‘A PROFOUND SECRET IN THE BREAST OF A VERY FEW’:

INDUSTRIAL VENTURES IN THE CHESAPEAKE REGION, 1720-1820

by

SOLOMON K. SMITH

(Under the Direction of PETER CHARLES HOFFER)

ABSTRACT

My dissertation demonstrates the importance of industrial and manufacturing ventures to the development of the Chesapeake region in terms of economic growth, social structure formation, and the emergence of geographic infrastructure. It is a collection of five case studies exploring the development of industrial activities in the Chesapeake region from 1720 until 1820. Although organized chronologically, each work confronts the same set of questions: How were individual Chesapeake industrial endeavors organized? What did it take to succeed in an industrial activity? What led some individuals to succeed in industrial activities while others failed? How much could industrial ventures contribute to the wealth of individuals in the Chesapeake region? How did they spend their industrial income? Finally, how did industrial activities contribute to the development of urban areas in the Chesapeake region?

INDEX WORDS: INDUSTRY, MANUFACTURING, ENTREPRENUERS, BUSINESS, CHESAPEAKE

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A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2009

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December 2009

DEDICATION

To Sarah and Abigail, my inspiration for everything.

ACKNOWLEDGEMENTS

Colonials who sought after industrious pursuits understood better than any that no task is complete without the assumption of debts, and that sometimes those debts are greater than the task completed. My own debts are large, but I am happy to have the pleasure to thank publicly some of those who helped me bring this project to completion. Peter Hoffer is my greatest creditor; more than any other scholar and friend, Peter has sustained his faith in me and pushed me to complete this project, even when others had abandoned all hope. It has been a privilege to collaborate with Peter so early in my writing career, both with coursework and in this project. I have benefited greatly from his sage counsel, and can only hope that one day I will write half as many books as he has written.

Allan Kulikoff must also be recognized. For a long time, too long really, he methodically provided criticism and advice to me when, as a graduate student, I first began to scour the sources of the Chesapeake region. His inspired seminars provided me with the foundation for all of my efforts regarding this project. Over subsequent years, other scholars (especially those who sat upon this committee or allowed me to grace the tables of their classrooms) as well as several friends have lengthened my list of debts. Some offered comments on drafts, some remarked on papers and articles, some indulged me on discussions about theories of historical understanding or the significance of colonial American history. All were patient and yet critical colleagues. Each has left a

mark on the pages that follow and all of have become invisible underpinnings for this project.

Archivists and librarians at several institutions have made countless trips to the manuscript storage facility to bring me crumbling yellowed materials; some have even guided me to information I might never have found otherwise. Many manuscript curators, special collections librarians, and interlibrary staffs tirelessly fetched, copied, phoned and nagged at my behest. Especially important were those at the Library of the University of Georgia, the Library of Virginia, the Rockefeller Library of the Colonial Williamsburg Foundation, the Virginia Historical Society, the Special collections department at the University of Virginia, the Maryland Historical Society, and the Maryland State Archives. I am also grateful to the many institutions that have provided me with financial assistance; without your untiring assistance, no graduate student, or professional scholar for that matter, would ever accomplish anything.

And finally, my wife Sarah has done more to help me with this project than any other. She has helped me track down books, taken notes, listened to my ravings about things for which she has little interest, and pushed me to finish a project so long in coming to completion. She has tolerated the ebbs and flows of my research and writing over the years, endured poverty and uncertainty, but still saw fit to give me the greatest gift I have ever received: our daughter Abigail. I hope they both always know that they bring me the greatest joy. To them I lovingly dedicate this work.

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[1] Tayloe's blacksmithing activities at Mt. Airy comes from the John Tayloe Account Book, 1776-1786, TFP, VHS.

Introduction

Unable to find work in Vermont or the north after graduating from university in 1839, Jason Niles headed south to find a teaching position. While at a hotel in Nashville for several days, Niles overheard several conversations between two local patrons. The men argued in a friendly manner for several hours nearly every day about the comparative virtues of a career in agriculture and industrial or business enterprises. In the end, Niles believed the dialogs between the two men offered the quintessential points why Southerners focused on agricultural pursuits rather than other endeavors. Although much of the conversation was of interest, one participant summed up the discussion by finally declaring that he strove to be an independent farmer because they were more aristocratic than businessmen. "The merchant lived by being complacent and simple to all; and when he ceased to be so he starved; while the farmer who is not dependent on others for his living, could be as aristocratic and haughty as he pleased with perfect impunity."[2]

Businessmen in the South did not have the social prestige of their northern counterparts despite their wealth, ranking well beneath planters, politicians, military officers, and professionals as a social group. As a result, Niles surmised that the agrarian focus of Southerners reflected a general disdain for businessmen as unprincipled men who lusted after money. Such a notion led most successful businessmen in the South to purchase plantations as soon as they could afford them, and thereby attain the status of planter within society. For Niles, it also clearly explained the reluctance of intelligent

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[2] Diary of Jason Niles, November 23, 1839, quoted in Clement Eaton, *The Growth of Southern Civilization, 1790-1860* (New York: Harper and Row, 1961), p. 244.

young men in the South to enter into a business career of any sort outside of agricultural production.[3] To be important in the South one needed to pursue an agricultural career and become a planter.

While one could suggest that Niles' experience in Nashville only reflected the ideals of the nineteenth century, it would not be a correct assumption. When the Virginia Company of London founded the colony of Virginia at the beginning of the seventeenth century, agricultural production was at the heart of their plan for success. The Chesapeake region offered tremendous opportunities for the landless masses of Great Britain.[4] Thousands of Englishmen sold themselves into servitude for the cost of transportation to the Chesapeake on the prospect of gaining land and making a fortune once their servitude had ended. In addition to indentured servants, the possibility for earning great wealth also attracted many of England's aristocratic families as well as the burgeoning English middle class, especially second and third sons since they could never expect to inherit property in England due to the laws of primogeniture and entail. Unfortunately, only a few men earned more than an early death in the Chesapeake, but that did not stop the vast numbers who embarked for the region.[5]

Despite abundant natural resources, most of the first settlers in the Chesapeake were attracted by the enormous wealth being secured from the growth of the labor-intensive tobacco plant. This reliance on the production of tobacco as the major export industry forced the rapid transition from indentured servitude into complete chattel

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[3] Diary of Jason Niles, quoted in Eaton, *Growth of Southern Civilization,* p. 221.

[4] Allan Kulikoff, *Tobacco and Slaves: The Development of Southern Cultures in the Chesapeake, 1680-1800* (Chapel Hill: University of North Carolina Press, 1986), 4.

[5] Russell R. Menard, "British Migration to the Chesapeake Colonies in the Seventeenth Century," *Colonial Chesapeake Society*, Edited by Lois Green Carr, Philip Morgan, and Jean B. Russo (Chapel Hill: University of North Carolina Press, 1988), 99-132, and Henry Miller, "An Archeological Perspective on the Evolution of Diet in the Colonial Chesapeake, 1620-1745," ibid., 176-199.

slavery by the late seventeenth century.[6] In order to appreciate the transition from servitude to slavery, it is necessary to recognize the importance of tobacco and how the incongruities of tobacco production altered the development of Chesapeake society. Native Americans were harvesting tobacco in various parts of the American continent centuries before Europeans arrived, but they never bothered to domesticate the plant because of its abundant natural growth.[7] Once Europeans recognized the intoxicating properties of tobacco, they quickly sought to control the plant for commercial production. Learning growing techniques from the local tribes around the Jamestown settlement, John Rolfe became the first European to successfully cultivate the plant in British North America about 1612. Within eight years, tobacco was the major export commodity for the colony.[8] This development brought tremendous profits to the owners of the first tobacco plantations and stimulated a mass migration of Englishmen during the middle of the seventeenth century.

The price of Chesapeake tobacco initially soared and many early growers made great fortunes from its production, attracting more planters and eventually leading to a troublesome overproduction problem. Following the natural laws of supply and demand, the price of tobacco dropped as production increased beyond demand. Unaware of what was occurring, planters increased output of tobacco in order to increase their profits, thus escalating their expenses by using more land and labor while also driving tobacco prices lower. From 1620 to 1680, the price of tobacco steadily declined. By the early 1700s, tobacco producers were still struggling with problems of low pricing. Fortunately, the

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[6] Winthrop Jordan, *White Over Black: American Attitudes Toward the Negro, 1550-1812* (Chapel Hill: University of North Carolina Press, 1968), 72.

[7] Joel Sherman, *A Passion for Cigars* (Kansas City: Universal Press Syndicate Co., 1996), 12-13

[8] Edmund S. Morgan, *American Slavery, American Freedom: The Ordeal of Colonial Virginia* (New York: W. W. Norton, Co., 1975), 90-91.

increased production made the crop relatively profitable in terms of bulk sales, but the situation regarding low tobacco prices failed to subside, leading a number of leaders in the region to recognize that prices might never improve.[9]

In order to protect themselves financially, several members of the Chesapeake's planter elite sought new ways to seek their fortunes. These innovators worked through the colonial legislatures to encourage the production of alternative crops like hemp and various grains by offering bounties to planters who produced a specified quantity of the crop each year. In addition to the development of new crops, they made several serious attempts to engage in industrial activities. One of the first industrial ventures was the extraction of valuable minerals and metals. Extraction enterprises failed to make money as much money as agricultural activities, and forced many participants to turn to the manufacture of materials needed in England such as the production of naval stores (tar, pitch, potash, iron, timber, and rope), and luxury items (glass, furs, and gold).[10]

Despite these small steps toward diversification, by the beginning of the eighteenth century the Chesapeake's culture and society remained firmly dependent on and indebted to tobacco production and its reliance on slavery. The cyclic production of the tobacco crop dominated the lives of the regional people.. It influenced settlement patterns, government operations, the distribution of land and wealth, the organization and development of social classes and the everyday tedium of life for every individual, regardless of race or condition of freedom.[11] Unfortunately, there were only a few individuals in the Chesapeake region that actually attained the highest levels of affluence,

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[9] Russell R. Menard, "The Tobacco Industry in the Chesapeake Colonies, 1617-1730: An Interpretation," *Research in Economic History* 5 (1980): 109-177; Kulikoff, *Tobacco and Slaves*, 5.
[10] Morgan, *American Slavery*, 44-45.
[11] T. H. Breen, *Tobacco Culture: The Mentality of the Great Tidewater Planters on the Eve of the Revolution* (Princeton, Princeton University Press, 1985), 3-26, 40-73.

and many of them had great difficulty maintaining their wealth by participating in the volatile tobacco exclusive economy. Directly underneath the region's wealthy elite, there was a slightly larger middle class, or middling sort, that was composed of moderate landowners, merchants, artisans, and craftsman. At the bottom of white Chesapeake society were the majority of the colony's population, the small subsistence level farmers and frontiersmen. Since forty-five percent of the region's population owned slaves by 1790, nearly every white member of the population was dependent on slavery in some manner or another. Labor was always a scarce commodity and the price of slaves was extremely high, precluding widespread ownership.[12] Painfully working to recreate the world they left behind, nearly every British colonist in the region hoped to acquire a massive landed estate through tobacco production where they could display their wealth and prestige by building an immense house, possessing a countless number of servants, and engaging in frivolous pursuits as entertainment.

With so much emphasis on acquiring labor and growing tobacco, it is no surprise that historians have focused on slaves and tobacco production as the most essential elements to the culture and society of the Chesapeake region.[13] But there was a lot more

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[12] Rhys Isaac, *The Transformation of Virginia, 1740-1790* (New York: W. W. Norton & Co., 1982).

[13] A brief list of the literature addressing on the agricultural focus in the Colonial Chesapeake follows: James Curtis Ballagh, *A History of Slavery in Virgini*a (Baltimore: Johns Hopkins University Press, 1902); T. H. Breen, *Tobacco Culture: The Mentality of the Great Tidewater Planters on the Eve of Revolution* (Princeton: Princeton University Press, 1985); Lois Carr, Philip D. Morgan, and Jean Russo, eds., *Colonial Chesapeake Society* (Chapel Hill and London: University of North Carolina Press, 1988); Lewis Cecil Gray, *History of Agriculture in the Southern United States to 1860,* Parts I and II (Washington, D. C.: Carnegie Institution, 1933. Reprinted, Washington, D. C., 1973); Robert William Fogel, and Stanley L. Engerman, *Time on the Cross: The Economics of American Negro Slavery* (Boston, 1974); Eugene Genovese, *The Political Economy of Slavery* (New York: Vintage, 1965); Rhys Isaac, *The Transformation of Virginia, 1740-1790* (London and New York: W.W. Norton & Company, 1982); Samuel Kercheval, *A History of the Valley of Virginia* (Fourth Edition, Revised by the Author, and new notes by the editor, Strasburg, Va.: Shenandoah Publishing House, 1925); Alan Kulikoff, *Tobacco and Slaves: The Development of Southern Cultures in the Chesapeake, 1680-1800* (Chapel Hill and London: University of North Carolina Press, 1986); Jackson Turner Main, *The Social Structure of Revolutionary America* (Princeton, N.J., 1965); Russell R. Menard, "British Migration to the Chesapeake Colonies in the

economic activity happening than just tobacco production. To begin with, by the 1750s most planters shifted away from the production of tobacco to other crops due to the volatility of tobacco prices and uncertainty of profitable return. Many engaged in the production of wheat and other grains. Since the population grew substantially during the eighteenth century, foodstuffs garnered high prices at market and stayed relatively stable in price. George Washington shifted nearly all of his agricultural production away from tobacco to that of wheat in the 1760s, and other planters like Thomas Jefferson successfully experimented with growing flax and hemp.[14]

Seventeenth Century."*Colonial Chesapeake Society*, Edited by Lois Green Carr, Philip Morgan, and Jean B. Russo (Chapel Hill: University of North Carolina Press, 1988); Edmund S. Morgan, *American Slavery, American Freedom* (New York: W. W. Norton & Company, 1975); Philip D. Morgan, *Slave Counterpoint: Black Culture in the Eighteenth Century Chesapeake & Lowcountry* (Chapel Hill: University of North Carolina Press, 1998); Douglass C. North, *The Economic Growth of the United States, 1790-1860* (Englewood Cliffs, New Jersey: Prentice-Hall, 1961); Charles S. Sydnor, *American Revolutionaries in the Making: Political Practices of Washington's Virginia* (New York: Free Press Publishing, 1952); Eugene D. Genovese, "The Significance of the Slave Plantation for Southern Economic Development" *Journal of Southern History* 28 (1962): 422-437; G. Melvin Herndon, "The Significance of Forests to the Tobacco Plantation Economy in Antebellum Virginia" *Plantation Society in the Americas* (1979), pp. 430-439; Jackson T. Main, "The One Hundred" *William and Mary Quarterly* 11 (1954), 363-383; Russell R. Menard, "The Tobacco Industry in the Chesapeake Colonies, 1617-1730: An Interpretation." *Research in Economic History* 5 (1980): 109-177; Robert R. Russell, "The General Effects of Slavery Upon Southern Economic Progress" *Journal of Southern History* 4 (1938): 34-54.

[14] James T. Flexner, *Washington: The Indispensable Man* (New York: Signet Books, 1984), 43-50; Morgan, *Slave Counterpoint*, 173, 191, and 360; Kulikoff, 52, 120-21, and 124. A brief list of scholarly literature follows: James Curtis Ballagh, *A History of Slavery in Virgini*a (Baltimore: Johns Hopkins University Press, 1902); Frederick Bancroft, *Slave-Trading in the Old South* (Baltimore, 1931); Ira Berlin and Philip D Morgan, eds , *Cultivation and Culture: Labor and the Shaping of Slave Life in the Americas* (Charlottesville: University Press, 1993); Ira Berlin, *Many Thousands Gone: The First Two Centuries of Slavery in North America* (Cambridge, Mass : Harvard University Press, 1998); Alexander Crosby Brown, *The Great Dismal Swamp Canal* (Chesapeake, Va : The Norfolk County Historical Society, 1970); Mills Brown, *The Williamsburg Manufactory* (Colonial Williamsburg Foundation, Research Report Series) Kathleen Bruce, *Virginia Iron Manufacture in the Slave Era* (New York: Century Company, 1931); Lois Carr, Philip D Morgan, and Jean Russo, ed., *Colonial Chesapeake Society* (Chapel Hill and London: University of North Carolina Press, 1988); Colonial Williamsburg, Inc *The Blacksmith in Eighteenth-Century Williamsburg: An Account of His Life & Times and of His Craft* (Williamsburg: Colonial Williamsburg, 1987); A Conrad and J. Meyer, *The Economics of Slavery* (Chicago: Aldine, 1967); Wayland Fuller Dunaway, *History of the James River and Kanawha Company* (New York: Longmans, Green & Co , 1922); Howard N Eavenson, *The First Century and a Quarter of American Coal Industry* (Pittsburgh: Author, 1942); Joseph A. Goldenberg, *Shipbuilding in Colonial America* (Charlottesville: Published for the Mariners Museum, Newport News, Virginia, by the University Press of Virginia, 1976); David Harvey, *A Progress Report on the Reconstruction of the American Bloomery Process* (Williamsburg, Va : Colonial Williamsburg Foundation Library Research Report # 339); Will Holmes, *Early American Sawmills* (Williamsburg, Va : Colonial Williamsburg Foundation, 1960); Rhys Isaac, *The Transformation*

While other crops could be profitable and less volatile than tobacco, the English people who originally came to the Chesapeake hoped to build manufacturing and industrial activities as well as agricultural ventures in order to make or sustain their personal wealth. What the colonists quickly learned was that the building of manufacturing and industrial ventures could be difficult and expensive, largely due to a shortage of skilled labor. They were also hampered by the King and Parliament, who actively discouraged American manufacturing in the hope of selling English

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of Virginia, 1740-1790 (London and New York: W W Norton & Company, 1982); Alan Kulikoff, *Tobacco and Slaves: The Development of Southern Cultures in the Chesapeake, 1680-1800* (Chapel Hill and London: University of North Carolina Press, 1986); Ronald Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia, 1715-1865* (Westport, Conn : Greenwood Press, 1979); Charles Royster, *The Fabulous History of the Dismal Swamp Company: A Story of George Washington's Times* (New York: Alfred Knopf, 1999); John S Salmon, *The Washington Iron Works of Franklin County Virginia, 1773-1850* (Richmond, Va : Virginia State Library, 1986); Robert S Starobin, *Industrial Slavery in the Old South* (New York: Oxford University Press, 1970); R. Keith Aufhauser, "Slavery and Technological Change " *Journal of Economic History* 34 (1974): 36-50; Fred Bateman, James Foust, and Thomas Weiss, "The Participation of Planters in Manufacturing in the Antebellum South," *Agricultural History* 48 (1974): 277-98; Raymond P. Barnes, "Roanoke Valley's Early Iron Mines " *Journal of the Roanoke Historical Society* 3, no 2 (1967): 24-27; James Adam Bear, "Mr. Jefferson's Nails," *Albemarle County Historical Society* 16 (1957-1958): 47-52; Sidney Bland, "Plantations of Iron: Valley Industry Amidst the Farms," *Harrisonburg Rockingham Historical Society* 8, no 4 (1986): 1-2; Samuel Sydney Bradford, "The Negro Ironworker in Ante-Bellum Virginia " *Journal of Southern History* 25 (1959): 194-206; Alexander Crosby Brown, "America's Greatest Eighteenth Century Engineering Achievement: The Potowmack Company's Canal at Great Falls " *Virginia Cavalcade* 12, no 4 (1963): 40-47; Alexander Crosby Brown, "Colonial Williamsburg's Canal Scheme " *Virginia Magazine of History and Biography* 86 (1978), p. 26-32; Kathleen Bruce, "The Manufacture of Ordnance in Virginia During the American Revolution, Parts I and II " *Army Ordnance* 39 (1926): 3893-91; G MacLauren Brydon, "The Bristol Iron Works of King George County " *Virginia Magazine of History and Biography* 42 (1934): 97-102; Robert D. Burhams, "The Spotswood Iron Empire " *Northern Neck of Virginia Historical Magazine* 21 (1971): 2238-2244; Lester J. Cappon, "The Trend of the Southern Iron Industry Under the Plantation System " *Journal of Economic and Business History* 2 (1930): 353-381; Randolph Warner Church, "John Ballendine: Unsuccessful Entrepreneur of the Eighteenth Century " *Virginia Cavalcade* 8 (1959): 28-29, 39-47; Alexander Brown Crosby, "America's Greatest Eighteenth Century Achievement " *Virginia Cavalcade* 12 (1963), pp 40-47; Charles B. Dew, "Disciplining Slave Ironworkers in the Ante-Bellum South: Coercion, Conciliation, and Accommodation " *American Historical Review* 79 (1974): 393-418; Charles B. Dew, "David Ross and the Oxford Iron Works: A Study of Industrial Slavery in the Early Nineteenth-Century South " *William and Mary Quarterly* 31 (1974): 295-320; Charles E. Hatch and Thurlow Gates Gregory, "The First American Blast Furnace, 1619-1622: The Birth of a Mighty Industry on Falling Creek in Virginia " *Virginia Magazine of History and Biography* 70 (1962): 259-296; G. Melvin Herndon, "A War Inspired Industry: The Manufacture of Hemp in Virginia During the Revolution " *Virginia Magazine of History and Biography* 74 (1966): 301-11; Kelso, William M "Shipbuilding in Virginia, 1763-1774 " *Proceedings of the Columbia Historical Society*, 71 / 72 (1971-1972): 1-13; Ronald L. Lewis, "Slavery on Chesapeake Iron Plantations Before the American Revolution " *Journal of Negro History* 59 (1974): 163-175; Sinclair Snow, "Naval Stores in Colonial Virginia " *Virginia Magazine of History and Biography* 72 (1964), 75-89; Robert S. Starobin, "The Economics of Industrial Slavery in the Old South," *Business History Review* 44 (1970); William Theriault, "Friend's Ore Bank and Keep Triste Furnace " *West Virginia History* 48 (1989): 42-61.

manufactured gods to the colonists, whose purpose in the mercantile system was to produce raw materials for use by the mother country. With this in mind, Parliament passed legislation such as the Wool Act (1699), Hat Act (1732), and Iron Act (1750) to discourage colonial manufacturing.[15] Despite the difficulties and obstacles, Chesapeake residents actively engaged in industrial and manufacturing ventures, activities which played a crucial part in the development of the region. In the following pages, I will relate their stories.

While the importance of business and industry in the South has been somewhat obscured by the all-encompassing shadow of the plantation, the steady stroke of the saw mill, the roar of a blast furnace, the scrape of shovels in the mines, the clanking of blacksmith's hammers, and the din of a cotton factory were not infrequent. Southerners as a group may have aspired to be plantation owners, but most successful planters rarely limited themselves to agriculture, investing capital in merchant and industrial activities as well as slaves and land. Southern planters were not resistant to, threatened by, or even skeptical of economic diversification, manufacturing or industrialization.[16]

Nearly every industrial enterprise documented herein was owned or established by members of the Chesapeake region's wealthy elite class. But what made someone a

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[15] Victor S. Clark, *History of Manufactures in the United States* (New York: McGraw-Hill, 1929), I: 19-27.
[16] Ronald L. Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia*, 1715-1865 (Westport, CT, 1979), 209, 215-217; Frederick F. Siegel, *The Roots of Southern Distinctiveness: Tobacco and Society in Danville, Virginia, 1780-1865* (Chapel Hill, 1987), *passim*; Peter Parish, "The Edges of Slavery in the Old South: Or, Do Exceptions Prove Rules?" *Slavery and Abolition* 4:2 (1983), 116-117. Among those characterizing southern planters as entrepreneurial are: Hoffman, "Charles Carroll the Settler"; Main, *Tobacco Culture*; Menard, *Economy and Society in Early Colonial Maryland*; Aubrey C. Land, "Economic Base and Social Structure: The Northern Chesapeake in the Eighteenth Century," *Journal of Economic History* 25(1965). 639-654; Christine Daniels, "Gresham's Laws: Labor Management on an Early-Eighteenth Century Chesapeake Plantation," *Journal of Southern History* 62(May 1996), 205-238; Edwin Perkins, "The Entrepreneurial Spirit in Colonial America: The Foundations of Modern Business History," *Business History Review* 63(1) (Spring 1989), 164; Louis Morton, *Robert Carter of Nomini Hall: A Virginia Planter of the Eighteenth Century* (Charlottesville, 1965), vii; and Jackson Turner Main, *The Sovereign States, 1775-1783* (New York, 1973), 44-46.

member of that class? In an article for the July 1954 edition of the *William and Mary Quarterly*, Jackson T. Main established a list of the Virginia's richest property owners based on records of taxes levied in 1787 and 1788.[17] According to Main, the only way to identify a member of the wealthy elite class in the Chesapeake was to focus on two main taxable items, which were also the principal investments of the Chesapeake farmer: land and slaves. The Chesapeake region also taxed two important farm animals, cattle and horses, which Main included as part of the calculations for his list of the wealthiest elites. While Main was correct to view land, slaves, and even farm animals as essential to wealth, such a focus paints an image that wealthy elites were only engaged in agriculture, which suggests that pursuit was the sole basis of their wealth. Quite the contrary, it is interesting to note that thirty-six individuals on the list of one hundred were also active participants in industrial ventures.[18] Since active participation represents more than one third of the total number, ownership of an industrial or manufacturing venture should also be factor when tabulating a list of region's wealthy elite. Even more revealing, every member of the list was at least an investor in an industrial activity or an endeavor seeking to expand the region's transportation networks. If Jackson T. Main's list of the wealthiest Virginians was expanded to include the entirety of the Chesapeake region, it is likely that the active participation of Chesapeake elites in industrial ventures was even more

[17] Jackson T. Main, "The One Hundred" *WMQ* (July 1954): 354-384.

[18] By active participant, I mean they were running or operating their own industrial ventures as either the sole owner or principle owner. The thirty six active participants were: John Armistead, Henry Banks, Edmund Berkeley, Robert Beverly, Carter Braxton, Lewis Burwell, Nathaniel Burwell, William Cabell, Charles Carter, Landon Carter, Robert Carter, Archibald Cary, Miles Cary, Francis Eppes, Philip Grymes, Benjamin Harrison, Patrick Henry, Adam Hunter, Thomas Jefferson, Henry Lee, Richard Lee, William Lightfoot, George Mason, Thomas Nelson, John Page, Mann Page, Edmund Randolph, Thomas Randolph, William Randolph, David Ross, Edmund Ruffin, Alexander Spotswood, James Southall, Richard Taliaferro, John Tayloe, and George Washington.

widespread. Unfortunately, the tax records of the Chesapeake region outside of Virginia are either incomplete or missing, so such a list can not be accurately tabulated.

Main's list was used as the basis for the studies herein. Three are case studies of involvement in industrial ventures that by individuals or groups that are representative of others doing the same thing during the period. The remaining two chapters are hybrid case studies on risk and urban development, which was not typical of all people in the Chesapeake but were representative of attitudes and activities of a business nature in this period. They tell a story of the emergence of a second Chesapeake economic history, which existed between the tobacco focus of the early colonial period and the emphasis on cotton in the Old South.

With a well-established labor supply and the entire British Empire for a market, many enterprising individuals in the Chesapeake turned away from agricultural pursuits to the more risky but highly profitable activities associated with industry. These ventures were crucial elements to the economy and the society for which the participants lived. If for no other reason than their neighbors from nearby towns and the surrounding counties were their most regular customers. The present work will demonstrate the importance of industrial and manufacturing ventures to the development of the Chesapeake region in terms of economic growth, social structure formation, and the emergence of geographic infrastructure. 'A Profound Secret in the Breast of a Very Few' is a collection of five case studies exploring the development of industrial activities in the Chesapeake region from 1720 until 1820. Although organized chronologically, each work confronts the same set of questions: How were individual Chesapeake industrial endeavors organized? What did it take to succeed in an industrial activity? What led some individuals to succeed in

industrial activities while others failed? How much could industrial ventures contribute to the wealth of individuals in the Chesapeake region? How did they spend their industrial income? Finally, how did industrial activities contribute to the development of urban areas in the Chesapeake region?

The first chapter will focus on the Principio Company, whose operations spanned the colonial era. It has long been assumed that industrialists organized their activities in the same manner as agricultural activities were managed—creating "iron plantations." While this might have been true of individual planters who ventured into industrial activities, it was not the way all industrial ventures in the region were organized. The Principio Company was an iron works complex founded by a group of people who did not reside in the colonies. They organized their company like a business venture, rather than a plantation, with a board of directors and a manager to run the day to day operations.

The second chapter will focus on the industrial activities of the Tayloe family. For nearly eighty years leading up to the American Revolution, the Tayloes evolved into one of the wealthiest families in the Chesapeake region. Although they had plantations engaged in agricultural activities, the majority of their wealth derived from industrial ventures, particularly iron production. The chapter will track the development of the various Tayloe family industrial ventures, detailing the wealth that three successive generations of the Tayloe family earned from iron production while exploring the many ways that they solidified their social position within the Chesapeake by spending their industry money.

The third chapter will examine the role risk played in industrial activities during the American Revolution. The key to success in early industrial ventures depended on the ability of those involved to manage their risk (a trait not unknown to successful business ventures even today). The most successful industrialists took huge risks, succeeding largely because they were able to reduce their exposure to failure. But a larger number of participants in industrial ventures failed. The chapter focuses on three failures in order to try to understand how some succeeded while others failed. While some failed to manage risk, others were more than successful. The fourth chapter focuses on Henry Heth, the first individual in the Chesapeake to engage in coal extraction. Heth was an innovator who constantly sought out new ways to be successful financially. When agricultural endeavors failed to produce the wealth he desired, he quickly shifted his attention to industrial activities. Once bitumous coal was discovered, Heth bought the land, sought experts to extract the material, and began a marketing campaign to develop a market for the material. When he came across new technologies he thought could boost production, he immediately adopted them, for example the first steam pump and engine in the region.

The final chapter will focus on the relationship between industrial activities and city building along the Patapsco River Valley. The Chesapeake had few towns, so it is important to trace the role industry played in their development. In 1715 there were few settlements along the Patapsco River. In the 1740s a group of industrialists started building along the river in order to harness its power to propel their industrial activities. A new town grew around the factories, providing housing and a service sector to the workers.

This dissertation examines how and why the people in the Chesapeake region engaged in industrial and manufacturing activities from 1720 to about 1820. It presents industrial and manufacturing ventures as an extension, rather than a replacement, of what historians have traditionally identified as the sole occupation of people in the South. By offering a new place for industrial and manufacturing activities in the Southern economy, it contradicts the notion that the South was always adverse to industrial development or modernity, while offering the Chesapeake region a more active place in the story of America. Despite great obstacles and adversity, entrepreneurs motivated by profit and self-improvement took great risks to harness the abundant natural resources of the Chesapeake and make a better life for themselves and their succeeding generations.

CHAPTER 1

"With his upmost Skill and Industry employ": Business Structure and the Industrial Management of the Principio Company[19]

In the years just after the American Revolution, the establishment of an industrial endeavor like an ironworks could be an extraordinarily profitable undertaking. Even when compared to other investment opportunities such as agriculture and land speculation, a potential investor could depend on reliable financial growth and profitability. But while the establishment of an ironworks could be highly profitable, it was also incredibly risky. Just as was the case with so many other industrial ventures, whether coal mining, copper mining, textile production etc., many factors could lead to disaster. As a result, potential investors sought to alleviate their risk by seeking whatever support was possible to offset potential risks.

In the autumn of 1786, a North Carolina businessman named Richard Blackledge decided to build an ironworks. Since constructing an ironworks was a major decision involving thousands of pounds, Blackledge contacted a well known ironmaster and industrialist named Henry Drinker of Philadelphia. Drinker was actively involved in the iron industry as ironmaster of the Atsion Ironworks, which was located on the Atsion River in the pine barrens of southern New Jersey less than thirty miles from

[19] As quoted in William G. Whitely, "The Principio Company: A Historical Sketch the First Iron-Works in Maryland," *Pennsylvania Magazine of History and Biography* XI (1887), 67.

Philadelphia.[20] Despite his experience in the industry, Drinker confessed that he "may fall short of Judgment in such Matters," and he regretted that a more experienced ironmaster was not nearby who could share their knowledge with Blackledge.[21] Despite his confessed ignorance, Drinker wrote a comprehensive letter full of specific advice that would be helpful for anyone participating in the endeavor.

When it came to the technical process of iron making, Drinker stressed that success in the iron business depended almost entirely on location. Iron production consisted of melting iron ore in a large stone furnace using charcoal as the fuel. The ore must be heated in the presence of a flux, a chemical which promotes coagulation of the ores nonmetallic impurities while drawing off impurities.[22] Lime is the usual flux for iron. The typical English furnace of the period was square at the base, measuring about twenty-five feet on each side and rising to a height of about thirty feet. While in blast, the three main ingredients must be continuously dumped into the furnace in alternating layers and the temperature kept constant by using large bellows powered by a water wheel to pump air inside. If the temperature cooled or the ore to lime mix was not precise, the iron would harden and stop the blast, which usually would not restart until the following year.

While in blast, a two inch diameter hole, or tap as it was called, in the furnace about six feet off the ground was periodically opened so slag—a molten glass like waste material—could be drawn off. Two or three times every twenty-four hours, a lower tap

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[20] Henry Drinker to Richard Blackledge, Oct. 4, 1786, Henry Drinker Letterbook, 1786-1790, 80-84, Henry Drinker Papers, Historical Society of Pennsylvania, as quoted by Thomas M. Doerflinger, "How to Run an Ironworks," *Pennsylvania Magazine of History and Biography* [Hereafter, *PMHB*], Volume 108, Number 3 (July 1, 1984), 357—366. All manuscripts concerning Drinker hereinafter quoted from this reprinting. Recognizing the value of this document, Arthur Cecil Bining cited it several times in *Pennsylvania Iron Manufacture in the Eighteenth Century* (Harrisburg, 1938), 71, 73, 75, 121, 170.
[21] Doerflinger, "How to Run an Ironworks," *PMHB*, 366.
[22] Michael Robbins, *The Principio Company: Iron-making in Colonial Maryland, 1720-1781* (New York: Garland Publishing, 1986), p. 5-6.

was opened so the iron could run out for casting. The hollow center of the stone furnace was shaped like a lantern glass and generally about eight feet in diameter at the widest part—called the bosh.[23] The iron making process progressed from iron ore to pig iron to bar iron. Molten unrefined iron, cast iron, or pig iron as it was often called because it was captured in a series of depressions in the ground that looked like a line of suckling piglets, flowed from the bottom of the furnace. Rather than just make pigs, the molten iron could also be poured into molds to produce pieces of hollow ware such as pans, kettles, and stove backs.

Pig iron was very brittle, so it needed to be refined before worked by blacksmiths. To be refined, crude pig iron was taken to a forge fire. It was reheated to a plastic state and pounded by a large water powered hammer. Reheating and pounding removed additional impurities and strengthened the metal by realigning its molecular structure into a lengthwise fibrous pattern. The reheating and pounding process needed to be repeated several times, but the result was a more malleable metal that was less brittle than plain cast-iron. Drawn out and cut into bars of convenient size, the refined iron was ready to be worked by blacksmiths or machines into a variety of useful items. Most iron furnaces during the colonial era refined their own pigs. With three fires at work, a moderately sized furnace could produce "3 Tons if not 4 Tons P Week of Bar Iron," while a refining forge might process only 200 pounds of malleable iron per day.[24]

According to Drinker, an ironworks had to be close to its raw materials if it was going to be profitable. It needed a sizeable deposit of iron ore of the highest quality, but the ore could not be too expensive to mine. Inferior ore could doom a works from the

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[23] Robbins, *The Principio Company*, p. 6.
[24] Doerflinger, "How to Run an Ironworks," p. 362-366.

beginning, reducing furnace output and compromising product quality. An ironworks required a sizeable supply of woodlands for charcoal, and limestone for flux. If a source of limestone was not on hand, oyster shells could be substituted. The average blast furnace consumed three tons of iron ore and about three hundred bushels of charcoal for every twenty-four hours of operation. The furnace usually would not be put into blast until a sufficient quantity of raw materials was assembled to cover the entire blast season. After each year's blast, it was necessary for the ironmaster to rebuild the furnace hearth, so it was possible to save nearly £100 per year by having a ready supply of stones on the property as well. Heat was produced in the furnace and forge with a bellows, so a stream was needed that would not overflow in the spring or run dry in the late summer and autumn. In total buildings, improvements, owned laborers, and utensils, Drinker believed that ironworks could "hardly be worth less than from 4 to £5000," and that "it would seem to me that the Estate described would be cheap at six thousand pounds & probably not dear at ten Thousand pounds."[25]

Unfortunately, sites that met the stringent specifications were usually isolated. Most ironworks had to be small self-contained industrial villages. Workers and their families purchased supplies at a company store, and most ironworks operated both a gristmill and sawmill to serve the needs of the community.[26] Once an appropriate site was located, the next problem became labor, both skilled and unskilled. The issue of labor was rarely solved to the satisfaction of the ironmaster, but even agricultural endeavors

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[25] Paul Faler, "Cultural Aspects of the Industrial Revolution: Lynn, Massachusetts, Shoemakers and Industrial Morality, 1826-1860," *Labor History* XV (1794), 380, cites an call for shoemakers to "make all your workman temperate, industrious, punctual and faithful in their business." Drinker's attitude may be related to an innovation in Philadelphia poor relief that Quaker merchants offered in the 1760s: the replacement of out relief with a workhouse or "Bettering House," where the poor would be "reformed rather than relieved." See Gary B. Nash, "Poverty and Poor Relief in Pre-Revolutionary Philadelphia," *William and Mary Quarterly* [Hereafter, *WMQ*] 3rd Ser., XXXIII (1976), 18.

[26] Doerflinger, "How to Run an Ironworks," p. 362-366.

struggled with labor problems and the colonies never had an extensive abundance of skilled laborers.[27]

Although Drinker offered his advice in the 1780s, there was no counsel available when the earliest full-scale iron making operation was established in the Chesapeake region. The Principio Company was the first large scale iron operation in the region, and offers an excellent example of a typical industrial venture in the Chesapeake region. By examining the organization and establishment of the Principio operations, it is possible for us to understand how other industrial ventures were organized. Focusing on the activities of Principio's first and last manager in particular, we will gain insight into the problems industrial ventures faced as well as how the participants dealt with those problems. Although it will become apparent that Principio was a unique venture, if for no other reason than its longevity, the trials and tribulations that the owners and operators of Principio faced were common to all industrialists operating in the Chesapeake region. The Principio operations encountered all of the problems Drinker discussed nearly a half century before he offered his advice, so it offers a good example for understanding what was necessary for a successful organizational structure in industrial ventures as well as the type of leadership required to keep the works in operation. In order to get a sense of the Principio Company's place in the Chesapeake, it is necessary to understand why it was established.

The Principio Company was an association of British ironmasters, merchants, and capitalists. All of the partners were men living in England and involved with the English iron industry. The original members of the company were Joshua Gee, Joseph Farmer, Thomas Russell, William Russell, and John Ruston. The partners drew up their

[27] Faler, "Cultural Aspects of the Industrial Revolution," 380, Nash, "Poverty and Poor," p. 18.

agreement to start the Principio Company on March 4, 1720, then sent Stephen Onion to the Chesapeake Bay area to begin setting up the operation. The partners stated explicitly why Onion was being sent: "said Stephen Onion shall and will with his upmost Skill and Industry employ himself in the doing and performing of such Acts, Matters and Things as shall be judged requisite to meet for the furthering, carrying on and managing of the said joint work in business for the most Advantage of the said Partners."[28] As time passed, company membership grew to include Nicolas Hackell Carew, Thomas Russell Jr., John England, Joshua Gee's two sons Samuel and Osgood, William Chetwynd, and Augustine and Lawrence Washington (the father and brother of George Washington).[29]

The Principio Company was formed to take advantage of the iron situation in England. By the 1710s, England could not produce the amount of iron needed for its metalworking activities. Most iron was being imported from Sweden, but relations between the two nations began to decline when George I ascended the throne in 1715. As Elector of Hanover, George hated the Swedish and prohibited all trade with Sweden in 1717.[30] Hoping to take advantage of the new policies in England, the founders of the Principio Company sought to manufacture iron in the colonies of Maryland and Virginia "specifically to supply the English market."[31] The main portion of the Principio operation was up and running by 1730 under the direction of John England, who ran the two furnaces and was shipping iron directly to London.

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[28] Thomas Ruston Papers, LOC, LC 1707, *Abstract of Writings Relating to Ironworks in America*, p. 5. Principio purchased lands on the 27th of April, 1721. In July of the same year the patent was transferred to Stephen Onion and company, "for a viable consideration by me received and other good reasons there unto me moving," and comprised a tract of land called Geoffarrison in Cecil County near Northeast, containing 5,743 acres as originally surveyed extending from Carroll Co. on the North East River to within a mile or so of Elkton. See, Whitely, "The Principio Company," 67.
[29] Whitely, "The Principio Company," p. 63.
[30] Bining, *Pennsylvania Iron Manufacture*, p. 150.
[31] Victor S. Clark, *The History of Manufacturers in the United States* (New York: Peter Smith, 1949), p. 97.

Principio iron sold well. Quarterly receipts for parts of 1730 indicate sales totaling £426 4s by the end of June, and additional £199 11s by the end of September. If it was pig iron Principio sold at L8 per ton, then the Company then sold more than seventy-eight tons of pig iron in those two quarters.[32] In all likelihood, Principio produced more iron, although it is uncertain how much went to England since a burgeoning local market appeared almost as soon as the ironworks was established. Iron was valuable in the local economy because it was used in metalworking. Prior to Principio's establishment, all iron in the Chesapeake came from England. As it turned out, English demand for colonial bar iron was smaller and less regular than the market for colonial pig iron. Nevertheless, the Maryland and Virginia operations of the Principio Company supplied the overwhelming majority of pig iron sent from the American colonies to England.[33] Pig iron shipments from the colonies grew yearly until they hit a plateau by the middle of the 1720s of a yearly average of just over 2,000 tons, and remained there except for a few occasions in the 1740s and 1750s when the total exceeded 3,000 tons.[34]

The Principio Company had an established market in England by the middle of the 1730s. Most of their iron went directly to London, with pig iron being supplied primarily for foundry use.[35] Principio faced substantial competition from several ironworks in the Chesapeake Bay area by 1735, including the Baltimore Ironworks and Snowden's Pawtuxet works as well as several smaller works in Virginia. One of Principio's competitors, the Baltimore Ironworks, actively traded with the England,

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[32] John Price to John England, February 5, Principio Company Papers, Maryland Historical Society [Hereafter MHS]. This letter only covered amount sold by Principio and already credited to John England, it did not include all sales for the year.
[33] Bining, *Pennsylvania Iron Manufacture*, p. 187-89.
[34] Robbins, *The Principio Company*, p. 190-194.
[35] All partners to Mr. Chapman, December, 1736, British Museum Additional Manuscripts, Library of Congress, Washington [hereafter, LOC].

sending "far more iron to England than [they sold] on this side of the Atlantic," averaging no less than 400 tons of pig iron per year by 1735.[36]

The Royal Navy was a huge part of the English iron market, with an extensive program for testing the quality of iron from its various suppliers. The Naval testing facilities had mixed results when it came to iron from the North American colonies. A representative test of Principio iron conducted at Deptford in February 1735 brought the following results: "we pray leave to acquaint you that the ton of American iron imported by Mr. Crowley and directed to this Yard for an experiment has been wholly applied to such uses for which it was most fit as Hoops, Bolts, etc., and carefully surveyed in Making and Driving . . . and we continue of the same opinion of its Goodness and Value." A similar test at the Woolwich Yard in September 1735 confirmed that bar iron "Imported by Mr. Crowley from America had made sufficient Trial of each of the Sorts, find said Iron to be very good and fit for His Majesty's Service, superior in every respect to the best Swedes Iron and in our opinion worth £17 10s 6d per ton."[37] Once qualified to supply to the British Navy, sales to the British government became a central part of the export activities of the Principio Company partners in England. By the 1750s, most Principio imports to England went to government facilities.[38]

The Principio Company also imported a lot of iron to English ironmasters, manufactures, and merchants for their own manufacturing activities. When dealing in this manner, Principio iron went to warehouses in numerous cities, particularly London and Bristol, following a complex route of transactions. A trader (or factor as they were called

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[36] Keach Johnson, "The Genesis of the Baltimore Ironworks," *Journal of Southern History* XIX, (1953), p. 256-257.
[37] *House of Lords Journal*, LOC, p. 184-85.
[38] All partners to Mr. Chapman, September 11, 1758, British Museum Additional Manuscripts, LOC.

at the time) for the Principio Company, T. S. Ashton, quoted "Edward Knight, one of the largest ironmasters in Britain," when he offered a description of the complex movement of American bar iron as such:

> The Factor beyond Sea, the importer cowboy, who sells it to the Bar Iron monger that lies near the manufacture; he sells it the Manufacturer that employs the Workmen: Which Iron, when manufactured [into finished goods] is sent to the London Iron Monger, who sells it to the Merchant, and he exports it, and a Factor disposes of it back in America.[39]

To understand the process of selling Principio iron in England, it is important to understand British laws concerning the iron trade in the eighteenth century. England's trade with other nations and the colonies was controlled by a mercantile trade theory called mercantilism, which was developed by the various official bodies that regulated trade for the British Empire. The central precept of mercantilism was a notion that colonies exist to supply the mother country (England) with raw materials for England's own consumption or for manufacture into finished items that could be sold abroad, including back to the colonies that originally shipped the raw materials. Colonies were not allowed to sell raw materials to international trade competitors of the mother country, nor were they supposed to purchase finished goods from any other source. Even more important, there was to be no manufacture of finished goods in the colonies, since that would be competition with the mother county and could destroy the system.[40]

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[39] T. S. Ashton, *Iron and Steel in the Industrial Revolution* (New York: Augustus M. Kelley, 1970), p. 239-41.

[40] While talking about the place of Virginian and Maryland plantations in the English economy, historian John Oldmixon probably offered the best explanation for the value of colonial markets to the producers of manufactured goods in the mother country, saying: "Negroes from Guinea, every one of which consumes yearly two Hilling-Hoes, two Weeding Hoes, two Grubbing Hoes, besides Axes, Saws, Wimbles, Nails, and other Iron tools and Materials, consumed in Building and Other Uses, to the Value of that least £120,000 in only iron work." See, John Oldmixon, *The British Empire in America* (New York: Augustus M. Kelley, 1969), p. XXIII.

The production of iron functioned somewhat differently than other colonial goods within the mercantile system. While mercantile theory usually required the importation of raw materials, it was in this case not iron ore but rather pig iron, the output of a smelting process, which was sent to the mother country. Colonials could have easily sent iron ore, but it was bulky and heavy. Pig iron was a compact commodity and much easier to ship, but it also eliminated part of the expenses of production. Traditional charcoal iron smelting consumed huge quantities of wood, which was not available in England. The American colonies had great quantities of both iron ore and wood, making it reasonable for them to smelt the ore into iron before it was sent to England.

Once iron ore was smelted into pigs, a convenient iron package, it was shipped to secondary metal working centers in London, Bristol, Birmingham and Liverpool. In England the iron was manufactured into finished goods and sold back to the colonists. Since England could not fill its own demand for iron, English ironmasters felt threatened by the importation of colonial competition.[41] When George I and Parliament cut off iron imports from Sweden in 1717, an intense struggle emerged over the regulation of the iron trade in the American colonies. To relieve the distressed English iron industry, many prominent people in England and the colonies got interested in the iron industry, including Governor Alexander Spotswood of Virginia, William Byrd and Joshua Gee. As early as 1718, several groups appeared before the Board of Trade calling for the removal of duties on pig and bar iron produced in the colonies, as well as the creation of a bounty to encourage more iron production. The Board of Trade agreed with the petitioners,

[41] England had about 60 blast furnaces and 1720, according to Paul Mantoux, *Industrial Revolution in the Eighteenth Century* (New York: Harper & Row, 1962), p. 280.

enacting bounties to be granted to the American colonies at £3 per ton of bar iron and £1 10s for pig and cast-iron.[42]

In the hope of accessing market demand and take advantage of bounties being offered, the Principio Company was intended to focus on the English market rather colonial American markets. For several years after its founding, most Principio iron went to England, where the original owner's had all been active participants and had the necessary trade connections to market their product. But the English market suffered from a continuing need for pig and bar iron, making it relatively easy for Principio to sell there and not dependent on the actions of the partners. As a result, the iron regulations of the eighteenth century had more of a social and political effect rather than an economic one for the American colonies: "as was the case with other laws, its violation brought with it an attitude of defiance to the mother country and the prohibition itself was a grievance that irritated the colonists," thus making iron one of the many causes of the American Revolution, even if it was not proscribed or even acknowledged.[43]

Despite the various regulations, Principio sold most of its annual iron production to Britain for much of its history. In the beginning, goods were sent to London and consigned to one of the partners. Quickly, they were producing enough iron to market through merchants other than the Company partners. Iron was shipped to ports like Bristol and Liverpool.[44] Bar iron was the first product the Company shipped. When it failed to prove profitable since they could not get more than £18 sterling for every ten

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[42] Bining, *Pennsylvania Iron Manufacture*, p. 19.
[43] Bining, *Pennsylvania Iron Manufacture*, p. 159.
[44] A letter from William Chetwynd to John England, November 9, 1726, suggested that Accokeek "lett the pigs be weighed weekly and immediately sent to Bristol are anywhere near that place if can have shipping is not for London." William Chetwynd to John England, November 9, 1726, Principio Company Papers, MHS.

tons of bar iron, the partners calculated that they would lose money at the then existing rate of exchange between sterling and paper currency. In a letter to their manager of operations in the American colonies, they calculated their situation as such, "Supposing we Sell the Iron with you at £40 per ton current and that in paper money, and return hither in English bills at £150 paper money for £100 sterling:

4 Tons of barrs at £40 per time current paper money is	£160.0.0
£160 paper money at £150 Ditto for £100 sterling English money	£100.13.4
But 4 Ton of Barrs at £18 Sterling here is but	£72.0.0
Loss to Company in 4 Ton of Barr by Sending them hither	34.13.4"

Based on these calculations, the partners wisely ordered their manager, John England, to begin sending pig iron to England, saying that they "desire you to Send us by the first Shipping, either to London or Bristol or Liverpool or Milford Haven, or elsewhere, what takes you can spare over and above what can be worked out that the forge." The production of pig iron was profitable, selling in Bristol for £6 per ton, but the company was evidently hopeful that it could get as much as £8 per ton.[45]

The Principio operations encountered several problems in shipping. The biggest issue was largely due to the distance of transatlantic trade. Shipping goods to England was costly and unreliable. Ships could be lost a sea, or captured but combatants. A major issue for many American iron works was the quality of the iron produced. If it was not of the correct chemical mixture, the iron proved brittle and unusable within the secondary refining and manufacturing industry. Surprisingly, Principio had few problems with consistency, but breakage was a major concern. As John Wightwick noted in 1730, "Some of those last arrived and especially those from Principio, are broke into thousands of pieces, and are sadly complained of. If this is not owing to their being made white,

[45] All partners to John England, September 15, 1725, Principio Company Papers, MHS.

there must be more care taken in putting them on board."[46] Breakage occurred because iron was carried as ballast on the sailing ships, a practice which gave advantage to the shippers and the producers, since iron did not take up regular cargo space. Joshua Gee remarked that iron was "a Merchandize that can be exported at a small Expense, because it serves as Ballast everywhere."[47] Using iron as ballast caused most of the breakage, so many ironmasters complained about the treatment iron received at the hands of the shippers and merchants. One prominent ironmaster, Dr. Charles Carroll of the Baltimore Ironworks, accused the Crowley's of attempting "to Engross and Beat down' the value of the iron by means of 'deductions drafts and other Management' to drive the price below the cost of production."[48]

The shipment of goods from the colonies to England was seasonal. Nearly all iron shipped during the second half of each year, particularly in August, September, and October. Prior to the 1750s, vessels carried either iron or tobacco from the Chesapeake region. There was a reason for this phenomenon. Since tobacco was the main commodity produced in the Chesapeake and it was ready for shipment at the same time every year, a fleet of vessels arrived just after the product was ready. By the early 1770s, vessels carrying tobacco also shipped iron because, as many contemporary observers noted, iron pigs and bars made convenient ballast and could be stuck between hogsheads of tobacco. For this reason few transatlantic shipments of iron departed in winter, spring, or early summer, but coastwise shipping of smaller quantities of bar and pig iron occurred during that time.

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[46] John Wightwick to John England, October 2, 1730, Principio Company Papers, MHS.
[47] Joshua Gee, *The Trade and Navigation of Great Britain Considered* (London: Bettesworth & Hitch, 1738), p. 103
[48] Johnson, "The Genesis of the Baltimore Ironworks," p.134.

While the intent of the Principio Company partners in making a colonial iron business was to provide the material to England, they were aware as ironmasters, iron mongers and merchants of the growing need for iron within the colonies. The metalworking industries of England supplied only a small part of the diverse iron manufactured goods the colonials sought.[49] Thus, Principio was well positioned to break into the market by operating around the British restrictions on colonial manufacturing. As time past, other colonial ironmasters also became active suppliers for the local markets in iron products. Principio produced a variety of items for local consumption, such as "bar iron for rudders, grist mills and sawmills; share moulds, large and small, square and flat iron of all sizes; and also cart, wagon and chair tire."[50] Once the American Revolution began, putting an end to British imports, colonial ironworks offered an even greater variety goods, including "Scythes, nails, pots, kettles, griddles, and Irons, smoothing irons, mortars, cart and wagon boxes, six and ten plate stoves, weights, etc."[51]

Although they had access to stable markets for their goods, the Principio partners constantly sought new markets for their product. [52] They wrote to John England in September of 1725 that it would be best to sell bar iron anywhere but England "Viz in Virginia, Pennsylvania, Maryland, New York, Jerseys, Carolina or else in the Islands of Barbados and Jamaica,"[53] due to poor demand for that material. In fact, the partners

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[49] Iron goods sold to the new world included candlesticks, tobacco boxes, ladles, shears, hammers, heater plates, gridirons, tap borers, Taylor's geese, Iron pours, latches, augers, gouges, files, saws, tongs, closet locks and staples, hinges, staples, axes, wedges, hoes, et cetera, see Maryland Hall of Records, Chancery Records, Liber 5, folio 529, Maryland State Archives.

[50] New York Is Said in the Weekly Mercury, December 28, 1772, quoted in Charles S. Boyer, *Early for Forges and Furnaces in New Jersey* (Philadelphia: University Of Pennsylvania Press, 1931), p. 43.

[51] *New Jersey Journal*, June 22, 1779, quoted in Boyer, *Early for Forges*, p. 137.

[52] The isolation of the colonies was such that"it often was impossible for colonial producers to estimate the demand for their commodities abroad or to insure themselves a profitable exchange," see Clark, *The History of Manufacturers*, p. 87

[53] All partners to John England, September 15, 1725, Principio Company Papers, MHS.

narrowed their focus somewhat in the same letter, stating "We take Philadelphia to be the place where the greatest quantity of Iron will be sold."[54] Another partner, William Chetwynd, suggested that the American market be the main focus of the operation, for no other reason than proximity. Chetwynd even recommended the establishment of another ironworks, this time in Jersey, because "I am apt to think that New York must prove almost as good a market for bar as Philadelphia."[55] Other partners had different ideas about marketing their product. John Wightwick suggested that if the Principio operations could expand their sales above 150 tons of bar iron per year, then "we might then also be enabled to send Bars to the Islands for Rum and Sugar."[56] While the islands were an intriguing market, Wightwick's suggestion was probably more of an effort to reduce the drafts on the company for much-needed supplies than an actual push in a new direction.

Reacting to the prompting of the company partners, all Principio managers did a lot of traveling in search of new markets for their iron, particularly to the areas surrounding the Chesapeake Bay, Philadelphia, and even to New York. By the 1740s, Principio was shipping bar iron on consignment to Philadelphia merchants Israel Pemberton Jr., and Reese Meredith, who sold some iron in the colonies and also shipped to England. [57] In the 1750s, Principio was sending small shipments—under ten tons per shipment—to Barbados, Virginia, and North Carolina in exchange for supplies needed at the operations.

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[54] Ibid.
[55] William Chetwynd to John England, October 5, 1725, British Museum Additional Manuscripts, LOC.
[56] John Wightwick to John England, October 2, 1730, Principio Company Papers, MHS.
[57] Such merchants dealt an iron from a number of furnaces and forges. Reportedly, brokering Principio Iron "formed an important item in Pemberton's exports." See, Theodore Thayer, *Israel Pemberton, King of the Quakers* (Philadelphia: The Historical Society of Pennsylvania, 1943), p. 11.

The marketing of Principio iron changed rather drastically in the years just before the American Revolution. Customers served with coastwise shipping were the dominant market, involving much larger vessels carrying iron (more often bar iron than pig iron) to such destinations as Boston, Virginia, Road Island, North and South Carolina, Philadelphia, Barbados, Bermuda, Antigua and St. Kitts. Principio still shipped a large quantity of iron to England, but its market pattern had clearly diversified. Principio was atypical of colonial iron makers in that respect, since most stopped shipping large quantities of iron to England by the 1760s.[58]

While the marketing of Principio iron was important, the organizational structure of the company was crucial to its longevity and success. For most of its history, the Principio Company depended on an operational manager who ran the business for the investors in England. It was typical for iron enterprises in the eighteenth century to be operated by a single, resident executive. Although the executive was usually an ironmaster, some enterprises found it necessary to employ combinations of iron masters, founders, clerks, and agents as well as a higher level executive normally called the manager.[59] During its six decades of operation, the Principio Company had a long string of managers. Each individual provided an important service to the Principio Company during its history, but the administrations of two particular individuals—John England

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[58] Kathleen Bruce, *Virginia Iron Manufacture in the Slave Era*, (New York: Augustus Kelley, 1968), p. 17.
[59] The term "ironmaster" is not a precise title. In Maryland they occupied several roles and formed a wide variety of duties. Sometimes an ironmaster was owner of the works, a shareholding partner, or just the manager of the operation for the owner. Generally the term described an individual with some grasp of the iron making process. Most learned their trade by informal apprenticeship, as A.C. Bining suggests they "rose from the ranks," see, Bining, *Pennsylvania Iron Manufacture,* p. 132. Dr. Charles Carroll of the Baltimore Ironworks became an ironmaster through a direct program of the diligent research, reading about iron production and corresponding with iron masters in order to learn the requisite skills to enabled him to set up and operate an ironworks, see Johnson, "The Genesis of the Baltimore Ironworks," p. 157-180. In Virginia, William Byrd embarked on a similar program of learning, as described in his *A Progress to the Mines, 1732*, but never entered the iron business. See William Byrd, *A Progress to the Mines in the Year 1732* ed. Mark Van Doren (New York: Vanguard Press, 1928).

(1723-34), and Thomas Russell II (1764-69 and 1771-81)—proved vital to the success of the Company and showed the range of problems and issues an industrial operation could face.

John England became manager of the Principio operations in 1724, shortly after its founding. His major challenge involved getting the business established. Although two company partners, Thomas Russell and Stephen Onion, initiated operations for the Principio Company, England had to create an operation to produce iron where one had never existed, to fashion his own sources of supply and labor, to developed lines of communication, and to build a physical plant of some complexity. England had complete control of Principio operations, and he was expected to act as the Company representative in America.[60] Originally from Staffordshire where he was married and had a family, England was an accomplished ironmaster who was far from youth when embarking for America early in 1723.[61] For his service, England was given a one-twelfth stake in the company, which started with a £10,000 capital investment. Since he brought the technical skill of an ironmaster to the endeavor, England did not contribute financially to the Company.

Immediately upon his arrival, England realized things were not as progressed as he had been led to believe by the partners. He was told that the Principio furnace was ready to begin production, when such matters as furnace location, availability of ore, charcoal, flux, and water for power and transportation had yet to have been decided. Writing to his new partners, England stated succinctly: "I find the furnace a great way

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[60] Whitely, "The Principio Company," p. 683.
[61] After nearly a decade of work in Maryland, John England was described in a letter by Stephen Bordley in 1734 as being "very old." See, Stephen Bordley Letter Books. Manuscript Collection 81, Maryland Historical Society.

from finishing, contrary to what it was Reported to me in England." Even worse, he "searched into the mine [iron ore] in several places to find all discouraging; for I cannot find no more mine then will serve one blast." Yet despite the setbacks, England "concluded to stay and Set up a little forge to try the iron."[62]

As he began to get things in order, England continued to keep the partners abreast of the situation, which also served to clearly demonstrate his knowledge and abilities as an ironmaster. Although he was loath to disparage the two partners originally sent to establish Principio, England found that "Neither did I think thee wouldst has been Guilty of Ordering a furnace to have been built until thee hadst [sic] been sure of mine; that which was good and enough of it for perpetuity."[63] The more England examined what had been completed, the more he realized that the entire operation had to be completely reorganized, even matters as small as the acquisition of charcoal fuel. "I have particular notice of the Cole here and find it a very tender Cole so that much more will go to perform the same burning I fear."[64]

England's responsibilities as Principio Company's ironmaster involved both technical and administrative activities. The technical responsibilities required England to see to all the tasks necessary for the production of pig and bar iron, while the administrative duties needed skills like conducting property transactions, negotiating labor contracts, implementing plantation management, store keeping, and iron marketing. From the beginning, England's technical responsibilities seemed to dominate his time. Shortly after arriving in America, he had to get the operation running. The first task was to find a suitable source of raw materials. England repeatedly indicated his

[62] John England to Williams Chetwynd, April 25, 1723, Principio Company Papers, MHS.
[63] John England to Joseph Farmer, April 25, 1723, Principio Company Papers, MHS.
[64] John England to Joshua Gee, April 25, 1723, Principio Company Papers, MHS.

disappointment in the small supply of iron he found when he arrived, suggesting that "there may be about two months stock of both Cole and iron at the mine, . . . which I Suppose may Serve for one blast and no more."[65] He quickly located a more substantial supply of ore, which he evaluated by trial, saying "I have been at a Bloomery with some of our Mine and it maketh [sic] a very good Iron."[66] While the raw materials were being gathered, England "hoped to finish the Stack of the Furnace casting house and Bridge in a month more. The Colliers are at work and hope to have in by Christmas 400 Loads of Coal etc."[67] Next, England set to work "on the Damn" and "with cutting a Race to bring water to the forge, all which I hope I shall accomplish to Satisfaction."[68] Despite his rapid progress, England worried that it would be difficult to initiate the first blast of the furnace because he did not have a waterwheel to drive the furnace bellows. He sent an urgent letter to the partners requesting they send the necessary gear and spring components, since "the furnish wheel Cannot be finished without them."[69] In the same letter, England assured the partners that he was taking care to marshal every available resource, but that the operation was progressing slowly.

> As to the works, I have Rather let the furnish stand Still and not finish it; by reason of not having Stock enough upon the bank to began at neither mind nor Coal, and have Drove the forge on and Damn with all the possible speed I Could and have them both as forward as Could be expected, considering the Season of the year for out doors work.[70]

The situation at the first Principio furnace improved considerably by May of 1725. England had the ironworks in operation and had begun the production of castings,

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[65] England to Gee, April 25, 1723, Principio Company Papers, MHS.
[66] John England to Joseph Farmer, April 25, 1723, Principio Company Papers, MHS.
[67] All partners to John England, Sept. 11, 1723, Principio Company Papers, MHS.
[68] John England to Joseph Farmer, January, 1724, Principio Company Papers, MHS.
[69] England to Farmer, January, 1724, Principio Company Papers, MHS..
[70] John England to Joshua Gee, April 2, 1724, Principio Company Papers, MHS.

pig and bar iron. Since he had a reputation for being a skilled ironmaster, England quickly received an inquiry from Joseph Growdon of Bensalem, Maryland. Growden wanted two things from England. For one, was interested in seeing if England wanted to expand Principio's iron business. He had a parcel of land with a water supply and access to good iron ore on which he hope to set up a bloomery, since it could easily be "converted into Refinery" at a future date.[71] If England and Principio were not interested in expansion, then Growdon wanted England to make him "a Hammer, Anvil and other Iron Work necessary for one single Bloomery, which is now ready for them."[72] It is uncertain whether England forwarded Growdon's business offer to the partners, since no correspondence deals with it. More likely than not, England examined the land and chose not to involve the company. He was in negotiations with Captain Augustine Washington to build another ironworks for Principio, so it is also possible that England may have felt Growdon's offer was too much additional risk (or work) to take on. As the examples of Robert Carter, John Ballendine, and John Reveley demonstrate, risk was always one of the most destructive factors leading to failure, but so was taking on too much work. By late 1725 England reached an agreement with Captain Augustine Washington to use his land for both iron mining and manufacture.

Hearing of the new acquisition, the partners urged England to begin erecting a furnace and forge on the new property. There were sound reasons for their haste. The English Parliament was in the midst of debate over the nation's place in the international iron trade. Restrictive legislation against the American colonies seemed a distinct

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[71] It was not unusual to set up a forge hearth and bellows to use as a bloomery forage for smelting, and later to use the facilities as a refinery forge for making half blooms. Joseph Growdon to John England, May 9, 1725, Principio Company Papers, MHS.

[72] Regardless of why the offer was rejected, he did produce the requested items for Growdon. Joseph Growdon to John England, May 9, 1725, Principio Company Papers, MHS.

possibility, as William Chetwynd wrote to John England: "the Iron Masters here as I formally review word being resolved to put a stop to the building of any more forges in America."[73]

Since the other Principio iron works were in operation and functioning at full capacity by the fall of 1725, the partners offered a number of recommendations on how to proceed with the property of Captain Augustine Washington.[74] To begin with, they suggested that England "sell what shares of the Iron made at Principio at what price and where you please" to raise funds for new constructions.[75] England was also directed "to try to Captain's mine in the furnace and forges as soon as you can."[76] Clearly, England moved quickly to begin mining the ore on Washington's property, since the partners asked on September 19, 1725, "to send us a surplus of the pigs as soon as you can." England, quick to exploit the iron making opportunities on Washington's Stafford County land, immediately initiated construction on what he hoped would be "two or three more furnaces" in Virginia.[77]

England had one furnace named Accokeek well under way the following year. William Chetwynd wrote on August 19, 1726 that he was "very glad to find you are getting the furnace up and doubt not but you will make all the dispatch possible both in the building laying in stock and getting in blast."[78] In addition to the usual waterpower arrangements and a furnace stack, England also built a house for the founder of

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[73] William Chetwynd to John England, October 5, 1725, British Museum Additional Manuscripts, LOC.
[74] The Washington family's interest in the Principio Company was successfully held by Captain Augustine Washington (1694-1743); his son Lawrence Washington; Lawrence's wife, Mrs. Anne Washington; Colonel Augustine Washington; John Augustine Washington; and William Augustine Washington.
[75] All Partners to John England, Sept. 15, 1725, Principio Company Papers, MHS.
[76] William Chetwynd to John England, Sept. 19, 1725, Principio Company Papers, MHS.
[77] All Partners to John England, Sept. 15, 1725, Principio Company Papers, MHS.
[78] William Chetwynd to John England, August 19, 1726, British Museum Additional Manuscripts, LOC.

Accokeek, a stable and mill.[79] The ironworks at Accokeek did not hinder the other Principio operation. Instead, an expansive Principio Company became a functioning reality under England's supervision, with ironworks at both ends of the Chesapeake area.

There was more to operating an ironworks than just securing raw materials and constructing a furnace. John England quickly found that most of his time was not spent keeping an eye on the operation, but administering to the business. At the outset, England had to find and hire a competent work force. Several partners with connections in the British iron trade sent over a number of skilled laborers. Some, like "William Harris, a finer, and Parsons a finer," proved to be quite able hands.[80] But other laborers were more trouble than help. Somewhat surprisingly, the partners rehired Steven Onion (who, with young Thomas Russell, had returned to England in December of 1724) over John England's repeated protests.[81]

Another problem that England encountered as an administrator was a constant scarcity of money and credit. Lack of financial support quickly became one of the most difficult problems he faced. Shortly after his arrival in Maryland, England wrote Joshua Gee saying, "How to Raise money or drop for money I know not to say that my Hands are tied behind me and I can do nothing. J. Farmer Told me I need to bring no Ready money so I brought not nor have none or my necessary use."[82] The partners tried on several occasions to help England with the issue of operating cash and credit. William Chetwynd and a Joshua Gee suggested that England seek credit from Gee's trading contacts in Annapolis and Philadelphia, Charles Cole and John Copson. England and

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[79] Principio Papers, Restorable Society of Delaware.
[80] William Russell to William Chetwynd, April 17, 1725, British Museum Additional Manuscripts, LOC.
[81] All partners to John England, Sept. 15, 1725, Principio Company Papers, MHS.
[82] John England to Joshua Gee, July 12, 1723, Principio Company Papers, MHS.

others at the company did conduct transactions with Copson, but it did not resolve the insufficient funds problem.[83]

Scarcity of funds caused numerous difficulties. England heard "Great Complaints for want of money amongst the men."[84] He had to bring supplies and trading goods to America at his own expense. But even that failed to solve the problem since he could not secure credit for more when his personal supplies ran out. Copland refused to assist England since Principio did not buy "goods from him he Cannot find ready money to supply us with."[85] Greatly distressed at the situation, England began to make unauthorized drafts on the Company with merchants in Britain, notifying the partners that "I must be supply'd [sic] with money Sufficient to carry on such undertakings, or I can not meddle any further."[86]

By far the most difficult administrative responsibility for England was the acquisition and maintenance of an effective labor force. Principio was supposed to be employing sixty skilled and unskilled laborers when he arrived, but England found that the quality of the labor force he inherited when he took over was less than desirable. "Had thee and Company Sent me to Newgate [Prison] before I came here, . . . I had been obliged to you."[87] Rather than the convicts he would have preferred, England had a hard drinking, intractable, lazy, mutinous and even dangerous crew of Welshmen. They were the major obstacle to success, and sometimes made it impossible for him to conduct business during much of the 1720s.

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[83] A.C. Bining, writing chiefly about Pennsylvania ironworks declared: "a shortage of working capital was the chief obstacle to the development of the early iron industry." Bining, *Pennsylvania Iron Manufacture*, p. 169.
[84] John England to Joseph Farmer, January, 1724, Principio Company Papers, MHS.
[85] Ibid.
[86] John England to Joshua Gee, April 2, 1724, Principio Company Papers, MHS.
[87] John England to John Ruston, April 27, 1723, Principio Company Papers, MHS.

The crew issue was not simply that they were "a wicked company" as England often called them, but that they had been asked by Stephen Onion and Thomas Russell to do as little work as humanly possible. Even worse, there were several disputes over wages before England arrived, leaving the workers with little to no respect for the Principio Company. Consequently, the workers were by no means cooperative. As England described it, "they have had the Reins laid on their necks so long that now they come to be check'd [sic] a little they won't bear it at all."[88] England gradually won the men over, but only after he improved the pay system and made friends with their main leader, founder Robert Durham.

While several administrative problems made life difficult for John England, the most time consuming administrative chores were activities completely unassociated with iron production. Early on, England found it difficult to find food for his laborers, forcing him to engage in the supervision of a farm to produce food for the labor force and to build a company store stocked with commodities for the Principio workers and others living in the neighborhood.[89] Of the two, the company store occupied the biggest portion of England's time and correspondence. The inventory had to be kept under a constant observation and accounts for individual customers properly maintained.

Everyone, including the ironmaster, relied on the stores credit system and had an account. The store became the main mode for payment for everyone in America who was connected with the Principio Company. Wages were totaled on a credit side, purchases on the debt side. The store also served as a supply source for the company, with some

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[88] John England to Joshua Gee, July 12, 1723, Principio Company Papers, MHS.
[89] The practice of operating a neighborhood store to supply the ironworkers and the rural neighborhoods was common among Maryland iron Enterprises. The Principio Company operated three—at Principio, Accokeek, and Kingsbury.

materials being charged as Principio expenses. But the store was not a closed system. Since it was the only mercantile business in the neighborhood, customers from the area who had no connection with the iron business also used the establishment. John England and the Principio partners regarded the neighborhood business of the store as a profit-making adjunct to their regular iron business.[90]

A corollary to running the company store was the necessity of marketing the production of the furnace and forge. In the 1720s, there was a general agreement among the partners that they should not try to sell bar iron throughout Britain.

> We must hint to use some things which may be of use to you . . . we think it best to sell all the Iron you make at the Forge at Principio either on the continent [America] Viz in Virginia, Pennsylvania, Maryland, New York, Jerseys, Carolina, or else in the Islands of Barbados and Jamaica, for if you should send it hither, though we should Sell it at more than £18 per ton clear profit . . . we must lose greatly by having the bars sent home.

The reason they did not want to sell iron just in England was that a loss existed in the exchange rate between current paper money and sterling in the English market. Since the two currencies were not equal in value, serious financial losses would arise if the accounts were not closely monitored. It was possible to make a profit by shipping pigs to England, but only as long as the ironmaster "will freight them as cheap as you can." Uncomfortable with the market conditions back home, John England chose to establish a ready market for Principio iron in the Chesapeake Bay area instead.[91]

Even though England's term as manager began with numerous problems—including inferior location, poor ore, high transportation costs and uncooperative laborers—he got the Principio Company's installation in the Chesapeake efficiently

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[90] John England to John Gee, July 12, 1723, Principio Company Papers, MHS.
[91] John England to Joseph Farmer, January, Principio Company Papers, MHS. The Principio furnace produced castings like hammers, anvils, fire backs, mantelpieces and plates during the 1720s, but there is little information on how those products are marketed.

operating. As Principio partner William Chetwynd wrote on October 5, 1725, "I think I may be bold enough to say that the works would never have come to anything if you did not undertake in them."[92] Knowledge of John England's success at Principio stretched well beyond the interests of the Company, since William Byrd of Virginia recounted several favorable reports about Principio's works in his *Progress to the Mines*, stating that England "is so well skilled in Ironworks, that he does not only carry on his furnaces, but has likewise the chief management of the works at Principia [sic] at the head of the Bay, where he has also erected a forge and makes very good bar iron."[93] Despite all the accolades lauded upon him, England eventually ended his term of manager, although he remained a partner in the company.

Unlike John England, Principio manager Thomas Russell II did not face the problem of starting from nothing. Instead, the appointed manager who preceded Russell, Nathaniel Chapman, died in 1761, leaving the company without a clear replacement. For the next few years, the Company went through a series of ineffective managers who seemed hell bent on running the Company into the ground rather than making profits. When Thomas Russell II arrived in Maryland in 1764, he found an ailing company, marred by personal strife.

Thomas Russell was the exact opposite of John England. For one, he was not an ironmaster. Russell had no training in iron production, nor any experience with the iron business. What Russell did have were the rudiments of a business education, which he received while apprenticed to a merchant named Mr. Barker. More than an expert ironman, the partners in England needed a manager with strong hand, one who would be

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[92] William Chetwynd to John England, October 5, 172, British Museum Additional Manuscripts, LOC.
[93] Byrd, *Progress to the Mines*, p. 355.

familiar with their interests and had a direct reason to see the Company successful. With that in mind, they prevailed upon newly inherited partner Thomas Russell, the son of founding partner William Russell. He was paid a salary of £100 per year and agreed to stay not less than two years in order to reorganize the company. In his time as manager, Russell would rebuild the aging operation and solve the company's bitter personnel problems only to be overcome by the Revolutionary war.[94]

Since there had not been a resident manager in three years, the Principio facilities were operating in a chaotic manner when Russell reached Maryland. All facilities were in operation, but there were several severe problems. Each of the four iron operations worked independently from the other, making a variety of products, but often in direct competition. An entire blast from one furnace was bad (becoming excessively brittle when heated), and nearly destroyed the Principio Company's established reputation when the material was sold in London. There were also several issues with some of the non-iron production enterprises in operation. For one, the company store at Kingsbury was being grossly mismanaged. When the store was inventoried at the death of its clerk operator Anthony Rhodes, it turned out that Rhodes was conducting an extensive and varied trade for his own benefit using company funds, even selling whole cargoes of iron to merchants who competed directly with Principio in the English iron trade. Second, the company plantations were producing at a drastically reduced rate compared to their operation under previous administrators.[95]

A final difficulty encountered by Russell when he took over the Principio operations was labor. A common problem for all industrial activities in the American

[94] Whiteley, "The Principio Company," 197.
[95] Whiteley, "The Principio Company," 288.

colonies, the matter of skilled labor was something all Principio managers endured. The manager previous to Russell, Nathaniel Chapman, improved the situation considerably by purchasing skilled slave workers and by acquiring several skilled indentured servants and contract laborers. But while the company had loyal contingent of skilled laborers, they were getting old. Many of the workers, like forgeman Francis Maybury, had worked for the company for as long as thirty years. While it is always good to have experienced laborers, iron production was strenuous work, for "the technique of swinging the half bloom to the hammer them back to the hearth required much strength and practice. The hammerman, likewise, were experienced. It required no little degree of strength to draw the bar to exact given sizes."[96]

Despite the many difficulties Russell encountered upon arrival in Maryland, he got the iron works operational and working efficiently relatively quickly. Account books from his tenure show that he kept both furnaces regularly in blast for six to eight months each year, while the Company boats were continuously carrying iron to the local ports and markets as well as ore from the mines. The Company did well financially under Russell. In a typical year, 1769, Principio sold over twenty tons of pig iron to Liverpool, over sixty-five tons of pig iron to Bristol, over forty-six tons to London, over fifty-one tons of bar iron to London, and dispersed nearly £1,000 to the shareholding partners.[97] Russell was constantly looking to improve the operational capacity of the works. When drought struck the region in 1772, Russell and his assistant Philip Coale used the setback to an advantage by making repairs to the works, as Russell noted in a letter to the partners:

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[96] Bining, *Pennsylvania Iron Manufacture,* p. 288.
[97] Record Books 1769, Principio Papers, Historical Society of Delaware; and Bining, *Pennsylvania Iron Manufacture,* p. 289.

> Mr. Coale has wrote me that Water is very scarce, they had not worked on the chaffery with these three days, not withstanding which the pool had not rose 2 feet perpendicular . . . as there are some heavy repairs on hand it will well agree with that work: the Drum, Beam Poppet, Prickport, and Waterport and indeed all the Hammer Harness is in a most shattered condition, but Mr. Coale as so contrived it as to have Paul in such ready this as when the Old Harness is pulled down to put the new up immediately which hope will be done without much loss of time proportionate for such heavy repairs."[98]

An important difference between Russell and John England is that he was never directly in control of the Principio operations. Instead, he relied on a cadre of clerks and skilled foremen at each of the installations. These individuals were Philip Coale at North East and Principio Forges, Nathaniel Martin at Kingsbury Furnace and William Baxter at Lancashire Furnace. Since he could depend on these men to keep the facilities in production, Russell was able to focus on the overall supervision of the operation and deal with matters like supply, manufacture, marketing, provincial governments and communicating with the English partners.[99] While Russell was able to get the Principio operation running smoothly again, his experience as the manager was far from perfect. During his tenure, Russell faced two significant challenges which serve to illustrate the types of issues an industrial executive could face and the limitations of the operational structure of the Principio Company.

The first challenge for Russell involved the disposition of the individual member shares within the partnership form of business organization. Specifically, a problem occurred when Captain Augustine Washington died in 1743. Washington left his partial share to his son Lawrence, who in turn died in 1752 and left the partial share to his brother Col. Augustine Washington. By the time Thomas Russell came to Maryland, the partial share belonging to the Washington family was in the possession of Anne

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[98] Thomas Russell to all partners, June 22, 1772, British Museum Additional Manuscripts, LOC.
[99] Russell to all partners, June 22, 1772, British Museum Additional Manuscripts, LOC.

Washington of Wakefield, Virginia, as part of the estate of her late husband, Colonel Augustine Washington.

Thomas Russell found difficulty not just in tracing the descent of the partial share through the Washington family, but in parceling out the rights entitled by the partial share. The original organization of the Principio Company was based on the equal distribution of shares among the twelve partners. It was understood by the partners that shares were property, and thus subject to being bought, sold, given as gifts, or inherited. Although shares were sold on a few occasions, inheritance was the main way Principio shares transferred from one person to another. New shareholders retained the rights and powers of the original owner, even ignoring social limitations established by age and gender. For example, when John Wightwick died in the 1760s, the share was transferred to his widow Mary and she was an active partner for several years until her son became old enough to legally take control.

Since the partnership had an established policy concerning share transfer, the problem with the Washington share did not involve transference, which was uncontested, but the actual value of the share. In 1772, Anne Washington notified the partners that she would like to sell the Washington share to them, writing Russell: "if Sir you [Thomas Russell] are as cordially disposed to offer me the just and true value of our share as I am to sell it; there will be no difficulty in agreeing when it shall please you to confer with me on the subject."[100] The partners were willing to purchase the Washington share, but had difficulty establishing a fair value. The agreement made with Captain Augustine Washington in 1725 gave him two of the twelve shares in return for the use of his

[100] Anne Washington to Thomas Russell, May 28, 1772, British Museum Additional Manuscripts, LOC.

property in Stafford County for mining and smelting.[101] A revision to the agreement was made in 1737, reducing the Washington share to just one of twelve shares in return for an unspecified concession. Dividends were regularly distributed to shareholders, which included the estate of the late Colonel Augustine Washington. Since a share in the Company possessed both an intrinsic value and an expected return value, Russell feared Mrs. Washington would ask a high price for the share. Writing to the partners, Russell proclaimed, "I'm pretty certain that she will be asking near double the money, that I should be willing to give."[102]

Thomas Russell promised the partners that he would "act with the utmost Caution and precision to capitalize in this affair," but he was not prepared for what ensued.[103] Anne Washington wanted to sell the share to the highest bidder, regardless of whether it went inside the Principio Company or not. In order to establish a reasonable price for the share, Anne Washington's London attorney William Lee sought to examine the Principio Company accounts.[104] For a ten year period, Washington and her attorneys tried to negotiate a fair price with the partners in London. No agreement was ever reached. The partners continually referred the matter to Thomas Russell, since he was the company manager. Russell, in turn, denied that he had the authority to make such a decision without explicit orders from the partners. What is uncertain is whether this game of passing the buck between the partners and Russell was a real misunderstanding or a

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[101] The division of shares in 1725 were as follows "to the Captain 2/12ths as you have agreed, To Walter Chetwynd, Esq. 2/12ths, to William Chetwynd, Esq., 2/12ths, to John Wightwick Esq. 2/12th, to Mr. Joshua Gee 2/12ths, to Mr. T. Russell 1/12th, To yourself [John England] 1/12th." See, William Chetwynd to John England, September 19, 1725, Principio Company Papers, MHS.
[102] Thomas Russell to all partners, June 22, 1772, British Museum Additional Manuscripts, LOC.
[103] William Lee to Anne Washington, December 24, 1771, Washington Family Papers, MHS.
[104] William Lee, Anne Washington's London attorney, wanted to examine the books to see "what it is you are going to sell." See, William Lee to Anne Washington, December 24, 1771, Washington Family Papers, MHS.

calculated maneuver. Anne Washington died in late 1774; still owner of the partial Washington share. Her attorney, William Lee, accused the partners of applying underhanded tactics to get their way.[105] In the end, the American Revolution broke out before a resolution could be made, leaving the dispute to be settled by the Maryland legislature years after the war had concluded and the property had been confiscated by the state.

In dealing with the issue of Washington's share, Russell had a complex and winding path to navigate. He sought serve the interests of the company (for which he was the overall manager), while serving his own needs as a partial shareholder. In explaining the matter to the partners in December of 1772, Russell made clear his position as both a partner and the Company manager, stating that he made sure the executors of Colonel Augustine Washington's estate:

> could not come at the real value of their share until a proper Estimate of the whole of the Estate was taken: . . . on my Part I could not consent to any such thing being done until I had your particular Orders for so doing; and provided that this Proposal is allowed (of which you will deliberate amongst ourselves) I think it should be under this particular injunction . . . that the said Estimate be kept as private as possible and showed to no one excepting a person inclinable to purchase of which intention proper judgment may be formed by the proposals the said purchaser may have to make and all this before the Estimate is shown."[106]

Although Russell clearly tried to act in the best interest of the Company, he also wanted to make sure the individual shares retained a high value.

At the same time, the fact that such a discussion had to take place exhibits several definite problems with the partnership form of business organization. For one, when the partners are dispersed over some distance from each other and/or the production

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[105] In particular, Lee accused the company partners of fabricating the right of first refusal on the sell of the Washington family's 1/12th share of the works. See, William Lee to John Augustine Washington, December 15, 1774, Washington Family papers, MHS

[106] Thomas Russell to all partners, December 24, 1772, British Museum Additional Manuscripts, LOC.

facilities, the distance diffuses the decision making process over an extended period of time and makes it difficult for the partners to come to a consensus with their management. Another problem was that as time passes shares come into the possession of individuals who, unlike the founding merchants and ironmasters, had neither experience nor training relevant to the Company endeavors to make a sound judgment about the business. As a result, the remaining partners were left in the awkward situation of having to buy up a costly share or watch their control and dividends dissipate. Even worse, managers like Russell were left in the uneasy position of serving absentee owners as well as accidental ones.

The second challenge Russell faced as overall manager of Principio operations involved the need to secure production managers for a dispersed absentee ownership group and supervise those managers when their local interests conflicted with that of the partners. Since he was not an ironmaster and had no previous experience with iron production, Russell chose to continue the practice of employing an individual ironmaster at each production facility, whether forge or furnace. Unfortunately, Russell found that the various production managers in residence at the facilities when he took over were a mixed group in terms of ability and character. Some of the production managers, like Frances Philips, were quite able administrators. Russell even went so far as to describe Philips as “a most worthy and industrious man.” But other production managers, like William Baxter at North East, proved to be of questionable behavior. With managers of such divergent competency in charge, Russell found himself spending as much time keeping an eye on the production managers as he did running the company. Throughout

his tenure as supervisor, Russell had to regularly visit "all the works frequently," hoping to see "a change for the better arise and of receiving the things of his partners."[107]

Baxter proved to be the most difficult site manager for Russell. For one, Baxter's management of the laborers "encouraged a resentment of the Company and their total dissatisfaction, which had been brought by his misdeeds to a height which culminated in the resolve to make a clean sweep of all their former representatives."[108] When personal affairs forced Russell to return to England in 1769, Russell tried to circumvent Baxter's trouble making proclivity by putting Philips in charge in his absence. Much to Russell's chagrin, Philips died shortly after his departure and Baxter seized control of operations. Almost immediately, production fell off and there were questions of fiscal impropriety on the part of Baxter. From England, Russell hired a new overall supervisor, Nathaniel Martin, in the hope of "apprehend[ing] the absolute ruin of our Interest."[109] Baxter was again reduced to the position of production manager of North East furnace. Why Baxter was not immediately fired for incompetence is unknown. Instead, Baxter remained with the company and continued to cause disruptions by openly questioning Nathaniel Martin's authority, forcing Russell to return to the colonies at the end of 1771 to regain control of the operations of the Principio Company.

Russell's return to the colonies did not end the problems with Company employees. Since the partners believed he hand picked Baxter to run the operations in his absence, Russell's reputation with the partners was tarnished. They were uncertain whether Russell possessed the temperament to be the overall manager, and questioned his judgment concerning laborers. Shortly after his return to Maryland, the partners wrote

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[107] Whitely, "The Principio Company," p. 289-90.
[108] Whitely, "The Principio Company," p. 198.
[109] All partners to Anne Washington, February 27, 1771, Washington Family Papers, MHS.

Russell a scathing letter asking whether "any set of gentlemen embarked in a business like ours, can be so negligent of their interest as to remain content in such darkness or to suffer a continuation of such remissness [?]" Russell responded with an explanation of the situation concerning Baxter's elevation to Company manager in his absence and his personal feelings for the man, which appears to have resolved the matter.[110]

Through out his tenure as the overall manager of the Company operations in America, the correspondence between Russell and the partners focused almost entirely on the never ending problems that seemed to plague the Principio operations. No sooner did Russell solve one issue, than another would rise to replace it. Old debts were a recurring dilemma, with each new day bringing another outstanding bill to Russell's attention. He discharged bills he could prove to be legitimate, but that caused problems with the other partners, who preferred to see money coming into the Company accounts rather than leaving.

Personnel became another recurring issue for Russell when he returned to Maryland. Surprisingly, Russell had mixed feelings about Baxter, telling the partners that it turned out "[Baxter] has not been one of your private purse making men" since he "equally neglected his own private affairs as well as the Works."[111] Believing that Baxter was not stealing Company funds, as had been mistakenly assumed by discrepancies found in the Company accounts (turns out Baxter was just incompetent), Russell decided to keep Baxter in place because he was a tolerable manager when kept under scrutiny. Keeping Baxter in the Company's employ clearly did not change Russell's uncertainty of his intentions, since Russell described Baxter after his death in May 1772 as a "strange,

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[110] Quoted in Whitely, "The Principio Company," p. 290.
[111] Thomas Russell to all partners, December 24, 1772, British Museum Additional Manuscripts, LOC.

obstinate infatuated Man, and many circumstances seemed to make the integrity of his Heart much to be Questioned."[112]

No sooner was Russell relieved of one problem employee when another emerged, albeit in an unexpected quarter. Russell began to notice, as time passed after his return to the colonies, that "[Nathaniel] Martin behaves in a very odd manner: because I have not put anyone over him as yet he thinks he is to do as he pleases." Worse still, Russell believed that Martin used company funds to purchase several slave workers as his own property, and then leased them to Principio at rather high rates. Another disconcerting bit about Martin was his "conduct with John Murray the overseer; whom he has taken upon to discharge though he [Murray] served the late Mr. Phillips most of his time and is the best man in such a station." While these activities were problematic, Russell's real problem with Martin involved gross mismanagement. According to Russell, Martin failed to get the furnace into blast in 1772 until just before the river was about to freeze, which ended water transportation and left the company's forges at Principio and North East without any pig iron to work into bars. As a result, production levels dropped substantially at the Principio works, causing great consternation among the partners.[113]

In the end, despite the numerous problems he encountered when he returned to Maryland, Russell got the company operations back into order and improved the works with several good decisions. One of the first men he hired in 1771 was Philip Coale, who took control of the forges and displayed great diligence and knowledge of iron production.[114] In 1772, Russell hired several new skilled iron workers from Pennsylvania. Nathanial Martin left the company in 1773, allowing Russell to replace him with George

[112] Thomas Russell to Michael Harris, May 26, 1773, British Museum Additional Manuscripts, LOC.
[113] Thomas Russell to all partners, December 24, 1772, British Museum Additional Manuscripts, LOC.
[114] Thomas Russell to all partners, July 4, 1772, British Museum Additional Manuscripts, LOC.

Matthews, who remained with the company until the Revolution.[115] Mathews notified the Partners when the war broke out, suggesting to "them to relinquish iron making entirely . . . although the iron Works might be carried on without loss."[116] Yet, from the variety of difficulties and inconveniences the works were naturally subject to, Mathews was apprehensive the Principio Company would ever yield a profit in any degree equivalent to the capital employed and deemed the company's landed property to be the greatest object worthy of their attention.

Mathew's admonitions of the company proved prophetic. When the war broke out, the Principio Company lost everything. Russell was in Maryland at the time, and remained there through the difficulties. He kept the works in operation during the war, signing an oath of allegiance to Maryland in 1778 and actively supplying the continental army. The Maryland General Assembly passed a law to confiscate all British property within the state in 1780, but Principio was not seized until late 1781. The Commission, having taken possession of the Principio properties, put it under the care and management of Mr. Thomas Russell, who entered into a bond for "£40,000 gold currency." The intent of the State was to maintain the value of the property until it could be conveniently sold at auction. Sales of the confiscated property began in 1781, with Russell, instead of waiting to receive a portion of the proceeds, taking instead by a special Act of Partition passed by the General Assembly of Maryland in April, 1782, the North East Forge, "and Such of the Lands, Negroes, Stock and utensils to the same appertaining as the said Thomas Russell might think necessary for carrying on the same Forge."[117]

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[115] Thomas Russell to all partners, December 24, 1772, British Museum Additional Manuscripts, LOC.
[116] Whitely, "The Principio Company," p. 291-292.
[117] Commission on Confiscated British Property Journal, Maryland State Archives, p. 8-9, 236.

The industrial operations of the Principio Company were varied and extensive, spanning the entirety of colonial iron making in Maryland and Virginia. While its ownership remained in the control of a small group of English partners, in all other respects the company was representative of Chesapeake iron manufactures in its administration, labor force, technology, marketing and relationship to the larger regional community. Despite the fact that attention has been directed at the Principio Company, it was representative of other iron enterprises in the Chesapeake and in neighboring colonies. The problems affecting Principio operations—like access to raw materials, reliable labor and accessibility of markets and the necessity of having good leaders such as John England and Thomas Russell—were problems every industrial activity faced during the colonial era.

Founding an industrial operation in the British American colonies demanded an energetic effort and solid technological knowledge. The first men to operate an industrial company needed to be experts in the industrial activity they were establishing. Although a few individuals like Henry Heth were capable enough to pick up their expertise along the way, it was better if the founding owner or manager of a new industrial venture already had the knowledge before engaging in development. As time passed and an increasing number of industrial activities had developed in the region, it was no longer necessary to have an expert in charge as long as the manager or owner of the industrial venture possessed some understanding of the business. Instead of being an expert, it was possible to acquire the necessary knowledge at various nearby works or to hire men with the necessary skills.

Principio offers a perfect example of this situation. Once the Principio operations were well established, an ironmaster was not needed as much as a business administrator to direct the various operations. As the Principio Company progressed and matured, it seemed to find itself at several crucial moments when the previous style of leadership could no longer serve it interests and a new innovative approach was required. Like any successful business operation, Principio adapted to meet the new needs of the changing situation. As the experiences of the two key Company ironmasters and managers suggest, the biggest problem threatening the success of the Company's operations was the combination of a diffused partnership of owners, and the uncertainty of 18th-century transatlantic communications. These problems were not fatal handicaps; the Company dealt with the problems when they arose, and was very profitable for the owners. But those conditions multiplied the difficulties inherent in conducting an industrial enterprise in the nonindustrial context of British North America. Even more important, it was a problem the Principio Company never really solved in the end.

Another thing that the example of the Principio Company suggests is that the colonial iron industry of the mid-Atlantic region was important, albeit often overlooked, as a generating factor in social organization in the Chesapeake region. As a form of organization, the iron industry reflected varying patterns of land acquisition and land-use that was also found in other commercial activities in the colonies.[118] The iron industry also reflected that some physical and geographical requisites for iron making translated to other activities, including the transportation of heavy raw materials and finished products; the acquisition of disciplined and skill nonagricultural labor as well as unskilled labor;

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[118] For an examination of iron making organization in 17th century New England, see E.N. Hartley, *Ironworks on the Saugus* (Norman: University of Oklahoma Press, 1971).

and, the need for access to ample supplies of raw materials like iron ore, timbre for charcoal, lime for flux, and running water for power. One key similarity can be found between the English iron "plantation" and tobacco plantation of the Chesapeake. The geographical and social circumstances found in the Chesapeake—including exceptional transportation facilities along the Tidewater rivers in the Chesapeake Bay; a tradition of tobacco plantation organization; the presence of a varied laboring population, like African slaves, transported convicts, indentured servants and free wage earners; and the location of iron enterprises in both early urban and rural settings—was shaped as much by the region's direct involvement in agricultural activities as it was by the iron industrial ventures of some of the most significant families (Carrolls, Dulaneys, Ridgleys, Tayloes, and Johnsons) of social and political importance to the colony.

Iron making was a fundamental industry in the colonial era. Iron was essential for the maintenance and production of the tools of agriculture and many crafts. In addition to its necessity in agriculture, iron was essential for colonial shipbuilding, building construction, and weapons manufacture. Iron production was one of the earliest industries undertaken by the European settlers in the American colonies, and it was a prerequisite for industrialization, one of the most important social economic facts of America's development. The Principio Company was the first large scale colonial iron production venture in the colonies, and operated throughout the colonial era. By coming to an understanding of how Principio was established, organized, and operated, we begin to grasp both the operation of other types of industrial ventures and the emergence of industrialization in the American colonies.

In the next chapter we will be examining how industrial ventures were organized when they were being established and operated by a single family over succeeding generations. A crucial factor in this discussion will be an examination of how participation in industrial ventures could contribute to the wealth of individuals in the Chesapeake region, how they spent their industry money, and how the spending of money acquired from industrial ventures affected their social position. The example we will focus on is the Tayloe family, who were one of the wealthiest families in the Chesapeake region in the years just prior to the American Revolution. Although the Tayloes had tobacco plantations, the majority of their consumable wealth was derived from industrial ventures, particularly iron production.

CHAPTER 2

"Though ultimately our profits may be large"[119]: The Tayloe Family & the Spending of Industry Profits

As J.F.D. Smyth neared the hamlet of Williamsburg, the capitol of the colony of Virginia, in the fall of 1774, the first thing he noticed was that "adjoining to the town is a very excellent [horse racing] course, for either three or four mile heats." After a quick inquiry, Smyth found that "there are races at Williamsburg twice a year; that is, every spring and fall, or autumn. Their purses are generally raised by subscription, and are gained by the horse that wins two four mile heats out of the three; they amount to an hundred pounds each for the first days running, and 50 pounds each every day after; the races commonly continuing for a week. There are also matches and sweepstakes very often, for considerable sums." Besides the races at Williamsburg, Smyth was told by several Williamsburg residents that races were held annually across the colony at almost every town or considerable place in Virginia and on which large sums of money often would depend. According to Smyth, Virginians "almost to a man, are quite devoted to the diversion of horse racing."[120]

While Smyth was impressed with the extensive layout of the track at Williamsburg (which matched any he had seen in England) and the interest in racing in the colony, what he saw at the races intrigued him even further. The Virginians' horses seemed to be the equal, and possibly even the rival, to the best English horse stock. "Indeed, nothing can be more elegant and

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[119] John Tayloe, Mount Airy, to Mr. Reeves, London, June 1, 1801, John Tayloe III Letterbook, May-June 1801, Tayloe Family Papers, [here after TFP], Virginia Historical Society [here after VHS]. Unless otherwise noted, research for this study was conducted from the microfilm series, *Records of Southern Ante-Bellum Plantations*, Series M, Part I: The Tayloe Family. The original papers are located at the Virginia Historical Society.

[120] J.F.D. Smyth, "A Tour in the United States of America," (London, 1787) as quoted in William Standard, "Racing in Colonial Virginia," *Virginia Magazine of History and Biography* [Hereafter, *VMHB*], vol. II (1894-95), p. 299-300.

beautiful then the horses had here, either for the turf, the field, road, or the coach; and they have always fine, long, full, flowing tails." In fact, Smyth believed that the Virginians had some of the most beautiful horses in the world, "such as would make no despicable figure at Newmarket." Nor was their speed or blood inferior to their appearance, because the gentleman of Virginia spared no pains, trouble, or expense in importing the best stock, and improving the excellence of their horses by proper and judicious crossing. According to Smyth, the horse stock of Virginia came from "old Cade, old Crab, Old Partner, Regulus, Babraham, Bosphorus, Devonshire Childers, the Cullen Arabian, etc., in England; and a horse from Arabia, which was imported into America, and is now in existence….I am confident that there is not a horse in England, nor perhaps the whole world, that can excel them in rapid speed."[121]

The Virginians were so invested in horse flesh, according to Smyth, that "gentleman of Fortune expend great sums on their studs, generally keeping handsome carriages, and several elegant sets of horses, as well as others for the race in road; even the most indigent person has his saddle horse, which he rides to every place, and on every occasion; for in this country, nobody walks on foot the smallest distance, except when hunting; indeed, a man will frequently go 5 miles to catch a horse to ride only 1 mile upon afterwards." In short, Smyth found that horses were the pleasure and the pride of Virginians. But Smyth's experience also showed that one Virginia family seemed to dominate the diversion in terms of interest and investment. For three generations, horses bred by the Tayloe family were found at nearly every race in Virginia. It was not enough for them to just attend races. Three generations of John Tayloes built race tracks across the colony. They imported the best studs to breed with their racing stock, and made their name synonymous with great race horses. In the process, they expended great sums of money to

[121] Smyth, p. 299-300.

partake in their chosen hobby (perhaps, obsession is a better way to describe the Tayloe interest with horses).[122]

The interest of the three generations of John Tayloes in horses was for business as much as it was for pleasure. Like other Virginia gentlemen, the Tayloes participated in horse racing because they enjoyed the sport for its competition, entertainment, and the social interaction.[123] But the Tayloes also made sizable sums of money from racing, since their thoroughbreds usually won the races they entered, whether it was in Richmond County or Williamsburg or Yorktown or Fredericksburg or even in Annapolis, Maryland. The athletic prowess of Tayloe horseflesh is well documented by many of their peers. Landon Carter noted in April of 1752 that he "Went to a Race in York Town Where Colo. Tayloe's Mare, *Jenny Cameron*, won the Purse."[124] Later that fall, Carter again remarked in his dairy that Tayloe's horse *Traveller* won Ł100 purse on the same track. *Belair* continued the dominance of the Tayloe's by winning at Williamsburg during the spring of 1767 and taking another Ł100 purse.[125] Robert Carter's tutor Philip Vickers Fithian recalled a race in 1773 at the Richmond County Courthouse, "where two Horses [ran] for a purse of 500 Pounds . . . One of the Horses, belonged to Colonel John Tayloe, and is called *Yorick*—the other to Dr. Flood, and is called *Gift* . . . the Course was one Mile in Circumference . . . [and] *Yorick* came out the fifth time [around the course] about 40 Rod before *Gift*." In 1774, Tayloe's horse *Single Peeper* dominated the track in Fredericksburg, capturing a purse of Ł50.[126] Much to the irritation of their competition, the list of Tayloe victories seems endless, and can be widely

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[122] Smyth, p. 299.
[123] Rhys Isaac, *The Transformation of Virginia, 1740-1790* (New York 1982), 98-101, 118-119; T. H. Breen, "Horse and Gentlemen: The Cultural Significance of Gambling among the Gentry of Virginia," *The William and Mary Quarterly* [Hereafter, *WMQ*] 3rd 34:2 (1977), 239-257.
[124] Landon Carter, "Diary of Colonel Landon Carter," *WMQ*, 15:3 (Jan., 1907), pp. 63-69.
[125] Virginia Gazette, April 25, 1766; October 24, 1766; April 23, 1767.
[126] H. D. Farish, ed., *Journal and Letters of Philip Vickers Fithian, 1773-1774: A Plantation Tutor of the Old Dominion* (Williamsburg, 1945), 24-25; Virginia Gazette, October 20, 1774.

attributed as the main reason why the Tayloes were so well known in the British Atlantic World in matters of the turf.

Horses owned by the Tayloe family provided an income in a rather unexpected way as well. Because of their success in racing and strong lineage, Tayloe horses were widely sought for breeding (known at the time as covering). The Tayloe patriarchs extensively advertised the availability of their horses for such services. As early as 1755, John Tayloe I advertised in the *Virginia Gazette* for the use of "a fine Bay Horse *Childers*, to cover this Season at Two Guineas a Mare, Leap and Trial, the Money paid at the Time of covering, or Five Pistoles for a Foal."[127] *Childers* was a good breeding stallion who was both lucky in getting foals and placing well at races. He was second at the race called Beverley taking Ł50 Plate in June 1750, second at York in August 1751, first, third, and second respectively in each of two heats at Richmond in July 1752.

In 1770, Tayloe II offered his two most famous horses, *Yorick* and *Traveller*, for stud. *Traveller* was offered for ten shillings per leap or forty shillings for the entire season." *Yorick*, who was probably the most popular of Tayloe II's studs, was available until mid-June at Mt. Airy, "afterwards, he will stand the remainder of the season at Gwynnfield, a plantation of the honorable John Tayloe's in Essex County, for the greater convenience of the Southern customers."[128] Tayloe II's advertisement makes it clear that studding horses was a business enterprise with immense profit potential. The Tayloe account books substantiate this revelation. Between 1776 and 1779, the Tayloes kept detailed records of their horse-breeding activities. In 1776, they charged Ł8.10 for covering services provided by *Yorick* and another horse named *Nonpareil*. The next year, *Yorick* alone brought Ł20.16. In 1778, Tayloe offered *Yorick* and

[127] Virginia Gazette, April 18, 1755
[128] Virginia Gazette, May 24, 1770; April 5, 1770.

another named *Black Horse* for covering and made Ł37.2. But *Yorick* remained the most valuable of the Tayloe studs, routinely bringing in Ł14.8 worth of services every year. For at least 15 years, studding *Yorrick* provided the Tayloes with a regular income in addition to the much larger sums the horse consistently won on the track.[129]

Although all of the Tayloe patriarchs were active in the horse breeding industry, one individual stands above the rest as a breeder of horses and practitioner of the turf. Well before he was of an age to safely ride horses, John Tayloe III showed an intense interest in racing, prompting his father to amusedly suggest his son was "fond of horses to a distraction."[130] John Tayloe II was a well known and respected breeder and racer, but his son would surpass him, becoming known internationally for the quality of his race horses and his interest in the sport. While in England as a young man in school, Tayloe III was actively involved in the English racing scene. Once returning to Virginia, he immediately became active in Chesapeake racing by entering horses in races in Maryland, Virginia, and the new city of Washington. One horse, named *Belle Air*, won Tayloe III more than £400 that first year and brought him another £100 when sold to William Archie in 1795.[131] Another horse, *Nantoaki*, won nine out of ten races in 1794, bringing in an unspecified amount of prize money before being sold for £112 in early 1795. *Leviathan* won sixteen times between 1798 and 1802 before being sold for £180. *Castianira* brought Tayloe over £800 from racing and breeding activities between 1800 and 1808. In 1805 alone, Tayloe won £976 from eight races won his horses.[132] From 1791 to 1806,

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[129] John Tayloe Account Book, 1776-1786, TFP; Jack P. Greene, ed., *The Diary of Colonel Landon Carter of Sabine Hall* (Charlottesville, Va., 1965), 2:1010-1011, 1017; John Tayloe, Mount Airy, to George William Fairfax, December 14, 1773, TFP, VHS.
[130] John Tayloe, Mount Airy, to George William Fairfax, December 14, 1773, TFP, VHS.
[131] John Tayloe III and Benjamin Ogle Tayloe Account Book, 1791-1834, TFP, VHS.
[132] John Tayoe III and Benjamin Ogle Tayloe Account Book, 1791-1834, TFP, VHS, p. 2; John Tayloe Horse Account Book, TFP, VHS.

he entered every major race in the Chesapeake, taking home at least £9000 currency in prize money.[133]

While Tayloe III obviously took great pleasure from his large and reputable stables, he just as surely recognized their value as a business opportunity. In the course of his life, Tayloe III owned nearly 100 race horses.[134] He raced most of these horses himself while they were in their prime at the several Chesapeake competitions held each year. Once a horse past its prime, Tayloe used them as studs or breeding mares. In many ways, breeding was more profitable than racing. Tayloe III's horse, *Grey Diomed*, was bred with "57 strange Mares" in 1797, netting $912. Another horse, *Kill Devil*, was used as a stud for two seasons at Tayloe's plantation Nejemoy because the demand in the surrounding Maryland community was so great. A close neighbor, William Holburne, instructed Tayloe's overseer at Nanjemoy, "[Y]ou will have all the Nanjemoy mares covered by him, & as many others as you can in the neighborhood—at such a Price as you may deem it most advisable to stand him at—to make the best of the Season." *Kill Devil* earned Tayloe nearly $1500 while at Nanjemoy.[135]

The reputation of Tayloe III's horses went well beyond the Chesapeake. Henry Cotton, a in planter Tarbrough, Alabama, contracted with Tayloe III to rent a horse named *Chance* for five years in return for "the half part of his earnings [from racing and covering] to be paid as soon after each season as you can possibly remit it." Tayloe agreed to the deal, telling Cotton that

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[133] John Tayloe Horse Account Book, TFP, VHS.

[134] For lists of Tayloe's horses, see John Tayloe Horse Account Book; "List of the Stud formerly owned by Colo. John Tayloe [from] American Farmer vol. 6, page 50," TFP; John Tayoe III and Benjamin Ogle Tayloe Account Book, 1791-1834, TFP; John Tayloe Horse Account Book, TFP.

[135] John Tayoe III and Benjamin Ogle Tayloe Account Book, 1791-1834, TFP; John Tayloe Horse Account Book, TFP. William Holburne for John Tayloe III, Mount Airy, to Mr. Hewlett, Najemoy, by Israel, May 26, 1801, John Tayloe III Letterbook, May-July, 1801. Quote from Laura Croghan Kamoie, "Three Generations of Planter-Businessmen: The Tayloes, Slave Labor, and Entrepreneurialism in Virginia, 1710-1830," Ph. D. Dissertation, College of William and Mary, August 1999, p. 189-190; This dissertation has since been made into a book placing the Tayloe family and their entrepreneurial activities more firmly into the historiography of the Chesapeake region, but it does not go beyond that. Laura Croghan Kamoie, *Irons in the Fire: The Business History of the Tayloe Family and Virginia's Gentry, 1700–1860* (Charlottesville: University of Virginia Press, 2007).

Chance was "the best bred horse in America." Besides racing and breeding, Tayloe was keen to make money on his horses in any manner possible, even breeding excess horses purely for sale. Some of the horses who had the best pedigrees were sold as colts, while others (with lesser pedigrees or who failed to sale as colts) were raced just long enough to establish their reputation as racer so they could be sold to the highest bidder.[136]

Since reputation and pedigree were essential to racing and making profits on horses, Tayloe sought after the best horse flesh he could find. He imported several horses with particularly notable pedigrees from England. Partly, such actions sought to increase the bloodline of his own horses, but he also used such transactions as a way to attract further business. He negotiated a partnership with two merchants, Mr. Reeves and John Weatherby of London, by asking them to find and send him several "very preferable horse[s]" to offer for breeding purposes. In the course of the transaction, Tayloe urged caution in their spending, noting that "though ultimately our profits may be large, yet the time will be long before we can get in our money. When they sent him information on their final selections, Tayloe carefully analyzed the pros and cons of each of the horses they were considering, finally urging immediately shipment of their selection."[137] Satisfied with their business acumen, Tayloe engaged the two men in several business transactions associated with his other financial interest (iron production).

Tayloe III was more than just a breeder and racer of horses. He was actively involved in developing the Chesapeake racing scene. He was the president of the Tappahannock Jockey Club from 1796 to 1801; simultaneously, he founded and oversaw the Washington Jockey Club in

[136] John Tayloe, Washington, to Henry Cotton, near Tarbrough, Alabama, July 7, 1819, TFP; emphasis original.
[137] John Tayloe, Mount Airy, to Mr. Reeves, London, June 1, 1801, John Tayloe III Letterbook, May-June 1801, TFP.

1798.[138] When he decided to move permanently to Washington, Tayloe built a racetrack just four blocks from the President's house and six from his own. Wilhelmus Bryan, a historian of early Washington, attributed the popularity of horseracing in the new federal city "to the interest taken in the breeding of racing stock by John Tayloe, reputed to be the wealthiest man in the city."[139]

It is not that unusual that the Tayloes were so passionate about horse racing, since as J.F.D. Smyth noted that the past time was the main interest of Virginians, but what is unusual is how financially involved in horse racing the Tayloes were compared to other Virginian elites. While many Virginia elites had at least one race horse, the Tayloes had several large stables of race horses. But it was not just horses which the Tayloes took to an extreme, for they also possessed several houses that were the envy of their peers. One of the most famous Tayloe house was Mt. Airy, which was situated on a 3,000 acre plantation in Richmond County. A Georgian mansion built in the late 1750s by John Tayloe II, it featured imported brown sandstone. The massive and ornate structure proclaimed the family's emergence within the colony as prominent planters, politicians, and businessmen.[140] A tutor for Robert Carter's children, Philip Vickers Fithian, probably wrote the best description of Mt. Airy and what it meant for its' masters social position, stating:

> Here is an elegant Seat! –The House is about the Size of Mr. *Carters*, built with Stone, & finished curiously, & ornamented with various paintings, & rich Pictures . . . . In the Dining-Room, besides many other fine Pieces, are twenty four of the most celebrated among the English Race-Horses, Drawn masterly, & set in elegant gilt Frames. —He has near the great House, two fine two story stone Houses, the one is used as a Kitchen, & the other, for a nursery, & Lodging Rooms—He has also a large well formed, beautiful Garden, as fine in every Respect as any I have seen in *Virginia*. In it stand four large beautiful Marble

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[138] Tappahannock Jockey Club Record Book, 1796-1801, TFP; Tappahannock Jockey Club Accounts, 1797-1800, TFP; Orlando V. Ridout, Building the Octagon (Washington, DC, 1989), 23.
[139] Wilhelmus Bryan, *A History of the National Capital from its Foundation through the Period of the Adoption of the Organic Act* (New York, 1914-1916), I: 304, 609.
[140] Isaac, *Transformation of Virginia*, 34-42, 74-79; William S. Rasmussen, "Palladio in Tidewater Virginia: Mount Airy and Blandfield," in Mario di Valmarana, ed., *Building by the Book* (Charlottesville, 1984), 76.

> Statues—From this House there is a good prospect of the River *Rappahannock*…[141]

While constructing Mt. Airy, Tayloe insisted on using the finest materials. The house had marble floors, mahogany wall paneling throughout with silver trim, and a massive French cut-glass chandelier in the parlor. The estate gardens featured exotic plants, a deer park, and a bowling green. The mansion was surrounded by brick outbuildings, including a stone dairy, coach house, a smokehouse, and a counting room, stable, and orangery. Every thing about Mt. Airy spoke to the prestige and importance of the Tayloe family, but the orangery was the most important ornament of the family seat. The orangery at Mt. Airy was not just a feature of the garden or a green house; it was a symbol of wealth, prestige, and a connection to the elites of the old world. An Orangery was frequently found on the grounds of the most fashionable European estates from the 17th to the 19th centuries. In fact, the *Orangerie* at the Palace of the Louvre, built in 1617, inspired imitations that were not eclipsed until the development of the modern greenhouse in the 1840s. Tayloe II loved his ornagery, often bringing guests there during tours of the garden so they could admire not only the architecture without but also the fruits within.[142]

When Tayloe III decided to build a second home for the social season in the newly established capitol of the United States in 1796, he, like his father before him, used the opportunity to display the wealth and importance of his family as well as trying to establish their interconnection with the power elite of the new nation. On April 19, 1797, Tayloe III bought Lot 8 in Square 170 for $1,000. Less than a mile walk from the U.S. Capitol and the new 'white'

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[141] Hunter Dickinson Farish, *Journal & Letters of Philip Vickers Fithian, 1773-1774: A Plantation Tutor of the Old Dominion* (Colonial Williamsburg, Incorporated, 1943), 94.

[142] An Orangery is similar to a greenhouse or conservatory, the name is derived from the original use of the building as a place where citrus trees were often grown in tubs and wintered under cover. Often the orangery would contain fountains, grottos, and an area in which to entertain in inclement weather. See, Rasmussen, "Palladio in Tidewater Virginia," 82-84.

house being built for the president, Tayloe commissioned the most popular architect of the area, Dr. William Thornton. For Tayloe, Thornton designed and oversaw the construction of a four story brick house which finished out at just over $13,000.[143]

Popularly known as "The Octagon," Tayloe III's Washington townhouse was a wonder for both its neighbors and its residents. The main door entered into a circular vestibule of imported mahogany gilded with gold trim and headed by an immense ornately decorated stair case to the second floor. Inside the house, Thornton laid out a geometric masterpiece of inter connected rooms, passageways, and stairways which clearly was a tip of his hat to capitol planner Pierre L'Enfant's geometrically inspired layout for the city. The circular entranceway led into a stair hall that is actually an isosceles triangle, with its long side the center rear wall connecting the house to its two main wings. Triangles proliferate throughout the house. The big triangle entrance is partitioned to make the stairwell straight sided, leaving two smaller triangles on each side. The remainder of the bottom floor is a fourth triangle, which housed several rooms and a triangular servant's stairwell to the basement. The second floor, accessed by the main stairwell which divides it into two wings, is dominated by a massive master bedroom, a circular study, a library, a long gallery, several bedrooms, and a circular stairway to the bedroom dominated third floor. Behind the residence was a two storied kitchen with a brick floored basement wine cellar.[144]

Tayloe III loved architectural minutiae. Visualizing intricate architectural details as the highest display of wealth and social standing, Tayloe III commissioned Thornton to spread them throughout the Washington house. The structure is laced with hidden nooks, stairwells, closets, and doorways. A door from the first floor to a servants' stairwell is set flush within the plaster

[143] George McCue, "The Octagon, Town House That Proceeded the Town," *Historic Preservation* (April-June 1974), 27-32.
[144] McCue, "The Octagon," 29.

wall, making it barely noticeable to the eye in order to protect the carefully calculated symmetry of the room. Other doors were similarly recessed and painted to look like the wall. Another servants' stairwell on the first floor was hidden behind a paneled bookcase. A door in the dining room opened into a closet and was artfully concealed in paneling. It could only be accessed by a secret handle in the woodwork.

But not everything at the Octagon was enmeshed in secrecy, as the visible details of the structure make it one of the great examples of the Federal architectural style. The elegance of the Octagon's appearance can be found in its' consistent subtlety, simplicity and the refinement of the structures exterior. The broad entranceway gently bulges outward, with its many panels and moldings perfectly joined. Thornton invented a spring loaded closing device to keep the door always latched and locked to the outside. The window composition for the front of the building is six over six panes on the first floor, six over nine on the second, and three over three on the third. Each floor of the house is divided on the exterior with a stone string stretching continuously around the house above the first floor, and a course of white plaster panels between the second and third floor windows. Architectural historian Glenn Brown probably wrote the best description of the appearance of the Octagon and intentions of its owners, stating,

> We can well imagine the old house in that period, with its simple tinted walls, polished long leaf pine floors, polished mahogany doors on the first floor, white woodwork, with the mantels elaborately carved and sometimes relieved by gold, the elaborate and delicate cornices, crystal chandeliers, Adam, Sheraton, and Empire furniture, paintings by Stuart and some of the better English painters of the day—a simple, refined and stately ensemble…Is it any wonder that James Madison would use the Octagon as his residence after British soldiers burned the Whitehouse?[145]

[145] Cited in McCue, "The Octagon," 30-32.

Although the Tayloe patriarchs insisted on having the finest things, they were adamant that "it won't do to throw away money in Trifles."[146] The Tayloe family was representative of Virginia planters, with much of their wealth tied up in tobacco, land, and slaves. But the Tayloes were more than just planters, they were business men. While agricultural endeavors and land speculation were important parts of their wealth, those types of investments were not the only ones the family patriarchs engaged. The Tayloes prospered through risk-taking, business savvy, ambition, and entrepreneurialism. As a result, unlike other Virginians of their class, the vast wealth and resources of the Tayloe family devolved from something other than the norm of tobacco and slaves. Like the partners of the Principio Company, the Tayloes were industrial minded individuals—planter industrialists. For the Tayloes, plantation based industrial ventures were more important than agriculture activities. By examining the industrial ventures established by the Tayloe family, we can come to understand how individuals engaged in such activities as well as how participation in such ventures could contribute to the wealth and social position of a family.

The Tayloe family's involvement in industrial activities began with John Tayloe I. Originally a tobacco planter, John Tayloe I was bothered by the financial insecurity caused by the constant price fluctuations in the tobacco market. Tayloe was not alone in this concern. Most planters of his generation came to the conclusion that they could not depend on tobacco.[147]

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[146] John Tayloe, Mount Airy, to Charles Wingman, Messrs. Hodgson, Baltimore, June 7, 1801, TFP.

[147] Warren M. Billings, "Sir William Berkeley and the diversification of the Virginia economy," *VMHB* 104:4 (1996), 433-54 433-454; Christine Daniels, "Gresham's Laws: Labor Management on an Early Eighteenth-Century Chesapeake Plantation," *Journal of Southern History* (hereafter *JSH*) 62 (May 1996), 208-209; Richard L. Bushman, "Markets and Composite Farms in Early America," *WMQ* 3rd. Ser., 55(3) (July 1998), 356; James B. Slaughter, *Settlers, Southerners, Americans: The History of Essex County, Virginia 1608-1984* (Salem, WV, 1985), 14; Russell R. Menard, "Tobacco Industry in the Chesapeake Colonies, 1617-1730: An Interpretation," *Research in Economic History* 5 (1980), 114, 125-126; Allan Kulikoff, *Tobacco and Slaves: The Development of Southern Cultures in the Chesapeake, 1680-1800* (Chapel Hill, 1986), 78; John J. McCusker and Russell Menard, *The Economy of British America, 1607-1789* (Chapel Hill, 1985), 119; Aubrey C. Land, *Bases of the Plantation Society* (Columbia, SC, 1969), 99, 101; Gregory Stiverson, "'Gentlemen of Industry, Skill, and Application': Plantation

Governor Alexander Spotswood reported to the British Council of Trade in 1710 that a shift to industry had

> become so universal that even in one of the best counties for tobacco, I'm credibly informed there had been made this last year above 40,000 yards of divers sorts of Woolen, Cotton, and Linen Cloth, and other counties where tobacco is less valuable have no doubt advanced their manufactures proportionately.[148]

But the shift away from tobacco also came because colonial leaders had been encouraging diversification since the first decades of settlement, which meant experimenting with new industries was more than a temporary reaction to market fluctuations.[149] Economic diversification was part of a long-term inclination in the Chesapeake region that would alter local commercial interactions, social relations, labor supplies, and planter class identity.[150] Wealthy Chesapeake planters had immense resources of land and slaves, but only a few moved toward diversification. Those who did were looking for new and more reliable ways of making money. According to historian Joyce Chaplin, such planters were innovators, not responders.[151] Low

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Management in Eighteenth in Eighteenth-Century Virginia," (Williamsburg, VA, 1975), 97-98; Carville V. Earle, *The Evolution of a Tidewater Settlement System: All Hallow's Parish, Maryland, 1650-1783* (Chicago, 1975), 131-132.

[148] Alexander Spotswood, Governor of the Colony of Virginia, to the British Council of Trade, March 20, 1710, in Ulrich Bonnell Philips, ed., *Plantation and Frontier Documents, 1649-1863, Illustrative of Industrial History in the Colonial and Antebellum South* (Cleveland, 1909), 186-188.

[149] For an idea of the types of legislation colonial leaders passed to encourage diversification see William Waller Hening, ed., *The Statutes at Large: Being a Collection of All the Laws of Virginia, from the First Session of the Legislature, in the Year 1619* (hereafter Hening's *Statutes*)(Charlottesville, 1969), 1:218, 1:469-470; 2: 120-121; 2:241-242, 2:306-307, 2:503-507, 4:96-97, 6:144-146 (flax, hemp, wheat, silk, tar); 2:38, 2:122-23, 2:186 (salt); 2:122-123, 2:178 (shipbuilding), 2:123 (tan house); 5:362-363 (salt petre); 2:260-261, 3:110, 3:401-404 (mills). See Billings, "Sir William Berkeley and the Diversification of the Virginia Economy," *VMHB* 104(4) (August 1996), 433-454, for a discussion of diversification attempts during the seventeenth century.

[150] Lois Green Carr and Lorena S. Walsh, "Economic Diversification and labor Organization," in Stephen Innes, ed., *Work and Labor in Early America* (Chapel Hill, 1988), 145-146, 163; Richard B. Sheridan, "The Domestic Economy," in Jack Greene and J. R. Pole, ed., *Colonial British America: Essays in the New History of the Early Modern Era* (Baltimore, 1984), 46-47; Land, *Basis of the Plantation Society*, 101, 125; Paul G. E. Clemens, "The Operation of an Eighteenth-Century Chesapeake Tobacco Plantation," *Agricultural History* 44 (July 1975), 518, 521-522; McCusker and Menard, *The Economy of British America*, 127; and Jean B. Russo, "A Model Planter: Edward Lloyd IV of Maryland, 1770-1796," *WMQ* 3rd. Ser., 49 (January 1992), 62.

[151] Joyce E. Chaplin, *Anxious Pursuits: Agricultural Innovation and Modernity in the Lower South, 1730-1815* (Chapel Hill, 1993), 187; see also Carr and Walsh, "Economic Diversification and labor Organization," 146; Clemens, "The Operation of an Eighteenth-Century Chesapeake Tobacco Plantation," 525.

returns from tobacco for successive years meant many planters had less money to buy the goods they regularly required, whether they were for subsistence or luxury.

John Tayloe I was one of these innovators. To establish financial stability, Tayloe intentionally diversified his economic activities. He grew agricultural products like corn, oats, wheat, peas, and beans. He speculated in western lands, making a small profit leasing hundreds of acres to tenants. He served as a merchant's agent, and tried his hand as merchant (even peddling slaves). But none of these activities provided the financial security he desired. Thus, in 1724, Tayloe shifted toward involvement in more risky business ventures, making his first foray into industrial ventures by getting into grist milling. In august of that year, Tayloe petitioned the Richmond County court for permission to buy several acres of land on the fork of the Shorts and Ridge Quarter Swamps in order "to erect a Grist Water Mill."[152] Although milling was a fairly easy venture to establish (requiring only a suitable location on the water and the necessary machinery), it was a relatively complex agricultural input industrial activity. Historians characterize water powered gristmills as the basis of early industrialization in America. Gristmills involved some of the most sophisticated technology of the period, requiring entrepreneurial and technical talent to establish and operate while providing important services for surrounding communities.[153]

Simultaneous to the establishment of the gristmill, Tayloe began trading with a group of Bristol merchants. Isaac Hobhouse, John King, Jeremy Innys, John Lewis, Samuel Jacob, Lyonel Lyde, Walter King, John Templeman, and Samuel Dyke. These individuals were a core group of

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[152] Beverly Fleet, comp., ed., *Virginia Colonial Abstracts* (Richmond, 19--), 17:175. Both Virginia and Maryland allowed for the redistribution (not in all cases compensated) of sites appropriate for building water mills as a means of encouraging their construction. The earliest act of Virginia occurred in September of 1667, and stated that anyone who was willing to build a mill but did not have access to the appropriate land could get the land of someone who owned such land condemned if they were not interested in building a mill there themselves.

[153] McCusker and Menard, "The Rise of Flour Milling in Richmond," *VMHB* 18 (October 1970), 390.

Virginia and Bristol investors who were looking for industrial opportunities in Virginia, and began developing a plan to establish an ironworks. John Tayloe I joined them and the group established the Bristol Ironworks in early 1721.[154] Since other interests prevented them from overseeing the day-to-day operations of the works, they turned to several long-time business associates to act as partners and managers of the venture. There were three main managers of Bristol, John Tayloe, John Lomax, and Philip Elway. Tayloe seems to have performed most of the managerial duties, and by 1724 he was appointed "Principal agent overseer and Director of the said Iron works." [155] His duties included supervising workers and production, purchasing and selling tracts of land, and acquiring the necessary raw materials, including iron ore and wood for charcoal.[156]

Once he took over as manager, Tayloe immediately started expanding the works. The Bristol Iron Works was at the confluence of the Bristol Mine Run and Rappahannock River in King George County. He purchased fifty acres from John Underwood on Foxhall's Mill Run.[157] In June of 1726, he purchased ninety-two acres from Mark Hardin and 300 acres from Timothy Reading. John Williams, a Bristol Mariner, purchased an additional 680 acres for the company as well as two lots in the nearby town of Falmouth. During the 1730s, Tayloe acquired at least 350 additional acres in King George County adjoining the company's other lands. Altogether, the

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[154] Isaac Hobhouse of Bristol was a partner in the Joseph Percivall & Copper Company as well as a shareholder in a sugar refinery at Radcliffe, Bristol; Lyonel Lyde, relative of Elizabeth Tayloe's deceased husband Stephen Lyde, was a Virginia merchant and member of the Society of Merchant Ventures. See Isaac Hobhouse & Company Papers, VHS.

[155] King George County Deed Book, 1: 51-52, Library of Virginia [hereafter LOV]; Essex County Deed Book, 17:174; 49, 8:489-491, LOV.

[156] King George County Deed Book, 1: 52, LOV; Essex County Deed Book, 17:174, LOV. See also G. McClaxen Brydon, "The Bristol Iron Works in King George County," *VMHB* 42(2) (April 1934), 97-102; Edward Heite, "The Pioneer Phase of the Chesapeake Iron Industry: Naturalization of a Technology," *Quarterly Bulletin of the Archeological Society of Virginia* 38 (3) (1983), 144.

[157] So called because a water grist mill operated by John Foxhall of Westmoreland County had existed at the site since the seventeenth century. King George Deed Book, 1:14-19, LOV.

Bristol Ironworks Company owned over 1,350 acres by the 1730s.[158] Such an extensive estate was required to successfully operate an ironworks, as furnaces required huge amounts of raw materials, especially wood. The company operated ore mines as well as a blast furnace. Tayloe dammed the creek to provide a source of water power for the mill's waterwheel. When he was finished, the estate consisted of "one Iron Furnace, a Grist Mill, Coal House, Stable and Divers other Houses."[159] The Bristol Ironworks produced pig iron, rectangular chunks of workable iron about a half foot wide, four feet long, and weighing fifty or more pounds each, well into the 1740s.[160]

Most of the work at Bristol was performed by white indentured servants and wage workers. There were only a few blacks at Bristol. The two most skilled were Sharper and Pompey, valued together at Ł68 and listed without occupation, but apparently skilled due to their price. An inventory of Tayloe's King George County estate from 1747 indicates he had thirty-three men and women residing on his lands nearby, and they were probably used at Bristol as well. This was the case with Sharper and Pompey, who were transferred from Bristol to Tayloe's Neabsco Furnace in Prince William County in 1747.[161] It was not unusual to rely on white labor during this early period, since Alexander Spotswood did just that at an iron works in Germanna. Nevertheless, it is not possible to know the entire racial make up of the workforce at Bristol since

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[158] King George Deed Book, 1:641-642, 1A: 115-118, 2: 59-63, LOV; Peggy Joiner Shomo, comp., *Abstracts of Virginia's Northern Neck Warrants & Surveys, 1710-1780* (hereafter *Northern Neck Warrants*) (Portsmouth, Virginia, 1986), 153.

[159] King George Deed Book, 2:429-431, LOV.

[160] For other physical descriptions of bar and pig iron see Michael W. Robbins, *The Principio Company: Iron-Making in Colonial Maryland, 1720-1781* (New York, 1986), 20-21; David Curtis Skaggs, "John Semple and the Development of the Potomac River Valley," *VMHB* 92(3) (1984), 285. Several pigs bearing the Bristol Company mark "BC" have survived, and are dated 1734, 1740, and 1742, see Bristol Iron Works File, Tate Thompson Brady Papers, VHS. Although the location of the site is known, no archeological investigations have been completed (44WM44). The Bristol Company pig irons are at the Valentine Museum, Richmond, Virginia.

[161] John Tayloe Estate, TFP, VHS.

company records are incomplete. At least a dozen or more men at Bristol labored at jobs like timbering, coaling, mining, carting, milling, iron making, and shipping.

Work at iron plantations was difficult, constant, and exhausting. Workers constantly expressed their discontent by running away. Augustine Washington, George Washington's father, captured a "Runaway Servant belonging to the Bristol Iron Works under the Care of Colo. John Tayloe" in 1727. In 1737, James Sumners, "a Servant Man" from the "West Country," also ran away.[162] The most shocking demonstration happened in 1729. Because of financial difficulties, the company could not pay workers on time. At least a dozen servants belonging to the Bristol Iron Mines, including Thomas Steel, William Payne, John Tingle, Thomas Ozban, Stephen Williams, Thomas Nicholas, James Legoes, Robert Carr, William Jones, Joshua Jess, James Powell, and Mathew McMahone, "seized a ship at the works' landing and refused to release it until they were paid." The authorities were called in and dispersed the riot, arresting the servants. The two ringleaders, Powell and McMahone, were whipped and fined.[163]

It is not possible to determine levels of production and profit at the iron works, but the Bristol merchants remained confident in Tayloe's management. In 1724, he became the sole director of the works. A few years later, he was offered the remaining ten percent available shares in the company for "Divers and Manifold good Services . . . . and also for the respect and esteem they . . . . the said partners beareth [sic] toward the said John Tayloe" as well as power of attorney for all matters related to the works.[164] Throughout the 1730s, Tayloe had complete control over expanding and shaping the works. When the works were no longer profitable in the 1740s, the investors authorized him to "Dispose of all" of their interests in the property to any interested purchaser and Tayloe handled the "B[ristol] Co. Disbursements," or the partners'

[162] Westmorland County Orders, 172101731, 19a, LOV; Virginia Gazette, March 18, 1737.
[163] Bristol Iron Works File, Tate Thomason Brady Papers, VHS.
[164] Richmond County Deed Book, 8:488-491, LOV.

shares of the money made from the sale of the estate.[165] Despite the sale, Tayloe appears to have stayed involved with the Bristol works. He received a salary of Ł60 in 1741, and recorded having paid Ł10 for "the rent of the Furnace 1 Years," which suggests that Tayloe continued to operate the works on his own behalf—he still owned a tenth of the original company—as well as for the benefit of the new partner-owners. Tayloe continued to manufacture iron at Bristol through at least 1742, since he accepted 903 tons of iron ore for the works in 1741, enough to keep the furnace in blast for almost 300 continuous days.[166] In 1742, Tayloe sold what remaining company property he owned, which indicated an end to his involvement with, as well as the closing of, the Bristol Ironworks.[167]

The operation at Bristol had actually become gradually less productive by the middle of 1730s, leading Tayloe to begin concentrating on establishing his own iron works. As early as 1728/29, Tayloe showed interest in founding his own iron works, writing Robert "King" Carter to join him. Carter declined saying "At this time I am [not] willing to be a joint Undertaker with your Society until I am better acquainted with the progress you are likely to make . . . . [However] Your Second proposal has really a great deal of temptation in it . . . that I might make a Considerable Advantage by delivering you Oar [ore] at the landing." Carter learned the hard way to choose his investments carefully because industrial ventures carried more risk than other investments; the previous year, Carter's Frying Pan Company folded when British merchants found the quality of his ore to be mediocre. Yet Carter was encouraging, telling Tayloe, "I am

[165] King George County Deed Book, 2:429-431, LOV.
[166] Account of John Tayloe [with Bristol Ironworks], TFP, 1:38.
[167] King George County Deed Book, LOV 2:445-446.

glad to find so many considerable gentlemen are engaged in designs of digging Treasure out of the Earth and do heartily wish them success in their Undertakings."[168]

The new venture was established in 1737, when Tayloe founded an ironworks on Neabsco Creek, a branch of the Occoquan River, in Prince William County. In the next few years Tayloe steadily accumulated large tracts of land there, acquiring more than 12,000 acres.[169] Tayloe's biggest concern was the need to obtain iron ore for production. Most of the lands surrounding Neabsco were part of the "Fairfax Proprietary," a tract of over 5,000,000 acres in northern Virginia granted to the honorable Thomas Lord Fairfax Baron Cameron, which required Tayloe to pay special fees and taxes on one-third of all ores and minerals removed from the land.[170] Although Tayloe initially used ore deposits around Neabsco, he decided to find a source not subject to Proprietary rules.

In 1738, Tayloe purchased lands containing quality iron ore deposits on the Patapsco River in Anne Arundel and Baltimore Counties, Maryland.[171] Unfortunately, mined ore from Maryland was subject to Virginia taxes. Thus, in 1738, Tayloe went to great lengths to convince the Council of Virginia, of which he was a member, to relieve "himself and other Adventurers in Iron Mines" from port duties on ores imported from Maryland. The Council agreed, and ordered "the Naval Officers of the several Districts into which any Oar shall be Imported to not require the Port duties or other fees . . . for any Vessels importing Iron Oar from Maryland for the use of

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[168] Robert Carter to Colo. John Tayloe, January 29, 1728/29, Robert Carter Letterbook, 1728-1730, VHS; Lois Morton, *Robert Carter of Nomini Hall: A Virginia Planter of the Eighteenth Century* (Charlottesville, VA, 1965), 18.

[169] Stafford County Deeds, TFP, VHS, 5:39, 41; Prince William County Deed Book, A, 153, 387; B:4-7, 31, 34, 245; D:364; E:10, LOV; See also, Deeds, TFP, VHS, 5:53, 602, 604; and, Shomo, *Northern Neck Warrants*, 129.

[170] *Northern Neck Warrants*, ix-xii; Sarah Hughes, *Surveyors and Statesmen: Land Measuring in Colonial Virginia* (Richmond: Virginia Surveyors Association and The Virginia Association of Surveyors, 1979), 107.

[171] No deeds exist for the purchase, but his appeal to the Council to allow duty-free importation of ore in 1738 and his 1741 account book entries identifying his ore source as his "new Bank" point to this three-year period. By the 1750s, John Tayloe II owned about 300 acres in Anne Arundel and Baltimore Counties, from which he mined iron ore for the use of his Virginia ironworks. These lands were likely the ones purchased by John Tayloe I. Baltimore County Certificates, Patented, May 7, 1757, Maryland State Archives; Account Book, TFP, VHS, 1:38.

the Iron Works here so [long] as such Vessels do not carry any other Goods & Merchandize."[172] In addition to ore from his own mines, Tayloe sometimes purchased ore from Stephen Onion's ore bank in Maryland. In 1741 as he was just getting his Maryland mines operating, Tayloe bought 718 tons of ore from Onion.[173]

When work began at Neabsco, it only included a blast furnace and a water powered grist mill, but the entire operation quickly grew to occupy both sides of the waterway. Forging, blacksmithing, and other processing activities were conducted on the east side of the creek, while the more central iron making and domestic areas were located on the western side. The furnace sat at the base of a steep hill, while the workers' quarters sat on a relatively level ridge a short way up Neabsco Creek. The furnace was about thirty to forty feet square, and was producing nearly 800 tons per year by January of 1742.[174] Neabsco quickly became the center in Prince William County for smith's work. Neighbors regularly brought items for repair or purchased tools or other products made at Neabsco. The Neabsco smiths, such as slave "Tom, a Black Smith," shod horses, made hoes, repaired plows, and labored at a variety of similar tasks.[175] Since he needed to move large quantities of ore along the waterway, Tayloe also built ships at Neabsco. He owned several barge-like "ore flats" used to transport loads of Maryland ore down the Chesapeake Bay to the Potomac River, and then up the Potomac to Neabsco Creek. In 1741, Tayloe paid two men for "floating ore up Neabsco," and two others for "trimming a flat" and

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[172] H.R. McIlwaine, ed., *Executive Journals of the Council of Colonial Virginia* (Richmond, 1925), 4: 433; William P. Palmer, ed., *Calendar of Virginia State Papers and Other Manuscripts* (New York, 1968), 38:387.
[173] John Tayloe Account Book, 1740-1741, TFP, VHS.
[174] Carter L. Hudgins and Douglass W. Sanford, "Neabsco Mills Ironworks Site, National Register of Historic Places Registration Form," *Center for Historic Preservation* (Mary Washington College, 1993), Section 7, 1-4. A copy of the form is located in the Neabsco Furnace File, Tate Thompson Brady Papers, VHS. Only Phase I and II archeological investigations have been conducted at the Neabsco Ironworks Site (44PW629). See also, John Tayloe I Account Book, 1740-1741, TFP, VHS, 1:35.
[175] John Tayloe I Account Book, 1740-1741, TFP, VHS, 1:23-25; John Tayloe Estate Inventory, TFP.

"repairing a float."[176] Tayloe oversaw the construction of more substantial ships as well. When he died in 1747, John Tayloe I left his son a full line of "Sloops, Schooners, boats, and vessels."[177]

Neabsco required a staff of managers, overseers, clerks, and laborers to run the works. Tayloe employed at least eight white laborers year round by 1741. Many probably came from Bristol. These wage workers included Benjamin Wilkinson, John Jones, William Williams, Joseph Dean, Charles Ewell, Doctor Lawson, and John Dennis. They received between Ł25 to Ł80 VA currency depending on their position.[178] Nine other white men were employed part time at tasks ranging from "floating ore to the landing" to "work about the Funnel head" to "putting in a new charge & hearth," and finally at "building a waste to the new sloop."[179]

Tayloe purchased several slaves for the works in the 1740s. Some individuals, like Pompey, Charles, and Sharper, previously worked for Bristol Iron Works. Such workers were experienced, skilled, and valuable ironworkers. In all, Tayloe owned 100 slaves valued at more than Ł2800 on his Prince William County lands, many of whom probably resided at Neabsco and assisted with some part of the iron making process. Although many Neabsco slaves were skilled or semi-skilled workers, white men held the master craftsman and supervisory positions. The mostly adult slave population consisted of sixty-nine men and thirty-one women. An additional forty slaves worked at mining, carting, and shipping iron ore for Neabsco on Tayloe's Maryland

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[176] John Tayloe I Account Book, 1740-1741, TFP, VHS, 1: 5-45.
[177] John Tayloe I Account Book, 1740-1741, TFP, VHS, 1: 15-45; Will of John Tayloe I, TFP, VHS. Sloops and schooners were among the smallest, quickest, and most frequently built ships in the colonies. Sloops averaged 31 tons while schooners averaged 34 tons. See William Kelso, "Shipbuilding in Virginia, 1763-1774," *Records of the Columbia Historical Society,"* Its Records, Washington, D. C., V 71/72 (1971-1972): 1-13; Arthur Pierce Middleton, "Ships and Shipbuilding in the Chesapeake Bay and Tributaries," in Earnest M. Eller, ed., *The Chesapeake Bay in the American Revolution* (Centerville, MD., 1981), 98.
[178] Tayloe purchased two slaves from the Bristol Company for his Neabsco Ironworks. John Tayloe I Account Book, 1740-1741, TFP, VHS, 1:5-45. Doctor Lawson may be a free black, as the research of Melvin Ely suggests that the name "Doctor" was popular among African Americans. Cited in note 77, Kamoie, "Three Generations of Planter-Businessmen," p. 47.
[179] Kamoie, "Three Generations of Planter-Businessmen," 47-48.

estate. The predominance of males in the slave population of Neabsco was typical for the Chesapeake slave population in the first half of the eighteenth century. This meant that slave men at Neabsco had trouble forming families, although records indicate that about twenty percent of the inventoried slaves were children.[180]

The size and gender of Neabsco's workforce was comparable to other ironworks of the period. In 1732, Charles Chiswell, who operated the Fredricksville furnace, advised William Byrd II that "one hundred and twenty slaves, including women, were necessary to carry on all the business of an iron works."[181] Chiswell employed more than 100 slaves at Fredricksville, although he considered himself short handed.[182] The Baltimore Company had about 150 slaves split between its various works, while the Nottingham Iron Works employed 153 slaves. Another ironworks owner, Benjamin Moore, had fifty-four slaves employed at his forge in King and Queen County, including thirty-three men and twenty-one women. The labor pattern at Moore's forge is indicative of the sexual division of labor prevalent on most colonial iron plantations. The men at Moore's Forge held all the skilled occupations, such as forgeman, finer, hammerman, chafferyman, carpenter, cooper, collier, and blacksmith, while the women worked in essential but ancillary positions like housekeeping, field work, and childcare.[183]

John Tayloe I died in 1747, leaving his son John Tayloe II over 20,000 acres of land in Virginia and Maryland. These lands included a successful ironworks, an infant shipbuilding enterprise, four water-powered grist mills, and at least one regularly patronized smith's shop. When he died, John Tayloe I was a well known merchant's agent, a dealer in slaves, a member

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[180] Kulikoff, *Tobacco and Slaves*, 68, 70, 355-356; John Tayloe Estate Inventory, TFP, VHS.
[181] John Tayloe Estate Inventory, TFP, VHS; Charles Chiswell quoted in Robbins, *The Principio Company*, 11-92; Colonel William Byrd, "A Progress to the Mines, In the Year 1732," *The Writings of William Byrd of Westover in Virginia*, edited by John S. Bassett (New York: Burt Franklin, 1970), p. 352; Ronald L. Lewis, "Slavery on Chesapeake Iron Plantations Before the American Revolution," *Journal of Negro History* 59 (1974), p. 243.
[182] John Tayloe Estate Inventory, TFP, VHS; Charles Chiswell quoted in Robbins, *The Principio Company*, 40-56; William Byrd, "A Progress to the Mines," 351-2.
[183] Lewis, "Slavery on Chesapeake Iron Plantations," 242-3.

of the colonial government, and one of the wealthiest men in the colony. He lived in a large Georgian style plantation mansion complete with the latest furnishings and adornments. The mansion had a minimum of ten rooms as well as a detached Counting House (office) and Kitchen. A full contingent of slaves tended to the family's every need. They ate off the latest Chinese porcelain and white salt-glazed stoneware dishes, used silver knives and forks, drank tea, wine and brandy, and flavored their food with a variety of expensive spices and seasonings. Each year, the Tayloe family purchased the latest fashions and possessed an extensive of wardrobe, like linen and silk dresses, suits, and "fashionable petticoats" for his wife and the "6 shirts, 3 handsome fashionable neck cloths, hose for summer wear, silk coat lined with silk, [and a] black silk waistcoat and britches," which Tayloe I purchased for himself for one year's use.[184] He was an avid reader and owned an extensive collection of history, oratory, and literature books which later formed the foundation of an impressive family library.[185] All of these things were bequeathed to his son.

As with his father, John Tayloe II assumed control of the family's fortune at an unstable economic time. Along with tobacco production, a successful planter needed to experiment with new crops and invest in non-agricultural enterprises to insure financial security.[186] Tayloe II learned from his father's experience, confident that entrepreneurialism could provide the foundation for economic success. From the extensive foundation Tayloe II inherited from his

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[184] Stephen Loyde and John Tayloe Account Book, 1708-1778, TFP, VHS, 1:2, 65, 107; John Tayloe Estate Inventory, TFP, VHS. A counting house, or compting house, literally is the building, room, office or suite in which a business firm carries on operations, particularly accounting. The term is British in origin and is primarily used in the context of the 19th century or earlier periods.

[185] John Tayloe I Book Collection, Special Collections and Rare Books, Earl Gregg Swem Library, The College of William and Mary.

[186] The problem was largely overproduction, but inflated consumer prices, depreciated currency, and limited credit combined to reduce production and exportation during the era. For more on this situation, see T.H. Breen, *Tobacco Culture: The Mentality of the Great Tidewater Planters on the Eve of Revolution* (Princeton, 1985), 204-210; McCusker and Menard, *The Economy of British America*, 361; John T. Schlotterbeck, "Plantation and Farm: Social and Economic Change in Orange and Green Counties, Virginia, 1716-1860," unpublished dissertation, Johns Hopkins University, 1980, 1-2; Morton, *Robert Carter of Nomini Hall*, 131, 164.

father, he built an even larger and more diversified estate, unlike some of his contemporaries who were content to just maintain the standard of comfort provided by their fathers.[187]

John Tayloe II was a planter businessman. He saw no contradiction between land speculation, agricultural activities, and industrial pursuits. If one venture was not working, Tayloe would just switch to another or some combination of activities. Industrial ventures were the center of John Tayloe II financial system. He inherited one ironworks, and quickly expanded into other forges and furnaces. Because he needed to move large quantities of materials to and from his ironworks, Tayloe began another shipbuilding operation. But his activities were not limited to augmenting his iron operation. He regularly invested in a variety of different business schemes, and joined several times with other prominent planters in partnerships promoting new business or industrial activities. He speculated in large tracts of land, which he profitably rented or resold. He established a subdivided manor that provided him with regular rental income throughout his life. He built lumber and grist mills, and added to his income through sales and tolls.[188] Tayloe II established an assortment of profitable small craft industries on his plantations, including clocksmithing, cloth making, shoemaking, fishing, blacksmithing, and distilling.

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[187] Some historians characterized John Tayloe II's generation of planters as merely maintaining and preserving wealth they inherited without contributing anything new to their estates or to society at large. These scholars have largely overlooked the entrepreneurial and business activities of the colonial planter class. See Thomas M. Doerflinger, A *Vigorous Spirit of Enterprise: Merchants and Economic Development in Revolutionary Philadelphia* (Chapel Hill, 1986), 184; Jean B. Russo, "A Model Planter: Edward Lloyd IV of Maryland, 1770-1796 *WMQ* 3rd Ser., 49 (January 1992), 62; William H. Siener, "Economic Development in revolutionary Virginia: Fredericksburg, 1750-1810," unpublished dissertation, The College of William Mary, 1982. Edwin Perkins makes a useful distinction between "entrepreneurs" and "maintainers." The former "were individuals willing to risk the expenditure of capital and labor in an effort to increase their income levels over the long run and to accumulate greater property and wealth" while the latter's "primary aim . . . was to maintain the status quo in their living standards rather than to enhance them." Perkins characterized most members of the planter class as entrepreneurs. Edwin Perkins, "The Entrepreneurial Spirit in Colonial America: The Foundations of Modern Business History," *Business History Review* 63(1) (Spring 1989), 164, 169-170, 176-177. For other definitions of entrepreneurialism, see Rudolf Braun, "The Rise of a Rural Class of Entrepreneurs," *Journal of World History* 10 (1967), 557; Jay R. Mandle, "The Plantation Economy: An Essay in Definition," *Science and Society* 36 (Spring 1972), 59-61; Land, *Bases of the Plantation Society*, 99-101; Robert Gallman, "Slavery and Southern Economic Growth," *Southern Economic Journal* XLV (1979), 1018.

[188] Mill owners were permitted by law to charge their customers a fee or toll for grinding their grain. See Hening, ed., *The Statutes at Large*, 1:301-348.

Neighbors regularly patronized his various craft and industrial services, but shoemaking and blacksmithing were the most successful. Mount Airy, Tayloe's plantation in Richmond County, served as blacksmithing and shoemaking center for county, the developing town of Richmond, and the surrounding region.

In order to expand the resources of his business and in keeping with actions of other planters of his generation, John Tayloe II was actively involved in Virginian politics. While he dominated county politics, Tayloe's most significant political activities involved the colonial government. He served as a burgess from Richmond County. This position brought him into an alliance with Edmund Jennings, who, in conjunction with his various London contacts, had done some maneuvering "To get…[Tayloe II] appointed one of his Majesties Council in Virginia," which succeeded in 1756.[189] Tayloe held these positions consecutively for over two decades, as well as a variety of internal positions such as a Minister of the Oath of Allegiance and Receiver General.[190] Political positions let Tayloe make important social connections, influence legislation, and seize financial opportunities required of any successful planter businessman. One key advantage of being a member of the government was that he was able to renew advantageous legislation providing abatements on port duties and other fees on iron imported from outside Virginia during the 1750s.[191] By the 1770s, Tayloe's industrial ventures, political activities, and other entrepreneurial activities made him one of the fifteen wealthiest men in Virginia.

While politics gave Tayloe II a means to protect and expand his various economic activities, nothing was possible with out slave labor. The Tayloe family owned large numbers of slaves, and they were integral to the family's success in diversification. John Tayloe I founded

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[189] Edmund Jennings II to Coll. Tayloe, 1756, Edmund Jennings letter book, p. 179-180, Virginia Historical Society.
[190] *Executive Journals*, 6:229; John Pendleton Kennedy, *Journals of the House of Burgesses of Virginia* (Richmond, 1915), 1766-1769 volume.
[191] *Executive Journals*, 4:433; William P. Palmer, *Calendar of Virginia State papers and Other Manuscripts* (New York, 1968), 38: 387. See also Braum, "The Rise of a Rural Class of Entrepreneurs," 554.

the Neabsco Ironworks with slave labor, and it eventually employed 100 slave ironworkers.[192] When Tayloe II took over, his iron works and other activities were dependent upon the skills and know-how of slaves.

As Tayloe family began diversifying their agricultural endeavors, they found they were better able to channel energy and resources into other business opportunities largely due to the skills and abilities of their slave population. Of Tayloe family's 500 slaves, more than two thirds labored outside of agricultural endeavors by the 1770s.[193] Both men and women performed vital functions for the Tayloe family. As early as 1747, forty women worked at Neabsco and the family's Maryland iron ore mine banks, while twenty-four labored at the Occoquan Iron Works by 1770. Slave men worked as founders, furnace keepers, fillers, blacksmiths, millers, colliers, miners, woodcutters, carpenters, and skippers, while slave women worked as spinners, weavers, cooks, laundresses, dairy maids, and domestics.[194] As of 1750, Neabsco had nearly 100 slave workers, most of which Tayloe II inherited.

Building Occoquan himself during the 1750s and 1760s, Tayloe established the labor force while the iron works was being put into operation. In 1755 and 1756, he purchased two ironmongers named Tom and Jack, plus fourteen other slaves whose names were not mentioned. Between 1758 and 1760, he added another twenty-three slaves, and also began hiring three to

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[192] John Tayloe I Estate Inventory, TFP, VHS.

[193] Occoquan Inventory; John Tayloe I Estate Inventory. TFP, VHS. While no inventories exist for the ironworks in the eighteenth century that designate slave occupations, several nineteenth century inventories are informative regarding slave occupations and the sexual division of labor at the ironworks. See "Working Hands Belonging to Neabsco," 1824, TFP, VHS, 27:773; 1825 Neabsco Inventory, TFP, VHS, 6:396. See also, Robbins, *The Principio Company*, 91-92; Charles B. Dew, "David Ross and the Oxford Iron Works: A Study of Industrial Slavery in the Early Nineteenth-Century South," *WMQ* 3rd Ser., 31 (April 1974), 195; Samuel Sydney Bradford, "The Negro Ironworker in Antebellum Manufacturing," *Journal of Southern History* 25 (May 1959), 194-195.

[194] Occoquan Inventory; John Tayloe I Estate Inventory, TFP, VHS. While no inventories exist for the ironworks in the eighteenth century that designate slave occupations, several nineteenth century inventories are informative regarding slave occupations and the sexual division of labor at the ironworks. See "Working Hands Belonging to Neabsco," 1824, TFP, VHS, 27:773; 1825 Neabsco Inventory, TFP, VHS, 6:396. See also, Robbins, *The Principio Company*, 91-92; Dew, "David Ross and the Oxford Iron Works," 195; Bradford, "The Negro Ironworker," 194-195.

five other slaves each year from nearby slaveholders for seasonal work. When Occoquan was inventoried after Presley Thornton's death in 1771, there were sixty-nine slave men, women, and children living and working at the iron works.[195] William Lawson, clerk at Neabsco during the late-1770s, recalled that slaves labored on the iron plantation in every skilled and semi-skilled capacity:

> [F]ourteen Wood cutters besides white men hired at different time, Six colliers and a hire[d] Overseer--five blacksmiths[,] two ship Carpenters, two house carpenters, two Wheelwrights, two Coopers, two shoemakers, one tanner[,] three house carpenters, a grist Mill kept by a Negro, a Merchant Mill kept by a hired Miller and a Negro, two horse teams and One ox team drove by negroes, six or eight hands employed in Manufacturing Cloth and linen . . . [and] a Schooner navigated by five hands. . . . [plus] hands [that] were employed at the Mine bank in digging ore, hauling it to the landing and working the plantation there.[196]

Iron plantations were not the only economic activity which slaves labored upon for Tayloe II. Many slaves worked on the various Rappahannock lands, the center of Tayloe's agricultural activities, and they increasingly worked in a variety of other plantation industries. By the 1770s, Tayloe's main plantation, Mt. Airy, hosted slave operated milling, shoemaking, cloth making, and blacksmithing businesses. Various types of grist and lumber mills existed on the Tayloe's lands from at least 1724, when John Tayloe I successfully petitioned to receive one acre of a Mr. Carey's Richmond County land on which to erect a water grist mill.[197] Tayloe II added to these holdings. There were two more at Neabsco, one at Occoquan, and one that Mt. Airy. Tayloe II

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[195] Occoquan Company Accounts, TFP, VHS, 2:186, 196; Presly Thornton Account with John Alexander, February 18, 1759, TFP, VHS, 55: 404; Thomas Lawson's Occoquan Accounts, 1757-1785, File 171; Occoquan Furnace Inventory, Thomas Lawson, Neabsco, to John Tayloe, Christmas Eve, File 171.

[196] William Lawson Deposition, March 11, 1789, File 171, TFP, VHS.

[197] Both Maryland and Virginia passed legislation in the 1660s allowing persons wishing to erect mills to petition for the land of someone who had water access but either did not build a mill himself or refused to sell the land. See Hening's *Statutes*, 2:260-261; Hart, "Maryland Mill Act," 1-2., 7.

purchase of Occoquan in 1756 included a profitable sawmill, and at about 1761 he built a large-scale grist mill, known as merchants mill, at Neabsco.[198]

Although owning slaves was essential for the success of the Tayloe's numerous business operations, their value was twofold. As items of property, slaves possessed marketable value at sale which could be accessed whenever the slave owner had a need, with skilled slaves bringing the highest prices at market. When the estate of Tayloe's business partner Presley Thornton was inventoried in 1771, Occoquan had sixty-nine slave men, women, and children valued at Ł3185.[199] Tayloe owned 100 slaves valued at more than Ł2800 on his Prince William County lands, many of whom probably resided at Neabsco and assisted with some part of the iron making process.[200] His personal domestic slaves were worth more than Ł7000.[201] Unfortunately, these numbers only represent values for slaves whom Tayloe tabulated while he was alive, which only represents a small portion of the slaves he owned. There are no accurate values for the remainder of Tayloe's slave population. Nevertheless, the amount of money Tayloe paid for slave hires can also provide some understanding of the value of slaves. Between 1759 and 1779, Tayloe annually hired three to five slaves from Thomas Lawson for £12.10 each. In 1759, Presley Thornton was paid just over £39 "for the hire of 2 negro carpenters for 9 months."[202]

But the true value of a slave for the owner lies in their production. Slaves owned by John Tayloe II's were the main labor source for all of his business endeavors, whether industrial, agricultural, or some other enterprise. Although Tayloe's enterprises were run by slave labor, it

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[198] Travers Nash deposition, March 1789, file 171; John Ballendine to John Tayloe, May 13, 1756, TFP, VHS, 56: 1034-1035; Occoquan company accounts, TFP, VHS, 2:211; special report by the commissioners, file 171; William Holburne Deposition, August 28, 1798, file 171.
[199] Occoquan Company Accounts, TFP, VHS, 2:186, 196; Presly Thornton Account with John Alexander, February 18, 1759, TFP, VHS, 55: 404; Thomas Lawson's Occoquan Accounts, 1757-1785, File 171; Occoquan Furnace Inventory, Thomas Lawson, Neabsco, to John Tayloe, Christmas Eve, File 171.
[200] Kulikoff, *Tobacco and Slaves*, 68, 70, 355-356; John Tayloe Estate Inventory, TFP, VHS.
[201] William Tayloe Inventory, TFP.
[202] Virginia Gazette, February 9, 1769.

is not always possible to gauge their value to production in every endeavor. Nevertheless, there are three industries Tayloe engaged in that do allow a direct assessment of the value of their production. Those areas are milling, blacksmithing, and iron production.

Tayloe had nearly twenty mills operating on his properties. He preferred mixed mills, which were both gristmills and lumber mills. Operating different types of mills at once allowed Tayloe to extend their use and value beyond the limited season for grinding grain. As long as water was available to power the mill, timber could be sawed into plank for market or into staves for barrels and hogsheads.[203] The volume of business at Tayloe's various mills is difficult to discern since records for these enterprises are incomplete, but one estimate for the Prince William County mills made "not less than between Ł700 & Ł800" in profits during 1774 and 1775.[204] The Landsdown fulling mill regularly sold cloth to Tayloe's neighbors during the 1770s and 1780s. Ralph Wormley, Jr., made seven purchases of "8 yards fine cloth" each in 1776. Richard Parker bought thirty-one yards from Landsdown in 1778, while Mann Page bought 46.5 yards of various types of cloth in 1781 for Ł128.[205]

As his activities at Landsdown suggest, Tayloe II invested in a "Manufactory of Cotton, Wool, & Flax" cloth. He employed a white weaver and fuller (a worker who processed woolen cloth by moistening, heating, and pressing it) to run Landsdown. Between 1777 and 1779, Lawrence McKinney worked as a fuller for Ł36 annually. Otherwise, the mill operated with a full staff of twenty slave weavers and spinners.[206] Tayloe used his cloth making business to provide a service to the surrounding community as well as for his own purposes on the

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[203] McCusker and Menard, The Economy of British America, 323-325; Thomas Berry, "The Rise of Flour Milling in Richmond," *VMHB* 18 (October 1970), 390. All of these authors agree that milling was an industry that required entrepreneurial talent. They define mills as the basis of early industrialization in British America, reinforcing my argument that the North and South were economically, developmentally, and technologically similar before the 1790s.
[204] Thomas Lawson, Neabsco, to John Tayloe, Mt. Airy, September 24, 1775, file 171, TFP, VHS.
[205] John Tayloe Account Book, 1776-1786, TFP, VHS.
[206] John Tayloe, Mt. Airy, to Col. Baylor, August 14, 1770, John Tayloe Papers, VHS.

plantation. In addition to cloth making, a smaller number of slaves at the same location engaged in the subsidiary activity of shoemaking. Tayloe regularly sold shoe thread and shoe leather prepared by his slaves at his plantation Mt. Airy, and Thomas Lawson personally hired the shoemakers on more than one occasion to resole shoes or make leather boots.[207] Despite this small sale of goods, the main value in having his own slaves produce shoes and clothing was in the use of these items on his plantations.

While cloth and shoe production provided items Tayloe needed and whose excess he could sell locally, Tayloe's blacksmithing operation employed several full time slave laborers. The blacksmiths did some work directly for Tayloe, but their work for paying customers regularly provided large profits. Blacksmithing and forging activities were a regular part of slaves' work at the Tayloe's Ironworks and on the Rappahannock farms, but Mt. Airy evolved into the community blacksmithing center as early as 1770s (if not earlier). Small and great planters from surrounding lands in Richmond County regularly patronized Tayloe's shop. The Mt. Airy blacksmiths worked year-round, but tended to be busiest between February and June (see Table 1 below).

[207] John Tayloe Account Book, 1776-1786, TFP, VHS; Document No. 32, File 171.

Table 1

The seasonality & transaction values of Mt. Airy blacksmiths, 1775-1781[208]

Month	# of Transactions	Overall Value in Ł VA. Currency
January	70	31.7.1
February	74	30.6.6
March	66	40.18.8
April	82	48.18.0
May	100	43.8.7
June	87	36.11.8
July	57	19.5.10
August	34	13.12.5
September	46	20.5.6
October	35	57.11.3
November	40	29.15.4
December	38	17.2.11
Not specified	15	55.15.7

Tayloe's slave blacksmiths were talented craftsman. Records indicate they performed basic tool making or paring services as well as more intricate work on looms, chariots, guns, and cotton gins. They made and/or repaired tools, such as hoes, axes, saws, shovels, files, chisels, wedges, spades, pitchforks, scythes, wheat fans, and irons; but they also made weapons such as tomahawks and bayonets, mended or made cast hollowware items, or performed millwork.[209] Mostly, they spent their time making and repairing plows and other agricultural tools, or shoeing horses (see Table 2). From 1775 to 1781, eighty-six customers employed Tayloe's blacksmiths at Mt. Airy. The patrons ranged from tenants and small farmers—like Garland and Beale—to the

[208] Tayloe's blacksmithing activities at Mt. Airy comes from the John Tayloe Account Book, 1776-1786, TFP, VHS.
[209] George Washington's smiths shop, which operated from approximately 1755 to 1798, similarly served as a community blacksmithing center in which slave blacksmiths performed many of these same activities. See Dennis J. Pogue, "Blacksmithing at George Washington's Mount Vernon," Northern Neck of Virginia Historical Magazine 46(1) (December 1996), 5379-5381.

wealthiest families in Virginia—Lees, Carters, and Pages. Regardless of social standing, Tayloe's neighbors were his most regular customers.[210]

Most of the blacksmithing services Tayloe's slaves provided cost less than Ł1 Virginia currency, so the value of running a shop did not come from individual service, but rather in serving a large quantity of customers. The best fiscal year at Tayloe's shop was 1778, when it provided Ł126.17.9 worth of services. The average value of a transaction for that year was about 18 shillings. Yet since the only cost was the labor time of slaves, most of the annual income was profit, with only a small deduction for the cost of materials. Tayloe's blacksmiths did make more than just a few shillings per job though, charging about two shillings to shoe a horse and from two shillings to Ł1 to mend a plow, depending on the amount of iron required. Some tasks were more intricate, time consuming, and costly. Work such as the making of intricate pieces like buckles, blocks, nuts and screws, or the various parts on carriages and carts usually cost more than Ł1 per job. As a result, the Mt. Airy blacksmith shop was able to provide a regular annual income.

[210] Tayloe's adjacent and nearby neighbors frequented his shops more than anyone else. William Brockenbrough utilized the Mt. Airy blacksmiths more than eighty times in two years, 1776 and 1777, spending Ł26.13.6 Virginia currency. John Belfield did fourteen times from 1776 to 1778for Ł3.19.2; the Beale family did thirty times from 1775 to1779 for Ł44.10.1; Moore Faultenroy spent Ł37.15.1 during the same time and the Carter family spent Ł10.11.6; Richard Neale purchased Ł5.6 worth of services in thirty visits, while Lindsy Opie spent Ł7.16.6 for eleven jobs between 1776 and 1779; and finally, the Garland family patronized the Mt. Airy smith shop 88 times in four years, spending Ł88.12.11. See, John Tayloe Account Book, 1776-1786, TFP.

Table 2

Frequency of blacksmithing activities at Mt. Airy, 1773, 1775-1781[211]

Activity	Frequency
Making, repairing plows	239
Making, repairing various tools	144
Shoeing horses	86
Making, repairing hoes	70
Making, repairing axes	42
Repairing chariot parts	39
Mending locks	28
Making nails	24
Making looms & spinning wheel parts	18
Repairing carts, cart parts	18
Making, repairing pot hooks	11
Repairing gun parts	10
Making, repairing keys	9
Making, repairing fire shovels & tongs	8
Making, tomahawks	7
Mending frying pans	6
Mill work	6
Making, repairing bayonets	5
Making cask hoops	4
Making, repairing hollowware	3
Repairing cotton gin parts	3
Mending candlesticks	2
Work on a coffin	1

Although the mills and the Mt. Airy blacksmith shop provided sizeable incomes to Tayloe, nothing compared to the profits accrued from his iron works and furnaces. Both the Neabsco and Occoquan Furnaces produced large quantities of pig iron for market. Existing receipts and accounts for one forge between 1756 and 1774 indicate that Tayloe sold bar iron to local planters and British merchants.[212] He consigned his iron to at least nineteen different

[211] Tayloe's blacksmithing activities at Mt. Airy comes from the John Tayloe Account Book, 1776-1786, TFP, VHS.
[212] Occoquan Company Accounts, TFP, VHS, 2: 186, 196, 212; Handman Lancaster Accounts in John Tayloe II Account Book, 1749-1768; Receipts, TFP, VHS, 56: 394, 400.

merchants during the period, but the most regularly trusted London merchants were James Buchanan, John Backhouse, James Russell, Robert Allason, John Stewart, and John Jordan. Occasionally, he consigned his iron to merchants in Bristol, Liverpool, Dublin, and Glasgow, but only if he could get better prices. As a precaution against ship wrecks and piracy, Tayloe divided his iron shipments between as many as fourteen ships each season, ensuring that most of the iron would arrive safely in England. Tayloe often marketed tobacco and iron together, which was an advantageous arrangement for the ship captain since he could use the iron as ballast and fill the cargo hold with tobacco. Due to weight, it was impossible to fill an entire ship with iron. Nevertheless, Tayloe required merchants to take both of his products as a prerequisite for doing business, stating "[M]y Tob[acc]o hitherto, so it ever shall, command fr[eigh]t for my Iron. I consider the advantage of Iron ballast to my Tobacco loaded ship. . . is greatly superior to any expense . . . . therefore upon the whole I will not ship Tob[acc]o in any Ship whose Owner disputes taking Iron freight free, as usual."[213]

The prices Tayloe received for his iron fluctuated from year to year and the price of iron often coincided with depressions in Virginia's tobacco economy. When the price of tobacco increased, Tayloe was able to secure the highest prices for his iron and vice versa.[214] The highest amount Tayloe's iron commanded was Ł7.12.10 per ton in 1759, while the lowest prices ranged from Ł3 to Ł4 per ton during the period between 1758 and 1760. In the course of his life, Tayloe

[213] John Tayloe, Mt. Airy, Virginia, to William Lee, Merchant at London, June 12, 1771, William Lee Papers, VHS. By 1772, Tayloe and Russell had apparently come to some agreement, as Tayloe was again shipping his tobacco and iron to Russell.

[214] Kulikoff, Tobacco and Slaves, 119; McCusker and Menard, The Economy of British America, 62-63, 121; Ronald Hoffman, A Spirit of Dissension: Economics, Politics, and the Revolution in Maryland (Baltimore, 1973), 18.

Table 3
Tayloe's Average price per ton, in Pounds Sterling, received for Pig iron, 1754-1774.[215]

Year	Ł	Year	Ł	Year	Ł	Year	Ł
1754	5.17.0	1760	5.0.0	1765	5.7.0	1770	6.9.0
1755	6.3.0	1761	4.10.0	1766	5.11.0	1771	--
1756	6.12.0	1762	5.11.0	1767	6.0.0	1772	5.14.0
1757	6.6.0	1763	6.14.0	1768	6.11.0	1773	5.14.0
1758	4.7.0	1764	5.12.0	1769	6.4.0	1774	4.10.0
1759	4.10.0						
5 year average	5.16.9		5.10.0		6.1.0		5.11.9

averaged Ł5 to Ł6.1 sterling per ton for his pig iron (see Table 3 above). Since iron prices fluctuated with tobacco, it was an important protection against the uncertainties of the tobacco economy and insured a higher return than tobacco alone.[216] When his tobacco brought only Ł4.16.10 per hogshead in 1763, he still got Ł6.14.6 per ton for pig iron, making his total return for the two commodities at about Ł1957 (see table 4).

Despite the fact that iron production clearly augmented Tayloe's tobacco profits, the real question was whether or not the activity was profitable. To determine the profitability of the endeavor, it would be necessary to deduct the costs of production and marketing of the material. In 1756, Tayloe produced 417 tons of pig iron, which he consigned to two London merchants for Ł6.12 per ton or Ł2549.5.1 in total. Since Tayloe's records are incomplete, it is difficult to assess his production and marketing costs for that year. But his expenses are probably comparable to

[215] Although the accounts for this period are incomplete, they are the most detailed records available for John Tayloe II's industrial activities. See, Account Books, TFP, VHS. The prices Tayloe received for pig iron during the period are equal with those of other ironworks. From 1728 to 1760, Charles Chiswell and Alexander Spotswood made 800 tons of pig iron per year which they sold for Ł6 sterling per ton. See, William Byrd II, "Progress to the Mines," in Louis B. Wright,, ed., *Prose Works: Narrative of a Colonial Virginian* (Cambridge, 1966), 347-348. The Baltimore Company of Maryland produced 500 tons annually and sold it for Ł8 sterling per ton. See, Johnson, "Baltimore Company," 47; Johnson, "Genesis of the Baltimore Company," 157, 169-170.
[216] See McCusker and Menard, *The Economy of British America*, 119, 126-127, for a discussion of motivation for and the impact of diversification on the tobacco economy.

other industrialists. Charles Carroll's Baltimore Company expenses for 1751 cost Ł1715 to make Ł2324, leaving him a profit of over Ł600.[217] If Tayloe had relatively similar shipping and production expenses in 1756, it would have cost him around Ł1715 to make Ł2549, leaving him a profit of nearly Ł1000 from his iron works alone.

The profitability of the ironworks allowed Tayloe to expand his activities and diversify into new enterprises. For one, Tayloe expanded his activities already in existence as well as diversified into new enterprises. Tayloe invested in another ironworks in 1755.[218] In 1758 and 1759, he invested in a trans-Atlantic shipping vessel in partnership with a London merchant. While this was not likely a high-volume business, Tayloe probably made some money from the higher prices he could charge at the stores since his workers had no choice but to patronize since it was also the location where they were paid. In 1761, he opened a retail store, renewed his shipbuilding activity, expanded his ore banks, and built a new merchant mill. In 1765, he tried to buy lands for "a scheme to make salt, . . . oil of Tar, and fish oil," although Princess Anne County residents blocked the venture on the grounds that the lands included "a common fishing hole."[219] In 1770, he rented out his Maryland ore banks for nine years for a total of £315 in the hope it would increase the value of the lands. And finally, he erected a new mill at Neabsco in 1771 to replace an older one.[220] No matter what he got involved in, Tayloe sought to maximize his profits to their fullest extent.

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[217] Keach Johnson, "Genesis of the Baltimore Company," Journal of Southern History 19 (May 1953), 56-58. In 1751, Carroll sold 376 tons of pig iron to London and Bristol merchants, and received Ł2324.10.2, or about Ł6.3 per ton. Since it cost Ł3.2.3 to make a ton of Baltimore pig iron, Carroll's production cost for 376 tons was Ł1170.6. If you include freight, wharf fees, insurance, commissions, and other shipping charges, then it cost Carroll about Ł545 to sell his pig iron.
[218] Travers Nash Deposition, March 1789, File 171.
[219] John Wadman Petition, 1771, VHS.
[220] Thomas Lawson, Neabsco, to John Tayloe, December 2, 1771, File 171.

Table 4
A Comparison of Tayloe Family Tobacco and Iron Production, 1751-1774[221]

Year	Hogsheads of Tobacco	Ł Sterling Received	Tons of Pig Iron	Ł Sterling Received
1751	45	27	-	-
1752	53	303	-	-
1753	59	246	-	-
1754	97	430	109	657
1755	101.5	781	40.5	256
1756	75.5	626	416.5	2549
1757	50*	478	124	706
1758	194*	865	281*	1049
1759	89*	654	450*	2343
1760	125	986	258*	1112
1761	127*	932	110.5	566
1762	129	635	289	1617
1763	153*	712	214*	1245
1764	119	696	60	338
1765	60	517	24*	97
1766	75	540	129*	667
1767	42	320	67*	603^
1768	36	292	35*	179^
1769	64*	606	93*	550
1770	23	204	54	325
1771	28	198	0	0
1772	47*	115	120*	365
1773	19	94	76*	167
1774	12*	0	40*	20

* Portion of annual amount lost at sea.
^ No value recorded for portion of exports, or value listed without tonnage figures.

In 1779, John Tayloe II died. For more than four decades, he had constructed a multi-faceted industrial complex out of a few rural iron furnaces. Altogether, Tayloe founded and managed two furnaces, a forge, several profitable mills, an active shipbuilding enterprise, as well as merchant and landlord investments—creating an extremely valuable and profitable estate. One

[221] These figures are drawn from John Tayloe II Account Book, 1749-1768, TFP, VHS, 2: 179-214; John Tayloe II Ledger, 1747-1787, LOV; Accounts, Bonds, Orders, 1756-1762, TFP, VHS, 56: 392-427; John Tayloe II Account Book, 1770-1776, TFP, VHS; and, Thomas Lawson's Occoquan Accounts, 1757-1785, File 171.

of his iron works, The Occoquan Company, was valued at over £20,000 while his total land holdings in Prince William County were worth at least £45,000. These industrial activities allowed John Tayloe II to break his dependence on the fluctuations of the tobacco market, proving that colonial planters understood the potential of economic diversification as well as entrepreneurialism. John Tayloe II expanded the estate he received from his father—3,000 acres and 21 slaves—to an impressive one of over 20,000 acres and 327 slaves. At his death, the Tayloe family estate was worth somewhere between Ł30,000 to Ł40,000.

John Tayloe II left the entire fortune to his son, John Tayloe III. Only eight years old at the time of his father's death, the youngest Tayloe would not be involved in the family's numerous enterprises until the 1790s. When he did take over the family business, John Tayloe III found himself in the same situation as his father and grandfather before him. The economy of the Chesapeake region had been turned upside down. Because of turmoil caused by the American Revolution, tobacco could not be relied upon for long term financial security. Once again, a member of the Tayloe family found that a successful planter needed to experiment with new crops and invest in non-agricultural enterprises to insure financial security.[222]

John Tayloe III engaged in many new activities in search of financial solvency. The activities characterizing the financial strategy of Tayloe III varied a great deal, but included investments in city lots, horses, banks, internal improvements, transportation lines, and hotels and taverns as well as expanding the various endeavors of his father, like iron production and

[222] The market in tobacco did return after the war, but the American tobacco colonies no longer received the many benefits and protections formerly available to them from Great Britain. Inflated consumer prices, depreciated currency, limited credit, the republican distrust of debt, and British indignation combined to reduce production and exportation during the post-revolutionary era. For more on this situation, see Breen, *Tobacco Culture*, 204-210; Russo, "A Model Planter," 67; McCusker and Menard, *The Economy of British America*, 361; Gerald W. Mullin, *Flight and Rebellion: Slave Resistance in Eighteenth Century Virginia* (London, 1972), 125-126; John T. Schlotterbeck, "Plantation and Farm: Social and Economic Change in Orange and Green Counties, Virginia, 1716-1860," unpublished dissertation, Johns Hopkins University, 1980, 1-2; Morton, *Robert Carter of Nomini Hall*, 131, 164.

multi-use mill operations. He enlarged his estates, advantageously cultivated a variety of grains, and expanded profitable plantation industries like fishing, blacksmithing, shoemaking, and cloth making. For John Tayloe III and many of his contemporaries, non-agricultural business activities were more important than agricultural ones.

As soon as his sons were old enough to run their own businesses, Tayloe III turned over management responsibilities to them, keeping a share of the profits for himself. Moving to his city house in Washington (DC), Tayloe completed the shift from tobacco to grain and non-agricultural activities that had been initiated by his father while turning to the symbolic new business of building and expanding the urban areas of Washington. Tayloe's interest in city life was partly personal and partly based on considerations of business. His wife was from Baltimore, where her father built the city into the economic hub of Maryland. Thus, Tayloe's cosmopolitan upbringing in Britain paired with his wife's connections cemented their interest in politics and economic opportunities, as well as the social and cultural events found in urban areas. As we have already seen, Tayloe's first and most entrepreneurial use of industrial profits was the building of his mansion, The Octagon, in the fledgling federal city before it was clear the government would remain in its new home.

Besides the decision to leave the plantation and move to Washington, Tayloe III also differed from his forefathers in his business interests. He continued the tradition of iron production, making a huge investment in 1810 in two western iron plantations, Cloverdale Furnace and Brunswick Forge, in Botetourt County, including 4523 acres, valued at more than £21,900 Virginia Currency.[223] But his true business acumen seemed to be the ability to identify unproductive endeavors in his estates and sell them for a profit. As a result, most of the first

[223] Botetourt County Deed Book 19:179, 205, 208; TFP, VHS, 5:647. By 1817, Cloverdale's appraised value was $112,595, not including the Brunswick Forge, Martha's Furnace, or the Slitting Mill.

decisions when he took over the family estates were the selling off of unproductive and underutilized business ventures.[224] Much of this activity revolved around sizable land sales, especially lands associated with the Neabsco and Occoquan Ironworks in Prince William County, which had experienced measurable production cuts due to resource depletion and competition from the developing western iron industry (of which Tayloe was an active participant). Once his western works were well under operation, Tayloe sold over 2500 acres of his Prince William County holdings between 1793 and 1813, decreasing the older ironworks by over a quarter. As Cloverdale and Brunswick became more productive, Tayloe sold off another 3900 acres.[225]

Tayloe III shifted his agricultural production considerably by cultivating hundreds of pounds of wool and cotton each year, which provided the raw materials for a group of slave spinners he purchased and put to work at Mt. Airy. Tayloe's spinners turned the unprocessed cotton and wool fibers into thread or yarn, which was then made into cloth by an equal number of slave weavers. Tayloe also had two ginners, Sam and Cato, who assisted with the processing of cotton by passing it through a "Cotton Machine" Tayloe purchased for £15 in 1805.[226] This machine separated the usable fibers from the seeds; greatly accelerating the speed it took slaves could clean the cotton.[227] Each of Tayloe III's spinners produced between one and two pounds of cotton thread each week during 1805. Wool was easier to work, since the spinners produced an

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[224] Gustavus Scott to John Tayloe, April 9, 1797, TFP, VHS; Jonah Thomson and Richard Veich to John Tayloe, January 21, 1803, District of Columbia Land Court Records, 1806 Deed, Liber O, Vol. 14, Document 9, p. 385/287; Richmond County Deed Book 18:334, 19:179, 205, TFP, VHS, 5:604, 614-615; Henry Lee to John Tayloe, August 31, 1807, District of Columbia Land Court Records, 1807 Deed, Liber S, Vol. 18, Document 13, p. 152/124; 1756-1799 Legal Documents, Letter Box 1, Folder 1, Tayloe Family Papers, UVA, 38-630; James McCormick to John Tayloe, August 17, 1811, District of Columbia Land Court Records, 1811 Deed, Liber AB, Vol. 27, Document 18, p. 93/76; Prince William County Deed Liber 5:270, 283; Charles Glover and Richard Forrest to John Tayloe, November 10, 1815, District of Columbia Land Court Records,, 1815 Deed, Liber AK, Vol. 35, Document 22, p. 120/93.

[225] Prince William County Deed Liber Y: 484, 618, 621, 623, 732, Z: 112, I:57, 2:306, 4:88, 5:189, 781, 799, 11:258, 352, 369, 513; TFP, VHS, 5:602, 751-752, 762.

[226] John Tayloe III Account Book, 1805-1812, TFP, VHS, 1:185.

[227] Spinning and Weaving Accounts, John Tayloe III Account Book, 1805-1806, TFP, VHS.

average of four and one-half pounds a week. The weavers collectively produced an average of eleven and one-half pounds of cotton cloth per week in summer and an average between fifteen and twenty pounds of wool cloth per week in winter. Much of the cloth manufactured by Tayloe's slaves was made into clothes that were sold to his neighbors or at the local market. In 1827, he instructed his manager Benjamin Boughton to "push the spinning & weaving . . . you must try to make enough to pay my every debt."[228]

In a related industry, Tayloe also employed his Mt. Airy slaves at shoe making. Joe, Ruffin, and Joe Big spent much of their working lives producing custom-made shoes for Tayloe's slave population as well as work shoes sold to neighborhood customers.[229] The Mt. Airy shoemakers made, repaired, and sold a variety of shoes. In one week in February of 1806, they made four pairs of women's and men's shoes, three pairs of boots, and mended two other pairs of shoes. During another week in September of 1813, they mended two sets of shoes and crafted five pairs of men's shoes, three pairs of women's shoes, and six pairs of boots. The cost depended on style, workmanship, and shoe size.[230] From June of 1816 to November of 1817, the shoemakers earned Tayloe III over $150.[231]

Shipbuilding was one of the few industrial activities his father toyed with that Tayloe III expanded into his own endeavor. Operating at the old Occoquan Ironworks, the ship builders produced several vessels per year and quickly became one of his most profitable enterprises. Tayloe's shipbuilding activities had two main advantages—it provided him with transportation as well as an extra source of income. In 1801, Tayloe offered a newly built brig to some of his merchant associates in Baltimore, saying "I have a remarkably fine Hull of a Brig for Sale—just

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[228] John Tayloe III to Benjamin Bougton, no date [April 18, 1827], TFP, VHS, 5:257-258.
[229] Mt. Airy Inventory, 1808, TFP, VHS.
[230] John Tayloe III Account Book, 1805-1806, TFP, VHS, 1:2-3; John Tayloe III Account Book, 1810-1814, TFP, VHS, 1, 343.
[231] John Tayloe III Account Book, 1816-1817, TFP, VHS.

launched in Occoquan of 160 Tons--& built of the very best materials."[232] Tayloe's asking price was a mere $4000; more than four times the cost of construction. In June of 1801, a Fredericksburg merchant agreed to purchase one hundred hogsheads of Tayloe's tobacco which was shipped on one of his own boats from his plantation to the Norfolk market.[233]

Tayloe also reshaped the family estate in another important way. While Tayloe III's records regarding non-staple crops and non-agricultural business activities are consistent and relatively complete, there are few references to tobacco after he returned from London. Before he took over the family businesses in 1790, the estate administrators regularly sold quantities ranging from two to thirty hogsheads to merchants in the Northern Neck.[234] Account records from 1801 prove that Tayloe III continued growing tobacco at several of the plantations, since he sold thirty hogsheads of tobacco of varying quality to William Murdock of London, and another thirty hogsheads to Robert Walker of Fredericksburg.[235] Yet from 1801 to 1819, it was rare for tobacco to be discussed in Tayloe III's accounts. In fact, the last notation for tobacco in his accounts occurred in 1819 when he sent his second son, Benjamin Ogle Tayloe, and a few hogsheads full of a large crops to London to settle debts with London merchant William Murdock. The infrequency of tobacco being mentioned in Tayloe's accounts could reflect several things. For one, Tayloe began to turn over management of his agricultural activities to his sons in June of 1819 and no longer had anything to do with the production of tobacco. It could also reflect the reality that Tayloe was not producing tobacco with the same frequency. Tayloe

[232] William Holburne for John Tayloe III, Mt. Airy, to Benjamin Day, Esq., Fredericksburg, June 8, 1801, June 26, 1801, John Tayloe III Letterbook, May-June 1801, TFP, VHS, 5: 203, 218.
[233] William Holburne for John Tayloe III, Mt. Airy, to Benjamin Day, Esq., Fredericksburg, June 8, 1801, June 26, 1801, John Tayloe III Letterbook, May-June 1801, TFP, VHS, 5: 203, 218.
[234] John Tayloe III Account Book, 1788-1790, TFP, VHS.
[235] John Tayloe III Letterbook, various letters, July 1801, TFP, VHS.

had been actively switching his agricultural production to grains, which were more valuable and also served the needs of his milling businesses.

Tayloe III, like a few others, redefined the identity of the planter class. During the first half of the eighteenth century, Tayloe and men like him were shifting away from being planters to become businessmen. They looked beyond tobacco and other agricultural activities in their pursuit of wealth and social status. Robert "King" Carter suggested this sentiment was developing as early as1728/29 when he said, "I can't expect to see much good from these beginnings [of diversification] in my day[,] but the rising generation I hope will to the great benefit of this poor Country., but the Tayloe family seemed to embody it.[236]

By the time John Tayloe III was running the family finances in the 1790s, he was reputed to have an estate worth more than $75,000. This considerable sum was derived largely from non-agricultural business enterprises. While one historian has characterized John Tayloe III as the quintessential example of a genteel, un-acquisitive Virginia Planter, in reality, Tayloe III, like his father and grandfather, was an accomplish entrepreneur.[237] He continuously modified his business activities to meet the needs of the economy and market. He sold and/or rearranged lands and slave production to maintain profitability. He invested in and/or operated agricultural and industrial enterprises to fill the market demands emerging with the new nation. As a result, he earned the reputation of being the wealthiest man in Virginia and Washington City at the start of

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[236] Robert Carter to Colo. John Tayloe, January 29, 1728/29; Robert Carter Letterbook, 1728-1730, Virginia Historical Society.

[237] Richard Dunn characterized John Tayloe III as a "no profit-maximizing entrepreneur" whose "well-worn fields produced modest yields, his work force was far larger than necessary, and the rhythm of the place evoked leisured gentility rather than business efficiency." See, Richard Dunn, "A Tale of Two Plantations: Slave Life at Mesopotamia in Jamaica and Mount Airy in Virginia, 1799-1828," *WMQ* 3rd Ser., 36 (January 1877), 64. Dunn based his assumption on an analysis of Mt. Airy, but failed to mention that Tayloe no longer resided at Mt. Airy, had turned managerial responsibility of the property over to his sons, and that he was actively engaged in activities other than agricultural production.

nineteenth century.[238] By the time he turned his business activities over to his sons, Tayloe had an annual income from his various agricultural and industrial activities (not including ironworks) ranging between $20,000 and $30,000. His estate in Virginia was valued at almost £100,000, or over $300,000.[239] When the ironworks and various city investments and businesses were included, Tayloe's average yearly income ranged from $40,000 to $60,000.

Clearly, John Tayloe III was the culmination of his father's and grandfather's legacy of attempting to become entrepreneurial businessmen, rather than mere planters. But the struggle of the Tayloes to attain financial security extends beyond one family. The story of the Chesapeake in the eighteenth century is dominated by the efforts of individual planters to offset the diminishing profits they accrued from tobacco.[240] Chesapeake planters knew the tobacco market was subject to a boom and bust cycle, but they were not always successful at avoiding the difficult times. As a group, those of sufficient means tried with varying degrees of success to diversify their agricultural activities in order to soften the blow of low demand, falling prices, lost shipments, and bad weather. Since elites in the Chesapeake region were the most heavily involved in the market, they were the first to diversify their activities in order to soften the impact of market fluctuations, poor crop yields, and other factors beyond their control. Far from participating reluctantly, elite Chesapeake planters realized by the 1700s that production for market—whether of tobacco, grain, iron, or other commodities—was central to their ability to

[238] During his lifetime, it was rumored Tayloe had an annual income of at least $75,000 from his agricultural and non-agricultural activities combined. While this is an impressive figure, it is not possible to calculate its accuracy due to incomplete records and unsettled accounts. See George McCue, "The Octagon, Town House That Proceeded the Town," *Historic Preservation* (April-June 1974), 28; Roberta Love Tayloe, *Return to Powhatan: Growing Up in Old Virginia* (no publisher, 1985), 20.
[239] For example, see the 1809 Mt. Airy Inventory, TFP, 6:316.
[240] Lorena S. Walsh, "Plantation Management in the Chesapeake," *Journal of Economic History* 49 (1989), 394; Richard L. Bushman, "Markets and Composite Farms in Early America," *WMQ* 55:3 (July 1998), 366-369.

sustain a comfortable standard of living, or "competency," over generations.[241] Ultimately, eighteenth century planters were trying to create long-term wealth and social status for their families. Almost all of the Chesapeake's wealthiest planters were also businessmen and entrepreneurs. The greatest wealth went to those individuals who combined their land and slaves to create or engage in the larger opportunities found in commerce and industry.

There were a variety of economic interests that competed with planting. Entrepreneurs of the Chesapeake region engaged in numerous industrial and manufacturing activities to varying degrees of success. Above all things, it is important to recognize that planters did not think that they had to choose between agriculture and business enterprise. Shifts in agricultural production were easier to implement within a largely rural plantation society like the Chesapeake, and far less risky. This meant that elites in the Chesapeake were moving steadily away from a sole dependence on tobacco and toward an economy based in agricultural diversification first and business investment second, with the prize for successful risk-taking and diversification ultimately being increased wealth and social standing.[242]

In that light, the Tayloes still stand out within the world they lived. Tayloe I demonstrated an entrepreneurial spirit, acumen at risk-taking, and a desire to pursue profit when few were willing to break free from the hold tobacco held on the economy.[243] John Tayloe II

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[241] Daniel Vickers, "Competency and Competition: Economic Culture in Early America," *WMQ* 3rd Ser., 47 (1990), 3-4 and *passim*.

[242] For a detailed study of agricultural diversity in Virginia, Maryland, and South Carolina, see Peter V. Bergstrom, "Markets and Merchants: Economic Diversification in Colonial Virginia, 1700-1775," unpublished dissertation, University of New Hampshire, 1980; Chaplin, *Anxious Pursuits*; Gloria Main, *Tobacco Colony: Life in Early Maryland, 1650-1720* (Princeton, 1982); Russell Menard, *Economy and Society and Early Colonial Maryland* (New York, 1985); Earle, *The Evolution of a Tidewater Settlement System*.

[243] The family's propensity for innovation and entrepreneurialism can be found as far back as the London background of William Tayloe the Younger (1645-1710), father of John Tayloe I. For more on this, see Martin H. Quitt, "Immigrant Origins of the Virginia Gentry: A Study of Cultural Transmission and Innovation," *WMQ* 45(4) (October 1988), 629-655. Quitt investigated the backgrounds of several hundred seventh-century Virginia leaders and concluded that their experiences as younger sons and London inhabitants produced an inclination towards innovative attitudes and values. It is likely not a coincidence, then, that several of the families he analyzed later found themselves among the wealthiest one hundred Virginia Planters in the 1780s.

lived during era where tobacco still dominated the economic activity of Chesapeake planter class. Yet he focused his economic activities on land speculation, merchant activities, ironworks, companies promoting industry, and shipbuilding businesses—all this alongside the management of more traditional agricultural interests. John Tayloe III was from a generation who came of age in the years just after the Revolution, and whether they knew it or not they were the last of the great planter-businessmen in the Chesapeake region.

Just as their fathers and grandfathers had before them, men like John Tayloe III lived during a major transition in the economy which was also one for planter elite class identity—the movement towards economic specialization. As the infant republic developed new ideas about manufacturing, industrialization, sectional differences, and slavery, the planter businessmen of the Chesapeake region could no longer play integrated multiple roles, financial success demanded specialization.[244] Increasingly, Chesapeake planters would return to an agricultural focus while businessmen turned their attention to more strictly business and industrial activities—ironworks, mercantile firms, and textile factories et cetera. Newer versions of businesses which had long been a part of the Chesapeake plantation now found a new geographical setting in cities such as Richmond, Norfolk, and Baltimore. While planters had been the most sophisticated businessmen of the colonial era, and most businessmen were members of the planter class, the two roles began to diverge in the early national period. By the middle of the nineteenth century, planters and businessmen pursued separate, specialized interests.[245]

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[244] Walter Licht describes specialization as a nationwide phenomenon during the early-nineteenth century. See, Walter Licht, *Industrializing America: The Nineteenth Century* (Baltimore, 1995), 5, 15, 33.

[245] Fred Bateman as well as other historians found that few manufacturers in the antebellum South were also planters, and only a small number of planters operated any type of industrial enterprise. See, Fred Bateman, James Foust, and Thomas Weiss, "The Participation of Planters in Manufacturing in the Antebellum South," *Agricultural History* 48 (April 1974), 282-288. See also Peter Parish, "The Edges of Slavery in the Old South: Or, Do Exceptions Prove Rules?" *Slavery and Abolition* 4 (2) (1983), 113-117; Angela Lakwete, "A Southern Model of

Many historians, notably John McCusker and Russell Menard, argue that planters sought to diversify their economic activities only when tobacco prices dropped and the economy contracted, then once the economy recovered they cut back or abandoned the new activities.[246] The activities of the Tayloe family challenge that assumption. The numerous activities of the Tayloe family were not depression-induced, and they continued long after the price of tobacco recovered. In Joyce Chaplin's terms, the Tayloe patriarchs were innovators. They were men who always looked for new opportunities to diversify regardless of market conditions.[247] The Tayloes developed most of their new enterprises in the midst of major price spikes in tobacco. Prices reached some of their highest levels in 1720, 1743, 1755, 1760, and 1770—all of which are years when the Tayloes were investing in new ironworks, building mills and other business enterprises.[248] Although some of these new enterprises flourished just as the economy began to recover from a contraction, they frequently initiated the new projects in the midst of economic expansion, not depression.[249]

A final important fact to note is that the Tayloes made long term commitments to their business enterprises and investments. Their involvement with various iron works, the Ohio Company, Occoquan Company, Bristol Company, Kittockton, shipbuilding, as well as milling activities lasted for decades. Perhaps, the Tayloe family's ability to diversify was self-reinforcing. Their success in diversifying and maintaining business activities other than

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Industrialization: The Case of the Antebellum Cotton Gin Manufacturing Industry," research seminar paper #12 presented to the Center for the History of Business, Technology, and Society, March 1998, 6-47; Bradford, "The Negro Ironworker in Antebellum Virginia, *JSH*, *passim*; Lacy Ford, "The Tale of Two Entrepreneurs in the Old South: John Springs III and Hiram Hutchinson of South Carolina Upcountry," *South Carolina Historical Magazine* 95 (July 1994), 201; T. Stephan Whitman, "Industry Slavery at the Margin: The Maryland Chemical Works," *JSH* 59(1)(February 1993), 33; Ronald L. Lewis points out that while southern planters did not often become businessmen, they did often invest in that industrial expansion that did occur. See, Ronald L. Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia*, 1715-1865 (Westport, CT, 1979), 3.

[246] McCusker and Menard, *The Economy of British America*, 126-127.

[247] Chaplin, *An Anxious Pursuit*, 187.

[248] For an analysis of tobacco price drops and spikes, see McCusker and Menard, *The Economy of British America*, 126

[249] Chaplin, *An Anxious Pursuit*, 62-63, 121.

agriculture led them to engage in an even higher level of diversification on their large estates, which in turn made them more profitable. As a result, tobacco was barely an afterthought in the Tayloe family's struggle to maintain financial security by the 1750s. While they continued to produce small quantities of tobacco, it was largely a result of the commodity being the main product of trade requested by English merchants and not because it contributed to their income or overall wealth. For both John Tayloe II and John Tayloe III, tobacco opened the door for them to trade more valuable commodities. Clearly, for the Tayloe family, diversification and business development provided protections against the uncertainties involved with the dependence on tobacco alone, strengthening their ability to withstand economic contractions while helping the economic growth of the Chesapeake as a whole.

Widespread involvement in industrial activities by the wealthiest members of Virginia's elite class must be considered as a contributing factor to the overall wealth of the individuals in question as well as an important aspect of what it meant to be a member of the elite class in Virginia and the rest of Chesapeake society. The Tayloe family offers an excellent example of this very situation. They clearly made their wealth and established themselves socially by participating in industrial activities and not from agricultural pursuits. The Tayloe patriarchs, like many others engaged in industrial and manufacturing ventures, redefined the identity of the planter class. By the time John Tayloe III took control of the family finances in the 1790s, the various operations were reputed to be worth more than $75,000, a sum well beyond the value of even the largest and most productive tobacco plantation. The main reason their business operations became so valuable was that the Tayloes did not limit themselves to one endeavor, but constantly modified their businesses to meet the needs of the economy and market, continuously discarding unprofitable ventures for more profitable ones. As a result of their adaptability, the

Tayloes were one of the wealthiest families in the Chesapeake region at the start of nineteenth century.[250]

It is also important to remember that one crucial aspect to the Tayloe family's success was their ability to manage risk. The decision to engage in industrial ventures, the diversification of their financial investments, and abandonment of tobacco production was a huge risk. It could have resulted in the financial ruination of the various Tayloe patriarchs, as well as their family. In the end, the decision was well founded because the Tayloe patriarchs managed the risks that they took. We shall see in the next chapter that the ability to manage risk successfully was a trait not common to all who tried to engage in industrial activities.

[250] During his lifetime, it was rumored Tayloe III had an annual income of at least $75,000 from his agricultural and non-agricultural activities combined. While this is an impressive figure, it is not possible to calculate its accuracy due to incomplete records and unsettled accounts. By the time he turned his business activities over to his sons, Tayloe had an annual income from his various agricultural and industrial activities (not including ironworks) ranging between $20,000 and $30,000. His estate in Virginia was valued at almost £100,000, or over $300,000. When the ironworks and various city investments and businesses were included, Tayloe's average yearly income ranged from $40,000 to $60,000. See George McCue, "The Octagon, Town House That Proceeded the Town," *Historic Preservation* (April-June 1974), 28; Roberta Love Tayloe, *Return to Powhatan: Growing Up in Old Virginia* (no publisher., 1985), 20.

CHAPTER 3

"Where there is the Least Hindrance":[251] Risk & Industry in the Chesapeake Region

In 1795 George Washington sent a letter to John Jameson to estimate the value of his four quarter shares in the Dismal Swamp Company (DSC).[252] Although he was a founding member of the company in 1763, Washington's interest in the venture had come to a conclusion. Founded to reclaim land from the swamp as the Dismal Swamp Land Company, the DSC morphed into an attempt to build a canal to the Albemarle Sound across the Dismal Swamp. Sadly, the DSC failed to produce profits in any incarnation. From Mount Vernon, Washington wrote to Thomas Newton and John Page in September asking them to estimate the "highest price" he could expect to get for the shares.[253] Much to his dismay, both men said a quarter share was not worth more than £1000 Virginia currency. But if Washington were willing to keep his shares and invest in a new activity, Newton predicted success if they turned the DSC into a lumber extraction operation in the Dismal Swamp.

Although Washington was not convinced the scheme would succeed, the desire to find success by changing the direction of the Dismal Swamp Company toward the extraction of lumber was not going to be too difficult. In 1786 and 1787, the DSC was successfully involved in lumbering. From August 1786 to January 1788, company slaves produced nearly 12,000 shingles per month and received 10 to 12 pounds sterling per thousand shingles when they sold

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[251] Lord Windsor, the Jamaican Governor, made this comment as part of a recommendation to planters to seek free trade wherever it could be found. Such admonitions were issued by the Governors of the Chesapeake colonies, although not as poetically. Lord Windsor, April 8, 1662, *Calendar of State Papers, Colonial Series, America and the West Indies, 1661-1738*, ed. W. Noel Sainsbury, J.W. Fortescue, and Cecil Headlam (1860-1953; rep. London 1964), 5:85.

[252] For more on the DSC or Washington's participation in it, see Charles Royster, *The Fabulous History of the Dismal Swamp Company: A Story of George Washington's Times* (New York: Alfred A. Knopf, 1999).

[253] George Washington to Thomas Newton, Jr., Sept. 23, 1795, George Washington to John Page, Sept. 23, 1795, *Writings of Washington*, ed., Fitzpatrick, XXXIV, 313-314.

them at local markets. Prices for shingles dropped considerably in 1789 to just 6 to 7 pounds sterling per thousand, but company slaves continued to produce between 9,000 and 12,000 shingles per month.[254] Although shingle prices remained low to the end of the 1790's, the DSC continued to employ slaves in shingle production. Throughout the 1790's, the company averaged 9,000 to 13,000 shingles during summer months, when most of the company's activities were directed toward the completion of the canal. During the winter months, work on the canal slackened and the company produced between 14,000 and 21,000 shingles per month.[255] During this period, the DSC had nine slaves—eight men and one boy—hired solely to fell trees and cut shingles.

But more than the ease of making the switch, the biggest reason Newton wanted to make the change was a letter he received from Isaac Sexton. According to Sexton, "the land in a few years will be very valuable far exceeding the present prices or £1000 per share."[256] The company, if it applied "activity," could return profits of at least twenty-five per cent per year.[257] For Newton the chance to make such profits was too appealing. Even more tempting, the source for the claim was difficult to ignore. Isaac Sexton was a partner with John Cowper (a former manager of the DSC) in a lumber business working in Nansemond County. Sexton knew the value of the lumber on the DSC's land because he was busy stealing it. Sexton and his partner previously worked for the Dismal Swamp Company as surveyors for the same area where they were stealing timber. Several years before giving his sage advice to Newton, Sexton tried to propose a deal to clear DSC lands of timber while allowing him to remove white cedar and other

[254] John Driver to David Jameson, June 17, 1787, and September 5, 1789, Letters and Papers, Dismal Swamp Land Company, Series A, *Slavery in the Antebellum Southern Industries*, Microfilm, LVA [Hereafter, the entire series on the Dismal Swamp Land Company will be cited as DSLC Papers].
[255] Account Books, 1793, 1795, 1796, and 1798, DSLC Papers.
[256] Thomas Newton, Jr., to George Washington, Sept. 30, 1795, Papers of George Washington, Library of Congress [Hereafter, cited as LOC]; John Page to George Washington, Oct. 14, 1795, Gratz Collection, Historical Society of Pennsylvania, Philadelphia.
[257] Isaac Sexton to Thomas Newton, Jr., Sept 30, 1795, Papers of George Washington, LOC.

valuable timber. When told that the managers "wished the Land to remain undisturbed," Sexton cut the trees down anyway. John Driver reported: "With the number of hands employed by Mr. Cowper & himself they get a very considerable quantity."[258]

Sexton and Cowper were not novices to illegal timber removal. They developed their method in the 1780s along the North Carolina line in Norfolk County's part of the Dismal Swamp. According to testimony provided by Sexton, the men claimed to have been hired to resurvey William Byrd's dividing line in order to protect prior claims. When pressed, Sexton admitted that they knew the land they surveyed already had a patent for ownership, but he thought earlier titles were not good because the land was not in use. Since use was a patent requirement, Sexton believed he was entitled to resurvey the land and place his own claim. It was a clever ploy, although not necessarily legal. Sexton added "that the soil was not his object, but that the timber was his object, and that he was determined to establish his survey if he could and that if they did sue him, it might so happen that he could get the Timber off first, and then he did not care what became of the Swamp."[259] While Sexton was offering advice to George Washington through Newton, his partner John Cowper was surveying new claims along the western line of the DSC's tract. The two men clearly intended to use Sexton's method of encroachment for timber against the DSC.[260]

The managers of the Dismal Swamp Company tried to stop the predations of Sexton and Cowper on a number of occasions, but the lumbering company operated unabated. Sexton and Cowper's operation employed more than twenty-five slaves full time at lumbering, and it was

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[258] John Driver to David Jameson, July 11, 1791, DSLC Papers.
[259] Deposition of Peter Culpeper, November 15, 1809, *Etting & Wife v. Wilson et all* and *Mordecai v. Wilson et al.*, BR Box 211, Deposition of Peter Culpeper, October 17, 1810, Norfolk County Court, Virginia Court Records, BR, Box 222(21), Henry E. Huntington Library, San Marino, California.
[260] John Cowper did buy some land from John Lewis at £1 per acre in Virginia State Currency. See John Lewis, Deed to John Cowper, May 17, 1791, transcribed in Fillmore Norfleet Papers, Box 13, Library of Virginia [Hereafter, cited as LVA].

estimated by one Dismal Company manager that the culprits were removing timber worth 250 to 500 pounds sterling per month. Late in 1798, Cowper and Sexton had so little concerned about repercussions from their thievery that they built a permanent sawmill run by slaves on the Dismal Company's land along the banks of the Dismal Swamp Canal. Fearing that access to the canal would only increase the timber removal by the interlopers, the Dismal Swamp Company dammed the canal. Despite these efforts, the timber depredations of Cowper and Sexton's company continued for years beyond 1800 and had profit levels exceeding 10,000 pounds sterling per year once they gained access to the inexpensive transportation of the canal.[261] Not surprisingly, both agents and partners of the DSC denounced "that bad man, Sexton."[262] George Washington and Isaac Sexton had a lot in common as investors in manufacturing and extraction industries. Both took a huge risk with their investment, one legally and the other just beyond the law.

Risk, and the way individuals manage the risk involved with their financial endeavors, has a lot to do with the degree of success possible. In the New York merchant community during the colonial period, a direct relationship between successful risk management and new patterns of economic thought developed. Lacking social standing (and therefore credit) to engage in the profitable but extremely risky transatlantic trade, lesser merchants limited their risk by nurturing local links with retailers and consumers in New York City, farmers and middlemen in the hinterland, and customers and suppliers along the northern seaboard and in the Caribbean. The inland economy created additional opportunities for small traders, but it was fraught with risk. While this broke with the pattern of focusing solely on trade with the mother country, a few

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[261] Thomas Shepherd to William Nelson Jr., August 17, 1792, January 13, 1799, December 12, 1800, DSLC Papers; Deposition of Peter Culpeper, November 15, 1809, *Etting & Wife v. Wilson et all*, Deposition of Peter Culpeper, October 17, 1810, Norfolk County Court, Virginia Court Records, DSLC Papers.

[262] Thomas Shepherd to Thomas Swepson, June 30, 1800, Dismal Swamp Land Records, Duke University , Durham, North Carolina.

lesser merchants achieved great wealth, while most went bust. In part, their willingness to take new risks turned out to be detrimental. The prosperous great merchants, meanwhile, concentrated on the more lucrative dry goods trade with London and rarely experience failure. Although prosperous merchants were the most successful and least likely to be unsuccessful, lesser merchants made a key contribution to New York's ideological development by rejecting the dichotomy between free trade and mercantilism in favor of a mercantilism controlled locally rather than in London, and thus they were more responsive to their interests. Unfortunately, studies of New York merchants focus too much of their attention on economic elites and the last politically charged decades of colonial rule, rather than "take a longer view of the colony's international commerce" and consider "an expanding majority of city wholesalers whose interests and material accomplishments lay somewhere between those of eminent wholesalers and the myriad petty producers, sailors, and service workers attached to city commerce." By looking at this expanded period and community, it is possible to uncover "the densely textured activities" of lesser merchants and explain their influence on the development of New York.[263]

A similar situation existed in the Chesapeake region. Historical studies of the region during the Colonial era and the era of the New Republic focus almost exclusively on successful financial activities, whether agricultural or industrial.[264] But, as the example of George

[263] Cathy Mason, Merchants and Empire: Trading in Colonial New York (Baltimore: Johns Hopkins University Press, 1998), p. 2-4.

[264] Historians have often ignored risk in the Chesapeake region business activities. Thomas M. Doerflinger studied the processes by which a high-risk, socially mobile community of merchants created, ultimately, the entrepreneurial leadership necessary to transform the lower Delaware and Chesapeake Bay (above Virginia) areas into one of the primary manufacturing and commercial regions of the Early Republic. According to Doerflinger, banking, colonizing, and land speculation, as well as domestic and then factory-based manufacturing, all grew out of a vigorous market economy in Philadelphia. Yet in 1775, it was not much more than an obscure destination for credit-granting dry goods exporters in Bristol and London. Along with an analysis of the trading community and the discussion of politics, Doerflinger established an "entrepreneurial" theory of economic development. "To understand the origins of this extraordinary economic progress," Doerflinger announced, "we must reconstruct the mentality of its engineers." Repeatedly, he reminded the reader that the Philadelphia merchants, and their counter-parts in New York and Boston, faced adversity and hence were "favorably disposed toward innovation." For more

Washington and the DSC suggest, not everyone engaged in these activities succeeded. Although a great deal can be learned from successful participation, and even larger understanding of the activities as well as what it took to be successful can be learned from studying ventures that failed. Regardless of the period or type of financial activity or the region of operation, risk and the ability to manage it was key for success. Like New York, the Chesapeake region had a number of individuals who broke with traditional economic activities in their efforts to build or maintain their wealth. Unfortunately, not all of them succeeded. Four examples of failure stand out and offer interesting insight into the role of risk in successful engagement of industrial activities.

Risk has always been central to all financial investments, bringing an edge to ensuing legal problems of loss and damage. There are many definitions of *risk*, varying by specific application and situational context. One suggests that risk is an issue that can be avoided or mitigated (wherein an issue is a potential problem that has to be fixed now). Risk usually is described as a situation which would lead to negative consequences. But risk can also be described as both qualitative and quantitative. Qualitatively, risk is proportional to both the expected losses that may be caused by an event and to the probability of the event. Greater levels of financial loss and the greater event of likelihood result in a greater overall risk. In financial matters, risk is the probability that an investment's actual return will be different than expected. This includes the possibility of losing some or all of the original investment. Some regard a calculation of the standard deviation of the historical returns or average returns of a specific investment as providing some historical measure of risk. Financial risk may be market-

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on this discussion, see Thomas M. Doerflinger, *A Vigorous Spirit of Enterprise: Merchants and Economic Development in Revolutionary Philadelphia* (Chapel Hill : University of North Carolina Press, 1986), 5, 136, 158.

dependent, determined by numerous market factors, or operational, resulting from fraudulent behavior.

While staple crop dependency restricted the development of business innovation the planter class, the Chesapeake possessed an exceptional fluidity, competitive, and materialistically inclined social environment that strongly encouraged aggressive risk taking. Horse racing and gambling were the two main preoccupations of Chesapeake society. Participants regularly risked sizable fortunes in the pursuit of pleasure. Formal horse racing began as early as the 1690s, with more than a dozen tracks spread across the Chesapeake. Racers participated for honor as well as prizes. The wealthiest members of society raised the best horse races and rode their own mounts in the races, as was demonstrated by the example of the Tayloe family. The size of bets and entrance fees precluded participation by ordinary members of Chesapeake society, but large crowds of spectators attended the events and engaged side betting.

Aggressive risk taking by participation in lotteries was also an important aspect of Chesapeake society. Advertisements for lotteries ran with great frequency in every newspaper in the region. Lotteries funded numerous financial activities, although most were organized in order to obtain a small fraction of an estate's paper value for individuals who found themselves hopelessly in debt and pressed by creditors. One lottery organizer in 1768, Benjamin Johnson, explained in an advertisement why he promoted "A Scheme for a Lottery," saying "the reason of my selling on this method is (I assure the public) to pay my debts, and prevent imposition: and to prevent the selling of my estates by execution at half value."[265] Since few people in the region possessed enough currency to buy an estate outright, an indebted individual could sell lottery tickets at affordable prices to vast numbers who were willing to risk small sums for a chance at a

[265] *Virginia Gazette*, (Rind), 14 April 1768. For more on lotteries, see T.H. Breen, *Tobacco Culture: The Mentality of the Great Tidewater Planters on the Eve of Revolution* (Princeton University Press, 1985), 169-75.

big return. Lucky winners carted away the organizers possessions, or took possession of land and property. The largest lottery involved the holdings of William Byrd III, a planter who had squandered his inherited fortunes at the gambling tables. Ten thousand tickets were sold for five pounds each for the chance to be one of 839 winners dividing the estates.[266]

To the industrial minded who lived in the Chesapeake region in the period from the colonial era into the early republic, risk and change, not stability and caution, were the norm: they were psychologically prepared to move to a new city or send their commodities to England without a certainty it would arrive or undertake a new enterprise in order to advance their fortunes. They labored strenuously to augment their fortunes, forever scheming and projecting future returns with an intensity that would have seemed quite alien to the socially secure elites of Maryland and Virginia. Even the more conventional forms of business carried on by the merchants entailed a great deal of risk. It is hardly surprising, therefore, that when new potentially lucrative investments became available, these ambitious arrivistes plunged in. Although the huge profits often derived from industrial enterprises could offset concerns over the great risk of such activities, success was far from guaranteed. The various individuals who engaged in industrial activities in the Chesapeake region expected to have failures, and in those failures we can learn a great deal about participation in industrial activities and Chesapeake society.

Through out his life, Robert "King" Carter focused most of his entrepreneurial energies on expanding his land holdings. He excelled at it. He began with only £1000 and 1,000 acres in 1669, but increased it to close to 300,000 acres by 1730. But Carter was not averse to taking risks outside of his land dealings. In 1728, he organized the Frying Pan Company with the purpose of mining copper ore on a tract of land near the present boundary of Fairfax and

[266] Breen, *Tobacco Culture*, 170.

Loudoun counties.[267] Like most of Carter's business ventures, his partners in the Frying Pan Company were relatives: his sons, Robert and Charles Carter; and Mann Page, his son-in-law. They began with a "Mountainous piece of Land [27,000 acres] on which there is some show of a Copper ore."[268] They made elaborate preparations to get the mining operation running. Operations began in 1730, when a refiner named Shaw began working for them a year and a half before the miners arrived. The company purchased a schooner to carry ore down the river from the mine.[269] Carter believed the operation would be profitable, rejecting an offer from John Tayloe to found his own iron works, writing "At this time I am [not] willing to be a joint Undertaker with your Society until I am better acquainted with the progress you are likely to make . . . . [However] Your Second proposal has really a great deal of temptation in it . . . that I might make a Considerable Advantage by delivering you Oar [ore] at the landing."[270]

Once the framework of the Frying Pan Company's operation was in order, the business partners turned to acquiring a labor force. Carter quickly decided the colonies did not have enough properly skilled miners, so he sought miners and foundry workers from among the Welsh, saying "we are told there are great numbers of workers in the mines of both Cornwall and Derby that would gladly be hired to come over seas at Moderate wages, being hardly able to get their bread where they are."[271] His agent in England, Edward Athawes, immediately began recruitment, focusing on Wales. Using Welsh laborers proved to be problematic though. Once in

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[267] The enterprise was named the Frying Pan Company in part because the ore was found in an impression in the terrain, but the investors no doubt had high hopes that their ores would produce copper that would soon become cookware.

[268] Robert Carter to James Bradley, Sept. 9, 1729, Carter Family papers, Virginia Historical Society [Hereafter, the Virginia Historical Society will be cited as VHS].

[269] Katharine L. Brown, *Robert "King" Carter : Builder of Christ Church* (Staunton, VA, 2001), p. 47.

[270] "King" Carter to Captain Christian, Corotoman, September 7, 1727, Letter Book, 1727-1728, Cater Family Papers, VHS. His interests were indeed so extensive at one time that when Colonel John Tayloe wrote him urging participation in another mining venture, he refused, declaring that "the Irons I already have in the fire are so many one half of them burn for want of a rigorous Application. . . ." Letter of January 29, 1729, Letter Book, 1728-1729, VHS. See also, Louis Morton, *Robert Carter of Nomini Hall* (Charlottesville: University Press of Virginia, 1945), P. 18.

[271] Charles Carter to James Bradley, Sept. 14, 1729, Carter Family papers, VHS.

Virginia, the workers spent their spare time drinking and carousing in taverns and ordinaries within a twenty mile range of the mines. Then, in July of 1731, the Welsh miners revolted, claiming it "as the custom of Miners that every red letter day are holy days to them and that Saturdays in the afternoon are their own." The holy days in question were unknown to Carter and his managers. The imported workers also complained about their provisions, saying they were inadequate and rancid. Carter balked at their complaints, since he provided them with salt meat every day, several deer were killed for them each week, and they had fresh milk daily from a cow provided for their use.[272]

Despite their dissatisfaction, the workers did find what was believed to be a rich vein of copper ore. Carter loaded sixty-seven barrels of it "bagged and washed" onto a schooner named the Bailey along with several hogsheads of tobacco and sent it to Bristol to test the consistency of the ore and see "Whether that or the lumps may afford the most Metal."[273] This small amount proved to be the best that the mine ever produced. Robert Carter wrote his longtime merchant colleague Alderman Perry just two months later saying that "we had a little run of hopes raised about three or four ton of good ore which we send to Mr. Athawes, the vein is gone out and our hopes flag upon it."[274] Even worse, the test proved that the yield of copper content was unprofitable. The next year Carter's son, Charles, sent another load of ore from a different vein aboard a ship named Sarah for testing in London, but it too proved valueless.

Although it cost a considerable sum, the mine was abandoned. The land and mine would remain a source of dispute among Carter's descendants.[275] More importantly, Robert Carter

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[272] Brown, *Robert "King" Carter*, p. 47-48.
[273] Robert Carter to Colo. John Tayloe, January 29, 1728/29, Robert Carter Letterbook, 1728-1730, Carter Family papers, VHS.
[274] Brown, *Robert "King" Carter*, p. 48.
[275] When Robert Carter died, the a tract called Frying Pan, which consisted of 27,560 acres, went to his sons as part of their inheritance. It was owned by Robert Carter along with his cousins Mann Page, Charles Carter of Shirley, and Charles Carter of Stafford. The original purpose of mining copper there having failed, the land was left to the

learned the hard way the necessity of choosing investments carefully. Industrial ventures carried more risk than other investments. The Frying Pan Company took all the necessary steps to get everything in place for the operation to remove copper ore, but they did so before testing the quality of the ore. In the end, the Frying Pan Company failed because British merchants found the quality of its ore to be mediocre. A failure of this nature is not too shocking since Carter was one of the first Virginians to engage in mining activities and he had no prior experience with industrial ventures. Despite his failure, Carter remained optimistic about participating in industrial ventures, telling John Tayloe in 1729, "I am glad to find so many considerable gentlemen are engaged in designs of digging Treasure out of the Earth and do heartily wish them success in their Undertakings."[276]

Robert Carter's failure was more the result of not proving the quality of the copper ore prior to getting the operation underway; an act resulting more from his lack of experience than an error in judgment. Other risk taking industrial entrepreneurs failed for less understandable reasons, like incompetence or a grave miscalculation in risk assessment. Successful participation in industrial ventures required special skills and knowledge not easily acquired by someone unfamiliar with the operations. When a novice tried to get established, failure was often resulted unless they hired an experienced manager to run the operation. The best example of this can be found in the experience of John Ballendine, a Virginian who dabbled in many speculative enterprises and continually seemed to run into trouble.

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administration of the Councilor who divided into tracts to be rented. The income derived from this property was distributed among the owners on a *pro rata* basis. A dispute about the payment of the income and the division of the land led to a long drawn out court battle among the descendants of "King" Carter. The relevant papers are in the Old District Chancery Court in Fredericksburg, Carter of Shirley v. Carter of Nomini, 1798. See also, Morton, *Robert Carter of Nomini Hall*, p. 66.

[276] Robert Carter to Colo. John Tayloe, January 29, 1728/29, Robert Carter Letterbook, 1728-1730, VHS; See also, Morton, *Robert Carter of Nomini Hall*, 18, 66.

Descended from the captain of a Liverpool tobacco ship that plied the trade on the Rappahannock River in the 1720's, John Ballendine came from a good family. He and his sister were entertained more than once by George Washington at Mount Vernon. His only son, Thomas W. Ballendine, was a member of Phi Beta Kappa at the College of William & Mary.[277] Records for John Ballendine's early business activities are limited. He operated a packet boat on the Potomac River for nearly fifteen years, even transporting troops for Dunmore's expedition of 1755.[278] Ballendine's later interest in transportation and shipping probably came from his early experience in this field, although it did not help him succeed.

It should not be assumed based on his past employments that Ballendine's interests would focus on water borne transportation indefinitely. Taking an interest in industrial activities in the 1750s, he left the waterways to engage in manufacturing. In 1755 John Ballendine "of the County of Prince Wm." declared intent to erect and operate a forge and a grist mill.[279] With nothing more than an energetic imagination, a small amount of mechanical ability, and a gift for persuasion, Ballendine somehow acquired enough financial backing to secure a contractual interest in several acres of land in Prince William County on the Occoquan Creek (an inlet of the Potomac River) and quickly laid plans to build a settlement incorporating a flour mill, two saw mills, a furnace, and a forge. Shortly after acquiring the land, John Tayloe II, who ran the nearby and already successful Neabsco Furnace in partnership with Presley Thornton, offered capital to back Ballendine's new enterprise as well as to provide iron for the Occoquan Forge from Neabsco.

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[277] Randolph W. Church, "John Ballendine: Unsuccessful entrepreneur of the eighteenth century," *Virginia Cavalcade*, v.8, n. 4 (1959), p. 39.
[278] Church, "John Ballendine," p. 38-39.
[279] Church, "John Ballendine," p. 39.

The offer of financial support resulted in a partnership between Ballendine, Tayloe, and Thornton.[280] The partnership proved more difficult to maintain than any of the partners probably expected. Shortly after it formed, George Washington "Directed an Indictment to be formed by Mr. Johnston against John Ballendine for a fraud in some iron he sold me" on January 8, 1756.[281] The indictment was a caused by carelessness on Ballendine's part rather than fraud. Washington cancelled it when Neabsco iron was shipped to him, but a bigger problem was developing.

The partnership with Tayloe and Thornton seemed to give Ballendine a false idea of prosperity. Borrowing heavily from his partners, he immediately began to expand the forge complex. Less than six months from the merger, Occoquan had become a constant drain on Tayloe and Thornton, offering no expectations of return for at least a year. In an act of financial self-defense from Ballendine's incredibly ambitious and somewhat reckless business spending, Tayloe and Thornton advertised in the local newspapers in November of 1756 that "John Ballendine is no longer agent for their Furnace at Occoquan," and advised readers "not [to] trust him on their account."[282] Despite their reticence, Ballendine's enterprises—sawmills, bolting mills, furnaces, bake houses, and various storehouses—quickly grew at Occoquan, slowly establishing the small town of Occoquan, Virginia.

The Occoquan Furnace and Forge (called the Occoquan Iron Works by the partners) was in full operation by 1756. Ballendine believed he could "make 1000 Tons of Pigs" from the furnace if he had an appropriate labor force in addition to the "70,000 Ton of Anconies [he made

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[280] The merger foreshadows the modern practice of larger companies removing rivals by combining with them. See Kathleen Bruce, *Virginia Iron Manufacture in the Slave Era* (New York: Augustus Kelley, 1968), pp. 17-18.
[281] John C. Fitzpatrick, *Diaries of George Washington, 1748-1799* (Boston & NY, 1925), I, 109. See the editor's explanation of Ballendine's error in note 6. Though the editor claims it was a matter of carelessness rather than "fraud," the entire incident says a great deal about Ballendine's personality.
[282] Maryland Gazette, November 25, 1756. See also, David Curtis Skaggs, "John Semple and the development of the Potomac valley, 1750-1773" *Virginia Magazine of History and Biography*, 92:3 (1984), 289.

at the forge] since last Dec[ember]" of 1756.[283] When Archdeacon Burnaby visited the Occoquan in October of 1759, he was impressed by what he found. Burnaby proclaimed, "About two miles above Colchester there is an iron furnace, a forge, two saw mills and a bolting mill . . . They have every convenience of wood and water that can be wished for."[284]

In spite of his confidence, Ballendine was about to experience his first failure with industrial activities. The business relationship between Ballendine, Tayloe, and Thornton was becoming more strained as time passed. The partnership remained legally intact for a few more years, but Tayloe and Thornton finally withdrew in 1760. No longer willing to trust Ballendine, the two partners let the agreement establishing the Occoquan Iron Works lapse and took possession of nearly 1800 acres on the southern side of the river. Although the partners had lost interest in Occoquan Iron Works, it is safe to assume that they realized Ballendine would never become a major competitor and chose to break their relationship before it became even more costly.

The dissolution of the Occoquan Iron Works placed the small amount of what remained of the endeavor entirely in the management of Ballendine. Quickly, he found himself incapable of running the business alone. Partly, this was due to the reduction of the enterprise, but it also was a result of his complete lack of knowledge concerning the running of an iron based activity. Surprisingly, despite Ballendine's managerial incompetence, the complex was flourishing, just not financially. It acquired several contracts to supply iron and the town of Occoquan grew rapidly in population. Unfortunately, Ballendine's many debts created a situation where disputes

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[283] John Ballendine to John Tayloe, May 13, 1756; Tayloe Family Papers, 54: 1034-1035; Tayloe and Thornton Land Lists, Tayloe Family papers, Series M, Part I, Slavery in the Antebellum Southern Industries, Microfilm, LVA [Hereafter, the Papers of the Tayloe Family will be cited as TFP], 5: 153; Prince William County Deed Book P: 201-210. See also, Skaggs, "John Semple," 288. See also, Laura Croghan Kamoie, "Three Generations of Planter-Businessmen: The Tayloes, Slave Labor, and Entrepreneurialism in Virginia, 1710-1830," dissertation, W&M, 1999, p. 105.

[284] Archdeacon Burnaby as quoted in Fairfax Harrison, *Landmarks of Old Prince William: A Study of Origins in Northern Virginia* (Baltimore, 1987), 2: 428.

over ownership and management of Occoquan began to emerge. Unable to meet his financial obligations, Ballendine sold several shares in the business to various investors. John Semple of Maryland, another area ironmaster, purchased most of the shares and decided to take control the operation in the spring of 1762. What remained of Ballendine's financial investment in Occoquan dissolve a short while later, when he borrowed heavily from Semple in an attempt to stop Tayloe and Thornton from forcing him to sell Occoquan to them in remuneration of debts he still owed to them as a result of their dissolved partnership.

In 1764, further debts acquired by Ballendine on Occoquan led to another change in the operation. Semple, acting as the majority investor in the business, reduced Ballendine from a partner to the position of superintendent with a share in the profits, but he had no other pecuniary interest in forge, furnace, or mills. Then in 1765, Semple decided to force Ballendine out of the business altogether, having moved to Occoquan personally to take control of the works. Although Ballendine's continued lack of ability gave Semple enough credence for his action, he probably realized that the rapid opening up of wheat producing lands in the back country areas nearby offered a new opportunity for a flour milling operation. As a result, Semple let Ballendine's forge and furnace fall into inactivity while he concentrated on grinding flour.[285] In the mean time, Ballendine sold the iron operation to Tayloe and Thornton, who acquired the entire furnace and forge complex, which included over 4,000 acres of land, in return for paying several of Ballendine's debts.[286] The final acquisition of Occoquan left Ballendine's former partners entangle in a new financial dilemma with John Semple.

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[285] Bruce, *Virginia Iron Manufacture*, pp. 17-18.
[286] Prince William County Deed Book P: 7-8. 299-308, LVA; Tayloe and Thornton Land Lists, TFP, 5: 153; Anne Arundel County Deed Book BB 2, 629-631, Maryland State Archive Land Records. See also, Skaggs, "John Semple," 290.

While he may not have been using it, Semple continued to claim the forge complex as his own property. Semple's investment claims included the Occoquan Furnace, which was being operated by Tayloe and Thornton. The gristmill operations were barely a quarter of a mile down the river from the forge, and the two men built it in concert with Ballendine's activities at the forge. Since Semple bought out Ballendine, both operations belonged to him. But Tayloe and Thornton rejected Semple's assertion of property rights, saying that they bought the iron works from Ballendine several years earlier. Angry about the new claim, Semple went out of his way to interrupt work at the furnace and repeatedly rejected their lucrative offers to purchase his interest in the works. Eventually, Tayloe and Thornton legally questioned Semple's interest in either the forge or the furnace in court, contending that Semple knew they purchased the complex from Ballendine in January of 1763. According to the two partners, Semple disregarded "our possession, [and] afterwards purchased the same of Ballendine, and became possessed thereof."[287]

Still in desperate financial straits, Ballendine further complicated the situation concerning the Occoquan Iron Works by selling the complex to yet another party in late 1765, forcing Tayloe and Thornton to purchase the works for a third time. During the summer of 1766, Tayloe and Thornton warned the public about the status of the works and their situation. "LEST any person inclined to purchase the lands and works on Occoquan river . . . and to prevent any pretense of ignorance of our right and claim thereto, we are induced to advise the public that there is now of record in the Secretary's Office of this colony articles of agreement made between the said Ballendine and us, for the conveyance of the said land and works, where we

[287] Virginia Gazette, June 13, 1766; Skaggs, "John Semple," 290. See also, Kamoie, "Three Generations of Planter-Businessmen," p. 106-107.

were forthwith put in possession of."[288] Expecting more trouble from Semple as well, they cautioned readers of the *Virginia Gazette*, "If any will purchase of the said Semple after this notice, they will do it with their eyes open, and must stand to the consequences, as we are determined to assert our rights."[289] The situation still had not been resolved as late as 1771, when Tayloe's manager complained, "I must think that one day or other the Occoquan Forges must fall into your hands."[290] The manager was correct, since John Semple and at least one other businessman were still partly involved in Occoquan at that time. In fact, when Semple died in 1788, his executors advertised the estate for sale.[291]

Ballendine's financial difficulties went beyond his former relationship with Tayloe and Thornton. In 1767, he tried to liquidate what little remained of his estate, even selling several slaves belonging to Occoquan.[292] Later that year, Ballendine filed for bankruptcy. Despite Ballendine's inability to run Occoquan or his own finances successfully, the operation he started at Occoquan was sound. Semple operated the mills advantageously for a number of years, and the Occoquan Iron Works operated profitably for several years, although it eventually went out of existence when the ore ran out and a new source could not be located.[293]

While Ballendine's former partners were busy cleaning up the problems caused by their association with him, it seems that neither his recent failure nor a lack of knowledge and technical expertise could circumscribe his ambitions and schemes. Departing from Occoquan,

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[288] Virginia Gazette, June 13, 1766.
[289] Virginia Gazette, June 13, 1766; Skaggs, "John Semple," 290. Several others were embroiled in the conflict. In 1769, Thomas Tabb and Thomas Yuille placed a similar notice, declaring they purchased land and slaves from Ballendine in Fauquier, Prince William, and Fairfax Counties, and forewarning "all persons from making any purchase of the said lands or slaves." The slaves included a number of men with iron making skills. Virginia Gazette, November 16, 1769. See Kamoie, "Three Generations of Planter-Businessmen," p. 106-107.
[290] Thomas Lawson, Neabsco, to John Tayloe, October 27, 1771, File 171, LVA.
[291] Virginia Herald and Fredericksburg Advertiser, June 5, 1788.
[292] Virginia Gazette (Purdie & Dixon), November 16, 23 1769; Bruce, *Virginia Iron Manufacture*, p. 18; Ronald L. Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia, 1715-1865* (London: Greenwood Press, 1979), p. 23.
[293] Church, "John Ballendine," 39.

Ballendine returned to the Potomac River and began to focus his attention on water borne transportations, moving up the river and developing a new scheme. At some point between 1765 and 1772, he became obsessed with an idea occupying the minds of several men in the region: the desire to establish passable waterways and canals from the Chesapeake Bay into the rapidly expanding territories on the western side of the Appalachians.[294] Since the James River was at the top of the list of entrepreneurs looking to create a navigable water route west and had several endeavors underway, Ballendine focused his attention on the Potomac instead. The "most brilliant plan" as Ballendine called it brought him into close contact with George Washington again. Washington had become interested in clearing the navigation of the Potomac as early as 1754, shortly after he speculated in several thousand acres near present day Pittsburgh. Surprisingly, Ballendine's former creditor, John Semple, also helped promote the new scheme.[295]

In 1770 Ballendine began work on the venture. First, he dammed the channel of the Potomac at the Seneca Falls so he could construct a saw mill, which he had in operation by early 1771.[296] Once the saw mill was doing well, Ballendine decided to expand his operation by becoming a builder of canals and waterways. In early 1772, he had a meeting with Lord Fairfax and the governors of both Maryland and Virginia. Securing testimonials of confidence for his technical ability and integrity from the three prominent gentlemen, Ballendine convinced them to pledge subscriptions for his plan to clear the falls of the James and Potomac rivers. Before he departed, they recommended Ballendine tour England to study canals and locks in order to aid him in the undertaking. George Washington, who joined the group of new financial supporters

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[294] Bruce, *Virginia Iron Manufacture*, p. 42-44.
[295] It is possible that Semple actually believed that Ballendine's plan could succeed and thus provided him with a character reference, but it is more likely he hope any success Ballendine found might bring remuneration for past debts still owed to him. Semple did not contribute financially to Ballendine's newest scheme. Church, "John Ballendine," p. 39.
[296] Harrison, *Landmarks of Old Prince William*, II, 427-429, 435-437.

shortly after Ballendine received the confidence of the prominent men, was warned against supporting Ballendine. Several days prior to the meeting, George Johnson wrote to Washington that Ballendine was a "Lurking Scoundrel" with "superior Talents" in "the art of being a Villain."[297] But the opportunity to open the Potomac obviously proved too tempting for Washington to resist.[298]

Washington as a member of the Virginia House of Burgesses had been trying to secure colonial support for any scheme to open the Potomac since 1770.[299] In late 1771, Washington introduced an act calling for the immediate creation of a company capable of clearing the water way up the Potomac River or building a canal around any obstructions. The Assembly took Washington's suggestion, but stipulated that as soon as a majority of the subscribers or any ten of them should deem enough money had been secured, the company could elect a president and eleven directors to manage the undertakings. This managing body would be empowered to employ an "undertaker" to begin work on the river. A considerable sum was procured for the endeavor, but no president or directors were ever elected.[300] While many people in both Maryland and Virginia (including George Washington) were eager to link the Potomac with the western lands, nobody seemed willing or capable of taking on the endeavor. Ballendine, however, believed he possessed the ingenuity to complete the task and immediately sought to capitalize on the interest in both districts.

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[297] George Johnston to George Washington, Jan. 8, 1760, George Washington to Jonathan Boucher, May 5, 1772, *The Papers of George Washington: Colonial Series*, ed. W.W. Abbot et al., (Charlottesville: University Press of Virginia, 1983-94), VI, 382-383, IX, 40-41.

[298] Charles Royster, *The Fabulous History of the Dismal Swamp Company: A Story of George Washington's Times* (New York: Alfred A. Knopf, 1999), p. 295.

[299] Hening, *Statutes at Large . . . of Virginia* . . . VIII, 570 and WC Ford, ed., The *Writings of George Washington* (Richmond, 1889-1890), II, 348; X, pp. 376-377.

[300] Jefferson to the Speaker of the House of Delegates of Virginia, October 30, 1779, Virginia State Papers, LVA, and P.L. Ford, *Writings of Thomas Jefferson* (New York, 1892-9), II, 267-272. The Virginia Assembly authorized a canal to be cut at James River Falls in 1764, financed by subscription. There were not enough subscriptions to carry forward the work at this early date.

A few months after Washington's act passed, Ballendine offered a proposal for extending the navigations of the James and the Potomac rivers to the assembly.[301] The Virginia House of Burgesses voted to support Ballendine's plan. Ballendine announced in April of 1772 his intent to travel to Europe to tour to the great canals of the continent, and then bring his new expertise back to Virginia.[302] Since the creation of the western colony of Vandalia seemed imminent, and Virginia would have to compete with Pennsylvania for its trade, several prominent Virginians stepped forward with financial support for Ballendine's working vacation. By early 1773, Ballendine was well under way, writing from London through a friend to the *Virginia Gazette,* he claimed to have acquired "Plans and Models of all the necessary Machines" to construct a canal and had "engaged several ingenious Mechanics to go out with me to Virginia."[303] According to Ballendine, nothing could keep him from passing the falls of the James. As to financial concerns, Ballendine assured the people of Virginia that the new proprietors of Vandalia would "contribute largely towards opening both James and Potomac Rivers."[304]

Ballendine also took the time to secure more financial backing while in London.[305] Though he failed to raise all the money needed for the endeavor from English investors, Samuel Gist gave him a letter of recommendation saying that Ballendine "has not only been

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[301] Bruce, *Virginia Iron Manufacture*, p. 42-44.
[302] Robert Carter Nicholas to John Norton, April 7, 1772, John Norton & Son Papers, Rockefeller Library, Colonial Williamsburg Foundation.
[303] Purdie and Dixon's Virginia Gazette (Williamsburg), May 27, 1773.
[304] Purdie and Dixon's Virginia Gazette (Williamsburg), May 27, 1773.
[305] Samuel Gist lived in Britain, but owned approximately 1200 slaves on land in Amherst, Goochland, and Hanover counties, Virginia. He was a partner of George Washington, and one of the first admiralty insurance brokers in London. He lived for nearly a hundred years, helped start Loyd's of London, and owned the first stud racehorse to come to America. In *The Fabulous History of the Dismal Swamp Company* (Royster 1999), Gist is identified as "an old Jew" who he went to Virginia in 1739, where he was an indentured servant, and later factor-storekeeper, on John Smith's Gold Hill Plantation, Hanover Co. Gist proved to be an able business man. His investments included thousands of acres in Virginia and even a slave ship. In 1789, he valued his Virginian plantation at £23,000. Although married to a Virginia woman, he returned to England and became a London tobacco merchant. By 1773-1775, he was next to Lydes in tobacco taken from the Upper James Naval District, and in January 1775 he was one of three men appointed to represent Virginia trade in Parliament. Harrison, *Landmarks*, pp. 540, 556; Corra Bacon-Foster, *Early Chapters in the Development of the Potomac Route to the West* (Washington, 1912), pp. 24-29.

Countenanced by the first People here but has a very handsome Subscrip[tion].”[306] Gist was confident that work would “go on immediately,” providing Ballendine with credit and equipment worth more than £500.[307] Unfortunately, Gist and the Virginians would lose money on Ballendine. Returning to Virginia in the summer of 1774, Ballendine proclaimed himself “fully qualified’ to “remove the obstructions to the navigation of Potomac river.”[308] He initiated several meetings with his Virginian subscribers, and convinced them to pledge additional sums to the endeavor. By October of 1774, Ballendine was back at Seneca Falls getting work under way on a canal traversing the Maryland side of the Potomac.[309]

The Virginia and Maryland trustees heralded Ballendine’s proposals for making the Potomac River navigable and received him favorably upon his return from Europe.[310] George Johnson of Maryland, George Washington of Virginia, and others provided substantial sums to the project. Despite the seemingly endless financial backing and vote of confidence in his abilities, Ballendine experienced his second failure in an industrial activity. Although he did not publicly discuss what caused him to do so, John Ballendine announced on October 28, 1775 in the *Virginia Gazette* that he had given up the Potomac plan after a year of public silence about the project.[311] Undefeated by the Potomac failure, Ballendine immediately transferred his activities to the James, undertaking to build a canal around the falls of Richmond.

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[306] Samuel Gist to John Tabb, April 12-May4, 1774, *Tabb’s Admr. V. Gist et al.*, 1829, United States Circuit Court, Virginia district, Ended Cases, Vi; List of Debts in London, No. 1, Claim of Samuel Gist, American Loyalist Claims AO 13/30, PRO; Purdie and Dixon’s Virginia Gazette, July 7, 1774; Harrison], *Landmarks*, II, 540.
[307] Royster, *Fabulous History*, p. 295.
[308] Pennsylvania Gazette (Philadelphia), Sept. 14, 1774; Pamela C. Copeland and Richard K. MacMaster, *The Five George Masons: Patriots and Planters of Virginia and Maryland* (Charlottesville, 1975), 120-121.
[309] Church, “John Ballendine,” p. 39-41.
Bacon-Foster, *Early Chapters*, pp. 27, 28; G.L. Nute, “Washington and the Potomac: Manuscripts. . . , (1754) (1769-1796,” I, in *American Historical Review*, XXVIII, 516.
[311] Ballendine’s personal announcement in the Virginia Gazette, October 28, 1775, quoted in Bacon-Foster, *Early Chapters*, pp. 29.

The reasons for Ballendine's second failure are complex. He was unable to secure approval from the Maryland legislature to cut a canal on the Maryland side of the river. The Maryland legislature and Governor publicly offered their support for the Potomac project, but landownership issues appeared over the location of Ballendine's canal. It seems that Ballendine did not possess clear title to the land he intended to use for the canal. Political difficulties with England also played a major part in the Maryland Assembly's reticence to support the project. Difficulties with England were reaching a boiling point, with many calling for a move toward complete independence for the colonies. Yet despite the political troubles of the era, one has to wonder if Ballendine's complete lack of technical knowledge played a part in the decision not to back him since several other equally risky manufacturing and industrial projects received the support of the government during this same time frame.[312]

Though he failed on the Potomac, Ballendine did not abandon industrial enterprises. In June 1775, the troublesome but always ingenious Ballendine left the Potomac River behind and moved to Richmond. He advertised his intent to dig a James River canal in the fall of 1775. The James River canal would be financed by his own capital in anticipation of "large and generous contributions from all who benefit" after its successful completion.[313] For £560 sterling, he bought fifty acres of land from Patrick Coutts, including an island in the James. He named the property Ettrick Banks, promptly built a home and placed a timber dam across the river to the island to get the operations going. Having established himself upon the northern bank of the James River, Ballendine began collecting subscriptions for work on the canal. According to Thomas Jefferson, without authority from either the Virginia assembly or a Virginia court of law, Ballendine built a dam across an arm of the river, drew off fifty feet of water, and proceeded to

[312] Church, "John Ballendine," p. 41.
[313] Pinkney's Virginia Gazette, Oct. 26, 1775; Bruce, *Virginia Iron Manufacture*, 42-50; Harrison, *Landmarks*, II, 435-436; Copeland and MacMaster, *Five George Masons*, 202-203.

begin construction on a canal.[314] Perhaps recognizing the illegality of his endeavor, Ballendine petitioned the Assembly for support and was granted permission by the Virginia legislature to open the falls of the James River at Richmond.[315] The legislature granted Ballendine authorization to build a canal around the falls, if the opening of the falls proved unreasonable.

While Ballendine was engaging in the work, the Battle of Concord was fought in Massachusetts. The first engagement of the American Revolution, it forced Ballendine to change his plans somewhat. With new expenses and turmoil from the American Revolution, the new state government of Virginia had little revenue to spend on the development of transportation networks.[316] Unable to secure financial support from the state for a transportation improvement, Ballendine joined the aspirations of his canal project with John Reveley in a scheme to mine and manufacture iron for the good of the war effort.[317] Claiming to possess knowledge of the various branches of the iron business, John Ballendine and John Reveley went to Williamsburg with an offer to produce ordinance for the state. Appearing before the Virginia Convention of May 1776, Ballendine and John Reveley asked the convention to subsidize a plan for developing an iron ore mine in Buckingham County. The two men intended to float the ore down river to Ballendine's canal terminus where they would construct an iron works consisting of a furnace and foundry to cast cannon and ball for the use of the Continental troops.[318]

Neither of the partners had much in the way of capital. Reveley saw the colony's need for munitions as an opportunity for a trained and industrious iron worker to serve both the interest of the state and himself. Thus with the expectation of receiving government aid, Ballendine and

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[314] Bacon-Foster, *Early Chapters*, pp. 29; Jefferson to the Speaker of the House of Delegates of Virginia, October 30, 1779, Virginia State Papers, LVA.
[315] Church, "John Ballendine," 42-43.
[316] Church, "John Ballendine," 39-47.
[317] Bruce, *Virginia Iron Manufacture*, p. 42-44.
[318] Church, "John Ballendine," 43-44.

Reveley jointly contracted to purchase land in Buckingham county. The plot in question had valuable iron and coal mines close to James River. Although it was more than forty miles from Ballendine's canal in Richmond, the partners intended to build and conduct an extensive iron works with the support of the new state government. For this purpose, they petitioned the convention for funds. [319] In dire need of military supplies, the convention agreed to furnish £5000 and to purchase any finished iron Ballendine could deliver in return for a mortgage on Ballendine's and Reveley's property.

The Virginia convention referred Ballendine and Reveley's petition to the Committee on Propositions and Grievances, which advised the state to build a foundry in order to provide the cannon in case of future hostilities. The Committee suggested that the foundry be run by government administrators and operated on government expense. The convention also agreed to build and operate a foundry utilizing the water power produced by Ballendine's canal. Several months later, Ballendine sold the newly founded State three and a half acres of land for the foundry buildings, while Reveley was made the supervisor of the foundry operations and additional acres of property were acquired from Ballendine for the foundry.[320] Since the operation would be built and operated by Ballendine and Reveley, the committee recommended that the two petitioners be provided with a sum not exceeding £5000, under certain stipulations, to enable them to erect a blast furnace to supply the foundry with pig iron.[321]

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[319] *Journal of the Convention of Virginia*, May, 1776, p. 17. Dudley Digges, a member of the Committee of Safety set before the convention on May 13, 1776, a proposition which John Reveley made to the committee to build a cannon foundry (*Journal of the Convention of Virginia*, May, 1776, p. 13). See also, Bruce, *Virginia Iron Manufacture*, 42-44.

[320] Church, "John Ballendine," 43.

[321] *Journal of the Convention of Virginia*, May, 1776, p. 22-23. In a letter to the Speaker of the House of Delegates of Virginia, October 30, 1779 (Virginia State Papers, LVA), Governor Jefferson mentions the resolutions of May 16 and 22, 1776. See also *Writings of Jefferson* (Ford ed.), II, 267-272.

The convention accepted the committee's advice.[322] The State immediately advanced five thousand pounds to the trustees to be conveyed to John Ballendine and John Reveley in such installments and at such times as the trustees judged necessary to enable the petitioners to buy lands and build and carry on a furnace.[323] Simultaneously, the committee appointed Richard Adams, Nathaniel Wilkinson, and Turner Southall as commissioners for erecting a government cannon foundry as well as a blast furnace.[324] Eventually called Westham foundry, the operation was just outside Richmond.[325] The petitioners accepted the decision of the committee, promising to furnish to the foundry all the pig iron they could make at seven pound ten shillings currency per ton[326]. They also promised to return the five thousand pounds advanced to them in five equal payments, and gave all the lands which they intended to purchase for the undertaking as well as the works built thereon for security. According to Governor Thomas Jefferson, the loan amounted to a contract to provide the commonwealth 666 2/3 tons of pig iron.[327]

The three commissioners were free to choose who they wanted to erect the foundry, or whether to use the purse of the colony to carry out the scheme.[328] Although each was an able businessman, none had industrial experience.[329] The Patriot cause was in desperate need of

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[322] *Journal of the Convention of Virginia*, May 22, 1776, p. 22-23.
[323] *Journal of the Convention of Virginia*, May 22, 1776, p. 22-23, June 14, p. 47; *Journal of the House of Delegates of Virginia*, January 23, 1810, p. 79; *Journal of the Convention of Virginia*, May 22, 1776, p. 22-23.
[324] *Journal of the Convention of Virginia*, May 25, 1776, p. 24.
[325] J.L. Bishop, *History of American Manufacturers from 1608 to 1860* (Philadelphia, 1864), I, 606; James M. Swank, *Iron in All Ages* (Philadelphia, 1892), p. 268.
[326] Ballendine and Reveley claim that seven pounds, ten shillings currency per ton was cheaper than pig iron could be furnished by any other Virginian furnace of that date (*Journal of the Convention of Virginia*, May 22, 1776, p. 22-23). A month later, the convention: "Resolved that a sum of money not exceeding £1000 be advanced to Thomas Walker and Company on their entering into bond with sufficient security to repay the same in pig iron, to be delivered at Westham, at the price of £7.10s. per ton" (*Journal of the Convention of Virginia*, June 24, 1776, p. 64).
[327] *Journal of the Convention of Virginia*, June 24, 1776, p. 23; *Journal of the House of Delegates of Virginia*, January 23, 1810, p. 79; Thomas Jefferson to the Speaker of the House of Delegates of Virginia, October 30, 1779, Virginia State Papers, LVA; P.L. Ford's *Writings of Thomas Jefferson*, II, 267-272. See also, Bruce, *Virginia Iron Manufacture*, p. 42-44.
[328] *Journal of the Convention of Virginia*, May 25, 1776, p. 24
[329] The trustees were George Carrington, John Nicholas, and Samuel Jordan (*Journal of the Convention of Virginia*, January 23, 1810, p. 79), Samuel Jordan was appointed for sake of convenience to take the place of William Cabell, one of the first appointed trustees (*Journal of the Convention of Virginia*, June 24, 1776, p. 23).

cannon and ammunition, so perhaps circumstances gave the commissioners no choice.[330] Either way, the commissioners relied on the expertise of the two petitioners, purchasing three and a half acres of land on the north side of James River from Ballendine, a mile below the hamlet of Westham.

The decision would prove to be a mistake, albeit not an immediate one, and a huge financial gain for Ballendine. To begin with, Ballendine benefited greatly from the decision to build a public manufactory on his property. For a small fee, Ballendine extended the privilege of free navigation on his adjacent canal, which he had been building between Westham and Richmond for nearly a year, as well as the right to draw all the water necessary to turn the machinery of the government mills from the canal.[331] The location also had active bituminous coal mines nearby, which would provide Ballendine with revenue for it use and removal. "Pit coal" was needed for the manufacture of cannon.[332] John Reveley was appointed as constructor and future manager of the iron works by the commissioners.[333] John Ballendine was supposed to have no part in the construction or management of Westham Foundry. Yet by depending upon his canal for water power and selecting his partner as manager of the foundry, Ballendine was actively involved in the state's business which would require the state to have to help him build

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[330] Bruce, *Virginia Iron Manufacture*, p. 42-44.

[331] Thomas Jefferson to the Speaker of the House of Delegates of Virginia, October 30, 1779, Virginia State Papers, LVA. For the rights the commissioners paid John Ballendine £242.10s, and bound themselves to contribute to the repairs to the section of the canal they should use.

[332] The committee reported to the convention that the casting of proper cannon could only occur in a foundry using pit coal (*Journal of the Convention of Virginia*, May 22, 1776, p. 23). The Westham Foundry, according to the Board of War, was "Convenient to pit coal either by Land or Water carriage." See, Representation the Board of War to the Executive to be hear on Wednesday the first of December, 1779, Virginia State Papers, LVA.

[333] The exact date of Reveley's appointment as manager of Westham Foundry is uncertain. *Journal of the Convention of Virginia*, May 13, 1776, p. 13; *Journal of the House of Delegates of Virginia*, November 22, 1777, p. 39; *Journal of the House of Delegates of Virginia*, December 8, 1779, p. 81-82; John Reveley, Case and Papers . . . February 1, 1788, Virginia State Papers, LVA. Before the convention could figure out the situation, the Committee of Safety committed the state to aiding Reveley in establishing a cannon foundry. See also Account to the Commonwealth with John Reveley, 1776-1777, Westham Foundry Account Books, LVA.

the canal authorized by the House of Burgesses in 1764.[334] Ballendine and Reveley also became partners in the Buckingham County furnace, which was supposed to provide pig iron for the foundry. Instead, the Buckingham Furnace became heavily indebted to the state as the two partners struggled to locate men capable of conducting iron works.

Work began on Ballendine's new scheme in May 1776, leaving those involved optimistic about the future of the endeavor. Reveley superintended construction of the main building of a foundry for two hundred and forty-four days. It had four double stacks, eight air furnaces, and a boring mill.[335] He also constructed several other buildings, including a magazine, a manager's dwelling, and cabins for the artisans.[336] Although there is no record when construction on the operation facility ended, Lt. Col. John Graves Simcoe, an officer in the British army, pronounced the foundry, furnaces, and mills complete five years later.[337] The state also built a laboratory to make shells in collaboration with the continental government about one mile from the foundry.[338] Although he was supposed to be directing the construction project himself, Reveley instead contracted with a local builder for most of the foundry buildings.[339] Meanwhile, Reveley spent most of his time in Fredericksburg inspecting the Hunter mills and trying to secure labor. He eventually brought back a stone mason who immediately went to work with the other workmen, both white and black.[340] The interior portion of the furnace was lined with firebricks, special clay bricks capable of enduring the great heat. Clay for the firebricks was secured from neighboring

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[334] Thomas Jefferson to the Speaker of the House of Delegates of Virginia, October 30, 1779, Virginia State Papers, LVA.
[335] Account of the Commonwealth of Virginia with John Reveley, 1776-1777, Westham Foundry Ledger, LVA; Marginal note says: "This work to be finished by December 31, 1776, per contract," but it was not finished by that date.
[336] Account of the Commonwealth of Virginia with John Reveley, 1776-1777, Westham Foundry Ledger, LVA; *Writings of Tomas Jefferson*, (Ford ed.), II, 394 and 407.
[337] John Graves Simcoe, *Simcoe's Military Journal* (New York, 1844), p. 163.
[338] *Writings of Jefferson*, (Ford ed.), II, 393, 407, 508.
[339] Turner Southall to Colonel George Muter, February 18, 1781, Virginia State Papers, LVA.
[340] Account of the Commonwealth of Virginia with John Reveley, 1776-1777, Westham Foundry Ledger, LVA. Slaves were constantly employed at the foundry. For bill, see Bruce, *Virginia Iron Manufacture*, n.123, p. 48; Account of the Commonwealth of Virginia with John Reveley, 1776-1777, Westham Foundry Ledger, LVA..

coal mines.[341] The foundry was clearly in operation by the fall of 1778, when a supply of lime made from oyster shells was brought from the bay.[342] Reveley was teaching workers, both white and slaves, how to melt and bore iron by October of 1778.[343]

Then the first signs of trouble began to appear. In November of 1778, John Reveley solemnly announced to the House of Delegates that the foundry could not continue operation for want of proper workmen. The Delegates quickly funded a search for not more than three men familiar with the method of casting cannon.[344] Accompanied by his assistant John Onions, Reveley went in search of workers as far north as Elkridge, Maryland.[345] Traipsing through knee deep snow, the two men returned to Westham at end of January with several workers in tow.[346] By early March of 1779, Reveley had enough workers, whether white laborers or slaves, to begin regular work at the foundry.[347]

Not unexpectedly, Ballendine was at the center of the troubles for the Reveley partnership, beginning the path that would eventually take him to his third failure involving industrial ventures. Everything began with the Buckingham mine and furnace. Iron making should have been a lucrative investment. High grade iron ore was readily available in both the hills and bogs of the region. The limestone required as flux for the furnace and the waterpower to activate the bellows and the forge hammer were also readily available locally. More importantly, the enormous amounts of timber—thousands of acres—needed to make the charcoal continually

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[341] Representation the Board of War to the Executive to be heard . . . December 1779, Virginia State Papers, LVA.
[342] John Reveley to George Muter, Esq., September 2, 1780, Representation the Board of War to the Executive to be heard . . . December 1779, Virginia State Papers, LVA.
[343] Account of the Commonwealth of Virginia with John Reveley, 1776-1777, Westham Foundry Ledger, LVA.
[344] *Journal of the House of Delegates of Virginia*, November 21, 1778, p. 76. See also, Bruce, *Virginia Iron Manufacture*, 42-44.
[345] In 1720, Stephen Onions, ironmaster, of Stafford County, England, and one of the original partners in the Principio Company, was selected to go to America to buy lands, build furnaces, and conduct the business for the joint partnership.
[346] Westham Foundry Journal, 1779-1781, LVA.
[347] Bruce, *Virginia Iron Manufacture*, 42-44; see also, Church, "John Ballendine," p. 43.

dumped into the blast furnace were easily obtained. It was not just the supply side of the industry that was positive. Pig and bar iron as well as finished goods of iron such as pots, fire backs, and nails, commanded large local markets and huge profits. What little was not sold locally could be shipped to other states or to international locations. In the years before the Revolution, England purchased large quantities of iron from the colonies in the form of bar iron or pig iron. These advantages were substantial enough to make iron industry of American internationally competitive. By 1775, one seventh of the global production of iron was being supplied by the thirteen colonies.

Inexplicably though, the Buckingham Furnace could not make any money from iron production. Largely, this was caused by the fact that it could not produce the iron contracted to the state. A lack of iron from Buckingham forced Reveley to supplement it with pig iron furnished from other contractors at Buckingham's expense. In November 1777, Ballendine and Reveley petitioned the assembly for an additional £2500 to acquire more ore for the iron works, which was granted. Shortly afterward, the blast furnace provided its first load of pig iron used at Westham Foundry, but it never maintained the promised quotas and owed Westham (and the State of Virginia) as much as 761 tons of pig iron by 1780.[348]

Despite the failure at Buckingham, Ballendine's problems really involved the canal. Construction on the canal suffered one difficulty after another. The State was forced to provide a steady stream of money to get just the small amount of water needed to run the boring mill. By October 1779, Ballendine had completed only one-twentieth of the distance from Westham to

[348] *Journal of the House of Delegates of Virginia*, November 18 and 21, 1777, p. 31, 35-36; Account Pig Iron, Westham Foundry Journal, 1779-1781, LVA; *Journal of the House of Delegates of Virginia*, July 14, 1780, p. 87; "Ballendine and Reveley in Account with the Commonwealth, a Report . . . on Demand of the Legislature of July 14, 1780," Virginia State Papers, LVA.

Richmond.[349] He was provided a small labor force and additional money from the legislature to finish the project in November of 1779, but Ballendine used it to complete work on the Westham Ironworks instead, which included building a arms manufactory and another small canal. Work on the remainder of the canal project never materialized. The assembly continually advanced Ballendine money until the end of 1779, when he owed the commonwealth over £2000 on a still incomplete canal.[350] The debt on the canal might have been overlooked if the Buckingham Works had been providing the contracted pig iron, but as already noted such was not the case. Adding further fuel to fires of Ballendine's apparent failure, nothing had been done to open the Richmond falls.

Certain Ballendine was taking advantage of the government, Governor Thomas Jefferson tried to remove him entirely from association with the Westham project. Despite Jefferson's best efforts, nothing could be done about Ballendine short of throwing him in jail. Concerned that Reveley and the Westham Foundry could not be untangled from John Ballendine, Jefferson grew interested in a new scheme developed by Peter Penet, a Frenchman visiting Virginia. At the end of June 1779, Jefferson referred a memorial of the French firm, Peter Penet, Wendel, and Company, to the Virginia House of Delegates. Although John Reveley's Westham Foundry was already in operation, the Delegates resolved that it would be "to the interest of this Commonwealth" to transfer the rights in Ballendine's canal and also the foundry and other works, which the commonwealth owned at James River Falls to the French firm. It was also decided to empower the governor, with the advice of the council, to purchase and convey to the firm an additional 3,000 acres of land on either side of the James River for the erection of another foundry and several furnaces, together with the right of way to cut either a canal or open

[349] Church, "John Ballendine," 43.
[350] Thomas Jefferson to the Speaker of the House of Delegates of Virginia, October 30, 1779, Virginia State Papers, LVA; *Journal of the House of Delegates of Virginia*, July 14, 1780, p. 87.

a road to either Richmond or Manchester. The lands were to be examined by Virginian and French investigators to find the most favorable location. The use of a coal mine located as convenient as possible to the foundry would also be provided to the firm at government expense. In return for the Westham works, canal rights, 3,000 acres of land, coal mine, and the right of way, Penet and Company were asked to give only a security for payment.[351]

The contract with Peter Penet was signed on July 22, 1779. The French company agreed to establish all items stipulated as well as a manufactory of arms on James River at their own expense. Rather than search for local laborers, they intended to import "Artists and Domestics" from France in order to carry on the works.[352] The governor and council were obliged "to purchase from the company the said number of ten thousand stands of arms annually, or such smaller number as they shall have occasion for."[353] Under these circumstances, the French firm of Peter Penet, Windel and Company would take over the operations of both Buckingham and Westham through the debt mortgage held by the state. Ballendine and Reveley would be paid for damages done, but would be effectively removed from the operation.

Peter Penet returned to France and tried to put the agreement into action without delay. But shortly after his return to France, the French Government issued a "Prohibition," on threat of capital punishment, on the passage out of France for any workmen employed in the manufacture of ordinance in time of war. Thus, Penet's scheme came to an immediate end, as Penet wrote to

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[351] *Journal of the House of Delegates of Virginia*, June 25, 1779, p. 66

[352] "Articles of Agreement between the Governor and Council of Virginia and Peter Penet, Wendel, and Company, July 22, 1779"; and Jefferson to the Speaker of the House of Delegates of Virginia., October 30, 1779, Virginia State Papers, LVA. See also, "Articles of Agreement between the Governor and Council of Virginia and Peter Penet, Wendel, and Company, July 22, 1779"; and Jefferson to the Speaker of the House of Delegates of Virginia., October 30, 1779, Virginia State Papers, LVA; Bruce, *Virginia Iron Manufacture*, 42-44.

[353] "Articles of Agreement between the Governor and Council of Virginia and Peter Penet, Wendel, and Company, July 22, 1779"; and Jefferson to the Speaker of the House of Delegates of Virginia., October 30, 1779, Virginia State Papers, LVA.. See also Bruce, *Virginia Iron Manufacture*, 42-44.

the Governor and Commissioners, "we regret to be compelled to suspend it."[354] The failure of the Penet scheme caused great disappointment for the Virginians, but also great loss since Peter Penet and his French partners would have helped the American cause with the establishment of a modern weapons facility in Virginia. Although France had a ready market for needed munitions, the members of Penet's firm clearly anticipated greater industrial opportunities in America compared to their native country.[355]

With the failure of the Penet scheme, Ballendine was given a reprieve. Irrespective of the canal, the Westham Factory did make a return of cannon and ball to the State, and Ballendine was allowed to continue his industrial endeavors.[356] John Reveley, in spite of his relationship with Ballendine and the pessimism of Governor Jefferson concerning the Westham operation, struggled to be successful and gain creditably. Westham was in full operation by March 1779. The air furnaces manufactured grates, flat irons, bake irons, utensils, and castings; a sledge hammer weighing twenty-seven and one-half pounds and iron "sheaves" for a crane weighing twenty-seven pounds for the Fredericksburg Iron Works; while the smiths in the foundry shop cut a small number of five nine-inch, and "plum" spikes and nails of various sizes. Reveley began producing cannon balls, grape, and canister shot in April, and continued to do so until 1781.[357]

The skill to cast cannon proved elusive at first. Westham did not make its first gun until September 1779, and none were bored prior to December of that year.[358] The first eight cannon

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[354] Monsieur Peter Penet to the Governor and Council, May 20, 1780, *Calendar of Virginia State Papers*, I, 355.
[355] Bruce, *Virginia Iron Manufacture*, 42-44
[356] Church, "John Ballendine," p. 46.
[357] Westham Foundry Ledger, 1779-1781, LVA.
[358] The model was that "agreeable to the order used in England, visit 1st January 1779" which included four-pounder guns of 3-2/8 bore and six pounders of 3-5/8 bore (Fly Leaf of the Westham Foundry Journal, LVA). See also, Westham Foundry Ledger, 1779-1781, LVA. On September 30, 1779, John Onions and John Jones were each paid for casting four-pounder guns. The number of guns cast is not cited. On December 20, 1779, John Brown was recompensed for his expenses for making drills and drilling seven four-pounder guns.

sent from Westham were six four-pounders and two six-pounders, each of which weighed between eight and nine hundred pounds. Charged to the account of Ross Shore and Company on May 3, 1780, the cannon were transported to Richmond with two swivels to carry twelve ounce balls.[359] Once the first cannons were cast, Reveley began producing them in rapid succession. At the end of May, Westham delivered eight guns, four each of six-pounders and four-pounders, to Zachariah Rawling.[360] A six-pound cannon was charged to the State of Virginia on June 4,[361] while Colonel Benjamin Harrison ordered twelve six-pound cannon as well as swivels, ball, and grape shot. Reveley completed Harrison's order on September 2.[362]

Production at Westham continued through much of 1780. In late May, Robert Hunter of Fredericksburg ordered from the Westham Foundry three hammers, each weighing five hundred pounds, for his forge and two rollers for his slitting mill, the combined weight of which was fifteen hundred pounds, while he sent nail rods and wire to Westham.[363] It is possible that after May 1777, Hunter produced a portion of the pig iron Westham consumed. In December of 1779, John Reveley borrowed James Brown from an unnamed Fredericksburg enterprise to make drills and drill cannon at Westham.[364] John Ballendine remained an active partner. He drew both iron and food supplies from the foundry, which he supplied with pig iron from a Buckingham blast furnace built specifically to feed the Westham air furnaces.[365] The air furnaces were erected with fire brick from the neighborhood and burned bituminous coal from Henrico County coal

[359] Westham Foundry Ledger, 1779-1781, LVA. The term four-pounder or six-pounder bore no relation to the weight of the iron gun either in the eighteenth or nineteenth century.
[360] Westham Foundry Ledger, May 24, 25, 26, 27, 1780, LVA.
[361] Westham Foundry Ledger, June 4, 1780, LVA.
[362] Westham Foundry Ledger, September 9, 1780, LVA; John Reveley to George Muter, Esq., September 2, 1780, Virginia State Papers, LVA.
[363] The Westham Foundry account books, LVA.
[364] The Westham Foundry account books, December 20, 1779, LVA.
[365] *Journal of the House of Delegates of Virginia*, November 18, 1777, p. 31.

mines.[366] Canoes freighted coal from Westham to the State Arsenal and Shops located at Mount Independence at Point of Forks on James River, where wagons and gun carriages were made and repaired.[367] David Ross made pig iron that was famous for its toughness, and a few iron bars and plates were shipped down the river to the foundry.[368] With a solid supply of materials, John Reveley was able to cast at least forty cannon a year with considerable ball, shot and plantation castings.[369]

Thus for most of 1780, the foundry was clearly in full operation. "We have poured five swivels to-day all good and cast four Guns 6 pounders this week which I shall have Bored next week," Reveley wrote to the War commissioner in Richmond. "I find John Onions [Westham manager] makes his Guns to skin much better since he has made use of the Sower Cyder [sic]."[370] Westham was filling an seemingly endless demand of its products. On October 21, 1780, Colonel John Fitzgerald collected a six-pounder cast on order.[371] Four more guns, all six-pounders, were taken to Richmond for Colonel Benjamin Harrison in the middle of December.[372] With so many guns being supplied to the Virginia defense forces and continental army, there was even interest in using Westham cannon on Virginian naval vessels.[373]

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[366] *Journal of the House of Delegates of Virginia*, November 18, 1777, p. 59.
[367] Captain H. Young to Colonel Davies, May 21, 1781, Virginia State Papers, LVA; the Commonwealth of Virginia to David Ross, April 10, 1785, with enclosure; David Ross to Governor Henry, December 27, 1785, Virginia State Papers, LVA; *Journal of the House of Delegates of Virginia*, June 22, 1781, p. 29. The magazine, workshops, barracks and other houses were built in 1780, destroyed by a small party of the enemy in 1781, and rebuilt immediately.
[368] Jefferson's *Notes on Virginia*, p. 25 ; "Representation the Board of War to be heard. . . on the first of December, 1779 . . . " Virginia State Papers, LVA.
[369] Jefferson's *Notes on Virginia*, p. 74. See also, Bruce, *Virginia Iron Manufacture*, p. 77.
[370] John Reveley to George Muter, Esq., September 2, 1780, Virginia State Papers, LVA. See also, Bruce, *Virginia Iron Manufacture*, p. 42-44.
[371] Westham Foundry Ledger, 1779-1781, LVA.
[372] Apparently, these are the last guns delivered before the foundry was burned. Westham Foundry Ledger, 1779-1781, LVA.
[373] Colonel George Muter to Governor Jefferson, January 22, 1781, Virginia State Papers, LVA. See also, Bruce, *Virginia Iron Manufacture*, p. 42-44.

After just eight months of full capacity operation, John Reveley computed that Westham could make three hundred cannon and one hundred tons of shell, shot, and other castings annually with the current staff configuration. If they could acquire more artisans and sufficient materials, Reveley believed they could increase the annual production to nine hundred cannon and three hundred tons of additional castings.[374] In a letter to Colonel Muter, the Virginia Commissioner of War, Reveley said Westham was casting an averaged of four guns per week, which were then bored the next week. If Westham could get a proper supply of pig iron and a sufficient number of workmen, they could cast and bore simultaneously at the foundry and boring mill, providing more than two hundred guns per year.[375] Unfortunately Reveley's claim was never tested since operations at Westham were about to come to an end.[376]

Early on New Year's Eve 1780, Governor Jefferson was warned that twenty-seven enemy ships had entered the Chesapeake Bay.[377] Jefferson immediately dispatched General Nelson to the lower counties with the authority to act on his own initiative until new orders were sent from Richmond. Jefferson also sent the same intelligence to Major-General Baron Stueben, the commanding general of the district.[378] Since he was unsure where the British were headed, Jefferson did not directly alert the militia nor warn State facilities.[379] Under favorable winds, the

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[374] Representation, the Board of War . . . To be heard on . . . the first of December 1779, Virginia State Papers, LVA.

[375] It seems improbable that Reveley could meet his claim, as it would mean he would be producing more cannon annually than the Tredegar Iron Works did at Richmond in 1861. Westham did deliver forty-one cannon between May 3 and December 12, 1780, but some of these guns were evidently cast in 1779. He did cast other guns, not bored, but the number of these is indefinite. The most effective part of the Westham business lay in furnishing cannon ball, grape, and canister shot to the army in Virginia, but since tonnage was not systematically noted in the account books, it is impossible to compute the exact amount. Nevertheless, Reveley probably came nearer to this estimate than he did in the manufacture of cannons. Colonel George Muter to Governor Jefferson, January 22, 1781, Virginia State Papers, LVA.

[376] Bruce, *Virginia Iron Manufacture* , p. 42-44.

[377] *Writings* of Jefferson (Ford ed.), II, 391-192, 195, 405, 475; Jefferson to the Speaker of the House of Delegates, Virginia State Papers, LVA, pp. 472-476. See Thomas Jefferson, Governor in Council, March 1, 1781, Virginia State Papers, LVA.

[378] *Writings* of Jefferson (Ford ed.), II, 391, 475.

[379] *Writings* of Jefferson (Ford ed.), II, 392, 396-398, 475.

enemy ships tracked quickly up the James River. Jefferson was alerted to their arrival on January 2, but did not realize their objective was the government foundry, or even Richmond, until the fleet was anchored opposite of Westover, twenty-five miles overland from the capital. Just before sunset on January 4, the governor learned that the enemy was disembarking within a mile of Richmond.[380]

On receiving the news of impending invasion, Jefferson speedily sent evacuation orders to Reveley. The laboratory and magazine at the foundry were to be taken to the town of Westham, a mile beyond. Whatever remained in the capital was to be removed south into Chesterfield. Although they were ordered to work through the night, no one began moving before it was well past noon of the next day and with the enemy almost inside Richmond. Jefferson raced about giving orders and further confusing the situation, leading to accusations of both incompetence and cowardice in the matter. [381]

Eventually, Jefferson went to Baron Stueben's headquarters to summon the militia.[382] Unfortunately for Westham, Jefferson arrived too late. In the early afternoon on January 5th, Brigadier General Benedict Arnold led nearly fifteen hundred infantry and nearly one hundred and twenty horsemen into the capital without obstruction. Once in control of Richmond, Lieutenant Colonel Simcoe hurried up the river to destroy the foundry.[383] As Simcoe's party rounded the last bluff, rising precipitately out of a winding stretch of the river bottom and with a

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[380] *Writings* of Jefferson (Ford ed.), II, 393, 397, 399, 406, 422, 475. See also, Bruce, *Virginia Iron Manufacture*, p. 42-44.
[381] *Writings* of Jefferson (Ford ed.), II, 393, 407, 422-423, note, p. 392.
[382] *Writings* of Jefferson (Ford ed.), II, Extracts from "Diary," pp. 393-394.
[383] *Writings* of Jefferson (Ford ed.), II, 394, 407; Simcoe's *Military Journal*, p. 163. "On Lt Col Simcoe's return, he met with orders from Gen Arnold to march to the foundry at Westham, six miles from Richmond, and to destroy it. The flank companies of the 80th, under Major Gordon, were sent as reinforcement. With these and his corps he proceeded to the foundry: the trunnions of many pieces of iron cannon were struck off a quantity of small arms and a great variety of military stores were destroyed. Upon consultation with the artillery officer, it was thought better to destroy the magazine than to blow it up this fatiguing business was effected by carrying the powder down the cliffs, and pouring it into the water; the warehouses and mills were then set on fire, and many explosions happened in different parts of the buildings, which might have been hazardous had it been relied on, that all the powder was regularly deposited in one magazine; and the foundry, which was a very complete one, was totally destroyed."

half finished canal wound about the base of the high hill, they found on the hillside near the summit the stacks and chimneys of eight furnaces, a boring mill, a molding house, a magazine, the manager's house, and several subsidiary buildings. Startled by the arrival of enemy troops, the busy company at the foundry stopped loading the wagon trains with arms and other military stores, abandoning the works and hurrying for safety.[384]

Rather than pursue the fleeing artisans, the swarming red coats focused on the production facilities. Rushing about, they struck off the trunnions of the iron cannon scattered about the place, breaking up the various small arms, and destroying the great host of military stores.[385] The most difficult task proved to be the disposing of the magazine without endangering themselves. An artillery officer directed it to be destroyed rather than blown up. The men toiled for hours, wearily carrying powder up and down the cliffs to dump it into the unfinished canal.[386]

Just before midnight, the soldiers set the various buildings on fire. With the destruction complete, they marched six miles to Richmond through the winter night with the sound of explosions booming continuously from the burning factory. [387] A day later, the whole force, after destroying military stores found in Richmond, returned to their ships.[388] In a letter to the President of the Continental Congress, Jefferson commiserated that "within less than 48 hours from the time of their landing & 19 from our knowing their destination, they had penetrated 33 miles, done the whole injury & retired."[389]

Although he failed to stop the invasion, Jefferson, aided by the Commissioner of War and Turner Southall, tried to rebuild the works as quickly as possible.[390] They immediately went to

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[384] See also, Bruce, *Virginia Iron Manufacture*, p. 42-44.
[385] Simcoe's *Military Journal*, p. 163.
[386] *Writings* of Jefferson, II, 408.
[387] *Writings* of Jefferson, II, 394, 475; Simcoe's *Military Journal*, p. 163.
[388] *Writings* of Jefferson, II, 423. See also, Bruce, *Virginia Iron Manufacture*, p. 42-44.
[389] *Writings* of Jefferson, II, 408. also, Bruce, *Virginia Iron Manufacture*, p. 44.
[390] Colonel George Muter to Governor Jefferson, January 24, 1781, Virginia State Papers, LVA.

Westham to inspect the damage. The boring mill, magazine, and artisans' houses were completely destroyed. The roof of the foundry was burnt, but the chimneys and furnaces remained intact.[391] By February 23, 1781, the Commissioner of War contracted with Nathaniel Chow to build a new boring mill and molding house.[392]

The new mill would utilize a water wheel shaft to bore one cannon at a time, which was a simpler and more efficient than that of the former mill. Jefferson demanded that the shaft be capable of having a cog wheel put in place just in case the business should require the operation of more than a single borer.[393] The Commissioner of War, approved by the Governor in Council, arranged to procure considerable labor to assist the contractor with the work, but the restoration of the Westham works was abandoned.[394] Ballendine was dead by March 19, 1782. In July 1784, the Sheriff of Buckingham County threatened a forced sale of the furnace for taxes.[395]

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[391] *Writings* of Jefferson, II, 394, 408.
[392] Turner Southall to Colonel Muter, February 23, 1781, Virginia State Papers, LVA.
[393] Jefferson "In Council, January 24, 1781 . . ." on back of letter of Colonel Muter to Governor Jefferson, January 24, 1781, Virginia State Papers, LVA.
[394] Reveley sued the state for the specie arrears of the salary paid to him in depreciated currency. The assembly, he maintained, intended to give him specie, and so, he declared, his claim was not restrained by the act of 1781 which comprehended contracts between January 1777 and January 1782, and especially excepted contracts for specie. Refusing to resign his share in the Buckingham furnace property until his claim was settled, he blocked the settlement so the furnace debt. The suit, interrupted by his death, was still pending in 1809. See, Colonel George Muter to Governor Jefferson, January 24, 1781, Virginia State Papers, LVA.
[395] For more on the involved affairs of Ballendine and Reveley with the state of Virginia see *Journal of the House of Delegates of Virginia*, November 21, 1777, p. 35, November 21, 1778, p. 76, November 18, 1779, p. 62, January 23, 1810, and in the LVA, Jefferson to the Speaker, October 30, 1779; Thomas William Ballendine to Edmund Randolph, Esq., March 13, 1778; Reveley Case and Papers, February 1, 1788; Resolutions of the Assembly, . . . July 5, 1788; Carrington to Governor Randolph, October 1788; John Nicholas to Governor Randolph, October 4, 1788; In Council, June 9, 17789, etc., Robert Brooke . . . to Governor James Wood, February 15, 1799. See also the Westham Foundry Ledger and Journal, LVA. The Failure of Ballendine's furnace to which Jefferson called attention (Letter to the Speaker, October 30, 1779) is difficult to reconcile with the statement in Jefferson's *Notes on the State of Virginia* (Boston, 1832), p. 25. By Ballendine's own account the furnace in 1781 needed a "hearth to put her in blast" and improvements and support (Ballendine to the Governor and Council, February 28, 1781, Virginia State Papers, LVA). Ballendine's death, see Fairfax Harrison's *Landmarks of Old Prince William* (Richmond, 1924), II, 436.

Ballendine's son would have sought to stop the sale, but he committed suicide and ended his family's claim.[396]

Time after time, Ballendine's reach exceeded his grasp. While Ballendine did seem to possess a vision beyond his time, his misadventures should not be held entirely against him. Although he was clearly an incompetent industrialist, it was not for lack of trying. He was the first to attempt to provide water transportation around the falls of the Potomac and the James Rivers, and his work clearly led to future canals and railroads.[397] He sought out knowledge when his own fell short and tried to fulfill his financial commitments, albeit without much success. Yet, Ballendine attempts at industrial ventures were abject failures. In four years work, Ballendine completed only five percent of the projected canal at Westham. He died deeply indebted to the state, leaving his family in dire financial straits. Jefferson, Washington, and the various other supporters dealt with Ballendine to their cost.[398]

But Ballendine's failures, and those of others like him, could be blamed upon the region they lived in as much as it could be blamed on their own shortcomings. The Chesapeake economy focused mainly on agriculture, tobacco in particular and grain to a lesser degree. The lack of segmentation in the Chesapeake economy meant that non-agriculturally oriented businessmen never felt the competitive threat of big money. Competition did not drive or restrict them, only their own intellectual or financial limitations. When a planter decided to order a new vessel he went to the local shipyard, then the shipyard turned to the local ship carpenters, boat builders, caulkers, block makers, sail makers, mast makers, and other artisans. Most planters never considered operating their own shipyard largely because they did not have the money or

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[396] For more on the Buckingham Sheriff and the suicide of Ballendine's son, see *Calendar of Virginia State Papers* . . . III, 601; and, Wills and Probates, Prince William County, Virginia, Probate Records, 1731-1951, LVA.
[397] Church, "John Ballendine," p. 46
[398] Royster, *Fabulous History*, p. 295-296.

know how. Thus, they choose instead to remain a customer, rather than become a competitor, of the mother country. But those who sought to engage in industrious pursuits thought differently. They decided it was better to build something themselves than to buy it from elsewhere, and to do so they had to take on a great deal of risk and manage it as best they could. To such men, risk and change, rather than stability and caution, were customary: they were psychologically prepared to undertake a new enterprise in order to advance their fortunes.

Unfortunately, the uniqueness of the Chesapeake economy restricted the availability of new business talent. Since agriculture was dominated by slave labor, it was often difficult to attract skilled wage laborers to the region. This meant that budding entrepreneurs would have to purchase skilled laborers, at considerable expense, or figure out a way to lure skilled free laborers to their endeavor. Industrial ventures required technical expertise, and the Chesapeake had a severe lack of cheap skilled labor.

Yet, the Chesapeake possessed an exceptionally fluid, competitive, and materialistic social environment that strongly encouraged aggressive risk taking. Its entrepreneurial ranks were remarkably deep. In addition to the wealthy planter elite, there was a pool of small but capable capitalist entrepreneurs—minor planters, merchants, land speculators and others—waiting like sharks to snatch any opportunity that opened before them. The majority of these entrepreneurs, regardless of their class origins, were men on the move—ambitious, competitive, and intensely acquisitive. Many were immigrants, but a sizable number came from the upwardly mobile within the Chesapeake's occupational and agricultural economic structure. Even the sons of the most established families received but a small financial beginning from their social background, rather than a secure financial future. They therefore labored strenuously to augment their fortunes, forever scheming and managing risks.

Because the risk was so deeply embedded in their everyday operations, those who engaged in industrious pursuits were favorably disposed toward innovation. Continually subjected to uncertainty, they were emotionally and psychologically prepared to face the stresses associated with participation in an unfamiliar market or novel enterprise. At a more coldly calculating level, the probability of going bankrupt in such a venture was not inordinately higher than the odds of having to call a meeting of creditors after several years of bad weather or losing an entire year's crop in the cargo hold of a lost ship. When businessmen in the Chesapeake found themselves in trouble, they were strongly tempted to bail themselves out through innovation. These individuals not only had the motive to innovate, but also the means to do so. They were always in touch with foreign products, technologies, and markets. They had access to European credit. These things, together with the relative flexibility of their own estates, permitted them to seize upon the risk of new opportunities, even if—as in the case of Carter or Ballendine or Reveley—the possibility of success was less than certain.

In the next chapter we will examine the role of innovation in the success of industrial and manufacturing endeavors. We will be focusing our attention on Henry Heth, the first individual in the Chesapeake to get involved in coal extraction. Heth was an innovator who constantly sought out new ways to succeed financially. When agricultural endeavors failed to produce the wealth he desired, Heth quickly shifted his attention to industrial activities once bitumous coal was discovered. Heth bought up the land, sought experts to extract the material, and began a marketing campaign to develop a market for a material previously unknown as well as unused in the American colonies. But Heth's willingness to innovate went beyond marketing a new commodity. Anytime Heth came across new technologies that he thought could boost production

or improve his operations, he adopted them, bringing the first steam pump and engine to the region.

CHAPTER 4

"Business is dangerous in the extreme"[399]: Using of Innovation to Manage Risk in the Chesapeake Coal Industry

In the gloomy humid hours just before sunset on May 2, 1807, a horse drawn carriage ambled along the winding deserted road that stretched south west from the Midlothian Turnpike, the main westward road leading out of Richmond, to the house of the mine manager of the Black Heath Coal Pits in Chesterfield County. In 1807, the Black Heath mines were the largest and most productive bituminous coal fields in eastern North America, and in the sole possession of Henry Heth,[400] the man in the carriage being maneuvered along the track by his faithful slave driver. As the two men approached a low bend in the road bordered by high mounds of coal just on the outskirts of the pits, an unseen assailant, or possibly assailants, hurled huge chunks of coal down upon the unsuspecting passengers.[401] With amazing accuracy, the assailants' salvo struck

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[399] Harry Heth to Thomas Railey & Brother 1815 Oct 10, Henry Heth Papers, University of Virginia [Hereafter, this collection will be cited as Henry Heth Papers, UVA].

[400] Henry Heth used the name "Henry" only in a handful of official documents, commonly relying on the shortened "Harry" both officially and informally in most cases, so I am going to use "Harry" as well. He was probably born in Frederick County, Virginia, sometime during the 1760s. His parents emigrated from either Ireland or England during the 1740s. During the Revolutionary War, Heth served as a captain in the Continental Army and became a charter member of the Virginia Society of the Cincinnati. Following the Revolution, Captain Heth served as the U.S. Commissioner of Loans for Virginia and as a major in the Virginia militia during the War of 1812. After several years of illness, he died in 1821 at Savannah (GA) upon returning from a trip to England. As the oldest male of Harry Heth's eight children, John Heth (1798-1842) became heir to the Heth coal empire and became one of the leading colliers of the region. For more on Heth's origins, see "An Account of the Coal Mines in the Vicinity of Richmond, Virginia, Communicated to the Editor in a Letter from Mr. John Grammar Jun.," *American Journal of Science* 1 (1819): 126-127. Ida J. Lee, "The Heth Family," *Virginia Magazine of History and Biography* [Hereafter, *VMHB*] 42 (July 1934): 273-82.

[401] It is uncertain how many people attacked Heth. Based on the sheer volume of coal hurled upon the travelers, it would seem as if there was more than one assailant. Several individuals claimed to have seen the attack, but their descriptions of the incident varied a great deal, and their own reliability was uncertain, so that the exact number of attackers seems unknowable (and possibly unnecessary). As one friend of Heth's pointed out, so many people were angry with Heth at the time of the attack that even if they had not been physically present for the assault, they were certainly there in spirit. An equal number of people were concerned for Heth, as demonstrated by a comment made by James Scott, who asked that Heth provide hourly or at least daily updates to his health as the royalty of Europe due when they are ill. For more on the attack, see: Archibald McRae to Harry Heth, 1807 May 3, & 1807 May 6;

the driver upon the head, knocking him unconscious and dislodging him from his perch on the carriage driver's seat. The passenger was also struck upon the head, as well as his neck and shoulders, causing severe cuts, bruises, and a concussion.

Unfortunately for the driver (and his passenger), he fell forward into the back haunches of the carriage horse, tying himself up in the reins and spooking the beast. The horse fled recklessly down the track kicking the driver numerous times about the body and head, severely wounding him and leaving him in a coma. As the carriage careened down the track out of control, its' wheel got caught in a rut a few hundred feet from the attack and overturned, rolling several times before coming to rest diagonally across the road. The passenger, after discovering that the driver and horse were incapacitated, pulled a small pistol from his pocket, fired a shot in the direction of the coal mounds, and then scurried away on foot into some nearby bushes as quickly as his wounds would enable. Maneuvering under pursuit through the underbrush for several hours, Heth finally managed to elude his attacker and escape to the safety of the Black Heath Mine manager's house located a few miles away from the attack location.

Distressed at finding his boss Harry Heth in the middle of the night on his doorstep in such a perilously disheveled condition, the mine manager quickly sounded the alarm to gather the odd assortment of slave and free workers under his charge. Placing several men under arms to ensure the defense of the house, the manager sent his most trusted laborer to summon a doctor for Heth. Although the manager desperately wanted to catch the assailant, Heth refused to be left alone. By the time the doctor arrived, it was so dark that pursuit of the attacker was impossible.

James Scott to Harry Heth, 1807 May 6, & 1807 May 7; A. Nicolson to Harry Heth, 1807 May 7, & 1807 May 10; Thomas Taylor to Harry Heth, 1807 May 8; Thomas Hay to Harry Heth, 1807 May 8; James Rowland to Harry Heth, 1807 May 9; J. Heth to Harry Heth, 1807 May 10; A. Nicolson to Henry Heth, 1807 May 10; John Cundiff from Edward Moseley to Henry Heth, 1807 Jul 8; Heth Family Papers, UVA.

Heth suffered severe blows to the head. He waxed in and out of consciousness for several days after the attack. The true identity and whereabouts of the assailant (or assailants, as some suspected) was never completely ascertained. Suspicion immediately fell upon a hired slave, named Moles, who came to work at the mines a month before the incident. Moles had several altercations with Harry Heth in the course of his short employment, and his owner Archibald McRae was a known enemy of Heth, partly due to the details of Moles' employment contract.

Surprisingly both Moles and Archibald McRae remained obstinately hostile toward Heth after the attack. Upon hearing that his slave was under suspicion, McRae pressed Heth in several letters to remain circumspect in his accusations until concrete evidence emerged that could prove guilt, because "there are probably a lot of people in Heth's neighborhood who might want to hurt him." If Heth was certain that "it was his man, [and] he should be set upon," then McRae agreed that Moles should be "tried as a ruffian and assassin." When Heth found evidence of Moles guilt, McRae maintained a belief that Moles was innocent, firmly asserting that Moles could never engage in such an act on his own accord and was being manipulated, stating, "I verily believe he is the puppet, and that the prime mover can only be guess at."[402]

Surprisingly, Moles never attempted to flee the vicinity; even after it was made known to him that he was under suspicion for the crime. When interviewed by Harry Heth a few days after the incident, it appears that Moles admitted to the attack, although Heth says his master Archibald McRae and others had coerced him into making the assault. According to Moles via Heth, the slave had asked not to be hired away from the McRae property because his wife was pregnant and there was no one to look after her. Unfortunately, McRae told Moles that the

[402] Archibald McRae to Harry Heth, 1807 May 3, Heth Family Papers, UVA. Heth agreed with McRae about the large number of people who might want to hurt him, and could not offer a rogues list of possible assailants when asked. Part of the problem resided in Heth's rather aggressive personality, but he also attracted the ire of the many people from whom he rented coal land. Surprisingly, the individuals who leased to Heth seemed not to understand that their land would be indelibly altered in its physical appearance when Heth's miners began to dig for the coal.

contract was already final and Heth refused to release the slave from the contract. Thus, when Moles got to the property, he argued with Heth repeatedly about returning home. Compounding Moles' distress, several people in the neighborhood harangued and cajoled him about the situation by "urging, & persuading him to use violent means against [Heth]."[403] Eventually, Moles set upon Heth believing the act was his only recompense. After hearing the details of the interview, McRae dropped his hostility toward Heth while trying to divert attention from himself. Accordingly, McRae admitted that he was not surprised to hear about the incident, as this was not "the first time he [Moles] has committed outrages on the highway." Such being the case, McRae assured Heth that "all orderly members of the community are deeply concerned in applying the rod of correction to this vile offender."[404]

Henry Heth brought charges against Moles in the Chesterfield District Court and tried to sue McRae for the damages caused by his slave, but the final outcome of this case offers an incredible insight into the mindset of an ingenious industrialist like Henry Heth. When notified by his lawyer that Moles could be executed for the assault, Heth did something unexpected. Rather than lose a laborer who had proved to be an able miner and who remained at the pits even after charges were brought against him, Heth made a deal with McRae. The exact details of the arrangement remain obscure and no correspondence between the two men refers directly to it, but Heth was transferred ownership of Moles, his wife, and their unborn child for a paltry sum in exchange for dropping the charges against the slave and McRae.

Though Heth believed strongly that justice must be served, he was unwilling to do so at the stake of good business sense. To put it frankly, it was better to keep a good worker than it

[403] James Rowland to Harry Heth, 1807 May 9, Heth Family Papers, UVA.
[404] Archibald McRae to Harry Heth, 1807 May 3, and 1807 May 6, Heth Family Papers, UVA.

was to serve the fickle whims of justice and punishment.[405] Thus, Heth demonstrated an uncommon and rather cunning willingness to deviate from traditional norms of his planter neighbors. It seems that Heth based his decisions in two traits, innovation and entrepreneurial acumen, both of which appear relatively frequently in his repertoire and helped to contribute a great deal to his (and other industrialists) success. If we examine the various instances when Henry Heth exhibited these two traits, we can begin to come to understanding of what made him a successful industrial entrepreneur.

One area where Heth stepped well beyond the confines of normal risk for a man of his day was in his willingness to use new and untested technologies in his mining endeavors, even when he knew failure rates for untested technologies were high and a wrong choice could spell disaster for his firm. The main problem for Heth and other individuals seeking to apply technological advances to their endeavors was that there were a confusing number and variety of machines on the market. Entrepreneurs willing to utilize new technologies found it increasingly difficult to know in advance what devices were best suited to their particular mix of materials and types of output. Heth addressed the problem in a letter to a steam engine manufacturer, stating,

> Business is dangerous in the extreme, and that which you are attempting to undertake must ever exist in some degree of uncertainty. Suppose on sinking the shaft 400 feet I should discover that the coal is not there, by no means an improbable, are you going to be liable for any loss of time, labor and money? Suppose the engine should after beginning to work gets into some kind of problem and no longer will work, choking and thereby suffocating and not making the 400 feet or killing my 40 Negro men, a circumstance which has lately

[405] Archibald McRae to Harry Heth, 1807 May 3, & 1807 May 6; James Scott to Harry Heth, 1807 May 6, & 1807 May 7; A. Nicolson to Harry Heth, 1807 May 7, & 1807 May 10; Thomas Taylor to Harry Heth, 1807 May 8; Thomas Hay to Harry Heth, 1807 May 8; James Rowland to Harry Heth, 1807 May 9; J. Heth to Harry Heth, 1807 May 10; Heth Family Papers, UVA. For his part, Moles responded to Heth's generosity by becoming one of most trusted and hard working miners at the pits, a result that also would repeat itself in Heth's life.

> actually occurred in England, in two separate instances. Who is going to replace my losses?[406]

The problem was compounded for men like Heth because there were many unscrupulous individuals who sought to take advantage of an unknowledgeable purchaser by selling them defective, broken, or inadequate machines; or worse, no machine at all.

Complicating the matter further, an unfortunate event could make the acquisition or completion of the machine impossible. In 1818, Heth and a group of business partners contracted with an engineer named James Bryson to build a steam engine based of his own design only to have Bryson die before completing the work. The partners tried to find another engineer capable of finishing the job, but found that the design was so complex that no other man could finish the task. The partners lost more than $12,000. Yet despite the risks, the value and utility of the engine, when applied to the coal mining trade, could not be over estimated: "The utility of the steam engine has been repeatedly and decidedly ascertained, that its application to the coal works must questionably be sound policy, and as it will require considerable time to get one into operation, we think with you that we should get started immediately."[407] As a result, Heth ignored the risks and contracted to build several other steam engines.

Heth erected the first steam-powered hydraulic pump for any coal mine in the country in 1811. It was used as a replacement for a horse-drawn tub device already in use.[408] Heth contracted for its construction with Daniel French of New York. On November 30th, French agreed "to erect, build and put into operation" a steam engine of power and force sufficient to raise 150 gallons of water per minute from a pit 350 feet deep while at the same time raising

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[406] Harry Heth to Thomas Railey & Brother 1815 Oct 10, Henry Heth Papers, UVA.
[407] Thomas Railey to Harry Heth 1815 Aug 1, Henry Heth Papers, UVA.
[408] Steam engines were used at Pittsburgh in 1808 but because there was no hoisting done at mines around there until many years later and very little pumping; steam engines were probably not used at mines until a later. Howard N. Eavenson, "Some Side-Lights of Early Virginia Coal Mining," *VMHB* 50(3) (July 1942): p. 203-204; Ronald Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia, 1715-1865*. (Westport, Conn.: Greenwood Press, 1979), p. 58

from the same shaft 1,500 bushels (approximately sixty tons) of coal every twelve hours.[409] French furnished all materials and erected the engine for the sum of $5,000. Heth promised to provide room and board for French and his men without charge, regardless of the outcome—although if the machine proved unsatisfactory, French would not be paid for the machine. The engine, called a twenty horsepower by French, was expected to produce as much energy as twenty horses tethered together for twenty-four hours, but may be worked up to thirty, thirty-five, or even forty horses for short periods if necessary.[410] It is not possible to overestimate the value of using a steam engine in Heth's operation. Heth believed the twenty horsepower engine, about the strength of a modern lawn mower, would clear one dollar in profits for every bushel of coal it burned in its operation and it could be employed at any work normally conducted by men or horses. So while it may cost him $6,000 to install in the end, if Heth could keep it working for one year it could return to him as much as $15,000.[411]

Although Heth purchased the engine, he did not follow French's advice about operating the machine. Heth employed large numbers of slaves in his mining endeavors, working them in every occupation associated with the business, including the most highly skilled. So when French's man, Oliver Evans, asked for an additional $3 per day in wages to act as an engineer and to teach a local white mechanic how to operate and maintain the machinery, Heth rejected

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[409] Agreements between Harry Heth and Daniel French, November 30, 1811, and anonymous to Messrs. Fenton, Murray and Wood, November 26, 1818, Heth Family Papers, UVA; Lewis, *Coal, Iron, and Slaves*, p. 58; Eavenson, "Some Side-Lights of Early Virginia Coal Mining," p. 203-204.

[410] Agreements between Harry Heth and Daniel French, November 30, 1811, and anonymous to Messrs. Fenton, Murray and Wood, November 26, 1818, Heth Family Papers, UVA; Lewis, *Coal, Iron, and Slaves*, p. 58; Eavenson, "Some Side-Lights of Early Virginia Coal Mining," p. 203-204. For a complete list of all items sent to Heth, see the following letter from New York shipper Amgand Cornwell & Company: Bolton, Watt & Co. to Amgand Cornwell & Co., 25 Sept. 1814, Henry Heth Papers, 1805-1815, Section 5, LVA [Hereafter, cited as LVA]. When Heth upgraded to a more powerful steam engine in May of 1815, he rented the French engine to William H. Wash for $1700 for twelve months in order to draw water from the three shafts of Railey's Pits. To run the engine, Mr. Wash was to have the use of his engine as it now stands and access to what Coke and coal as may be necessary. For more on this matter, see William H. Wash 1815 May 1, Henry Heth Papers, UVA; and Eavenson, "Some Side-Lights of Early Virginia Coal Mining," 205. For more on expanding the power of the engine, see Oliver Evens to Harry Heth, 1813 June 15, Henry Heth Papers, 1805-1815, Section 1, LVA.

[411] Oliver Evans to Harry Heth 1813 Aug 3, Henry Heth Papers, UVA.

the offer. According to Heth, $3 per day for an engineer was too high and the collier intimated that his slave hands could take care of the engine as well as any white engineer while costing Heth much less money.[412] Evans assured Heth that a good engineer would not accept less, scoffing:

> I fear you have wrong Ideas if you think Slaves can keep a steam engine in order. A man must be free before his mind will expand so much. They might soon learn to keep the engine going as long as it will go without the piston being pushed, or anything else requiring to be put to right. But slaves cannot keep a saw mill or flour mill at work without the millwright, not even a plow without the assistance of the plow maker. So you must think of engaging some mechanical Man always about the place.[413]

Heth proved Evans wrong. He boasted in 1817 to neighboring operator, A.S. Wooldridge, that he "had two young negro men to hire out, & one or two machine boys—one of the men has generally been employed at the pits for the last ten years, the other for two or three. Both the boys have been employed as machine drivers."[414]

While Heth took an innovative stance by rejecting Evans' assertion concerning the utility of slave laborers, he still needed an engineer to come to Virginia and teach the salves how to operate the machine. He asked Evans to locate a man who might be willing to come south for less money, only to find that Evans was not the only northerner to hold prejudicial views toward the south and its labor system. Evans informed Heth that northern workmen refused to work in the south because they believe that:

> If a master mechanic goes into your employ, and will refuse to work, keeping a slave himself, and helping himself freely to Brandy, then you will treat him as a gentleman. But if he lays his hands vigorously to the work (which he will be

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[412] Agreement, Harry Heth and Daniel French, November 30, 1811, Oliver Evans to Harry Heth, June 15, 1813, and Harry Heth to Oliver Evans, July 8, 1813, Heth Family Papers, UVA; see also, Eavenson, "Some Side-Lights of Early Virginia Coal Mining," p. 205.

[413] Oliver Evans to Harry Heth, July 14, 1813, Heth Family Papers, UVA; and Lewis, *Coal, Iron, and Slaves*, p. 65-66.

[414] Harry Heth to A.S. Wooldridge, December 28, 1817, Heth Family Papers, UVA. See also, Lewis, *Coal, Iron, and Slaves*, p. 65-66. Interesting enough, Heth's slave engineers and mechanics were trained by French at his workshop in Philadelphia, see Oliver Evens to Harry Heth, 1815 June 20, Henry Heth Papers, 1805-1815, Section 1, LVA.

> compelled to do because Slaves cannot do it) you immediately will think him a slave and will not think him benefited to more than half the wages of a gentleman mechanic, who does not earn wages by his own hand.[415]

Resultantly, Evans could easily find a good hand or master engineer willing to go North or West for most any price because they could expect to find work within the region's free labor economy if the deal went sour, but that same man would not go south for less than three dollars per day in guaranteed wages because he would have to pay for his own passage out of the region if the job did not work out or when it concluded.

Unfortunately, Heth still needed a trained and experienced man to run his engines and teach his workers to do the same, especially if that man could also be relied upon to run the entire business. With that in mind, Heth had a friend David Meade Randolph, who was traveling across England studying mining techniques, begin searching for a European man willing to contract for work in the United States. Heth asked Randolph to "send a man of good character to set up the engine and all prospects. I should be glad if you would engage him, to come out to me, for 10 years. I would give him a small farm, for his family and furnish him with a snug carriage and horse."[416] As to wages, Heth told Randolph to make the best bargain possible, especially since wages in England were much lower than those in the United States. Heth promised to pay passage to and from Europe if the man proved incapable of performing the necessary duties. Eventually Randolph found a man named Scotch Gordon who came to Virginia and worked for Heth for a number of years. With Gordon's assistance, Heth purchased enough steam engines to have one in operation at each of his major mining sites, and even employed another at a salt manufacturing operation he established on the Kanawha River.[417]

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[415] Oliver Evans to Harry Heth 1813 Jun 26, Henry Heth Papers, UVA.
[416] Harry Heth to David Meade Randolph 1814 Jun 22, Henry Heth Papers, UVA.
[417] For more on his other steam engines, see Harry Heth to Mssrs. Fontaine, Murray, & Woods 1818 Dec 8, Henry Heth Papers, UVA; Agreement between Harry Heth and James and John Baird 1818 Dec 8, Henry Heth Papers,

Another way in which Harry Heth stepped beyond the comfort range of his fellow planters to become an innovator was in his willingness to embrace new extraction techniques, even when he was skeptical of their success. The best example of this situation arose in 1809, when Heth was approached by Philadelphia inventor George Huato with a scheme to extract "substances other than Coal, dug out or extracted from the Said Coal pits, Coalmines, and lands [belonging to Heth], capable of being wrought, manufactured, and converted, by chemical or other process, into Commodities of various kinds."[418] But while Heth was willing to concede to the possibility of there being more commodities available for extraction from his pits, it seems that he did not believe Huato's scheme would work because he was not willing to risk his own money to fund such an unprecedented endeavor. Instead, Heth sold Huato to right to carry on the business at the Black Heath Coal Pits for an undisclosed sum of money upfront, and one eighth of all materials removed from the site for a ten year period to be paid at the end of each year. In return, Huato received "all the said Substances other than Coal, which have already been dug out or extracted, and are now laying on the Surface of the said Coal lands, or which may hereafter be dugout, or extracted from the same, at any time or times during the term of ten years from the date of these presents," and "all the water, that has already or may at any time, hereafter during the said term, be collected."[419]

UVA; Fenton, Murray, & Wood to Harry Heth 1819 Feb 2, Henry Heth Papers, UVA; and, Ben Sheppard to Harry Heth 1819 Oct 12, Henry Heth Papers, UVA. For the Kanawha Salt works, see Nathaniel Bosworth to Harry Heth 1815 Apr 22, Henry Heth Papers, UVA; B. Randolph to Harry Heth 1815 May 9, Henry Heth Papers, UVA, Virginia; Beverly Randolph to Harry Heth 1815 May 30, Henry Heth Papers, UVA; and, Samuel G. Adams to Beverly Randolph 1815 Jun 4, Henry Heth Papers, UVA.

[418] Articles of Agreement between George Huato & Harry Heth, 14 April, 1809, Henry Heth Papers, 1805-1815, LVA; Cited in Howard N. Eavenson, "Some Side-Lights of Early Virginia Coal Mining," *VMHB* 50(3) (July 1942): p. 200-203

[419] I am not sure how Huato became interested in the proposition he offered to Heth. In the Philadelphia directory for 1808, he is listed as a merchant. A native of Germany, his full name was George F. A. Huato, and he died a bachelor in Philadelphia on February 4, 1825, at the age of 45. He was said to be an enterprising and intelligent citizen. Prior to his involvement with Heth, Huato was interested in developing the Lehigh Coal and Navigation Company in the anthracite region with White and Hazard; in his estate were 159 shares of coal stock and 59 shares of Easton and

Although he was uncertain whether Huato's extraction experiment would succeed, Heth was excited by the possibility of success and extended an unprecedented number of privileges to the endeavor. Knowing that Huato would need to set up machinery to conduct the operation, Heth extended the right to build any structures necessary as long as they did not inhibit the coal business. With that in mind, Huato was allowed to use Heth's roadway from the pits to the James River, as well as his loading facilities at the river, free of charge to move his finished goods from the site. If that arrangement proved unfeasible to transport Huato's goods, Heth offered to assist him in the construction of a canal or rail line to the James.

Of course, Heth was being anything but charitable by extending these benefits. The construction of a canal or railway would be a tremendous benefit to his own coal pits, and come at a reduced cost if Huato helped to fund construction. Even more important and probably the real reason why he was so accommodating to Huato, Heth hoped to take advantage of the new extraction technique if the plan proved successful. At some early coal mines, iron ore was found immediately under the coal seam. While the references to what Huato was expecting to find are indefinite and incomplete, iron was probably "the substance other than coal" specified in the agreement.[420] If Huato's extraction technique proved itself, Heth could make a sizable profit on iron ore at his other mines by using the technique.

But there is a distinct possibility that Heth expected Huato to find some other substances, particularly Alum or copperas. Well after his contract with Huato concluded, Heth began corresponding in 1818 with J. H. Hurst and P. G., Lechleitner of Pennsylvania. Hurst owned an

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Wilkes Barre turnpike stock. For more on Huato, see Eavenson, "Some Side-Lights of Early Virginia Coal Mining," 203; *Press*, 2/4/1825; Poulson's *American Dailey Advertiser*, 2/5/1825.

[420] Eavenson, "Some Side-Lights of Early Virginia Coal Mining," p. 203.

anthracite coal mine with a large alum and copperas manufactory in operation at the site.[421] Heth believed based on information provided to him by Huato that some of the water found in his mining shafts contained pyrites and minerals that suggested the existence of a deposit of aluminum or copperas nearby. If such was the case, then Heth could make a considerable sum of money selling the minerals to the burgeoning American textile industry. In response to Hurst and Lechleitner's urging, Heth took a sample of the mine water from ten feet below the surface and shipped it to them for examination. The water contained useable substances, but Heth was unwilling or incapable of bearing the expense of establishing the manufactory on his own in order to extract the materials for use.

In 1815, Heth used a similar sleight of hand system of payment which he employed with Huato to defer the expense of removing water from Railey's Pits after the mining shafts began to flood, ending coal extraction at the site. William H. Wash contracted to set up a water pump driven by a steam engine to draw water from the three shafts at Railey's for 1700 dollars. But there was a slight catch in the terms of service. If Wash could not empty at least one of the shafts entirely of water in twelve months, then Heth did not have to pay him for his work and could continue using the pump system for another nine months. The scheme worked in Heth's favor. Wash was not able to empty the shaft in the allotted time; Heth kept the pump for the nine month

[421] J. H. Hurst to Harry Heth 1818 Jul 10, Henry Heth Papers, UVA. Different substances were distinguished by the name of "alumen"; but they were all characterized by a certain degree of astringency, and were all employed in dyeing and medicine, the light-colored alumen being useful in brilliant dyes, the dark-colored only in dyeing black or very dark colors. Copperas, or green vitriol, is a form of ferrous sulphate, extracted from iron pyrite-rich nodules, which was used extensively in the textile and metallurgical industries and for a number of other purposes. In metallurgy it was a key ingredient in the production of nitric acid (*aqua fortis*) and sulphuric acid (oil of vitriol) from which chlorine was produced. Chlorine was used as a bleaching agent in the 17th and 18th century textile industry while copperas itself was used as a dye fixative for woolens. Additional uses of copperas included printers ink, a tanning agent for leather and in the manufacture of gunpowder.

extension and eventually bought the machine from Wash at a reduced price because it was used.[422]

Heth's willingness to get involved in the extraction of new materials from his long running coal mines was not the only way in which he was willing to take on more risk than most other planters. Whenever a new technique (whether it was more proficient or cost effective) or useful form of machinery was developed in the United States for use in coal mining, Heth immediately sought it out for use in his operations. However, he did not limit his continual search for innovation to the United States.

In the summer of 1808, Heth sent his good friend David Meade Randolph to England for a year to examine several English coal mining operations as well as several related manufactories.[423] Heth had more than a few purposes in mind when sending Randolph to England: 1) to learn new mining techniques, 2) to locate and attract well trained workers to Virginia, and 3) to find a good manager for his coal mines. In order to fulfill his task, Randolph "visited several coaleries [sic]" and immediately learned a new technique "to make every bushel of such fine & slatey [sic] coal, fetch as much as any to the best grate coal, by turning it into coke." After paying all the expenses involved in the process, Randolph believed that this new technique will add a large increase to Heth's profits, as long as coke is in demand to a great extent and the price is higher than coal. In fact, Randolph believed that the knowledge he acquired was so useful to Heth that he was "almost inclined to return and submit all I know" rather than continuing his trip. Heth pushed Randolph to continue the excursion, but took his

[422] William H. Wash to Harry Heth, May 1, 1815, Henry Heth Papers, 1805-1815, Section 2, LVA. While this scheme worked in Heth's favor, such was not always the case. In 1804, he contracted with a well digger to sink a shaft to drain water from one of his mine shafts, but the attempt failed when the well digger died in the course of the work and Heth (who contracted to pay for the work up front) lost the full amount of the money invested in the endeavor. See Letter to [Harry Heth] from A. Nicolson, 1804 Apr 21, Henry Heth Papers, UVA.

[423] Randolph served with Heth during the American Revolution in the 1st Virginia Regiment while a Captain in Bland's Dragoons. Randolph was well connected in Virginia coming from one of the best families in the state and serving as the U.S. Marshall for Richmond under President James Madison.

advice to "ascertain the price and amount of demand for this article throughout the united states, among brewers & manufacturers."[424]

While he missed his family sorely during his extended trip, Randolph believed some "good may make from my inquiries." He spent several days at each location, sending baskets of stone samples to Heth from each site along with detailed descriptions of how each mine and manufactory operated. The mission was a complete success for Heth, as Randolph's intense examination of "lime kilns, docks, &c with a vein to acquiring much information as may be useful in my return." This was particularly the case in terms of lime extraction and its use in various forms of manufacturing. By the end of his trip, Randolph acquired enough information to make him the foremost authority on lime in Virginia. But isolation and homesickness eventually got the best of Randolph, forcing Heth to recall him to Virginia well before the one year mission was complete.[425]

Despite the early end to Randolph's excursion, the expedition proved useful to Heth well beyond the information Randolph acquired. While traveling and examining coaleries in the English countryside, Randolph acquainted Englishmen with Henry Heth and piqued their interest in his endeavor. Such interest paid off for Heth in 1819, when he was contacted by Robert Pettigrew. A coal master from Scotland, Pettigrew was recommended to Heth by a number of English mine owners who remembered that Heth was looking for an experienced man to run his expansive mining operations in Virginia. Pettigrew described himself as a "minor brought out from my youth and understands it in all its branches, such as digging pits, boring, and blowing rocks etc. or any other thing that belongs to mines" and "has been in the habit of conducting or

[424] Letter, [D. M. Randolph to Harry Heth] 1808 Jul 19, Henry Heth Papers, UVA. Randolph's letter to Heth probably the first reference to the possibility of making coke in Virginia, and the US. For more on Randolph's trip to England, see Eavenson, "Some Side-Lights of Early Virginia Coal Mining," p. 199-200.
[425] Letter from D. M. Randolph to Harry Heth 1808 Aug 22, Henry Heth Papers, UVA.

carrying on coal mines for a number of years before he left Scotland."[426] This was just the sort of man Heth needed.

Based on his extensive experience, Heth put Pettigrew in charge of his operations, allowing him to inject new extraction techniques into the endeavors which drastically increased production and efficiency. In return, Heth promised to provide the man with a reasonable wage, a "small farm for his family, and furnish him with a snug horse carriage and horse." But even in paying Pettigrew, a man Heth came to depend upon greatly in the course of their relationship, he tried to work out a deal in his own favor. As he told David Meade Randolph on June 22, 1819, "it is my intention to hold him close to me by an accumulation of his wages, to be paid at the end of each year of the contract." He also assured Pettigrew that he would pay to send him back to Scotland if their relationship should sour, but actually threatened to do so on several occasions when Pettigrew refused to follow his orders.[427]

By constantly seeking better techniques and new technologies to work his mines, Henry Heth was able to increase his production levels, but he still faced major problems moving his coal to markets. The United States lacked an efficient and economical transportation network, which was at the foundation of so many of the financial difficulties confronting industrialists like Henry Heth. As a result, internal improvements dominated Heth's business concerns.[428] Most coal mined in Virginia was transported by boat to Richmond, either down the James River or the James River Canal. This over portaging caused severe economic difficulties for Henry Heth and other Virginia coal dealers.

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[426] Robert Pettigrew to Harry Heth, 1819 Jun 1; 1819 Jun 9; 1819 June 7; and 25 Jun 1819; Henry Heth Papers, UVA.
[427] Harry Heth to David Meade Randolph 1819 Jun 22, Henry Heth Papers, UVA.
[428] Lewis, *Coal, Iron, and Slaves*, p. 201.

The shipping of bituminous coal involved numerous steps. After hoisting the coal out of the pits and heaping it near the pit, coal was generally shoveled into a cart and conveyed to the river or canal bank where it was re-shoveled into wheelbarrows and dumped into the barges. In other cases, the carts were drawn out over a scaffold (or triple) erected over the water, and emptied into the waiting coal boat (commonly called bateaus). The bateaus normally carried two hundred bushels, but during the dry season when the river was low, loads were reduced to half that amount. Obviously, this procedure increased transportation costs because coal boats were slow moving and had to pay a flat toll of $1 per load. Half-loads cost the same and took the same time, but brought in only half the revenue. On arrival at Richmond, coal yard slaves stockpiled the fuel for sale to local purchasers. Coal designated for export was then reloaded and wheeled to the city wharves, where it was once again emptied into coastal vessels destined for Atlantic ports. The entire process was incredibly labor intensive, slow, and led to the break up of the individual pieces of coal, which raised prices and drastically reduced its value on the market.[429]

Richmond had a canal system, but it did not serve the interest of most Virginia colliers. The James River Canal was located on the north bank, so mines south of the river seldom used the facility. Instead, they were forced to wagon their product along makeshift roads to wharves at Richmond. Even though they commonly owned and operated their own wagons, moving coal by land increased shipping costs. Wagoning decreased handling, but the jarring movement of the wagon rumbling over rough roads tended to break the lumps of coal into smaller and smaller pieces, which again greatly diminished the coal's marketability and reduced profits. Only large pieces fetched the highest prices at market. In many cases, the excessive handling damaged the product so badly that it frequently sat at the loading wharves without being sold or went for very

[429] Lewis, *Coal, Iron, and Slaves*, p. 200-201.

low prices. Water conveyance was less damaging and cost about seven cents per bushel, making it more cost effective. In 1820, a report by the Virginia's Board of Public Works concluded:

> It will be perfectly safe to say, that if the coal could be got to market, nearly in the condition it is delivered from the mine, that the average sales would be five cents per bushel higher. It results then, that the collier pays seven cents in actual charges, and suffers by the present mode of conveyance five cents deterioration, making twelve cents per bushel cost between the waters edge near the mine and the vessel which carries it to market: and it is also to be remembered, that the freight of a cargo of inferior coal, will be equal to a cargo of that which will sell for the highest price.[430]

The board believed that with improved methods and reduced handling transportation charges could be reduced to about three cents per bushel.

Moreover, since the coal trade involved extended lines of conveyance, frequent accidents beyond the control of the operator occurred. Such accidents could be catastrophic. Heth had one vessel sunk at Alexandria due to a piloting error of the captain. Regarding "the 3504 Bushels of coal sunk at Alexandria, I have been very unfortunate," wrote an agent to Heth in 1819. Heth tried to have the cargo raised by his own men, but the attempted failed and "the Vessel still remains as she was." In the end, Heth and the agent selling the coal were forced to find "a competent person to raise her for 1000 dollars." Despite numerous relatively expensive attempts to hoist the vessel and its cargo of coal to the surface, Heth salvaged only a small part of the coal and the ship was a total loss.[431]

With so many difficulties involved with the transportation of coal, it should be no wonder that Henry Heth constantly sought to develop and employ new schemes to solve the problem.[432]

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[430] VA Board of Public Works, *Annual Report*, 1820, VA State Library; see also, Lewis, *Coal, Iron, and Slaves*, p. 201.

[431] Andrew Ramsey to Harry Heth, March 7, 1819, Heth Family Papers, UVA; see also, Lewis, *Coal, Iron, and Slaves*, p. 203.

[432] Heth went beyond the development of new transportation networks; he also bred his own draft animals (horses, & mules) as well as invented vessels of transportation ranging from new wagons, carriages, and boats. For more on these subjects, see: Letter from James Martin to Harry Heth 1807 Oct 12; Letter from Harry Heth to Mr. Smith Blakey, 1803 Apr 13; Letters, Miles Seldon to Henry Heth, 1803 Jun; Letter to Harry Heth from A. Nicolson 1804 Jan 19; Letter to [Harry Heth] from A. Nicolson, 1804 Nov 16; Letter to Harry Heth from Peter Duprey 1807 Jan 7;

Coal transportation along the James River involved too many costly and damaging transfers. Since the region lacked an integrated or centralized transportation system, the first major undertaking Heth became interested in was the construction of a canal on his land south of the James River in the summer of 1810.

Heth needed a canal to connect his pits at Black Heath to the James River. Without the canal, Heth had to use over land transportation to move his coal to the loading docks on the James River. Large chunks of coal bounced by wagon a few miles along Heth's personal road to the Midlothian Turnpike, where it was then taken to his James River loading docks. At the James, the coal was piled inside storage facilities until a boat arrived for shipment. When transports arrived, the coal was shoveled into wheelbarrows, moved to the docks, and deposited it into barges by dumping it down long wooden chutes. Upon reaching the water basin of Richmond, the coal was removed from the transports and shoveled into wheelbarrows at Heth's Richmond port called Rockets, where it was again dumped into warehouses and stored until it could be loaded into a coastwise transport ship. When the coastal ship arrived, the coal was shoveled yet another time into wheelbarrows and moved to the hold of the coastwise vessel to carry it to market. Each step of the process pulverized the coal, which reduced the combustibility of the mineral and lowered its value. But it also lengthened the time it took Heth to move his product to market.[433]

Letter to Harry Heth from A. Nicolson 1807 Feb 10; Andrew Nicolson to Harry Heth, 1807 February 14; Letter from James Martin to Harry Heth 1807 Oct 12; Letter from B. Randolph to Harry Heth 1810 Nov 13; Thomas Mann Randolph to Harry Heth 1813 Jan 16; Steewaggon & Knight to Harry Heth, June 12, 1813; William Pennock to Harry Heth 1813 Jul 10; William Dodge & Son to Harry Heth 1815 Mar 10; William Dodge & Son to Harry or Richard Hughes 1815 Mar 21; Francis Minor to Harry Heth 1815 May 2; [?] to Harry Heth 1815 Sep 17; R. Hughes to Harry Heth 1815 Oct 19; Harry Heth to Thomas Railey & Brother 1817 Jun 16; R. Hughes to Harry Heth 1817 Nov 30, Henry Heth Papers, UVA.

[433] Sean Patrick Adams, *Old Dominion, Industrial Commonwealth: Coal, Politics, and Economy in Antebellum America* (Baltimore: Johns Hopkins University Press, 2004), 39.

As a result of the time and damage to his coal, urban retailers told Heth that the coal he shipped from Richmond was less than satisfactory than his competitors, even while they asked for more to sell. J.P. Pleasants of Baltimore complained to Henry Heth in 1811 that "the quality of the Coal lately had been so indifferent that I have lost the sale of a great deal. It is not one, two or three who complain, but all." Thomas B. Main of Boston wrote to Heth in December 1815 that his last shipment was "small and dirty" and must have been the "scrapings of the yard." Main canceled orders for the next spring and summer, losing Heth a valuable contact. Chesterfield County colliers would complain to the legislature as late as 1824 that the existing system delayed and damaged their shipments, reducing their profit margins and costing them business: "The Quality of the coal is so naturally injured that it can never gain a sufficient character in the northern markets to offer an inducement to us to use [the canal]."[434]

But Heth believed that moving coal loads by canal would assuage the overland transportation problem. He tried to contract with a canal builder from Maryland to build a canal from Black Heth to the James River, but found the price was too steep. He struggled to negotiate a fair deal with the Marylanders, but found the task impossible. Not only did the company expect a considerable amount of money to build the canal, they also wanted the rights of operation on the canal for ten years. During that time, they would charge Heth a small fee for passage. Unable to find a middle point, Heth broke off negotiations and began searching for more equitable transportation solution.[435]

Unfortunately, Heth's transportation difficulties only continued to grow. Coal traffic increased as a result the War of 1812, which led the Virginia turnpike Companies to gradually increase their tolls to cover the intensified wear and tear on their roads; but most found that the

[434] J.P. Pleasants to Harry Heth, 8 July 1811; Thomas B. Main to Harry Heth, 2 December 1815, Heth Papers, UVA; Chesterfield County Petition, 15 December 1824, Legislative Petitions File, LVA.
[435] H. G. Heth to Harry Heth 1810 Jun 15, Henry Heth Papers, UVA.

added revenue still failed to pay for their expenses. In response, the turnpike companies asked the state legislature for the right to charge even higher tolls and petitioned for the power to limit the amount of coal individual wagons were allowed to carry. In 1813, the Richmond Turnpike Company complained that narrow wheeled wagons filled with more than one hundred bushels of coal created deep ruts that required constant repair and asked the legislators for a charter amendment allowing them to charge high fees on wagons carrying more than sixty bushels in order to stop the practice. The State Legislature granted their request, greatly distressing the business prospects of local colliers like Henry Heth. "I understand that most of the Gentlemen who own coal pits or run wagons on the turn pike road, are very much displeased with those Gentlemen in the legislature that voted for the law regulating the turn pike road," William Pope, a delegate from Powhatan County, wrote to Henry Heth in 1812. The legislature also tried to alleviate the burden on individual turnpike companies by allowing them to construct new turnpikes in heavily used areas, but the addition of these roads proved of limited use for the Richmond basin's rapidly expanding coal trade.[436]

Facing constantly escalating tolls and load restrictions, Heth found the turnpikes to be an increasingly unappealing mode of transportation for his coal. The biggest problem was increased transportation costs. At the time, the rate for wagon transportation of one ton of coal for a mile ranged from thirty to seventy cents. Since the price of coal averaged about three or four dollars a ton, overland transportation costs quickly bit into potential profits. As time passed, Heth found he needed to sell larger and larger quantities of coal in each individual transaction just to break

[436] William Pope to Harry Heth, 4 April 1812, Harry Heth Papers, UVA; Legislative Petitions from Richmond City, 13 December 1813 and 9 November 1814; Legislative Petition Collection, LVA; *Richmond Enquirer*, 2 March 1816; George Rogers Taylor, *The Transportation Revolution, 1815-1860* (New York: Holt, Rinehart, and Winston, 1951), 133. See also, Adams, *Old Dominion, Industrial Commonwealth*, 22, 36-40, 42-48, 54-56, 80-85, 166-167.

even, but mostly he found that transportation costs were making long distance business dealings impracticable.[437]

In order to continue doing business, Heth had to find a new mode of transportation for his coal. He turned to a new and entirely untried form of transportation: the railway. In late 1812, Heth accepted a proposal from John Stevens of New York to construct a railway by the nearest practicable route from the Black Heath Coal Pits to the landing at Warwick. The two partners believed that if the railway would cost $10,000 to $13,000 per mile for ordinary construction, which included the cutting down of hills, the raising of valleys, the expense of using metal rails instead of wood (as was the standard practice), and the capital required to buy horses and coal carriages.

Since the total cost of the endeavor would stretch close to or beyond $130,000, Stevens and Heth believed that creating a joint stock company would the best way to defray the cost. The two men planned to sell 160 shares on subscription to investors at $500 per share in order to raise $80,000; Stevens would provide the remaining $50,000 out of his own pocket. The subscription would focus on local shareholders, but could also include investors from New York, Philadelphia, Baltimore, and Washington. In order to attract investment by local coal men, the two established that large stockholders would be allowed to use the railway to move coal at costs reduced in direct proportion to the number of stocks owned. For his investment and risk in the operation, Stevens would act as the superintendent of the railway and receive forty shares of stock, which would be transferred to his son Robert in case of death.[438]

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[437] William Pope to Harry Heth, 4 April 1812, Harry Heth Papers, UVA; Legislative Petitions from Richmond City, 13 December 1813 and 9 November 1814; Legislative Petition Collection, LVA; *Richmond Enquirer*, 2 March 1816; Taylor, *Transportation Revolution,* 133.
[438] John Stevens to Henry Heth, December 21, 1812, Henry Heth Papers, 1805-1815, Section 1, LVA.

Having devised how the railway would be funded, the two men next turned their attention to actual construction. The scheme would consist of two depots connected by a railway. Since the rails would have to traverse hills, valleys, and waterways, Stevens proposed they used a new rail construction method rather than follow the ordinary fashion. The pathway for the rails would be raised three or four feet from the ground. On top would be laid red cedar or locust cross tie posts attached to a metal track, rather than the standard all wood railway. It was believed that elevating the rails would allow it to last twenty years without any decay "and should the surfaces of the rails wear with use they can be caped at a small expense." After a mile and one quarter of the "rail-way is completed, an experiment will made therein" where a small line of loaded carriages will be pulled along the track by a team of horses. If successful, then the partners would declare the railway scheme "satisfactory as if the whole was respectively completed."[439]

A few weeks later, Stevens sent a new plan to Heth calling for another technological innovation for the rail system. Instead of utilizing horse drawn cars, Stevens proposed the railway employ a steam powered engine to pull the coal carriages. He believed the new method could be employed at the same expense, even though the change would require them to build tracks of a different gauge. To propel the steam engine, Stevens suggested the company allow local colliers like Heth to pay for the use of the railway in kind rather than specie. As a final addendum to garner Heth's support for the project, Stevens offered to nullify the original contract if the new method proved impracticable during the experiment. Stevens would then reimburse the company for the entire endeavor and run the railway in the ordinary mode. In return for this concession, Stevens required Heth to promise that he would oppose any and all attempts to build a competing railway system, a concession Heth fully supported since the establishment of a competing railway could only "be attempted but at a comparatively and

[439] John Stevens to Henry Heth, December 21, 1812.

enormous expense, and even then, subject to the disadvantages, among many others, which it is useless at present to enumerate, above stated because the transportation of articles would require double the time and three times the expense."[440] Fatefully for Heth and Stevens, war commenced between the United States and Great Britain in mid-June of that year, ending further development of the project.

In 1813, Heth asked his good friend J. P. Pleasants to engage a new company for the construction of a rail system. Pleasants informed Heth that the war made such acquisition difficult, but assured him the great distance to be traversed would certainly attract only the most ambitious companies. Heth's pits were approximately fourteen miles from the nearest source of navigation, the Manchester Turnpike, which was proving useless for transporting coal. Shortly thereafter, Pleasants notified Heth that he located a man named Mr. Pulley who would consider undertaking to build the railway at his own expense if the banks of the James River were "sufficiently high to admit vessels drawing 12 feet of water to load under a spout." The amount of the entire endeavor would exceed $75,000, but Pulley believed it could expect to make $50,000 the first year in clear profit "under an administration which is less embarrassed." Accordingly, Pulley told Pleasants that the "profit will be double every year of the installation" and could "as a piece price will yield $120,000 at the pits annually." Unfortunately for Heth's operation, fate interceded and Pulley died, stopping Heth's plans to build a railway yet again.[441]

The final plan for the establishment of a railway system would not be reasserted until 1818, when Heth sought the assistance of Yateses & Company for their advice concerning the construction of the railway and to enlist them to build the railway steam engine. According to Yateses & Co. of England, it would be best to build the railway on a raised pathway or crushed

[440] John Stevens to Harry Heth, Dec 31, 1812, Henry Heth Papers, UVA.
[441] J. P. Pleasants to Harry Heth, Oct 13, 1813 and May 5, 1814, Henry Heth Papers, UVA.

rock. Upon the pathway, they recommended that Heth laid wood sleepers topped by two iron rails (clearly, Stevens' earlier scheme had been based upon or sparked recent changes in construction). They reiterated an earlier admonishment, stating "to attempt to form a rail-way, on the ordinary construction, by so fragile and punishable a material as wood would be throwing away money, as it could not, probably, stand a single month." Yateses & Co. also promised to help Heth to set up the railway and operate it, guaranteeing that they could furnish a "proper engineer accustomed to the kind of work who shall go out on moderate wages, as we are in a constant habit of sending them abroad on those terms to erect, steam engines, and sugar mills etc." The entire railway, steam engine, and iron wagons to move the coal would cost approximately Ł77, 550; not including the expense of shipping the materials from England and the engineer.[442]

Unlike previous attempts to establish a new transportation network, Heth decided this time to seek financial support from the Virginia state government. Heth first petitioned his local politicians in the state legislature before seeking the help of other local representatives. He declared that the "said railway may be a public utility and beneficial to the lands it passes through."[443] He stressed the great expense required to "lay off the railway, to level the ground, to raise and dig it up," and asked that the state provide financial aid or at least purchase one share. If the state could not financially support the endeavor, Heth hoped they could at least "extend by set to him or his persons the said railway and all the privileges necessary for running it."[444] Heth's request was discussed in the legislature, but a clear decision could not be reached once the issue was opened to debate. The railway was finally completed in the 1820s, but Heth was not able to benefit from the network due to his own death.

[442] Pleasants to Heth, Oct 13, 1813 and May 5, 1814.
[443] Accounts and receipts for 1818, Henry Heth Papers, UVA.
[444] Petition to the State Legislature, Accounts and receipts for 1818, Henry Heth Papers, UVA.

While Henry Heth was involved in using some pretty novel technological improvements in his mining endeavors, his most ambitious and forward thinking innovation was a plan for the establishment of a professional school to train workers for the American coal mining industry. Skilled workers were crucial to the success of any industrial venture, but coal mining had special needs in terms of worker abilities. In 1815, Heth wrote that his son's "exertions to obtain hands on hire for the prosecution of my coal business will be absolutely necessary."[445] But the Chesapeake lacked trained workers. There were virtually no skilled white wage laborers in Virginia. The situation was so bad that many industrialists often tried to recruit workers from the north. On Oct 18, 1819, John E. Meade wrote Harry Heth that "I have myself contemplated a visit there [Pennsylvania] this winter, to procure an Engineer, since the white men in that line be generally so dissatisfactory in our region. I despair of getting any that are trustworthy."[446] This scarcity of skilled white workers forced many industrial entrepreneurs in the south into a dependence on slaves for skilled positions, but even this failed to fulfill demands.

The scarcity of skilled labor in the Chesapeake was a constant hindrance for the development and success of industrial ventures. To combat the problem, Henry Heth routinely made provisions concerning labor the central issue for all contracts for co-partnery and leases for mines. In an article of agreement with Thomas Taylor, Heth's participation in the partnership hinged upon the simple necessity on having the proper labor resources for the endeavor. "As I have long stated to you," Heth reiterated in 1813, "I refuse to enter into this Agreement without the presumption that the Stock put in shall be sufficient to purchase our own Negroes [to work the mines]."[447] Even with these precautions, finding skilled workers remained a problem.

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[445] Harry Heth to Henry Heth (son), February 26, 1815 Heth Family Papers; For more on the problem with limited numbers of skilled industrial workers, see Lewis, *Coal, Iron, and Slaves*, p. 83.
[446] John E. Meade to Harry Heth 1819 Oct 18, Henry Heth Papers, UVA.
[447] Articles of Agreement, Harry Heth and Thomas Taylor, January 31, 1813, Heth Family Papers, UVA.

To end the continual problem of a limited pool of skilled laborers in the Chesapeake, Heth believed it was necessary to establish an institution to educate skilled workers, whether such an endeavor was funded by the government or by private individuals. In a letter to his uncle H. G. Heth, Henry Heth stated that "it is absolutely necessary that some plan be pursued without delay for the education" of accomplished workers. The main problem for such an educational institute was finding enough funding to get the school in operation and keep it running long enough to attract enough students to make it financially viable. Heth recognized this problem, worrying about it a great deal, but he needed skilled laborers. Nevertheless, he had reservations about funding the school out of his own pocket without some form of help from the state legislature of Virginia. "Placed in the situation I am," Heth grumbled, "it is impossible for me to do more. It is hard that I should have the burden of their education upon my shoulder & not have the power to act as I think most to their improvement. It is not by any means natural [to be surprised], since my father during his lifetime could never educate his [own] children in a manner he thought proper." Despite his reservations concerning the school, Heth seemed comfortable with the fact he had done everything possible for the future students of his seminary, complaining "the world in general may affix much blame & censure to my conduct relative to them but knowing what exertion I have made my own conscience will strengthen me in the road I pursue."[448]

Although Heth was unable to convince the government of Virginia to support his seminary, he decided to implement the plan on his own. In the summer of 1817, Heth began to hire teachers for the new school. He hired James Keeler of New Jersey to teach English and languages. Since no students had been enrolled at the time, Heth allowed Keeler to hire himself out as an educator to locals seeking his services. Keeler seized upon the opportunity by making

[448] Letter to Harry Heth from H. G. Heth, Jul 7, 1805, Henry Heth Papers, UVA.

inquiries for students before he left New Jersey, even finding several gentlemen in the vicinity of Heth's seminary who were "perfectly satisfied that a term should be $25 for those who study English and $35 for such as study the language."[449] Heth understood that a crucial necessity for the success of an educational institute was establishing the authority of the school administration, for if "the master does not having proper authority, it is impossible the child can improve even if I was so fortunate as to procure the most eminent teacher."[450] With this need in mind, Heth believed it was important to allow the teachers and school administers to work outside of the seminary if they wanted so they remained happy in their positions at the institute. Having secured one teacher for the seminary, Heth actively began recruiting others.

In addition to hiring teachers and administrators, Heth recognized that it would be necessary to set forth the organization and curriculum for his Coal Mine Seminary. In a proposal delivered to legislators of the Virginia General Assembly and the Virginia members of Congress in October of 1819, Heth set forth his intentions for the institute. The seminary would focus on instructing mining techniques and the management of the coalmines. The government of the Seminary would fall under the leadership of a Preceptor who would be chosen by a board of Trustees. Together, the Trustees and Preceptor would select a Principal and, if necessary, an assistant to aid the Principal. The purpose of the Principal and assistant would be to preserve order in the Seminary and manage the day to day affairs of the school. Tuition would be based on a ten month school year, with students attending classes six hours each day for six days a week. Students would be admitted by the approval of the Principal and were required to pay a

[449] James Keeler to Harry Heth Jul 14, 1817, Henry Heth Papers, UVA.
[450] Letter to Harry Heth from H. G. Heth, Jul 7, 1805, Henry Heth Papers, UVA.

quarter amount of the tuition in advance. The course of study was to be directed by the Preceptor, who hired instructors and established class schedules.[451]

Since Heth wanted the students at the Seminary to come from any social and ethnic background, he believed that discipline was a crucial aspect for success. As with instruction, discipline at the Seminary would be the responsibility of the Preceptor, Principal, Assistants, and instructors. A roll containing the names of the students would be kept; if any student was absent at the time appointed for them to meet, it shall be at the pleasure of the principal or assistant to punish them as shall be deemed expedient. Students would be expected to address the Principal, his assistants and their teachers with respect. In case of neglect, the student was subject to such punishments as the Principal thought necessary. Swearing, indecent language, and improper behavior by a student above sixteen years of age would be met with swift punishments. For the first offense, the student would face admonishment from the principal; for the second, such other punishments as the trustees may direct would be applied. If the student was under the age of sixteen, the punishment would be of such manner as the Preceptor may direct. All cases of contumacy or defiance of authority were grounds for immediate expulsion. Should any parent or guardian feel himself or their child aggrieved, they would be able to make the same known to the Trustees, who were the only proper persons to hear complaints. Under no circumstances should a parent, guardian or student address the Preceptor, Principal or instructor directly themselves.[452] Despite his detailed planning and constant advocacy, the Seminary was never established and Heth continued to struggle with labor shortages.

In the end, despite his willingness to embrace modernization, Henry Heth was never able to get his facilities beyond a certain level of production. Heth's son was eventually driven out of

[451] Coal mines seminary Oct 10, 1819, Henry Heth Papers, UVA.
[452] Coal Mines Seminary, Oct 10, 1819, Henry Heth Papers, UVA.

the coal mining business long after his death because of mounting competition from the state supported anthracite mining corporations in Pennsylvania. But the failure of Heth's various mines was not because he was unwilling to innovate or change. Henry Heth's mining endeavors failed for several specific reasons. For one, Heth could never attract enough labor to meet his ever increasing demands. While slave laborers were more than capable of working efficiently in every aspect of the coal mining industry, Heth could not afford to purchase new slaves to meet his labor demands and faced increasing hostility from slave owners when he tried to rent workers. Even on the rare occasion when he could find a slave master willing to rent a slave to the mines, they placed such severe limitations on the type of work the slave was allowed to perform that the restrictions made the individual seemingly unusable at the pits.

Another major problem affecting Heth's success revolved around the difficulty of finding an efficient way to ship coal to markets without lowering the quality of his product. Despite his efforts to improve local transportation networks, Heth never solved the quality dilemma because the bituminous coal he mined was too brittle to withstand the travails of shipment. Anthracite coal, mined by his competitors, was a tougher and harder form of coal. It could withstand the difficulties of shipping while bituminous coal dissipated into bits. When huge deposits of anthracite were discovered in Pennsylvania and mines opened, Heth could not compete in terms of quality within national markets, or even local markets.

Yet Heth's problem competing within the national market place went beyond quality issues and inadequate transportation networks. At the height of demand for his coal, Heth hit a ceiling in production that he could not expand beyond. The question remains as to why? Many answers have been posited, but none really prove satisfactory.[453]

[453] Many historians have attacked the old historical assumption that slavery was not a productive labor system, but the best arguments can be found in: Carville Earle, "A Staple Interpretation of Slavery and Free Labor,"

Traditionally, historians have blamed the southern adherence to slavery for labor as the main cause for the regions inability to expand its industrial activities beyond the supply of local needs. While slavery was a problematic labor source, in actuality it could be more productive than free labor. Since slaves received rewards for hard work, they took pride in their skills and worked well beyond the normal production levels and hours prescribed by overseers when reward payments were available. Some families, such as the Heth's, accumulated considerable wealth from their slave run industrial ventures. But did this prosperity result *because* of slavery, or *in spite* of it? Certainly not all mine operators who utilized slaves succeeded. Indeed, the history of the Virginia coal industry is strewn with failures. Ultimately, however, neither testimonials to accumulated wealth among miners nor a reduction in specific operating costs by the use of slave labor comes to grips with the crucial question of profitability. That is, compared with equivalent free whites, did slave miners produce below, at the same, or above the levels of efficiency achieved by their free white counterparts?[454]

The only way to understand whether free labor or slave labor was more efficient would be to compare the per capita productivity at free and slave enterprises. Using wage labor in agriculture was competitive for part of a year but never on an annual basis. Farmers who needed labor for a few days, weeks, or months found their use of hired labor decidedly cheaper and more efficient than slaves. The decisive factor in the farmer's choice of either slave or free labor came down to the annual labor requirements of his staple crop. Crops such as wheat, which required only a few weeks of attention, lent themselves to wage labor. Whereas, crops such as tobacco or

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Geographical Review 68(1) (January, 1978): 51-65; Starobin, Robert S., *Industrial Slavery in the Old South*, New York: Oxford University Press, 1970; Fogel, Robert William, and Stanley L. Engerman, *Time on the Cross: The Economics of American Negro Slavery*, Boston, 1974; Lewis, *Coal, Iron, and Slaves*; Dew, Charles B., *Bond of Iron: Master and Slave at Buffalo Forge*, New York: W. W. Norton & Company, 1994;, Naomi R. Lamoreaux, "Rethinking the Transition to Capitalism in the Early American Northeast," *Journal of American History* (September 2003), 437-461; and *Global Perspectives on Industrial Transformation in the American South*, Ed. By Susanna Delfino and Michele Gillespie (Columbia: University of Missouri Press, 2005).

[454] Lewis, *Coal, Iron, and Slaves*, p. 204-205.

cotton, which demanded sustained attention during a long growing season, lent themselves to slave labor. Farmers and planters used the economically rational labor supply that best fit their needs. As a result, northern farmers rejected slave labor only because it was less efficient than free labor for working their crops, not because slavery was morally or ideologically repugnant.[455]

In 1795, William Strickland wrote an agricultural treatise which tried to prove that slavery was a poor economic choice in Virginia, but his evidence showed just the opposite: slaves cost less than free labor not only in Virginia but in all of the US.[456] Strickland's method was relatively simple. He felt that Virginia planters lamented the fact that using slave labor necessitated excessive costs and low returns. Strickland intended to verify these complaints by attacking the cost side of the Harrod-Domar equation,[457] confident slaves would cost much more

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[455] Carville Earle, "A Staple Interpretation of Slavery and Free Labor," *Geographical Review* 68(1) (January, 1978): 51-65.

[456] William Strickland, *Journal of a Tour in the United States of America, 1794-1795, With a Facsimile Edition of William Strickland's "Observations on the Agriculture of the USA*, edited by J.E. Strickland, (NY Historical Society, 1971), pp. 31-36.

[457] The Harrod-Domar model is used in development economics to explain an economy's growth rate in terms of the level of saving and productivity of capital. It suggests that there is no natural reason for an economy to have balanced growth. The model was developed independently by Roy F. Harrod in 1939 and Evsey Domar in 1946. The Harrod-Domar model was the precursor to the Exogenous growth model. According to the model there are three concepts of growth: 1) Warranted growth–the rate of output growth at which firms believe they have the correct amount of capital and therefore do not increase or decrease investment, given expectations of future demand. 2) Natural rate of growth–The rate at which the labor force expands, a larger labor force generally means a larger aggregate output. 3) Actual growth–The actual aggregate output change. Two possible problems are observed in an economy according to the Harrod-Domar model. First, the relationship between the actual and natural (population) growth rates can cause disparities between the two, as factors that determine actual growth are separate from those that determine natural growth. Factors such as birth control, culture, and general tastes determine the natural growth rate. However, other effects such as the marginal propensities to save and consume influence actual output. There is no guarantee that an economy will achieve sufficient output growth to sustain full employment in a context of population growth. The second problem identified in the model is the relationship between actual and warranted growth. If it is expected that output will grow, investment will increase to meet the extra demand. The problem arises when actual growth either exceeds or fails to meet warranted growth expectations. A vicious cycle can be created where the difference is exaggerated by attempts to meet the actual demand, causing economic instability. Let Y represent output, which equals income, and let K equal the capital stock. S is total saving, s is the savings rate, and I is investment. δ stands for the rate of depreciation of the capital stock. The Harrod-Domar model makes the following a priori assumptions:

$Y = f(K)$	1: Output is a function of the capital stock
$\frac{dY}{dK} = c$	2: The marginal product of capital is constant; the production function exhibits constant returns to scale

than free labor. Using records of construction costs for the James River Canal, Strickland calculated slave costs at Ł18 a year, which consisted of an annual hire rate for an adult male slave at Ł9 plus a maintenance cost of Ł9. He then computed daily slave cost at 1s. 2d. and compared this figure with Chesapeake day rates for free laborers. Much to Strickland's disappointment, slaves cost the planters less than free whites, who hired out at 1s. 6d. a day. In fact, the cost advantage of slavery was actually much greater than Strickland's estimate because

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$\frac{d^2Y}{dK^2} = 0 \Rightarrow \frac{dY}{dK} = \frac{Y}{K}$	3: Since the marginal product of capital is constant, it equals the constant ratio Y/K
$sY = S = I$	4: The product of the savings rate and output equals saving, which equals investment
$\Delta\ K = I - \delta$	5: The change in the capital stock equals investment less the depreciation of the capital stock

Derivation of output growth rate:

$$c = \frac{dY}{dK} = \frac{Y(t+1) - Y(t)}{K(t) + sY(t) - \delta\ K(t) - K(t)}$$
$$c = \frac{Y(t+1) - Y(t)}{sY(t) - \delta\ \frac{dK}{dY}Y(t)}$$
$$c(sY(t) - \delta\ \frac{dK}{dY}Y(t)) = Y(t+1) - Y(t)$$
$$cY(t)(s - \delta\ \frac{dK}{dY}) = Y(t+1) - Y(t)$$
$$cs - c\delta\ \frac{dK}{dY} = \frac{Y(t+1) - Y(t)}{Y(t)}$$
$$s\frac{dY}{dK} - \delta\ \frac{dY}{dK}\frac{dK}{dY} = \frac{Y(t+1) - Y(t)}{Y(t)}$$
$$s\frac{dY}{dK} - \delta\ = \frac{\Delta\ Y}{Y}$$

In summation, the savings rate times the marginal product of capital minus the depreciation rate equals the output growth rate. Increasing the savings rate, increasing the marginal product of capital, or decreasing the depreciation rate will increase the growth rate of output; these are the means to achieve growth in the Harrod-Domar model. Although the Harrod-Domar model was initially created to help analyze the business cycle, it was later adapted to explain economic growth. Its implications were that growth depends on the quantity of labor and capital; more investment leads to capital accumulation, which generates economic growth. The model also had implications for less economically developed countries; labor is in plentiful supply in these countries but physical capital is not, slowing economic progress. Less Developed Countries do not have sufficient average incomes to enable high rates of saving, and therefore accumulation of the capital stock through investment is low. For more on this, see Roy F. Harrod, "An Essay in Dynamic Theory," *Economic Journal* 49 (March 1939): 14-33; Roy F. Harrod, *Towards a Dynamic Economics: Some Recent Developments of Economic Theory and Their Application to Policy* (London: Macmillan,1948); E Domar, *Essays in the Theory of Economic Growth* (Oxford University Press: New York, 1957), Dennis H. Robertson, "Thoughts on Meeting Some Important Person," *The Quarterly Journal of Economics*, Vol. 68, No. 2 (May, 1954), pp181-190.

of a bias he calculated towards slave labor in his accounting method. Specifically, Strickland's designation that slave maintenance cost Ł9 is very high—a more realistic estimate would be on the order of Ł3 to Ł6 a year, which lowers the daily costs of a slave laborer to just 9s. 4d. or 11s. 7d., respectively.[458] This modified figure drops the cost of slave labor much lower than that of either free blacks or free whites. Thus slavery wins on the cost side in both Virginia and most northern states, where free labor received 1s. to 2s. per day, according to Strickland's own estimates.

Despite such an unexpected outcome for his attack on the cost effectiveness of slavery, Strickland persisted in pressing his thesis for the economic inferiority of slavery by launching a vicious attack on slave output—the productivity in the Harrod-Domar Equation. He depicted slaves as inert, recalcitrant, slovenly, and prone to willful destruction and pilfering. Given these traits, Strickland agreed with "the received opinion of the country, that slave-labor is much dearer than any other; and that the price paid for the *time* of the slave, by no means shows the amount of value of his labor; it certainly is much higher than it appears to be." But low slave productivity cannot be inferred from Strickland's exaggerated stereotype of black behavior, as he himself acknowledged, "though not knowing the quantity of labor performed by slaves in general in a given time, in a sufficient number of instances, I have not data whereupon to calculate the exact value."[459] Slaves may at times have been lazy, slovenly, and subversive in the fields, but evidence from colonial America suggests that white free men behaved in a similar manner.[460] Moreover, the measures of physical productivity Strickland presents offer no appreciable differences in output between white and black, slave or free. The common belief that freedom

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[458] Earle, "A Staple Interpretation of Slavery and Free Labor," 57, note 21.
[459] Strickland, *Journal of a Tour in the United States of America*, pp. 33-34.
[460] David Bertelson, *The Lazy South* (Oxford University Press, 1967); and Edmund Morgan, *American Slavery, American Freedom: The Ordeal of Colonial VA* (NY: W.W. Norton, 1975).

was a production incentive and resulted in productivity gains over slavery is unsubstantiated, but probably rests on free labor's superior output in broadcast grain production—superiority easily explained by the limited number of work days required and the divisibility of free labor. Yet the incentive of freedom disappears in industrial production and extraction enterprises because slaves can easily double the output of a free man for a given cost.[461] Even if slaves were not motivated by reward incentives to become as productive as free laborers, slave masters could reduce their maintenance costs by cutting expenditures for food, health care, clothing and shelter. Such cost cutting measures would drastically reduce maintenance costs and make slavery more cost effective than free labor for industrial ventures.

But Heth's problem was not in productivity. Slave labor was expensive and limited. He could never find enough slaves with the proper skills to work in his mines. High prices restricted his ability to purchase slaves, especially since mining was strenuous, dangerous, and life expectancies were low. Local masters did not want to rent their slaves to the mines because coal mining was dangerous work; they actually cared about the future of their slaves. Heth could not attract free labor because ideology suggested to wage laborers, whether American or foreign immigrants, that they could not compete with slaves. The existence of slavery also implied to the free laborers that their freedom was inherently at risk. In the end, Heth could have forced his workers to expand their output, but such an action came at risk of injury. More importantly, the very nature of the slave system suggests that forced increases in output would be counterintuitive. To increase production levels, Heth would have to willingly destroy his own limited labor supply—one which he could not easily replace—by working the laborers to death. In return for increased production, he would have more coal to sell for a time, but such levels of

[461] Earle, "A Staple Interpretation of Slavery and Free Labor," 57, note 21.

production were not sustainable nor could the increased profits compensate him for the loss in labor resources.

This situation simply was not a problem in the anthracite coal regions of Pennsylvania. Labor was always abundant, since there was a constant influx of foreign immigrants into the region. This constant influx of new laborers kept wages down, and reduced the need of employers to provide any benefits to their workers—a service which always cut severely into profit margins. When considering the growing competition of the coal trade in national markets in the 1820s and 1830s, the increased hardiness of anthracite made it more cost effective to consumers because it could stand the knocking around it inevitably received at the hands of less productive free laborers and transporters, who unlike their slave counterparts had little incentive to produce beyond the lowest level of output.

Despite the difficulties, Heth did really well for himself in the coal business, stating in 1814 "I have made a great profit last year." Heth evaluated his estate's worth at $100,000, and was certain that he possessed an immense fortune, saying:

> In the lands I own, there are inexhaustible amounts of coal free stone and quarries. I have only to work them. Consequently, my entire detention is not adequate to work all of my establishments. Unite me immediately and fully, upon all those parties lately looking to be engaged there. I really need to obtain such a man as could run my entire business as well as my need for an engine capable of moving from a pit 350 feet deep 2000 loads of coal, as well as at the same time. 103 to 120 gallons of water per minute, this must be made adequate to my present works, but it has better have too much than not an off.[462]

Thus, Heth never lacked opportunities to expand business. Heth's profits increased during the period after the War of 1812, but as Table 5 demonstrates, his mines could

[462] Harry Heth to David Meade Randolph 1814 Jun 22, Henry Heth Papers, UVA.

Table 5: Harry Heth's Coal Business, 1810-1817[463]

Year	Bushels Shipped	Profit (real $)	Profit (1810$)	Profit/per/bushel (1810$)
1810		52,092.34	52,092.34	
1811	704,307	43,647.85	40,885.33	5.8 cents
1812	830,742	50,718.80	46,914.89	5.6 cents
1813	125,488	8,155.42	6286.47	5.0 cents
1814	45,867	0	0.00	0
1815	446,828	68,778.73	55,022.98	12.3 cents
1816	503,005	75,592.77	66,199.59	13.2 cents
1817	567,245	78,540.89	72,650.32	12.8 cents

NOTE: These figures are based upon Heth's own calculations, which run from 1810 to 1817.

not match prewar production levels. Profit margins actually increased on a per-bushel basis. Once the pent up demand for coal caused by the embargo and War of 1812 subsided, the Virginia coastwise trade was vulnerable to competition. There was plenty of coal remaining in the Richmond basin, but as the region's coal trade came into direct competition with anthracite coal in the 1820s, the poor quality and relatively high price of Virginia coal made it incapable to compete.[464] Virginia colliers like Henry Heth struggled to increase production, but raising coal amid plantations, as it turned out, did not serve the future of the trade well. Despite national aspirations, the nation's first coal trade ran into local limitations.[465]

In the next chapter we will be examining how industrial activities contribute to the development of urban areas in the Chesapeake region. The chapter focuses on several industrial

[463] Heth Papers, UVA; McCusker, *How Much Is That in Real Money? A Historical Price Index for Use as a Deflator of Money Values in the Economy of the United States* (Worcester, MA: American Antiquarian Society, 2001). Quoted from Adams, *Old Dominion, Industrial Commonwealth*, 44.
[464] Adams, *Old Dominion, Industrial Commonwealth*, 44-45.
[465] Adams, *Old Dominion, Industrial Commonwealth*, 44-45.

activities operating in the Patapsco River Valley. Since the Chesapeake had few towns, it is important to trace the role industry played in their development. Like so much of the Chesapeake region, there were few settlements along the Patapsco River in 1715. Then in the 1740s, a group of industrialist started building along the river in order to harness its power to propel the machinations of their industrial activities, and towns developed around the factories providing housing and a service sector to the workers. By the turn of the century, the Patapsco River Valley had several flourishing urban centers who owed their origin to development of industrial ventures along the waterway.

CHAPTER 5

"There is now a considerable Trade carried on"[466]: Industrial Pursuits and the Development of Urban Centers in the Chesapeake

As Francois Alexandre Frederick, le Duc de la Rochefoucault-Liancourt, crossed over a low Cumberland mountain pass and took his first view of the Patapsco River Valley in early 1795, he found a sight that he did not expect nor could even have imagined. "The situation of this place, encircled by mountains, is truly romantic….the water is clear. The rocks are high and majestic; and I could have wished to enjoy one day longer this view." Journeying east from Frederick to Baltimore, the Frenchman followed the public turnpike. "From Poplar-Spring a road has been cut within a few years, which abridges by some miles the road to Baltimore. It is bad; being quite new it passes by but very few habitations." With each step toward Baltimore, the Duke observed a region shifting away from agriculture to wide-spread industrial production. One "large gristmill, belonging to Mr. Ellicott," he observed, contained "six pair of mill stones, and is constructed as well as any of the Mills of Brandywine, of which it possesses all the perfections." Even more important to industrialization, Rochefoucault found convicts employed in maintenance all along the turnpike and noted that surface conditions improved as he approached the city. Clearly, he was visiting a region in the midst of a transformation; much like the nation itself.[467]

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[466] Elk Ridge Landing, Petition for a Town [1762?], Maryland Historical Society [Hereafter, cited as MHS], Ms 2018.

[467] Francois Alexandre Frederick, Duc de la Rochefoucault-Liancourt, *Travels Through the United States of North America, the country of the Iroquois, and Upper Canada, in the years 1795, 1796, 1797, with an authentic account of Lower Canada* (London: T. Davidson, 1799, volumes I and II), 2: 125-130; 2:252.

The Patapsco River Valley offered to Rochefoucault both a source of emotional appreciation of the untamed natural beauty and a source for comprehensive economic opportunity. By 1825, another traveler Jared Sparks found that the cascading "headwaters of the Chesapeake" had instigated a dramatic change in the Baltimore region.[468] The most important of these rivers of transformation was the Patapsco. The "Great Falls of the Patapsco" that Sparks so poetically celebrated had attracted to itself extensive commercial investments. Over the course of fifty years, the region was transformed from an area dominated by tobacco culture to one where the opportunities were afforded by water power. Originally valued by colonists only as a shipping channel, the Patapsco River Valley had become synonymous with manufacturing.

The importance of the Patapsco Valley as a locomotive for industrial and economic development cannot be underestimated. The valley was home to many important early Maryland ironworks, including the Principio Company in Cecil County, the Nottingham ironworks in Baltimore County and the Baltimore Ironworks. The Patapsco Valley was also the location of numerous other industrial mill complexes, ranging from gristmills to textile mills to paper mills. These industrial centers employed hundreds of laborers, and contributed vast amounts of wealth to the Maryland economy. But they were important to the Chesapeake region in a far more valuable way. With so much industrial development along the banks of the Patapsco, the mill complexes of the Patapsco Valley quickly developed into urban centers. Urban growth was rare in the Chesapeake, so the experience in the Patapsco Valley exemplifies the correlation between the Chesapeake region's early industrial activities and its city building history. To understand that correlation, it is necessary to trace the history of several industrial ventures in the Patapsco Valley.

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[468] Rochefoucault-Liancourt, *Travels through the United States of North America*), 2:129-130.

The European inhabitants recognized early on that the Patapsco River was valuable not only for its natural resources but also for its usefulness as a means of locomotion for mills and as a means of transportation. William Patterson, the first textile producer in the valley, believed that the river would become one of the great foundation stones for the emerging American nation. On the contrary, Robert McKim, also involved in the textile industry, conceived of the river as an agent of construction in the emerging industry. McKim believed the Patapsco would not just supply force and power, but also act as an influence on development. The river's easy grade through rugged terrain cleared the valley and nourished the landscape. The position of its falls fixed the site for ferry crossings, like Elk Ridge Landing where Rochefoucault crossed "in an excellent ferry-boat, which is dragged over by the help of a rope."[469] The falls at Elk Ridge also marked the furthest inland point of navigation up river, although they were small enough to allow easy portage. The Patapsco's numerous upcountry fords became sites of many mill complexes and led early colonists to establish a network of roads stretching across the region. Nevertheless, the waters of the river could also bring destruction—floods ripped apart what had taken years to establish—asserting a clear choice to valley occupants: rebuild or move elsewhere.[470]

The history of the Patapsco Valley was dominated by the voices of men, not the rolling sounds of the river. Dorsey and Carroll, Ellicott and Patterson—these names and others remain in memory: wealthy, powerful, innovative and ambitious. There were also countless numbers of men who went unnamed: laborers, whether slave or free, adult or child, male or female; workers who cut nails, carried flour sacks, primed tobacco, pressed paper, sorted thread, drove spikes, poured pigs, and pounded iron. People who built communities of industry and made lives amidst

[469] Rochefoucault-Liancourt, *Travels through the United States of North America*), 2:130.
[470] Henry K. Sharp, *The Patapsco River Valley: Cradle of the Industrial Revolution in Maryland* (Baltimore: Maryland Historical Society, 2001), p. xv-xvii.

the constant, steadfast fall of the water. And yet, the story of the Patapsco Valley always returns to the river: it was the engine for industrial development in the extraction of natural resources, and it provided power for the foundering of iron, the pressing of paper, and the weaving of textiles—each of which were crucial blocks in the urbanization of Elk Ridge Landing.

Urbanization along the Patapsco did not happen over night. Colonists initially valued the river as a shipping channel. Tobacco planters cleared land for plantations along the river banks at the opening of the eighteenth century, and quickly began shipping hogsheads down the river to the Chesapeake Bay on bateaux flat boats. Tobacco planting inspired the first commercial investment in the valley at Elk Ridge Landing, the future location of one of the largest industrial cities on the river. Yet as late as 1743, there were few structures at Elk Ridge Landing. At the end of January of that year, William Cromwell, deputy surveyor for the province of Maryland, measured a tract of land at the site for Caleb and Edward Dorsey. Cromwell calculated that six and one half acres, extending along the edge of the waters, was some of the best farm land on the river. He anticipated that the Dorseys would have an easy time working the land, since it had only a handful of buildings located at the edge of the falls. The buildings included a well finished dwelling house, "built about 20 years [ago], 28 foot by 16, framed work… covered with Clapboard," but with a brick chimney and glass windows, which clearly signified it as a structure once the residence of a well-to-do land owner. Adjacent to the dwelling, Cromwell described a "Rowling house, 32 foot by 20," also framed and of clapboard, with "16 foot in Length of it planked for a Store room." This building, and the remaining structure, a hen house sixteen by eight feet, had "been built about 9 or ten years."[471]

[471] Patent survey for Caleb and Edward [Dorsey's] Friendship, 6.5 acres on the Patapsco, January 31, 1743, patented February 7, 1743, Ms 2018, Elk Ridge Landing, MHS. The "Rowling house," which Cromwell measured and described was a tobacco warehouse, "so named because it was a place of storage for large hogsheads of pressed tobacco, which were rolled along paths to river landings." See Kerry Carson, et al., "Impermanent Architecture in

The arrival of the Dorsey's at Elk Ridge Landing changed everything. Both the site and the description provided by Cromwell are significant for the history of the Patapsco River Valley. The Dorsey's purchased the site because it was near new land recently opened to tobacco cultivation. As the furthest navigable point inland along the Patapsco, Elk Ridge was the most convenient inland location to load vessels bound for the Chesapeake Bay with goods from the uplands and surrounding countryside. Since there were few obstructions between Elk Ridge and the Bay, tobacco laden ships could make a fast, easy, and inexpensive journey to the bay and beyond.

Tobacco culture was central to the economic success of the Chesapeake region. Official recognition of tobacco's status can be found in the constant struggle of Colonial authorities to regulate and improve the quality of tobacco sold for export in the early 1700s. After a great deal of hand wringing, Virginia's legislature finally passed a tobacco inspection act in 1730. The Act specified collection sites for export and provided for the public appointment of tobacco inspectors to maintain the highest quality standard.[472] The Maryland General Assembly passed similar legislation in 1747.[473] This legislation meant that centralized colonial inspection houses would replace the small operations in existence at individually owned wharves like the one

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the Southern American Colonies," *Winterthur Portfolio*, 16 (summer/autumn 1981):135-136; and Carl R. Loundsbury, ed., *An Illustrated Glossary of Early Southern Architecture and Landscape*, (New York: Oxford University Press, 1994), 309.

[472] Moss, C.G. Gordon. "The Virginia Plantation System," (Ph.D., Yale. University, 1932), 132-134; William Waller Hening, *Virginia Statutes at Large: Being a Collection of all the Laws of Virginia from the first session of the Legislature*, (Richmond, 1809-1823), III, 435-440; *Archives of Maryland*, XXXVIII, 175-176, XXX, 260-263 [see The Archives of Maryland Online at http://www.aomol.net/html/index.html]; Waverly K. Winfree, comp., *The Laws of Virginia: Being a Supplement to Hening's "The Statutes at Large," 1700-1750* (Richmond, 1971), 75-90, 119-124; Spotswood to Commissioners of Trade, Dec. 13, 1713, R. A. Brock, ed., *The Official Letters of Alexander Spotswood*, (Richmond, 1882), II, 26-52; Janis M. Horne, "The Opposition to the Virginia Tobacco Inspection Act of 1730" (Honor's Thesis, College of William and Mary, 1977), 12-16; David Alan Williams, "Political Alignments in Colonial Virginia, 1698-1750" (PhD. Diss., Northwestern University, 1959), 141-144, 161-162; Alan Kulikoff, *Tobacco and Slaves: The Development of Southern Cultures in the Chesapeake, 1680-1800* (Chapel Hill: University of North Carolina Press, 1986), 107, 104-116.

[473] Maryland State archives, worldwide website, "chronology of Maryland history;" http://www.msa.md.gov/msa/mdmanual/01glance/chron/html/chron.html; Kulikoff, *Tobacco and Slaves*, 107, 104-116

described by Cromwell. Caleb Dorsey, Sr., a wealthy Annapolis merchant, anticipating the passage of the Maryland Inspection law, saw favorable investment prospects at the Landing, since the fall line marked the end of river transport inland. Slow and difficult overland routes—known as rolling roads—converged on this point, making the site a natural gathering point for tobacco collection.

Once the land was purchased, Caleb Dorsey, Sr., sent two of his sons to establish business operations at Elk Ridge Landing, believing it to be a community on the verge of growth. As he predicted, a market community quickly emerged. In the early 1750s, residents at the Landing sought the establishment of a tobacco inspecting house on or near the property of Philip Hammond. Dorsey offered to build the warehouses on his land, but Hammond's lot was deemed more convenient for a town. By 1762, there were enough citizens in the vicinity of Elk Ridge to petition the colonial governor and assembly for an official charter. Although by this time, tobacco was no longer the dominant agricultural product of the region.[474]

Tobacco dominated Maryland's export economy for over a century, but by the mid-1700s, citizens around Elk Ridge began to shift to grain production. Recognizing the value of crop diversification, Marylanders were not alone in this view, and probably learned it from farmers in neighboring Pennsylvania. Many factors made grain production an attractive alternative for the Chesapeake region. First, aggressive tobacco cultivation rapidly depleted the soil, forcing planters to constantly move inland in search of new ground; but it also made alternative cash crops more appealing. Secondly, British agents firmly controlled the tobacco trade before the American Revolution, limiting profits and restricting production with strenuous

[474] *Archives of Maryland*, 50: xvi, 1752—54; Elk Ridge Landing, Petition for a Town [1762], MS2018, MHS; *Archives of Maryland*, 58: xxxviii, 1762—63. The petition is addressed to Royal Governor Horatio Sharpe, and consequently must date some time between his taking of office in 1753 and the date the petition was first presented to the colonial assembly in 1762.

quality standards. This situation led many colonists to become dissatisfied with the system because it drastically reduced their profit potentials. As a result, Colonials looked for profitable alternatives they could control more directly. During the period, cereals commanded more stable prices than tobacco, offering income security in contrast to the inconsistent price fluctuations in the tobacco market. And finally, as early as the 1730s a large number of German farmers from Pennsylvania pushed across the border into Maryland just west of Elk Ridge. These immigrants had a long history and expertise in grain production, but almost no experience with tobacco. Rather than grow a crop they knew nothing about, German immigrants in Maryland focused their production on wheat and corn.[475]

The increased production and shipment of grain caused existing commercial centers in Maryland to rapidly expand. Baltimore-Town had been a collection of only a few dwellings—twenty-five to be exact—in 1752. Merchants in the city made their first shipment of flour and bread to the West Indies in 1758; a decade later, those exports amounted to more than 45,000 tons and the town had increased ten fold in size.[476] The citizens of Elk Ridge Landing sought some of that remarkable profit and growth potential for themselves. Two small-scale grist mills were established along the banks of the Patapsco just upstream from the Landing. John Cornthwaite's Dismal Mill, the closer of the two, began operations about 1761.[477] Cornthwaite

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[475] Geoffrey Gilbert, *Baltimore's Flour Trade to the Caribbean, 1750-1815* (New York: Garland, 1986), 17-20.
[476] 45,868 tons to be exact, see Jared Sparks, "Baltimore," *North American Review*, 20 (January 1825): 103; Terry Sharrer, "Flour Milling in the Growth of Baltimore, 1750-1830," *Maryland Historical Magazine*, 71 (1976): 324.
[477] Martha Ellicott Tyson, *A Brief Account of the Settlement of Ellicott's Mills* (Baltimore: Maryland Historical Society Fund Publication Number Four, 1865), published in *History, Possessions, and Prospects of the Maryland Historical Society* (Baltimore: J. Murphy, 1871), 32, 33. Cornthwaite's Mill is identified on the 1794 Griffith Map of Maryland as the Dismal Mill site. In 1812, the site "formerly occupied by Brown and Cornthwaite" was identified in the following deed (the identity of Brown is unknown): Jonathan Ellicott of Baltimore County to Elias Ellicott of Baltimore County, George Ellicott of Baltimore County, John Ellicott of Baltimore County, September 9, 1812, Anne Arundel WSG 2/119, Maryland State Archives [hereafter, MSA]. In 1822, the "premises consti[tutin]g th[e O]ld Di[small]l m[i]ll [o]therwise called Brown & Cornthwaites Mill," was identified in the following bond and deed, dated February 13, 1822, and executed in the settlement of "the estate of John Ellicott, deceased on or about 10 October 1820. Jonathan Ellicott and George Ellicott of Baltimore County, and Elias Ellicott and William Kentworthy, trustee, of Baltimore City sell to Alexander Fridge and William Morris of the firm Fridge and Morris in

was a wealthy Baltimore landowner and clearly saw Dismal Mill as an opportunity to profit from growing grain trade. The second grist mill belonged to James Hood, who took possession of a mill seat through the Maryland Mill Act of 1669, which allowed grist mill builders to condemn twenty acre tracts on the colony's rivers and obtain an eighty year lease for the property.[478]

Although Elk Ridge Landing was beginning to grow, changes in the regional economy helped attract even more settlers. By the middle of the eighteenth century, the port of Baltimore was on the verge of tremendous growth. Wheat exports from Maryland grew steadily in the 1750s and 1760s. Although Philadelphia was the largest port in the region, several factors made Baltimore more advantageous. It was closer to the western areas where most grain cultivation was taking place, giving it an advantage over Philadelphia and other Tidewater ports such as Annapolis. More importantly, Baltimore Harbor rarely froze during the winter, which made it a more reliable as an all year port than Philadelphia. The market systems already in place for tobacco export served as a base for the developing cereals trade in Maryland. The collection of grain at centralized warehouses, like the one the citizens of Elk Ridge Landing sought to build and the subsequent wholesale networks paralleled those of the tobacco markets. But the existing system needed significant modifications in order to move wheat and corn. Unlike tobacco, the cereal market was not limited to raw grain. Millers ground flour and meal; bakers made bread;

Baltimore City, property adjacent the Dismal Mill." Dorsey v. Ellicott, Special Collections, MSA. Bond to Fridge and Morris, MSA; Deed to Fridge and Morris, MSA.

[478] This state-sponsored program sought to promote the construction of water mills by lowering their initial costs. Former owners were compensated, but at below market levels. Lower land prices reduced one of the expenses of setting up a mill, and greater numbers of grist mills would in turn promote the production of grain crops by tobacco farmers. Even so, this early initiative to encourage agricultural diversification was rarely employed by Marylanders until the mid-18th century. Conditions had changed by 1766, when the colonial assembly repealed the Mill Act—increasing demand and rising rates of return gave colonists efficient incentive to build without government assistance. For more on this, see Anne Arundel IB 5/139, MSA. John F. Hart, "The Maryland Mill Act, 1669-1766, Economic Policy and the Confiscatory Redistribution of Private Property," *The American Journal of Legal History*, 39 (1995): 1-7, 15-17, 20-21. Hart reviewed the various amendments over the history of the acts. In 1692, the Assembly increased the number of acres available for mill development from 10 to 20 acres. The number of condemnation writs issued (*ad quod damnum* writs) in the last six years of the act's effectiveness—sixty-six—equaled the total number issued during the previous 30 years.

distillers produced alcohol; and shippers traded with countries that did not necessarily produce the finished goods the farmers wanted. As a result, participation in the cereal trade allowed for a more complex economic system to evolve, which required "money and credit" and the coordinated actions of "wholesalers, retailers, …bankers and insurers." Accordingly, planters were no longer tied to a single trader for finished goods.[479]

Even more important, the growing cereal market attracted a small group of industrialists to the region. On April 24, 1771, Joseph, Nathaniel, Andrew, and John Ellicott—merchant millwrights from Baltimore—purchased fifty acres just east of Elk Ridge on the Patapsco River in Baltimore County from a farmer named Emmanuel Teal. The same day, the brothers purchased another thirty-four acres across the river from Teal's property from iron founder William Williams.[480] The Ellicott brothers recognized the changing economic circumstances

[479] Gilbert, *Baltimore's Flour Trade to the Caribbean*, 27-39..

[480] "List of taxable or Patapsco Upper Hundred, Baltimore County," 1773, Baltimore County Assessment Records, MSA; Emmanuel Teal, a Baltimore County, Farmer, to Joseph, Nathaniel, Andrew, and John Ellicott, all of Bucks County Pennsylvania, Millwrights, April 24, 1771, Baltimore AL C/683, MSA. The historic survey lines for Williams' track proved to be an accurate, so the brothers had to have it re-surveyed and patented as "Mount Unity." The patent certificate records an extraordinary 19.5 acres of vacant land on a 35.5 acre tract, that is, a 19.5 acre section included within the original survey lines, but not accounted for in the calculation of the acreage. Williams had actually sold 55 acres to the Ellicotts. The vacancy was partially cultivated, containing "40 Pannels of old Fence, and Ten Small Apple Trees." It lay along both sides of the river and extended up Tiber Branch (Anne Arundel Patented Certificate 1027, February 16, 1784, Mount Unity, Warrant for resurvey issued May 19, 1773 for Joseph, Andrew, Nathaniel, and John Ellicott, MSA). Williams could not have lost this land (20 acres of land at least partially open to cultivation) through oversight. No primary sources state that Williams collected ground rents from the Ellicotts nor does any record show that the Ellicotts purchased a leasehold on that part of the property from another individual. So the question remains: who owned the land? The condemnation provisions of the Maryland Mill Act had ceased to be in force five years before the Ellicotts purchased Williams' land. Since the 19.5 acre vacancy nearly corresponds to the 20 acre provision of water mills, Williams probably did not lose the river frontage uncompensated. The site must have been condemned by another individual before the act expired, and the Ellicotts must have arranged with that leaseholder to undertake development. More likely than not, Charles Carroll of Carrollton owned the leasehold. The Carroll family owned nearby lands for a number of years. Charles' father possessed a nearby quarter on an outlying plantation called the Patapsco Upper Hundred which he was taxed for in 1737. Tax records place this tract in Carroll's a name in 1773 ("Taxables for Patapsco Upper Hundred," 1737, Baltimore County Assessment Records; and "List of Taxables for Patapsco Upper Hundred, Baltimore County," 1773, MSA). John Thomas Scharf asserts in his 1879 *History of Maryland* that Carroll agreed to assist the Ellicotts, An arrangement between them would ensure him sources of wheat, and the facilities to mill it (J. Thomas Scharf, *History of Maryland from the Earliest Period to the Present Day* [1879, repr. Hatboro, Pa.: Tradition Press, 1967], 2:46). It is also possible the Ellicotts may have been present in the region before the purchase. Two early accounts of Ellicott family history, dating from 1847 and 1865, suggest that members of the family operated a grist mill on Jones

from the beginning. But they did not just invest in gristmills as Hood and Cornthwaite had done. Instead, the Ellicotts developed a network of facilities to promote a trade in grain while integrating other types of industrial and economic development in the region. The Ellicotts systematically expanded their property holdings in the Patapsco Valley in order to control development and maintain constant access to water rights, while acquiring wharf and warehouse lots in Baltimore as a base of operations at the Bay. As new mill seats opened at Gwynn's Falls, they expanded their operations further west. When the river proved incapable of providing all of their transportation needs, they sought the construction of improved transportation links between their properties by petitioning the state legislature to establish state supported turnpikes.

Much like Henry Heth, the Ellicotts most important innovation extended beyond the orchestration of regional change. On their properties surrounding Elk Ridge Landing, the Ellicotts promoted the use of land restoring fertilizers and explored alternative products resulting from grain crops. When the needs of their operations expanded beyond the production capacities of local artisans, they set up an array of support facilities to construct and maintain containers and vehicles, to provide lumber and stone building materials, and to house and educate laborers and their families. And finally, to ensure the health and happiness of their labor supply, they built housing for their workers and provided a place of worship for them. In essence, the Ellicotts built an industrial city.[481]

Falls, in present-day Baltimore, as early as 1760. See, John S. Tyson, "The Founders of Ellicotts' Mills, No. I," Howard District Press, May 15, 1847; transcribed by John McGrain. Martha Ellicott Tyson, *A Brief Account*, 51.

[481] Will of John Ellicott (1769-1820), proved October 31, 1820, filed in the folder 2, Baltimore County Circuit Court, Equity Papers; Caleb Dorsey et al. v. Estate of John Ellicott, Special Collections, MSA; these early purchases and transfers are summarized in the deed: Andrew Ellicott to Jonathan, Elias, and George Ellicott, October 26, 1786, Anne Arundel NH 2/590, MSA. Descriptions of the Upper Mills may be found in Charles W. Evans, *Biographical and Historical Accounts of the Fox, Ellicott, and Evens Families* (Buffalo: Baker, Jones, & Co. 1882; reprinted in Harry Lee Hoffman, Jr. and Charlotte Feast Hoffman, eds., *American Family History* (Cockeysville, Md.: Fox, Ellicott, Evans Fund, 1976), 19-27.

The growth of the Ellicotts' city can be traced through a number of sources. Martha Ellicott Tyson's 1865 memoir states that the Ellicotts original one hundred foot mill in Baltimore County, with a temporary log house for the mechanics and laborers, opened in 1774. The 1783 tax assessment for Anne Arundel County noted no major industrial buildings belonging to "John Ellicott and company."[482] Things had changed considerably by 1790. The brothers built a variety of supporting structures on both sides of the river: to the west stood a school and a group of stone and frame dwellings for "the workmen engaged at the wheelwright shop."[483] On the east side of the river, the Ellicott family dwellings, sawmill, a large stable, a capacious stone warehouse, and a store run by Samuel Godfrey were all located.[484] A series of bridges linked the buildings on each side of the river. That same year, the brothers surveyed two routes for a new road from Baltimore to the Lower Mills. The approved turnpike route was surveyed in 1791, following a path "opposite the lower Mills and store house. . . to a stake by the falls below the old bridge."[485] Just a half mile south of the Lower Mills, the Ellicotts established a distillery, which included "a large and very convenient still house, with three 150 gallons stills, a malt house, dwelling house, and other improvements." The distillery complex was obviously an experimental venture into a subsidiary market of the grain trade, which the family must have decided not to pursue as it was offered for sell by "Godfrey and Ellicott" in January of 1779.[486]

The Ellicott's city continued to change during the 1790s. The assessment papers for the Federal Direct Tax of 1798 record more than thirty principal buildings and dependencies on both sides of the Patapsco River as part of the community at Ellicott's Lower Mills. From the

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[482] Baltimore County Assessment Records: "List of Taxables for Patapsco Upper Hundred, Baltimore County," 1773; Baltimore East Hundred, 1783, Anne Arundel County Assessment Records, Elk Ridge Hundred, 1783, MSA.
[483] Tyson, *A Brief Account*, 5-8.
[484] Tyson, *A Brief Account*, 14-16.
[485] "Road. . . to Patapsco Falls," Baltimore County Court, Plats, 1790, MSA; "Road. . . to Patapsco Falls," Baltimore County Court, Plats, 1790, MSA; "Road. . . Baltimore to Patapsco Falls," Baltimore County Court, Plats, November 1, 1791, MSA.
[486] Advertisement, Godfrey and Ellicott, *Maryland Journal*, January 19, 1779.

descriptions of the structures, it is evident there was a clearly defined hierarchical stratification at the industrial community—ranging from principal and secondary residences, small laborers' dwellings, and central and auxiliary industrial structures. The stratification clearly demonstrates the rather rigid relationship of common laborer to mill owner. The dwellings of the Ellicott family were at the uppermost position in the community's hierarchy. George and Jonathan, sons of founder Andrew Ellicott, each lived in two-story stone houses situated prominently away from the mills across the turnpike. Valued at eleven hundred dollars, George's house, had more than twenty-five hundred square feet of useful space, separated along the classic eighteenth-century division for interior spaces with a parlor, dining room, central passage, and principal bed chamber on the first floor. Five subsidiary bed chambers and storage rooms were dispersed between the second floor and the cellar. Next in social stature came Benjamin Rich's nearby house. At four hundred dollars in value, its stone and frame walls were half the square footage of George Ellicott's. Below that came the houses of Henry Miller, next to the mills, and James Simpson, near the wheelwright's shop across the river. Miller's two-story frame house contained barely 640 square feet and was valued at just forty dollars, while Simpson's log hewn house was worth less than twenty dollars and enclosed only 168 square feet. The entire twelve-by-fourteen-foot space of Simpson's log cabin could easily have been contained within a single room of George Ellicott's house.[487]

[487] The assessment papers for the Federal Direct Tax of 1798 provide the most detailed record of the whole 18th-century complex. The 1798 tax was intended to be a comprehensive nationwide survey of real property, improvements, and slaves. In separate lists, it recorded dwellings of value greater than $100, and all other structures and dwellings. At the Lower Mills, the assessors made a detailed inventory, which indicates the extent of development, the architectural hierarchy of dwellings calculated by size, materials, value, and placement, and the attendant social position of the occupants. Federal District Tax records, Baltimore County, Patapsco Upper Hundred, October 1, 1798, Dwelling houses on two acres or less, exceeding $100 in value, M863, MSA. Federal Direct Tax records, Baltimore County, Patapsco Upper Hundred, October 1, 1798, Land and Buildings, excluding Dwelling houses which exceed $100 in value on two acres or less, M3469-10, MSA. "House" here is a generic term for a building, and a dwelling that would have been so designated. Federal Direct Tax Records, Anne Arundel County, Elkridge and Elkridge Landing Hundred, October 1, 1798, Dwelling houses on two acres or less, exceeding $100 in

But it was not just social stratification that emerged by the 1800s. Geographer Joseph Scott noticed when he visited the Lower Mills in 1806 that the industrial complex had changed considerably as well. He described the Ellicott flour and plaster mills in great detail within a treatise on the geography of Maryland and Delaware published in 1807.

> Here is one of the largest and most elegant merchant [grain] mills in the United States. It is 100 feet long, and 40 feet wide with four water wheels, which turn three pair of seven feet stones, and one pair of five feet. She is capable of manufacturing 150 barrels of flour in a day . . . The wheat is obtained from Loudon, and Jefferson counties in Virginia.[488]

There also was an enormous "mill, with one water wheel and a pair of burr stones, for the manufacturing of plaster of Paris," as well as a saw mill and an oil mill, "which are worked with great spirit. . . The [grist] mill alone will pulverize a ton [of grain] in 40 minutes." Although Scott was impressed by the entire complex, the most important aspect was the location, "Being situated on the great Western turnpike, the wagons on their return from Baltimore, to the Western country, loaded with [th]at article, stop and get it ground."[489]

The establishment of extraction industries like grist mills and tobacco warehouses initiated the population growth of the Patapsco Valley and attracted the attention of investors interested in a wide range of activities. When Caleb Dorsey of Annapolis sent his sons to Elk Ridge Landing in the 1740s, he clearly planned to invest in more than just tobacco warehousing. Much like the Mill Act of 1669, the Maryland Ironworks Act of 1719 permitted the condemnation of privately-held land for the construction of iron furnaces and forges. This allowed investors the opportunity to obtain legal instruments for suitable parcels at reduced

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value, M3468-4, MSA. Federal Direct Tax Records, Anne Arundel County, Elkridge and Elkridge Landing Hundred, October 1, 1798, Land and Buildings, excluding Dwelling houses which exceed $100 in value on two acres or less, M3468-4, MSA. George Ellicott Estate Inventory, May 10, 1832, Baltimore County Register of Wills, Book 40/418, WK 1073-1074-1, MSA.

[488] Joseph Scott, *Geographical Description of the States of Maryland and Delaware* (Philadelphia: Kimbler, Conrad, & Co., 1807), p. 90.

[489] Scott, *Geographical Description*, 90-91.

prices.[490] The Dorseys used the law to condemn parcels of their own land at Elk Ridge for a furnace. They were joined in the endeavor by Alexander Lawson, an experienced iron master who was part owner of the Nottingham Ironworks near White Marsh in Baltimore County. Lawson had recently managed the Baltimore Iron Works, an enterprise established by Dr. Charles Carroll and Benjamin Tasker, which had several locations east of Baltimore.[491]

The abundance of natural resources in the region for iron production was established in the early seventeenth century when Captain John Smith sent back observations of red soil along the banks of the Patapsco to England. Little interest was shown toward the discovery until European political conflicts hastened the development of colonial production. By the eighteenth century, England was importing large quantities of raw iron from Sweden. George I, an anti-Swedish monarch, took the British throne in 1714 and three years later suspended trade with Sweden. The loss of Scandinavian iron in 1717 forced Britain to find more easily controlled sources, resulting in the 1719 enactment of the Maryland Ironworks bill. The colonies of the Chesapeake Bay had abundant deposits of iron ore near rivers, vast woodlands for charcoal production, plentiful resources of oyster-shell lime as a purifying agent, swift rivers to provide easy access to overseas transport, and a well developed shipping and market system in place due to the tobacco trade—all that was required was the construction of facilities. Hoping to take advantage of the interest in colonial iron production, the Maryland General Assembly granted exceptions in 1721 to laborers at furnaces, forges, and mills, relieving them of participation in public highway maintenance. Planters responded by increasing their participation in the

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[490] *Archives of Maryland*, 33: 467, 468, cited in Hart, "The Maryland Mill Act," 22. In 1692, the Maryland Assembly increased the number of acres available for grist mill development from ten to twenty acres, Hart, "The Maryland Mill Act," 15.

[491] The Baltimore Iron Works was one of the earliest and largest ironworks operating in the colonial Chesapeake. For more on Lawson, the Baltimore Iron Works, or the Elk Ridge Furnace project, see Michael W. Robbins, "The Principio Company: Iron Marking in Colonial Maryland 1720-1781" (New York: Garland, 1986), 15, 190, 191, 299-308; Ronald L. Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia 1715-1865* (Westport, Conn.: Greenwood Press, 1979), 12, 21-23.

endeavor. The export of iron manufactured in Maryland and Virginia far exceeded those from any other colony until the 1750s. By the start of the American Revolution, Chesapeake iron masters were operating more than one quarter of the total number of colonial manufacturing sites.[492]

The growth of Elk Ridge Landing was directly tied to the establishment of an iron forge by Celeb Dorsey shortly after 1761.[493] Dorsey ran a furnace for nearly five years in nearby Anne Arundel County, so the forge at Elk Ridge complemented that endeavor. It was typical for colonial iron works to run separated facilities—forge and furnace—since the process employed in the refining process involved two states of production. First, at the furnace: charcoal, iron ore and a lime purifying agent—or flux—were loaded into a masonry chimney tower. The charcoal was ignited, and an appropriate temperature was sustained by use of a water-driven bellow. As the materials within the tower heated and liquefied, the flux bonded with impurities within the melting iron as it poured down the chimney stack and drained through canals into molds to form pigs (or blocks), which could be broken apart and sold as raw iron. The majority of the colonial iron market consisted of trade in pig iron. The second part of the process occurred at the forge, where iron pigs were refined into bar iron through a repeating cycle of heating and pounding with water-driven hammers to strengthened the material and make it easier to work into a finished product.[494]

Once he had the furnace up and running at Elk Ridge, Caleb Dorsey established a forge down stream from the furnace in the late 1760s. This was quickly followed by the establishment of another facility, further increasing the size of the community. Across the river from Dorsey's

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[492] Robbins, "The Principio Company," 15, 190, 191; Lewis, *Coal, Iron, and Slaves*, 11, 12, 22, 23.
[493] John W. McGrain, "The Development and Decline of Dorsey's Forge," *Maryland Historical Magazine*, 72 (1977): 346. Caleb Dorsey's brother Edward died in 1761. See Jonathan Pickney, Daybook, March 1761-May 26, 1762, MHS. Pickney's entry for November 30, 1761, includes an account for the estate of Edward Dorsey.
[494] Robbins, "The Principio Company," 6-9.

forge, Charles Carroll constructed a forge on a tract called Hockley, for which he had obtained a condemnation writ on June 14, 1760.[495] The growing market community at Elk Ridge Landing, as well as the proximity of raw materials, water power, and transport, made these types of investments very promising for men like Dorsey and Carroll. But British regulatory policy during the colonial period imposed significant limitations on items produced at ironworks. Essentially, the British mercantile system needed to restrict, or even eliminate, colonial production of finished goods in order to succeed. The colonies were intended to provide raw materials and consume British made products, not to compete with British manufacturers. As an incentive to its own finishers, Britain offered a ninety-two percent rebate on the duty imposed on imported foreign iron in 1703 if it came from the colonies and was subsequently exported. Parliament substantially reduced the duties on colonial pig iron in 1724, and eliminated them entirely in 1750. No doubt these changes proved influential for Caleb Dorsey, who began production of pig iron at Elk Ridge just five years later. English duties and restrictions on the import of colonial bar iron were similarly repealed in 1757, which not surprisingly led Dorsey and Carroll to built forges to produce bar iron from pigs a few years later.[496]

Though these acts added to the development of colonial iron making, colonial products were still only supposed to be the building blocks of the English industry. The 1750 act eliminated all import duties on pig iron, while it forbade the establishment of colonial facilities for producing finished items like sheet metal, nails, and tools.[497] But lax enforcement of the restrictions and increased demand of finished goods in the colonies meant most colonials ignored

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[495] McGrain, "Dorsey's Forge," 35, 352; John W. McGrain, Molinography in Maryland Series, Howard County and Baltimore County notebooks; entries for Elkridge Furnace, Avalon, and Hockley Forge, MSA. Carroll's family had been among the partners who established the furnace and forges of the Baltimore Ironworks at Gwynn's Falls earlier in the century, see Lewis, *Coal, Iron, and Slaves,* 23.
[496] Robbins, "The Principio Company," 201-11.
[497] Arthur Cecil Binning, *British Regulation of the Colonial Iron Industry* (Philadelphia: University of Pennsylvania Press, 1933), 81-96.

the regulations and produced finished goods for local sale. As the colonies moved toward independence, such blatant disregard for imperial law received active support within the colonial legislatures. In 1775 and 1776, the Maryland revolutionary convention gave interest-free loans to individuals who were willing to establish ironworks. At Dorsey's forge, William Whetcroft obtained such a grant from the Maryland Committee of Safety and leased an adjacent lot for an iron slitting and rolling mill to manufacture nails, nail rod, and sheet metal.[498] By 1780, Whetcroft had found a partner and was offering:

> nail rods of any size, equal, if not superior to any slit on the continent. The public will see the great utility this mill is to the state of Maryland, and what they have suffered by her being kept idle these two years past, as they may now be furnished with slit iron at this mill, twelve hundred and fifty pounds per ton cheaper than it could be procured in Baltimore-town before she got to work. They likewise may be supplied with sheet iron of any thickness.[499]

But Whetcroft and McFadon were not the only investors looking to get into the manufacture of finished goods in the Patapsco Valley during the Revolutionary War era. Charles Carroll took advantage of the same incentives offered by the revolutionary government to establish a facility across the river at his Hockley forge—a slitting mill was in full operation at Hockley by the early 1780s.[500] In the spring of 1780, Joseph Ellicott advertised for lease at his Upper Mills, "an excellent convenience for slitting-mill, rolling-mill, tilting-hammer, &c. &c. The place is so well known, it needs no recommendation." Later that year, his son Andrew offered to lease a steel furnace, which produced small quantities of the material for making finer and more durable tools.[501] While the arrival of the Ellicott family in the Patapsco valley went

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[498] Binning, *British Regulation*, 93; McGrain, "Dorsey's Forge,' 346-48. Nail rods were wrought into nails at a blacksmith's shop.
[499] Advertisement, Whetcroft and McFadon's "Slitting-Mill on Patapsco Falls," *Maryland Gazette*, September 1, 1780, col. 5.
[500] Dennis Griffith, *Griffith's Map of Maryland, 1794*, Federal Direct Tax Records, Anne Arundel County, Elkridge and Elkridge Landing Hundred, October 1, 1798, MSA.
[501] Joseph Ellicott advertisement, *Maryland Journal*, April 4, 1780, col. 7; Andrew Ellicott advertisement, *Maryland Journal,* July 4, 1780, col. 1.

undocumented, they were essential to the urban development of Elk Ridge Landing, which was eventually re-named Ellicott City. Like Samuel Dorsey, who had operated a blacksmith's shop at the Elk Ridge Furnace, the Ellicott brothers probably began their industrial undertaking by opening a smith's shop soon after their arrival in 1771 to supply essential materials for construction and repairs.[502] The Ellicotts wrought nails and other iron wares in their blacksmith shop and also imported merchandise and commodities to trade with local farmers for wheat, which they ground at their gristmill and shipped abroad.

Just as with the shift from tobacco to cereals, the growth of the iron industry had a tremendous impact on the Patapsco River Valley. At the end of the eighteenth and beginning of the nineteenth century, the valley experienced a significant transition. The Dorsey and Carroll families withdrew from the valley, while the Ellicotts gradually consolidated their ownership of property and came to dominate industrial development along the Patapsco. In 1806, the Ellicotts installed an extensive nail-making operation near Elk Ridge Landing, when they built an iron rolling and slitting mill. They situated the facility on the east bank of the Patapsco just upstream from their flour mill. By the spring of 1808, they were supplying a family warehouse in Baltimore with "3, 4, 5, 6, 7, 8, 10, 12, and 20 penny nails; hoop iron for cut nails; spike and nail rod."[503] Hezekiah Niles enthusiastically reported in 1813 that "a machine at Ellicott's mills that

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[502] Advertisement, Margaret Dorsey, executrix of the estate of Samuel Dorsey, *Maryland Journal*, August 18, 1778, col. 9. Direct tax records for the upper mills make no mention of a slitting mill or steel furnace, but do include Ellicott's blacksmith shop. Federal Direct Tax Records, Baltimore County, Patapsco Upper Hundred, October 1, 1798, Land and Buildings, excluding Dwelling houses which exceed $100 in value on two acres or less, see M 3469-10, MSA.

[503] Scott, *Geographical Description*, 92, Scott observed the rolling and slitting mill under construction in 1806. Andrew and Thomas Ellicott advertisement, *Federal Gazette*, May 24, 1808, col. 16; *Niles' Weekly Register,* November 20, 1813, 207. A number of deeds mention the location of the slitting and rolling mill, among them Jonathan Ellicott of Baltimore County to Elias Ellicott of Baltimore City, see George Ellicott of Baltimore County, John Ellicott of John of Baltimore County September 9, 1812, Anne Arundel WSG 2/119, MSA; Anne Arundel County Patent JK#T/453, 1811, Oella (Anne Arundel County Patented Certificates 1102), MSA.

cuts . . . twelve hundred nails in one minute."[504] George Ellicott obtained the slitting mill equipment from the Hockley works in 1807.[505] In 1815 Nathaniel Ellicott and Company purchased the forge facilities owned by Alan Dorsey's family. The 1818 Baltimore County assessment reveals additional changes. Nathaniel Ellicott and Company's 280-acre purchase contained a "rolling mill, slitting mill, grist mill, [and] saw mill" valued at three thousand dollars.[506] Apparently, the Ellicotts no longer operated the forge but continued the iron rolling, slitting, and nail-making operations at both Dorsey's and at the original Ellicott iron works at the Lower Mills. The Ellicott brothers incorporated the works at the Dorsey site in 1822, and Nathaniel named the company Avalon after his first-born son.[507]

The residents of the Patapsco River valley and Elk Ridge Landing/Ellicott City did not limit themselves to grist mills and iron production. The Patapsco River Valley saw several waves of industrial development at the last half of the eighteenth century, securing its identity as a vital engine in the American industrial economy. It began with the establishment of Caleb and Edward Dorsey's ironworks in the 1750s, John Cornthwaite's and James Hood's grist mills in

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[504] *Niles' Weekly Register*, November 20, 1813, 207.
[505] John McGrain, *From Pig Iron to Cotton Duck: A History of Manufacturing Village in Baltimore County* (Towson, Md: Baltimore County Public Library, 1985), 191-93; Hockley Mills advertisement, *Federal Gazette*, August 24, 1819.
[506] McGrain, "Dorsey's Forge," 349; Baltimore County Assessment Records, Patapsco Upper Hundred, 1813, entry for Edward Dorsey, MSA; Baltimore County Assessment Records, Election District One, 1818, entry for Nathaniel Ellicott and Company, MSA.
[507] McGrain, "Dorsey's Forge," 349. McGrain's research records the original owners were Benjamin (1761-1838) and James (1772-1820) Ellicott, brothers of Jonathan Ellicott (1756-1826). In 1815, Jonathan owned and operated the Lower Mills under the name Jonathan Ellicott and Sons. Benjamin and James then sold shares in the property to their brothers Jonathan, Elias (1759-1827), George (1760-1832), Andrew (1775-1823), and Thomas (1777-1859), recorded in Baltimore County Deed WG 163/110. The only brother not included in the transfer was Nathaniel (1763-1841). Yet his name appears as the sole owner of record in the 1818 property tax list; he also used middle name of his first born son (John Avalon Ellicott) to the incorporated company, "Avalon," in December 1822. For more on this, see Evans, *Bibliographical and Historical Accounts of the Fox, Ellicott and Evans Families*, reprinted in Hoffmann and Hoffmann, eds., *American Family History*, 149, 150, 151. The incorporation deed for the Avalon Company is recorded in Baltimore County WG 166/229. The Ellicotts were involved in number of complicated property transfers during the 1810s, 1820s, and 1830s, evidently attempting to apportion property fairly among the members of successive generations, and perhaps trying to protect the family's wealth from assault by creditors.

the 1760s, and the Ellicott brothers' merchant milling operations in the 1770s.[508] In addition to the water power being exploited upstream, river transport at Elk Ridge Landing promoted another commercial and industrial investment: papermaking.[509] Throughout the colonial period, the colonies imported a substantial proportion of their inventories of paper. Partly, this was due to restriction in the British mercantile system. But the colonies also suffered from a limited number of skilled workers, inadequate supplies of raw materials, and the expense of equipment. All of these problems combined to make domestically produced paper more costly than imported sheets. Even worse, uncertainties within the local market made investment in papermaking facilities a relatively high-risk venture.[510]

Most paper mills in colonial America were established to serve the needs of specific individuals rather than the general public. Printers and bookbinders constructed their own mills to ensure regular sources of paper, but these were relatively small-scale production facilities. William Parks established two newspapers in the early 1700s: the *Maryland Gazette* in Annapolis, and the *Virginia Gazette* in Williamsburg. He built a paper mill at the Virginal capital in 1744 to provide his own supply. The mill did sell paper generally, after Parks' own needs were met, but the market remained small until the Revolution.[511]

Obviously, imports from England ceased during the war. Faced with a significantly reduced supply of paper, the revolutionary governments tried to replace lost imports with domestic production. In May 1776, the Maryland Convention voted to loan four hundred pounds

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[508] Scott, *Geographical Description*, 1807, 49.
[509] Few studies cover the origins of the paper industry in the American colonies, including developments in the Patapsco Valley. See Lyman Horace Weeks, *History of Paper Manufacturing in the United States* (New York: The Lockwood Trade Journal Company, 1916), "Papermaking and Trade," Vertical Files, Maryland Room, the Enoch Pratt Free Library; Migraine, *From Pig Iron to Cotton Duck*; and John Migraine, Howard and Baltimore County notebooks, Special Collections, MSA.
[510] Weeks, *History of Paper Manufacturing*, 15.
[511] The Philadelphia region remained the preeminent paper producer for the colonies, providing half of the stores of colonial paper by the Revolution. Weeks, *History of Paper Manufacturing*, 3-33, 41-49.

to James Dorsett, specifically to construct a paper mill in Baltimore County. In an attempt to prevent price-gouging during the shortage, the convention required him to "sell to the inhabitants of the Province any kind of paper which he may make as cheap as the same can or shall be sold at any Mill in the Province of Pennsylvania."[512] Within two weeks, the Maryland Committee of Safety ratified the resolution, just as it had done the same year with the grant for William Whetcroft's iron slitting and rolling mill and Dorsey's forge. William Goddard, publisher of the *Baltimore American and Commercial Advertiser* and the *Maryland Journal*, built another paper mill in Baltimore County in 1778, probably with the same support as Dorsett's facility.[513] Simultaneously, Goddard's sister, Mary Goddard, "fostered . . . a paper mill at Elk Ridge Landing."[514] Goddard's mill operated throughout the war, but eventually went out of business in the 1780s.

Goddard's mill would not be the end of paper manufacturing in the region. Property records indicate that Thomas Mendenhall, a Philadelphia merchant, bought land on the Baltimore County side of the Patapsco on February 18, 1794, and began advertising for "Paper Makers . . . [at his factory] 9 miles from Baltimore" in January1796.[515] Mendenhall manufactured paper for almost two years, and then put the mill up for sale. The December 18, 1797 advertisement reveals that he had masons build a substantial three-story stone building, one hundred feet long by thirty-eight feed wide, "exclusive of sizing houses and vat houses." Mendenhall boasted that the mill could accommodate double the equipment originally installed with no fear that water power would be inadequate to drive it. The property was divided into two zones: one for

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[512] Peter Force, *American Archives*, Fourth Series (Washington: No Publisher., 1837-53), 5:1600, and 6:1467; and, *Archives of Maryland*, 2:465.
[513] Weeks, *History of Paper Manufacturing*, 96.
[514] Lawrence Wroth, *The Colonial Printer* (Portland, Maine: Southworth-Anthoensen Press, 1938), 132-33.
[515] Thomas Mendenhall advertisement, *Federal Gazette*, January 8, 1796, col. 5; Robert Mickle, trustee of Nathaniel H. Ellicott and Jonathan H. Ellicott, et al., to Martha E. Gray, May 15, 1841, Baltimore 308/385; John Howard Ford to Thomas Mendenhall, February 18, 1794.

owner/manager contained a frame house and requisite support buildings, all removed to a degree from the other zone; the second zone was an industrial area centered on the factory itself and a series of smaller, less well built houses for workers. The facility included a thirty-six-by-sixteen-foot frame dwelling, a kitchen, a stone spring house, a smoke house, a stable, and a "small log dwelling house near the mills."[516] Assessors for the 1798 Federal Direct Tax valued the total improvements at two thousand dollars.[517] The next owner, John Haggerty, doubled the amount of paper making equipment Mendenhall originally installed, an improvement reflected in the facility's increased value.[518] When Joseph Scott toured the valley to gather information for his 1807 *Geographical Description*, he listed Hagerty as the owner of "one of the largest paper mills in the United States . . . 120 feet long, 40 wide, and three stories high, built of stone. She works four sets of hands, and is supposed to manufacture more paper than any other mill in America."[519]

Despite the large investment in facilities which Mendenhall and Hagerty made, papermaking in the Patapsco Valley remained a borderline operation. No other paper manufacturer would invest in the mill complex, and the records of other operations in the valley are so incomplete as to suggest only transient enterprises.[520] Large-scale papermaking did

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[516] Thomas Mendenhall advertisement, *Federal Gazette*, December 18, 1797, col. 17; Federal Direct Tax Records, Baltimore County, Patapsco Upper Hundred, October 1, 1798, Land and Buildings, excluding Dwelling houses which exceed $100 in value on two acres or less, MSA; Federal Direct Tax Records, Baltimore County, Patapsco Upper Hundred, October 1, 1798. Dwelling houses on two acres or less, exceeding $100 in value, MSA. These list John Hagartha [Hagerty] as the owner.

[517] Federal Direct Tax Records, as in note 11. Samuel Moale advertisement, *Baltimore American*, January 6, 1813, col. 14; also printed in the *Federal Gazette*, January 30, 1813, col. 4.

[518] Baltimore County Assessment Records, Patapsco Upper Hundred, 1804, entry for John Hagathy [Hagarty], MSA. These figures were calculated at six shillings to the dollar, as employed in a Virginia document dated January 13, 1805, Holladay Family Papers, Virginia Historical Society; 1 = 20 shillings, 20 x 750 = 15000 shillings, 15000/6 shillings to the dollar = 2500 dollars; John Hagerty advertisement, April 1805, *Federal Gazette*, col. 17. Samuel Moale advertisement, *Baltimore American*, January 6, 1813, col. 14; also printed in the *Federal Gazette*, January 30, 1813, col. 4.

[519] Scott, *Geographical Description*, 92-95.

[520] G. M. Jefferies of Baltimore advertised in the November 13, 1805, issue of the *Baltimore American* that he "will sell paper from the mill of W. Hammond and Mark Pringle near Elk Ridge Landing." See Papermaking and Trade,

resume on the Patapsco until the last quarter of the nineteenth century, but again, despite a rather substantial investment, the enterprise ultimately failed. The biggest problem with large scale paper production was demand. While there were numerous uses for paper in the region, the largest consumers of the material chose to manufacture their own supplies. Thus, general demand never offered enough profits for long term commercial success, although it did add to the growing population at Elk Ridge Landing/ Ellicott City.

The success of locally produced finished iron, and even paper, demonstrated a steady shift in the Patapsco River Valley toward a more diversified economy. Political independence did not mean economic independence for the young republic. European political upheaval caused by the French Revolution and the resulting Napoleonic Wars allowed Americans to develop their Atlantic trade unrestrained by European competition or restrictions for a time. Acting as a neutral power, the United States established lucrative commercial connections with Europe and the Caribbean islands, but those wartime profits also stifled American incentives to establish domestic manufacturing because the new markets only desired foodstuffs.[521] Unfortunately for American economic development, increased participation by Americans with the world at large ran counter to European war interests. In an effort to stop American supplies from reaching their enemies, both the British and the French tried to limit American trade activities in the Atlantic Ocean. The British re-established control over the Atlantic by stopping American vessels from reaching the continent, and the French tried to block American trade with Britain by seizing

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Vertical Files, Maryland Room, Enoch Pratt Free Library. John McGrain, in his molinography for the Maryland Series, Anne Arundel County notebook, lists the Lamborne Paper Mill in existence in 1850 based on a reference to court records in a case of Lamborne against the Ellicott family: 2 Md 131, and a deed reference (Baltimore County?) 12/323, MSA.

[521] John S. Pancake, "Baltimore and the Embargo," *Maryland Historical Magazine*, 47 (1952): 174. Richard W. Griffin, "An Origin of the Industrial Revolution in Maryland," *Maryland Historical Magazine* 61 (1966): 24-25.

vessels deemed to be aiding Napoleon's enemies. Tensions with Europe grew from 1805 to 1806, culminating in the *Chesapeake-Leopard Affair* in the late spring of 1807.[522]

The *Chesapeake-Leopard Affair* was an attack on an American military vessel in American waters by a British naval vessel seeking to board the American ship in search of deserters from the British navy. Such an action by a foreign power was a direct assault on the sovereignty of the new nation and should have brought the United States to war, but President Thomas Jefferson sought instead to dispel British aggression by instituting an embargo on all trans-Atlantic trade.[523] Support for the Embargo was limited, in part because it would have serious repercussions for the American economy. Baltimore's annual exports dropped eighty percent in 1808, and the total fell by more than three quarters for the entire United States. The price of imports rose as substantially as prices for locally produced commodities fell—an unavoidable consequence of ending European trade. This inherent tension between domestic privation and long-term national aims was a necessary balancing act for the embargo to achieve its intended effect, but it also showed more clearly to the new nation the need to break its dependence on European manufacturing in order to free itself of European political affairs. The biggest lesson the new nation learned from the Embargo was that the domestic manufacturing capacity of the United States was plainly insufficient to fill market shelves, whether they were national, regional, or local.[524]

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[522] The H.M.S. *Leopard* loosed volleys on the *Chesapeake*, an American frigate, in U.S. waters. British firepower overcame the Americans, the *Leopard* crew boarded the *Chesapeake*, and detained four seamen they claimed to be British deserters. For more on this incident, see Robert E. Cray, Jr., "Remembering the USS Chesapeake: The Politics of Maritime Death and Impressments," *Journal of the Early Republic*, 25 (fall 2005), p. 445-474; Spencer C. Tucker and Frank T. Reuter, *Injured Honor: The Chesapeake-Leopard Affair June 22, 1807*, (US Naval Institute Press, 1996).

[523] Having drastically reduced the size of the American military in order to cut the U. S. budget, it was likely Jefferson was aware that a military challenge to British maritime strength would not be successful and thus turned to economic means of coercion rather than military. Pancake, "Baltimore and the Embargo," 174-78; the vote was two-to-one in favor of an Embargo in the House, and there was little opposition in the Senate.

[524] "Baltimore and the Embargo," 174-78; and, Griffin, "Origin of the Industrial Revolution in Maryland," 26.

To counter the problem, a group of Baltimore political and business leaders gathered at the Merchants' Coffee House in early January of 1808 to discuss the need for greater economic independence and self-sufficiency.[525] Choosing a coffee house as the meeting site was characteristic of the change underway in new nation's position in international commerce. South American coffee and Caribbean sugar had long been traded for Chesapeake wheat and flour, two domestic products that would be central to breaking American dependency on tobacco and its barter system. "The time will come," argued William Patterson, president of the Bank of Maryland and strong supporter of the embargo, "when the United States must and ought to manufacture her own supplies of clothing and other necessary articles, if she is ever to become completely an independent nation."[526] Patterson and the other assembled leaders believed that the Patapsco River Valley was the best location for a substantial manufacturing enterprise in the Baltimore region and they selected a committee to develop plans to establish the operation.

Their plan became the basis for the Union Manufacturing Company. The purpose of the Company was

> To be for establishing, carrying on, and encouraging Manufactories of all the useful and necessary articles, which have heretofore been imported from foreign countries—but the establishment of Manufactories of Cotton and Wool, by means of the latest improved labor-saving machines, to be put in motion by water, is to be the first and immediate object to which the attention and funds of this association are to be applied.[527]

The individuals who established the Union Manufacturing Company had two goals in mind: to promote manufacturing in general, and to manufacture cloth. But they hoped the company could be more than just an economic endeavor. They believed this manufacturing enterprise offered an opportunity to unite the citizens of the nation. Establishing a domestic industry could make a

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[525] William Patterson, *Report of the Committee and Constitution of the Union Manufacturing Company of Maryland* (Baltimore: Niles & Frailey, 1808), 3.
[526] Patterson, *Report*, 3-4.
[527] Patterson, *Report*, 17-18.

significant advance toward eradicating poverty and improving public morals. The factory would act as "an Asylum for the poor—many of whom are even now in a suffering condition; these, whatever may have been their follies, are still human beings . . . it is a fact by no means surprising, that their very errors and vices grow out of their poverty and wretchedness."[528] To change this dilemma, the company would provide regular employment and technical training at the factory for the able-bodied indigent population of the entire region.

However, the Company would not limit its employment to the poorest members of society. The founders expected the company to become a center for industrial learning in the region, suggesting that

> . . . in less than seven years, our wealthy merchants and farmers should find this a very desirable school of industry and useful information, where they may be anxious to send their sons, for the acquisition of a knowledge far more useful in common life than tedious counting balance calculations, dry studies of the law, or medical disquisitions—We admit the utility of these sciences, but deny the necessity of multiplying [their practitioners to excessive numbers].[529]

Regardless of how useful the Company was for providing knowledge and opportunity, it would still need to be profitable. Company founders were certain their inexpensive high quality manufactured textiles would become widely sought after within the consumer population—further increasing the economic success of the institution.

While they had lots of ideas about what the company would do and provide for the community, the founders still had to figure out a way to pay for its establishment. Here the founders believed it would be necessary to establish a joint-stock company valued at one million dollars to support the enterprise. Each share of stock would cost only fifty dollars, payable over a series of time in increments of $2.50. The low rate would open investment to as many investors as possible. One-twentieth of these shares would be set aside for the state, and the remaining

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[528] Patterson, *Report*, 14.
[529] Patterson, *Report*, 16.

shares would be issued in every Maryland County, "so shall we insure to the establishment, customers for its fabrications from every quarter, by interesting a large number of the success of our experiment." It was hoped that every level of society might contribute to the establishment of the enterprise and derive benefits from this successful operation. "This laudable and patriotic purpose," they concluded, "would cement us together as members of one common family."[530]

In March of 1808, stock subscriptions were opened for the Union Manufacturing Company, and notice went out that elections would be held for a board of directors at the first meeting to be held the following April. Simultaneously, a search began for a suitable site for the Company. Patterson advertised in the March 9, 1808 edition of the *Baltimore American*

> to request that all of those gentlemen who are owners of mills or mill seats within 20 miles of Baltimore, and who are willing to dispose of them to the company, will make their proposals for the sale thereof . . . particularly describing the fall of water, quantity and quality of land, improvement if any . . . . that the same may be ready to be laid before the president and directors immediately after their election.[531]

A site was found relatively quickly. The directors made an initial purchase of just over ninety-four acres on the Patapsco River in Baltimore County, a tract called "Cragged Hills" just north of Ellicott's Lower Mills.[532] They also bought an existing mill building on a much larger parcel across the river called "Contentment," the 350 acre tract extended for more than a mile up the west bank of the river from the Ellicott family holdings.[533]

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[530] Patterson, *Report*, 15-16; and, *Baltimore American*, February 13, 1808, 3.
[531] *Baltimore American*, March 9, 1808, 3.
[532] Charles Ridgely of Hampton to Robert McKim, William Wilson, William Jones, John Trimble, James. H. McCulloch, Ludwig Herring, August Jacob Schwartz, Nathan Levering, and James Beatty, trustees of the Union Manufacturing Company of Maryland, July 1808, Baltimore County WG 104/274, MSA.
[533] Anne Arundel County Patent, JK#T/453, March 15, 1811, Oella, MSA. The order to resurvey was given March 31, 1809; the resurvey was returned to the land office February 24, 1810; a patent for 864 acres was granted to the Union Manufacturing Company March 15, 1811. Accompanying the Patent Certificate number 1102, Oella, conveyed the following additional information: The Union Manufacturing Company part of West Ilchester was 279 ½ acres; the patent was to be "called Oella, in commemoration of the name of the first Woman who applied herself to the spinning of Cotton on the Continent." See, Anne Arundel County Patents, MSA.

Sales of stock subscriptions to finance the purchases remained a strong source of revenue for the rest of the year. Subsequently, in November 1808 the General Assembly incorporated the Union Manufacturing Company of Maryland, the first manufacturing enterprise to be incorporated in the history of the state.[534] The state incorporation act recognized cotton textile production as the initial installation of a much larger manufacturing establishment.[535] As a result, the Assembly stipulated that the site for the enterprise had to include both a source of substantial water power and a sufficient space to exploit that water power on a large scale. Direct links to markets and ready sources of labor were also essential.

The site near Ellicott's Lower Mills offered a tremendous opportunity to the directors. Conditions at the beginning of the nineteenth century had changed significantly from when the Ellicott brothers first settled on the Patapsco in 1770. The area had an established history of success, and seemed primed for further growth. The success of Ellicotts' mills proved that a carefully planned (albeit ambitious) development scheme could thrive. More importantly, the success of Mendenhall's and Hagerty's paper mill justified the acquisition of a large initial investment in facilities as long as they were designed to accommodate later growth. And finally, the newly opened Ellicott iron rolling and slitting mill seemed to signal a revival of iron production in the valley.[536]

The Union Manufacturing Company made Ellicott's Lower Mills the center of industry and trade in the Patapsco River valley, but the port of Baltimore was the only link to commerce beyond local markets. While the river could be used for some transportation needs, it did not

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[534] *An Act to Incorporate the Union Manufacturing Company of Maryland, passed November Session 1808* (Baltimore: John D. Toy, 1847), 3, 4; John W. McGrain, *Oella: Its Thread of History* (Oella, Md: Oella Community Improvement Association, 1976), 1.
[535] *An Act to Incorporate*, 3.
[536] For efforts in 1752-54 to keep the channel clear, see William Hand Brown, ed., *Archives of Maryland*, 73, vols. (Baltimore: Maryland Historical Society, 1872-), 50:xvi, , for evidence on deforestation, see Scott, *Geographical Description*.

serve the full requirements of the company—a problem well recognized by the directors of the Union Company. There was an established overland transportation system—the Baltimore and Fredericktown Turnpike—which joined the valley to the port, but it was not enough. In 1808, the founders of the Union Manufacturing Company pushed the federal government to build a new publicly-funded National Road through the valley. A visionary connection of eastern markets with new lands in the west, the turnpike went from Baltimore through Ellicott's Mills and led directly to the new National Road.[537] The new road gave the Patapsco Valley complete access to local and regional markets, while expanding its contact outside of the region. With the construction of the National Road, Patapsco became one of the best locations "to be found on this side of the Allegheny mountains" for the foundation of an industrial complex.[538]

The Union Manufacturing Company began construction on their manufactory in the summer of 1808.[539] From the beginning, the founders of Union prepared for expansion. The first stockholder report, issued on January 4, 1809 in the *Baltimore American & Commercial Daily Advertiser* by company president Robert McKim, described the progress to date and laid forth future plans. The most important aspect of the Patapsco site, McKim explained, was its elevation above the river because it allowed for the construction of a fifty-foot fall of water. McKim believed the waterfall would furnish enough power for two ranges of mill buildings "[w]hen the funds of the company will admit, and the situation of our county requires." McKim proposed that eight structures would be situated along each range, "all [driven] by the same stream of water, with the expense of only one dam which is already erected, and the cutting of only one canal." A

[537] Karl Raitz, ed. *The National Road* (Baltimore and London: Johns Hopkins University Press, 1996), xi.
[538] Robert McKim, "Union Manufacturing Company of Maryland," *Baltimore American and Commercial Daily Advertiser*, January 4, 1809, 2.
[539] Jonathan, Elias, George, and John Ellicott to the Union Manufacturing Company. Anne Arundel County Patents, Oella, February 1809, Baltimore County WG 109/51, MSA. McKim, "Union Manufacturing Company." "Fire," *Baltimore American & Commercial Daily Advertiser*, January 12, 1809.

single power source could propel the machinery of sixteen mills, a vast establishment capable of achieving the ambitious goals the Company had set when they envisioned building their operation. Thus, as the nation grew, so would the Union Manufacturing Company.[540]

McKim's report offered more than just a glimpse into the construction activities of the previous season and future expectations. It also detailed the building of a city. The success of large construction projects during the period required the establishment of their own service industries. Almost all the materials for the factory complex had to be hand-crafted on the work site. The company amassed extensive acreage to provide much more than a building site and water power; it also supplied lumber and stone to construct the factory system.[541] The first step was to build a staging area. Shops were needed to make tools and construction materials. The Company refitted the old mill building on the opposite side of the Patapsco as a machine shop, added a water powered saw mill, and built a smith's shop. The "mechanics," men skilled in construction, also supplied themselves with housing by repairing three adjacent small wooden buildings.[542]

From the staging area, work commenced on the rest of the factory. Company workers built roads and bridges strong enough to support the teams of draft horses that hauled materials and removed refuse.[543] Just above the bridge, work began on the dam and millrace—a "canal . . . of twenty feet in breadth, extending down the east of the stream upwards of a mile and a quarter,

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[540] McKim, "Union Manufacturing Company."
[541] Anne Arundel County Patents, Oella, MSA.
[542] McKim, "Union Manufacturing Company." Carl R. Loundsury, ed., *An Illustrated Glossary of Early Southern Architecture and Landscape* (New York: Oxford University Press, 1994), 229. The mill which became the Union Company's construction staging area and tool manufactory can be found on town maps, under the name "Eagle Factory" in 1823, and the "Old Eagle Factory" in 1831 as reproduced in James D. Dilts, *The Great Road: the Building of the Baltimore and Ohio, the Nation's First Railroad, 1828-1853* (Stanford: Stanford University Press, 1993), see "Map of the Practicable Routes of a Canal from Baltimore to the Potomac," 80-81; and "Map and Profile of the Route of the Baltimore and Ohio Railroad from Baltimore to Point of Rocks and of the Lateral Road to Frederick," 158-159.
[543] The distance McKim gives is "a few perches." One perch measures sixteen and a half feet. See, http://www.measurement.gov.au/index.cfm?event=conversions

to the commencement of the first range of mill seats." The waterway would "afford a good boat navigation" for its entire length. The expansion of the local transportation network meant materials formerly hauled or dragged downstream to the mill site from the staging area could now be carried across the bridge and transferred by bateaux to their destination.[544]

The founders designed their manufacturing complex to take advantage of the natural material resources of the valley. Sitting the mill seats more than a mile downstream from the dam produced the extraordinary waterfall required to operate so many proposed facilities, while the relatively level pathway of the roads and canal leading from the staging area down to the mills made it easier to transport building materials. But once the canal was opened, the designers again demonstrated a creative mastery of nature. The canal became the main artery of movement downriver, while the river became the main source of power for the mill operation and the locomotion for saws and other tools need for construction.

When the mill seats were cleared, workers next turned their attention toward the construction of secondary structures, particularly worker housing. Houses built for factory workers suggest a clear social structure at the site. The workers were housed in "five small buildings of wood," two stone dwellings, while a single "commodious stone house" was set aside for the superintendent. The only other structures constructed were two stables for draft animals and another smith's shop. Having built structures to house workers, maintenance functions, and provide shelter for animals needed during construction, the project next focused on raising the first factory building. By the end of the first year, the 44 x 106 foot stone structure was more

[544] McKim, "Union Manufacturing Company."

than two stories high. It topped out at five stories the following year, and began production in May of 1810.[545]

With the factory in operation, the Patapsco Valley took on an urban appearance. The first factory workers to spin yarn from the company's stores of cotton were mostly children, requiring the owners to construct dormitory housing, cafeterias, and laundry services. The new mechanized textile equipment needed small adept fingers to fix clogged yarn wheels and to clear obstructions, rather than strong and obtrusive adult workers. Since children already worked long hours in agriculture and home-based craft industries, child labor seemed appropriate to factory managers.[546] Besides, child laborers received fewer wage for their work and were easier to manipulate than adults. To manage the children, maintain product quality, and finish producing fabric, the company brought in a dozen or more skill men from New England. By 1811, the Company had 150 employees working under the direction of Matthew Waddell, an English factory master. The yarn-spinning machine operators were paid wages—minus the cost of room and board—and the hand-weavers earned money by the finished piece. The Union Company's operation typified the young textile industry in the United States—a system brought to America in 1790 by immigrant Englishman Samuel Slater when he organized the nation's first modern textile mill in Rhode Island. With Slater's arrival American yarn and fabric production moved from the domestic world to large-scale, water-driven installations, where workers earned wages as their principal income, generally under the direction of imported English managers.[547]

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[545] United States Census of Manufacturers, 1820; McKim, "Union Manufacturing Company." See also, John W. McGrain, "Oella Mill Village, Historical Background," unpublished manuscript, Vertical File-Baltimore County, Oella Historic District, Maryland Historical Trust, 6; and, McGrain, *Oella, Its Thread of History*, 2.

[546] Barbara M. Tucker, *Samuel Slater and the Origins of the American Textile Industry, 1790-1860* (Ithaca: Cornell University Press, 1984), 38.

[547] Margaret Kinard Latimer, ed., "Sir Augustus Foster in Maryland," *Maryland Historical Magazine*, 47 (1952): 291-92. Foster observed the Union Company's works from 1811 to 1812. *Niles' Weekly Register*, 1813, 173, gives the employee total for 1811, though Foster notes that "300 persons, in all, [are] kept together by this establishment." Evidentially, families of the children and adult laborers employed also lived on the premises. The 1820 United

The first textile mill proved so profitable that Company directors immediately began construction on a second mill. Work began in 1813, and it was complete within two years. Hezekiah Niles, editor of the local newspaper, enthusiastically reported that the directors had optimistic plans for yet more construction: they "will commence the third mill, as soon as the building of the second is done, and begin to count upon a fourth."[548] Thomas Jefferson's embargo on imports drove up prices for domestically manufactured goods and eliminated cheap foreign competitors. After the Embargo was repealed in March 1809, hostilities with Britain continued until the War of 1812, which sustained the long term constraint on British imports and allowed American manufacturers like the Union Company to develop unmolested by foreign competitors. With virtually no outside competition, American manufacturers could ask high prices for their yarn and fabrics. With absolute control over the domestic textile market in the hands of local manufacturers, the United States and the Patapsco River Valley experienced a boom in domestic factory construction and textile manufacturing which Niles recorded in 1813. But then peace came at the end of 1815, and foreign imports again flooded the U.S. market, undercutting the new American manufacturers, and forcing many closures.[549]

Against the backdrop of a quickly collapsing market, the Union Manufacturing Company experienced it first major setback. On the evening of December 13, 1815, the Company's first cotton mill burned to the ground. Less than six months later, the Company's waste house at Baltimore harbor, filled to the brim with raw cotton, also burned. It would take the Company

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States Manufacturers' Census reports that the Union Company employed ten men, no women, and 120 boys and girls. The company paid $16,000 in annual wages. McGrain, *Oella, Its Thread of History*, 2-3; William R. Bagnall, *The Textile Industry of the United States* (1893; reprinted New York: A.M. Kelley, 1971), 1:492ff.

[548] *Niles' Weekly Register*, November 20, 1813, 207. United States Census of Manufacturers, 1820, as quoted in McGrain, "Oella Mill Village," 6, indicates the size of the second mill and says that it was operational before the first burned in December 1815.

[549] Tucker, *Samuel Slater*, 90-91.

nearly a decade to recover from its losses. Although the second mill continued to operate, the depressed market meant it ran at only a quarter of capacity for at least five years.[550]

Despite the difficulties faced by the Union Manufacturing Company, the significance of William Patterson's manufacturing enterprise extended beyond the creative merger of commerce and idealism. The Union Manufacturing Company served as an example for those seeking to establish similar facilities. One of the first to follow was Edward Gray, a recent immigrant from Northern Ireland. Gray was just one of many British expatriates who contributed their collective expertise to early textile manufacturing in America.[551] As a result of the Embargo and subsequent War of 1812, cotton commodity prices were low, imports were scarce, and prices for finished goods were high. Gray tried to establish a cotton factory to exploit the potential within the domestic market. Hey searched for several years to find an appropriate site for his manufactory, but found most of the available waterpower in the Patapsco Valley was already tied up by the Ellicott family and the Union Company.[552] The situation was about to change though.

In January of 1813, Samuel Moale advertised the sale of a paper mill owned by the late John Conrad in the *Baltimore American* and the *Federal*. A relatively new factory complex, Conrad's paper mill was located on the Patapsco River just off the Baltimore and Fredericktown turnpike and less than a mile below Ellicott's Lower Mills. It included a three-story stone mill, an owner or manager's residence and secondary buildings to support the factory population—six

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[550] "Fire," *Baltimore American*, December 15, 1815, col. 9. "Monday morning 3rd inst," *Niles' Weekly Register*, June 15, 1816, 263. Sparks, "Baltimore," 128. United States Census of Manufacturers, 1820, as quoted in McGrain, "Oella Mill Village," 6.

[551] "Statement of Significance—Gray's Level Historic District," unpublished manuscript, Vertical File, Baltimore County, Gray's Level Historic District, Maryland Historical Trust, MHS, 2.

[552] Sparks, "Baltimore," 126, calculates the productive capacity of the fall of water between the Union Company's land and Elk Ridge Landing. The river fell 183 feet over ten miles, generating more power than eight of the nine other falls in the Baltimore region.

factory workers' dwellings, a number of incidental agricultural outbuildings, a saw mill, and a two-story frame house finished with a wine cellar and kitchen.[553]

Gray purchased the property in 1813 with three other investors—Joseph Taggert, William Rogers, and Robert Taylor. Early in 1815 their enterprise, the Patapsco Manufacturing Company, was incorporated by the General Assembly.[554] Since the main portion of the complex was already constructed, Gray and his partners began operations with a minimum of start-up time devoted to new construction. To support their operation, the company opened a warehouse in Baltimore at "No. 243, Market Street." Following the example of the Union Manufacturing Company, the Patapsco Company's initial water-driven production focused on "an extensive assortment of White & Blue COTTON YARNS, Sewing and Knitting COTTON" rather than woven fabric.[555]

While the Patapsco Manufacturing Company began at a small level of production, they utilized a similar spirit of innovation in their operation as Henry Heth used at the Black Heath Mines. Gray found it difficult to employ his workers at full capacity during the winter because of the cold. He tried to heat the building, but found it both expensive and completely inadequate due to the size of the structure. To remedy the problem, Gray hired Robert Mills to design an experimental furnace for the facility.[556] Mills designed a furnace made of soapstone with a brick flue, built "against one side of the building." Its fire box opened to the exterior so it could be charged with wood early in the morning. Once the fire reduced the wood to coals, a "register [was] let down," which released hot air into the building. The hot air was then circulated through

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[553] Samuel Moale advertisement, *Baltimore American*, January 6, 1813, col. 14; also printed in the *Federal Gazette*, January 30, 1813, col. 4. The widths for the various factory buildings are listed as 35, 38, and 40 feet, with sheds of different sizes expanding the 100-foot length.

[554] Griffin, "Origin of the Industrial Revolution in Maryland," 32. Acts of Assembly, 1815, chapter 140, cited in McGrain, Molinography in Maryland Series, Baltimore County notebook, Special Collections, MSA.

[555] "E. Gray & Co." advertisement, *Baltimore American*, August 29, 1815, col. 4.

[556] Robert Mills was the architect of the Washington Monuments in Baltimore and the District of Columbia as well as such important public buildings as the United States Treasury Office and the Patent Office

the building by a system of ducts and vents, so "the superintendent . . . [could] increase or diminish the quantity of heat in each room at his pleasure." The new heating furnace allowed Gray to raise the temperature of the building above seventy degrees on even the coldest days. The furnace's fuel efficiency matched its effectiveness, requiring only an eighth of a cord of wood in twenty-four hours. By comparison, open fireplaces required one full cord of wood per day, while a steam heating system required the same amount of wood but cost a lot more to install and operate. Thus Gray, in his quest to economize, installed an innovative heating system that considerably improved working conditions for his laborers.[557]

Materials filed for the United States Manufacturers' Census in 1820 reveal that, like the Union Company, Gray hired no adult women. According to that record, forty men and seventy-five boys and girls worked the spindles and newly installed looms at his mill producing yarn and fabrics.[558] The situation changed dramatically on the morning of January 21, 1820, when Gray's main factory building burned. The mill was a complete loss, but Gray stayed in business and had the cotton factory back in operation by 1824, this time with 150 employees. Soon after the original mill opened, Gray augmented production with fifty hand looms, and just before the fire, those looms had been replaced with eighty modern water-driven models. Gray installed only twenty-four water-powered looms in the new factory producing woven fabrics at a much lower cost than was possible with hand weaving.[559]

The shift to water powered textile machinery gave Gray an important advantage over competitors, albeit an expensive one. Widely promoted in response to the flood of imported cloth

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[557] "Economy of Fuel," *Niles' Weekly Register,* vol. 9 supplement (1816), 183.
[558] Baltimore County Assessment Records, Election District One, 1818, MSA. United States Census, 1820, Manufacturers' aggregation. These totals date from 1819, the last year of full operation before the facility burned on January 21, 1820.
[559] "Fire," *Niles' Weekly Register*, January 1820, 376. Niles suspected an arsonist, rather than a problem with the experimental furnace. Sparks, "Baltimore," 128.

after the War of 1812 concluded, power looms dramatically reduced production expenses and gave a much needed stimulus to the domestic textile industry. To further assist American manufacturers, the government instituted protective tariffs in 1816, which specifically targeted cloth imports and gave Americans time to gradually improve their domestic manufacturing climate. Textile imports continued to grow during the antebellum period, but their market share decreased.[560] Nevertheless, Gray's new power looms, like those of the Union Company, enabled his firm to remain competitive.

The establishment of an industrial system in the Patapsco River Valley brought large numbers of people into the region. The resources necessary to establish a factory, the work necessary to transform raw materials into finished products, and the energy needed to move goods to market, only worked effectively when individuals were organized into a cohesive system. Thus, the links between individuals—investors, managers, and laborers; shippers, merchants, and customers—created a community. While industrial ventures brought a larger number of people into the Patapsco River Valley, the most important spur to urban growth in the region was the expansion of transportation networks to serve the industrial growth.

Transportation networks are essential to the foundation of communities. They link individuals together within a region, but also connect them to the world at large. In order for products to have value—whether agricultural, raw materials, or finished goods—they must be accessible to markets, manufactures, and consumers. Transportation connections spread outward in ever-widening circles from the individual to the neighborhood to the local region to the nation and then on to the world. The efficient use of resources and the reduction in cost per unit that

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[560] Tucker, *Samuel Slater*, 90-91. Henry Louis Stettler III, *Growth and Fluctuations in the Ante-bellum Textile Industry* (New York: Arno Press, 1977), 188-89, 225-26. By 1825, the Union Company had seventy-six more power looms, and the improving economic climate encouraged the directors to rebuild their burned factory. See Sparks, "Baltimore," 128.

resulted from the increased production realized through the new operational efficiency normally will concentrate trading activities in convenient locations; but only transportation can bring goods and people together at market.

Although river power was important, the crucial factor in the development of the Patapsco River Valley was the connection the river provided to distant markets. Like every other river emptying into the Chesapeake Bay, the Patapsco served as a major avenue of communication and transportation. The rivers of the new world were gateways to the interior from the very beginning.[561] River navigation to the fall line helped to open inland territories to development, but roads needed to expand connections into the upcountry areas where water transports could not go. As European populations grew and extended away from the coast, they settled at the point where rivers and roads converged. In the case of Maryland, settlers gathered at Elk Ridge, where they built a ship landing at the falls of the Patapsco.

River transportation to Elk Ridge was crucial for regional development. The Maryland Assembly tried to protect the river channel from Baltimore to Elk Ridge Landing by passing legislation restricting destructive practices as early as the 1750s. The first protective act was prompted by iron ore strip mining along the banks of the river. Strip mining of iron ore was causing the shipping lanes to fill with silt, making future passage potentially dangerous and uncertain. After Elk Ridge Landing was selected in 1747 as the site of a state authorized tobacco inspection house, the shipping lane was further protected with the channel clearing act of 1753.[562] Although Elk Ridge was not legally a town yet, it was an important tobacco shipping

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[561] For an example, see John Smith, "The general historie of Virginia, New England, and the Summer Isles, 1624," in Philip L. Barbour, *The Complete Works of Captain John Smith* (Chapel Hill: University of North Carolina Press, 1986).

[562] *Archives of Maryland,* 50xvi. The date of the Maryland Tobacco Inspection Act can be found on the Maryland State Archives, world wide web site, "Chronology of Maryland History," http://www.msa.md.gov/msa/mdmanual/01glance/chron/html/chron.html.

community. The addition of pig iron manufactures after 1755 only reinforced the importance of Elk Ridge Landing as a doorway to transport and trade.[563]

The population of Elk Ridge continued to grow with each passing year, so residents petitioned the colonial government to give them a town charter in the early 1760s. Reminding the legislature that "there is now a considerable Trade carried on" at the site, the residents argued that incorporation would considerably increase urban development. At the very least, the residents believed it would result in the construction of additional warehouses, particularly those serving the newly established wheat market. But residents feared that potential investors were unwilling to invest in the community until it received official recognition. Greater growth could only be attained if the state provisioned it as an official town. Unfortunately, the Assembly declined to incorporate the town, although the emerging grain market along the Patapsco Valley continued to increase urbanization at Elk Ridge.[564]

Access to river transportation was essential for economic development. Yet as planters began turning to grain production, they also began to control the flow of the river for gristmills to prepare grains for market. Water-powered grist mills were generally installed at positions upstream where trails and other roads offered both a river ford and routs extending cross country to larger settlements. The two earliest flour mills in the Patapsco Valley—John Cornthwaite's Dismal Mill and James Hood's mill—were positioned at the intersection of inland roads and the river.[565] Colonial road orders reveal that the eighteenth-century landscape was quite intentionally crisscrossed with an intricate network of back country roads punctuated by mills at river crossings. Cornthwaite and Hood merely followed the established pattern, hoping to control

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[563] Elk Ridge Furnace was built in 1755. Anne Arundel IR 5/91; John McGrain, Molinography in Maryland Series, Howard County notebook, Special Collections, MSA SC 4300, loc 02/04/14.
[564] Elk Ridge Landing, Petition for a Town [1762?], MHS, Ms 2018. *Archives of Maryland*, 58:xxxiii.
[565] William B. Mayre, "The Baltimore County 'Garrison' and the Old Garrison Roads, Part II," *Maryland Historical Magazine*, 16 (1921): 237-53, 259.

grain production in the region. Nevertheless, small scale milling operations at this time only served the domestic needs of local farmers and did not produce large quantities intended for export. They were dispersed across the landscape and remained small because they operated for a strictly local market, making a scattered placement as much a result of local demand as from the varied sites of adequate water power. Roads allowed planters to bring corn to the mill and return home with meal, while simultaneously connecting the plantation with neighbors, churches, and government facilities. But the principal routes to international commerce remained waterborne.

Considering the situation in the Patapsco Valley, the arrival of the Ellicott family and the shift toward an industrial focus seems all the more extraordinary. The Ellicott's completely reconceived the economic system of the Patapsco River, but also of Maryland itself. They took a milling tradition, which focused on local production and use, and reoriented it toward a much larger scale of operation and an ever more distant market. This allowed them to produce vast quantities of flour which they sold to ever distant markets, starting at the local level and expanding first to inter-colonial and then later to the international export market. Since their gristmills needed manufactured tools and parts, they diversified their holdings to other industrial activities to serve their own needs and to meet the needs of their ever expanding markets. Their innovative reworking of the Patapsco economy heralded the larger economies of scale that would appear during the United States' Industrial Revolution. Like Henry Heth and Robert Carter, the innovations of the Ellicotts and other industrialists in the Patapsco Valley were based in risk. Rather than rely on the traditional mode of transportation, they rejected river bateaus and chose an overland route to Baltimore to move their merchandise, even though it was a mode of

transportation that for generations had only been reliable in dry weather and they had to build and improve it themselves.

Yet even in this instance, the Ellicotts seemed to know something others did not. Increasing levels of silt was filling the shipping channel at Elk Ridge Landing. By the end of the eighteenth century, Ellicott's Lower Mills had surpassed and subsumed the formerly bustling port community of Elk Ridge Landing as the regional trade center.[566] This transformation was possible because of the focus on expanding road networks across the region. John and Andrew Ellicott convinced the state to lay out a new road from Baltimore to Frederick by way of Ellicott's Lower Mills in 1787. They secured improvements to the route in 1791 under John Ellicott's direction just twenty years after he first cut a path from the river to the site.[567] As Rochefoucault-Liancourt noted, the Baltimore public turnpike stretched east "from Poplar-Spring a road has been cut within a few years, which abridges by some miles the road to Baltimore," and was maintained by convicts to ensure that surface conditions remained improved, regardless of the season, all the way to the city.[568]

State maintenance of the turnpike demonstrated public recognition and support for the industries being built along the Patapsco, even though it went counter to the importance of the river as a route to move tobacco. New generations of settlers were establishing a new economic and political system. "Tobacco was formerly cultivated in great quantities; but this species of

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[566] *Archives of Maryland*, 50: xvi-xxxiii.
[567] Mayre, "The Baltimore County 'Garrison,'" 246 (note 54); Baltimore County Court, Plats, 1790, "Road . . . to Patapsco Falls," A 14-mile line from Baltimore passed by Gwyns Falls on way to the Patapsco, MSA. Baltimore County Court, Plats, 1790, "Road . . . to Patapsco Falls," MSA; Baltimore County Court, Plats, 1 November 1791, "Road . . . Baltimore to Patapsco Falls . . . Commissioners of review appointed by an act of the general Assembly of Maryland entitled 'an act to lay out several turnpike roads in Baltimore County,' Having received from John Ellicott and Robert Long, two of the three Commissioners duly appointed . . . "to survey a road from Baltimore to Frederick Town, approve the route from metes and bounds description, including N 48 (W 61 31 perches with the old road, N 60 (W 61 perches towards John Ellicott's Mills; N 39 (W 7 perches crossing the Patapsco river, and to the county line., MSA
[568] Rochefoucault-Liancourt, *Travels through the United States of North America*, 2:125-30.

culture, which has as much decreased in Maryland as in all other Southern States, is here almost reduced to nothing. It has been superseded every-where by the culture of wheat," La Rochefoucault so clearly noted.[569] In the Patapsco Valley, the switch away from a cash crop resulted in an even more surprising move toward new forms of overland transportation.

River navigation was not completely supplanted as the most significant transportation network in the nation, but Americans began to focus increased attention toward new forms of long-distance transportation. Roadways represented only one form of overland movement to emerge in the new republic. Canals quickly became known as a safe and controllable alternative to rivers, although the barrier of the Appalachian Mountains proved a substantial impediment to westward expansion of that mode of travel. Roads could climb where a canal could not, and even later railways could close the gap entirely. Regardless of which means was used to traverse the mountains, the goal of these expanding corridors of commerce and travel was the great trans-montaigne region of the west.[570]

The years immediately following the American Revolution marked an important period of national self re-definition. Americans actively tried to promote their own economic development. They struggled to reach the full potential of the land—economic independence through the exploitation of natural resources. Maryland, like Pennsylvania and New York, recognized that publicly funded roadways could link developing western lands with established eastern markets. While improvements were being made in the route through Ellicott's Lower Mills in 1792, the state initiated a plan to extend the same road west from Frederick to Cumberland. A publicly-supported road from Baltimore to Cumberland was funded by the state

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[569] Rochefoucault-Liancourt, *Travels through the United States of North America*, 2:125-131.
[570] James D. Dilts, *The Great Road*, 14. For an excellent general discussion on the development of turnpikes and canals, and the use of rivers in the early national period, see Dilts, chapter 2. Joseph S. Wood, "The Idea of a National Road," Raitz, ed., *The National Road,* 94.

less than five years later by means of the bank of Maryland. Called the Bank Road or the Baltimore National Pike, it passed through Ellicott's Mills.[571]

President Thomas Jefferson's purchase of the Louisiana Territory from France in 1803 intensified the question of nationally funded internal improvements. If the nation were to survive, many believed that economic and political links must be maintained between the western territories and the settled east. In the words of historian Joseph S. Wood, Jefferson "was responsible for assimilating the West . . . into the conceptual geography of America," a circumstance which set the basis for manifest destiny and gave birth to the idea of a nationally funded road to the west.[572] In 1806, Congress commissioned the construction of a National Road, which stretched westward from Cumberland, Maryland. Albert Gallatin, Jefferson's Secretary of the Treasury, wrote of its potential two years later:

> Good roads and canals will shorten the distances, facilitate commercial and personal intercourse, and unite, by a still more intimate community of interests, the most remote quarters of the United States. No other single operation, within the power of the Government, can more effectively tend to strengthen and perpetuate the Union which secures external independence, domestic peace, and internal liberty.[573]

Gallatin framed the significance of internal improvements in language uniquely appropriate to the time. His eloquent appeal would be echoed by the founders of the Union Manufacturing Company just two years later.

While the founders of the Union Manufacturing Company could not have been unaware that the National Road passed by the site for their Union Company at Ellicott's Mills, they could not imagine the opportunity it would afford to them. The thoroughfare offered unimaginable potential and opportunity, linking the newly opened West with the far-ranging clipper ships of the eastern seaboard. The traditional crossing point of river and road which Elk Ridge once

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[571] Dilts, *Great Road*, 18, 19; Wood, "The Idea of a National Road," Raitz, ed., *National Road,* 113.
[572] Wood, "The Idea of a National Road," Raitz, ed., *National Road*, 102.
[573] Wood, "The Idea of a National Road," Raitz, ed., *National Road,* 93.

served, now took on a continental dimension with the river acting as both a source of power and a channel for commerce. Investors and entrepreneurs at Ellicott City took advantage of this potential for economic gain by opening as many manufacturing enterprises as they could seat. Thomas Mendenhall established a paper factory in 1794; John Hagerty and Joseph [or John] Conrad enlarged the facility over the next eighteen years; the Ellicotts opened additional mills for flour and oil production, metal working and the production of agricultural fertilizers; the Union Manufacturing Company attempted to build an extraordinary complex of sixteen textile mills; and Edward Gray began production of cotton thread and fabrics. Water power and transportation networks made this community possible, and helped it grow.

The years immediately following the American Revolution marked an important period of national self re-definition. Americans were actively promoting their own economic development by building transportation networks and increasing the land mass of the nation with the Louisiana Purchase. It is important to note that Chesapeake industrialists and manufacturers were the main engine driving the expansion of transportation networks in the region. Yet Americans continued to struggle to reach the full potential of the land, largely by seeking economic independence through the exploitation of natural resources. Investors and entrepreneurs at Ellicott City took advantage of this potential for economic gain by opening as many manufacturing enterprises as possible, drastically increasing the population of the city. Water power and transportation networks made this community possible, and helped it grow. Ellicott City does not have its own census records for this period, but instead was factored into the population of Baltimore whose growth was substantial. The population of Baltimore nearly quadrupled in the period from 1790 to 1810, going from 13,503 to 46,555. An examination of Baltimore's population growth gives a good sense of the population growth in Ellicott City. If it

grew at a similar rate as Baltimore, then Ellicott City experienced phenomenal population growth.

By the 1820s, the benefits of the National Road erased memories of the difficulties of construction and maintenance. But the desire for a more reliable and economical western connection remained seductive. Canals remained the best alternative during the period, but the great expense needed to build them was prohibitive. Still, the *Niles' Weekly Register* reported in 1829 that twenty-two canals were operating or nearing completion in the mid-Atlantic region.[574] Until the rise of the steam powered locomotive, the barge and wagon would have no competitors in ever increasing the urbanization of the Patapsco River Valley.[575]

[574] "Internal Improvement," *Niles' Weekly Register*, September 12, 1829, 44, 45.
[575] Dilts*, Great Road*, 24, 35, 40.

Conclusion

In summer and fall of 1732, a wealthy Virginian named William Byrd II made a one hundred mile explorative excursion across the Chesapeake to visit to the Spotswood ironworks facility at Germanna. Although Byrd had some interest in visiting his friend Alexander Spotswood, the real purpose for the journey was to investigate the numerous industrial activities being conducted in the region. Byrd passed several manufacturing and industrial complexes along the way to Chiswell's furnace, but at the township of Fredericksburg he encountered something unexpected. Byrd found a city geared toward industrial production. There were ironworks, coaleries, manufactories, ropewalks, shipyards, and mercantile operations as well as a newly built iron furnace operated by John Chiswell.[576]

Not certain where to begin his examination of the industrial urban complex at Fredericksburg, Byrd visited with Chiswell and ask him about the township. According to Chiswell, the city began with just one iron manufacturing operation, but quickly grew as other industries were built to assist in iron production. According to Chiswell, the key to success in industrial ventures was the ability of the owner/operator to seek out instruction from an expert in the industry. As Chiswell put it, I "sought out my instruction from one who understood the whole Mystery, having gained full Experience in every part." Without assistance from an experienced industrialist, none of the operations at Fredericksburg would have succeeded.[577]

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[576] William Byrd, "Progress to the Mines" in Louis Wright, ed., *The Prose Works of William Byrd of Westover: Narratives of A Colonial Virginian* (Cambridge, Mass.: Belknap Press of Harvard University Press, 1966), 346.
[577] Byrd, "A Progress to the Mines," 344.

Although he believed Chiswell's advice was sound, Byrd went in search of more information about industrial ventures by exploring the surrounding countryside. He noted the following industrial enterprises operating within fifteen miles from Fredericksburg: three stone quarries, two more iron furnaces, six iron mines, a number of lumbering enterprises, and a shipyard. Byrd was impressed by the number and variety of industrial activities in the region. When he finally arrived at Spotswood's furnace, Byrd asked Spotswood how difficult it was to set up an industrial operation. Spotswood replied that "the first step is to acquaint myself with a Skilful person" to work the operations. Once a good manager and labor force was acquired, the operation practically ran itself, grossing several thousand pounds per year. Shocked by such an omission, Byrd asked Spotswood why more people in the region were not getting involved in industrial ventures. Spotswood replied that industrial and manufacturing ventures required what he called "artful management," which "remains at this day a profound secret in the breast of a very few, and therefore in danger of being lost, as the Art of Staining Glass, and many others, have been."[578]

William Byrd was not unusual for the period. He knew what we have forgotten and I have tried to recover with these case studies. Other potential investors traveled the countryside examining established operations and seeking out the counsel of those already participating in such ventures. Industrial minded individuals were more than willing to discuss their activities with the uninitiated. In fact, as a group Chesapeake entrepreneurs talked unabashedly about their industrious pursuits, happily explaining the nuances of getting started, proper management, and profitability. Consequently, there was

[578] Byrd, "A Progress to the Mines," 349.

a plethora of information available to the endless number of individuals who sought to take part in industrial ventures in some capacity.

Although this work is not about the role of character in business activities, the willingness of Chesapeake entrepreneurs to talk about their activities and openly attack others can not be ignored. As they talk about these ventures and plan their own enterprises, they demonstrate attitudes and characteristics similar to entrepreneurs in other regions of the emerging country. This second Chesapeake was poised to be part of the industrial and commercialization occurring in the Mid-Atlantic community. When Thomas Russell II was asked by the Principio partners for his opinion on whether a forge manager had been stealing from the company accounts, Russell responded that the fellow was incompetent rather than stealing from the company, because he "has equally neglects his own private [finances]." Asked to speak at the man's funeral a few years later, Russell told the family that "[Baxter] was a strange, obstinate infatuated man that, many circumstances seemed to make the integrity of his Heart much to be Questioned."[579] But when the partners questioned his own use of funds, Russell explained his expenses tersely "How to Raise money or drop money I know not, to say that my Hands are tied behind me and I can do nothing. You Told me I need to bring no Ready money so I brought not nor have none or my necessary use."[580] An excellent example of wanton character assassination among Chesapeake entrepreneurs can be found in the assault on Henry Heth. When Heth confronted the owner of the slave who he believed attacked him, the owner Archibald McRae wondered how Heth could be so certain of the identity of the assailant when he had not seen the his face. In truth, McCrae felt he was just as certain

[579] Thomas Russell to Michael Harris, May 26, 1773, Principio Company Papers, Library of Congress.
[580] John England to Joshua Gee, July 12, 1723, Principio Company Papers, Maryland Historical Society.

there were several people in Heth's "neighborhood who might want to hurt you [Heth]," as result of Heth's frequently nefarious business dealings.[581] A final example for character assassination among Chesapeake entrepreneurs were directed at John Ballendine. When George Washington was considering whether to become a financial supporter of Ballendine's scheme to open the Potomac, George Johnson warned him that Ballendine was a "Lurking Scoundrel" who possessed "superior Talents" at nothing more than "the art of being a Villain."[582] A similar pronouncement was made in the *Maryland Gazette* by John Tayloe and Presley Thornton, two former partners of Ballendine, who advised readers "not to trust him on any account."[583] In an economy so dependent on reputation and character, entrepreneurs were as quick to defend themselves as they were to criticize others. But industrial entrepreneurs in the Chesapeake were not alone in this behavior, planters placed as much importance upon their character and honor as industrialists and they were as equally willing to defend themselves as they were their neighbors.

What is not clear is why the role of industrial ventures in the Chesapeake region remains to "this day a profound secret in the breast of a very few."[584] Despite the abundance of candor among Chesapeake industrial entrepreneurs, whether good or bad, the group's voice remains largely unheard. But they show the same qualities as businessmen in Philadelphia, New York City, or Boston. The second Chesapeake has a

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[581] Archibald McRae to Harry Heth 1807 May 3, Heth Family Papers, University of Virginia Library, Charlottesville, Virginia.
[582] George Johnston to George Washington, Jan. 8, 1760, George Washington to Jonathan Boucher, May 5, 1772, *The Papers of George Washington: Colonial Series*, ed. W.W. Abbot et al., (Charlottesville: University Press of Virginia, 1983-94), VI, 382-383, IX, 40-41.
[583] Maryland Gazette, November 25, 1756. See also, David Curtis Skaggs, "John Semple and the Development of the Potomac River Valley," Virginia Magazine of History and Biography 92(3) (1984): 289.
[584] Byrd, "A Progress to the Mines," 349.

history apart from tobacco production, but of which tobacco played a role. In the proceeding pages, we have taken a big step toward bringing economic activities like industrial and manufacturing ventures into the forefront of our understanding of the Chesapeake region in terms of social, economic, and geographic development. Organized chronologically in order to trace trends as they emerged over an extended period between 1720 and 1820, this work answers a particular set of questions: How were individual Chesapeake industrial endeavors organized? What did it take to succeed in an industrial activity? What led some individuals to succeed in industrial activities while others failed? How much could industrial ventures contribute to the wealth of individuals in the Chesapeake region? How did they spend their industrial income? Finally, how did industrial activities contribute to the development of urban areas in the Chesapeake region? By connecting these seemingly disparate cords together, it creates a new image of the Chesapeake region, one where industrial and manufacturing ventures stand beside agriculture as active contributors to the development of the Chesapeake.

While agricultural pursuits were certainly a key economic commitment, the key players in the Chesapeake were also heavily involved in industrial activities, even if it was just at the most basic level of participation—the extraction of natural resources—and they did so for their own use as well as for the commercial market. Like agricultural ventures, industrial and manufacturing activities required little more than the ownership of land possessing an abundance of a sought after resource, and a labor source to procure the material. The residents of the Chesapeake had an abundant supply of natural resources and they quickly found that slavery provided a more than adequate labor supply for the successful and profitable engagement of such industrial activities as the extraction

of natural resources.[585] But these activities were more than just technical curiosities or investment experiments. Entrepreneurs in Chesapeake were as busy expanding the region's transportation networks, developing industrial ventures, and engaging in manufacturing enterprises as they were tilling the soil. This work deals with such individuals and from their experiences a lot to be gleaned.

As we have seen, industrial operations in the Chesapeake region were varied and extensive. Unlike plantations, ownership of an industrial activity could range from groups of investors like Principio to individual and family owners like the Tayloes and Henry Heth. Certain factors were representative of all Chesapeake industrial ventures: administration, labor force, technology, marketing, and relationship to the larger regional community. The problems affecting one type of operation—like access to raw materials, reliable labor and accessibility of markets and the necessity of having good leaders—were problems every industrial activity faced. As a result, founding an industrial operation in the British American colonies demanded an energetic effort, solid technological knowledge, and a long term commitment not found with agriculture. Although a few individuals like Henry Heth were capable enough to pick up their expertise along the way, it was best for the founding owner or manager of a new industrial venture to already posses the knowledge needed to run the operation before engaging in development. The same could not be said of most agricultural pursuits. As time passed and an increasing number of industrial activities had emerged, it was no

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[585] Robert R. Russel, "The General Effects of Slavery Upon Southern Economic Progress," *Journal of Southern History* 4 (1938): 34-54; Douglass C. North, *The Economic Growth of the United States, 1790-1860* (Englewood Cliffs, N.J.: Prentice-Hall, 1961); Eugene D. Genovese, "The Significance of the Slave Plantation for Southern Economic Development," *Journal of Southern History* 28 (1962): 422-437; Genovese, *The Political Economy of Slavery* (New York: Vintage, 1965), pp. 281-283; A. Conrad and J. Meyer, *The Economics of Slavery* (Chicago: Aldine, 1967); R. Keith Aufhauser, "Slavery and Technological Change," *Journal of Economic History* 34 (1974):36-50.

longer a necessity to have an expert in charge as long as the manager or owner of the industrial venture possessed some understanding of the business or was in contact with someone engaged in the same type of venture. Instead of being an expert, it was possible to acquire the necessary knowledge at various nearby works or to hire men with the necessary skills.

What also becomes apparent in this work is that industrial ventures in the Chesapeake region were important generating factors in social organization. As a physical form of organization, industrial activities mirrored the pre-established patterns of land acquisition and land-use found in other commercial activities in the colonies, including agriculture. The need to acquire the right kind of land—whether it contained a specific mineral composition or was best for production or had access to transportation networks—was common to all economic activities. All commercial ventures have some commonalities. They required the transportation of raw materials and finished products; the acquisition of disciplined and skilled labor as well as unskilled labor; and, access to ample supplies of raw materials and running water. The geographical and social circumstances of the Chesapeake—including exceptional transportation facilities along the Tidewater rivers in the Chesapeake Bay; a tradition of tobacco plantation organization; the presence of a varied laboring population, like African slaves, transported convicts, indentured servants and free wage earners; and the location of iron enterprises in both early urban and rural settings—was shaped as much by involvement in industrial ventures as it was by agricultural activities. The most significant families (Carrolls, Dulaneys, Ridgleys and Johnsons) of the region, in terms of both social and

political importance to the region, were as involved in industrial activities as they were in agricultural pursuits.

The Tayloe family is representative of a much larger group of individuals in the Chesapeake region. There was an elite class who sought wealth and financial security as much through participation in entrepreneurial business ventures like industrial and manufacturing activities as they did as mere planters. All Chesapeake planters knew that the tobacco market followed boom and bust cycles. Those of sufficient means diversified their agricultural activities in order to soften problems intrinsic to tobacco production: low demand, falling prices, lost shipments, and bad weather. As a result, market production—whether of agricultural goods or other commodities—was central to sustaining a comfortable standard of living, or "competency," over generations.[586] The wealthiest members of the Chesapeake's society were both farmers and entrepreneurs, combining agricultural ventures with opportunities in commerce and industry. As a result, several economic interests competed with planting.

While everyone that could was engaging in industrial and manufacturing activities, Chesapeake entrepreneurs engaged in these activities with varying degrees of success. Planters never thought that they had to choose between agricultural activities and industrial business enterprises. Shifts within agricultural production were easier to implement and less risky than engaging in industrial and manufacturing activities, but agriculture never brought as high a rate of return as industrial ventures could. Consequently, those who could chose the more profitable option. What is important to note is that the Chesapeake was shying away from a traditional dependence on tobacco

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[586] Daniel Vickers, "Competency and Competition: Economic Culture in Early America," *William and Mary Quarterly* 3rd Ser., 47 (1990), 3-4 and *passim*.

toward an economy based in agricultural diversification and business investment. It was a risky shift, but ultimately, diversification led to increased wealth and social standing.[587]

Chesapeake entrepreneurs experienced several periods of transition in the economy, especially in the years after the American Revolution. Those periods also represent periods of transition for planter class identity. New ideas about manufacturing, industrialization, sectional differences, and slavery were developing. It was not enough for planter businessmen to integrate multiple roles, as time passed financial success demanded specialization.[588] Increasingly in the years after the Revolution, individuals more comfortable with agriculture returned to agricultural production while businessmen became occupied solely by mercantile and industrial activities—ironworks, mercantile firms, textile factories, et cetera. While planters had been the most sophisticated businessmen of the colonial era and most businessmen were members of the planter class, the two roles diverged in the early national period so that planters and businessmen were pursuing separate specialized interests by the middle of the nineteenth century.[589]

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[587] For a detailed study of agricultural diversity in Virginia, Maryland, and South Carolina, see Peter V. Bergstrom, "Markets and Merchants: Economic Diversification in Colonial Virginia, 1700-1775," unpublished dissertation, University of New Hampshire, 1980; Joyce E. *Anxious Pursuits: Agricultural Innovation and Modernity in the Lower South, 1730-1815* (Chapel Hill, 1993); Gloria Main, *Tobacco Colony: Life in Early Maryland, 1650-1720* (Princeton, 1982); Russell Menard, *Economy and Society and Early Colonial Maryland* (New York, 1985); Carville V. Earle,, *The Evolution of a Tidewater Settlement System: All Hallow's Parish, Maryland, 1650-1783* (Chicago, 1975).

[588] Walter Licht describes specialization as a nationwide phenomenon during the early-nineteenth century. See, Walter Licht, *Industrializing America: The Nineteenth Century* (Baltimore, 1995), 5, 15, 33.

[589] Fred Bateman as well as other historians found that few manufacturers in the antebellum South were also planters, and only a small number of planters operated any type of industrial enterprise. See, Fred Bateman, James Foust, and Thomas Weiss, "The Participation of Planters in Manufacturing in the Antebellum South," *Agricultural History* 48 (April 1974), 282-288. See also Peter Parish, "The Edges of Slavery in the Old South: Or, Do Exceptions Prove Rules?" *Slavery and Abolition* 4 (2) (1983), 113-117; Angela Lakwete, "A Southern Model of Industrialization: The Case of the Antebellum Cotton Gin Manufacturing Industry," research seminar paper #12 presented to the Center for the History of Business, Technology, and Society, March 1998, 6-47; Samuel Sydney Bradford, "The Negro Ironworker in Antebellum Virginia, *Journal of Southern History* 25 (1959): 194-206, *passim*; Lacy Ford, "The Tale of Two Entrepreneurs in the Old South: John Springs III and Hiram Hutchinson of South Carolina Upcountry," *South Carolina Historical Magazine* 95 (July 1994), 201; T. Stephan Whitman, "Industry Slavery at the Margin: The Maryland Chemical Works," *Journal of Southern History* 59(1)(February

The example of Henry Heth typifies this shift. Agriculture was never more than a side pursuit for Heth once he got involved in the extraction and sale of bitumous coal. As soon as he found a niche in the economy, he exploited it to the fullest. By the end of his life, the entirety of Heth's considerable wealth was derived solely from industrial activities. Heth still maintained several plantations, but they existed to produce foodstuffs for his labor source rather than tobacco.

While some Chesapeake entrepreneurs successfully engaged in industrial and manufacturing activities, quite a few did so and failed. Good risk management was essential to success industrial and manufacturing activities, but it was not a trait inherent in all participants. Nevertheless, a great deal can be learned from the experiences of those who failed. Again and again, John Ballendine's determination exceeded his ability. Possessing a vision beyond his time, Ballendine's misadventures establish him as a completely incompetent industrialist. He tried unsuccessfully to make money by expanding water transportation networks on the Potomac and the James Rivers, and then turned his attention to industrial ventures, but they too proved to be abject failures. He died deeply indebted to the state, leaving his family in dire financial straits. Those who got involved with Ballendine's various adventures did so at their own cost.[590]

While his many undertakings fell short of expectations, Ballendine's experiences had more going against success than just the shortcomings of the individual attempting them. The Chesapeake economy made it difficult for non-agricultural activities to succeed. Throughout the Colonial era, Britain was the main market for goods produced in

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1993), 33; Ronald L. Lewis points out that while southern planters did not often become businessmen, they did often invest in that industrial expansion that did occur. See, Ronald L. Lewis, *Coal, Iron, and Slaves: Industrial Slavery in Maryland and Virginia*, 1715-1865 (Westport, CT, 1979), 3.

[590] Charles Royster, *The Fabulous History of the Dismal Swamp Company: A Story of George Washington's Times* (New York: Alfred Knopf, 1999), p. 295-296.

the Chesapeake. As a group, British merchants traditionally identified tobacco as the Chesapeake region's most valuable commodity, which meant the exchange of tobacco for English manufactured goods dominated trade between the two entities.

The focus on agricultural production in the Chesapeake meant that its economy lacked market segmentation—meaning that there were few sections of the economy sharing one or more characteristic that would cause them to have similar needs. When market segmentation exists, the various sections of an economy are distinct from each other but exhibit common needs, which creates market stimulus and allows for market intervention if one section of the economy is not doing as well as the others. Since agriculture and industrial ventures serve different segments of the economy and had no commonalities besides labor, neither activity could effectively stimulate the other during down periods lasting over extended periods of time. When one segment was in a slump, producers could shift their labor resources to another segment, deferring the expense, but they could rarely find a market for the goods being produced.[591]

The lack of segmentation in the Chesapeake economy meant that businessmen engaging in non-agricultural activities never felt the competitive threat of bigger operations. They were not driven or restricted by competitors, just their own intellectual or financial limitations. When a planter wanted something manufactured like a new carriage or cart, he went to the local carriage maker who then outsourced most of the work to local artisans. Planters never considered establishing their own carriage shop just to build the item in question because they did not have the money or technical understanding for such an undertaking. Planters were customers as an economic class, not

[591] For more on Market Segmentation, see Michel Wedel, and Wagner A. Kamakura, *Market Segmentation: Conceptual and Methodological Foundations* (Amsterdam: Kluwer, 2000); Malcolm McDonald, and Ian Dunbar, Market *Segmentation: How to do it, how to profit from it* (Butterworth-Heinemann, 2004).

competitors. The economy of the Chesapeake pushed planters into this type of thinking. Success in agricultural undertakings depended on stability and caution. English industrialists and manufacturers preferred this situation. While they did not expect to supply bulky manufactured goods like carriages to the colonies, they knew that planters were just as willing to remain customers in terms of small manufactured goods and would not develop competing industries. To preclude the Chesapeake from developing competing industries, British merchants resisted trading in products other than tobacco, which forced a dependency on the staple crop production in the Chesapeake economy and retarded the development of business innovation. Complicating the situation, agriculture was dominated by slave labor, which made it difficult to attract skilled wage laborers to the region.

But those who engage in industrious pursuits thought differently than the average planter. They believed it was better to build something themselves than to buy it from elsewhere. As budding entrepreneurs, they were willing to purchase skilled laborers at considerable expense, even though they were competing with other economic venues who were also seeking slave laborers. The only limitation industrial entrepreneurs faced was that industrial ventures required technical expertise and the Chesapeake lacked cheap skilled labor, making labor one of the most expensive and uncertain detriment influencing successes. An entrepreneur might still succeed if short of finances and technical skill, but failure was guaranteed if a reliable source of skilled labor could not be obtained. To be successful, they had to take on a great deal of risk and manage it as best they could. Surprisingly, Chesapeake residents were psychologically prepared to

undertake a new enterprise in order to advance their fortunes. To such men, things like risk and change, rather than stability and caution, were customary.

With such a widespread adherence to chance within society, the Chesapeake's entrepreneurial ranks were remarkably deep: in addition to the wealthy planter elite, there was a pool of small but capable capitalist entrepreneurs—minor planters, merchants, land speculators and industrialists—waiting like sharks to snatch any opportunity that opened before them. The majority of these potential entrepreneurs, regardless of class origins, were men on the move—ambitious, competitive, and intensely acquisitive. They labored strenuously to augment their fortunes, forever scheming and risk taking for advancement in the society. Risk was deeply embedded in the everyday operations of industrial and manufacturing activities, making it important for those who engaged in industrious pursuits to be favorably disposed toward innovation. Continually subjected to uncertainty, they were emotionally and psychologically prepared to face the stresses associated with involvement in an unfamiliar market or enterprise.

These individuals not only had the motive to innovate, but also the means to do so. When they found themselves in trouble, they bailed themselves out with originality. They were continuously in touch with foreign products, technologies, and markets. They had access to European credit. These things, together with the relative flexibility of their own estates, permitted them to seize upon the risk of new opportunities, even if—as in the case of Carter or Ballendine or Reveley—the possibility of success was less than certain.

Yet as time passed, flexibility was not enough to succeed. In the years before the revolution, the Chesapeake economy was open for rapid investment and diversification.

Entrepreneurs and planters consistently shifted back and forth from participation in business oriented activities and agricultural ones. For a time, the Revolution amplified the aggressive risk taking inherent in the willingness to shift back and forth. The needs of the cause as well as the possibility of acquiring new sources of wealth led many to participate in whatever venture presented itself. When the revolution ended, the situation in the Chesapeake changed considerably. The window of opportunity that allowed for widespread risk taking and diversified investments no longer existed. Planters found themselves pigeonholed into agriculture, while industrial and manufacturing ventures became the realm of businessmen.

Despite the change in participation occurring in the period after the American Revolution, one factor that emerges from this study is the role of industrial and manufacturing activities to the development of urban centers in the Chesapeake region. Chesapeake industrialist produced for local, national, and international markets. In expanding their markets, the area around grew with their operations. The best example of this situation can be found in the arrival of the Ellicott family. They completely reconceived the economic system along the Patapsco River as well as that of Maryland itself. They took a region with a milling tradition focused solely on a local market, and reoriented it toward large scale production and ever more distant markets. Since milling operations needed manufactured tools and parts, the Ellicotts quickly diversified into other industrial activities. By the end of the 1700s, the Ellicott's industrial operations subsumed the formerly bustling port community of Elk Ridge Landing as the regional trade center.[592] The final transformation of the region into an urban center was completed

[592] *Archives of Maryland*, 50: xvi-xxxiii.

with the expansion of road networks across the region, networks whose development was instigated by the Ellicotts.[593]

Although the value of industrial enterprises could never displace the contribution of agricultural pursuits, the number and variety of industrial endeavors certainly requires a reconsideration of their importance by historians. Based on the numerous examples herein, it becomes obvious that industrial and manufacturing activities were important factors in the development of the Chesapeake region. They could provide huge profits for their investors or catastrophic failure. They contributed greatly to the success of regional economy, while influencing the lives of those engaged in them. There was another equally important aspect that must be considered concerning industrial enterprises: they served the demand of consumers with the commodities they produced. Participants in these activities found that both the Chesapeake and the British Empire offered the all important consumer demand for the products of industrial ventures. Thus, it was inevitable that people in the Chesapeake would engage in and succeed at such activities. With that in mind, it is no longer acceptable to let the "artful management" found in the numerous industrial and manufacturing activities of the Chesapeake region to remain "a profound secret in the breast of a very few."[594]

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[593] Mayre, "The Baltimore County 'Garrison,'" 246 (note 54); Baltimore County Court, Plats, 1790, "Road . . . to Patapsco Falls," A 14-mile line from Baltimore passed by Gwyns Falls on way to the Patapsco, MSA. Baltimore County Court, Plats, 1790, "Road . . . to Patapsco Falls," MSA; Baltimore County Court, Plats, 1 November 1791, "Road . . . Baltimore to Patapsco Falls . . . Commissioners of review appointed by an act of the general Assembly of Maryland entitled 'an act to lay out several turnpike roads in Baltimore County,' Having received from John Ellicott and Robert Long, two of the three Commissioners duly appointed . . . "to survey a road from Baltimore to Frederick Town, approve the route from metes and bounds description, including N 48 (W 61 31 perches with the old road, N 60 (W 61 perches towards John Ellicott's Mills; N 39 (W 7 perches crossing the Patapsco river, and to the county line., MSA

[594] Byrd, "Progress to the Mines," 346.

ABREVIATIONS

AHR	*American Historical Review*
CWF	Research Library, Colonial Williamsburg Foundation
DSLC Papers	Dismal Swamp Land Company Papers
JAH	*Journal of American History*
JEH	*Journal of Economic History*
JNH	*Journal of Negro History*
JSH	*Journal of Southern History*
LOC	Library of Congress, Washington, D.C.
LVA	Library of Virginia, Richmond
MHM	*Maryland Historical Magazine*
MHS	Maryland Historical Society, Baltimore
MSA	Maryland State Archives, Annapolis
PMHB	*Pennsylvania Magazine of History and Biography*
TFP	Papers of the Tayloe Family
UVA	University of Virginia, Charlottesville
VMHB	*Virginia Magazine of History and Biography*
VHS	Virginia Historical Society, Richmond
WMQ	*William and Mary Quarterly*

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