

Chesapeake tobacco earned European praise in the eighteenth century, but environmental changes during the colonial years contributed to the ruinous impact of tobacco farming on the fertile lands of the region. (Maryland Historical Society.)

Soil Miners Redux: The Chesapeake Environment, 1680–1810

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For seventy years Avery Craven's insightful study *Soil Exhaustion as a Factor in the Agricultural History of Maryland and Virginia, 1606–1860* has profoundly influenced the historiography of southern agriculture. His ideas on the southern landscape have been incorporated into the environmental literature of our time and his book is a major reference point for all serious students of the Chesapeake. Craven believed that soil exhaustion in the region "must be recognized as constant and important in shaping not only the course of agricultural development but the larger social-economic order as well." In the colonial Chesapeake there was nothing distinctively "southern" about the agrarian disaster caused by tobacco monoculture. "It was merely a normal product of frontier conditions" where land is abundant and capital and labor are scarce.¹

The ten-million-acre coastal plain of the Chesapeake that was put to tobacco and timber production in the colonial period was a land for the most part of sluggish streams and rivers and imperfectly drained soils. Despite its richness, the land had a shallow top soil easily injured by excessive agricultural use. Tobacco exhausted the soil in about seven years. Chesapeake planters had to own large tracts of land in order to replace their depleted fields. The most serious loss to the soils of the Chesapeake came from water drainage. Seasonal storms carried off potassium, phosphorus, calcium, and other important minerals from the land. Nitrogen also washed easily out of the soil, leaving behind a poor, infertile countryside. As Avery Craven and others have shown, frontier communities like the Chesapeake were "notorious exhausters" of the soil. In a region where land was abundant and capital and labor scarce, argued Craven, "only the most fertile soils will be used and only those methods which give greatest immediate returns regardless of future consequences. The problem is one of rapid spending, not conservation."²

For Craven, the story of the Chesapeake was that of an agriculture which "gave wide play to the destructive forces of depletion." Craven was not an optimist. Unlike Frederick Jackson Turner, who saw the free land of the western frontier as a kind of tapestry upon which the story of democracy and Ameri-

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can exceptionalism unfolded, Craven documented how frontier individualism led to the first great agricultural calamity in our nation. Also, Craven rejected Turner's school of environmental determinism that saw western lands as a powerful force for Americanization and the possibilities of social mobility. Craven's methodology, however, was not without its faults. He concerned himself too much with the negative legacies of agricultural individualism in the South and tended to place too great a focus on elite plantation development. Certainly today's historians can be critical of Craven's inattention to seascape and watershed in understanding the forces of environmental change in the Bay country.

Did Colonial Farmers Waste Our Land?

Recently scholars of colonial Chesapeake history have taken exception to the long-popular Craven thesis, arguing that agricultural practice in the Bay country during this period has been unfairly denigrated by "inappropriate comparison with European farmers who operated with much different constraints."³ Scholars like Carville Earle, Russell Menard, Lois Green Carr, Edward Papenfuse, and Lorena Walsh have produced a number of provocative and intriguing studies of seventeenth- and eighteenth-century Maryland. Their investigations constitute an important and fruitful Chesapeake oeuvre. (For convenience here I refer to these scholars as the Chesapeake School.)⁴ They believe that judgments about agricultural practice in the colonial Chesapeake have to take into consideration that a new husbandry was required in the region: one that exploited land that was cheap without destroying it and one that conserved labor which was expensive. Further, the Chesapeake School argues that Chesapeake planters were hardly the "soil miners" or "land butchers" that they have been portrayed. While tobacco monoculture made for an untidy landscape, it did not severely deplete the soil.

Among the scholars of the Chesapeake system of husbandry, Carville Earle has been the most assertive in taking issue with Avery Craven's thesis that tobacco monoculture devastated the Chesapeake landscape. While Earle agrees that the tobacco economy exerted considerable pressure on the soil and timber resources of the region, he argues that the Chesapeake was hardly ruined. Using data from All Hallows Parish in Maryland and other areas of the region, he asserts that the "stability of tobacco yields for more than a century suggest that planters, their servants, and their slaves were not ignorant abusers of the soil. They averted chronic soil exhaustion by practicing an intensive shifting agriculture, steeped in Indian planting techniques, in an area with a favorable land-man ratio." To counter exhaustion, a majority of planters used a field rotation system.⁵ Earle sees in the colonial Chesapeake "a new southern planter—adaptive to economic change, attentive to the problems of soil erosion, and contemplative of economic risk and environmental uncertainty." It

was neither planters nor the tobacco staple, argues Earle, that led to the undoing of the Chesapeake environment. It was Enlightenment-inspired agricultural reforms such as plow agriculture, the introduction of fertilizers, and continuous systems of cultivation that displaced an ecologically sounder primitive land rotation system. Earle believes that this period of "agrarian reform and destructive occupance" characterized the Chesapeake in the period 1780–1840. He claims that improving planters imposed order on an unkempt and unruly landscape and in effect destroyed it.⁶

The Chesapeake School builds upon the earlier work of Warren Scoville, who argued that planters in the Chesapeake acted economically and minimized waste in an age of scarce labor and capital. By using up land quickly, Scoville noted, farmers got a higher rate of return on their investment. With land plentiful in that era, it would have been wasteful to squander capital instead of land. To do otherwise, Scoville concluded, would have been to mismanage resources in ways that would have prevented subsequent generations from having a higher standard of living. It was the "extra income obtained by truly exploiting the land," that allowed for the capital accumulation that supported economic development in America.⁷

These recent studies of the colonial Chesapeake, however, focus mostly on the process of farm building. Little attention has been given to the environment in which agriculture actually took place. Throughout this period profound changes occurred in the landscape which affected patterns of climate, water quality, settlement, and economic opportunity. Furthermore, many of the destructive forces of environmental change in the Chesapeake were at work *before* agricultural innovation and "destructive occupance" became widespread. A society leaves its mark on the terrain it possesses; and the meanings that seventeenth- and eighteenth-century Chesapeake planters attached to their environment do not easily lend themselves to current social science models or pro-capitalist analysis.

My goal here is to raise a few points about what has been called "the Chesapeake system of husbandry" and the processes of soil erosion and deforestation that hopefully will expand Avery Craven's ideas and lead to a clearer understanding of the ecological transformation of the mid-Atlantic region to 1810. The southern soil miner in Chesapeake history may be far less mythic than current scholarship would have us believe.

Environmental Change, Population Pressure, and Long Fallows

As early as the middle of the seventeenth century, visitors to tidewater Virginia noted that the region was beginning to have a worn out appearance that resulted from tobacco monoculture and the sloth and negligence of its residents. By 1649, less than a generation after Captain John Smith, Virginia lands on the south side of the York River had become barren from cultivation. In his

letters to the Royal Society, British visitor John Clayton recorded the reluctance of planters to use enlightened farming methods. When Clayton tried to give a plantation overseer some advice about draining marshland, the overseer responded scornfully that "he understood his business well enough and did not desire to learn of me."⁸ Further, according to historian Hugh Jones, by 1724 a ruined landscape of "old fields" had become a permanent part of the Virginia tidewater. A similar situation prevailed in Maryland. Delegates to the Maryland Assembly believed that the exhaustion of the soil by tobacco planting took the wildness out of the soil and made it better for tillage.⁹ At this time, because of tobacco monoculture, writes historian Gloria Main, "Maryland appeared half-civilized to the European eye."¹⁰

In the Chesapeake there was no strong sense of community or commonality of enterprise like that of Puritan New England. The tobacco plantation was the first attempt at commercial agriculture in North America and must be viewed as a kind of agricultural unit that was not in harmonious relationship with the land. Ironically the colonial assault on the Chesapeake landscape took place during the time that the English countryside was flourishing as never before. Between 1570 and 1770 farmsteads were being preserved, woodlands and heaths restored, and maple and sycamore trees celebrated by poets and agriculturalists alike. In the words of landscape historian W. G. Hoskins, this was the period of the "flowering of rural England."¹¹ Unlike England, forces were at work in the Chesapeake that betrayed a region "surpassingly endowed." People lived in the region as "nearly isolated individuals," writes historian David Bertelson, with no concept of the natural world that surrounded them.¹² Using simple tools like the hoe and axe to exploit local resources, planters grew tobacco on recently cleared plots of twenty acres and put less fertile acreage into long fallow. The main problem with this system is that attention was given to tobacco to the exclusion of other forms of agriculture and livestock. Even Lois Carr and Russell Menard have argued that the "inability to feed livestock and hence use manure, trapped planters into long rotations that limited their options to expand."¹³

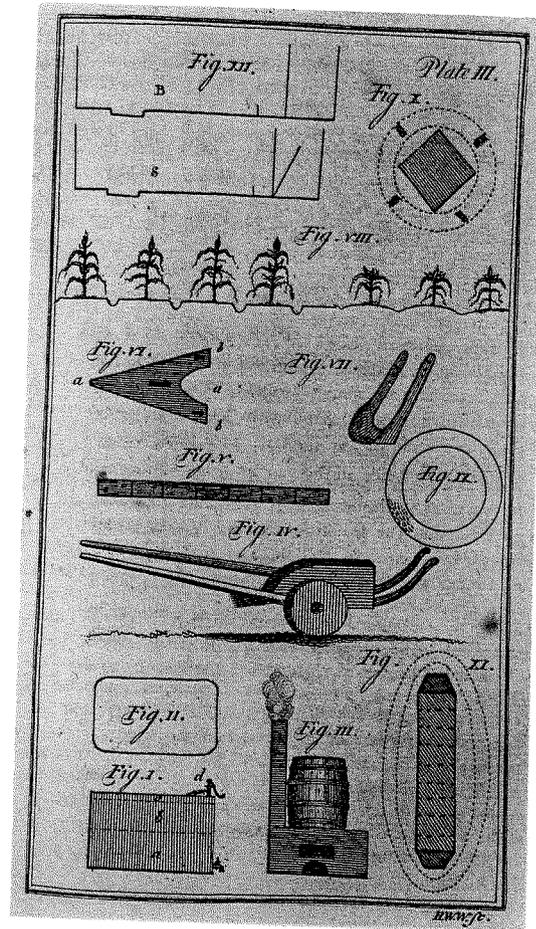
A masterly study of the Chesapeake tobacco economy by Allan Kulikoff provides us with a cogent insight on how changes in the labor supply affected the local landscape. Kulikoff found that with the rise of slavery in the Chesapeake after 1700 there was a net decline of tobacco production per acre as Africans had little incentive to work diligently and be productive. Still, small or marginal planters were interested in getting as much tobacco out of the soil as possible with their slaves. Dependent upon slave labor and tobacco, planters failed to diversify their crops and increase home manufactures. Therefore, Kulikoff notes, slave labor generally increased soil exhaustion in the region.¹⁴ Labor in the colonial period was valued at four times the cost of land, and farmers were determined to get the most out of their slaves regardless of the effect upon the land.

After 1690, Chesapeake planters on small holdings or on marginal lands were squeezed out by larger planters who could use African slave labor and the economies of scale to withstand periods of tobacco depression. Kulikoff and others have noted that during the period between 1690 and 1770 thousands of black slaves were imported into the Chesapeake; and slave labor tended to drive white freeholders off uncompetitive units. By 1750, when the European demand for tobacco increased, the tidewater gentry took its profits. Then, according to Kulikoff, "white families for the first time had to leave the Chesapeake in order to make a living." The consequences of internal migration coupled with changing economics had disastrous environmental consequences in the Chesapeake. In the piedmont of western Maryland and Virginia these small farmers started the same ruinous system of tobacco culture as it was the only money crop they could grow. When the geography of Appalachia presented tobacco planters with obstacles to transporting and marketing the royal weed, planters demanded that colonial governments provide funds to clear the Potomac and James rivers of falls and rapids so that tobacco hogsheads could be brought to royal warehouses by canoe and small boat. By 1800 practically all the piedmont had been planted at least once in tobacco. As environmental historian Albert Cowdrey suggested, tobacco could only be grown on new land "and only by the continuing sacrifice of land was success possible."¹⁵

Small planters were victimized by a land system more feudalistic than capitalistic. By the mid-eighteenth century wealthy tidewater oligarchies dominated the Chesapeake. On Virginia's Eastern Shore, for example, the Jennifer family owned over 8,000 acres. In 1732, the year of his death, Robert Carter, the richest planter in Virginia, left some 330,000 acres to his heirs. The Beverly, Fitzhugh, Byrd, and Thoroughgood families owned impressive estates as well. The greatest of the land grants in colonial Virginia, that of Lord Culpeper, comprised six million acres of the Northern Neck between the Potomac and the Rappahannock Rivers.¹⁶ Large tracts of land encompassing thousands of acres of Chesapeake farm land were also owned by such Maryland gentry as the Pacas, Carrolls, Lloyds, and Tilghmans. On both sides of the Chesapeake a rich and powerful society of cousins played marital ring-around-the-rosey and built an entrenched class system that frustrated the aspirations of small freeholders. The gentry also bought up large tracts of land in the western piedmont and experimented with vineyards, flax, and hemp industries in the valleys of the Blue Ridge. For the poorer classes before the American Revolution, there was no escaping the vise-like grip of the Chesapeake gentry.

Pressures of Population

The Chesapeake in the eighteenth century experienced a population explosion that placed great pressure on the landscape. In eighteenth-century Maryland and Virginia black slaves comprised 30 and 40 percent, respectively, of



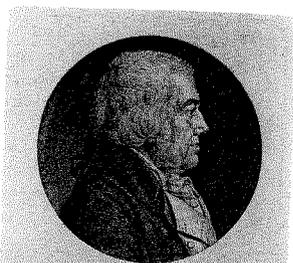
Agriculturalist John Beale Bordley tried to teach Maryland farmers how to care for the land with modern tools and planting instructions. (John Beale Bordley, *Essays and Notes on Husbandry and Rural Affairs*, Second Edition [Philadelphia: Thomas Dobson, 1801].)

the total population. Between 1700 and 1740 Maryland's total population mushroomed from 34,000 to 300,000. Local population figures in the tidewater are instructive. In 1705, All Hallows Parish contained eighteen persons per square mile. By 1776 the parish had forty-two persons per square mile. Prince George's County on the western shore at thirty-nine persons per square mile experienced similar exponential growth.¹⁷ Even if they had wanted to maintain the Chesapeake system of husbandry, planters were essentially running out of space to continue the long fallow. And, as Timothy Silver has noted in a recent study, population growth during the eighteenth century "made it difficult to maintain the minimum fifty acres per worker needed for successful field rotation."¹⁸

So arguably it was population pressure rather than the efforts of agricultural reformers that helped force a switch in the region to cereals and higher yielding crops. As David Grigg has noted in his important work, *The Dynamics of Agricultural Change*, population growth causes agricultural change rather than being a function of it.¹⁹ One of the consequences of population growth with a relatively fixed supply of land was the increase of landless laborers who had no alternative but to seek work on other people's farms. Rarely were these workers interested in a careful husbandry of the soil.

In passing, let us look briefly at the ecological significance of the long fallow. Were long fallows capable of reproducing the traditional forest which created the rich soil in the first place? Such an assumption is only minimally tenable. In the Chesapeake, pine invaded the old fields that had been cleared of oak and other hardwoods, and pine did little to reconstruct the forest floor humus. Both planters and poor whites alike thought pine forests were good range for cattle and with heavy grazing there was little likelihood of the great oak forests springing up again.²⁰ Under the system of deforestation at work in the Chesapeake, vegetation was so degraded that it is unlikely that the forest could recolonize planter fallows in any meaningful way. Probably the long-fallow system itself was not a beneficial ecological practice. Long fallows no doubt restored some fertility to ruined lands, but only in the way that grasses, shrubs, and some hardwoods ameliorate the ravages of timber clear-cutting in our own era.

Eighteenth-century travelers and writers, though far from scientific in their observations, provide us with a glimpse of what tobacco and the culture it engendered had done to the Chesapeake landscape. One English observer, Isaac Weld, saw a striking difference in the countryside when he traveled from Frederick County, Maryland, to tobacco-producing Montgomery County. "Instead of well-cultivated fields, green with wheat, such are met with along that rich track which runs continuous to the mountains," Weld confided to his journal, "large pieces of land, which having been worn out with the culture of tobacco, are seen laying waste with scarcely an herb to cover them." Weld was not optimistic about agriculture in the tidewater. In his journey from Port Tobacco to Hoe's Ferry, he saw a lot of "ruined tobacco land" covered with



1766-73

John B. Bordley

Alarmed by the condition of local farm land, John Beale Bordley urged Maryland planters to rotate their crops and to use the newest scientific agricultural methods to replenish the soil. His extensive studies led him to publish the popular work at right. (Maryland Historical Society.)

yellow sedge. The good houses upon poor land were "a reminder of what was once." Even on the aristocratic Northern Neck of Virginia, where the Carter family farmed with sophistication and used manures, diarist Philip Fithian noted that discarded tobacco fields at Nomini Hall had been allowed to grow into infertile thickets. Silted rivers and streams, eroded fields, and ever encroaching pine barrens provided mute testimony to the changes on land and water. Indeed the most common old-field tree on the Chesapeake coastal plain was the loblolly pine, a species that quickly conquered exhausted farm land and served as a legacy of tobacco's misrule.²¹ Though Edward Papenfuse and others of the Chesapeake School believe it took about three generations for the tobacco empire in the Maryland Chesapeake to run its course, Stanley Trimble, an expert on the history of soil erosion, suggests a more rapid process. Trimble asserts that it took "roughly three decades of tobacco culture in the tidewater and piedmont in the eighteenth century to set in motion the devastating consequences." Chesapeake planters had come a long way from the time of Robert Beverly when it was thought that improvements on the land would turn the Chesapeake into an English garden. In the view of historian Rhys Isaac, planters were "slovens in agriculture."²²

The transformation of the Chesapeake countryside was also the result of cultural factors associated with the plantation. Tobacco, notes historian T. H. Breen, "added a dimension to the colonists' perception of time and place" and transformed the language of agriculture. Growing good tobacco gave a planter a sense of pride, says Breen, in what was essentially a society-parvenu. It became the one

ESSAYS AND NOTES
ON
HUSBANDRY
AND
RURAL AFFAIRS.

By J. B. BORDLEY.

Still let me COUNTRY CULTURE scan:
My FARM's my Home: "My Brother, MAN:
"And God is every where."

THE SECOND EDITION WITH ADDITIONS.

PHILADELPHIA:

PRINTED BY BUDD AND BARTRAM,

FOR THOMAS DOBSON, AT THE STONE HOUSE,
No. 41, SOUTH SECOND STREET.

1801.

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respectable form of agriculture and "conveyed a source of meaningful social identity as well as a means to a high standard of living."²³

The Basic Problem of Agriculture

Chesapeake agriculturalists had a variety of motivations for doing what they did. Most were simply concerned with getting by on a subsistence level, drinking large quantities of liquor, and exploiting the landscape to provide daily family necessities. Prices were sufficiently high that a man's labor in tobacco brought him six times the financial yield that he would have gotten by cultivating other crops. Also, even during periods of exceptionally low prices, tobacco had an assured market in England. Given the primitive "Third World" quality of most of the Chesapeake during the colonial period, the statistics on tobacco production in the region are truly remarkable. In 1668-1669, for example, London received nine million pounds of tobacco from the region, with another sixteen million pounds headed for the European market. This left enough tobacco on the English market, quips historian G. K. Davies, to give one and one-half pounds of tobacco to every man, woman and child in England and Wales.²⁴

The basic problem of agriculture in the late eighteenth century in the view of John Beale Bordley, a respected "scientific" agriculturalist and planter in Queen Anne's County on the Eastern Shore, was that farmers paid no attention to their land or to their craft. Farmers in the Chesapeake, grumbled Bordley, were more interested in pursuing "folly" than husbandry. "They mount their horses and hurry to the tavern, the race, nine pins, billiards, excess upon excess of toddy, and their most nonsensical and idle chat [is] accompanied with exclamations and roarings, brutal and foreign to common sense and manners as the mind of wisdom can conceive of a depraved man."²⁵ Bordley claimed that excessive corn production in the Chesapeake ruined the land as much as tobacco. Corn production was closely tied to the maintenance of "supernumerary negroes" and did little to create wealth in the region. He urged farmers to put exhausted tobacco and corn fields in beans, timothy, and hay and to make extensive use of manure.

In Virginia, Landon Carter echoed Bordley's call for a more ecologically sensible agriculture. Carter had seen the ravages of tobacco monoculture in the James River basin and urged restoration of the soil thorough crops like peas and timothy. Like Bordley, Carter dismissed the "naked fallow" system of land management as a "crass operation." Peas would add what Carter called "vigor" and "air" to the soil.²⁶ Similar calls for a more environmentally responsible agriculture during the colonial period and after were made by George Washington, Thomas Jefferson, and John Taylor of Caroline. Despite their prominence in the Chesapeake, men like Bordley and Carter were politely listened to and then ignored by Bay country farmers. Also, one might

add that what made the work of land restoration in the Chesapeake so frustrating was that the remedies for soil erosion and infertility were easily at hand. Throughout the Chesapeake there were large deposits of marl, clay, and limestone from shell deposits that could have been used to restore the fertility of the soil. There is ample evidence to support the notion that many Chesapeake planters were a rapacious lot who cared for neither landscape nor seascap and caused what Craven called the Chesapeake's "agrarian disaster."²⁷ Even Lorena Walsh, whose research argues *sustained* tobacco and grain yields over time on some Chesapeake lands where records are available, admits that "not all planters were competent managers, that many did not work good lands."²⁸ Suffice to say, never again in the environmental history of the Chesapeake would a single agricultural staple have such power to transform a region and mobilize a population.

Deforestation

The extermination of the Chesapeake forest was inextricably tied to tobacco culture and the transformation of the Bay country landscape. Timber was a popular and valuable commodity in the region. It has been estimated recently that by the eve of the American Revolution the value of wood products exported from the Chesapeake to England ranked third after tobacco and grain.²⁹ Colonial trade records for the Chesapeake indicate a healthy regional trade in pitch, tar, turpentine, plank, shingles, and hogsheads.³⁰ While Puritan New England supplied the bulk of the timber used by England during the period, a not inconsiderable amount of timber flowed out of the Chesapeake to the mother country, Ireland, and the Caribbean. A good portion of it went to the islands of Barbados and Antigua, whose lands had been deforested to permit the operation of financially lucrative sugar plantations. Most exported lumber was in the form of rough planking and barrel staves. In turn, Marylanders and Virginians received rum, sugar, and cash. The Chesapeake woodsman with his ox-drawn timber cart was as much a part of the landscape as the indentured servant and black slave in the tobacco field. The colonial assault on the forests of the Chesapeake was not, of course, a new phenomenon. The Indians had been cutting firewood and burning forests long before the coming of the first white men to the region. What was new was that the English believed that the extermination of the forest was a necessary preliminary to the economic development of the Chesapeake. As it wore out, the land would be cleared by slash and burn methods that had not been seen in England for centuries. Unlike more primitive economies where such land use was a means of subsistence for small communities, this practice became a large source of monetary profit for whomever owned the increasing plantable acreage. As Paul Sears, a renowned ecologist, has noted, the forest, though "a welcome

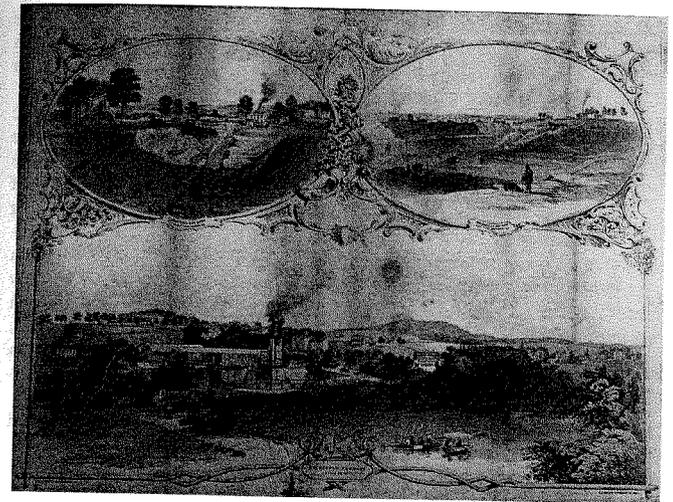
source of fuel and timber, as well as game, was regarded principally as an obstacle to agriculture."³¹

Throughout the colonial period a phenomenal rate of deforestation took place in the Chesapeake. The development of the Virginia "worm fence" particularly illustrates the lavish consumption of wood in the colonial Chesapeake. Today the colonial rail zig-zag "worm" fence seems a quaint reminder of our revolutionary heritage. Farmers needed to protect their corn and tobacco from the depredations of wild horses, cattle, and hogs. These fences, however, used six to ten rails at alternating angles. One mile of "worm" fence required 6,500 rails of timber. The use of this type of fence was unknown in timber-poor England and illustrates how wood was a central factor in the agricultural development of the Chesapeake.

In Maryland timber was a popular and valuable commodity; the county courts contain an ample number of suits over wood lots and timber theft. An illustrative case occurred in Charles County in 1665. John Chaireman sued Robert Downes, charging that Downes had pirated lumber from his forest tract equivalent to the value of 2,000 pounds of tobacco. Such a sum represented a good year's work for a farmhand on a Chesapeake tobacco plantation. During other squabbles over timber, ownership of valuable tools like broad axes and crosscut saws also became items of litigation.³²

Pressure on the Chesapeake woods intensified in the eighteenth century when it became increasingly difficult for small farmers to acquire land for tobacco farms. Most good land in the Chesapeake after 1700 was in the hands of a planter elite who chose to hold on to land as a family investment. Many landless colonials migrated out of necessity to the pine barrens, swamps, and piedmont areas of Maryland and Virginia, where they developed a backwoods economy of trapping, subsistence agriculture, and lumbering. "Live oakers" cut ship timbers in the oak groves of piedmont Virginia, and lumberjacks felled cypress in the Pocomoke Swamp of Maryland's Eastern Shore. Often felling trees twelve to eighteen feet in girth, Chesapeake woodmen transformed the forest into lumber, charcoal for pig iron furnaces, potash, and naval stores for England.³³

Further, the development of local manufacturing in the Chesapeake contributed to the growing deforestation and environmental problems of the region. The discovery of iron in Virginia and Maryland was a boon to colonists who needed iron tools and implements; iron furnaces became part of the local economy. While the Chesapeake fell below New England in wood products, its iron works, developed by planter capitalists, were superior to others in the colonies. The Principio Iron Furnace, Nottingham Furnace, and Lancashire Works in Maryland were exceptionally productive. The Accakeek Iron Mines and Furnace in Stafford County, Virginia, were also widely known for quality pig iron. These iron furnaces used charcoal to heat the iron ore (in many cases bog iron) to a molten state, a process that required a veritable army of lumber-



The Principio Iron Works in Cecil County and other foundries in Maryland and Virginia demanded large quantities of wood to feed their furnaces. The rapid deforestation contributed to soil erosion. (Maryland Historical Society.)

jacks and charcoal burners at the furnace sites. According to environmental historian Joseph Petulla, most iron furnaces had a voracious appetite for charcoal. The production of 5,000 cords of wood fuel needed 250 acres of timberland. Small wonder that rural iron manufacture and environmental desolation went hand in hand. By 1779 the lands that surrounded Accakeek Iron Mines and Furnace were so broken and denuded that the land could not be sold. Even though iron had not been mined there in twenty years, the ugliness of the region left an indelible impression on visitors.³⁴

Even in the more sedate aristocratic areas of the Chesapeake planters viewed themselves as part-time loggers and potash merchants and exploited their wood lots for profit during periods of low tobacco prices. For the colonists the forests of the Chesapeake were a boundless resource. Many planters were as respected as saw millers as they were as agriculturalists. In fact, William Byrd of Westover was such a lumber enthusiast that he boasted that his saw mill could rip two thousand feet of board in five hours.³⁵

Potash or potassium carbonate was a convenient by-product of burnt forests. England's business community used potash in glassmaking and other industrial processes, and farmers used it as fertilizer. Potash-making was just as timber-

intensive as iron manufacture: three to five acres of timber land had to be burned to yield a ton of potash. Despite its excellence as fertilizer, potash was seldom used by Chesapeake planters. The increasing demand for potash in European manufacturing made it too important an export to be used locally.

Chesapeake farmers and planters had little use for the forest as an aesthetic end in itself. Trees on the horizon irritated their eyes and they wanted to see bare ground. Isaac Weld amply documented this crude materialism in the Chesapeake in the 1795–1797 period. Weld observed: "The generality of Americans stare with astonishment at a person who can feel delight at passing through such a country as this [Chesapeake Bay]. . . . They have an unconquerable aversion to trees; not one is spared. . . . It appears strange that in a country where the rays of the sun act with such prodigious power, some few trees near the habitations should not be spared, whose foliage might afford a cooling during the parching heats of summer."³⁶ As Carville Earle has noted, by 1767 deforestation was so pronounced in the area of All Hallows Parish on Maryland's western shore that 49 percent of Anne Arundel Manor (All Hallows area) "was lacking or scarce of timber."³⁷

When the forest canopy was removed, rainwater ran off more quickly and the soil dried out and hardened faster. The intense summer heat made people feel lazy and ill. Seasoned veterans of the Chesapeake referred to those persons as "climate struck." Although the forest canopy naturally thins in winter, it still restricts the sun's heat from rising off the soil. According to historian Timothy Silver, agricultural clearing in the colonial period or in the modern era for that matter "creates more severe temperature fluctuations. Without forest canopy to moderate extremes, summer temperatures become hotter and winter readings colder."³⁸

Deluges of Destruction

The Chesapeake Bay country is subject to heavy rainfall. During the summer, storms can deluge the region with as much as fifteen inches of rain in a three-day period. In the Chesapeake, the Potomac and Susquehanna Rivers carry the bulk of the heavy runoff from the land. Scientists have estimated that almost 53 percent of the rainfall of the Potomac Basin reaches the sea; and at flood tide the Potomac can reach a discharge of 219,000 feet per second. Historical studies of the hydrography of the region indicate that in the late seventeenth century great storms whipped the rivers into flood tide. In 1667 and 1685 the major rivers of eastern Virginia rose thirty to forty feet in a short span of time, causing record amounts of destruction in the tobacco colony. In 1724 and 1738 violent rains and floods along the James and Rappahannock Rivers destroyed most of the tobacco in the region. Further, in the late eighteenth century destructive freshets raised Chesapeake waters forty feet above the average. These floods swept away wharves, tobacco houses, barns, and

manor houses and created obstacles to navigation on the rivers. The worst flood of the period occurred in 1771 when the James River rose twenty feet higher than any previous flood crest and swept away three thousand hogsheds of tobacco. One historical study of this flooding records that "many trees driven by the rapidity of the current imperiled even the largest ships, driving them from their moorings and carrying several ashore. . . and drowning a number of mariners." Ship channels in the Chesapeake rivers were clogged with sand. Good soil from many plantations was carried off in the deluge. To historian Arthur Middleton, the reason for such flooding was clear: "a result of the rapid settlement and deforestation of the piedmont upcountry during the seventeenth century."³⁹

Even under moderate rainfall the Chesapeake country is subject to destructive washing. Much of the Chesapeake region is composed of sandy and clay loam soils, so rainfall runoff can cause serious erosion to the landscape. Constant planting of tobacco and corn loosens the soil and weakens its binding capacity. The topsoil can be carried off in a single heavy rainfall. Historically, the Potomac River carries in suspension nearly four hundred pounds of soil for every acre in its drainage basin. The James River at flood crest can carry almost 300,000 cubic yards of soil during a single span of twenty-four hours. Such freshets in the seventeenth century did serious damage to the lands of William Byrd along the James and ruined several large planters in the Northern Neck. Also, without forest cover the land cannot absorb the heavy rains of the Chesapeake's summer and winter months.

Silt that accumulated in the river beds from runoffs made waterways shallower. Colonists further compounded the problem by dumping large amounts of debris, soil, and ballast into the region's harbors and rivers. As early as 1680 the Virginia assembly passed a law prohibiting the felling of trees into the rivers for crude docking facilities and in 1691 forbade the dumping of ship ballast such as stone, gravel, and chalk into Virginia waters. In both instances the law was honored more in the breach than in the observance. In Maryland colonists dumped ballast with impunity. Maryland's General Assembly in 1735 was forced to enact legislation forbidding the practice and establishing a fine of fifty pounds sterling per case. Small wonder that by the mid-eighteenth century Chesapeake inhabitants were complaining of numerous obstructions in their rivers that hindered navigation and commerce.⁴⁰

The process of environmental change in the Chesapeake region at this time is reflected in increasing sedimentation rates of Chesapeake rivers. Roughly speaking, it took about fifty years before open water ports on many rivers were converted into mudflats by erosion runoff. Therefore, using data provided by L. G. Gottschalk, it is safe to assume that the cycle of sedimentation in the Chesapeake was well under way before the introduction of the "Enlightenment-inspired agricultural reforms" that Carville Earle and the Chesapeake School claim were destructive to the region.⁴¹ Environmental geographer

Grace Brush has stated that her research on the upper Bay indicates "a twofold increase in the amount of sediment accumulation when the amount of land cleared changes from 20% to 40 to 50%." Rates of sedimentation in Chesapeake waters "are always higher after European settlement than before."⁴² In the area of Joppa Town in what is now Baltimore County for example, the Gunpowder River was silting up long before changes in agricultural practice were manifest in the region. Grain farming and plow agriculture were not in extensive use in this area prior to 1750.

Impact on the Bay

At this point it is appropriate to ask what impact changes in the regional environment during the colonial period had on the Chesapeake Bay itself. So much of what happened to the Bay later was dependent upon population growth; in the colonial period population pressures on the landscape did not seem to have a corresponding deleterious impact on the Bay. Chesapeake waters seemed more resilient than Chesapeake soils. There were, however, some tendencies in the maritime environment of the Chesapeake that are worthy of mention. First, the construction of mill dams and other obstructions on Chesapeake rivers may have worked to deplete migrating fish like shad and herring that could not swim upstream to spawn. The first areas to feel the effects of this problem, writes ecological historian David Hardin, were the headwaters of the Rappahannock River and other watercourses in southern Virginia. By 1750 there had been extensive dam construction for grain mills on these waters. Colonists complained, for example, of the decline of spawning runs on the Rapidan River.⁴³ Similarly, Maryland residents complained of mill dams that ruined fishing and pressured the assembly to give them relief from environmentally rapacious grain millers. Although Virginia colonists were aware of what was happening to spawning runs in Chesapeake waters they did not understand the role that soil erosion and agricultural runoff had in ruining the fishery. As Hardin observes, "there was certainly no legislation designed to deal with the problem."⁴⁴ The only legislation focusing on a decreased fishery was a Virginia law in 1680 that established an off-season during which no fish could be taken by gigs or harpoons. Cooperation between Virginia and Maryland regarding the regulation of the Chesapeake and its tributaries would have to wait until the Potomac River Compact of 1785.

Archeological evidence of the Chesapeake region tells us that the waters of the Chesapeake had a high salinity during the colonial period. Until the forest cover of the Susquehanna and James River watersheds was removed in the eighteenth century, observed Henry Miller, "it is likely that the rate of fresh water inflow was considerably less than today." Fresh water runoffs into the Chesapeake began to alter salinity in the eighteenth century, however. It was during this time that soil erosion and deforestation in the piedmont came to

be a serious problem. Increases in siltation and nutrient content in Chesapeake streams transformed fish habitat. The development of long oyster tongs by watermen in the eighteenth century may be an indication that the pollution of the streams was forcing Chesapeake fishermen to harvest in deeper, cleaner waters. Deforestation, soil erosion, and sedimentation would begin to have a noticeable impact on the waters of Chesapeake Bay by 1820, "a clear example of the impact that changing land use practices can have on estuaries," in the words of archeologist Miller.⁴⁵

Land Use and Property Rights

As we look toward the future, more fruitful studies of the region's environmental history may center on the historical transition in the conceptualization of property rights in the Chesapeake. What emerged in the region at this time was a conception of ownership that was in many respects different from what had prevailed in Europe over the centuries. As late as the seventeenth century many farmers in Europe were engaged in landholding rather than land owning. The crucial difference was that in the former case a man had the right to land which he and his family could work with their own labor. But property was not yet viewed as an abstract or fungible entity that could be owned, speculated in, and not worked. Many Englishmen who came to the New World brought this perception with them. The uniqueness of the frontier environment, however, lent itself to another property concept that was being articulated in the mother country at this time by John Locke in his *Two Treatises of Government*. Writing with the excesses of Charles I and the Puritan Revolution in mind, Locke argued that property rights existed independently of kings, government, and the collective rights of the community. To Locke's mind, a man who mixed his labor with nature was entitled to the fruits of that mixture and could enjoy it independently of any social context. Enjoyment of property was therefore a pre-societal natural right. Later, Thomas Jefferson would expand on this concept by referring to the "allodial rights" of Virginians. This hoary Saxon term, which referred to the English idea that property or an estate can be held in absolute dominion without obligation to a king or superior appealed greatly to Jefferson and his tax-avoiding generation of 1776.⁴⁶

As Eugene Hargrove has shown, property as a legal construct in the Chesapeake involved nothing more than the economic interest of the individual; it was devoid of moral obligation or moral responsibility. The ownership of land also relieved planters of any individual or collective responsibility to the land itself.⁴⁷ In effect, Chesapeake planters mythologized property rights by appealing to ancient traditions and to new political theories that appealed to their purses.

We should note that the Lockean or allodial concepts did not eliminate all

other ideas about property. According to Hargrove, the idea of landholding independent of land owning was reflected in the Morrill Land Grant Act of 1862 and was "influential in American political and legal thought" in the nineteenth century. Also, Laura Underkuffler, professor of law at Duke University, has argued that in the "founding era" of America "property in the historical view did not represent the autonomous sphere of the individual to be asserted against the collective; rather it embodied and reflected the inherent tension between the individual and the collective." For Underkuffler and many current scholars of American property rights, property had meaning only insofar as it recognized the individual's need for freedom "in the context of relatedness to others."⁴⁸

Finally, one might also add that scholars need to go beyond the plantation model to understand the evolution of Chesapeake society and environment. Like scholars of the post-Turnerian West, they need to examine points of cultural convergence as well as the competitive interactions of the peoples of the Chesapeake.⁴⁹ As historian Timothy Silver has pointed out, the Chesapeake was a huge multicultural area as well as a tobacco empire. People, adds Silver, "inhabit two environments at once. They not only live on the physical landscape, but also dwell within a second cultural environment composed of material goods, beliefs and patterns of behavior."⁵⁰

Unfortunately land in the colonial period had little moral or symbolic significance to Chesapeake planters. Devoid of both tradition and a land ethic, the only thing that sustained settlement in the region was the demand from other places for its resources. Even in its most basic aspect, the region was hardly a land of entrepreneurial, environmentally conscious farmers. The Chesapeake was part of a highly regulated and state-supported mercantile network. It was difficult to convince planters to develop more responsible attitudes toward the land when land itself seemed an unlimited and cheap commodity compared to the high price of labor. Landowners in the colonial Chesapeake believed that their special rights relieved them of any responsibility to the community. It is difficult to see them other than in their role as soil miners and destroyers of the Chesapeake landscape. When planters argued that they had a right to do what they pleased with their land, asserts Hargrove, they took a position analogous to a tyrannical king who "has the right to do as he pleases regardless of the consequences."⁵¹ Theirs was indeed a curious blindness; the land was taken for immediate needs with little regard for the future. Ultimately both tobacco and the forest became part of the individualism and materialism of the market. It led to the commodification of the Chesapeake environment and set the pattern for the exploitation of the region's natural resources in the future.⁵²

Seventy-one years ago, Avery Craven summarized his work on soil erosion in the Chesapeake with the comment that the "practices begun by the frontier were continued under the influence of markets and government, and the pres-



A New and Accurate Map of Maryland and Virginia by Emanuel Bowen, 1752. (Maryland Historical Society.)

sure which they added made the continuance of early practices almost compulsory.⁵³ In the mid-Atlantic in the colonial period accumulation outweighed egalitarianism as the stronger value. Unfortunately, only now are we beginning to see the harm that such practices have done to the environment and our national development.

NOTES

1. Avery Odelle Craven, *Soil Exhaustion as a Factor in the Agricultural History of Virginia and Maryland, 1606-1860* (Urbana: University of Illinois Studies in the Social Sciences, vol. 13, 1925), 162-164.
2. *Ibid.*, 19-21.
3. Lois Green Carr, Russell R. Menard, and Lorena S. Walsh, *Robert Cole's World, Agriculture and Society in Early Maryland* (Chapel Hill: University of North Carolina Press for the Institute of Early American Culture, 1991), xvii.
4. Among the best examples of the Chesapeake School of scholarship are: Carville Earle, "The Myth of the Southern Soil Miner: Macrohistory, Agricultural Innovation and Environmental Change," in Donald Worster, ed., *The Ends of the Earth: Perspectives on Modern Environmental History* (Cambridge: Cambridge University Press, 1988), 191, 194-200; Edward C. Papenfuse, "Planter Behavior and Economic Opportunity in a Staple Economy," *Agricultural History*, 46 (April, 1972); Carr et al., *Robert Cole's World*, op. cit.; and Lorena S. Walsh, "Land, Landlord, and Leaseholder: Estate Management and Tenant Fortunes in Southern Maryland, 1642-1820," *Agricultural History*, 59 (1985): 394. Walsh argues that "It was the failure of both landlord and tenant to follow traditional agricultural practices rather than the practices themselves that were at fault."
5. Carville V. Earle, *Evolution of A Tidewater Settlement System, All Hallows Parish, 1650-1783* (Chicago: University of Chicago Department of Geography Research Paper No. 170, 1970), 27-28; see Craven's comment that "Frontiers like those who come to sudden wealth are inclined to be spendthrifts." Craven, *Soil Exhaustion*, 19-21, 22.
6. Earle, "Myth of the Southern Soil Miner," 191, 194-200. Edward C. Papenfuse believes that before the Revolution "there was sufficient land to prevent soil exhaustion and levels of tobacco production per laborer confirm that the soil was not abused significantly." "Planter Behavior and Economic Opportunity," 306.
7. Warren Scoville, "Did Colonial Farmers Waste Our Land?" *Southern Economic Journal*, 20 (1953): 178-181. In a discursive footnote Scoville identifies left-wing and liberal historians like Harold Underwood Faulkner and Broadus Mitchell whose textbooks created a near unanimous academic viewpoint of "land butchery" in the colonial and antebellum South.
8. "Letters of John Clayton to the Royal Society, 1688," in Peter Force, ed., *Tracts And Other Papers*, repr. vol. 3 (Gloucester, Mass: Peter Smith, 1963), 22; Hugh Jones, *The Present State of Virginia*, (1724, repr. Chapel Hill: University of North Carolina Press, repr. 1956), 74.

9. William Hand Browne, ed., *Archives of Maryland* (Baltimore: Maryland Historical Society, 1912), 19:540, 580.
10. Gloria L. Main, *Tobacco Colony: Life in Early Maryland, 1650-1720* (Princeton: Princeton University Press, 1982), 43.
11. W. G. Hoskins, *The Making of the English Landscape* (London: Penguin Books, 1985), 154-163.
12. David Bertelson, *The Lazy South* (New York: Oxford University Press, 1967), 243.
13. Lois Green Carr and Russell R. Menard, "Land, Labor and the Economies of Scale in Early Maryland: Some Limits to Growth in the System of Chesapeake Husbandry," *Journal of Economic History*, 49 (June 1989): 413, 417.
14. Allan Kulikoff, *Tobacco and Slaves: The Development of Southern Culture in the Chesapeake, 1680-1800* (Chapel Hill: University of North Carolina Press, 1986), 83, 103.
15. Richard Morton, *Colonial Virginia*, 2 vols. (Chapel Hill: University of North Carolina Press, 1960), 2:558; Kulikoff, *Tobacco and Slaves*, 103; Albert E. Cowdrey, *This Land, This South: An Environmental History* (Lexington: University of Kentucky Press, 1983), 31.
16. Paul W. Gates, *History of Public Land Law Development* (Washington, D.C.: Public Law Review Commission, 1968), 37.
17. Henry M. Miller, "Transforming a 'Splendid and Delightful Land': Colonists and Ecological Change in the Chesapeake, 1607-1820," *Journal of the Washington Academy of Sciences*, 76 (1986): 182.
18. Timothy Silver, *A New Face on the Countryside, Indians, Colonists, and Slaves in the South Atlantic Forests, 1500-1800* (Cambridge: Cambridge University Press, 1990), 165.
19. David Grigg, *The Dynamics of Agricultural Change* (London: Hutchinson, 1982), 43.
20. See Lewis Cecil Gray, *History of Agriculture in the Southern United States to 1860* (Gloucester, Mass.: Peter Smith, 1985), 40, 45, 139, 150, 194-195.
21. Isaac Weld, Jr., *Travels Through the States of North America and the Provinces of Canada during the Years 1795, 1796, 1797* (1807, repr. New York: Augustus M. Kelly, 1970), 39-40; Philip Fithian, *Journal and Letters of Philip Vickers Fithian, 1773-1774* (Williamsburg, Va.: Colonial Williamsburg, Inc., 1965), 29 et passim. Earle tends to dismiss firsthand observations by Chesapeake visitors. He believes that they were "unaware of the ecological functions of this mobile agrarian system" and did not know how to interpret the environment in which they found themselves. For Earle the process was "winning ugly." See "Myth of the Southern Soil Miner," 195.
22. Papenfuse, "Planter Behavior and Economic Opportunity," 310; Stanley Wayne Trimble, *Man-Induced Soil Erosion on the Southern Piedmont, 1700-1970* (Washington: Soil Conservation Society of America, 1974), 47. Rhys Isaac, *The Transformation of Virginia, 1740-1790* (Chapel Hill: University of North Carolina Press for the Institute of Early American Culture, 1982), 33, 116. In Isaac's view, tobacco culture was "land greedy and involved those who were sustained by it in a constant westward movement to clear new areas."
23. T. H. Breen, *Tobacco Culture: The Mentality of the Great Tidewater Planters on the Eve of the Revolution* (Princeton: Princeton University Press, 1985), 22, 71. Planters imposed their own ideas of cosmology and patriarchy on the landscape. Relatively few farmers had

- the requisite 100–200 acres necessary for a planter way of life. See Isaac, *Transformation of Virginia*, 21.
24. G. K. Davies, *The North Atlantic World in the Seventeenth Century* (Minneapolis: University of Minnesota Press, 1974), 146.
 25. John Beale Bordley, *Essays and Notes on Husbandry and Rural Affairs* (Philadelphia: Budd and Bartram, 1801), 155, 156. For background on Bordley's role in the American Enlightenment, see David Hackett Fisher, "John Beale Bordley, Daniel Boorstin and the American Enlightenment," *Journal of Southern History*, 28 (1962): 327–342.
 26. "Landon Carter's Crop Book, Letters to Washington, 27 October, 1796," *William and Mary Quarterly*, Series 1, vol. 21 (July 1912): 11–21.
 27. See Craven, *Soil Exhaustion*, 25–72.
 28. Lorena S. Walsh, "Plantation Management in the Chesapeake, 1620–1820," *Journal of Economic History*, 49 (June 1989): 400.
 29. John J. McCusker and Russell R. Menard, *The Economy of British America, 1607–1789* (Chapel Hill: University of North Carolina Press, 1985), 120.
 30. For a perspective on the Chesapeake timber economy, see Jean B. Russo, *Free Workers in a Plantation Economy: Talbot County, Maryland, 1690–1759* (New York: Garland Publishing Inc., 1989), 225–226; Philip A. Bruce, *Economic History of Virginia in the Seventeenth Century*, 2 vols. (repr.; New York: Peter Smith, 1935), 2:421; Gray, *History of Agriculture in the Southern United States to 1860*, 2:1019.
 31. Paul Sears, *Deserts on the March*, 4th ed. (Norman: University of Oklahoma Press, 1980), 46.
 32. *Archives of Maryland* (Court Series) 40:214–215, 49:106.
 33. Richard G. Lillard, *The Great Forest* (New York: De Capo Press, 1973), 114–115.
 34. Thomas R. Cox, et al., *This Well-Wooded Land: Americans and Their Forests from Colonial Times to the Present* (Lincoln: University of Nebraska Press, 1985), 15.
 35. Cox, *This Well-Wooded Land*, 14.
 36. Weld, *Travels Through the States of North America*, 39–40.
 37. Earle, *Evolution of a Tidewater Settlement System*, 34.
 38. Jones, *Present State of Virginia*, 84; Silver, *A New Face on the Countryside*, 13.
 39. Arthur Pierce Middleton, *Tobacco Coast: A Maritime History of the Chesapeake Bay in the Colonial Era* (Baltimore: Johns Hopkins University Press, repr. 1989), 58.
 40. Middleton, *Tobacco Coast*, 99–100.
 41. L. G. Gottschalk, "Effects of Soil Erosion On Navigation in the Upper Chesapeake Bay," *Geographical Review*, 35 (1945): 219–238; Carville Earle, "The Myth of the Southern Soil Miner," 175–210. See especially his comments on pages 198–199.
 42. Grace S. Brush, "Geology and Paleocology of Chesapeake Bay: A Long Term Monitoring Tool for Management," *Journal of the Washington Academy of Sciences*, 76 (September 1986): 153.
 43. David S. Hardin, "Laws of Nature: Wildlife Management Legislation in Virginia," in Larry M. Disalver and Craig E. Colten, eds., *The American Environment, Interpretations of Past Geographies* (Lanham, Md.: Roman and Littlefield Publishers, 1992), 137–162.
 44. *Ibid.*, 143.
 45. Miller, "Transforming a 'Splendid and Delightful Land,'" 179, 186.

46. Roderick Frazier Nash, *The Rights of Nature, a History of Environmental Ethics* (Madison: University of Wisconsin Press, 1989), 14–15; Eugene C. Hargrove, "The Historical Foundations of American Land Use Attitudes," *Environmental Ethics*, 1 (1979): 209–240; Eugene C. Hargrove, "Anglo-American Land Use Attitudes," *ibid.*, 2 (Summer 1980): 138–148, 131–138.
47. Hargrove, "Anglo-American Land Use Attitudes."
48. *Ibid.*, 142–143; Laura S. Underkuffler, "On Property; An Essay," *Yale Law Journal*, 100 (No. 73, 1990): 129.
49. Alan Brinkley, "The Western Historians; Don't Fence Them In," *New York Times*, Sunday, September 20, 1992, Section 7.
50. Silver, *A New Face on the Countryside*, 33.
51. Hargrove, "Anglo-American Land Use Attitudes," 147.
52. In certain respects the Chesapeake during this period validates some of the observations of Karl Polanyi and his students about the nature of economic development in the West. See Daniel R. Fusfield, "The Market in History," *Review of the Month*, 45 (No. 1, May 1993).
53. Craven, *Soil Exhaustion*, 163.