

“The Same Sort of Seed in Different Earths”: Tobacco Types and Their Regional Variation in Colonial Virginia

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When tobacco planting spread out of the Jamestown area in the 1620s in Virginia and production began the following decade in Maryland, planters soon realized that something strange was happening in their fields. Using the same seeds from the same sources and using identical cultivation and curing practices, they found that “the same sort of Seed in different Earths” produced tobaccos “much different, as to goodness.”¹ By the middle of the seventeenth century, planters recognized two distinct types of tobacco: “sweet-scented” and “Oronoco.”² Those tobaccos would dominate the agricultural systems of Virginia and Maryland throughout the Colonial Period and sweet-scented tobacco dominated Virginia’s tobacco market until well into the eighteenth century.

Until recently, historians of the Chesapeake had only touched upon the general differences between sweet-scented and Oronoco tobaccos and their regional variations.³ Lorena Walsh has recognized the implications of the difference and has become the first scholar of the Chesapeake to approach the subregional level based on tobacco production regions rather than often arbitrary and sometimes ill-applied physiographic divisions.⁴ This study examines why different tobacco subregions (particularly a sweet-scented one) existed in Virginia. Emphasis is placed on how a combination of natural and human parameters created different tobacco subregions. The differences between sweet-scented and Oronoco tobaccos – especially in terms of appearance, soil requirements, and production – will be analyzed from an agroecological perspective by using historical descriptions and data, as well as modern applications of plant physiology, geomorphology, and soil science.⁵

Because the real focus here is on Virginia’s unique sweet-scented tobacco, close attention is paid to the nature and location of sweet-scented tobacco in Tidewater Virginia, the ultimate extent of the sweet-scented tobacco subregion, and important environmental and economic



Figure 1. The study area.

ramifications of the regionalization of tobacco production. This study is the first attempt to identify the absolute limits of the sweet-scented subregion, as well as to suggest ways in which differences among overall production, prices, and income between and even within subregions can be measured using data heretofore overlooked. The study area includes all of the settled portions of Virginia in the 1720s⁶ (Figure 1).

Defining Tobacco Types

Nicotiana tabacum – the species from which all domesticated tobaccos are derived - originated in northern South America and when domesticated became part of the agricultural hearth complex there. *N. tabacum* is an extremely adaptable plant capable of growing and thriving in a wide array of environments. That was illustrated by the

quick diffusion of *N. tabacum* around the world shortly after its discovery by European explorers in the late fifteenth century. By 1700, it was grown on every inhabited continent except Australia.⁷ The tobacco John Rolfe experimented with in and around Jamestown beginning in 1612 came from domesticated Spanish seeds obtained from northern South America.⁸

We know very little about the trial-and-error process that Rolfe used to arrive at a marketable product. However, within two decades, almost all of the techniques that would be used in tobacco production were in place. By the 1650s, Chesapeake planters recognized two distinct types of tobacco: Oronoco and sweet-scented. Oronoco tobacco – whose name refers to the Orinoco River Basin in Venezuela – had a large, thin leaf that was roughly oval in shape and pointed at the tip with a thick central vein. Oronoco was popular because of the light color the leaves obtained during curing. In fact, recognized differences in the Oronoco crop were based primarily on color: “Brightleaf” Oronoco cured a light yellow color and was grown along the Patuxent River and on the middle Western Shore of Maryland; “Dullbrown” Oronoco cured to a light brown or tan color and was grown along the Potomac River and on the Eastern Shore in Maryland and across much of Virginia.⁹ Oronoco was widely distributed in Virginia and Maryland. Oronoco was not as valued as sweet-scented and received a lower farm price and Virginia’s product was consistently considered superior to Maryland’s.¹⁰ Increasingly throughout the eighteenth century, Oronoco tobaccos produced in Virginia and Maryland came to dominate the tobacco market. The principal market for Oronoco was in continental Europe, particularly France and the Netherlands.¹¹

Sweet-scented tobacco was a distinct type exclusively found in Virginia and differed from Oronoco in several important ways. Its leaves were more rounded, had finer fibers, a narrower central stem, and a denser structure. When cured, it had a darker brown color than any Oronoco tobaccos. Although no colonial era tobacco could be inhaled (tobacco was typically smoked in pipes or ingested as snuff), sweet-scented tobacco produced a smoke with a milder taste, thus its name. Another difference was that because sweet-scented leaves were denser than Oronoco’s, fewer leaves were needed to match a comparable weight of Oronoco (even when the central vein was “stripped”), resulting in the need for fewer hogsheads in shipping, which reduced shipping costs and export duties.¹² As a result, it remained the most valuable tobacco exported from the Chesapeake well into the eighteenth century. The primary market for sweet-scented was England.

Delineating Virginia’s Tobacco Production Subregions

Two ways to approach the problem of defining a sweet-scented tobacco subregion are by using contemporary sources and modern

scientific descriptions of Tidewater Virginia. Literary evidence is limited, but luckily those few sources are remarkably straightforward: counties producing sweet-scented tobacco were all found in Virginia and were concentrated in the lower reaches of the Rappahannock, York, and James Rivers on the Middle and Lower Peninsulas. Smaller producing areas were found on the Northern Neck and south of the James River, but quality tended to decrease north of the York and south of the Lower Peninsula.¹³ Beyond that general delineation, however, contemporary observations become problematical.

The two most valuable contemporary sources on sweet-scented tobacco production in Virginia were reports submitted by Lieutenant Governor Hugh Drysdale in the 1720s. Those reports were written in response to an attempt by the colonial legislature to raise tobacco prices by curbing the production of “greater Crops than the persons employed therein are able duly to tend” on “Land not proper for producing good Tobacco.” In 1723 the legislature passed the “Act of the better and more Effectual Improving the Staple of Tobacco,” which limited all “tithable” (taxable) adults to six thousand tobacco plants (although single householders without servants or slaves could tend ten thousand) and boys between ten and sixteen to three thousand.¹⁴ In response to concerns expressed by the Board of Trade over possible revenue losses, Drysdale compiled “An Acc[oun]t of the Quantity of Tobacco planted and tended in Virginia in the Year 1724.” The report provided a wealth of information on tobacco production by county in Virginia, including the number of tobacco workers, the number of tobacco plants tended, and an estimate of the potential number of hogsheads of tobacco that would be available for export. He also indicated the “Quality of the Tobacco” or the proportion of sweet-scented and Oronoco each county produced¹⁵ (Figure 2). According to Drysdale’s 1724 report, all of the counties on the Lower Peninsula grew sweet-scented tobacco exclusively, except Charles City which produced half sweet-scented and half Oronoco. All of the counties of the Middle Peninsula were sweet-scented counties, except Essex, which Drysdale identified as producing seventy-five percent sweet-scented. One-third of the tobacco grown in Richmond and Lancaster Counties on the lower Northern Neck was classified as sweet-scented. All of the other counties in Virginia produced varying varieties of Oronoco tobacco exclusively. A similar report in 1726 listed only those counties on the Middle and Lower Peninsulas as producing sweet-scented tobacco; it dropped Richmond, Lancaster, and Charles City from the list of sweet-scented producers.¹⁶

To arrive at a more exact delineation of the sweet-scented subregion, an agroecological approach to the problem yields greater detail but also raises problems. Evidence suggests that the only controlling factor in the production of sweet-scented tobacco was the availability of suitable soils, and the geomorphology of the Chesapeake region determined what soils

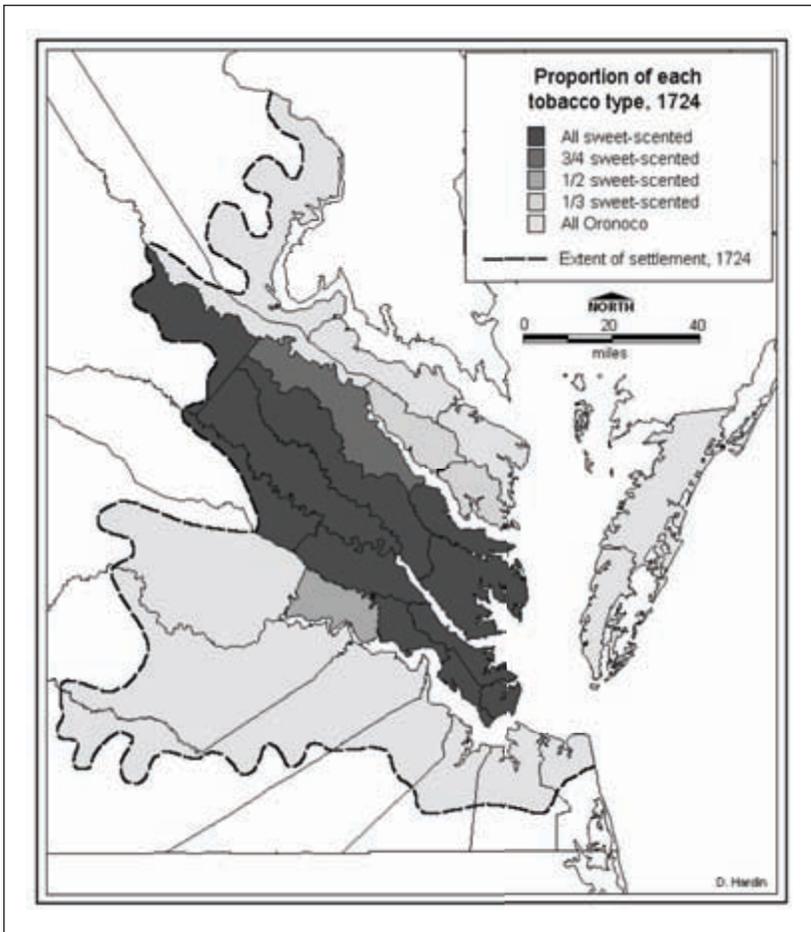


Figure 2. Proportion of each tobacco type in Virginia, 1724. Source: See note 15.

were available. Eastern Virginia is divided into two broad physiographic provinces or landform regions: the Coastal Plain and the Piedmont¹⁷ (see Figure 1). The Piedmont was clearly outside the sweet-scented subregion, so the Coastal Plain is the relevant physiographic province here. Virginia's Coastal Plain stretches more than 120 miles from the Potomac River in the north to the North Carolina border in the south and, at its widest, extends more than 130 miles from the edge of the Piedmont in the west to the shores of the Atlantic Ocean. It drops gradually in elevation from 300 feet in the northwest to sea level in the southeast. Most of the materials that make up the Coastal Plain are relatively young geologically. The central and western portions – the Inner Coastal Plain – are composed of older layers of clay, sand, and gravel that washed down from the Piedmont beginning about 65 million years ago.¹⁸ To the east, in a thin strip along the western shore of the Chesapeake Bay in

Virginia and along a thick band on the bay's eastern shore in Maryland and Virginia, lie sands deposited over the past million years by the rising Atlantic Ocean. That is known as the Outer Coastal Plain. The key to understanding varying tobacco varieties and production subregions lies in that geomorphological setting.

The depositional layers of clay, sand, and gravel that form the Inner Coastal Plain were laid down in warm shallow marine environments during the late Mesozoic and early Cenozoic eras. Gradual uplift exposed those layers to erosional processes that have left a series of incremental, step-like formations. During the Pleistocene glaciations, the Atlantic Ocean dropped as much as 450 feet below its present level. As it did, the Susquehanna River carved a deep valley from north to south across the Coastal Plain in order to reach the lowered ocean. Tributaries of the old Susquehanna River (the modern Potomac, Rappahannock, York, and James Rivers) followed suit and cut their valleys down deeper into the loose Coastal Plain sediments. At the end of the Pleistocene, sea level rose and the deepened and widened river valleys were flooded, forming the drowned estuarine system that is the Chesapeake Bay.¹⁹

The flooded river valleys formed broad tidal estuaries separated by wide, stair-stepped peninsulas that jut out into the Chesapeake Bay roughly parallel to one another. Three large peninsulas or "necks," highest in the north and increasingly lower to the south, can be identified: between the Potomac and Rappahannock Rivers lies the Northern Neck; between the Rappahannock and the York Rivers is the Middle Peninsula; and between the York and James Rivers is the Lower Peninsula or simply The Peninsula.²⁰ In reality, those necks are merely the drainage divides between the major rivers, which is belied by the fact that they all trend in a northwest-southeast direction, forming the dendritic drainage pattern of the ancient Susquehanna River.

Over the past few hundred thousand years, the rivers added new materials to the edges of the necks during floods. During high tides, denser salt water pushed up into the rivers, acting as a wedge, lifting fresh water up and out of the river channel. Muddy freshets that descended from the Piedmont inundated the lower terraces along the rivers and left fresh deposits of alluvial silts and loams. The fine sediments deposited along the lower reaches of the Rappahannock, York, and James Rivers during flooding episodes were what made the important environmental difference in tobacco production.²¹

The sands, gravels, silts, clays, and loams that make up the depositional layers of the Coastal Plain were the soil resources that planters and farmers in colonial Virginia utilized. Outer Coastal Plain soils, based on loose sands but missing rich alluvial deposits, were considered "cold, hungry, sandy" soils and were the least fertile to begin with.²² Inner Coastal Plain soils varied according to their location. Upland soils of the Inner Coastal Plain were judged to be less productive, especially in the drainage divides

where “Clay, then Gravel, and Rocky Stones” formed the foundation with a covering of poor soils of “light Sand, or a white or red Clay...”²³ Gentle side slopes were somewhat more fertile than the barren ridges, but were “still far from being valuable.”²⁴ Upland soils were particularly susceptible to erosion and easily became “more or less deprived of its soil, by the washing of rains, on every slight declivity,” which exposed a “sterile subsoil which continues thenceforth bare of all vegetation.”²⁵ In addition, leaching (the washing down of soil nutrients by heavy rainfall) caused the accumulation of minerals close to the surface, forming a stiff layer known as a “hardpan,” which proved impervious to the hoes and inefficient plows used during the colonial period. The most fertile soils in Tidewater were the alluvial silts and loams deposited on the low terraces of the major rivers. Those fine-grained sediments, dark in color and high in organic content, were remarkable for their “natural and long enduring fertility, as most of the other high lands are for the opposite quality.”²⁶ They suffered less from the threat of erosion, but were more prone to water-logging or periodic inundation. Poorly defined soils on steep slopes, flooded soils, and organic soils in wetlands were largely unproductive, although the latter could be utilized if sufficient drainage was provided.

The nature of Coastal Plain soils in the historical context has been a point of confusion in the past because writers – especially travelers – often supplied conflicting information on the true nature of sweet-scented soils. Part of the problem is the lack of a common nomenclature for soils. By the nineteenth century, knowledgeable laymen were in agreement that clays and “stiff” lands were synonymous with ridge tops, sands were coarse-grained and sterile soils of ridge tops and side slopes, and loams were river terrace soils composed of fine particles and high concentrations of organic matter.²⁷ In the seventeenth and eighteenth centuries, however, there was not clear agreement on the terms used to describe loamy, sandy, and clayey soils. John Clayton, who otherwise was one of the most knowledgeable observers of Tidewater environments and agriculture, used a collection of terms for soils that is confusing at best. When describing lowland and alluvial terrace soils he commonly used the terms “sand” and “sandy” grounds or soils. He correctly identified upland or ridge top soils as “stiff” and impregnated with clays, but he also called these soils “rich” at one point, which they clearly were not.²⁸

What sort of soil supported sweet-scented tobacco? Again, descriptions varied, but there was general agreement on one point: Writers commented that sweet-scented soils were black or dark brown in color. That clearly meant that the soils were loams, silts, or other finely textured soils high in organic matter. Therefore, sweet-scented soils could have been found only in alluvial deposits on the low terraces close to the major Inner Coastal Plain watercourses.

Another way to verify the association of sweet-scented tobacco production with dark, fine alluvial loams and silts is to positively identify

the lands on which the most prized sweet-scented tobacco was grown. According to Hugh Jones, the tobacco that came from along the York River was the best sweet-scented that was produced in Virginia. Of those, the tobacco produced on the Digges family's land in York County was the most highly acclaimed of all. Traditionally called "E Dees" after the land's second owner, Edward Digges, that sweet-scented tobacco commanded the highest prices and earned lasting praise throughout the colonial period.²⁹

The Digges' land – known as "Digges Neck" – was located along the south bank of the York River between Felgate's Creek and Indian Field Creek in York County, about four miles upriver from Yorktown. The only available soil survey of the area indicates that three types of soils are predominant: Portsmouth sandy loam, Norfolk sandy loam, and Norfolk fine sandy loam. All of those soils have fine textures with high percentages of loam or silt and are dark gray or dark brown in color. Ideally suited for agriculture, they are confined to the first and second terraces away from the river. Nowhere are those soils found in association with the clayey or coarse, sandy soils of the uplands and drainage divides.³⁰

Only dark-colored silts and loams are found where the finest sweet-scented tobacco was produced, so it is reasonable to conclude that sweet-scented tobacco soils were similar to those found at Digges Neck and should be simple to identify. Unfortunately, a pitfall arises when a search for similar soils is made throughout Tidewater Virginia. The two greatest obstacles are the changes that have occurred in soil science and nomenclature over the past few decades and differences between individual soil surveys. Soil surveys that predate the 1960s (such as the 1906 York County survey used to identify Digges Neck soils) did not employ the same names for soils and soil associations that are common in more recent studies. Also, surveys from two adjoining counties may describe the exact same soils, but use different soil or association names to label them. The result is that soil descriptions are similar, but different names were used from one survey to the next, creating a lesson in frustration when trying to assemble the results of soil surveys from different times and different counties into a usable whole. Ideally, individual county soil surveys should be assembled to compile an accurate tobacco soils map of Tidewater, but because not all Tidewater counties have been surveyed, small-scale general soils maps of Virginia must be used in concert with extant surveys to identify probable sweet-scented tobacco soils across the region.³¹ Using that method, it is possible to identify probable sweet-scented tobacco soils and to map their full extent.

When mapped, it becomes apparent just how limited sweet-scented soils were and therefore how finite the sweet-scented subregion was (Figure 3). Undoubtedly there are inaccuracies in the general tobacco soils map presented here, but it does present a compelling impression of the parameters of tobacco production in Tidewater Virginia. The soils

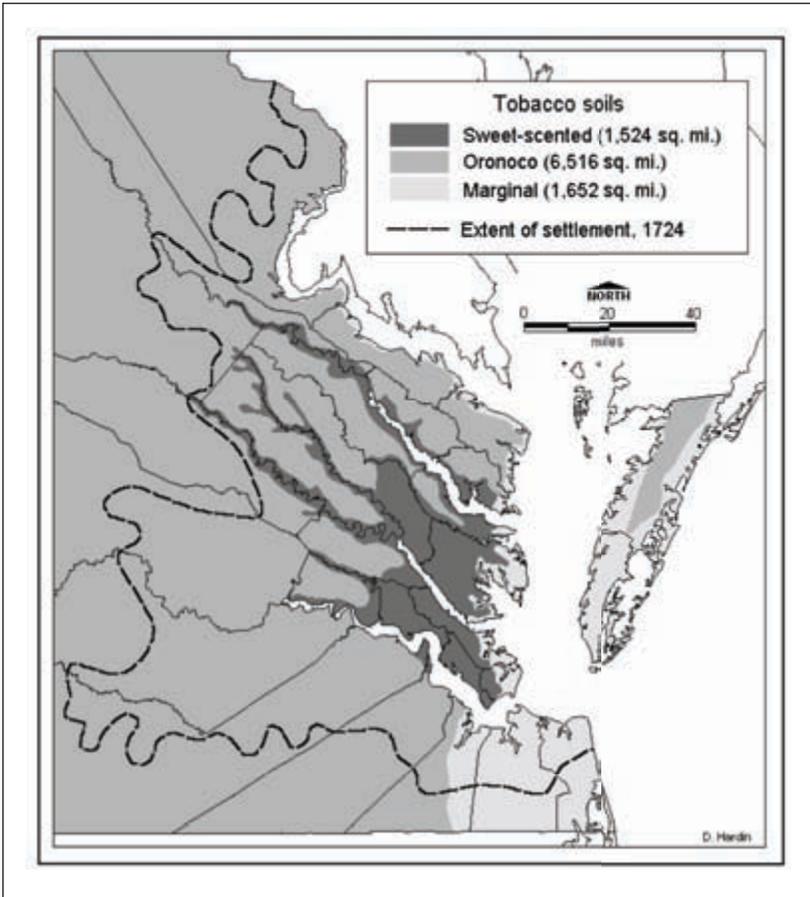


Figure 3. Tobacco soils in Tidewater Virginia. Source: See note 31.

most likely to be associated with sweet-scented tobacco production were dark loams and fine silts of the Inner Coastal Plain such as Emporia, Pamunkey, State, Suffolk, Tetotum, and their related soils.³² The greatest acreages were found at the ends of the Middle and Lower Peninsulas in lower King and Queen, lower Middlesex, Gloucester, York, James City, Warwick, and upper Elizabeth City Counties. Slender fingers of sweet-scented soils clung to the shores of the Rappahannock, the York River and its tributaries, and farther up the James River. That pattern corresponded with and explains the descriptions given by Governor Drysdale in his report of 1724 that included the counties of the Middle and Lower Peninsulas as well as King George, Richmond, and Lancaster Counties in the southern Northern Neck and Charles City County on the north bank of the James River.³³ Sweet-scented soils made up only about fourteen percent of the land area of Tidewater Virginia.

The soils map also reveals two other important relationships: the

locations of Oronoco soils and those soils that were probably incapable of supporting the long-term production of merchantable tobacco (henceforth termed “marginal”). Determining the extent of Oronoco soils is a simple process of elimination, because Oronoco could be profitably produced on any soils that could sustain tobacco that were not already producing sweet-scented tobacco. As settlement spread away from the sweet-scented subregion and onto the Piedmont in the early eighteenth century, it was Oronoco tobacco that appeared in planters’ fields. As a result, the Oronoco subregion constantly expanded as well. All of Tidewater outside of the sweet-scented subregion, which represented more than 69 percent of settled land in 1724, was capable of producing marketable grades of Oronoco tobacco.

Marginal soils were primarily in the Outer Coastal Plain. Those soils were incapable of producing sweet-scented tobacco. John Custis reported in a letter to Philip Perry in 1737 that when he planted the same seed he used in York County on his Eastern Shore lands, Oronoco resulted.³⁴ Such soils also were not conducive to quality Oronoco crops or long-term tobacco production in general and were the first areas to be turned out of tobacco production in Virginia. They were of questionable productivity for three reasons. First, they were geologically young – being composed almost exclusively of marine deposits of recent age and had not accumulated soil nutrients necessary for the production of tobacco.³⁵ Second, they were highly permeable sandy soils that suffered from severe leaching and drought if they were in elevated ridges removed from local water tables. Third, along the Chesapeake Bay and Atlantic Ocean they suffered from salt water spray and occasional inundation by salty and brackish water. Contemporaries noted that tobacco grown in salt-impregnated soils “smoaks [sic] not pleasantly, and will scarcely keep Fire.”³⁶ Marginal soils comprised more than 16 percent of Tidewater Virginia and were found along the Potomac River in Stafford, Westmoreland, and Northumberland counties, along the Chesapeake Bay in Northumberland, Lancaster, Middlesex, Gloucester, York, and Elizabeth City counties, and along the Chesapeake Bay and Atlantic Ocean reaches of Accomack, Northampton, and Princess Anne counties. The sandy soils south of the James in Nansemond and Norfolk counties and the marshy “pine barren” soils surrounding the Dismal Swamp also must be considered marginal.

Cultivation, Production, and Resource Use

Soils were the foundation for the differences between sweet-scented and Oronoco tobaccos, but cultivation and curing practices also set the two apart. The literary sources indicate that the main difference in cultivation was that sweet-scented was “topped” lower than Oronoco, usually at six to eight leaves rather than ten to twelve.³⁷ Topping involved

snapping off the upper stalk of the tobacco plant in the field. This stifed further vertical growth and prevented the plant from devoting resources to flowering. Low topping allowed greater structural growth to be channeled into the leaves, creating the dense structure characteristic of sweet-scented tobacco leaves.³⁸ If we take at face value Drysdale's use of eight plants to the pound and if sweet-scented plants were topped at an average of seven leaves and Oronoco at eleven, then fifty-six sweet-scented leaves equaled one pound, while it would have taken eighty-eight Oronoco leaves to arrive at the same weight.³⁹ Sweet-scented leaves were therefore 36.3 percent heavier than Oronoco leaves, which corroborates John Clayton's comment that "the best Tobacco will weight the heaviest, and pack the closest."⁴⁰

Lower topping also may have had ramifications for the taste of sweet-scented tobacco. High nitrogen content in tobacco results in a more pungent or strong-tasting cured leaf. That was often cited as the rationale for not using manure as a fertilizer. Lower topping resulted in less absorption of nitrogen and therefore a milder taste. Additionally, because nicotine accumulated in the upper leaves of the tobacco plant, lower topping may have raised nicotine levels. There is no way of knowing absolutely if that was the case, because no one in colonial Virginia was aware of nicotine in the first place. It would, however, help explain why sweet-scented remained in high demand among those addicted to smoking the weed.⁴¹

Sweet-scented tobacco may also have been cured differently, although that is less clear. In the first stage of the curing process, the tobacco stalks were cut and the plants were left to wilt in the sun, usually on their own hills, against a fence, or on simple racks. More than 88 percent of the weight of the plants – three-quarters of that water – was lost during this first stage; 500 pounds of cured tobacco weighed more than 4,400 pounds when it was hauled from the fields.⁴² The initial drying process also allowed the still-living leaves to consume the sugars in the ripe leaf, hastening the development of a yellow color. What happened in the second stage is in doubt, although this phase was most important to the outcome of the crop. Like Oronoco, sweet-scented stalks probably were driven onto stakes and hung in tobacco barns for air curing. However, one source indicated that sweet-scented tobacco was stripped from the stalk and strung on a line for curing, which would have contributed to the burning-off of sugars as the leaves cured, resulting in a darker dried leaf.⁴³

Cultivation practices also held ramifications when considering how quickly soil nutrients were depleted from Tidewater soils. Tobacco absorbs large amounts of nitrogen, phosphorus, and lesser amounts of potassium from the soil.⁴⁴ Nitrogen is the most important element and the one taken up by the tobacco plants in the largest amounts. Nitrogen deficiency causes reduced plant height, less substantial leaves, and loss of

a healthy green color.⁴⁵ When “soil exhaustion” was mentioned, nitrogen depletion was the primary culprit. Phosphorus is vital to tobacco’s early growth and if deficient, roots develop poorly and plants mature more slowly.⁴⁶ Potassium is essential to the general quality of the leaves and in creating a “sweeter” tobacco.⁴⁷

Because planters made few returns to the soil until late in the colonial period, they were exploiting the nutrients provided by the dense mat of decaying leaves that built up annually in soils covered with a deciduous forest. Known as the humus layer (or “black mould” in some contemporary accounts⁴⁸), this was the primary source of nutrients in the upper layers of the soil that planters “mined” for tobacco production. Fields for sweet-scented and Oronoco tobaccos were prepared in the same manner, beginning with slash-and-burn clearing of the forest cover. Burning the cut trees and brush added nutrients, but if done incorrectly could damage the humus layer. Cleared and prepared fields were planted season after season until the soil’s fertility was at such a low state that profitable tobacco production was no longer possible. Given such a system, the innate fertility of tobacco soils became a vital consideration.

Oronoco tobacco could be grown on the sandier Chesapeake soils for about three seasons before loss to the plants and leaching either removed or moved nutrients out of the reach of the tobacco’s roots, causing a decline in yields and quality. Sources vary on this point, but it appears that sweet-scented could be grown for longer periods on the naturally fertile dark loam and silt soils of the lower river terraces, possibly as long as six to eight years.⁴⁹ That fertility was derived from the high organic content of the soil, plus additions made by the humus layer. The fine rich loam and silt soils also were less permeable and were therefore subject to lower levels of leaching than the sandy, porous soils found in upland areas. The low topping of sweet-scented also caused less absorption of nutrients by the tobacco plants each season, leaving more left over for subsequent crops.

Another factor in the longevity of sweet-scented production was the possibility that, over time, sweet-scented planters tended fewer tobacco plants and utilized less land than Oronoco producers in Virginia and Maryland. Sweet-scented growers produced an average of well over one thousand pounds each in the six decades between 1650 and 1710. In the 1680s and 1690s, York laborers averaged a high of 1,453 pounds and along the lower Rappahannock the average reached 1,395 and peaked at 1,408 pounds between 1700 and 1709. In Essex County, average production topped one thousand pounds in all but one year between 1701 and 1705, reaching a maximum of 1,341 pounds in 1705. By contrast, Maryland averages over the same period never dropped below 1,100 pounds and on the upper Eastern Shore average production per laborer stayed above 2,500 pounds from the 1670s to the 1690s. After 1710, production averages dropped significantly in the sweet-scented

subregion, fluctuating between 500 and 900 pounds. A similar drop in production did not occur on Maryland's lower Western Shore and upper Eastern Shore until the mid-1750s. Growers in new Oronoco frontier regions of Virginia, such as Southside and the southern piedmont, often averaged more than one thousand pounds from the 1740s on.⁵⁰

The spacing between plants in tobacco fields was uniform across the Chesapeake and determined how much land was used. The pattern was three or four feet between rows and three or four feet within rows (less space on more fertile soils, more space on poor or depleted soils). Given those ratios, each plant occupied nine to sixteen square feet, which would have accommodated between 4,840 and 2,722 plants respectively. At eight plants per pound, that meant a theoretical range of from 605 to 340 pounds of tobacco. If an average spacing of three-and-one-half feet is used, each plant occupied 12.25 square feet and one acre would hold 3,555 plants with a cured weight of 444.5 pounds. Therefore, the 1,453 pounds of tobacco raised by each laborer in York County during the 1680s and 1690s required 3.27 acres. In the lower Rappahannock valley, each laborer needed 3.14 to 3.17 acres to produce 1,395 to 1,408 pounds of tobacco; in Essex County, 3.02 acres was required to raise 1,341 pounds of the leaf. After 1710, sweet-scented producers needed much less land to produce their smaller crops; 500 to 900 pounds of tobacco required only 1.12 to 2.02 acres. Producers in Southside and the upper James River drainage each utilized more than 2.25 acres to produce more than 1,000 pounds of tobacco after 1740. By contrast, Maryland growers used land at a much faster rate: At the height of production in the late seventeenth century, a laborer producing 2,500 pounds of tobacco needed 5.62 acres of land. In All Hallow's Parish on Maryland's Western Shore, laborers each set out more than twelve thousand plants on three and one-half acres.⁵¹ Through the middle of the eighteenth century, Maryland tobacco planters routinely used as much as 2.47 acres to raise over 1,100 pounds.

On a regional basis within Virginia, the disparity in production between the three subregions is clear. For a span between October 1723 and October 1725, Virginia exported an annual average of 23,922 hogsheads of tobacco containing 14,932,384 pounds of tobacco⁵² (Table 1). Nearly two-thirds of the tobacco exported was sweet-scented. Individually, the York District was the clear leader, exporting 45.5 percent of the tobacco, almost all of it sweet-scented tobacco. Following was the Rappahannock District, which accounted for 18.6 percent of the total, a little less than half of that sweet-scented grown on the south shore. The Upper James District was third (14.7 percent; about one-fifth sweet-scented), followed by the Lower James District (10.8 percent; about one-third sweet-scented). The South Potomac District (8.6 percent) and Accomack Districts (1.7 percent) were exclusively exporting Oronoco tobacco.

Table 1. Average Annual Tobacco Exports from Virginia, 1723-1725.

District	Hogsheads			Pounds			
	Total	Annual Average		Annual Average	Sweet-Scented	Oronoco	
Upper James	9,589	4,795	20.0%	2,196,775	14.7%	731,651	1,465,124
Lower James	5,128	2,564	10.7%	1,616,743	10.8%	549,393	1,067,351
York	19,413	9,706	40.6%	6,794,379	45.5%	6,794,379	
Rappahannock	8,580	4,290	17.9%	2,784,362	18.6%	1,473,352	1,311,010
South Potomac	4,289	2,144	9.0%	1,286,559	8.6%		1,286,559
Accomack	845	423	1.8%	253,566	1.7%		253,566
	47,844	23,922		14,932,384		9,548,775	5,383,609

Source: See note 52.

Prices (and therefore income performance) were distinctly different between the sweet-scented, Oronoco, and marginal subregions of Virginia and Maryland. From 1720 to 1728, the annual Quitrent Returns submitted by Virginia's governors – the accounts of the amount of patented land and the revenues due to the Crown from the two shilling per hundred acre “rents” – listed the market value of the tobacco levied for the quitrents.⁵³ All of the counties were included except those in the Northern Neck, which were subject to taxation by the Northern Neck Proprietary and did not report to Williamsburg. For the sake of comparison, prices derived by Walsh for the sweet-scented and Oronoco subregions have been added to the prices derived from the Quitrent Returns. The assembled series of prices from the designated sweet-scented, Oronoco, and marginal counties reveals the important difference in value and income potential (Figure 4). Over the entire period, sweet-scented prices were consistently higher than Oronoco prices, averaging 1.70 pence per pound versus Oronoco's 1.18 Pence, and the marginal subregion's .97 pence average.⁵⁴ Assuming that sweet-scented planters raised 650 pounds, Virginia Oronoco planters 800 pounds, and planters in marginal areas 300 pounds, each individual sweet-scented producer could expect to earn £4.60, Oronoco producers could expect to earn £3.93, and an average of £1.21 could be earned in marginal areas.

Regionally, sweet-scented clearly outperformed other regions of Virginia (Figure 5). The York and Rappahannock Districts consistently tracked the highest prices in the colony. The York District had the highest prices, averaging 1.86 pence per pound between 1720 and 1728. The Rappahannock District came in a close second, shadowing the York District's prices during the period. The Upper and Lower James Districts recorded similar prices, averaging about one and a quarter pence per pound from 1720 to 1728. The Accomack District of the Eastern Shore – one of the least productive regions for tobacco cultivation in Virginia – habitually received the lowest prices in the colony for its Oronoco

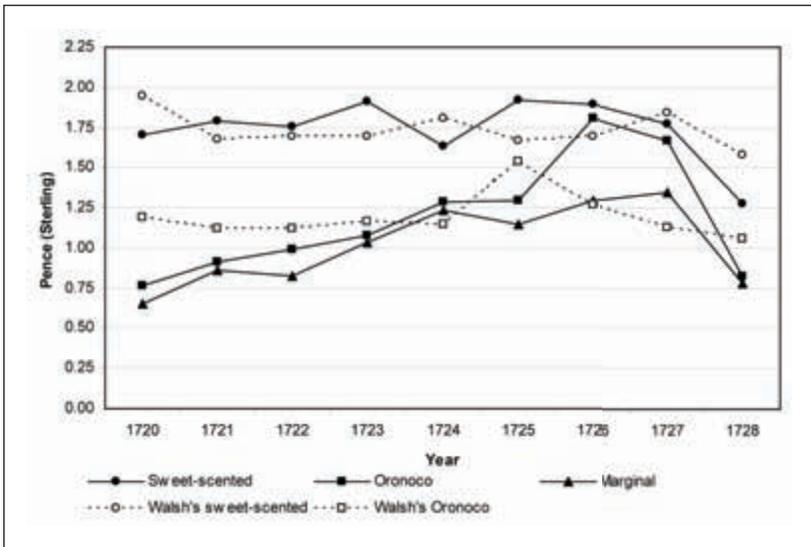


Figure 4. Tobacco Prices by Subregion in Virginia, 1720-1728. Source: See note 53.

tobacco. Not surprisingly, the Accomack District was the only district exclusively in the marginal subregion.

Implications of Different Tobacco Subregions

Regretably, the county records that would best illuminate the importance and uniqueness of the sweet-scented subregion largely were destroyed during the Civil War. The records of Gloucester, King and Queen, and King William – which might have been the most useful – are among the lost. Of all of the sweet-scented counties, only Essex, Middlesex, and York's records have survived and of those, only York was in the heart of the subregion. It is that paucity of county court records that contributed to the dominance of Maryland examples in studies of the Chesapeake over the past forty years. That in turn led to assumptions that were applied across the Chesapeake region – rightly or wrongly – without much regard for the regional variations between Maryland and Virginia.

The long-held notion that Virginia planters raised as much tobacco as did those in Maryland during the eighteenth century is clearly wrong. To some degree, the decline from one thousand pounds per laborer in the late seventeenth century to 600 pounds by the 1730s would have been offset by the higher prices sweet-scented commanded. At the same time, sweet-scented planters probably became increasingly concerned with the quality of their declining production. A more intensely competitive environment would not only have affected production and trade, but also would have bled over into social relations between the larger planters. Of

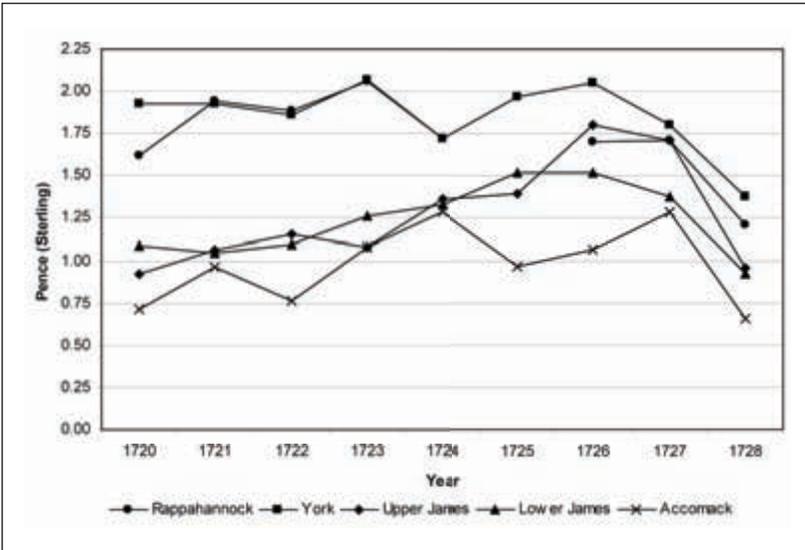


Figure 5. Regional tobacco prices in Virginia, 1720-1728. Source: See note 53.

interest is the price trend of the 1720s seen in Figures 4 and 5. Not only was there a downturn in all prices in the late 1720s, but an alarming trend must have become apparent to sweet-scented planters: As prices declined, they also began to converge. That helps explain why sweet-scented producers were more likely to support the Tobacco Inspection Act of 1730 in an effort to restore the reputation and price of their tobacco.

If Lorena Walsh's figure of 300 to 400 pounds per laborer⁵⁵ is more representative of what was occurring in the long-settled portions of the sweet-scented subregion, then other questions arise. If such diminished production was a result of long-term planting and the decline of soil resources, then all individual laborers generated much less income than they had in the seventeenth century. In that setting, the difference between how prosperous a plantation was would have been a factor of the scale of the labor force. As conditions stood in the 1720s, the overall scale of planting in the sweet-scented subregion was greater than in other parts of Virginia. The shift to African slave labor that had begun in the 1680s was all but complete by the 1720s. Because their income was substantially higher than in counties producing Oronoco tobacco during the critical period of labor conversion, many sweet-scented producers were able to afford a larger labor force. With the resulting higher population densities, the sweet-scented subregion could produce more tobacco than all of the other regions combined. Yet the decline in production per laborer meant that smaller planters would not have generated very much income. In fact, an individual sweet-scented producer could expect to earn £2.13 to £2.83, only half or a bit less than three-quarters as much as an Oronoco producer. Only the operations utilizing large numbers of African slaves

would have been truly profitable. In effect, the sweet-scented subregion would have become a bust for poor planters.

The inherent fertility of sweet-scented soils meant that sweet-scented planters suffered less from the soil exhaustion common in the rest of the Chesapeake – which calls into question the blanket application of the recultivation regime – but after decades of tobacco production, even those lands began to falter. The very advantage of scale meant that large plantations in the sweet-scented subregion could afford to divert labor away from tobacco planting and flirt with diversification. With the luxury of diverting labor to other pursuits at that critical juncture, sweet-scented planters began creating a form of mixed agriculture that increasingly emphasized the production of corn – rather than wheat – for the Atlantic market. Figures from the Rappahannock clearly show that wheat never approached the importance of corn as an export commodity.⁵⁶

All of the above rests on an understanding of the regional variation that different tobacco types fostered. We will know more when Lorena Walsh's long-term study of York County is completed. There remain some untapped resources, especially Drysdale's 1724 report and Revolutionary War Public Service Claims. It also will be important to revisit data sets that have been used in the past – most notably the personal property tax records of the 1780s utilized by Jackson Turner Main and the Naval Office Shipping Lists partially dissected by Peter V. Bergstrom⁵⁷ – with an eye toward the subregional divisions of Virginia based on sweet-scented and Oronoco tobaccos.

Notes

1. John Clayton, "A Letter from Mr. John Clayton Rector of Crofton at Wakefield in Yorkshire, to the Royal Society, May 12, 1688. Giving an Account of Several Observables in Virginia and in His Voyage Thither, More Particularly Concerning the Air" in *The Reverend John Clayton: A Parson with a Scientific Mind*, ed. Edmund and Dorothy Smith Berkeley (Charlottesville: University Press of Virginia for the Virginia Historical Society, 1965): 60.
2. There is room for argument concerning the spelling and capitalization of the two terms, more so with the former than the latter. There are many ways that "Oronoco" appears in historical documents. That name refers to the Orinoco River in Venezuela where it was commonly believed that all Virginia tobacco varieties originated. Variations in spelling, with or without capitalization, included "arrinoko," "arinoco," "orinoco," "orinoko," "oronoko," "oroonoko." Although none was ever agreed upon, the most common version seems to have been "Oronoco" (including a street in Alexandria). Because the label refers to a specific place name, it will be capitalized whether it stands alone or in tandem with "tobacco." The term "sweet-scented" was an adjective, so it should be hyphenated and left in lower case letters and will appear in that form throughout this study. Support for the spellings used here may be found in William Gooch, "A Dialogue Between Thomas Sweet-scented, William Oronoco, Planters, both Men of good Understanding, and Justice Love-Country, who can speak for himself" (Williamsburg, VA: William Parks, 1732).
3. For example, see Harold B. Gill, *Tobacco Culture in Colonial Virginia: A Preliminary Report*, Early American History Research Report No. 68 (Williamsburg, VA: Colonial Williamsburg Foundation, Inc., 1972); Russell R. Menard, "The Tobacco Industry in the Chesapeake Colonies, 1617-1730: An Interpretation," *Research in Economic History* 5 (1980): 109-177; Edward C. Papenfuse, "Planter Behavior and Economic Opportunity in a Staple Economy," *Agricultural History* 46 (1972): 297-311; David O. Percy, *The Production of Tobacco Along*

- the Colonial Potomac*, National Colonial Farm Research Report No. 1 (Accokeek, MD: The Accokeek Foundation, Inc., 1979); Darret B. and Anita A. Rutman, *A Place in Time: Middlesex County, Virginia 1650-1750* (New York: W.W. Norton & Company, 1984) and *A Place in Time: Explicatus* (New York: W. W. Norton & Company, 1984); and Mary M. Schweitzer, "Economic Regulation and the Colonial Economy: The Maryland Tobacco Inspection Act of 1747," *Journal of Economic History* 40 (1980): 551-569.
4. Lorena S. Walsh, "Plantation Management in the Chesapeake, 1620-1820," *The Journal of Economic History*, *T e Tasks of Economic History* 49:2 (1989): 393-406; "Slave Life, Slave Society, and Tobacco Production in the Tidewater Chesapeake, 1620-1820," in Ira Berlin and Philip D. Morgan, eds., *Cultivation and Culture: Labor and the Shaping of Slave Life in the Americas* (Charlottesville: University Press of Virginia, 1993): 171-199; and "Summing the Parts: Implications for Estimating Chesapeake Output and Income Subregionally," *William and Mary Quarterly* Ser. 3, 56:1 (1999): 54-94. Walsh's latest work is based in part on studies of sweet-scented counties, including her own work on York County, the Rutmans' study of Middlesex County, my dissertation, David S. Hardin, "Alterations They Have Made at This Day': Environment, Agriculture, and Landscape Change in Essex County, Virginia, 1600-1782," (Ph.D. dissertation, University of Maryland-College Park, 1995), as well as the extensive studies of various localities in Maryland.
 5. "Agroecology" is a relatively recent term applied to the study of the interaction between agricultural systems and their local environments from the perspective of the modern environmental sciences. It arose in response to the recognition that modern Western methods of agricultural production are not necessarily suitable in all ecological and cultural contexts around the world. The point is to craft "sustainable" agricultural systems that will not only provide dependable sustenance and income but that also will cause as little long-term damage to the environment as possible. The first appearance of the concept comes from 1928, while the term itself first appeared in a title in 1965 ("agrärökologie") and in English in 1983. See Stephen R. Gleissman, *Agroecology: Ecological Processes in Sustainable Agriculture* (Chelsea, MI: Sleeping Bear Press, 1998): 13-15.
 6. The line for the limit of settlement in 1724 in Figure 1 and subsequent maps was derived from Plate I, "The Colonies and the United States: 1625-1790: Distribution of Population" in Herman R. Friis, "A Series of Population Maps of the Colonies and the United States, 1625-1790," *Geographical Review* 30:3 (1940): 463-470.
 7. Louis Seig, "The Spread of Tobacco: Study in Cultural Diffusion," *T e Professional Geographer* 1 (1963): 17-20.
 8. Percy, *Production of Tobacco*: 5. The tobacco cultivated and smoked in the Powhatan Confederation at the time Jamestown was settled was *Nicotiana rustica*, which produced a bitter smoke that limited its use to religious ceremonies by shaman. The primary physical difference between the two is that *N. rustica* is a squat plant with small leaves and yellow flowers while *N. tabacum* is taller, with large leaves and purple flowers.
 9. Schweitzer, "Economic Regulation": 553.
 10. Although prices for Maryland's tobacco eventually would converge with Virginia's, this relationship still held into the late eighteenth century. Johann Schoepf supplied a price differential in the 1780s in which Virginia tobacco prices were still six to twelve percent higher than those in Maryland. Johann D. Schoepf, *Travels in the Confederation [1783-1784]* (New York: Burt Franklin, Publisher, 1968) II: 48.
 11. William Douglas, *A Summary, Historical and Political of the First Planting, Progressive Improvements, and Present State of British Settlements in North America [1770]* (New York: Arno Press, 1972): 371; John Mitchell, *American Husbandry [1775]*, ed. Harry J. Carman (Morningside Heights, NY: Columbia University Press, 1939): 161; Jacques Pierre Brissot de Warville, *New Travels in the United States of America, 1788*, trans. and ed. Mara S. Vamos and Durand Echeverria (Cambridge, MA: The Belknap Press of Harvard University Press, 1964): note p. 351.
 12. John Banister, *John Banister and His Natural History of Virginia 1678-1692*, ed. Joseph and Nesta Ewan (Urbana: University of Illinois Press, 1970): 360; Clayton, "Letter": 63.
 13. Hugh Jones, *T e Present State of Virginia, From Whence is Inferred a Short View of Maryland and North Carolina [1724]* (New York: Joseph Sabin, 1865): 34; Douglas, *British Settlements*: 371; Mitchell, *American Husbandry*: 161; Schoepf, *Travels* II: 47; Isaac Weld, *Travels T rough the States of North America [1807]*, ed. Martin Roth (New York: Johnson Reprint Corporation, 1968): 163.
 14. Waverly K. Winfree, comp., *T e Laws of Virginia: Being a Supplement to Henings T e Statutes*

- at Large, 1700-1750* (Richmond: The Virginia State Library, 1971): 247-253.
15. Hugh Drysdale, "An Acc[oun]t of the Quantity of Tobacco planted & tended in the Year 1724," Great Britain, Public Record Office [PRO], Colonial Office [CO] 5/1319, f. 220 (microfilm, Virginia Colonial Records Project [VCRP] Reel 41), Library of Virginia [LVA], Richmond, VA). Drysdale's conclusion was that the law would not cause a decrease in the quantity of exported tobacco and would in fact result in qualities that he predicted would be "the best kind that any year has produced." See Drysdale, Letter to the Board of Trade, January 29, 1724 [1725], PRO, CO 5/1319, ff. 212-213 (microfilm [VCRP] Reel 41), LVA, Richmond, VA). Much of the subsequent colony-wide data in this article focuses on the mid-1720s because it forms the basis for a study by this author of the data supplied by Drysdale and contained in surviving county court records as a result of the limitation law.
 16. Hugh Drysdale, "The present state of Virginia with respect to the Colony in General" [1726], PRO CO 5/1320, ff. 54-56 (microfilm [VCRP] Reel 42), LVA, Richmond, VA).
 17. The following description of the general geology of eastern Virginia, including the ages of the provinces and measurements of the Coastal Plain, is derived from materials contained in Commonwealth of Virginia, Department of Mines, Minerals, and Energy, Division of Mineral Resources, "Geologic Map of Virginia" (Richmond: Commonwealth of Virginia, 1987).
 18. Extensive use of generalized soil terminology will be used here. Most of the terms deal with the texture of the soil, which graded from very coarse to very fine. In descending order, from largest particle size and greatest coarseness to smallest size and finest texture, the soil materials are: gravel, sand, silt, and clay. Loams are a combination of sand, silt, and clay; different admixtures of the three provide soil descriptions such as "sandy loam," "fine sandy loam," "loamy sand," "silt loam," or "clay loam." See Diane A. S. Hoppe, *Soil Survey of Essex County, Virginia* (Washington, DC: United States Department of Agriculture [USDA], Soil Conservation Service [SCS], 1989): 80-87.
 19. Keith Frye, *Roadside Geology of Virginia* (Missoula, MT: Mountain Press Publishing Company, 1986): 24; Susan L. Woodward and Richard L. Hoffman, "The Nature of Virginia," in Karen Terwilliger, ed., *Virginia's Endangered Species: The Proceedings of a Symposium* (Blacksburg, VA: McDonald & Woodward Publishing Company, 1991): 30. These drowned river valleys still exhibit the diurnal influence of rising and falling tides and invasions of saline-rich waters from the bay, which is the origin for the name "Tidewater."
 20. The Pamunkey Neck – between the Mattaponi and Pamunkey Rivers – is another major feature, but it is not set apart by a pair of major drowned river valleys. As sea level continues to rise, it may one day take on the aspect of the other "necks." At this time, it is considered part of the Middle Peninsula. On a smaller scale, there are countless "necks" between larger creeks on each of the larger peninsulas. Examples include Digges Neck along the York River on the Lower Peninsula in York County and Ware Neck along Mobjack Bay on the Middle Peninsula in Gloucester County.
 21. Frye, *Roadside Geology*: 93; Robert B. Mixon, et. al., "Geologic Map and Generalized Cross Sections of the Coastal Plain and Adjacent Parts of the Piedmont, Virginia," USGS Miscellaneous Investigations Series, 1:250,000 scale Map I-2033 (Washington, DC: United States Geological Survey [USGS], 1989).
 22. Robert Beverley, *The History and Present State of Virginia*, ed. Louis B. Wright (Chapel Hill: University of North Carolina Press, 1947): 123.
 23. Beverley, *History*: 124.
 24. Edmund Rufin, "Remarks on the Soils in General, and Particularly the Ridge Lands, of Eastern Virginia," *Farmers' Register* 8 (1840): 169.
 25. Rufin, "Remarks": 170.
 26. Rufin, "Remarks": 171 and Beverley, *History*: 124.
 27. Rufin, "Remarks": 168-169.
 28. Clayton, "Letter": 60-61. That confusion led at least one researcher to incorrectly associate sweet-scented tobaccos with ridge tops rather than river terraces on the Lower Peninsula. See Craig Lukesic, "Soils and Settlement Location in 18th Century Colonial Tidewater Virginia," *Historical Archaeology* 24:1 (1990): 1-17.
 29. Jones, *Present State of Virginia*: 73, 191, 197. Digges bought the land from Capt. John West on September 11, 1650 and obtained a patent for the 1,200 acres on May 6, 1751 (Patent Book 2: 316). As late as 1811 the reputation of "E Dees" was used as a selling point for the Digges' estate, by that time called "Bellfield." See Anonymous, "Bellfield," *William and Mary Quarterly* Ser. 1, 15 (1906): 37-38.
 30. R. T. Arvon Burke and Aldert S. Root, *Soil Survey of the Yorktown Area, Virginia* (Washington,

DC: USDA, 1906): 14-21 and attached soils map. A more recent soil survey has been conducted in York County. See Robert L. Hodges, et. al., *Soil Survey of James City and York Counties and the City of Williamsburg, Virginia* (Washington, DC: USDA, Soil Conservation Service [SCS], 1982). Unfortunately, Digges Neck has subsequently come under the ownership of the Department of Defense and has been converted into the U.S. Naval Weapons Station, Cheatham Annex (USGS, Clay Bank 7.5 Minute Quadrangle). For purposes of national security, the soil survey has been censored and does not include most of the former Digges estate.

31. USDA, SCS, "General Soil Map, Virginia" (Lanham, MD: USDA, SCS, 1979). The location of soils was fine-tuned using the soil surveys mentioned previously, as well as John H. Elder, Jr., *Soil Survey of Spotsylvania County, Virginia* (Washington, DC: USDA, SCS, 1985), Danny R. Hatch, et. al., *Soil Survey of City of Virginia Beach, Virginia* (Washington, DC: USDA, SCS, 1985), Robert L. Hodges, *Soil Survey of Hanover County, Virginia* (Washington, DC: USDA, SCS, 1980), Dan Isgrig and Adolph Strobel, Jr., *Soil Survey of Stafford and King George Counties, Virginia* (Washington, DC: USDA, SCS, 1974), David L. Jones, et. al., *Soil Survey of Prince George County, Virginia* (Washington, DC: USDA, SCS, 1985), John C. Nicholson, *Soil Survey of Westmoreland County, Virginia* (Washington, DC: USDA, SCS, 1981), and Earl J. Reber, et. al., *Soil Survey of City of Suffolk, Virginia* (Washington, DC: USDA, SCS, 1981).
32. The actual soil associations on the USDA's general soil map identified here as sweet-scented soils are:

Inner Coastal Plain

- 66 Emporia-Tetotum-Bourne
- 70 Suffolk-Emporia-Goldsboro
- 72 Tetotum-Suffolk-Roanoke
- 74 Pactolus-Alaga-Fluvaquents
- 75 Pamunkey-Tetotum-Fluvaquents
- 77 Suffolk-Eunola-Kenansville

Outer Coastal Plain

- 83 Lumbee-Drageston-Johns
- 85 Meggett-Dogue

Alone, Emporia soils were probably too sandy to produce sweet-scented tobacco, but in association with Tetotum or Suffolk soils they appear to have had enough fine-grained materials to support sweet-scented. Originally, no soils of the Outer Coastal Plain were included in the definition of sweet-scented soils, but examination of the individual surveys for Lancaster and Gloucester Counties and the fact that Elizabeth City County was a sweet-scented producer spurred further analysis. My conclusion is that Lumbee and Dogue soils probably could have supported sweet-scented tobacco, provided adequate drainage was provided and low levels of salt intrusion were present. Additional study of Lancaster County and Middlesex County would answer many questions concerning how close to the Chesapeake Bay sweet-scented tobacco could be grown.

33. Drysdale, "Acc[oun]t of the Quantity of Tobacco."
34. As quoted in Arthur P. Middleton, *Tobacco Coast: A Maritime History of Chesapeake Bay in the Colonial Era* (Baltimore: Johns Hopkins University Press, 1984): note 13, 407.
35. Emil Onuschak, Jr., "Pleistocene-Holocene Environmental Geology," in *Geologic Studies of the Coastal Plain of Virginia*, Bulletin 83, Part 3 (Charlottesville: Virginia Division of Mineral Resources, 1973): 137.
36. Clayton, "Letter": 61.
37. Banister, *Natural History*: 360; Clayton, "Letter": 78; Mitchell, *American Husbandry*: 161. In the late nineteenth century, S. W. Travers and Company suggested the following topping ratios: ten to sixteen leaves for "bright" tobaccos; nine to twelve leaves for "sweet fillers;" and eight to ten leaves for "dark rich shipping" tobaccos. S. W. Travers and Company, *A Few Facts on the Cultivation of Tobacco, Distributed with the Compliments of S. W. Travers & Co.* (Richmond, VA: Johns & Goolsby, 1886): 7.
38. John F. Duggar, *Southern Field Crops*, Revised Edition (New York: The MacMillan Company, 1925): 394-395. Plants also had to be "suckered," which meant pinching-off renewed growth sprouting from the stalk.
39. Drysdale, "Acc[oun]t of the Quantity of Tobacco." Drysdale actually provided six useful columns of information: the number of tithables in each county, the number that tended tobacco, the number of boys under sixteen who were allowed to tend 3,000 pounds each, the total number of tobacco plants tended, and estimates of the number of hogsheads of

- Oronoco and sweet-scented tobacco that would be exported. From that information, several important statistics can be extrapolated. The percentage of tithables engaged in tobacco can be determined by dividing the number tending tobacco by the total number of tithables. Production of pounds of Oronoco and sweet-scented tobaccos can be generated by multiplying the number of each type of hogsheads by the figures supplied by Drysdale: 600 pounds per hogshead for Oronoco and 700 pounds per sweet-scented hogshead (at the time, hogsheads were set by law at the uniform size of 43 inches by 30 inches). Figuring the number of plants per pound in then only a matter of dividing the number of plants tended in each county by the total number of pounds produced in each. Leaves per pound was calculated by multiplying the number of plants per pound by eleven leaves per plant for Oronoco and seven leaves per plant for sweet-scented. Pounds per worker was derived by dividing the number of plants by the total number of tobacco workers. The number of tobacco workers was taken at face value, because later accounts of the number of persons tending tobacco exclude the number of boys allowed to tend 3,000 plants. From Drysdale's account it is possible to arrive at a surrogate figure for adults by removing the production by boys (number of boys x the 3,000 pound allotment for boys), but this is a dubious calculation at best and does not supply per capita production numbers that are significantly different. Workers' income from tobacco in 1724 was calculated using average Oronoco and sweet-scented prices obtained from quitrent returns from 1723, 1724, and 1725 (Quitrent Returns, 1724 submitted by Hugh Drysdale, PRO CO 5/1319, ff. 227-228 (microfilm [VCRP Reel 41]), LVA, Richmond, VA) converted to Sterling and multiplied by average production.
40. Clayton, "Letter": 78.
 41. Virginia Department of Agriculture and Immigration [VDAI], *Tobacco Growing in Virginia*, Farmers Bulletin No. 19 (Richmond, VA: Davis Bottom, Superintendent of Public Printing, 1914): 11; Stirling N. Hawks and William. K. Collins, *Principles of Flue-Cured Tobacco Production*, First Edition (Raleigh: North Carolina State University, 1983): 28, 32.
 42. VDAI, *Tobacco Growing*: 21.
 43. Banister, *Natural History*: 360.
 44. Duggar, *Southern Field Crops*: 391.
 45. Hawks and Collins, *Principles*: 117; James E. McMurtrey, Jr., "Distinctive Effects of the Deficiency of Certain Essential Elements on the Growth of Tobacco Plants in Solution Cultures" (Ph.D. dissertation, University of Maryland-College Park, 1931): 16.
 46. Hawks and Collins, *Principles*: 136; McMurtrey, "Distinctive Effects": 20.
 47. William A. Penn, *The Sovereign Herbe: A History of Tobacco* (New York: E. P. Dutton & Co., 1902): 101; Hawks and Collins, *Principles*: 141; McMurtrey, "Distinctive Effects": 22.
 48. Beverley, *History*: 123-124.
 49. Thomas Glover, "An Account of Virginia, its Scituation, Temperature, Productions, Inhabitants and their manner of planting and ordering Tobacco &c., Communicated by Mr. Thomas Glover an ingenious Chirurgion that hath lived some years in that Country," *Philosophical Transactions of the Royal Society of London* 126 (1676): 627; Francis Louis Michel, "Report of the Journey of Francis Louis Michel from Berne, Switzerland, to Virginia, October 2, 1701-December 1, 1702," ed. William J. Hinke, *Virginia Magazine of History and Biography* 24 (1916): 31.
 50. Figures on production were derived from Hardin, "Changes They Have Made," Appendix B, Table 3: 427-429; Rutman and Rutman, *Explicatus*, Table I: 4; and Walsh, "Slave Life," Table 7.1: 175.
 51. Carville V. Earle, *The Evolution of a Tidewater Settlement System: All Hallows' Parish, Maryland, 1650-1783*, The University of Chicago Department of Geography Research Paper No. 170 (Chicago, IL: Department of Geography, University of Chicago, 1975): 26.
 52. "The Acc[oun]t of His Majesties Revenues of 2s[hillings]/hogshead Arising within this Colony of Virginia," Great Britain, PRO CO 5/1319, ff. 202, 214, 225 (microfilm [VCRP Reel 41], LVA, Richmond, VA); PRO CO 5/1320, f. 17 (microfilm [VCRP Reel 42], LVA, Richmond, VA). These returns were compiled each April by the Receiver General and were then transmitted to the Board of Trade. They cover two periods per year, beginning in April and running to October, then October to April. That presents a problem, because the reporting periods do not coincide with the calendar year, nor do they correspond with the quarterly returns of exports submitted by the Naval Of fers. Drysdale's figures of 700 pounds net per sweet-scented hogshead and 600 pounds net per Oronoco hogshead and the proportion of production by variety were used to calculate annual tobacco production in pounds of sweet-scented and/or Oronoco (Drysdale, "Acc[oun]t of the Quantity of Tobacco"). By way of comparison, the

- average net weight of hogsheads in Essex County – three-quarters of which were sweet-scented – was 689.65 pounds (Hardin, “Alterations They Have Made,” Table 3: 427).
53. Quitrent Returns, Great Britain, PRO CO 5/1319, ff. 57-58, 72-73, 122-123, 203-204, 227-228; /1320, ff. 70-71, 155-156 (microfilm [VCRP Reel 41], LVA, Richmond, VA); /1321, ff. 59-61; /1322, ff. 15-16, 209-210; /1323, ff. 99-100, 132-133 (microfilm [VCRP Reel 42], LVA, Richmond, VA). Additional figures were derived from Walsh, “Summing the Parts,” Table II [Oronoco]: 87-88; Table III [“Peripheral”]: 90-91; and Table IV [sweet-scented]: 92-93. For the sake of comparison, prices derived by Walsh for the sweet-scented and Oronoco subregions have been added to the prices derived from the Quitrent Returns in Figure 4.
 54. There is a discrepancy here between the average prices derived from the Quitrent Returns and those quoted by Lorena Walsh in “Summing the Parts.” The difference probably has more to do with her selection of counties for each subregion in Virginia and the inclusion of Northern Neck and Maryland prices rather than anything else. Her averages for the same time period were 1.73 pence per pound for the sweet-scented subregion and 1.19 pence per pound in both the Oronoco and marginal subregions. The Quitrent Return figures are lower and may only be reflecting the inferior grades of tobacco typically reserved for paying fees, but because they show the relative relationship between the subregions, I have chosen to use them.
 55. Walsh, “Summing the Parts,” Table IV: 92-93.
 56. Hardin, “Alterations They Have Made,” Figure 24: 235; Appendix C, Table 1: 436-438.
 57. Jackson Turner Main, “The Distribution of Property in Post-Revolutionary Virginia,” *The Mississippi Valley Historical Review* 41:2 (1954): 241-258 and “The One Hundred,” *The William and Mary Quarterly* Ser. 3, 11:3 (1954): 354-384; Peter V. Bergstrom, “Markets and Merchants: Economic Diversification in Colonial Virginia, 1700-1775 (Ph.D. dissertation, University of New Hampshire, 1980; republished NY: Garland Publishing Company, 1985).