laws. Act 515 authorized any taxing authority in a metropolitan area to assess farmland, forest, flood plains, and certain open space land at current use value in exchange for an agreement by the landowner to retain the property in that use for at least 10 years.[8] Although Bucks County had tried to use it to protect farm lands, Act 515 had several disadvantages. First, it was purely voluntary, so the county had little choice in what properties would participate. The law also served land speculators by making it possible for a landowner to hold the property at low tax rates until it was "ripe" and then to sell it for a figure that made his requirement to pay the foregone taxes of negligible import.

Speculators found Act 515 a beneficial shelter for a variety of reasons, including the below-market interest rate on deferred taxes. Insofar as it served the speculator, the law was resented by homeowners and businessmen whose taxes rose to cover any losses to the county from taxing farmland at its use value. Critics pointed out that among the law's potential beneficiaries were major industrial corporations with extensive Delaware River frontage held in reserve for future expansion.

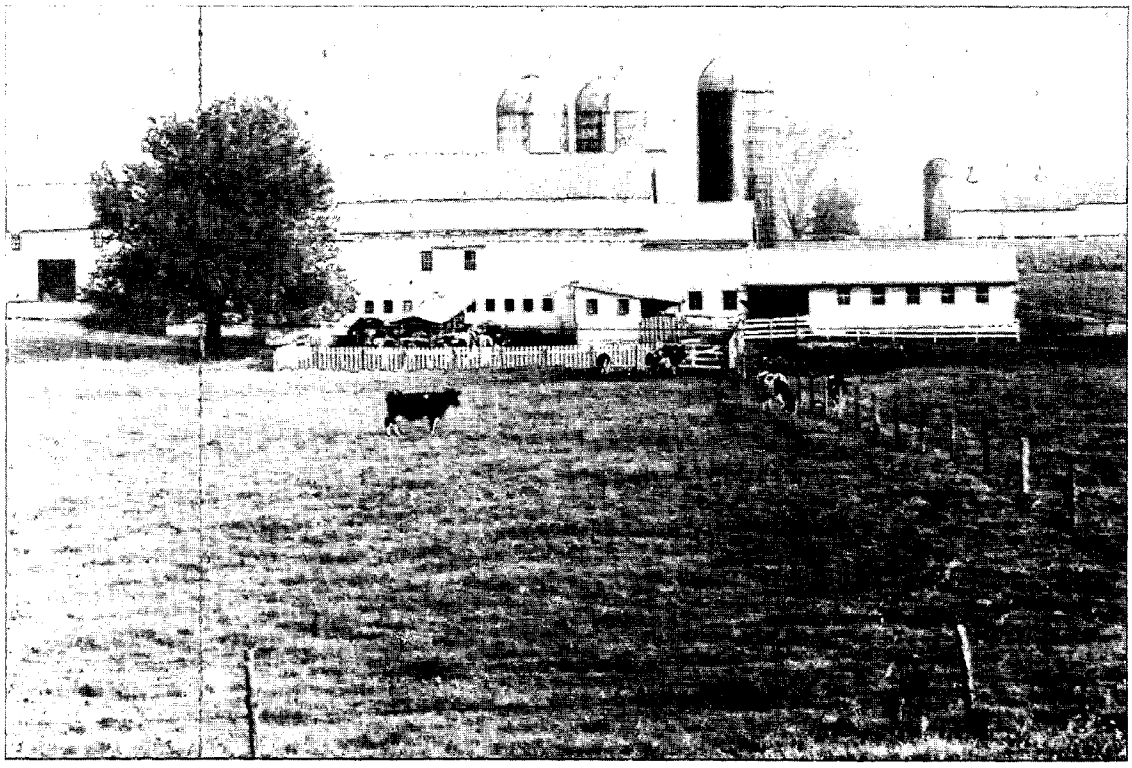
Act 515 will soon be superseded. Under an amendment to the Pennsylvania constitution approved in a 1973 referendum, all farmland in the State, including that under farm buildings, will be taxed at uniform rates based on agricultural use rather than at fair market value.[9] Following passage of implementing legislation late in 1974, a single statewide program replaced the optional, county-by-county approach of Act 515. Implementing legislation requires farmers to pay back taxes if they sell land for development.

The key issue was how many years' back taxes should be paid. Environmentalists would like to have seen the legislation require a 10- to 15-year tax liability and a notice of intention to withdraw lands several years in advance. But most farmers opposed any conditions that might prevent their profiting from sale of their lands. "My farm is my savings account, my life insurance, my pension," one Bucks farmer declared at a hearing on farm taxes by the Pennsylvania House Committee on Agriculture. A compromise was reached in which 7 years' back taxes are required if the land is sold for development. A notice of intent to withdraw from the program is also provided, with details yet to be worked out.

Even with new laws, there is little time left to preserve open space in Bucks County. For many years the county and townships neither sought nor accepted offers to preserve open space. In the early 1950's, for example, the developer of Levittown offered to dedicate the stream valleys and flood plains but was turned down by officials of both municipal and county governments who feared the long-term maintenance costs.

Yet attitudes toward conservation of land seem to be changing in Bucks. In the past 3 years, an increasing number of developers and farmers have offered or have been encouraged to offer the protection of particularly valuable land areas in exchange for permission to build additional housing on the remaining land. And all but one of the townships has adopted ordinances restricting development in flood plains.

The "value" of natural areas still ranks far below the "value" of development. It will take sensitive land use controls and careful planning of the location, timing, and size of public facilities to keep large parts of the county open. Otherwise, Bucks residents will lose the very things that attracted them there in the first place.



Many farms are productive and owners would like to stay in business, but rising land values and taxes often make it difficult or impossible. The new preferential assessment law in Pennsylvania attempts to provide relief.

Housing for Whom?

Although currently applicable zoning would accommodate almost a threefold increase in Bucks County's population, presently 416,000,[10] much of Bucks is practically off limits to all but the well-to-do. The main reasons are high construction costs and large lot zoning. In fact, civil rights groups allege that the land use policies of Bucks's local governments discriminate against low- and moderate-income groups, including minorities. This criticism is by no means unique to Bucks but is equally applicable to most suburban jurisdictions.

The trend toward high-cost housing began in Bucks County in the late 1950's after completion of Levittown and Fairless Hills, major moderate-income residential developments in the lower part of the county. Reviewing the succeeding 10 years, the Bucks County Housing Plan recently observed:

> Over the decade, Bucks County changed from an inexpensive place to live to an expensive one, compared to other places in the region. Undoubtedly, much of this change was due to the high cost of new construction. But part of it may have been the result of an excessive inflation rate caused by an inadequate supply of housing in Bucks, as evidenced by low vacancy rates.[11]

Between 1960 and 1970, the cost of occupied housing in Bucks increased more than that in any other Philadelphia area.[12] Monthly apartment rents rose 89 percent and the price of single-family homes 50 percent. In 1960, rents averaged only $8 per month more in Bucks than in Philadelphia; by 1970, the difference was $45.

These higher prices for living in Bucks reflect two factors. One is the very tight housing

Nearly all the new housing in Bucks County consists of single-family detached units that are out of reach of all but the affluent.

market there. At the time of the 1970 census, for example, there were over 48,000 owner-occupied housing units in lower Bucks, of which only 135 were for sale. Clearly it was a sellers' market. The Bucks County Housing Plan estimates that adequate choice of housing location and type requires a vacancy rate about six times higher. In theory, apartment co-ops, condominiums, and other multifamily structures could absorb some of the demand and keep prices down. But a relatively small number have been built. They tend to be luxury units in the lower part of the county and have done little to pull down the prices of new houses even there.

The second factor accounting for the rapid rise in the price of housing in Bucks is the nature and cost of most new construction. Of the 34,000 new units built between 1960 and 1970, 19,000 were owner-occupied, single-family homes with a median value 50 percent higher than the median for all housing in the county.

The costs generally put new housing out of reach of residents in the older towns and valleys, many of whom are below the poverty level. According to the 1970 census, there are approximately 22,600 families in Bucks with annual incomes below $5,000.[13] Many are long-standing county residents whose lives have been based on its agricultural economy. Nearly all could qualify for a housing subsidy. But the subsidized housing available or under construction can accommodate fewer than 8 percent of the eligible families already living in the county. Altogether there are only 1,800 units of subsidized housing occupied or under construction in the county, almost all in lower Bucks.[14] They represent less than 2 percent of the county's total housing stock.

For low-income dwellings, housing economics make it difficult to pay more than $750 per unit for land. Land near Doylestown, in the central part of the county, sells for about $7,500 per acre.[15] Thus a relatively high density of about 10 units per acre is necessary in Bucks for low-income housing to be economically feasible.

The result is that new housing built in Bucks has been almost exclusively for the affluent newcomer. This is a normal pattern for wealthier suburban counties, but it contrasts sharply with the heavy concentration of manufacturing employment in the county. Consequently, individuals living in Bucks generally earn higher incomes than those employed there.[16] Although the study reaching this conclusion was done in

1960, local authorities say that the situation has changed little since then, and a high percentage of Bucks homeowners commutes to downtown Philadelphia. It remains to be seen what effect the shortage of gasoline may have on this pattern, although the availability of good commuter rail service from the lower part of the county may mean little change.

In recent years, low-income residents of Bucks have joined forces with minority groups and the urban poor of Philadelphia to press for reform. In a suit filed with the Bucks County Court, minority and low-income groups residing in both areas asserted:

> during the 1950's and 1960's, there has been virtually no undeveloped acreage available for multifamily housing development in the County * * * and the practice and procedure of the municipalities have been to zone for such development only after a petitioner has filed an application for a change of zoning for a particular project, with the explicit or implicit representation that the project will not be for low-income and moderate-income persons, but only for relatively wealthy persons, so-called "luxury apartments," said application being approved without reference to comprehensive planning by the municipalities, the county or the Planning Commission.[17]

The Commonwealth of Pennsylvania joined as a plaintiff against Bucks County, but the suit was dismissed by county and State courts on the grounds that none of the plaintiffs had standing to sue. The U.S. Supreme Court refused to hear an appeal.

The Pennsylvania Supreme Court has served notice, however, that localities have a duty to permit a full range of housing types. The court held one ordinance requiring 2- and 3-acre lots unreasonable and exclusionary, adding that the township had to take into account the interests of the region when drawing up its housing policies.[18] In another case, the court held unconstitutional a township zoning ordinance that failed to provide for apartments.[19] As matters now stand, it may be assumed that unless the township comprehensive plan and zoning ordinances provide for a range of residential development opportunities, the locality is vulnerable to "spot zoning" orders by the courts in response to petitions from individual builders.

Nevertheless, civil rights groups cite instances in Bucks County in which areas zoned for moderate- to high-density and proposed for moderate-income housing have been rezoned for lower-density dwellings and in which rezoning of industrial land for low-income housing has been denied. Less than 3 percent of land zoned for residential uses is currently set aside for multifamily dwellings, and most of that is already developed. Seventy-seven percent, an area that includes nearly all the remaining open land, is zoned in lots of one-half acre or more. A number of municipalities have refused to zone for densities greater than one dwelling unit per acre. "The general mood," remarked one county official, "has been that any change is bad, any new people are bad, especially people who live in apartments, housing clusters, or subsidized housing."

One focus of controversy over growth and the desirability of lower housing costs has been the proposal of ordinances for planned residential developments (PRD's). Such laws would permit clustering of residences on small lots with the surrounding area devoted to open space. Overall, PRD's use less land per unit and consequently lower housing costs. From a design point of view, PRD's offer ample, attractive, and usable common open spaces and discourage the monotony that tends to result from traditional large-lot subdivisions. But from a housing option point of view, PRD's pose a threat to those who want to keep out all but the wealthy, because their variety in design can include townhouses, apartments, and even high rise—housing types that some suburbanites believe attract undesirable or "different" people who lower community standards and increase the costs of public services.

Only 11 of the county's 54 municipalities have adopted PRD ordinances, and several of them are under court challenge or reconsideration to reduce densities.[20] One of the first PRD's

built in Bucks was a luxury recreation development at New Hope.

Plumstead Township is one of the communities reconsidering its PRD ordinance. Recently the Bucks County Housing Authority acquired a parcel of land in Plumstead, about 5 minutes from fast-growing Doylestown. The township had previously zoned the land for a PRD at 8 units per acre.[21] The Housing Authority proposed to sponsor a development of 702 units, including a high rise with 480 apartments. One-fourth of the units was to be subsidized. Public opposition grew quickly and focused on the fact that the development was on agricultural land earmarked for preservation in the county Natural Resources Plan.[22] The county found itself in the embarrassing position of having either to drop the project or to renounce part of its Natural Resources Plan. The township supervisors decided to sidetrack the proposal and to consider downzoning the land to 4.5 units per acre—a density that the Housing Authority says will make the project uneconomical.

Farther south, Northhampton Township has been preoccupied with similar concerns. Spokesmen for the Northhampton Residents Association, many of whose members only recently settled in the area, point out that they enjoy their semirural environment and that their winding roads, single-lane bridges, and well water would not support heavy development. Moreover, they speak of the "moral environment" that they enjoy, the relatively homogeneous middle-class community of 18,000 inhabitants taking pride in expensive homes, superior schools, and volunteer community services.

But the poor are not the only ones who are left out by such policies. Newly married children of local residents, salesclerks, policemen, and even schoolteachers have difficulty finding housing that they can afford in Northhampton, where a half-acre lot costs $10,000 and there is no multifamily zoning. The choice is to change current policies or to force these people on whom the community depends to live outside the community.

Bucks's Chances

There are signs of change in Bucks, indications that some problems have to be worked out cooperatively among localities. As a result, some townships are beginning to plan together. The change is most apparent in upper Bucks, where the development pressures are least intense. Within the past 2 years, the townships of East Rockhill and West Rockhill and the boroughs of Perkasie and Sellersville worked out a joint development plan which now awaits action by the municipal supervisors. The six townships and boroughs of the Quakertown School District have a joint planning program. The six townships and borough of the Palisades School District in the northeast have taken a first step in setting up a regional planning agency.

These groups are being assisted by the Bucks County Planning Commission. The county approach, which these new planning districts are using as a model, seeks to accommodate new growth without destroying the county's most attractive features.[23] It deals with development pressures by proposing "development districts," where municipalities would concentrate services and utilities, near existing concentrations. "Rural holding areas" of agricultural and forest land are set up to be kept open until they are needed for development or for recreation. "Resource protection areas," where development would jeopardize natural, recreational, or historic values, are to remain essentially free of development, possibly by eventual public purchase of development rights. "Urban areas" can be fully developed.

The housing plan drawn up by the county illustrates the scope of the growth issues facing the townships in Bucks. It suggests that by 1980 the housing stock should grow about 33 percent in lower Bucks. The upper Bucks housing stock

Much of the future of Bucks County will be decided by the long-time residents who live in the older homes, on farms, and in the villages. They are the pivotal group between the developers and the newcomers who want no more growth.

should also grow about 33 percent. But central Bucks, according to the plan, will experience a 67 percent growth in housing. It is here that the county's best agricultural land is located, including much of that designated for preservation in the Natural Resources Plan.

The county plan suggests that the conflict between growth and conservation can be resolved and that the municipalities can provide housing for a population representing a range of age and income without changing their physical character. But having a countywide plan that might work is not the same as carrying it out.

The regional plans now being developed in upper Bucks have yet to be accepted by local supervisors, in part because they are called upon under the plan to yield some of their power over major land development decisions. Equally serious is the inability of the county to prevent land earmarked for resource protection from being sold for development. Under Pennsylvania's Act 442,[24] passed in 1968, the county could acquire and even condemn development rights for areas such as flood plains, scenic open spaces, and aquifers in conformance with the county plan. But where development pressures already exist, the purchase of those rights might be unacceptably costly to the county, and where the pressures do not yet exist, it is difficult for the county to justify purchase of rights.

In short, local citizens still appear reluctant to bear through taxes the considerable costs of preservation of open space and low density that they desire. But absent some plan to purchase at least some of the development rights of natural areas, Bucks is likely to try to fight growth with zoning decisions, subdivision approval practices, and other ad hoc techniques that are unlikely to result in what the plans call for. The cost for the necessary development rights over identified resource preservation lands could easily exceed $100 million. Moreover, a move to buy out farmers' development rights at present value would be deeply resented. "If we start moving toward Act 442," one county official remarked, "you're going to see a great mass exodus from this county by farmers."

The reality is that Bucks County is without the legal authority or the fiscal ability to make the plans come about. Pennsylvania law does not permit the county to regulate development—each township is autonomous. Few townships have acted in time to prevent environmental abuses. Nor has the Commonwealth adopted statewide land use legislation that could assure rational land use for the county, at least for

major development decisions. Much of Bucks County farmland and forest land seems fated to be converted within the next few years to small weekend farms, scattered subdivisions, and other developments—despite the detailed plans that show how growth could come and could be accommodated without harm to the county's natural and manmade environments.

Chapter VI
The Mountains—Land Boom in the Poconos

There are mountains more beautiful than the Poconos, but few are under such intense development pressure. They lie in the Pennsylvania uplands of the Delaware Basin, only an hour from New York City and two from Philadelphia. The Poconos were extensively logged in the late 19th century and into the early years of this century, but second growth is now mature enough to produce many attractive forested areas. Though the ground is too rocky and the soil too shallow and poorly drained for farming, there are many attractive marshes and lakes left behind by the glaciers.

Since the beginning of this century, the Poconos have been a popular summer retreat characterized by clapboard resort hotels and simple cabins for hunters and fishermen. The year-round population has been small. As late as 1960, the two principal counties in the region, Monroe and Pike, together had fewer than 50,000 permanent residents.[1]

The situation is rapidly changing because there has been a land boom in the Poconos. At its base is the tremendous increase in recent years of city residents seeking summer and weekend recreation. The influx has already resulted in a weekend population two or three times the number of permanent residents, and even the number of permanent residents increased 17 percent between 1960 and 1970.[2]

Interestingly enough, the boom has had relatively little impact on the steady decline of the old Pocono resorts on which the area built its reputation. Instead, the new rush is for recreation lots and seasonal homes. The first signs of the time appear in billboards, literally hundreds of them cluttering every road and highway into the Poconos. The old decaying ones advertise the resorts, but the new ones are after the potential landowner. "Lots of lots, $1,995 and up * * *," "Vacation home that pays for itself," "Where nature is your neighbor * * *," they call out one after another.

How much of what is for sale is unclear. Some are lots, some are recreation communities with a full range of activities, some include homes, and some are for campers and trailers. The best available estimate of the total number of subdivided lots is 70,000. It comes from the Pennsylvania Vacation Land Developers Association (PVLDA), a trade group representing many major developers, most of them in the Poconos.

The recreational lot and seasonal home sales are not simply a Poconos phenomenon. The urge to get away from it all has set off a similar boom in many parts of the country. For example, in 1971 an estimated 650,000 recreation lots were sold in the United States—a very small percentage of those subdivided and offered for sale. Furthermore, far more vacation homes are being built in the United States than low income housing.[3]

Aside from the widespread growth of interest by all Americans in the out-of-doors that has resulted from the environmental movement, several other factors have been at work to cause the frenzied pace of subdivision and lot sales in the Poconos. The Federal Government has been the prime cause of a number of them. A good example is highways. With the completion of the federally financed Interstate Routes 80 and

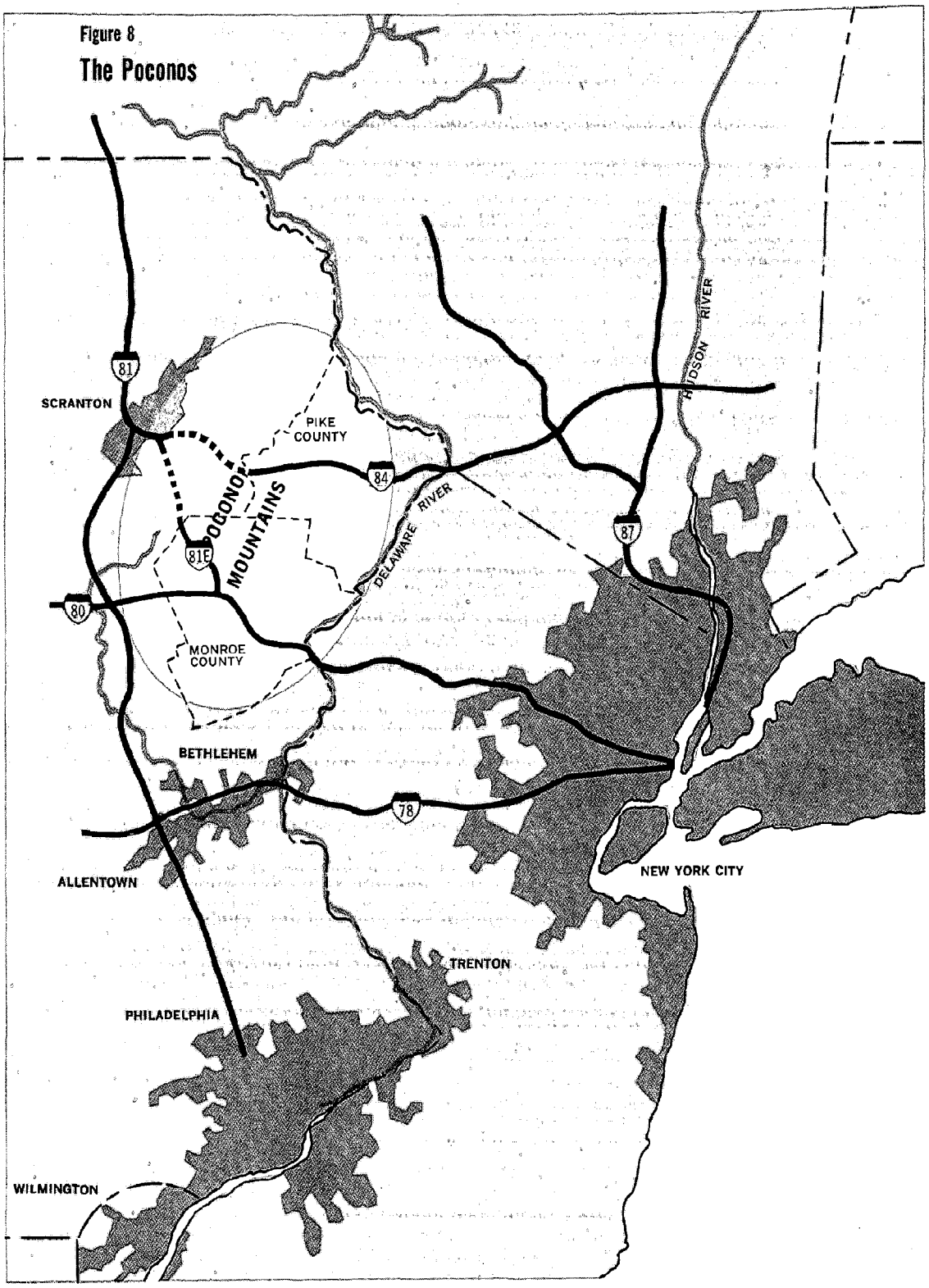
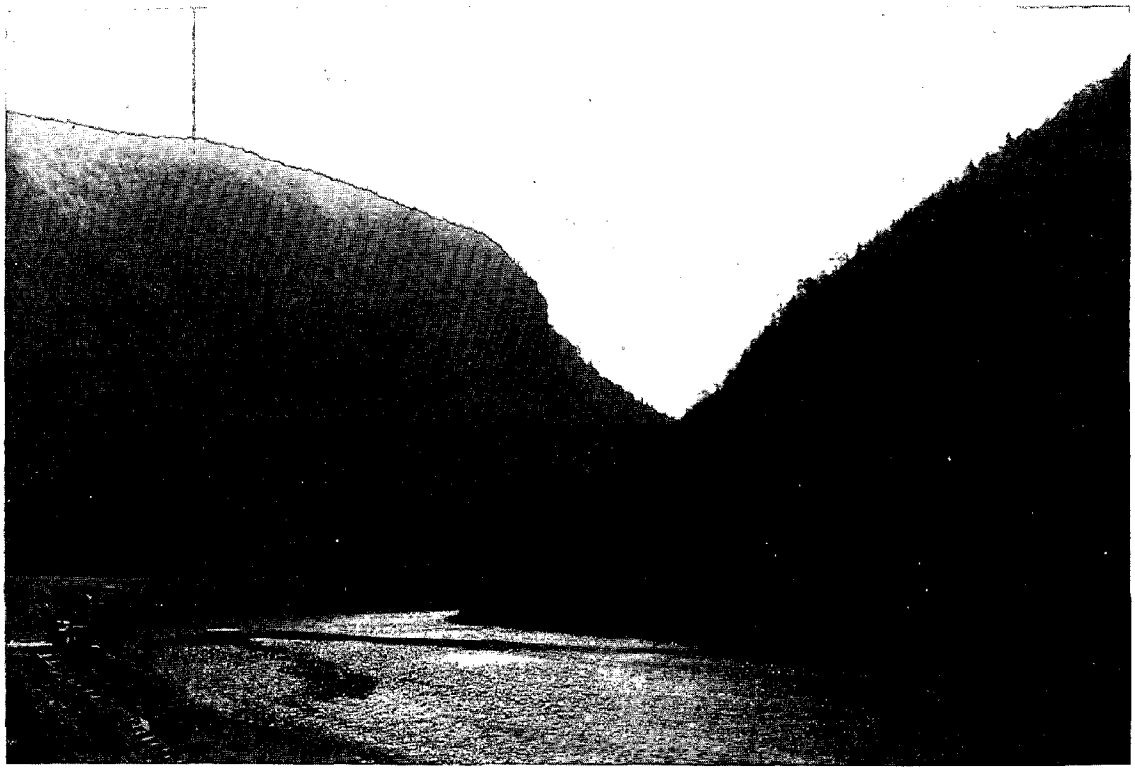


Figure 8
The Poconos



The wooded, rolling hills and clear waters of the Poconos have attracted vacationers for generations.

84, the trip from New York City will take 1 hour instead of 3. The area is also an easy weekend commute from Philadelphia to the south and Scranton and Wilkes-Barre to the west, thanks in part to the Northeast Extension of the Pennsylvania Turnpike. (See figure 8.)

Perhaps of even more potential significance is the Tocks Island project. Although approval for the Tocks Island Dam has been delayed for the environmental reasons discussed in chapter II, authorization of the project and the surrounding National Recreation Area has helped encourage large-scale recreational land development in the environs. In its 1971 "Statement of Facts: Tocks Island Lake,"[4] the U.S. Army Corps of Engineers estimated that by 1985 over 115,000 new dwelling units would be constructed to serve the 600,000 permanent and summer residents expected in the four-county service area (Pike and Monroe, Pa.; Sussex and Warren, N.J.). If the Federal projects are fully developed, daily tourism could reach 150,000, with a maximum annual visitation of 10.5 million people. It is ironic that these impacts are classified totally as "benefits" by the Corps in its cost-benefit analysis for the project.

Another stimulus for development is the Delaware River Basin Commission's proposal for a regional waste treatment facility for the six counties in New York, Pennsylvania, and New Jersey to be impacted by the proposed Tocks Island project and the National Recreation Area. In part, the intent was to prevent the serious problem of eutrophication in the proposed Tocks Island Reservoir. The proposal raised considerable controversy and is now dormant. Although many of the complaints centered around the level of local financing, others

were that new trunk sewers for the six-county region, while solving one problem, could accelerate the current subdivision boom.

This increasing citizen sensitivity to the long-term implication of such activities is an important new phenomenon. As traffic grows heavy on the old roads; as summer population swells to unprecedented numbers; as the summer recreation peak lingers for the fall foliage, winter snow, and spring flowers; as part-time residents think about becoming permanent commuters or retired full-time residents, people in the Poconos are beginning to worry. While the land boom has brought money to landowners and businessmen, it has brought along some other things. A tarnished image that turns away many, new demands on local government services, rock concerts, septic tank overflows, loss of once wild forests, commercial strips, and haphazard development are all unplanned side effects. More important, the change has brought a new kind of people, too. "The cabin mentality is gone," said one resident. "People don't come here any more to hunt and go without a shave for a week." They want everything in the Poconos that they have at home, which makes some locals wonder why they came.

Selling Off the Mountains

The rate of subdivision and lot sales in the Poconos is startling. In 1965 a little less than 3 percent of the privately owned land in Monroe County was under subdivision, but by 1973 it had jumped to almost 9 percent.[5] In Pike County over one-half the housing is already second homes, most of it in subdivisions. Land prices continued to spiral upward through most of 1973, but the first signs of the energy crisis began to be felt by the end of the year, and the 1974 selling season was sluggish due to the general economic slowdown.

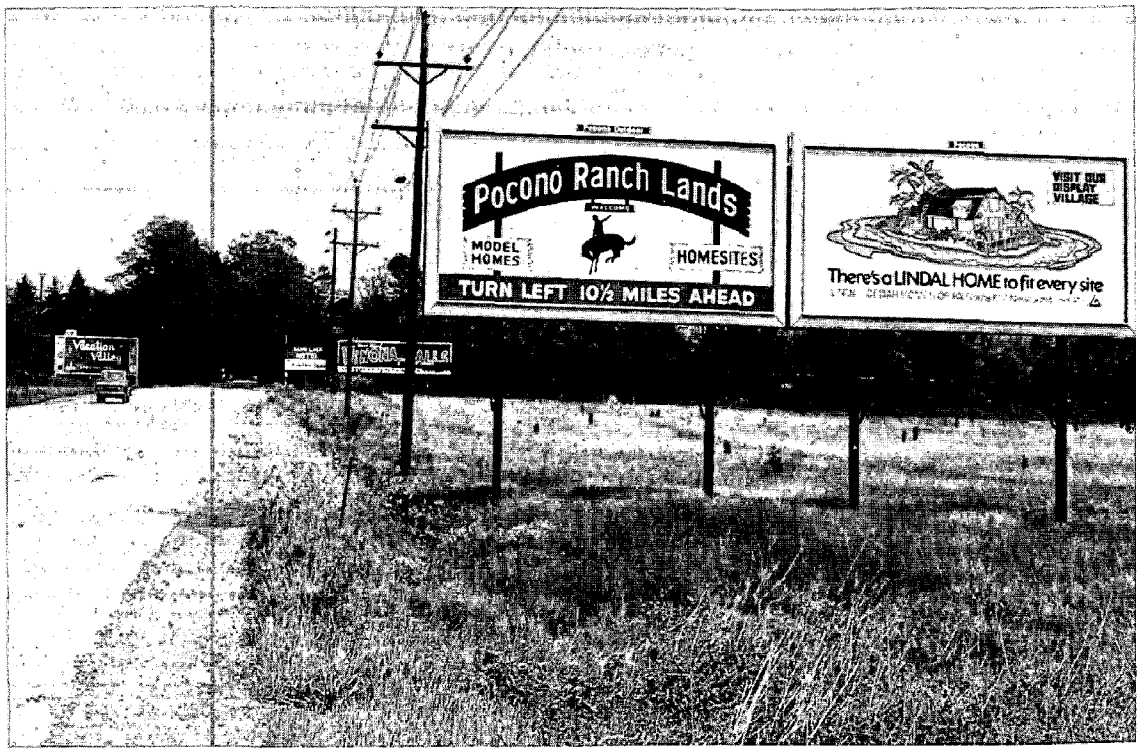
Regardless of the availability of gasoline and the effects of economic conditions, it is clear that far more lots in the Poconos have already been subdivided than are required to meet any foreseeable need. Latest figures for the Pennsylvania Vacation Land Developers Association indicate a 23.3 percent build-out in 1972.[6] Although this is higher than rates elsewhere in the country, it still means that three out of four lots remain vacant.

The process of converting the mountains to subdivisions begins when the owner, who for years has thought his land worth only the timber on it, decides to cash in on what he believes is a highly overinflated value. In fact, he usually makes far less than the buyer. Typically, he sells 150 or 200 acres to a land sales firm that is assembling a large parcel.

The land sales company prepares a subdivision plat indicating the layout of lots and roads and files it with township zoning and county planning commissions. If the townships have subdivision regulations, their zoning commissions must approve the plans. The plat seldom indicates topography, grading, and other natural features that should be considered in designing and approving a subdivision. With plan approval, the bulldozers are brought in. Often they scoop out an area for a "pond," which usually ends up being a muddy algae-filled puddle that cannot function naturally and serves no purpose other than attracting buyers for the first season. Then the forests are cut down for streets and roads.

At this point the sales force is brought in. Telephone campaigns are directed to major metropolitan areas such as Philadelphia and New York City. Free appliances, dishes, travel expenses—these and other come-ons are usually part of a concentrated sales onslaught that often raises the cost of the project.

Pocono lot sales, like those in other parts of the country, are often made in an atmosphere of exaggerated profit for the buyer, vague assurances about completion dates of community facilities, and intense pressure to sign. Advertising, particularly direct mail, is usually targeted to affluent metropolitan neighborhoods



Travelers reaching the Poconos are quickly made aware of the land boom in progress.

and stresses the pollution and crime of city life and the need to escape to a place in the mountains.

The sales tempo picks up as soon as a prospective buyer drives in. Based on past experience, most firms assume that the sale will be lost unless it is closed before the visitor leaves the site. Most developers prevent the prospective buyer from driving around the site unaccompanied by a salesman. Often a sales team operates from a fleet of cars or jeeps equipped with 2-way radios. As the affable salesman drives his prospective clients around the development, radio bulletins crackle from a central dispatcher asserting that lots are going quickly.

One of the biggest sales pitches touts the future resale value of the lots. Although salesmen continue to predict tremendous profits if a buyer should ever want to resell, those who have tried have been disillusioned. Unless it fronts on a lake or has an exceptional view, the parcel is just another lot on a market glutted with many others like it. One banker who has carefully observed lot resales said, "I would be surprised if the purchaser of a $10,000 lot can get $6,000 for it."

Far too few buyers take a sample copy of the proposed contract home to read before signing, and many buyers have been refused such a request. The Federal Interstate Land Sales Act allows the buyer to cancel a contract within 48 hours of signing.[7] But developers typically avoid this requirement by inserting a clause in the sales contract waiving the cooling-off period. The buyer is seldom aware of the waiver or even that he has the right to a cooling-off period. New Federal regulations require clear warnings to buyers to read before signing.

Too often the buyer is ensnared in his own gullibility and avarice. Many of the highly touted "lakes" are self-evident ponds dug out of the ground. Many of the subdivision maps

make clear that little open space has been provided and that lots are crowded corner to corner. Anyone who thinks about it knows that what looks like a mountain wilderness now will soon look like a half-built suburb.

Throughout the Poconos, one hears stories about developers pulling out before promises are kept. When a good number of lots in a development are sold, the seller is ready to pack his bag. He turns over roads and other facilities to a community association made up of property owners. The clause in the contract permitting his doing so is often unnoticed by the owners until they find themselves saddled with the unconnected hydrants, substandard roads, undersized culverts, and erosion from unsold lots.

Being city people, most buyers assume that all the facilities have been inspected and approved for adequacy. The reality is that the rural townships have only part-time volunteer planning commissions and engineers who have neither the time nor the expertise to make adequate inspections and who often see any development as good.

Shaping the frenzied pace of subdivision and pressured sales is the little-understood financing of the lot seller. With the buyer's 10 percent down, he is able to take out a loan for the remaining 90 percent of the price at the local bank. These loans are precarious in two ways: The bank credits the developer with receipt of the total sales price, although the customer may have 5 to 7 years to pay, and the loans are callable in 90 days. Explaining this to a visitor in the days preceding gasoline shortages and economic woes, the president of a Pike County bank worried about how a downturn in business conditions might affect the Poconos. Making a "conservative" guess that there was at least $25 million in short-term real estate loans outstanding in Pike and Monroe Counties, he warned that if banks began to call in their notes, a major financial crisis would ensue. He hastened to add that his bank's policies were more prudent than most, holding such loans to 10 percent of its loan portfolio. His bank also dealt only with four developers whose policies he judged sound, particularly on delivery of promised amenities. Because of deteriorating general economic conditions and a noticeable rise in delinquency by lot owners—up 10 percent from the previous year, he estimated—the bank's policies were recently changed to require a 20 percent downpayment.

The Impact on the Environment

The environmental impacts of recreational subdivisions begin to be felt long before—and whether—any lots are sold or houses built. To make lots accessible to potential buyers, roads must be cut through forests. Rains then wash silt from the cleared areas into the streams and lakes, destroying the natural functions of what are supposed to be major attractions of the recreational development. Because Pocono subdivisions rarely adopt clustering but instead repeat the pattern typical of sprawling suburban developments, the grids of dirt streets are often extensive. Given the number of Pocono subdivisions and the shallow soils, silt runoff can be substantial.

Although the number of recreation homes built is dwarfed by the number of lots subdivided and sold, the construction of homes and community facilities, including ponds and lakes, nonetheless brings additional environmental problems. Trees are cut, natural cover is removed, and sloping sites graded. Powerlines must be connected, wells must be drilled, and systems of solid and human waste disposal provided. All this is exacerbated by subdividing far more land than will ever be sold and by pulling out before all the promised facilities are built.

Refuse disposal poses problems because public collection is rare outside a few towns. Most developers do not provide for any service but leave it to the property owner to dispose of refuse, encouraging open dumps, burning of trash, and dumping along the roads. Although the

Economic conditions, potential energy shortages, and local concern over social and environmental impacts have begun to take some of the momentum out of the vacation land boom, but sales efforts continue.

Monroe County Commissioners have appointed a Solid Waste Authority to recommend a plan, controversy has arisen over a proposed land fill site.

Sewage disposal has created the most serious environmental problem and has generated the most controversy. Home builders normally put in septic tanks. But the Pike County Soil and Water District has warned that much of the county's soil is not suitable for septic tank systems because of shallow soil conditions, compact substrata, and a high water table.

Local developers and officials argue that most sewage limitations can be solved by larger lots, central water systems, and use of more advanced types of septic tanks. They say that soil conditions are only a general guide and that each lot needs a percolation test to determine soil capabilities. Despite numerous complaints on file at the Federal Office of Interstate Land Sales and the Pennsylvania Bureau of Consumer Protection about ineffective septic systems, developers insist that there is hysteria over a minor problem. State pollution control officials strongly disagree.

Focusing special attention on the Poconos, the State issued regulations in 1965 (recently updated) requiring local officials to disallow plans for new subdivisions of less than 1-acre minimum lots if there is no approved municipal plan to provide sewerage facilities.[8] A plan for the western part of Monroe County, whose waters drain into the Lehigh, has been approved.[9] The eastern half, which flows directly into the Delaware, is under study.

Most subdivisions now being marketed were approved before the latest State regulations went into effect and therefore were exempted

from the 1-acre minimum. But an owner must still secure a building permit, which requires a septic tank percolation test on the lot, a fact which many buyers do not understand and are not told. Although owners of such lots are usually issued building permits, the process is no longer automatic and may take several months. Substantial numbers of owners are being required to install septic systems at double or triple the normal cost. In a few instances, people have been refused permits; in those cases, developers have sometimes swapped lots, but sometimes they have not.

Although lot sellers have defended their reluctance to put in sewerage facilities on the ground that the homes are used only seasonally, it is estimated that over one-third is used year-round, in part because of rentals and the many visits by family and friends, and in part because of conversion to permanent residences, often by retired people.

One of the environmental ironies of Pocono development is that very little open space is being set aside in most subdivisions. Usually it is limited to swampy land that cannot be built on and to artificial ponds or lakes that are virtually surrounded by "lakefront" lots and provide little access for others. If it is assumed that most people who buy lots will eventually build, the Poconos will soon look like suburbia—no resemblance at all to the rustic area it has been for so many years. Even if only one-third or one-half the lot buyers ever builds, the region will be chopped up with the dirt tracks, cleared lots, and silted ponds of numerous uncompleted developments.

In the rush for a second home to "get away from it all," many Pocono lot buyers may find that they have indeed gotten away from very little. And those who have lived there for years and initially welcomed the development will wonder what happened to their countryside and their towns and villages. It is perhaps this environmental impact, in the form of subtle changes in the character of the towns, the natural beauty of the countryside, and the life-style of the people who live there, that is at once the most pervasive and the most difficult to assess.

The Local Dilemma

Long-term residents of the Poconos are of many minds about the subdivision boom. To a large degree it seems a welcome change. The new version of vacationer has several advantages over the old; he buys property, pays taxes, and on the weekends buys groceries and other staples in town. As in any rural area, development means jobs and income through purchases at local stores, construction by local contractors, mortgages by local banks, and services by local lawyers. It brings highways, motels, summer theatres, new ski runs. As one young resident said, "People are happy that things are happening here."

"There is no question that this development has benefited the county and the townships tremendously," says a Pike County commissioner. When he first took office 18 years ago, there was a $9 million assessment on 9,000 parcels of land; today there is a $40 million assessment on 25,000 parcels. "There are no townships or school districts in debt. The county had a 40 percent reduction in taxes last year, and our revenue sharing money is in the bank," he said. During this time, the budget in Pike County has doubled, something that he attributed to normal growth rather than to any special problems related to the proliferation of subdivisions. An official of a school district in neighboring Monroe said that his was "a wealthy district" due to the number of seasonal developments within it. The subdivisions produced few new school children and tax rates were low.

But some are beginning to question the long-term effects of the development. At least one Monroe County commissioner is sure that the costs will outweigh the gains. A reassessment of

property has resulted in a heavy tax increase to long-term residents in Monroe County. The county budget, which has risen from $1.9 to $3.2 million in 5 years,[10] reflects the public service demands brought on by the growth—a new hospital, fire trucks, a jail, a halfway house, and old-age facilities, to name but a few.

Township and county governments either lack the necessary legal authority to deal with the development pressures or are unable to finance or find the staff to implement needed policies. Monroe County does have subdivision regulations requiring that plans contain specific information on soil conditions, topography, swamps, rock outcroppings, and road widths.[11] It also has a paid planner and engineer and a part-time, volunteer planning board. The county is preparing a comprehensive plan, but meantime extensive land is being subdivided.

Pike County has no subdivision ordinance and is only now considering zoning regulations. It has a part-time planning commission but no paid planners or engineers.

The townships are governed by supervisors who meet once a month. Most of the townships are without plans or even part-time professional planners, and several have neither zoning nor subdivision regulations. Even when these laws exist, as one town supervisor complained, they are "only as good as the people who implement them."

But by far the biggest and costliest issue now being debated is sewage treatment. The study for western Monroe County has a range of alternative systems to serve a growing population through the year 2000. Overall capital costs for the project are estimated at $12 million.[12] In addition, each owner would be charged for a hookup to the central system.

There are other cost burdens, too. One Monroe County township supervisor, for example, believes that one-half the developers' roads in his township are substandard and will need extensive repairs or replacement at public cost. The roads begin as part of a developer's investment; some are paved at the start, but most are paved as the lots are sold. If the roads are approved when constructed, residents can petition the county to take over maintenance. The county is then responsible for meeting the costs.

It is costly to provide the full range of public services to the scattered developments. And the new residents are demanding street lights, traffic signs, and police and fire protection. For police protection alone, one town supervisor claims that a major tax increase will be required.

So the citizens of the Pocono region are riding a runaway horse. Local governments strain to meet the service demands brought on by the subdivisions, but few have yet acted to control the source of the increased costs by controlling the subdivision process. Meanwhile, new roads are built into the area, and the region moves closer to a choice between growth-inducing sewers at tremendous cost and a potentially serious health problem from thousands of inadequate septic systems. Meanwhile, the energy crisis and the economic slowdown threaten to bring the boom to an abrupt end.

"The quality of life is really changing here; there's no question about it," mused one citizen who, nevertheless, firmly supports the influx as a way of lowering taxes. Although obviously difficult to measure, public interest appears confused about what the long-term costs and effects of the development will be. Although there is growing suspicion that all may not be right the way things are going, the dominant mentality is one of a land rush. The guiding principles in the Poconos remain buyer beware, any development is good, and local government knows best.

Chapter VII
The Bay Country—Villages, Condominiums, or Superports?

From Wilmington, the Delaware spreads out and slows, becoming one of the most naturally productive estuaries in the Nation. Extensive marsh areas are woven with streams and tidal runs, some of which lead to villages and towns that date back hundreds of years. But the apparent serenity of the bay country belies the changes and conflicts about to be brought upon it.

After years as a backwater passed over by international trade on the way to ports upstream and by thousands of city dwellers flocking from those ports to Atlantic beaches on summer weekends, the bay is suddenly attractive to nearly everyone. The deep natural channels of the bay and the areas immediately offshore, as well as its proximity to existing refining capacity and markets, make it an ideal site for handling large tankers and for building energy facilities both onshore and offshore. At the same time, the people of New Jersey and Delaware are beginning to see the potential for a great recreational resource in a clean and swimmable Delaware Bay. Travel limitations placed on city dwellers by gas shortages simply raised the potential for the nearby bay's becoming a new recreation center, especially as cities upstream begin to control water pollution.

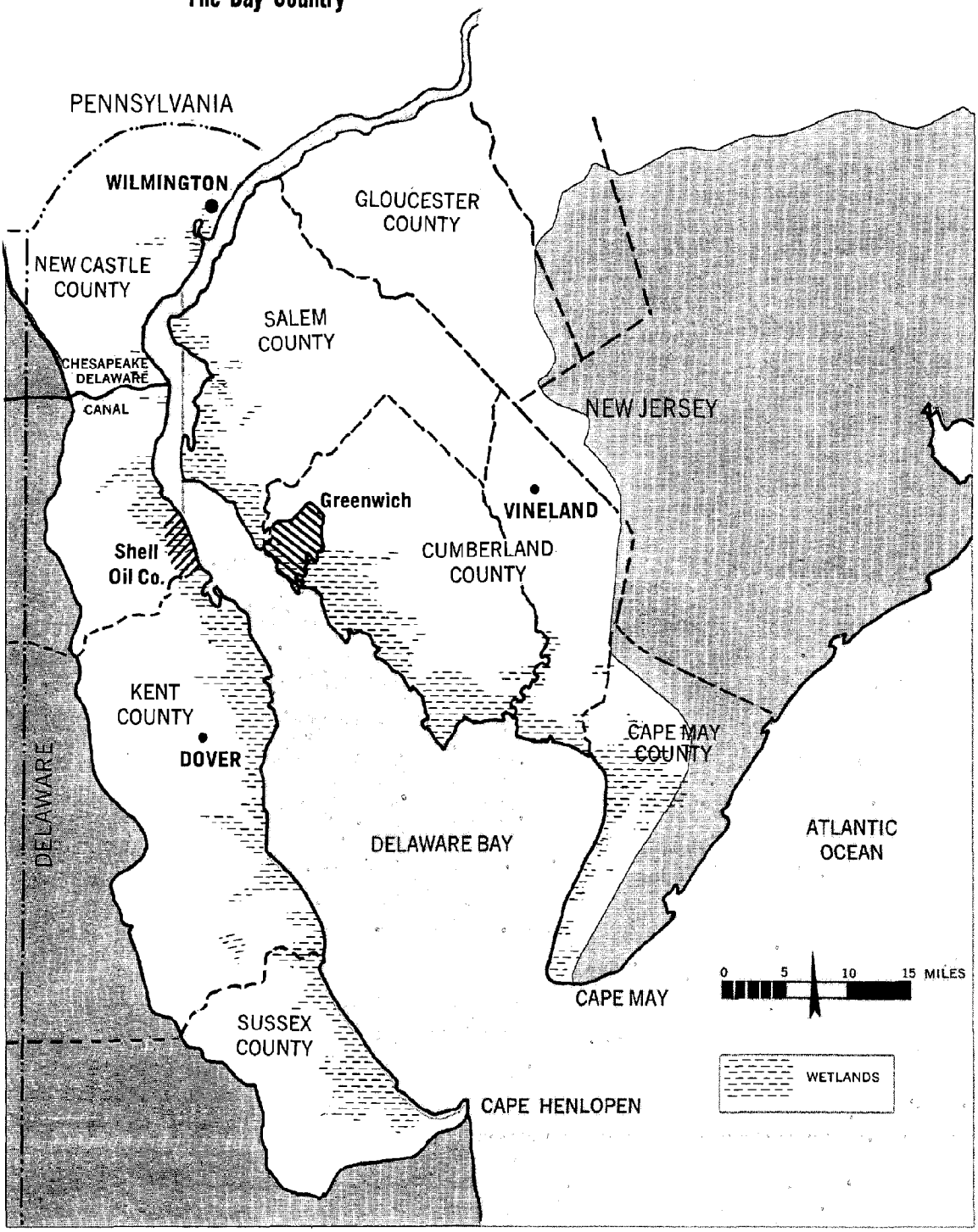
These two new circumstances—the immediate pressure for energy facilities and the long-term potential for recreation—are not necessarily compatible, and in fact considerable planning and regulatory effort will be needed for them to coexist. The permanent changes that these new pressures will bring to the bay country will threaten the natural and the manmade environment that has grown up there over the years.

There is no doubt that changes will occur in the bay country. The important issues are related to the nature and pace of the changes and to the way that potential conflicts can be identified and resolved. In this sense the localities and states that comprise the bay country will need to make very real choices about the kind of future that they want. Otherwise the decisions will be made by the energy companies, the real estate developers, and the Federal Government—none of which has as much to gain or lose from the consequences as the people who live there now.

In a sense the bay country provides in microcosm a glimpse of the future that many of the coastal areas of our Nation will face. The competition among traditional lifestyles, recreational development, and energy facilities development (superports, refineries, powerplants, and the like) is a fact of life that many areas are facing today and more will face tomorrow. It will take effort to identify the options, to make the choices, and to try to accommodate the new to the old. In the bay country the effort is just beginning, but there have already been important decisions and significant milestones.

Figure 9

The Bay Country

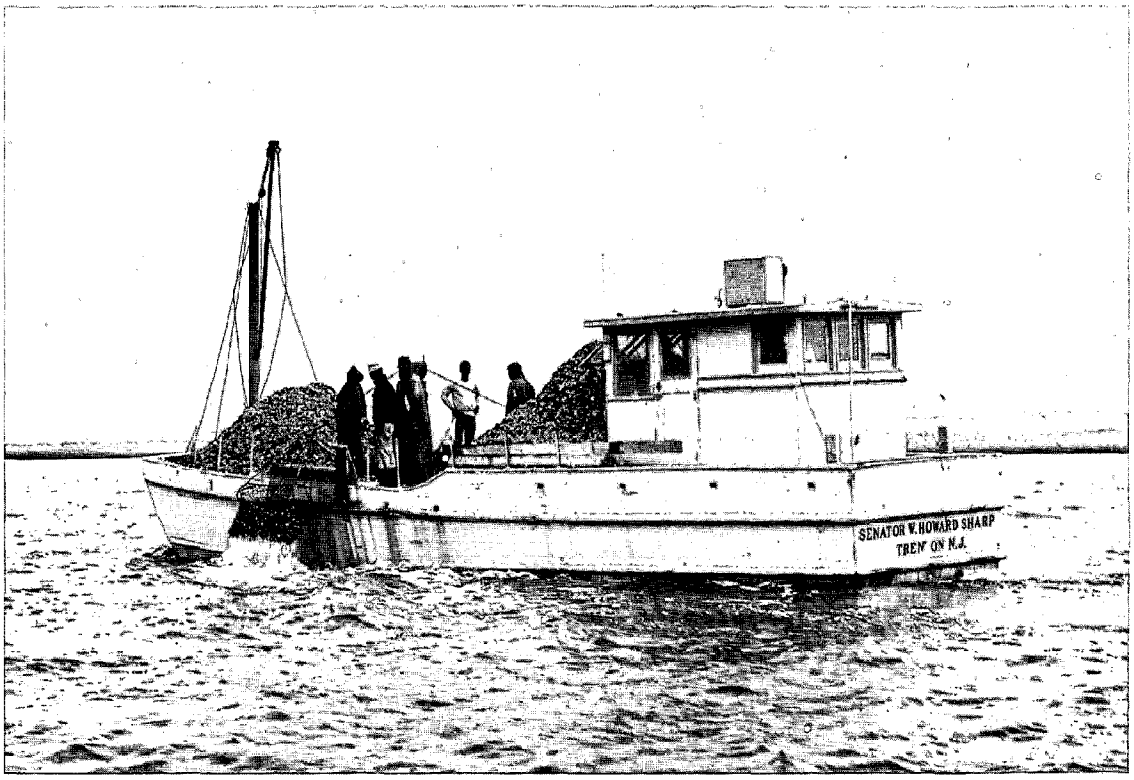


The Traditions

The bay country today is a serene expanse of salt marshes, farmlands, villages, and productive waters. The towns carry the way of life in their names—Bennett's Pier, Bivalve, Big Stone Beach. In places, the marshes reach inland for many miles, providing shelter and food for a wide variety of waterfowl, fish, and wildlife. Waterfowl and shore birds by the hundreds of thousands winter in the bay and continue north and south from the numerous wildlife refuges along its shores. By late spring the birds are gone and the bay begins the warming process that makes it a spawning and nursery ground for fish and shellfish, among them the oyster.

Oystering has long been a way of life on the bay. Most of the small towns grew up around the trade. Delaware Bay oysters were in such demand that by the time of the American Revolution laws were passed to ban the use of shells for lime because the new oyster larvae need old shells in order to "set" on the bottom. For over 100 years, battles ensued among oystermen of different States as far away as Connecticut over dredging rights in the bay until the Supreme Court set boundaries in 1934.[1] But by then the oyster business was in serious trouble from pollution and the predatory oyster drill. One of the most active centers, Bivalve, N.J., has seen 11 of its 15 oyster companies close in the last 50 years as the annual catch dropped to 20 percent of what it was.[2] Only 41 oyster boats now sail out of Bivalve, whereas in 1920 there were over 350.

Ironically, just when unprecedented economic development is about to hit the bay in the form of proposed energy facilities, the oyster



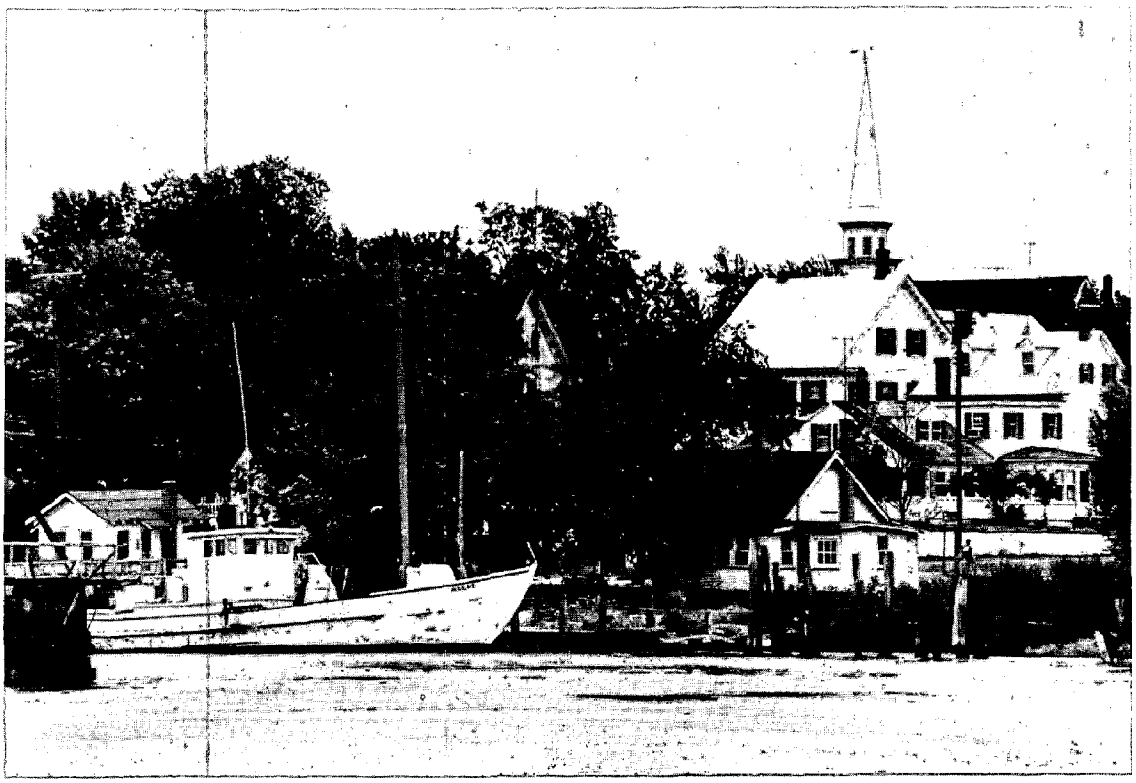
Many people living along the bay still depend on oystering and fishing for their livelihoods. After a long period of decline, catches have been increasing in recent years.

industry is beginning to make a comeback. With the help of government authorities, the oyster drill is being controlled, beds are being reseeded, and processing plants are expanding and modernizing. Pollution is lessening and is likely to drop further, and a 10 percent increase in oyster production was predicted for 1974.[3] But often the sons of the watermen are attracted to other jobs and other places.

Although the bay's traditions are heavily descended from the oystering industry, there are other important economic activities with deep roots. Glassmaking is an old craft on the New Jersey side; the first factory dates from 1738. Today the silica sands of South Jersey continue to support a thriving glass industry.

Perhaps the most prominent image of the bay country in the minds of residents of the industrial cities on the Delaware is the extensive truck farms that dot the countryside among the marshes and cover nearly every acre as the wetlands fade inland. These areas are among the Nation's most productive for fruits and vegetables. Even more important to the economy of the region are the massive food freezing and packaging industries that in recent years have grown enormously, as has production of fruits, vegetables, and other farm products. One of the highlights of a summer weekend at the shore for many an urban family is the bushel of Jersey peaches or Delaware tomatoes picked up at a roadside stop on the way home.

Last to mention are the towns and villages of the bay country. Many have long and colorful histories that begin with Dutch, Swedish, or English settlers and move on to generations of wealthy merchants and traditional industries. Most have seen more prosperous days, usually long before settling into a tranquility that only now seems to be slipping away. Industrial de-



Mauricetown is typical of the Cumberland County towns that could be permanently changed by energy-related development.

velopment has already enveloped one or two, but in at least one town, New Castle, the effort to preserve the history and charm in the face of tremendous development pressures from Wilmington has been successful.

In some of the more remote villages prosperity is just beginning to return, for the most part due to bigger oyster harvests and to wealthy urbanites' buying and rehabilitating old houses for second homes. How to preserve the traditional way of life along the bay and the character of towns and the natural surroundings is the task facing citizens and public officials throughout the region.

The Imminent Recreation Boom

As late as the early 1950's, bathing beaches and recreational boating were still common at places like Bowers Beach. But weekenders stopped coming, in part because they learned more about the adverse health effects of pollution, and headed instead for the cleaner Atlantic beaches. The old cottages remain along the muddy, littered sands, but visitors are few. The recreation boom of the last 10 years has bypassed the bay as the Atlantic coastal areas of both Delaware and New Jersey have undergone unprecedented residential and commercial growth that has stirred controversy over high rise condominiums, traffic congestion, and overloaded sewage treatment plants.

Meanwhile the bay waters are slowly regaining the quality that they lost. As discussed in chapter II, reductions in levels of industrial pollutants plus the massive federally financed effort to upgrade municipal sewage plants along the length of the river have begun to take effect. Not beyond imagination is a clean and swimmable bay in the not too distant future.

The 1972 Amendments to the Federal Water Pollution Control Act,[4] if fully implemented, will help accomplish this in a number of ways. For the first time the large cities on the river have available levels of Federal assistance needed to meet the cost of multimillion dollar water treatment improvements. Smaller towns benefit as well, but particularly important to them is the higher Federal share (75 percent),[5] lessening the burden on their relatively low tax base. The new Federal pollution laws also make it easier to coax industries to use the facilities and to share the costs of expansion and upgrading.[6] Industrial facilities can take advantage of significant advancements in treatment technology. Finally, required areawide planning,[7] if used creatively, will provide a basis for evaluating the effects of pollution control on land development and growth.

The impacts of this new potential for recreation in the bay, though not likely to be as serious as what has happened to the barrier reef beaches from Atlantic City, N.J., to Ocean City, Md., nontheless merit attention and concern. If poorly accommodated, growing recreation interests could result in damage to important natural areas. A new weekend influx could create pressures for commercial and residential construction that would threaten the character of established communities and economic activities.

On the other hand, if steps are taken to assure that new development avoids damage to important natural areas and complements existing communities, then the full recreation potential of the bay could be accommodated with preservation goals. The more important question is whether this new opportunity for the bay can be realized in light of growing pressures to develop energy-related industry along the shore and inland.

Energy and Industry—A Threat or a Promise?

The bay and the lower river are a major import gateway of the country. For decades growth centered around the major cities of the

region, but new technology, changes in transportation, and a shortage of large sites in the crowded estuary above the bay make the flat coastal plain and marshes of the southern counties of Delaware and New Jersey attractive to industry. Union Carbide has purchased 1,400 acres near St. Georges south of the Chesapeake and Delaware Canal,[8] and farther south Shell Oil bought over 6,000 acres for a refinery.[9] Although all types of industry are attracted to these new sites, the driving force behind the push for industrial development in the bay country is energy, particularly the Nation's need for a more reliable supply of petroleum products.

The Delaware River Basin already contains one of the largest concentrations of petroleum production facilities in the country. It is the site of 8 of the 10 east coast oil refineries and produces over 80 percent of the east coast's petroleum products.[10] Energy supply problems have drawn national attention to siting major new facilities in a manner acceptable to the public. In the short term it can be done in the Delaware Valley to a large extent by expansion on existing sites. In the long term, however, adequate petroleum supplies will depend on new technology that could severely impact the bay country.

To the extent that the Nation continues to import petroleum, the unique natural depths of the bay and offshore will attract supertanker facilities. To the extent that domestic petroleum is developed, emphasis will be on the outer continental shelf, including the OCS off the Delaware Bay. Either way, the bay country is under pressure for sites for refineries, petrochemical complexes, liquified natural gas conversion facilities, and the commercial and residential development that is induced by industrialization. The onshore effects of superport and OCS development merit close examination.

Today the largest tanker that can navigate the Delaware's 40-foot channel fully loaded is 70,000 deadweight tons. The new supertankers, which range in size from 125,000 to 540,000 deadweight tons, require channel depths up to 100 feet.

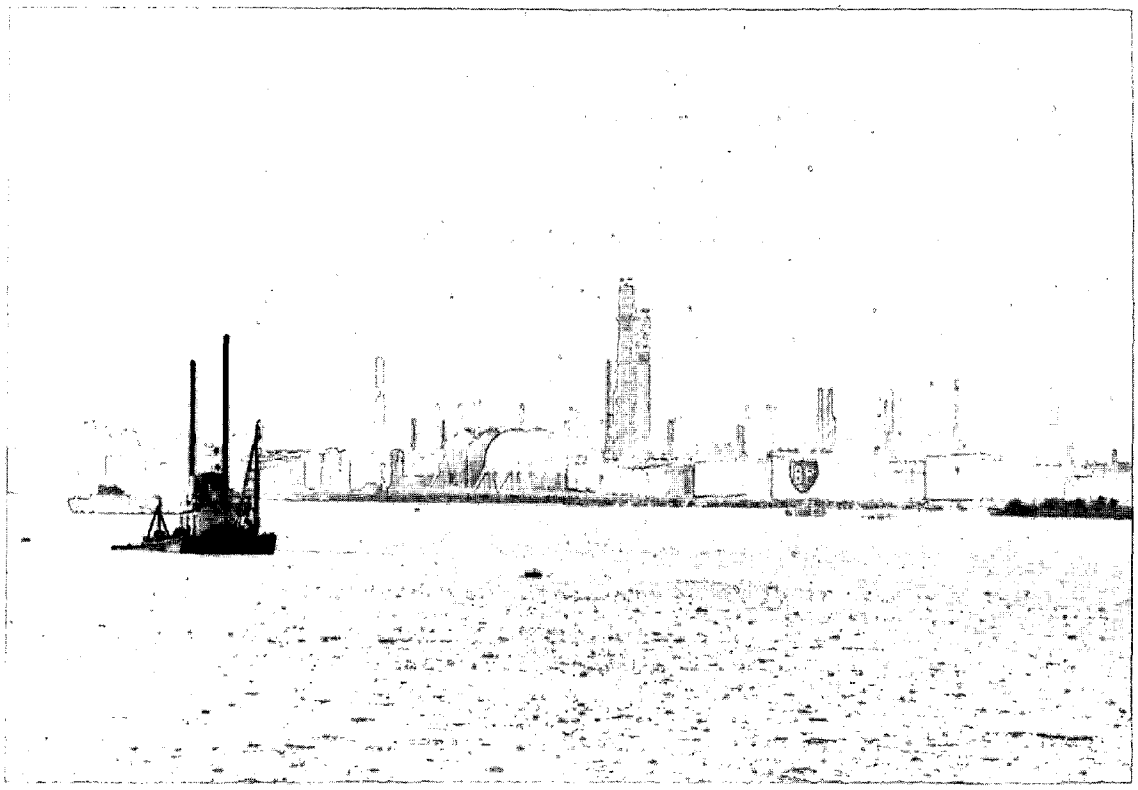
The Army Corps of Engineers' recent study of potential superport sites along the Atlantic coast tentatively examined four sites in the vicinity of Delaware Bay—two in the bay, one on the Delaware side and the other on the New Jersey side, and two on the Atlantic coast off New Jersey and Delaware.[11]

Deepening and widening the bay channel, particularly on the New Jersey side, would require a major dredging operation that would destroy bottom habitat, cause extensive turbidity, and require the disposal of massive amounts of dredge spoil. In fact, the damage to marine life from dredging and the greater risk of serious oil spills occasioned by supertanker traffic within the confined bay are so significant that the study concludes with a recommendation for development of deepwater ports far offshore to minimize adverse impacts of dredging, port construction, and oil spills.[12]

In addition to marine effects, which would vary according to the type and location of a superport facility, environmental and economic effects would be felt onshore as a result of industrial, commercial, and residential development induced by the port. To assess these impacts, the Council on Environmental Quality contracted with Arthur D. Little, Inc., to evaluate the potential onshore effects of a deepwater port serving several areas, including New Jersey's Cape May and Cumberland Counties. ADL's working assumption was that crude oil from an offshore terminal would come ashore by pipeline to the vicinity of Greenwich in Cumberland County.[13]

An examination of this area provides insight into how a deepwater port affects use of the land. Both counties are decidedly rural. In 1970 their population of 181,000 was only 3 percent of the State's; yet they cover 10 percent of the land.[14] Per capita income was just over $3,000, 18 percent below the State average.[15]

If relatively little reliance were placed on oil imports and existing refinery capacity else-



Without careful planning and effective siting policies, much of the bay coastline could take on the appearance of Marcus Hook, Pa., farther up the Delaware.

where in the region could be doubled, Cape May and Cumberland Counties would continue at their present growth rates. Crude oil shipped to the deepwater port offshore would be stored temporarily at a pipeline terminal onshore and then transported north to existing refineries and petrochemical complexes around Wilmington, Camden, and Philadelphia, where capacity would be expanded.

But if a deepwater oil terminal is located in or near the bay (or if oil is discovered offshore), it is possible that over the ensuing 25 or 30 years the Mid-Atlantic will experience an even more significant expansion of petroleum-related industry.[16] In such a case, it is likely that new refineries will be built in Cumberland and Cape May Counties, which would become an important industrial and economic center for the entire Mid-Atlantic region.

From a purely economic standpoint, there would be gains from a superport or from significant oil development on the outer continental shelf. Refineries, petrochemical plants, storage tank farms, supply facilities, and added service industries would rapidly develop. By the year 2000, under high impact conditions, more than 150,000 new permanent jobs could be created,[17] double the employment expected under normal conditions, and per capita income could increase to $6,750, about $1,200 more than under normal growth conditions.[18]

But the environmental impacts of such a large and rapid industrial boom would be alarming. The amount of developed land in the two counties would triple in less than 30 years. Crude oil storage, refining, and petrochemical operations sited on the bay would cover over one-half of Cumberland's 30-mile shore, still only a small

fraction of what would be developed for other industries, businesses, and homes. Extensive development like this would permanently change both the appearance and the lifestyle of the bay country.

In addition, water would be needed for industrial cooling and processing and for the larger population and the commercial development. Even with adequate industrial water-cooling facilities and full advanced waste treatment, the daily discharge of BOD by 2000 would equal the pollution from raw sewage produced by a city of 250,000.[19] The potential for air pollution would increase significantly as well.[20]

What happens onshore will also depend on what happens to offshore oil drilling—whether the Atlantic outer continental shelf is found to contain petroleum and natural gas and whether these resources are developed. The Council on Environmental Quality contracted with Resource Planning Associates, Inc., to determine the onshore impacts of OCS oil and gas development.

On the assumption that a superport serving the Delaware Bay with a high level of imports would precede OCS oil and gas production, the onshore impacts of OCS-induced development would add little to the superport-induced development. However, on the assumption that there will be no superport or that only a low level of imports will come into the Delaware Bay, OCS development impacts could be significant: four or five new refineries, two gas processing plants, and two petrochemical complexes within 10 years. By the year 2000, there could be seven or eight refineries, eight gas processing plants, and six petrochemical complexes. Much of this development could be in Cumberland and Cape May Counties.

Low-level OCS development would create 9,000 new jobs in the two-county area; high-level development would mean 30,000. High-level OCS development and large-scale deep-water port development would more than double the 1970 population. Industry would replace tourism, fishing, and agriculture as the economic base, and large numbers of new public facilities, especially schools, hospitals, and waterworks, would be needed.

Because there are no large cities in Cumberland or Cape May County, the impact would be borne by the small towns, especially the fishing villages. Although most towns would welcome certain kinds of economic development, some have already seen an upturn from improved oystering and from city residents buying second homes. But few have the land use planning and regulatory tools necessary to control the volume of growth that is imminent.

In addition to these problems, locating industry will be difficult without causing major conflicts with recreation, wildlife, and wetland preservation efforts. Air and water pollution appear to be controllable, but extensive dredging and construction in the wetlands are highly controversial and in some cases will be unacceptable. A partial solution may lie in locating major industrial facilities inland, limiting coastal disruption to pipeline and unloading facilities. Refineries and other related industries may also locate at existing industrial centers in the Delaware River Valley.

Institutional Responses

Pressures for change in the bay country, whatever their form, have not been ignored by local and State authorities. Both Delaware and New Jersey, concerned about protecting the bay and trying to avoid piecemeal, ad hoc, and crisis decisionmaking, have enacted legislation to put development and preservation decisions on a rational basis. Both States have acted to take back some of the land use regulatory powers previously delegated to localities. Major development decisions are so far reaching and the coastal zone resources so limited that this

broader view is essential to prevent the many individual decisions from becoming cumulatively destructive and to avoid decisions that affect areas far beyond the locality that is making them.

In the summer of 1971, after a study commission recommended a halt to coastal industrialization,[21] Delaware banned all new development of oil refineries, petrochemical complexes, steel mills, and other heavy industry along its Atlantic and bay coasts and created a permit system for controlling new manufacturing and the expansion of existing industry.[22]

The Delaware Coastal Zone Act was passed in an atmosphere of concern about the long-range goals for the State coast for which heavy industrialization seemed inevitable, as indicated by Shell's plans for a refinery near Smyrna and a possible deepwater port near Big Stone Beach in Kent County. By legislating a flat prohibition on heavy industrial development along the coast, the public made a clear-cut choice to encourage recreation and open space use of the bay shore.

But protection against heavy industry was not enough, for the ban itself stimulated interest in recreational developments along the coast. Real estate interests quickly felt and responded to the demand for second homes and other housing within view of the now-protected bay. The need for a broader system of land use controls was evident.

In 1973, the Delaware General Assembly passed a wetlands statute that established a strong conservation policy as well as State control over virtually any development in the State's tidal marshes.[23] Except for the heavy industry exclusion and the protection of wetlands, however, Delaware has no statewide method of review and approval for other types of major incursions along the coast, including recreation-based development.

Recent attempts have been made to repeal the Coastal Zone Act. Based upon arguments that the ban on heavy industry has given the State a bad name with industry in general, a major effort for repeal was mounted by economic development interests, including the Chamber of Commerce, the president of the DuPont Co., and the AFL–CIO. Defenders of the law include the United Auto Workers, environmental groups, and many residents. They argued that repeal is unnecessary in light of the record of expansion by existing industries as well as the continued ability of the State to attract manufacturing, especially because some were attracted to new locations by the promise of a coastal zone set aside for the recreation of their employees. So far, such arguments have been persuasive.

Since enactment of the Coastal Zone Act, several applications for permits to construct industrial facilities have been made. However, an industrial consortium was denied a permit for a pipeline from a proposed oil transfer facility off the beaches at Rehoboth.[24] Although the facility was to be located beyond State jurisdiction and a pipeline was not a prohibited use per se, the State attorney general ruled that the pipeline was ancillary to a prohibited use and therefore was banned under the act.

With Delaware banning heavy industry on its coast, the pressure on New Jersey has increased. Shell Oil, for example, shifted a proposed refinery site from the Delaware coast to Gloucester County, N.J. Shell still owns the acreage in Delaware.

New Jersey enacted a statute in 1970 to control development in its extensive coastal wetlands, over one-fourth of which was destroyed between 1953 and 1970.[25] But the State had no laws to regulate industrial and recreational development in coastal areas outside the wetlands.

It was the proposal for a superport that brought things to a head. During the spring of 1972, the Corps of Engineers held hearings in New Jersey and elsewhere on possible deepwater port sites in the Delaware Bay. The hearings were jammed and the debate heated. Local officials, Congressmen, Senators, industry repre-

sentatives, and private citizens—nearly all vehemently opposed *any* superport. In flatly rejecting the suggested sites, the Governor of New Jersey noted that "the secondary effects of the location of these superports may ultimately prove to be more destructive to our environment than oil spills * * * completely changing the character of this part of our State." [26] The New Jersey Senate considered but has not passed legislation that would place a 4-year moratorium on construction of a deepwater port within State coastal waters.[27]

After a controversial session in which the Senate first defeated and then agreed to the proposal, the New Jersey Legislature passed a wide-ranging coastal zone law that gives the State control over virtually all major developments (including deepwater ports) within a broadly defined coastal zone reaching from Salem County south around the bay, up the Atlantic coast to the Raritan River, and out to the 3-mile limit—almost one-sixth of New Jersey.[28] It is still too early to anticipate how the State will use this powerful new law to resolve the inevitable conflicts between development and environmental interests.

Federal legislation to license the offshore siting of deepwater ports was enacted by the Congress and signed into law by the President on January 4, 1975.[29] The Deepwater Port Act authorizes the Department of Transportation to promulgate regulations and standards under which a port may be built and operated. The act also provides for a deepwater port liability fund to be used for cleanup costs in the event of a spill.

But the debate to determine what happens to the bay country does not go on only in Dover and Trenton and Washington, D.C. In the small towns and fishing villages along the bay, people are discussing what could be the biggest change to hit their area since the white man first appeared. The following section discusses how one small town in New Jersey is working out its response to what may be coming.

Greenwich

Caught in the impending battle between economic and environmental forces that typify what faces many bay towns is Greenwich, a small community of 1,000 along the bay at the mouth of the Cohansey River. The old town is listed on the National Register of Historic Places.[30] On December 22, 1774, a band of men confiscated and burned British tea in defiance of the Crown's tea tax; although the idea was not original and the Greenwich Tea Party never achieved the fame of its more northerly antecedent, the houses and streets of the town capture that earlier era even today.

Founded in 1675, the town was one the first permanent English-speaking settlements on the Delaware River, which until then had seen mostly Dutch and Swedish settlers. By the early 1700's Greenwich had become a thriving colonial port with gristmills, cabinetshops, sawmills, and stores. Its "Greate Street" was lined with churches and the homes of the prosperous. When the centers of commerce moved inland with agriculture, Greenwich entered a quiet period that brought few changes after 1840.

Today Greenwich is a graceful village, its wide main street bordered by old sycamores and many restored 18th century homes. However, the town is far from tranquil. New forces, internal and external, now press heavily on Greenwich, giving its citizens choices that they never had before.

Greenwich has been discovered both by city people who are buying old houses and restoring them and by international oil and utility interests for whom it is the ideal place to bring in oil from an offshore deepwater port. Petroleum storage facilities, refineries, and petrochemical complexes could follow in rapid succession—consuming much of the township's 19 square miles, most of which today is farmland, marsh, and woodland. On the one hand, the changes promise substantial increases in income for residents as well as in the town's property tax base.

On the other, they spell the end of Greenwich as the residents know it, a unique and historical area bypassed by major highways, far enough from industrial development to remain a retreat of beauty and calm.

Much as we found in our study of the suburbanization of Bucks County in chapter V, it is mainly the descendants of early settlers—the "natives," as they are known locally—who want to take advantage of the economic choices before them. It is the "outsiders," in this case even residents of 30 and 40 years, who want to keep Greenwich just as it is.

Greenwich has a high percentage of old people living on fixed incomes. Many residents work outside the town in large canneries, industries to the north in Salem County, and glass factories. In addition, over one-third of the population is agricultural laborers living in dilapidated housing on unmarked roads barely a mile off the main street.[31]

Greenwich farms produce the highest yields per acre in the State. Still, the future of farming is uncertain. In recent years, controversies have shifted crops away from those requiring "stoop labor" and have spurred mechanization. Sons of farmers are not staying, and the farms are being consolidated into larger operations. Land is becoming more and more valuable—good farmland now sells at $3,000 per acre.[32]

To hold down the costs of farming, over one-third of the township has been preferentially assessed for agriculture.[33] Although this reduces carrying costs for farmers, it places a heavy tax burden on the township's residences, two small gas stations, one store, and three marinas. County taxes are rising, up from $50,479 in 1969 to $106,283 in 1973, and so are school taxes, up from $106,291 to $206,205 in the same period.[34]

The rising tax burden on the residents of Greenwich has helped convince many of the desirability of new industrial development. Some look with envy at nearby Lower Alloways Creek, a town of 1,600 where a new nuclear powerplant pays $3.6 million in property taxes.[35]

Many in Greenwich are openly enthusiastic about possible industrial development. However, the mayor of the last 15 years has recently been voted out of office. This was due partly to the efforts of the Greenwich Emergency Committee, which now has three members elected as the three town councilmen, including the mayor. The question of development, therefore, is being carefully evaluated in Greenwich.

The pressures for industrial development go back many years. In the mid-1960's, General Electric began accumulating options on land in Greenwich Township to build the nuclear powerplant that was built in Lower Alloways Creek. A few years later, the Atlantic City Electric Co. (ACEC) exercised GE options to amass 4,554 acres of prime agricultural land, woodland, and marsh. The piece constitutes one-third of the township, including its entire 6-mile shoreline.

Conflicting efforts to preserve the unique character of Greenwich and to increase its tax base first came to a head in a 1970 battle to reduce the historic district and rezone part of it now owned by ACEC for industrial use. The town's first zoning ordinance, passed in 1966, established a historic district of 400 acres which encompassed the main street and some side streets.[36] Recognition of the district by the New Jersey Historical Society and the National Register of Historic Places followed. However, some of the citizens were unhappy with the local restrictions, particularly those that barred future subdivision of large landholdings to the north of town.

The 1970 zoning ordinance amendment was a joint effort by ACEC and disgruntled landowners. By cutting the historic zone to 80 acres, it eased development restrictions on farms to the north of town and on side streets leading to the ACEC site. Concurrent with the reduction, zoning for ACEC's acreage was changed to industrial.

A local citizen's group sued the township to set aside the new ordinance as an "emasculation of the historic village."[37] The suit also

charged conflicts of interest and other irregularities in the manner in which the ACEC site was rezoned.

But the trial court dismissed the suit, stating that the actions of the township were not "arbitrary, capricious, and unreasonable" and that "the record reveals that there are those in this area who oppose [the] burden [of living in a historic district]." [38] The judge also dismissed the conflict of interest charges.

The full extent of ACEC's plans began to emerge in August 1972, when a pipeline company applied to the Corps of Engineers for a permit to construct a deepwater port in the Atlantic just outside the Delaware Bay and two submerged pipelines to bring the crude oil from the port to the ACEC property in Greenwich. Soon after, officials of the same company announced plans to build and operate a "low profile" tank farm on 500 acres of the ACEC property. From there the crude oil would be transported by rail to refineries. Although the Greenwich Planning Board has tentatively approved the tank farm, concern has been expressed about possible damage to the oyster beds and the marshes from the pipeline trenches and about the tank farm's proximity to the historic district.

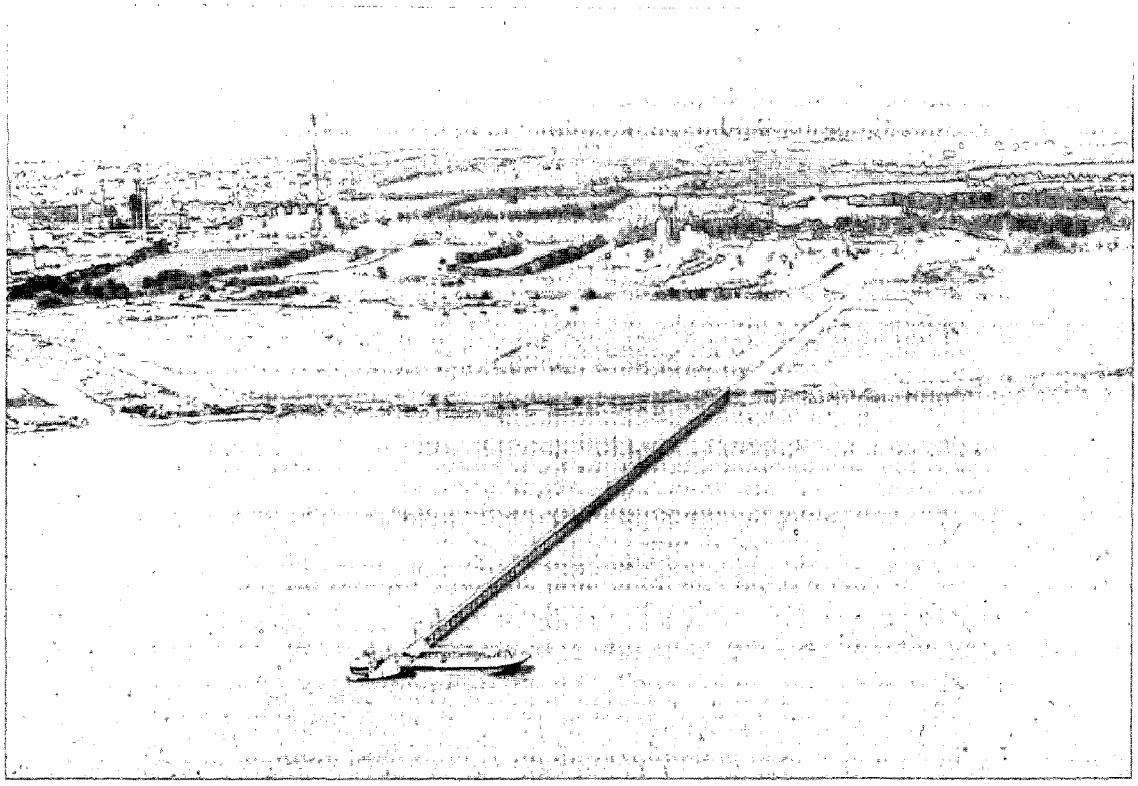
Of greater concern to many residents, however, is the power of interests behind the proposed tank farm and the plans that they have for the remainder of ACEC's 4,000 acres. Publice Service Gas & Electric, the giant New Jersey utility, has recently brought an 80 percent interest in the site. Officials of ACEC, Public Service, and the pipeline company will say only that expansion on the site is a national necessity in view of energy demands; they also say that it will be a boon to the economy of Greenwich and Cumberland County.

In the face of these powerful interests, the people of Greenwich are realizing that their range of choices about the future is narrowing. One resident whose livelihood is tied to the economic growth of Cumberland County and whose lifestyle is exemplified by a gracious home on Greate Street and a schooner moored in the bay expresses the ambivalence of Greenwich today. "I sit by the Bay sometimes at night, watching the lights blinking across the shore and can't get used to the idea of someday sailing by a tank farm. On the other hand, whether I like it or not, and whether people like it or not, industry is coming."

The Choices

The major questions about the future of the bay country remain to be answered. Will New Jersey's new coastal zone law be able to withstand pressures from all sides and allow the tough decisions on preservation and development to be made—to accommodate development where possible but choose where it is not? Can Delaware withstand the attacks on its Coastal Zone Act and continue to ban heavy industry near the shore? Will either State permit a superport in the bay or off its shore? How will the new Federal legislation affect that choice? How much OCS development will occur and how will the induced onshore industrial development be accommodated? What should the two States do about the increasingly evident recreation potential of a bay that will be getting cleaner every year? Is recreation compatible with industrialization, or is it an alternative means to achieve economic development? If there must be a choice between refineries and second home developments, which is more desirable? Or should both be rejected in favor of a total effort toward preserving the traditional way of life along the bay?

What is most striking about the bay country is that unlike other parts of the country where similar things are beginning to happen, the issues here are fairly well understood and articulated by those concerned, from oil company executive to farmer to mayor to oysterman. Both Delaware and New Jersey, as well as many local governments, have worked hard to devise



Industrial siting in coastal areas requires the careful balancing of competing uses of wetlands and farmlands and consideration of the nature and extent of further development induced by the industry.

ways to bring rational, open, and enlightened decisionmaking to these issues. The results are clearly among the Nation's best efforts to create new institutions to deal with these complex problems, institutions that should put the bay country years ahead of other areas about to experience similar conflicting pressures.

But the real difficulty is in defining the public interest in the bay—what should be allowed, what should be prohibited, how the bay should look in coming years. Until these questions are answered, residents of the bay country will continue to feel that forces far larger than they are making all the decisions about the future of their area, and bit by bit the options that they have today will slip away.

Chapter VIII
Tomorrow

Until recently the widely shared American ethic was that growth is good and the more of it, the better. Now that view is changing. If we have always been a restive, mobile people, we have nonetheless had roots in our social contacts, our families, and our surroundings. But as so many of our social ties are stretched and are made transitory by modern transportation and communication and as our physical surroundings undergo rapid changes, many Americans feel the need for more continuity in their lives. They want some brakes on what appears to be an uncontrollable process of growth and change. Not many want to stop the world, and few want to get off, but a growing number would like to slow it down a bit.

Geography was once a chief constraint on growth—on where and how areas developed. For centuries, the shallow shore areas and extensive marshes of the Delaware Bay attracted only a few who fished its waters or farmed near its shores. Similarly, the soils of the Poconos were too thin and barren for farming and the region too far away for weekend visits by city dwellers. Only the timber industry saw much value in its resources. Between the bay and the mountains—in the area of deep water, fast-running tributaries, and good harbors—grew the cities and industries of the Delaware.

Today's technology can easily surmount any constraints of geography. It is now possible to build deepwater ports offshore and to transport materials to new refineries and other industries located in marshes easily drained and filled. Likewise, coastal farmland can be converted to industrial sites and subdivided for homes for the workers, who can be supplied all their needs at shopping centers and commercial development not far away. Highway networks and almost universal car ownership have opened for recreational development large areas of land in the Poconos that a short time ago were all but inaccessible.

To question continued growth does not require a negative attitude toward development. Instead, it requires more an attitude that growth can be managed—that development decisions having major impact on an area should not be made until the full scope of effects is understood. It reflects a desire to use rational public policies and regulations as positive tools to preserve options and to weigh alternatives. It rejects the idea that public benefits inherently derive from unrestrained development. And it calls for a maturing of public attitudes, a recognition that judicious limits and constraints probably generate over time the greatest good for the greatest number.

The processes of resource management with respect to air and water are already underway. Controlling and reducing pollution will not be easy or cheap in the Delaware Basin, nor will it be accomplished quickly. But the ingredients for success exist. The institutions are in place—four strong State pollution agencies, the Delaware River Basin Commission, and the U.S. Environmental Protection Agency. Increased spending for pollution control by government and industry, improved technology, comprehensive Federal and State laws, and stepped up enforcement are now facts of life. Data on air and water pollution already show a gradual reduction in most pollutants.

Three nagging pollution problems remain for the Delaware River Basin. One is the control of toxic wastes, made more difficult by the seemingly unlimited proliferation of new chemical compounds, the difficulty in determining their

possible danger to the environment, the problems of identifying their sources, and the dangers inherent in previous disposal practices. Another is surface runoff. Because of the numerous and widely scattered sources of runoff in both rural and urban areas, there is yet no efficient means of control. The third is the automobile. Although Federal controls will continue to reduce the pollutants emitted by individual cars, the sheer number projected may necessitate more stringent measures to meet the standards set by law.

Land use presents quite a different situation. Unlike pollution, for which success is measured by decreases in pollutant levels, there is no agreement over what is "good" land use. And unlike pollution, which is being dealt with by government institutions of sufficient territorial scope and authority, land use conflicts are still almost exclusively the province of local government. Where the impact of development decisions is local, there is little need for concern. But in modern times the spinoff of many local zoning, sewer extension, road improvement, and building permit decisions is new development that reaches far beyond the boundaries of the local body making a decision. Tied as they are to local property taxes for revenue, municipalities and townships consider most rezoning applications with one eye on the balance sheet.

The property tax, in fact, is a focus for a great many land use problems facing the Delaware Basin. Particularly on the fringe of large metropolitan areas, where open land is especially valued by residents, the property tax seems to warp one public objective while it aids another. Should farmland be assessed at lower rates to discourage its urbanization and thereby protect scenic countryside? Or should local governments assess it on the basis of its development potential, thereby discouraging speculation but accelerating its urbanization? Is the goal of preferential assessment to support farming as a way of life, to preserve an aesthetically pleasing landscape, to provide open space for the public, or to control the pattern of urbanization? Will

it benefit farmers, newcomers, nostalgic city dwellers, or speculators? And even if the goals and beneficiaries can be identified, how can the tax be structured to achieve the desired results?

Center cities are equally affected by tax issues. To attract residents, the city needs employment and job security, but demands for social services result in high property taxes which drive companies to the suburbs. A board of directors, concerned about job availability and the low-income employee, may decide to locate or stay downtown. But when presented with an estimated property tax bill, such a decision looks less supportable.

In rural areas where both property taxes and land values are traditionally low, the promise of tax revenue from a new industry or a powerplant, no matter the environmental damage, is often irresistible. Likewise, many communities are quick to agree to new residential development because of the taxes that it will bring, but often everyone's taxes go up to pay for the public facilities necessitated by the new development.

Many local governments find themselves caught in this pinch between promised new wealth and the desire to protect an existing environment and lifestyle. Particularly in rural areas with development pressures, township and county officials serve under difficult circumstances. Because of the limited tax base, few local governments can afford to pay full-time chief executives, much less to hire an adequate planning staff, if any at all. With few jobs in rural areas offering much money, most residents who can afford to do so invest in land, counting on development pressures to raise values and allow them to make a good profit at the time of sale. This dependence on land as a source of public revenue and personal income often generates insurmountable pressures to encourage industrial and residential development at any price. When profits can be made overnight by a simple zoning amendment, the pressures can be overwhelming.

Help seems to be on the way. In 1972, the Congress enacted the Coastal Zone Management Act [1] to assist States in establishing management plans and institutional arrangements to cover major preservation and development decisions in the coastal areas. States are now developing their management programs to carry out the provisions of the act.

In addition, land use legislation is now before the State legislatures and the Congress to encourage State overview of land use and development issues of more than local impact. The overview would include the identification and protection of critical environmental areas such as wetlands and flood plains, review of large-scale development and land subdivisions, control of development induced by key public facilities like airports and highways, and assurance that needed regional facilities, such as solid waste disposal sites and subsidized housing, cannot be arbitrarily blocked by local jurisdictions.

The focus of both the Coastal Zone Management Act and proposed land use legislation is institutional, for that is the heart of land use reform. Both encourage a balanced land use decisionmaking process: Local governments retain their historical prerogatives over purely local issues and States assume more responsibility over decisions of regional and statewide impact. These new laws should encourage caution regarding major development proposals until their full range of impacts has been identified and weighed.

Within the past few years, some of the Delaware River Basin States have moved forward with progressive land use legislation. New Jersey regulates development in its flood plains and coastal wetlands as well as significant development within a more broadly defined coastal zone. Delaware has banned heavy industry on its coast and requires a State permit for development in the wetlands. New York has not acted to regulate development in the basin, but it has enacted landmark State land use regulatory powers over development in the

Adirondacks. Although Pennsylvania has strong pollution and mining controls, it has yet to enact laws necessary to come to grips with the Commonwealth's land use problems.

Once the necessary laws are passed and the institutional structures established, the Delaware Basin States must address an even stickier issue. Exactly where is new development to occur and what sort of development should it be? Are the farmland and marshes along the bay to remain completely rural and natural, to be converted into planned recreational developments, or to be consumed by industrial complexes and associated commercial and residential areas? How much of Bucks County's farmland should become suburban housing tracts or planned residential developments? What should be done about access to the waterfront in the cities along the Delaware? Should the Poconos be extensively developed with recreational subdivisions?

Land use questions like these will be the major environmental issues in the Delaware Basin in the next decades, and questions like them will face nearly every region of the country. How they are answered will determine how much of the Delaware River Basin will look, and that in turn will affect the way of life there. The questions have to be answered—how is largely up to the people who live there.

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