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The Virginia Iron, Coal, and Coke Company and the Growth and Decline of
Southern Appalachia's Iron Industry: 1880-1930.

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JAMES MADISON UNIVERSITY

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Abstract

During the late nineteenth century, the penetration of industrial capitalism into southern Appalachia fundamentally altered the region's economy. Historians have thoroughly studied this period's coal and timber industries, but little scholarly attention has been paid to the iron industry. Iron production also made great strides in both output and scale as railroads and mining increased demand for iron products. The growth of Birmingham's iron and steel industry has dominated the studies of iron that have been done, but between the 1880s and 1920s the iron industry of southwest Virginia and east Tennessee also were thoroughly modernized. The consolidation of the Virginia Iron, Coal, and Coke Company (VIC&CC) provides an excellent lens through which to observe this region's industrial transformation. At the turn of the twentieth century the VIC&CC consolidated ownership and management of practically all of this region's iron industry, and for decades management attempted to compete in the national iron market. This thesis examines the conditions that made the organization of the VIC&CC possible, the company's attempt to profitably produce iron, and the activities of two businessmen (one a native of Virginia and prominent player in the state's iron industry, and the other a New Yorker and seasoned veteran of Wall Street) that both played integral roles in this company's business. During the studied timeframe, coal came to dominate the company's interests over iron, and shortly after World War I, management dissolved its iron department. Although the iron industry ultimately failed, it still played a valuable role in southern Appalachia's economic transformation.

Introduction – Interpreting the New South and Industrial Expansion

As a period and process, the New South emerged in the wake of Reconstruction as a rush of industrial development rapidly reshaped the agrarian economy and landscape of the former Confederacy. In many ways sharecropping, low wages, and racial segregation maintained the basic dynamics of economic production and social order that defined the southern plantation economy, but the rise of heavy industry and manufacturing fundamentally set the post-Reconstruction South apart from the antebellum South. A rapidly expanding rail network, telecommunications systems, textile industries and manufacturing, and an influx of northeastern and English capital all reintegrated Dixieland into the American economy as it had never been before.

The New South's industrial evolution drew from both new and old enterprises, cheap sources of labor, and a host of largely untouched natural resources. The textile and tobacco industries flourished within the South's agrarian heritage and were largely financed by southern money, while capitalists from the northeast and England often financed heavy and extractive industries. Outside investment capital generally included the timber, fertilizer, iron and steel, and coal industries that required large sums of financing or a high degree of technical organization for operation. Late nineteenth century industrialization across the South was not uniform in pace, and neither was the manner in which it happened.¹

¹ The best works to consult on the New South include C. Vann Woodward's *Origins of the New South* (Baton Rouge: Louisiana State University Press, 1951); Gavin Wright's *Old South, New South* (New York: Basic Books Inc., 1986); and Edward L. Ayer's *The Promise of the New South* (New York: Oxford University Press, 1992).

Historians have generally emphasized the rise of the coal and timber industries in explaining the Appalachian economy in the New South, but have frequently overlooked or cast aside the growth of the iron industry in interpreting the New South. This is not to say that the iron industry has been absent from historical studies, but few works dedicate large attention to an industry that until the turn of the twentieth century grew as rapidly as the timber and coal industries. As an industry that largely relied on slave labor and increasingly antiquated technology prior to the Civil War, by studying the growth and modernization of the iron industry in southern Appalachia one can offer another lens through which to view the emergence of the New South.²

Until the mid-twentieth century American and southern historians accepted a general narrative of the New South that reinforced “the pretensions of the South’s self-proclaimed leaders.”³ During the mid-twentieth century, C. Vann Woodward’s *Origins of the New South* offered a new interpretation of post-Reconstruction South’s and sparked a historical debate on the New South’s economy that has continued into the present day. Woodward’s contribution to the now-cornerstone series *A History of the South* includes his colonial thesis pertaining to the revolution in the southern economy. To Woodward, the New South represented a period, beginning approximately with the end of Reconstruction, in which the region’s new timber, mineral, and textile industries gave rise to a new class of Southern businessmen who increasingly “acted as agents, retainers, and executives, [but] rarely as

² For a thorough study of the antebellum iron industry see Ronald Lewis’s *Coal, Iron, and Slaves* (Westport, CT: Greenwood Press, 1979). Wright’s *Old South, New South* also offers an insightful analysis of the southern iron industry’s post-bellum transformation.

³ Ayers, *The Promise of the New South*, vii.

principals.”⁴ Although textile and tobacco industries arose with southern money and ingenuity, outside capital largely financed the railroads, mineral, and timber industries and this represented a distinct break from the sources and modes of the region’s economic production. With the shift of land and enterprise ownership from the landed, planter elite to a body of absentee owners concentrated in the American northeast and England, the South’s resources and profit increasingly flowed out of the region. This only exacerbated poverty and racial segregation in the region and characterized the former Confederacy well into the twentieth century.⁵

While the colonial thesis has taken a strong foothold in New South historiography, it is not the only macro-level interpretation of industry and economy to influence the field’s historiography. Barrington Moore offered his interpretation of the South’s industrial revolution in *Social Origins of Dictatorship and Democracy*. Moore used a Marxist framework to comparatively explain global industrial modernization and the rise of democratic and communist regimes. More specifically, he seeks to explain the conditions in which rural populations were brought into these regimes. In comparing the capitalist democracies that arose in England, France, and the United States, Moore uses the American Civil War to explain the American relationship between agrarian and industrial elites. His Prussian Road thesis implied both the continuation of the traditional agrarian social structure and the inclusion of a growing bourgeois-industrial class that resulted in a

⁴ Woodward, *Origins of the New South*, 292.

⁵ Woodward’s colonial economy thesis has influence a long line of scholarship. Among the most influential are David Carlton’s *Mill and Town in South Carolina 1880-1920* (Baton Rouge: Louisiana State University Press, 1982). Carlton concludes that the rise of Southern towns allowed for the opening of a wedge in which modern forms of social organization arose and offset the autonomy of the white, planter elite.

top-down modernization of the former Confederacy. This top-down modernization allowed for a continuation of the landed, planter elites' control over the South and in many ways hindered the region's growth for decades.⁶

The Woodward and Moore theses have left indelible marks on New South historiography since the mid-twentieth century. Woodward's thesis has largely withstood the test of time, and sparked the revision of New South economic development. Moore's thesis has been largely criticized, but scholars such as Jonathan M. Wiener and Dwight B. Billings, Jr. have supported it.⁷ Scholars such as Alex Lichtenstein, James Cobb, and Gavin Wright have credited Woodward's thesis, but have downplayed "the wholesale demise of the planters at the hands of upstart businessmen and industrialists," and instead emphasized the importance of continued sources of cheap labor in determining the path of New South economic development.⁸ James Cobb has also criticized the continuity-versus-discontinuity debate that pits planter against industrialist as being "the lost cause of southern historiography as the New South enter[ed] its second century."⁹ Despite slight differences in the emphasis in factors that limited Southern industry, historians also generally agree that "federal banking policy, railroad freight rates, absentee ownership, reliance on outside expertise, high interest rates, cautious state governments, [and a] lack of industrial experience" all limited the industrial growth

⁶ Barrington Moore, *Social Origins of Dictatorship and Democracy* (Boston: Beacon Press, 1966), 111-154.

⁷ Jonathan M. Wiener, *Social Origins of the New South: Alabama 1860-1885* (Baton Rouge: Louisiana State University Press, 1978); Dwight Billings, *Planters and the Making of a "New South": Class, Politics, and Development in North Carolina, 1865-1900* (Chapel Hill: University of North Carolina Press, 1979).

⁸ James C. Cobb, "Beyond Planters and Industrialists: A New Perspective on the New South," *The Journal of Southern History* Vol. 54, no. 1 (February, 1988): 47.

⁹ Cobb, "Beyond Planters and Industrialists," 68.

of the South.¹⁰ By the 1880s industrialization in the South was willingly being undertaken by southerner, northerner, and Englishman alike. This period marked a significant shift in Appalachian political discourse. Ronald L. Lewis states, “The penetration of industrial capitalism into the back-counties also fractured previous political alignments and stimulated the emergence of a new political culture. The old Confederate-Democrat versus Yankee-Republican split was replaced by pro-versus anti-industrialist factions in both parties, and the industrial factions generally prevailed.”¹¹

The interpretations of Woodward, Wright, and Cobb have influenced this thesis. As Cobb states, “There is considerable irony in the persistent tendency to associate the South much more closely with the defense of tradition than with the pursuit of progress. In fact, industrial development became the consuming passion of regional, state, and local leaders in the Post-Reconstruction South.”¹² Regional geography, raw materials distribution, and cheap labor had as much to do with patterns of industrialization as did the traditions of the landed elite or absentee owners. In southern Appalachia’s experience with industrial economy it is easy to see patterns of Woodward’s colonial thesis. While much of the former planter elite fueled growth in the textile and tobacco industries that arose in the southern piedmont and lowlands, the mineral and timber industries that canvassed the

¹⁰ Edward Ayers, *The Promise of the New South* (New York: Oxford University Press, 1992), 104.

¹¹ Ronald L. Lewis, *Transforming the Appalachian Countryside* (Chapel Hill: The University of North Carolina Press, 1998), 8.

¹² James Cobb, *Industrialization and Southern Society: 1877-1984* (Lexington: The University Press of Kentucky, 1984), 2.

South's mountainous regions were extractive in nature and dominated by outside finance.

Prior to the final quarter of the nineteenth century, southern Appalachia was sparsely populated and operated outside of the American cash economy, as the region's small communities were almost entirely dependent upon subsistence agriculture, local trading, and bartering. Beginning in the 1880s, agents representing northern timber, railroad, and mineral enterprises cheaply purchased or rented large tracts of land and backcountry from families and individuals who saw opportunity in making an easy profit off selling the trees and minerals that were abundant and underground and supposedly would not disturb their agrarian way of life.¹³

The rapid extraction of the region's resources began as huge tracts of land were consolidated under the control of single industrial enterprises. Logging camps nomadically moved across the region to clear-cut huge virgin timber-stands. Massive log drives moved the cut timber downriver, to sawmills for manufacture into rail ties, furniture, and construction lumber. Promoters and boosters drew railroads into the mountainous regions to extract the region's rich coal, iron ore, and mineral deposits. During the late nineteenth century the once sparsely populated mountains saw an influx of business and population that gave rise to logging camps, railroad depots, company towns, and cities that all fundamentally transformed the regional economy in an extraordinarily short period of time.

¹³ Ronald D. Eller, *Miners, Millhands, and Mountaineers: Industrialization of the Appalachian South, 1880-1930* (Knoxville: The University of Tennessee, 1982).

With this social and economic transformation came a revolution in enterprise structure and scale. While textile industries did penetrate southern Appalachia, logging, iron, coal, and railroad companies brought the most dramatic change to the region's landscape. The expansion of the region's iron industry provides an excellent perspective to view this regional transformation. By the turn of the twentieth century, several large mergers of Appalachia's coal and iron enterprises rapidly consolidated ownership of region's industrial capacities. Many of these companies were structured similarly to the oft studied Tennessee Coal, Iron, and Railroad Company. The Virginia Iron, Coal, and Coke Company (VIC&CC) was one such consolidation, and it was set apart from many of the other coal and coke operations by consuming a vast majority of their coke in their local iron furnaces, which produced products for their coal operations as well as outside purchasers. This makes the VIC&CC a dynamic case study of the region's social and economic transformation as southern Appalachia quickly integrated into the American industrial economy as a source of energy and raw materials.¹⁴

Southwest Virginia and east Tennessee were the source of large deposits of iron ore and coal, but the region's mountainous terrain, agrarian economies, and sparse population all limited industrial exploitation of the region. There were small charcoal furnaces in the region, but these remained close to rivers and limited in function. By 1880, a flood of capital investment from the northeast and England poured into the region to finance the expansion of railroads and exploit the mineral

¹⁴ Eller's *Miners, Millhands, and Mountaineers* offers the most comprehensive study of industrialization in Southern Appalachia. For a description of the Tennessee, Coal, Iron, and Railroad Company see Greg Robert's *Origin and Development of the Tennessee, Coal, Iron and Railroad Company* (New York: Newcomen Society of England, American Branch, 1948).

wealth of the region. More than a dozen modern, coke fueled iron furnaces were constructed throughout southwest Virginia and east Tennessee to serve the railroads and growing iron manufacturing and coal industries. Rapid increases in economic output and activity characterized the region for much of the late nineteenth century. The man responsible for the organization of the VIC&CC, George L. Carter, played an integral part in the iron industry's growth during this time and his life and career represents the region's transformation from agrarian economy to industrial economy.

Born to a respected Carroll County farming family in 1857, George L. Carter found work, not on the farm, but in the region's growing mineral industry. Proving to be an adept clerk and manager, he became associated with a contractor for the Norfolk and Western Railway, and together they entered the iron industry by constructing the Dora Iron Furnace in Pulaski, Virginia. Carter's successes at Dora and association with the Norfolk & Western led him to expand his business by purchasing a large furnace in the rapidly growing railroad and manufacturing city of Roanoke. Although Carter had accumulated a fair amount of wealth and was himself an ambitious businessman, he stretched his finances to the limit by expanding his iron enterprise. This took Carter to New York in search of additional financing, and he became connected with the investment firm of Moore & Schley. Moore & Schley was looking to form a large consolidated iron enterprise, and in Carter the firm thought they had found what they wanted. Even though Moore & Schley's ambitions were beyond those of Carter's, Carter agreed to their proposal to consolidate nearly the entire iron industry of southwest Virginia and east Tennessee. In doing this,

Carter sold his Carter Coal and Iron Company to Moore & Schley and agreed to preside over the much larger consolidated company as president.¹⁵

The resulting Virginia Iron, Coal, and Coke Company (VIC&CC) was organized in 1899 and owned or leased over one hundred thousand acres of mineral lands, multiple collieries, over a dozen iron furnaces, foundries and casting facilities, a sawmill, grist mills, and a small railroad to link their most valuable ore and coal properties with their iron furnaces. With Carter's expertise and intimate knowledge with the region's iron industry at the helm of the \$10,000,000 company, the VIC&CC seemed poised to become a powerful player in the American iron and steel industry. The company's management structure consisted of a seven member Board of Directors that steered the company's general direction, while the president, vice-president and general manager, secretary and treasurer, and assistant secretary controlled the logistical and day-to-day operations of the company.¹⁶

Carter was unable to effectively manage the company to Moore & Schley's expectations, and within two years Carter was forced out and the VIC&CC was placed under the control of court appointed receivers. One of the receivers, Henry K. McHarg, personally invested heavily in the company, was elected company president after the receivership, and spent the next decade trying to turn the VIC&CC into a profitable iron enterprise. Neither iron nor steel would ever produce the profits the VIC&CC organizers hoped for, and by the 1920s coal production became the company's primary focus.

¹⁵ Willie Nelms, "George Lafayette Carter: Empire Builder," *Virginia Cavalcade* 30, no. 1 (Summer 1980): 12 – 21.

¹⁶ Virginia Iron, Coal and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company and Virginia & Southwestern Railway Company*, (Roanoke, VA: The Company, 1905), 3.

It is the purpose of this thesis to examine the patterns of industrialization and growth in the United States and southern Appalachia that created the conditions for the formation of the VIC&CC, and explain why the company ultimately failed to produce the results promised at its organization in 1899. The VIC&CC also provides a prime example of southern Appalachia's integration into American industrial economy of the late nineteenth and early twentieth century, and the region's function as a colonial supplier of energy and raw materials for the larger American economy. Although its origins were heavily tied to a southerner, George L. Carter, he himself arose in the industry through strong ties to Norfolk & Western, which Philadelphia interests financially backed. New Yorkers financially supported the VIC&CC, and it produced pig iron that the company itself consumed or was sold outside the region, although for a time it did conduct business in Birmingham. The company's coal was also sold primarily to the major rail networks in the region, as well as in the northeast, and manufacturers in the Midwest.

Primary evidence is derived from several sources and contextualized with the secondary sources referenced in the historiographical footnotes. Multiple volumes of the *Directory to the Iron and Steel Works of the United States* published by the American Iron and Steel Association help to trace the national pattern of growth the iron and steel industry experienced during the nineteenth century. The available *Annual Reports of the Virginia Iron, Coal, and Coke Company* between the years 1905-1922 provide insight into the company's operations and its relationship with stockholders. A 1916 *Report on Examination of Financial Condition and Operations for the 13½ Years Ended June 30, 1916* provide in depth financial and

production numbers during the primary years of the VIC&CC's iron operations. The *New York Times* and *Washington Post* also help to detail large events during the company's history.

Chapter One provides roughly fifty years of historical context regarding the growth of the American iron and steel industry before the 20th century. Chapter Two specifically examines industrial modernization in southern Appalachia and the growth and emergence of the companies that became the VIC&CC between 1880 and 1900 before detailing the tumultuous first years of the company's operation. Chapter Three examines the years between 1903 and 1911 when the reorganized VIC&CC slowly turned its focus from iron to coal production under the leadership of Henry K. McHarg. Chapter Four covers the years between 1912 and approximately 1922 when the VIC&CC ceased to produce pig iron and focused almost all of its energies on coal production and sales. It concludes with a brief summary of the years between 1940 and 1970 when the company functioned as a lessor of coal properties before being absorbed by a larger manufacturing group. A conclusion returns to the company's origins for a final analysis of why the company failed as an iron producer, but managed to succeed as a producer of coal during much of the early twentieth century while serving as a colonial supplier of raw materials in the much larger American industrial economy.

***Chapter One – Nineteenth Century Modernization and Growth of the American
Iron and Steel Industries***

Advances in the iron and steel industries were central to the growth of the American economy during the second half of the nineteenth century. The production of iron and iron products in the United States had historically been a small-scale enterprise that drew from relatively local resources and demand, but by the close of the Civil War a dramatic change in the industry was well underway. This change began primarily in the American northeast during the mid-nineteenth century while the American South became increasingly dependent on cotton and agricultural production. Technological advances made primarily in Pennsylvania and New York, and an increasing raw materials base stimulated growth in the scale and complexity of the country's iron and infant steel industries. The growth of iron and steel consuming industries also drove the expansion.

During the decades preceding the Civil War the North's industrial economy and South's agrarian economy grew increasingly apart as the regions' differing systems of labor organization allowed for a fundamental distinction. In the years following Reconstruction free labor and the rise of industry narrowed this distinction and differences between north and south were increasingly cultural rather than economic. The antebellum coal industries of Pennsylvania and Virginia, which shared similar resource endowments but differing political and cultural heritages, has been the subject of recent historical scholarship investigating this divergence between the northern and southern economies. Sean Patrick Adams' recent analysis of the divergent paths taken by these two states concludes that the

gap originated as much from pivotal “state-level solons that in some instances aided entrepreneurial initiatives and other time stood squarely in the way of them” as it did from the more laissez-fair market revolution associated with the era.¹⁷ The antebellum legislative inhibitions of southern states were clearly a thing of the past during the final twenty years of the nineteenth century, and the South experienced a period of rapid industrial development. Particularly in southern Appalachia, much of this industrial modernization came from northern and English investors seeking to capitalize on the modernization of the region’s iron and coal industries. This chapter focuses on the American iron industry’s growth in the northeast during the mid-nineteenth century and the subsequent modernization of the southern iron industry during the years following Reconstruction.

Charcoal fueled iron furnaces almost without exception until the mid nineteenth century. The slow transition from charcoal fueled furnaces to coke¹⁸ fueled furnaces helps explain the huge rise in furnace output during the period. Even though English ironmasters began utilizing coke in the production of iron in the 1730s, American iron masters did not begin to make the transition until the 19th century. Historian Stewart Holbrook accredits this slow transition to American “pigheadedness” as ironmasters’ clung to the charcoal method “until the receding

¹⁷ Sean Patrick Adams, *Old Dominion, Industrial Commonwealth: Coal, Politics, and Economy in Antebellum America* (Baltimore: The Johns Hopkins University Press, 2004), 9.

¹⁸ Although charcoal and anthracite coal both produced superior pig iron, both were limited in availability. Charcoal is essentially timber and anthracite was limited by quantity and location, but bituminous coal deposits are abundant in comparison to both. Impurities in bituminous deposits countered its advantage in abundance until the coking process was perfected. By cooking either bituminous or anthracite coal in an airtight furnace, many of these impurities are removed. What remains is coke. It is nearly pure carbon and provides a consistent and hot flame that is suitable for iron furnaces.

forest forced them to [coke].”¹⁹ Although the attitude of ironmasters certainly matters, the development and availability of efficient modes for utilizing other fuels in the production process offers better reasoning for the transition.

By the mid-nineteenth century the design of charcoal furnaces were little changed since the seventeenth century. Historian William Hogan describes these charcoal furnaces as being stone structures,

built in the form of a truncated pyramid into which the iron ore, charcoal and limestone were charged in order to produce pig iron. . . . To facilitate charging raw materials many furnaces were built next to a hillside with a bridge connecting the hill with the top of the furnace. Combustion was aided by a blast of cold air blown in at the base of the furnace through an opening called a tuyere.²⁰

Charcoal furnaces’ voracious appetite for wood limited both the size and output of these furnaces and it would be the introduction of furnaces fueled by anthracite and coke beginning in the 1840s that marked the rapid growth and would characterize the American iron industry for the rest of the nineteenth century.

The location of both anthracite and bituminous coals has played a primary role in the concentration of the iron and steel industry since its entrance as a primary fuel supply. Coal is abundant in the United States and deposits are located in thirty-eight of the present fifty states. The largest concentrations of bituminous and anthracite coals are located along the Appalachian range in Pennsylvania, Ohio, West Virginia, Virginia, Maryland, Kentucky, Tennessee, Georgia, and Alabama. Practically all deposits of anthracite coal in the United States are located in northeastern Pennsylvania, although small deposits are located in Arkansas,

¹⁹ Stewart H. Holbrook, *Iron Brew* (New York: The MacMillan Company, 1939), 12.

²⁰ William T. Hogan, *Economic History of the Iron and Steel Industry in the United States, Volume 1* (Lexington, MA: Lexington Books, 1971), 4.

Colorado, Virginia and New Mexico. Bituminous coal deposits along the Appalachian range occur in all the states previously mentioned. Anthracite coal was the first fuel to begin replacing charcoal because of its high carbon content, but coke from bituminous coal came to dominate the industry's fuel source by the turn of the twentieth century.²¹

Eastern Pennsylvania ironmasters utilized anthracite coal on a small scale for years prior to its large-scale use by the iron industry. Problems with igniting and controlling the temperature of burning anthracite were solved during the late eighteenth and first half of the nineteenth century. During the 1830s a group of American ironmasters traveled to Wales, where anthracite also occurs and was in common use, to attract an English ironmaster to the United States to build an anthracite hot-air blast furnace. In 1840, the first of these furnaces was successfully opened near Allentown, Pennsylvania. Hot air blast furnaces used a small engine to circulate hot air from the top of the furnace to the bottom via iron pipes. This development led to an explosive growth of the iron industry in northeast Pennsylvania as the abundant deposits of anthracite fueled a booming industry in this region for much of the remaining nineteenth century.²²

Even though the successful implementation of anthracite as fuel spurred a dramatic boost to northeast Pennsylvania's iron industry, it would be the successful development of coking technology for bituminous coal that reshaped the entire American iron industry. Bituminous coal has a lower carbon content than

²¹ Carmen DiCiccio, *Coal and Coke in Pennsylvania* (Harrisburg, PA: Pennsylvania Historical and Museum Commission), 7-11.

²² DiCiccio, *Coal and Coke*, 9-11, 27.

anthracite, and in order to produce a suitable fuel for iron production, the volatile matters must be cooked out. These matters include tar, oils, and gases that give bituminous coal high amounts of phosphorous and sulfur that leave it unsuitable for use in iron production. The earliest methods of coking coal involved cooking the coal in a turf-covered mound, but this wasteful process limited coke's use. It would be the development of the beehive oven that would lead to coke's success in reshaping the iron industry. The process was fairly simple: bituminous coal was placed inside an airtight beehive oven and the coal was baked with an exterior heat source. This heating drives off the impurities, and leaves behind coke.²³ Iron masters in Connellsville, Pennsylvania produced the first dome-shaped beehive coke ovens in Connellsville, Pennsylvania during the 1830s, and by the 1860s they were the primary means of producing coke.²⁴

The first iron blast furnace to successfully use coke was the Clinton Furnace near Pittsburgh, which began using Connellsville coke in 1860. The results were so positive that furnace management secured a continuous supply of Connellsville coke, and set off a boom that would make the Connellsville district the country's largest source of coke for much of the remaining nineteenth century. The beehive ovens used to produce coke were,

[A]rched-roof circular brick room constructed of masonry firebrick and tile with an opening at the top. The space, between the lining and the outside walls, was filled with waste brick and other material to prevent, as far as possible, the loss of heat to the exterior. On the top of each oven was a twelve-inch circular opening called the trunnel head or 'eye,' which could be covered with a metal led. Coal was

²³ The bituminous coal did not burn inside the beehive oven because there was no air. After the impurities of coal tar and coal oils were removed, what remained was nearly pure carbon, or coke.

²⁴ DiCiccio, *Coal and Coke*, 28.

emptied into each oven through these openings. The interior of the oven was shaped like a beehive, measuring about twelve feet across the base and seven feet high, and was lined with heat-resistant refractory firebricks.²⁵

These ovens were built in rows and often by the hundred. This basic design and method of producing coke changed little until ovens and methods began to render beehive ovens irrelevant during the early twentieth century. But during the nineteenth century, the superior quality and price of coke produced at Connellsville by beehive ovens was one reason why Pittsburgh became an iron and steel center. Although Connellsville, Pennsylvania dominated coke production, the fuel was also produced in mass quantities in Ohio, Illinois, Indiana, several southern Appalachian states, and Colorado by the twentieth century.²⁶

The development of anthracite and coke fuels accompanied with the perfection of hot air blast furnaces led to an entirely new type of furnace by 1860. These new larger, cylindrical iron shell furnaces were now constructed on level ground, lined with firebrick, and relied on hoists to raise the raw materials to the furnace top to be hand fed into the fire.²⁷ These new furnaces allowed for larger loads of raw materials to be fed into the furnace and the more compact and powerful coke aided the dramatic increase in furnace output. Stronger, more efficient stoves utilizing steam engines to operate the bellows²⁸ also aided the heating process. The development of the Whitwell and Cowper furnaces allowed for

²⁵ DiCiccio, *Coal and Coke*, 43.

²⁶ DiCiccio, *Coal and Coke*, 38-46.

²⁷ Hogan, *Economic History of the Iron and Steel Industry*, 5, 27-29.

²⁸ Bellows are mechanized systems for delivering controlled bursts of pressurized air.

the more efficient circulation of hot air in the much larger furnace stacks. The Whitwell stove were typically installed in sets of three and;

contained fire-brick chambers, within which the waste gases burned for a period, until the fire-bricks were at a red heat. The gases were then turned off to the alternate stove, and the air for the blast-furnace was driven in through the heated stove until the other one had become sufficiently heated.²⁹

This aided in doubling the output of iron without requiring much more energy, and in many cases the output increased much more than that. With the basic coking process understood and the ignition problems associated with it overcome by improvements to stoves and bellows, coke iron quickly began reshaping the American iron industry.³⁰

Although coke became the primary fuel used in iron and steel production by 1880, it should be noted that neither charcoal- nor anthracite-fueled furnaces ceased to produce pig iron. On the contrary, both essentially maintained their production rates over the next twenty years. They were simply outpaced by growing iron and steel industries in bituminous coal regions. For example, in 1880 anthracite-fueled furnaces produced 1,807,651 tons of pig iron, while charcoal fueled furnaces produced 537,558 tons of iron, and 1,950,205 of pig iron were produced in bituminous coke fueled furnaces. By 1900, anthracite and charcoal fueled furnaces respectively produced 1,879,293 and 380,658 tons of pig iron whereas bituminous coke fueled furnaces produced 13,134,927 tons of pig iron. This dramatic increase over 20 years of 673.5 percent in pig iron produced by

²⁹ R.H. Richards, "The Hot Blast in Making Iron," *Science* 3, no. 50 (January 18, 1884): 72.

³⁰ Hogan, *Economic History of the Iron and Steel Industry*, 28, 29; Richards, "The Hot Blast in Making Iron," 73.

bituminous coke fueled furnaces is indicative of the exploding scale of American iron and steel industries and the limited quantity of anthracite and timber.³¹

As the United States expanded westward, so too did the iron industry's ore supply and manufacturing centers. Accompanied with Connellsville coke, this shift in ore supply heavily influenced the growing concentration of the American iron and steel industry in southwest Pennsylvania by the turn of the twentieth century. The opening of new ore fields during the late nineteenth century in the Lake Superior and Alabama region had the largest impact on reshaping the industry.³²

Iron ores from the Lake Superior region of Michigan, Minnesota, and Wisconsin have been utilized since 1852. During the closing decades of the 19th century this region's ores became the primary source for the country's furnaces and steel mills. William Burt first discovered the huge ore deposits in this region in 1844, the transportation of the iron ores via the Great Lakes was dramatically improved by bypassing the rapids of the St. Mary's River between Lake Superior and Lake Huron with the opening of the Sault Ste. Marie canal in 1855. Michigan's Upper Peninsula held an abundance of ore that was low in phosphorous, which was best suited for the Bessemer conversion process, and by 1880 Michigan was well on its way to overtaking Pennsylvania as the leading ore producing state because of.³³ The opening of the Mesabi Range in Minnesota during the 1880s would only add to the Lake Superior region's importance as a supplier of iron ore. As more and more

³¹ Hogan, *Economic History of the Iron and Steel Industry*, 205.

³² Hogan, *Economic History of the Iron and Steel Industry*, 25.

³³ Hogan, *Economic History of the Iron and Steel Industry*, 18-20.

eastern ore mines were depleted, the country's iron and steel manufactures became increasingly dependent on ores mined in the Lake Superior region.

The opening of the Minnesota iron ore fields played a significant role in reshaping the industry's ore supply. These ores were ideally suited for the growing iron and steel industry. The iron ore deposits were abundant and near the earth's surface, and therefore cheaply extracted. They contained a high iron content and low phosphorous level, but they were of a much softer composition than ores that had been previously used.³⁴ The soft composition of the Mesabi Range ores initially kept them from primary use because these softer ores would clog furnaces designed to handle much harder and more rocklike ores, but furnaces were quickly refitted to handle these softer ores and only these softer ores. With the refitting of furnaces to handle these ores, production of pig iron grew so that by 1890 American pig iron production would outpace British production of pig iron for the first time. And in recovering from the economic depression caused by the Panic of 1893, it would be the ores from the Michigan and Minnesota fields that would provide a majority of the pig iron for finished iron and steel production in the United States.³⁵ By 1900, Minnesota produced 9,834,399 tons of iron ore, far outpacing the 1,515,992 tons of ore mined in Virginia and Tennessee during the same year.³⁶

Pittsburgh became the nation's steel center for several reasons. The city's location served as an economically central point for meeting coke from western

³⁴ If too high, phosphorous content in iron ore can render the hardened iron and steel too brittle for effective use making the use of high phosphorus ores unpractical until oxidizing technologies were developed to reduce high levels.

³⁵ Hogan, *Economic History of the Iron and Steel Industry*, 184.

³⁶ Hogan, *Economic History of the Iron and Steel Industry*, 196.

Pennsylvania and iron ore from the Lake Superior region. Many of the sharpest minds in the industry were already in Pennsylvania because of the state's long established iron industry and its strong ties with English ironmasters. Pittsburgh's centrality to a wealth of natural resources and mental capital made the city's meteoric rise during the late nineteenth century possible. Skyrocketing demand for steel rail also fueled Pittsburgh's growth as the United States rapidly expanded westward and the country's rail network grew annually at often astonishing rates. Historian Kenneth Warren notes that while Pittsburgh did not produce steel rails in 1875, "by 1878 it rolled 13.13 percent of the total, and in the late 1890s it rolled as much as 29 percent."³⁷ He also notes similar gains in the production of pig iron and it was during this time that men such as the Carnegies and Henry Clay Frick came to dominate iron and steel industry and controlled much of the industry by the turn of the twentieth century. Much of Pittsburgh's growth can be linked to the superiority of the ore coming from the Lake Superior districts.

The ore from these districts were not only seemingly abundant, but had a much higher metallic content than ores from practically anywhere else in the country. Moving the ore by water helped to keep the cost of transportation low and when, "Lake Superior ore reached its destination in northeastern Ohio or southwestern Pennsylvania, its favorable chemical characteristics paid off."³⁸ This advantage came from these ores' suitability to the primary steel making process of the day, Bessemer-steel conversion. Unlike ores from southern states, which

³⁷ Kenneth Warren, *Triumphant Capitalism: Henry Clay Frick and the Industrial Transformation of America* (Pittsburgh: University of Pittsburgh Press, 1996), 22.

³⁸ W. David Lewis, *Sloss Furnaces and the Rise of the Birmingham District* (Tuscaloosa: The University of Alabama Press, 1994), 92.

contained high concentrations of phosphorus and silica, the northern operators could easily use Lake Superior pig iron in Bessemer converters.³⁹

Three men, two English and one American, mastered the Bessemer steel conversion process during the mid 1850's.⁴⁰ They discovered a method to force air through molten pig iron so that the oxygen would combine with the carbon in the pig iron to form steel, which is both stronger and more flexible than wrought, or cast iron. Skilled laborers were able to gauge when the appropriate levels of carbon were reached by pouring molten pig iron into an oval shaped iron vessel lined with firebrick and blasting air through a number of tuyeres in the bottom of the vessel. As simple as this process is in principle, it was also incredibly costly, dangerous, and limited to very specific types of pig iron.⁴¹ Iron ores found in the region stretching from Virginia to Alabama are largely red hematites or brown ores, which contain levels of phosphorus too high for use in Bessemer converters.⁴² As previously stated, it would be the Great Lake ores that contained the appropriate levels of phosphorus for conversion through the Bessemer process and be one of the determining reasons why the manufacturing belt along the Great Lakes and Pennsylvania developed in the manner that it did.

Regardless of the Bessemer's shortcomings, the advantages of steel over iron were immediately clear and it would be the production of steel rails for the

³⁹ Lewis, *Sloss Furnaces*, 91,92.

⁴⁰ Hogan hypothesizes that the Englishmen and American came up with the same basic method at roughly the same time, but who mastered what first is not the focus of this work.

⁴¹ The specific limitations to pig iron suitable for the Bessemer process were largely tied to the phosphorus levels within the iron ore. Too high and the end product will be too brittle for intended use. Phosphorus levels do need to be well under 1 percent, but to be more precise than this is, at the moment, beyond the author's comfort level.

⁴² Edwin C. Eckel, "The Iron and Steel Industry of the South," *The American Academy of Political and Social Science* 153 (January 1931): 55-56.

seemingly ever-expanding railroad systems that would drive much of steel's rapid rise. Historian William Hogan states that, "by 1880 the picture had changed as larger mills were built and the steel rail outdistanced its iron rival two to one."⁴³ It would not be until modern open-hearth furnaces were constructed that southern steel industries could become legitimate competitors to their northern counterparts. Southern steel production would never come to seriously challenge northern production.

Technological innovation, such as the Bessemer converters and open hearth furnaces, the utilization of efficient but costly coke, the opening of new ore fields along the Great Lakes and reaching southern ore fields via railroads, as well as the country's expansion westward and growth in population would all be forces in driving the rapidly expanding American steel industry. It would be advances in the iron and steel consuming industries that largely drive the coming of the American century. By the 1870's, railroads were well established as the principal iron consuming industry within the country, and rail's conversion from iron components to steel components would coincide directly with the rise of the Bessemer conversion process. The first year any steel rails would be produced within the United States was 1867 at which time British imports of iron and steel rails still countered American producers' inability to match the country's skyrocketing demand for railroads. The production of steel rails would come to outpace the

⁴³ Hogan, *Economic History of the Iron and Steel Industry*, 41.

domestic production of iron rails in 1877, and from there on would only continue to replace iron rails.⁴⁴

Besides the growth of railroads and the conversion from iron to steel rails, a growing number of applications for iron and steel also helped boost the industry's rapid expansion. Much of this came from rise of agriculture in the newly settled Midwestern and western portions of the country and a growing demand for agricultural implements. Farmers increasingly utilized plows, cultivators, harrows, shovels, hoes, hayforks, and any number of other farm tools as the country's population continued to expand. Factories producing components such as these tended locate themselves in areas where the cheapest sources of raw materials could be attained. To a lesser degree this occurred in the South as well. As late as 1886, the Edinburg Agricultural Works of the Shenandoah Valley produced plows and harrows from entirely locally produced materials.⁴⁵ Increasingly more structural steel companies, wire rolling mills, machine shops, assembly plants, construction components, and more positioned themselves as closely as possible to the cheapest and most accessible ores. This concentration also placed the skilled labor force increasingly in the northern regions of the country, and with most southern ores unfit for early steel conversion processes, southern industries were hampered during a crucial time in the American iron and steel industry's development.⁴⁶

⁴⁴ Hogan, *Economic History of the Iron and Steel Industry*, 114.

⁴⁵ Allen W. Moger, "Industrial and Urban Progress in Virginia from 1880 to 1900," *The Virginia Magazine of History and Biography* 66, no.3 (July 1958), 310.

⁴⁶ Gavin Wright, *Old South, New South: Revolutions in the Southern Economy Since the Civil War* (New York: Basic Books, Inc, 1986), 172.

Despite these trends, the production of wrought iron pipe would be one of the southern Appalachia's primary finishing industries. As oil fields were tapped at an increasingly rapid pace and more and more American cities installed modern waterworks and sewage systems, the demand for wrought iron and cast iron pipeline skyrocketed. The construction of more and more wrought and cast iron pipe mills in the South took place at the same time steel mills were developed in northern communities.⁴⁷

Even though during the later nineteenth century Pittsburgh and the Great Lakes rapidly became the iron and steel industry's premier manufacturing center, the Birmingham district of Alabama emerged practically overnight as the South's major iron and steel producing center. While Pittsburgh's growth was aided by a variety of forces, the Birmingham district of Alabama held the richest deposits of the necessary raw materials for iron production in the country. In the years following the Civil War, largely because of nearby concentration of raw materials, Birmingham rapidly became the United States' second largest iron producing center, and much of southern Appalachia saw comparable investment in smaller, but comparable industries.⁴⁸

Although the ores and coals that drove Birmingham's rise were less suitable for the Bessemer steel-making process and beehive oven coking processes of the day, technological adaptations and the sheer abundance of the materials helped counter these deficiencies. The close concentration of red hematite and brown iron ores, bituminous coal suitable for coking, dolomite and limestone for fluxing,

⁴⁷ Wright, *Old South, New South*, 166.

⁴⁸ Wright, *Old South, New South*, 165.

combined with Birmingham's close proximity to the Gulf of Mexico, western states, and south also lent to the city's booming iron industry from its formation in 1871 to the turn of the twentieth century.⁴⁹ Birmingham's early development as an iron center has been heavily linked to investment from Virginia. W. David Lewis details this complex pattern of intraregional investment and development in the years following the Civil War. He argues that the Sloss Furnaces are a prime example of Richmond's "economic outreach" during the later nineteenth century.⁵⁰

Prior to the Civil War Richmond, Virginia was the most industrialized southern city, and although much of the city burned during the fall of the Confederacy, former Confederate and city leaders led a rapid post-war recovery that quickly restored Richmond's position as a manufacturing and investment center. Many ex-Confederates, like and including, the same men who rebuilt Richmond quickly, put their energy into industrializing the South. These men continued to work intimately with antebellum business connections in cities such as Baltimore and New York City for financial support in constructing railroads while money for factories, mills, and furnaces largely came from southern interests. Railways and iron producers only became more interrelated in the South during this time, and the relationship between Birmingham's emerging steel industries and the rail network that became the Southern Railway exemplifies this. This connection primarily came through a Richmond industrialist, Joseph Bryan, a promoter for the Georgia Pacific

⁴⁹ Langdon White, "The Iron and Steel Industry of the Birmingham, Alabama, District," *Economic Geography* 4, no. 4 (October 1928): 349-350.

⁵⁰ Lewis, *Sloss Furnaces*, 103.

(the predecessor of the Southern Railway), whose syndicate purchased the struggling Sloss Furnaces in 1886.⁵¹

Sloss was the largest iron-producing group in Birmingham until a Tennessee firm bought its way into the city about the same time as Bryan and his associates did. Birmingham's rapid rise to prominence was aided by this company's entrance, and as historian Gavin Wright notes,

[A]s late as 1886, Chattanooga (Tennessee) was still regarded as the 'centre of iron-making in the South,' in that same year the Tennessee Coal Iron and Railway Company (TCI) bought its way into the Birmingham area, and over the succeeding years, TCI and Birmingham came to dominate the southern industry.⁵²

With the TCI and Sloss operations continuing to fuel growth and steel demand gradually supplanting iron, the Birmingham district entered steel production in 1898 at Ensley. Although TCI would be bought by U.S. Steel Corporation in 1907, the company was one of the earliest and most powerful examples of vertically integrated producers of pig iron and iron products.⁵³

Although Alabama seemed well prepared to become a dominating iron and steel region, several factors delayed the growth of their industry, and for the most part they coincide with the problems faced by the much smaller iron industries in Virginia and Tennessee. The ores mined in Alabama were often inconsistent in composition, but would be smelted in the same manner regardless. This would produce inferior pig iron and it would not be until 1890 that furnaces began

⁵¹ Lewis, *Sloss Furnaces*, 103-113.

⁵² Wright, *Old South, New South*, 165.

⁵³ Wright, *Old South, New South*, 165-167.

regularly analyzing the ore they fired.⁵⁴ Another problem faced by Alabama's iron industries were high phosphorus levels that rendered Bessemer converters impossible to use. It would not be until the Alabama Iron and Steel Company rebuilt their facilities in 1883 that the open-hearth method of converting iron to steel made the conversion of southern ores possible.⁵⁵ Alabama's failure to emerge as a leading steel producing center until well into the twentieth century is outside the scope of this work, but its iron and steel shops built during the 1880's and 1890's would provide ample competition for Virginia and Tennessee iron and steel works.

Several smaller regional centers in the southern Appalachians emerged in the late nineteenth century to produce iron by bringing together locally mined coal and iron ore. Chattanooga, Tennessee became one such city in the years following the Civil War. The area immediately surrounding Chattanooga held a high concentration of iron and coal deposits, "[and] by 1885 the city boasted nine furnaces with seventeen foundries and machine shops."⁵⁶ The city was responsible for nearly half of Tennessee's total outputs of rolled iron, steel rails, blooms and forges. Chattanooga's iron and steel boom would peak at roughly the turn of the twentieth century as steel production in the North began to rapidly outpace southern competition.⁵⁷

Bristol, Tennessee would experience a similar iron and steel boom in the late nineteenth century. Bisected by the Virginia and Tennessee border, the city would

⁵⁴ Hogan, *Economic History of the Iron and Steel Industry*, 204.

⁵⁵ American Iron and Steel Association, *Directory of the Iron and Steel Industry of the United States and Canada* (Philadelphia: The American Iron and Steel Association, 1898), 154.

⁵⁶ Wright, *Old South, New South*, 165.

⁵⁷ Hogan, *Economic History of the Iron and Steel Industry*, 369.

rise as a regional center for manufacturing, wholesale distribution, and retail. It became an iron center with the opening of southwest Virginia's coalfields and northeast Tennessee's iron ore deposits.⁵⁸ This would be a determining reason for the management of the Virginia Iron, Coal, and Coke Company to locate their company headquarters on the Tennessee side of the city. Bristol's largest problem would be high transportation costs. Historian Tom Lee notes that,

[A]fter 1887 the Interstate Commerce Commission gave legal sanction to the classifications and freight rate differentials institutionalized by America's railways during the 1870s and 1880s. As a result of the system of regions established by the railroads, southern producers paid higher rates to ship good to the far larger markets of the northeastern United States than to points in the South.⁵⁹

This is not to say that railroads were necessarily trying to retard southern industrial growth, but that southern industrial development did not begin in the region until late and railroads were investing much of their resources into the area, and charging higher rates in return.

The growth of Roanoke, Virginia was as impressive as any of the southern Appalachian industrial cities. With the coming of the Norfolk and Western Railroad in the early 1880's, what had once been a stop along the line connecting Lynchburg, Virginia and Bristol, Virginia quickly grew as a junction for commerce between southwest Virginia, the Shenandoah Valley, and the eastern port city of Norfolk. Roanoke's first iron works were built in the late 1880's. Within a few years blast furnaces were operational, but like many of the blast furnaces in southwest Virginia and northeast Tennessee, they were sold in the wake of the 1893 economic

⁵⁸ Tom Lee, *The Tennessee-Virginia Tri-Cities: Urbanization in Appalachia, 1900-1950* (Knoxville: The University of Tennessee Press, 2005), 47.

⁵⁹ Lee, *The Tennessee-Virginia Tri-Cities*, 58.

depression after iron prices plummeted and many of the newly established blast furnaces were unable to remain in business.⁶⁰ In addition, Roanoke would serve as the company headquarters for the Norfolk and Western Railway, as the city would become a major distribution point for coal mined in the southwest corner of the state.

The second half of the nineteenth century witnessed a dramatic reshaping of the United States iron industry and the emergence of the American steel industry in both the North and South. Technological advancements in furnace and mill designs as well as skyrocketing demand, primarily from railroads, helped to drive this revolution in production and use. The introduction of coke as a fuel supply and the entrance of ores from the Lake Superior districts also contributed greatly. The American South, which had only been industrialized on a limited basis prior to the Civil War, also experienced a boom in its iron industry. For much of this time Birmingham, Alabama was thought to be an emerging southern Pittsburgh while Tennessee and Virginia also saw dramatic advances in production. While the quality of raw materials would ultimately lead to the demise of the Birmingham and Appalachian iron industries in the face of steel, the region still played a large role in reshaping American industry during the later nineteenth and early twentieth century.

⁶⁰ Raymond P. Barnes, *A History of Roanoke* (Roanoke, VA: City of Roanoke, 1968), 184-185.

Chapter Two – Late Nineteenth Century Industrial Modernization in Southern Appalachia and the First Years of The Virginia Iron, Coal, and Coke Company

While the ore fields of the Lake Superior, New York, and Alabama regions gave rise to major steel centers in western Pennsylvania, Alabama, and the Midwest during the nineteenth century, capitalists also saw opportunity in modernizing southern Appalachia's iron industry during the later nineteenth century. During this time the small charcoal furnaces that served the demands of the largely agrarian regions of southwest Virginia and east Tennessee were quickly outmoded as northern investors built much larger, modern coke fired iron furnaces region. It was during the final two decades of the nineteenth century that the conditions for the formation of the Virginia Iron, Coal, and Coke Company (VIC&CC) were made possible.

When the VIC&CC formally organized in January 1899 as a vertically integrated producer of pig iron and coal, it was the result of several decades of speculation, capital investment, and industrial modernization in southwestern Virginia and east Tennessee. During the company's checkered first years management faced several hurdles that ultimately led to receivership and reorganization. Severe internal strife and accusations of sabotage at the company's highest levels, heavy property losses from fires, a shortage of working capital, and logistical problems in transporting freight can all be linked to the company's near collapse in 1901. When the reorganized company began operations in 1903, the company continued to produce pig iron, but during the next three decades

management increasingly turned their interests towards their Pocahontas coal interests.

In the years following the Civil War capital investment poured into southern Appalachia to access the largely untouched and close concentrations of timber, waterways, coal, iron ore, and other valuable ores and minerals. As Virginians worked to rebuild the state's economy and social fabric during the years following the war, Virginia's economy did grow, but at a slow pace. By the 1880s, this had changed. Historian Allen Moger characterized this decade in Virginia as a "time when the commonwealth assumed a new spirit. No longer were its leaders in trade and industry controlled by despair and hesitation. There was a spirit of hope and courage. Turning their backs on defeatism and inaction, they adopted the spirit of confidence and vision which in that decade became characteristic of the 'New South.'"⁶¹ The state's cities, towns, and counties eagerly promoted their resources and potential for development in period of rapid overdevelopment and speculation. The promotional efforts of southern newspapers such as the *Richmond Whig*, journals such as the *Manufacturers' Record*, and wealthy Civil War veterans such as General John Daniel Imboden and Major Jedediah Hotchkiss drew outside attention to these resources, and as a result investors from the Northeast and Great Britain flooded southern Appalachia. Land agents representing large timber and iron interests purchased or leased land from individuals to a point that by the end of the nineteenth century a single individual, group, railway, or company owned tracts of

⁶¹ Allen Moger, "The Rebuilding of the Old Dominion" (PhD. Diss., Columbia University, 1940), 31.

hundreds of thousands of acres.⁶² In the remaining twenty years of the nineteenth century, this general atmosphere created the conditions that made the formation of the Virginia Iron, Coal, and Coke Company possible.

Although the region's rich coal fields and timber stands came to dominate industrial activity in the area, for much of the later nineteenth century the production of iron and steel offered great potential for investors. During this time there was much speculation on the quality and volume of the ores present in southern Appalachia, but excited investment poured into the region nonetheless. According to historian Harold Mann, "The dominant iron ore found in the New River counties, called 'brown' with one version called limonite, and a less desirable kind of 'brown' name 'mountain ore.'"⁶³ Historian William Hogan notes that production of iron ore and pig iron quadrupled between 1880-1890.⁶⁴ As the production and use of steel slowly replaced cast and wrought iron during the later nineteenth and early twentieth centuries, the ores of southern Appalachia proved less desirable for the Bessemer process and slowly rendered them inferior. This process took decades to become apparent, so during the 1880s and early 1890s southern Appalachia investors were highly interested in developing iron works and several modernized, coke fired iron furnaces and iron works were constructed in the region.

These modern iron furnaces were much larger than the small charcoal furnaces that had met the region's demands for well over a century. The stacks

⁶² Ronald Eller, *Miners, Millhands, and Mountaineers* (Knoxville: University of Tennessee Press, 1982), 39-50.

⁶³ Harold Mann, "The Virginia, Iron, Coal, and Coke Company" (paper presented at New River Symposium, Wytheville, VA, April 10-12, 1986), 50.

⁶⁴ William T. Hogan, S.J. *Economic History of the Iron and Steel Industry in the United States: Volume II* (Lexington, MA: Lexington Books, 1971), 202.

constructed stood between seventy and eighty feet tall, which was roughly twice the height of older charcoal-fueled furnaces. They primarily utilized coke fueled Whitwell stoves; although coke fueled Cowper stoves were also used. The two stoves were similar in design and,

contained fire-brick chambers, within which the waste gases burned for a period, until the fire-bricks were at a red heat. The gases were then turned off to the alternate stove, and the air for the blast-furnace was driven in through the heated stove until the other one had become sufficiently heated.⁶⁵

This allowed a doubling in the output of iron without requiring much more energy, and in many cases the output increased much more than that.⁶⁶ Constructing and operating these new furnaces was very expensive, and although local investment played an important role in the rapid expansion of the industry during this time, many investors in Philadelphia, New York, and Great Britain financed these furnaces.

The chief organizer of the VIC&CC, George L. Carter, was one such local capitalist and entrepreneur. Born in 1857 to a relatively well-to-do family in Carroll County, Virginia, Carter spent his life developing industry and railroads in southern Appalachia. Carter began working as a clerk at a Hillsville, Virginia store, and in 1877 he secured a position with the Wythe Lead and Zinc Company, located in Wythe County outside Wytheville. At Wythe Lead and Zinc Company Carter served as a buyer before becoming a manager and bookkeeper for the company. During this time Carter also began his own business ventures and became associated with George T. Mills, a railroad contractor with Norfolk & Western that built the Dora

⁶⁵ R.H. Richards, "The Hot Blast in Making Iron," *Science* 3, no. 50 (January 18, 1884): 72.

⁶⁶ Richards, "The Hot Blast in Making Iron," 73.

Iron Furnace in Pulaski, Virginia. Mills, who died during the construction of the Dora Iron Furnace, began construction in 1891 and made Carter the company's vice-president and general manager.⁶⁷

The modern Dora Furnace began operation during May 1892 and employed three Whitwell stoves fueled by coke from Tom's Creek, to reduce limonite and hematite ores into pigs branded "Dora."⁶⁸ Graded No. 1x foundry pig iron, "Dora" pig was suited only for use in casting mills.⁶⁹ Cast iron is very hard, but is brittle and suitable for products like manhole covers, drainpipes, and heavy cookware. Although there was a pipe works in Radford, and Richmond had a developed manufacturing core at this time, vast majorities of casting plants were in northern cities. The Dora Company had sales agents in New York hoping to sell their pig iron to northern casting mills. Developing and securing the necessary raw materials for the "Dora" brand necessitated that Carter borrow heavily against the company's holdings, which Carter had expanded to include four charcoal furnaces and their land holdings along Cripple Creek in Wythe County.⁷⁰ One of the few charcoal furnaces purchased by Carter was located in Pulaski County along the Reed Island branch of the Norfolk and Western Railway. Completed in 1881, the Reed Island Furnace produced pig iron for the manufacture of car wheels and remained active into the twentieth century as charcoal furnaces quickly became outmoded.⁷¹

⁶⁷ Willie Nelms, "George Lafayette Carter: Empire Builder," *Virginia Cavalcade* 30, no. 1 (Summer 1980): 12 – 21.

⁶⁸ American Iron and Steel Association, *Directory of the Iron and Steel Works of the United States* (Philadelphia: American Iron and Steel Association, 1898), 29.

⁶⁹ William Kent, *The Mechanical Engineer's Pocket-Book* (New York: John Wiley & Sons, 1902), 365.

⁷⁰ American Iron and Steel Association, *Directory*, 67.

⁷¹ George S. Jack, *History of Roanoke County* (Roanoke, VA: Stone Publishers, 1912), 116.

To secure a consistent fuel supply, Carter purchased several coalmines along Tom's Creek in Wise County, which he outfitted with modern machinery and organized into the Tom's Creek Coal and Coke Company. The Tom's Creek Coal and Coke Company would serve as the VIC&CC's main fuel supply, and with 700 coke ovens in operation, it would be one of the largest coking operations in the region. With the expanded operations at Tom's Creek and Dora, Carter purchased the properties of the Crozer Iron Company at Roanoke, Virginia in 1898. Carter named his consolidated holdings in the several furnaces the Carter Coal and Iron Company (CC&IC). The formation of this company began the rapid series of mergers and expansion that would result in the organization of the VIC&CC.⁷²

Samuel A. Crozer, a Pennsylvania cotton manufacturer drawn to the region because of the promotional work of Jedediah Hotchkiss, built the Crozer Iron Company near Roanoke in 1882 and expanded it in 1889.⁷³ Roanoke grew almost overnight as a manufacturing center out of the small farming community of Big Lick as the result of Norfolk and Western Railroad management's decision to locate its head offices close to southwest Virginia's coal fields. Crozer's company operated two furnaces employing six Whitwell stoves fueled by Pocahontas coke to reduce local hematite ores. The Crozer Iron Company had sales representatives in New York, Boston, and Philadelphia to market the company's "Crozer" brand foundry and forge pig iron. By the turn of the twentieth century when the VIC&CC was organized, Roanoke had grown to include a locks works, engine works, carriage

⁷² Mann, "The Virginia, Iron, Coal, and Coke Company", 49.

⁷³ Eller, *Miners, Millhands, and Mountaineers*, 72.

works, and bridge works, as well as some nearby iron works like Crozer.⁷⁴ By expanding his operation into Roanoke, Carter's CC&IC spanned distance of roughly sixty miles, and his much larger company required that Carter look beyond local investment for capital.

This took Carter to New York where he became associated with the Wall Street firm of Moore & Schley. The group "had been trying to arrange a merger of the Carnegie interests," and in Carter they found an opportunity to organize a large, promising iron company that also held vast coal reserves in southwestern Virginia.⁷⁵ In working with Moore & Schley, Carter sold the CC&IC to Moore & Schley, who in turn "advanced him \$10,000,000 to exploit the mineral wealth of his region."⁷⁶ Carter agreed to sit as the president of this much larger consolidated venture that became the Virginia, Iron, Coal, and Coke Company. When the company organized in February 1899 it was a diverse operation that included fifteen blast furnaces capable of producing 500,000 tons of pig iron, two rolling mills and planned steel works, a cast iron pipe works, the Virginia and Southwestern Railway, its own sawmill, grist mills, hundreds of coke ovens, and ownership or rights to over 125,000 acres of iron ore, limestone, and coal properties.⁷⁷

While George Carter expanded his own iron enterprise during the 1880s and 1890s, northern and English interests financed the construction of the several furnaces involved in the VIC&CC merger. These were located in or near the manufacturing and distribution centers that developed throughout the mountainous

⁷⁴ Jack, *History of Roanoke County*, 95.

⁷⁵ Mann, "The Virginia, Iron, Coal, and Coke Company", 55.

⁷⁶ Nelms, "George Lafayette Carter," 16.

⁷⁷ "A Virginia Iron Combine," *New York Times*, February 25, 1899.

hinterlands of southern Appalachian as railroads and feeder lines penetrated deeper into the region. Historian Ronald Eller notes that these emerging cities are now coined “growth centers” by modern planners and they, “served as convenient extensions of the eastern industrial core into the Appalachian heartland. In many ways, they functioned in the same exploitive relationship to their surrounding rural counties as did the larger metropolises to their surrounding rural counties as did the larger metropolises of the South and Northeast to the region as a whole.”⁷⁸

William Cronon provides the most comprehensive study of the rise of industrial urban centers during the nineteenth century. His *Nature's Metropolis* details the rapid growth of Chicago and the vital role railroads and waterways played in making the city a “funnel” for meeting the natural resources of the American West with the industrial economy of the East.⁷⁹ Railroads and city boosters fueled the growth of the much smaller cities in Southern Appalachia that emerged during the nineteenth century, such as Bristol and Roanoke, and their patterns of growth are comparable to those laid out by Cronon.

Three major railroad companies were organized during the later nineteenth century as the result of a pattern consolidations and mergers similar to the ones the iron industry underwent at the turn of the twentieth century. In Virginia, the Norfolk & Western (N&W) had operated for much of the nineteenth century before northern capital purchased and restructured the company in 1881. The new owners rapidly expanded westward into the territory that the VIC&CC would operate in and the two companies would be closely related: the railroad providing

⁷⁸ Eller, *Miners, Millhands, and Mountaineers*, 58.

⁷⁹ William Cronon, *Nature's Metropolis* (New York: W.W. Norton & Company, 1991), 92.

the transportation to markets outside the region, and VIC&CC providing the freight. The same can be said for the VIC&CC in eastern Tennessee and Kentucky, as the company would come to rely on the oldest of the large rail networks, the Louisville and Nashville (L&N), for shipping routes.⁸⁰ J.P. Morgan organized the Southern Railway in 1894 out of the ruined Richmond & Danville System and several other smaller networks to make it the largest of the rail networks in the South. The Southern Railway would prove to share the most interesting relationship with the VIC&CC during the twentieth century as it became a large purchaser of the company's coal and bought the VIC&CC's rail line.⁸¹ When the VIC&CC organized, the company purchased its own small railroad, the Virginia & Southwestern Railway, to penetrate into the Wise County coalfields and secure the cheap transportation of coal to Bristol, Virginia and the larger coal markets of the eastern seaboard and Great Lakes region via the N&W and L&N.⁸²

The newly formed Virginia and Southwestern Railway (V&SW) ran a distance of approximately 93 miles from Looney Creek, Tennessee to Elizabethtown, Virginia.⁸³ Formerly two separate lines, the South Atlantic and Ohio Railroad Company and the North Carolina Railway Company, the V&SW was in need of large scale improvements and extensions in order to properly serve the company's needs, and would require large amounts of capital in order to do so.⁸⁴ From the outset, directors of the VIC&CC recognized that because of the high costs in operating the

⁸⁰ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1905), 15.

⁸¹ John F. Stover, *American Railroads* (Chicago: University of Chicago Press, 1997), 138.

⁸² Eller, *Miners, Millhands, and Mountaineers*, 75.

⁸³ Office of the Railroad Commissioner, *23rd Annual Report of The Railroad Commissioner of the State of Virginia* (Richmond: I.N. Jones & Son Print, 1899), 324.

⁸⁴ "A Virginia Iron Combine," *New York Times*, February 25, 1899.

railroad it would likely be necessary to separate the V&SW from the VIC&CC under a separate incorporation. In the early twentieth century, receivers briefly sold the line before being buying it back.⁸⁵ Although the VIC&CC managed to retain ownership of the V&SW after the company's restructuring, it quickly sold the V&SW to the Southern Railway Company in 1906 in order to retire outstanding VIC&CC and CC&IC bonds.⁸⁶ The VIC&CC would continue to use the line after its sale, but without extensive maintenance and operation costs.

Securing affordable transport of the VIC&CC's pig iron and other raw materials along these lines was essential in linking the company's several furnaces with fuel, raw materials, and markets.⁸⁷ The VIC&CC was initially headquartered in Bristol, Virginia, a central location to these rail lines and the company's properties. Located along the border of Virginia and Tennessee, the city boomed during the late nineteenth century as a "convenient extension of the eastern industrial core in the Appalachian heartland."⁸⁸ The VIC&CC's furnace in Bristol was similar to the Dora and Crozer furnaces. Completed in 1891, the Bristol furnace had not been active since the year of its completion, although it remained in good repair. Company management purchased the Bristol Furnace from the Home Iron Company, and the furnace fueled three Whitwell stoves with Pocahontas coke to reduce Cranberry ore from North Carolina into high-grade Bessemer pig iron.⁸⁹ The ores from the North Carolina's Cranberry ore field were among the few ores in southern Appalachia

⁸⁵ "Virginia Road Changes Hands," *New York Times*, December 17, 1901.

⁸⁶ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1907), 6.

⁸⁷ Mann, "The Virginia, Iron, Coal, and Coke Company", 49.

⁸⁸ Eller, *Miners, Millhands, and Mountaineers*, 58.

⁸⁹ American Iron and Steel Association, *Directory*, 29.

suiting for use in the day's primary method of steel production, the Bessemer process. A majority of the region's ore is referred to as "brown" and contains high percentages of manganese, phosphorous, and sulfur. These properties caused a caking to the furnace tiles and necessitated frequent and expensive repair to the Bessemer converters. Most steel companies during this time employed the Bessemer process and were not interested in such ores.⁹⁰

North of Bristol and just north of Carter's Dora Furnaces in the heart of the New River Valley, the city of Radford developed as a smaller railroad and manufacturing hub that would play an important role in the VIC&CC's early business. The VIC&CC would purchase a modern coke-fired furnace and cast iron pipe works in Radford, and was headquartered in the city between 1903 and 1908. The company relocated its headquarters from Bristol to Radford in 1903 on the advice of then receiver Judge Archer A. Phlegar. The VIC&CC's Radford-Crane furnace was built by Philadelphia financiers between 1890 and 1892, but was never blown in prior to the VIC&CC's purchase because of depressed economic conditions in the years following the Panic of 1893. When active, the furnace employed four Whitwell stoves fueled by Pocahontas coke to reduce Virginia hematite ore into foundry pig iron.⁹¹ Along with the Radford-Crane Furnace, the VIC&CC purchased the Radford Pipe Works from the Radford Pipe and Foundry Company of Cincinnati, Ohio. At the time of purchase the pipe works was idle, but could produce pipe ranging from two to thirty-six inches in diameter.⁹² The Radford Pipe Works would

⁹⁰ Mann, "The Virginia, Iron, Coal, and Coke Company", 50.

⁹¹ American Iron and Steel Association, *Directory*, 31.

⁹² American Iron and Steel Association, *Directory*, 299.

be quickly sold in 1905 after the company's receivership would be used to retire CC&IC first mortgage bonds.⁹³

Aside from the VIC&CC's holdings in Pulaski, Bristol, and Radford, the company also included a modern coke-fired furnace and horseshoe and iron works at Max Meadows in Wythe County, Virginia. Owned by Philadelphia capitalists, the Max Meadows Furnace was completed in 1891, but would not be blown in until late 1895. The furnace employed three Whitwell stoves, which were fueled by Pocahontas coke to reduce local brown hematite ores to foundry pig iron.⁹⁴ When purchased by the VIC&CC, the Max Meadows furnace had been idle since 1898 and would not be blown in until 1901.⁹⁵ The Crescent Horse Shoe and Iron Works were owned by the same Philadelphia interests and had been in operation since 1892. Pocahontas coke fueled these iron works, and included eight puddling furnaces, three heating furnaces, three spike machines, six horseshoe machines, and two trains of rolls.⁹⁶

The only Virginia furnace located outside of the New River Valley or deep southwest Virginia was located at Buena Vista in the James River Valley. Located in Rockbridge County along the Maury River, the city of Buena Vista, like Bristol, boomed as a manufacturing growth center throughout the 1890s. A close concentration of iron ores, limestone, and abundant waterpower attracted Philadelphia investors represented by the Virginia Development Company. In 1889

⁹³ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1907), 5.

⁹⁴ American Iron and Steel Association, *Directory*, 30.

⁹⁵ "Record Showing Properties Operated by the Virginia, Iron, Coal, & Coke Company," 12/31/1900, Virginia Iron, Coal, and Coke Company Records 1899-1969, McConnell Library, Radford, VA.

⁹⁶ American Iron and Steel Association, *Directory*, 148.

construction began on the Buena Vista Furnace, and by 1890 the furnace was in blast. Fueled by New River coke and employing three Whitwell stoves, the Buena Vista Furnace reduced Craig Creek brown ore to produce foundry pig iron. When the VIC&CC purchased the furnace at Buena Vista it had been leased to the Alleghany Iron Company for a number of years.⁹⁷

Aside from the furnaces and foundries located in Virginia, the VIC&CC organization also included several furnaces in Tennessee and Kentucky. In later years the company would invest heavily in developing the coalfields of eastern Kentucky, but when the VIC&CC was organized, its primary focus was on its holdings in Virginia. The largest furnace the company purchased in Tennessee was at Embreeville in Washington County, Tennessee. One of two VIC&CC furnaces built by English investors, the Embreeville Furnace was constructed in 1891 and remained active until 1899 when it was sold to the VIC&CC. Employing three Cowper-Kennedy stoves fueled by Pocahontas and Big Stone Gap coke to reduce brown hematite ore, Embreeville produced iron suitable for malleable castings and special pig iron.⁹⁸

The Carnegie Iron Company built the second coke-fired furnace purchased in Tennessee. Work began in the early 1890s, but was suspended in 1892 with tightening financial conditions in the Panic of 1893. At the time of its purchase the Carnegie Furnace was not yet complete, but when active would employ three Whitwell stoves fueled by Pocahontas or Stonega coke to reduce Cranberry ore and produce a “special Bessemer” pig iron. The Carnegie Furnace would be one of the

⁹⁷ American Iron and Steel Association, *Directory*, 28.

⁹⁸ American Iron and Steel Association, *Directory*, 36.

first furnaces the VIC&CC would sell after its reorganization in 1902.⁹⁹ The company also purchased a couple long-idle charcoal furnaces in Tennessee, but these were never utilized for production purposes.

In Kentucky, the VIC&CC purchased two stacks from the Watts Steel and Iron Syndicate at Middlesborough. Middlesborough, Kentucky was another industrial center that rapidly emerged in the late nineteenth century as the result of large-scale promotional work. Promoters managed to attract “investors from throughout the United States and Europe, including over twenty million dollars of British capital.”¹⁰⁰ Deemed the “Magic City,” Middlesborough grew from a population of sixty families in 1886 to over 5,000 people in 1889. One of the largest English groups to invest in the city were led by Edgar and Frank Watts, of England’s prestigious Watts Steel and Iron Company in Great Britain. The Watts built two large coke fueled stacks between 1889 and 1891. By the middle of 1893 both stacks were blown in and producing pig iron suitable for conversion into basic open-hearth steel. The stacks employed seven Whitwell stoves fueled by Middlesborough coke to reduce red fossiliferous and brown hematite ores. The more desirable red fossiliferous ores would prove to be isolated and limited in concentration to a point that they could not profitably sustain the large coke furnaces built in southern Appalachia during this period.¹⁰¹

When the VIC&CC organized, beside the furnaces, foundries, and rail line, the company owned or controlled 125,000 acres of producing lands. At the time there

⁹⁹ *Annual Report of The Virginia Iron, Coal, and Coke Company*, (1905), 5.

¹⁰⁰ Eller, *Miners, Millhands, and Mountaineers*, 81.

¹⁰¹ Mann, “The Virginia, Iron, Coal, and Coke Company”, 50.

were five active mines and management would make it an immediate priority to improve existing mines and open new operations. Most of the ore properties controlled were directly adjacent to the existing furnaces. The same could be said of the company's limestone properties. In January 1899 the Virginia Iron, Coal, and Coke Company formally began operation under President George L. Carter's leadership. During 1899 and 1900, the prospect for a profitable iron conglomerate in southern Virginia seemed promising, but by 1901 the company verged on collapse.¹⁰²

Backed not only by their iron interests, but also the United States Navy's high demand for the company's Pocahontas coal, the VIC&CC moved quickly to continue expanding their business.¹⁰³ By May 1899, the group nearly completed a deal that would have expanded their capital by 50 percent to \$15,000,000. If completed, the plan would have added several significant properties to the Virginia Iron, Coal, and Coke Company. The additional properties would have included furnaces at Johnson City, Tennessee, the holdings of the Pulaski Iron Company (a sister company to the Dora Furnace Company), and the Camden Iron Works in Salem, Virginia. There is little evidence to suggest why this deal did not happen, but the company's shortage of cash and withheld loans can likely be suggested as a reason for its failure.

Expansion continued to be a primary objective of the VIC&CC into 1900. In February 1900, company president Carter announced plans for the construction of a new steel plant stating that,

¹⁰² "Receivers for Iron Concern," *New York Times*, February 8, 1901.

¹⁰³ "Not in the Steel Trust," *Washington Post*, June 11, 1899.

We feel very much encouraged. Business is excellent, and in a short time we shall start an additional steel plant at Middlesborough, Tenn. Much is being done to develop East Tennessee and Southwestern Virginia, and the large naval orders which will soon be placed by France and Germany must necessarily stimulate business.¹⁰⁴

Although VIC&CC management worked vigorously during the first years of operation to grow their business by expanding the syndicate's holdings and investing in a new steel plant, the high cost of transporting freight and several unforeseen events severely hampered the company's momentum.

The acquisition of land rights was often a tense if not hostile affair. On February 10, 1900 a lawsuit involving VIC&CC land agents came to a violent conclusion. John Wampler and Sam Ware, both VIC&CC land agents, fatally wounded William Jenkins, a prominent lawyer, in East Radford, Virginia over a law contest involving all three.¹⁰⁵ Aside from company employees murdering a lawyer, in March 1900 a large fire at Embreeville, Tennessee destroyed the foundry, machine shops, and blacksmith shops connected with the plants of the VIC&CC valued at \$60,000.¹⁰⁶ Only two months later during May a large fire destroyed \$100,000 of property at the VIC&CC's Toms Creek coal mines. Among the losses were the operation's coal disintegrator and washers.¹⁰⁷

Not only did the company face hurdles involving murder and costly fires, but transporting freight also proved more difficult than initially believed. Even though the VIC&CC owned the Virginia & Southwestern Railway and could cheaply ship its ores and coke to its furnaces, the company still had to rely almost exclusively on

¹⁰⁴ "Steel Plant for Tennessee," *New York Times*, February 14, 1900.

¹⁰⁵ "Lawsuit Ends in Bloodshed," *Washington Post*, February 11, 1900.

¹⁰⁶ "Losses By Fire," *New York Times*, March 14, 1900.

¹⁰⁷ "\$100,000 Fire in a Virginia Mine," *New York Times*, May 17, 1900.

water transport to ship its Pocahontas coal and pig iron to buyers. When the company was organized, it opened an office at Norfolk, Virginia to handle shipping affairs to points north and south. Much of the company's purchased coal and pig iron left Norfolk at Lambert's Point. Although the VIC&CC successfully negotiated an acceptable shipping price with Norfolk & Western Railway to move its coal and pig iron to Norfolk, the company found it exceedingly difficult to acquire water transportation once at Norfolk. Because the ocean route to North Carolina ports was among the most dangerous on the Atlantic Ocean, the VIC&CC's Norfolk agent put his support behind the expansion of the Dismal Swamp Canal in 1900 to secure a route that would be both cheaper and safer.¹⁰⁸

The VIC&CC also found an eager and dependable purchaser of its Pocahontas coal in the United States Navy. The Navy found the VIC&CC's Pocahontas coal to be the most desirable fuel for its vessels, but in the crucial first years of operation the company had difficulty in filling a Navy order to be delivered to Fort Caswell, North Carolina. As noted by the VIC&CC Resident Manager at Norfolk in a letter lobbying for the expansion of the Dismal Swamp Canal and shipping's logistical problems,

We have found it exceedingly difficult to make charters for small cargoes going south of Hatteras, owing to the extreme danger of going outside. There is considerable business that could be built up provided we could move coal in small cargoes....Our company had some experience along this line in the months of July and August in trying to fill an order for the Government at Fort Caswell.... [A]fter the business was accepted we found it absolutely impossible to secure transportation at any price, and we have been forced to handle this coal by rail, at a very great loss to us....At this time there are from 30,000 to 40,000 tons of coal going to the West Indies each month from here. We are inclined to think that a considerable amount of this tonnage might be diverted through this canal and handled at cheaper

¹⁰⁸ War Department, *Report of the Chief of Engineers. Part 2*, 57th Cong., 1st sess., 1901, 1528.

rate than we now have, with equally as good profits to the transportation companies.¹⁰⁹

Difficulties with shipping logistics and fire were not the VIC&CC's only problems. Although management reopened the Bristol Furnace during the later portion of 1900, the company shut down several of its ore mines and had limited access to some of the ore properties purchased by the company.¹¹⁰

Combined, these several problems put the company in a position that left it unable to meet the cost of improvements or provide adequate working capital. VIC&CC management "promptly borrowed \$700,000, for which it gave its serial notes secured by a junior mortgage given to the Morton Trust Company of New York."¹¹¹ This additional borrowing appears to have been what caused a divide between President Carter and the company's New York financiers. The additional debt and the issues facing the company indicated serious financial problems. Besides the company's fiscal challenges, president Carter's personality aggravated the situation: over the course of his career he had a tendency to turn friends into enemies, and his tenure at the head of the VIC&CC was no exception.¹¹² The board of directors controlling the VIC&CC came to view Carter's actions as reckless and the company's financial situation as desperate. They considered reorganization of the company, allowed the company to move into receivership, and began what

¹⁰⁹ "Not in the Steel Trust," *Washington Post*, June 11, 1899.

¹¹⁰ "Record Showing Properties Operated by the Virginia, Iron, Coal, & Coke Company," 12/31/1900, Virginia Iron, Coal, and Coke Company Records 1899-1969, McConnell Library, Radford, VA.

¹¹¹ "Virginia Iron, Coal and Coke Company: New York Curb Exchange Listing Application No. 1802," November 1, 1951, Virginia Iron, Coal, and Coke Company Records 1899-1969, McConnell Library, Radford, VA.

¹¹² Nelms, "George Lafayette Carter," 16; Lyon G. Tyler, LL.D., ed. *Men of Mark in Virginia, Ideals of American Life, A Collection of Biographies of Leading Men in the State* (Washington D.C.: Men Of Mark Publishing Company, 1907), 66.

amounted to a hostile takeover. A brief *New York Times* article detailed Carter's infuriation with the receivership, and his unsuccessful effort to resist it.¹¹³

When the VIC&CC defaulted on its quarterly interest payments, control of the VIC&CC was placed into the hands of receivers appointed by the United States District Court of western Virginia. Henry K. McHarg, a vice-president of the Manhattan Company, and Cornelius Shields of Bristol were both appointed receivers. According to Shields, "the receivership does not indicate a collapse, but will rather conserve the interests of all concerned."¹¹⁴ This infuriated President Carter and officers of the company who claimed (as reported by the *New York Times*) that,

Moore & Schley charged \$750,000 for financing, but also retained \$830,000 in bonds. When persistent demands were made for the refunding of the latter sum, it is said that Grant B. Schley, who controlled a majority of the board of seven Directors, caused the concern to be placed in the hands of receivers . . . Mr. Carter, having no faith in the receivers whom he regards as the friends of Moore & Schley, has applied to Judge Paul of the Federal Court of the Western District of Virginia to have the receivers removed. . . Other security holders have brought similar proceedings to those instituted by President Carter and asking that competent and impartial men be appointed as receivers in the place of Messrs. McHarg and Shields.¹¹⁵

Carter ultimately proved to be somewhat successful in his attempts to remove the receivers as Carter's close friend Judge A.A. Phlegar would ultimately be appointed as a receiver as well.¹¹⁶ Even though Carter was successful in ensuring his continued interests with the company, his influence was essentially done. He did receive some parting compensation "when the [VIC&CC] was sold, Carter received

¹¹³ "Wants Receivers Removed," *New York Times*, March 16, 1901.

¹¹⁴ "Receivers for Iron Concern," *New York Times*, February 8, 1901.

¹¹⁵ "Wants Receivers Removed," *New York Times*, March 16, 1901.

¹¹⁶ Tyler, ed., *Men of mark in Virginia*□, 66.

several hundred thousand dollars for his part in the business.”¹¹⁷ Carter was forced to resign as president of VIC&CC, as control went to receivers.

Carter’s career spent developing the coal fields of southern Appalachia was just beginning. After his separation from the VIC&CC Carter went on to lead development on the Carolina, Clinchfield, and Ohio Railroad linking the coal fields of east Kentucky, West Virginia, Virginia, and Tennessee with the textile mills of South Carolina. From the Clinchfield, Carter moved on to his Carter Coal Company before passing in 1936.¹¹⁸

Regardless of whether or not Carter’s leadership led to his disassociation with the VIC&CC, the insight offered by Benjamin L. Dulaney, showcases the highly competitive and unsure nature of these newly organized iron companies at the turn of the twentieth century. Dulaney, a promoter heavily involved in the organization of the VIC&CC and the V&SW, offered his first-hand experience with the VIC&CC to the sixty-third session of Congress (1913-15). The topic of discussion was the establishment of permanent seaboard coal distribution points at Norfolk, Virginia and Charleston, South Carolina. Dulaney had been intimately involved with the organization of the VIC&CC and the V&SW and understood the company’s situation. He argued that a small circle of financiers, including the company’s receiver and future president Henry K. McHarg, intentionally wrecked the VIC&CC in order to gain full control of the company. Dulaney disassociated with the VIC&CC, but remained active in the coal industry and at the time of his testimony was

¹¹⁷ Nelms, “George Lafayette Carter,” 16.

¹¹⁸ Nelms, “George Lafayette Carter,” 16-21.

responsible for a competing coal interest active in the Black Mountain coalfields of Virginia and Kentucky. As Dulaney stated in his testimony:

You know I had much to do with the organization of the Virginia Iron, Coal & Coke Co. and that I severed my connection *from* it after being thoroughly convinced that Henry K. McHarg, E. J. Berwind, Grant B. Schley, and associates had planned to wreck that company, and I believe afterwards wrecked it and as a result secured that complete control they now have....the Virginia Iron, Coal & Coke Co. was wrecked by practically this same circle of men; that one of the circle withheld about a million dollars which belonged to that company until a receivership had been forced and until after the securities of the company had been bought in by them or by their agents, after which the large sum was paid to the receivers, making the receivership no longer necessary; that both Mr. McHarg and Mr. Berwind were on the board of directors of the Virginia Iron, Coal & Coke Co. before the receivership and had knowledge of the fact that Grant B. Schley was withholding the large sum of money needed, and that they made no effort to collect the money until after the receivership.¹¹⁹

Despite the fact that Dulaney's testimony was primarily concerned with securing fair shipping rates for his Black Mountain coal interests to Charleston, South Carolina via the Southern Railway, his testimony supported claims made by President Carter in 1901 that the company had been unduly forced into receivership.

Under the direction of receivers McHarg and Phlegar, the company's finances were quickly righted; they avoided the participation of their labor force in the coal strike of 1902, and were able to announce plans for reorganization by August 1902.¹²⁰ Control of the property and business of the VIC&CC would be transferred from the receivers to company directors. Under the receivers multiple suits for foreclosure were filed, and with the reorganization these would be dismissed and the company's failed obligations would be restructured. As well as negotiating the

¹¹⁹ Senate Subcommittee of the Committee on Naval Affairs, *Transportation of Coal*, 63rd Cong., 3rd sess., 1915, 99.

¹²⁰ *New York Times*, June 10, 1902.

settlement of back interest accrued since January 1901, the plan would also allow for the financing of improvements to the Virginia & Southwestern Railway. With the plan for restructuring put into action stockholders elected receiver Henry K. McHarg as the president of the reorganized company.¹²¹ The production of pig iron and sale of coal were still the VIC&CC's primary objectives, but George Carter was no longer associated with the company and the new president Henry McHarg personally invested a great deal of his own money into the company.

The forces that created the conditions for the formation and subsequent reorganization of the Virginia Iron, Coal, and Coke Company reflect the colonial nature of the iron and coal industries in southern Appalachia. Although these industries were almost purely extractive in nature, the VIC&CC also does not reflect disenfranchised southern leadership in the face of northern industrialists. George L. Carter was perhaps the most successful iron master of his time in southern Appalachia. Practically all the iron enterprises in the region that were organized by Philadelphia and New York financiers during the 1880s failed when economic conditions worsened after 1893, while Carter's Dora Iron Company forged ahead. Carter's ambition led him to buy out the Crozer furnaces in Roanoke, which were among the region's most successful furnaces backed by northern capital. When Carter and Moore & Schley formed the VIC&CC, Carter eagerly tried to enter steel production in Tennessee and expand his company's holdings, but when several of the company's properties were discovered to be overvalued, unforeseen accidents incurred heavy costs, and internal disagreements all joined together the union

¹²¹ "Virginia Coal and Coke," *New York Times*, August 16, 1902.

between southern ironmaster and northern financier quickly disintegrated. Carter was as adept at coal and iron production as any, but his inexperience with managing such a large enterprise as the VIC&CC made it easy for Moore & Schley to exclude Carter in favor of Henry K. McHarg, who also personally vested himself in the company. McHarg's previous experience as the vice-president of a large bank and experience with the Louisville & Nashville Railroad all made him a much more proficient manager than Carter. McHarg brought a degree of organization and personal finance to the company that the VIC&CC was lacking under Carter's management.

Despite the questionable actions of management and the Board of Directors during the VIC&CC's first years, the company was able to successfully continue operations well into the twentieth century as management increasingly focused its interests on developing the company's coal operations, especially when it became apparent that iron ore deposits were not suitable for the new steel industry. As the entire region would come to be dominated by coal, Henry McHarg and the VIC&CC served as one of the region's largest players in making this transition to coal a reality.

Chapter Three – Virginia Iron Coal and Coke Company 1901 – 1911

For the American iron and steel industry, the twentieth century opened on an extremely high note. During 1899 the price of pig iron doubled in price on markets across the country as domestic manufacturing increased and export orders poured in. Wages too were at an all-time high, and unsold stockpiles of pig iron were greatly reduced. American furnaces worked at maximum capacity to keep up with orders. There was little threat from imported iron and steel because minimal foreign stockpiles of pig iron meant that there was little chance that the English could flood American markets with cheaper English products.¹²² Aside from high market prices, busy furnaces, and high wages, a new era in corporate management and ownership began in 1899 as several huge corporations were organized to consolidate the production process into vertically integrated systems of production. These new corporate entities were organized under ideal market conditions and their performance over time remained to be known. This gave industry analysts reason for concern. As noted by James C. Bayles, former editor of *The Iron Age*, a leading industry trade journal, these consolidations “are not yet so well established as to make them quite independent of Wall Street, and it is yet to be shown that they have in every case secured the kind of talent in their management which is capable of handling such vast and varied interests.”¹²³

One of the first new corporations organized in 1899 was the Virginia, Iron, Coal, and Coke Company (VIC&CC). George L. Carter, with the financial backing of the Wall Street firm Moore and Schley, organized the VIC&CC after nearly three

¹²² “The Iron Outlook at Home and Abroad,” *New York Times*, April 29, 1900.

¹²³ “The Iron Outlook at Home and Abroad,” *New York Times*, April 29, 1900.

decades of capital investment and industrial modernization of the iron industry in southern Appalachia. When organized, pig iron and coke production were the VIC&CC's primary objectives, but the company's iron interests faltered, their focus shifted to developing their extensive coal properties for coal production. In the case of the VIC&CC the hesitancy expressed by Bayles would prove to be justified and in January 1901 the company fell into the hands of receivers after only two years of operation. During the receivership, the company underwent a complete financial and management restructuring before the dismissal of the receivers on January 1, 1903. It is the subject of this chapter to detail the operations of the reorganized VIC&CC.

The reorganized VIC&CC failed to remain a competitive producer of pig iron for several reasons. A large bonded debt financially limited the company even during the most prosperous years. Management also struggled with the high costs of labor while continuing to improve and maintain the company's plants and equipment. Although noted as being adequately managed, the company was also described as being "capable of improvement along modern scientific lines."¹²⁴ Although these reasons were all severe hurdles to the company's iron holdings, the most crippling challenge the company faced was plainly a dwindling supply of high quality ore. This necessitated that the company begin purchasing large quantities of ore on the open market rather than relying on their own ore supply. By purchasing on the open market the company had to compete with other buyers, pay a mark up,

¹²⁴ Arthur Young & Company, "Virginia Iron, Coal, and Coke Company: Report on Examination of Financial Condition and Operations for the 13½ Years Ended June 30, 1916," (1916), 13, Virginia Iron, Coal, and Coke Company Records 1899-1969, McConnell Library, Radford, VA.

and deal with increased shipping rates. Such purchases significantly increased the cost of the essential raw material in iron production. In addition, this put their interests at a severe disadvantage against the better, less expensive pig irons being produced in the Great Lakes regions and in Alabama.¹²⁵

Even though the company struggled to survive as a producer of pig iron, management took several measures in the decades following the company's restructuring to retain a degree of profitability. Beginning during the receivership, their primary objective was to reduce the stockholder's bonded debt so normal operation of the company could resume.¹²⁶ This policy continued long after the receivership ended, and an auditing firm's 1916 independent study of the company's financial standing suggests that this policy was pursued to a point of "impairing the working capital required to carry on the business . . ." ¹²⁷ Another consistent measure was the sale of property and mineral lands. Several furnaces were quickly sold or shut down and scrapped as the company concentrated their pig iron production into a few furnaces. As well as furnaces and mineral lands, the company subsidized the Virginia Land Development Company to handle the improvement and sale of lots and dwellings the company owned in the small cities and towns in the region.¹²⁸ The subsidiary company to the VIC&CC was an active developer in cities such as Radford during the twentieth century, and further study

¹²⁵ VIC&CC: Report on Examination of Financial Condition, (1916), 12,13, VIC&CC Company Records.

¹²⁶ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1921), 5-6.

¹²⁷ VIC&CC: Report on Examination of Financial Condition, (1916), 8, VIC&CC Company Records.

¹²⁸ W.L. Brugh to Mr. G.F. Willman, April 11, 1969, Virginia Iron, Coal, and Coke Company Records 1899-1969, McConnell Library, Radford, VA.

of the Virginia Land Development Company could greatly enrich historical interpretations of southwest Virginia.

From the company's outset in 1899, coal offered strong potential. Improving the company's coal mining, refining, and transport capacities drew a considerable amount of management's resources and attention. Aside from coal orders from the United States Navy during the company's first years of operation, the VIC&CC sold their coal primarily to railroads. By 1916 their buyers were the Boston & Maine Railroad, Southern Railway, and Norfolk & Western Railway.¹²⁹ Along with coal sales, management sought to purchase securities "from time to time as investment."¹³⁰ These came in the form of purchasing their own VIC&CC first mortgage bonds, Virginia & Southwestern Railway first mortgage bonds, and heavy investment in the American and Canadian war efforts during World War I via the purchase of Liberty and Victory Bonds.¹³¹ Keeping in mind the VIC&CC's basic management strategy was to reduce the company's bonded indebtedness by means of consolidating pig iron production, to expand the company's coal interests, to sell unnecessary facilities and land, and occasionally to invest in securities.

Under the announced reorganization plans in 1903, control of the property and business of the VIC&CC would be transferred from the receivers to company directors. The company's failed obligations would be restructured. As well as negotiating the settlement of back interest accrued since January 1901, the plan would also allow for the financing of improvements to the Virginia & Southwestern

¹²⁹ VIC&CC: Report on Examination of Financial Condition, 1916, 14, VIC&CC Company Records.

¹³⁰ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1921), 6.

¹³¹ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1921), 6.

Railway as well as developing profitable sections of the company. With the plan for restructuring put into action, stockholders elected receiver Henry K. McHarg as the new company president.¹³²

As co-receivers McHarg and A.A. Phlegar (who separated himself from the company shortly after reorganization) were able to take advantage of improving market conditions for pig iron during 1901 and 1902, and that momentum carried into the first half of 1903.¹³³ This period was one of the few times that the company was able to record a net profit from practically every sector of its enterprise with its coke ovens, grist mills, Crescent Horseshoe Works, and Dora Foundry (which produced tram car wheels) all recording profits. The only loss during the first half of 1903 came from the company's saw mill, although this was the only period this sector recorded a loss. In the six months following reorganization, the company recorded a total net profit of \$424,442.29. The company's furnaces were in full blast at this time with an average selling price of \$17.51/ton for pig iron and \$26.35/ton for charcoal iron. With these high selling prices the company's furnaces recorded a profit of \$713,416.78 after selling \$2,232, 524.47 of iron.¹³⁴ During the same period coal recorded a profit of \$36,456.35 after selling \$378,181.52 and costing \$0.64/ton to produce.¹³⁵ The first few years of reorganization seemed to indicate that the reorganized company could recover from its tumultuous beginnings, as it made

¹³² "Virginia Coal and Coke", *New York Times*, August 16, 1902.

¹³³ Until 1918 the VIC&CC recorded their fiscal years from June 30 to June 30. Information for 1903 pertains only to the 6 months from January 1, 1903 to June 30, 1903. Beginning in 1918 the company began recording their fiscal years from January 1 to December 31.

¹³⁴ VIC&CC: Report on Examination of Financial Condition, (1916), Exhibit C, D, and 32, VIC&CC Company Records.

¹³⁵ VIC&CC: Report on Examination of Financial Condition, (1916), Exhibit F, VIC&CC Company Records.

progress toward paying off its debt after ending receivership. With the exception of 1904, this momentum carried into 1907 when the near collapse of the VIC&CC's backers, Moore & Schley, helped fuel an economic downturn that the company would never fully recover from.

Between June 30, 1903 and June 30, 1904, the VIC&CC incurred a considerable loss, and during fiscal year (FY) 1904 the company recorded a net loss of \$351,439.66. Although profits from the company's furnaces fell to only \$177,330.36 and the selling price for pig and charcoal iron dropped to \$13.17/ton and \$23.45/ton respectively, the company produced more pig and charcoal iron with less expenses than it had in FY1903. Coal did see significant gains during FY1904 and recorded a profit of \$125,984.58 after mining 996,362 tons at a cost of \$0.68/ton. A majority of the company's loss during FY1904 came from bond interest on VIC&CC bonds and a rare, but considerable, depreciation on stocks owned in other companies.¹³⁶ Although FY1904 saw a huge net loss, the following three years would be a profitable period.

Even though the VIC&CC recorded a small profit of \$79,458.87 during FY1905, the year proved to be an unsatisfactory one.¹³⁷ Poor market prices and even bad weather kept the company from selling any iron until October 1904. As noted by President Henry K. McHarg in his opening address to the stockholders, market prices during the summer of 1904 for the pig iron produced by the company did not cover the costs of production. As a result, the company only kept its Dora

¹³⁶ VIC&CC: Report on Examination of Financial Condition, (1916), Exhibit C, F, VIC&CC Company Records.

¹³⁷ VIC&CC: Report on Examination of Financial Condition, (1916), Exhibit C, VIC&CC Company Records.

furnace at blast during this time, only to have heavy rains during the month of October flood the facility's stock house and shut down the furnace for several weeks. Limited by these untimely events, VIC&CC pig iron and coke production fell significantly while coal production remained steady. Pig iron production fell 12.3 percent from 1904 to 143,305 total tons; coke fell a similar 11.4 percent to 290,832 total tons. Coal production remained constant from 1904 and actually saw a slight increase of 2,000 tons from the previous year and produced a total of 998,362 tons.¹³⁸

Although poor market prices for pig iron hampered the company, and the prices for coal and coke were no better, not all news was bad. The company was able to sell or separate from properties that had not been profitable, improve the facilities which were, and even expand their holdings of ore properties. The Cranberry Furnace Company that had been leasing the Carnegie furnace exercised their option to buy the property from the company for \$70,000. The VIC&CC also separated from The Radford Pipe Works, which was sold for \$160,000, and the buyers of the Embreville property were able to settle their debt with the company. The monies received for these properties would be applied to retiring the first mortgage bonds from the Carter Coal and Iron Company. Company management was also able to settle a longstanding conflict with the Norfolk & Western Railroad that finally enabled the company's Virginia & Southwestern trains to move coal and coke from their Toms Creek facility to markets to the south and west via the Louisville and Nashville Railway. With the sale of these facilities and improvements

¹³⁸ VIC&CC: Report on Examination of Financial Condition, (1916), Schedule II, VIC&CC Company Records.

to others, the increase in ore properties, and easily accessible coal and improved rail links beyond the region, the Virginia Iron, Coal, and Coke Company seemed close to separating itself from its tumultuous beginnings and period of operation under receivers.¹³⁹

The fiscal year of 1906 showed a marked improvement over the previous two years. The company recorded a total net profit of \$147,274.03 as both pig iron and coal sales expanded. The company's furnaces drew a profit of \$287,400.42, a 3 percent increase from the previous year, as market prices for pig iron rose from over \$1/ton to \$14.06/ton and the company shipped 224,149 tons of pig iron for the year, a 14.3 percent increase from 1905. Charcoal iron also saw an increased selling price, although the company only shipped 1,573 tons. On average, charcoal iron sold for double the price per ton that pig iron did, but the VIC&CC never shipped more than 3,179 tons in a year between 1903-1915 when data is available.

Typically the company shipped less than 2,000 tons of charcoal iron in a year and that number steadily declined into 1915, and most of what they did produce was consumed at their own Crescent Horseshoe Iron Works facility.¹⁴⁰ During FY1906 profits from coal production grew 32.3 percent to \$185,978.93 after 1,264,564 tons were extracted at an average cost of \$0.60/ton. Coke shipments reached a record high during the year as 411,708 tons were shipped at a profit of \$69,868.24.¹⁴¹ In

¹³⁹ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke* (Roanoke, VA: 1905), 5.

¹⁴⁰ VIC&CC: Report on Examination of Financial Condition (1916), Schedule II, VIC&CC Company Records.

¹⁴¹ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, G, and 30, VIC&CC Company Records.

1906 President McHarg reached a deal with the Southern Railway Company that was advantageous to both corporations.

The VIC&CC's railroad, the Virginia & Southwestern, connected its coal and ore holdings in southwest Virginia and eastern Tennessee to its furnaces in Bristol and the larger rail networks of the region. The company invested heavily in improving this line from the outset of reorganization, and coal sales to the south were growing at a rapid rate and shipped via the Southern, McHarg found that the Southern Railway system was greatly interested in purchasing his company's line. As McHarg stated in his 1907 letter to company stockholders, "the amount of coal that we have been able to dispose of in that territory has been only limited by our ability to get cars for its transportation, and miners in our mines to produce it."¹⁴² When the deal was finalized the Virginia & Southwestern Railway was sold to the Southern at a profit of \$1,004,500.¹⁴³ Securing affordable freight rates was essential to the survival of coal producers and the VIC&CC managed to obtain affordable access to Charleston, South Carolina, and when the sale of the V&SW was completed, "Mr. McHarg, as bondholder of the road, was continued as a director of the Virginia & Southwestern, and remained such up until the last annual meeting of the company."¹⁴⁴ By remaining as both the director of the line now owned by the Southern Railway and the President of the VIC&CC it is plausible that McHarg managed to manipulate freight rates that were advantageous to the VIC&CC.

¹⁴² Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1907), 4.

¹⁴³ VIC&CC: Report on Examination of Financial Condition (1916), 10, VIC&CC Company Records.

¹⁴⁴ Senate Subcommittee of the Committee on Naval Affairs, *Transportation of Coal*, 63rd Cong., 3rd sess., 1915, 881.

Besides now having access to an Atlantic port without having to switch lines, the sale of the small railroad also removed the burdensome costs of maintaining a rail line, locomotive and car fleet from the company's balance sheet.

Fiscal year 1907 proved to be the company's most successful in the four years since the reorganization took effect in January 1903. The agreement with Norfolk and Western Railroad noted in the 1905 report continued to serve the company well as the movement of coal from their Toms Creek facility was only limited by the number of cars VIC&CC owned. Also during 1907 the Southern Railway Corporation paid the VIC&CC 25 percent of the amount owed and remained on schedule to meet the terms of the sale agreed upon. In addition, iron production for the year was up, and in 1907 the company produced 202,453 tons of pig iron entirely from local sources of ore. The total tonnage of coal mined also increased from 1905 to 1,166,445 tons, an increase of 14 percent, and the company managed to increase its coke production to 394,791 tons, a slight decrease of 1.5 percent from the previous year as iron production also fell slightly.¹⁴⁵

One interesting note from 1907 regarded labor (which is largely absent from the *Annual Reports*), the cost of production, and market prices. Henry McHarg noted incredible difficulties in acquiring the labor necessary to operate the company's mines, which could have been a comment on increasing mechanization, modernizing the company. McHarg noted:

If it were not for the steam shovels which your management has bought during the last two or three years it would have been impossible for us to have obtained enough ore from our mines to keep our furnaces going. This labor situation has added to the cost of

¹⁴⁵ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1907), 4.

production of iron very materially, but owing to the quite rapid advance in the prices this was more than counterbalanced by the figures received for iron sold.¹⁴⁶

Along with good prices for pig iron and good coal and coke markets, 1907 proved to be another successful year in cancelling the bonds owed on the company's first mortgage as well as the Carter and Iron Company bonds. The company was able to cancel, or pay back \$766,000 worth of outstanding bonds with the monies made from iron, coal, and coke. Management also increased their ore property holdings with the purchase of 20,000 acres of the "Scott" properties in Tennessee, which President McHarg believed would supply their Bristol furnace for many years to come. With all of this accomplished in 1907, the Virginia Iron, Coal, and Coke Company continued to recover from its disastrous beginnings.¹⁴⁷

Consistency certainly did not define the iron markets of the early 20th century, and an economic recession in late 1907 hit the iron and steel industry and its related businesses particularly hard. A feared nation-wide shortage of money, the failure of a prominent New York City bank, and the near collapse of an over-extended brokerage house that had invested heavily in southern industries in the fall of 1907 had set the tone for the 1908 financial year. Only the timely intervention of J.P. Morgan and other bankers prevented a near failure of the banking system, but in the wake of the financial crisis, a number of companies failed

¹⁴⁶ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1907), 4.

¹⁴⁷ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1907), 4,5.

and production slowed considerably. The economic recession clearly affected the VIC&CC.¹⁴⁸

For the VIC&CC in 1908, only the Bristol and Roanoke furnaces operated, while newly improved furnaces, such as the one at Radford, sat idle. The company's ore mines were shut down for nearly six months and when mining resumed in February 1908, the production of pig iron would outpace its sales. By the end of the year the company had over 100,000 tons of raw iron ore simply stockpiled at the company's various furnaces. According to President McHarg, the company's coal business suffered from the same poor conditions; its coalmines were closed during much of the same time as the ore mines. While the first half of 1908 saw decreased activity at the company's facilities, the VIC&CC did increase its land holdings. This included purchasing 1,000 acres of iron ore properties in Cartersville, Georgia and a property in Ashe County, North Carolina containing a vein of high grade ore as the development of the Scott properties purchased in 1907 were yielding positive results.¹⁴⁹

As a result of this sudden business slowdown the fiscal year 1908 proved to largely be a disastrous one. Total production numbers for all three of the company's main products - coal, coke, and iron - were down for the year. The company posted a net loss of \$694,303.30 when the year previous it posted an impressive \$655,686.91 net profit. Pig iron shipments plummeted 65.1 percent from 221,599

¹⁴⁸ Ironically, the brokerage firm of Moore and Schley, which had invested heavily in the VIC&CC, was overextended its investments and on the verge of collapse. See Robert Burner and Sean Carr, *The Panic of 1907* (Hoboken, NJ: John Wiley & Sons, 2007).

¹⁴⁹ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1908), 2-8.

tons during FY1907 to a mere 77,316 tons during FY1908. Coke production suffered a 33.8 percent decline from FY1907 to FY1908, and even though the company had recently opened two new leased coalmines at Linden and Marion, coal production fell a relatively small 17 percent from FY1907 to 968,131 tons at a net cost of \$0.69/ton during FY1908.¹⁵⁰ Even though the company's production suffered a huge decline during the year, shortly after the close of the 1908 fiscal year, the Southern Railway also made its final payment on the Virginia & Southwestern railway stock, which the VIC&CC used to increase its cash holdings in bank to \$250,000.¹⁵¹

As was the case in 1907, the company's production of iron continued to outpace its sales and at the close of FY1908, 70,000 tons of pig iron sat unsold at the company's facilities. Although this was the case, President McHarg noted that "this is all paid for and no money has been borrowed on it and as it does not deteriorate and is piled on our own property, the only loss by holding same is the question of interest on the money."¹⁵² High production costs, a large number of producers, and the speculative expansion of the nation's rail network all meant that over production was common in the period's national iron and steel industry, and as noted in the 1908 Annual Report, national market prices had plummeted by ten dollars a ton and production had decreased from 1907 by almost 50 percent. Although the company's iron interests were not panning out as had been hoped at the company's outset, the production of coal was proving to be hugely profitable.

¹⁵⁰ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, 30, and 32, VIC&CC Company Records.

¹⁵¹ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1908), 3.

¹⁵² *Annual Report of The Virginia Iron, Coal, and Coke Company* (1908), 4.

McHarg noted the VIC&CC's coal holdings as having "enhanced very much in value during the time mentioned [Jan. 1903- July 1908] and, my own personal opinion is, that . . . what we have now is worth from 25% to 33.33% more than when the Company was reorganized . . ." ¹⁵³

In 1903, when the company was reorganized it was saddled with approximately \$7,744,000 in liabilities from outstanding accounts, bonds and bond interest, unpaid payrolls, vouchers, and depreciation in land values caused by mining. In the five years since the reorganization, VIC&CC management had remarkably reduced that number by over 50 percent, and in 1908 had only \$3,777,000 in liabilities ahead of the company's capital stock. Despite poor markets for the sale of pig iron, the Virginia Iron, Coal, and Coke Company was making rapid progress in improving the company's financial footing. ¹⁵⁴ The Panic of 1907 had set back the company's continued efforts to reduce the overall debt and remove receivership.

McHarg's ever-optimistic outlook for improving iron markets once again fell short during the financial year ending June 30, 1909. The company relocated its headquarters to Roanoke, Virginia and although Virginia iron continued to sell at practically its cost of production, the VIC&CC continued to mine iron ore and smelt pig iron throughout the year. By the year's close it had stockpiled 139,486 tons of ore at their furnaces. With the poor markets, VIC&CC management operated only two of its furnaces and by year's end had produced 119,659 tons of coke iron and 3,899 tons of charcoal iron, but only 25,692 tons were actually sold. Besides the

¹⁵³ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1908), 5.

¹⁵⁴ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1908), 2-5.

company's large stockpiles of raw ore, 157,594 tons of pig iron now accompanied it. In addition to poor sales, the company was still unable to reach by rail valuable ore properties it had purchased in North Carolina, while several of their oldest ore mines were worked out. Furthermore, fiscal year 1909 also proved to be the first year that the company was unable to pay back a substantial amount of bonds remaining from the company's reorganization. Management was pleased, however, with the results of improvements made at their Radford furnace which they believed to now be the most efficient furnace in the state and competitive with Birmingham iron prices.¹⁵⁵ Despite the gloomy iron market and the economic stagnation in the aftermath of the economic recession, the company seemed poised to return to profitability once the economy improved.

The momentum gained in the national iron market during the summer of 1909 proved to be short lived. President McHarg noted that after November 1909 sales began to decrease along with the market prices for pig iron, and prices continued falling into 1910. Although the year was unsatisfactory on the whole, the company was able to reduce its stockpiles of finished coke and charcoal irons to approximately 148,134 tons. Gains were also made regarding improvements to furnaces and the extension of rail lines to ore properties that had previously been unreachable for mineral extraction. The opening of these new lands reduced the cost of mining iron and negated the increased mining costs gained in 1909, again indicating that the company was seemingly prepared to make a profit in iron production. The company's coal interests continued to be the most profitable aspect

¹⁵⁵ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1909), 5.

of the company, and in 1910, 1,128,327 tons of coal was mined, an increase of 35.6 percent over from the previous year, and coke production increased 19.5 from the previous year to 275,768 tons. It seems that in 1910 VIC&CC management were beginning to turn more of their attention to their coal interests as McHarg noted in his report:

. . .this Company has very large and valuable holdings of coal lands, which, if retained and developed as the demand for coal increases, must, in the future, become extremely valuable.¹⁵⁶

Aside from their coal and iron interests, the company was again only able to purchase a small amount of bonds, and the outlook for 1911 was certainly not optimistic.¹⁵⁷ McHarg had continued to try making the company a profitable producer of pig iron, but as the first decade of the twentieth century came to a close, the likelihood of this ever happening was slowly becoming evident.

McHarg's views about the shift in company focus would finally prove to be correct as the company continued to struggle in the years following the economic recession. By the end of 1911 the company's iron interests continued to slump while coal production continued to expand. This year would also prove to be the last that the VIC&CC operated under Henry McHarg. Demand for iron remained low, while the company continued to produce pig iron at two furnaces and spend liberally on improvements to the company's facilities. By year's end their stockpiles of iron had increased to 187,611 tons from 148,134 tons in 1910, an increase of 39,477 tons, or 26.6 percent. The company's mines increased production by 19.7

¹⁵⁶ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1910), 4,5.

¹⁵⁷ *Annual Report of The Virginia Iron, Coal, and Coke Company* (1910), 3-5.

percent to 1,404,638 tons of coal in FY1911, while coke production fell 17.9 percent to 226,379 tons as the company shut down its Inman coke ovens during the final year of McHarg's leadership.¹⁵⁸ Coal was the one significant source of income during the final two years of McHarg's tenure and netted the company \$120,086.72 in FY1910 and \$226,698.00 in FY1911.¹⁵⁹

Henry McHarg had been with the Virginia Iron, Coal, and Coke Company since his appointment as a receiver by the United States Federal Court in early 1901. Under his leadership, the company had made great strides towards recovering from its disastrous beginnings. In his ten years of leadership, he greatly reduced the company's bonded debt and modernized many of the company's furnaces. But between increases in the company's coal land holdings and the rapid increase in market prices for coal, by McHarg's estimate, the VIC&CC coal interests had doubled in value during his decade of leadership. When McHarg took the helm in 1903, coal netted the company a meager \$36,456.35 and this annual profit from coal had grown steadily and by McHarg's departure was bringing in over a quarter million dollars a year.¹⁶⁰ The inverse can be said for iron production during McHarg's tenure. During FY1904, the first full year of McHarg's tenure, the VIC&CC's iron furnaces posted a profit of \$177,330.36. Although that number fluctuated over time by FY1911, the company's furnaces only recorded \$87,006.76 in profit, roughly half

¹⁵⁸ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1911), 4.

¹⁵⁹ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, VIC&CC Company Records.

¹⁶⁰ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, VIC&CC Company Records.

of what it had netted in 1904.¹⁶¹ While much of McHarg's tenure focused on iron production, he was perceptive enough to see that the company was no longer competitive in this capacity and was able to begin developing the vast coal holdings.

During McHarg's tenure he significantly reduced the company's bonded debt. When the reorganized company began it had an outstanding debt of \$7,747,000 and by the end of McHarg's tenure he had reduced this by \$2,459,500, or 31.75 percent. This was a fairly remarkable accomplishment considering the business slump of 1907-1908. McHarg reduced the debt in a number of ways. The company opened three new coal mines in southwest Virginia and generally expanded mining operations, negotiated close ties and affordable freight rates with the Louisville and Nashville, Norfolk and Western, and Southern railways to many markets outside the region. McHarg also consolidated iron production into the Radford, Crozier, Bristol, and Dora furnaces, sold several furnaces in the process, invested heavily in new ore properties and mining equipment. As McHarg claimed in his final address to stockholders "it would take a smart man three years to become fully acquainted with [the company's] affairs."¹⁶² After a decade at the helm of the VIC&CC McHarg nominated the VIC&CC's Vice President and General Manager, John B. Newton, as the next company president. Aside from his long tenure with the company, Newton had worked alongside McHarg since he was associated with the Atlanta, Knoxville and Northern Railway that became part of the Louisville and Nashville Railway. To replace Newton as company Vice President and General Manager, McHarg

¹⁶¹ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, VIC&CC Company Records.

¹⁶² *Annual Report of The Virginia Iron, Coal, and Coke Company* (1911), 5,6.

nominated his son, Henry K. McHarg, Jr., who had worked as a furnace manager in Radford for eight years.¹⁶³ It was believed that these two men, with their long association with the company and its practices, would lead the company toward greater profitability in the coming years because they were the most intimately familiar with the VIC&CC's business.

The years following McHarg's departure would continue to see a decline in iron production, and with the exception of the American involvement in World War I, iron and coke production dwindled until it completely ceased during the 1920s. Management was able to successfully develop their coal properties for several decades, but the VIC&CC's iron production had peaked during the first decade of the twentieth century. During this decade the speculative and highly positive tone that accompanied the expansion of southern Appalachia's iron industry during the final two decades of the nineteenth century began to fade. As the twentieth century rolled on coal's rise helped to rapidly disassociate iron production with southern Appalachia.

¹⁶³ Harold Mann, "The Virginia, Iron, Coal, and Coke Company" (paper presented at New River Symposium, Wytheville, VA, April 10-12, 1986), 51.

Chapter Four – Virginia Iron, Coal, and Coke Company 1912 – 1920s

After Henry McHarg Sr.'s departure from the Virginia Iron, Coal, and Coke Company (VIC&CC) John Newton led the company's continued transformation from a producer of pig iron to a provider of coal. While the company's ore supply was failing, it was hoped that the new management team would be able to successfully manage its iron department and produce results that could accommodate its coal department. The continued emphasis on iron led the new management team to try producing iron by purchasing ore on the open market. This method was not sustainable and aside from a huge increase in production during World War I the variables for the failure of the company's iron department were in place by 1912. Chapter Four tracks the final decade of the VIC&CC's iron production as coal came to dominate the company's business model.

Despite the work of VIC&CC management in the years before 1912, several factors worked against the company and its iron interests. One of the most financially burdensome of these problems was the bonded debt of the company. Henry McHarg himself had loaned significant amounts to the company to provide working capital, and in 1916 the VIC&CC still owed him \$1,150,000. As noted by the 1916 *Report on Examination of Financial Condition*, "the wisdom of this method of financing is plainly open to criticism, as it changed the Company's liability from a long term obligation (the bonds being due only in 1949) to a demand obligation."¹⁶⁴ Because much of the company's income was immediately put towards paying down

¹⁶⁴ Arthur Young & Company, "Virginia Iron, Coal, and Coke Company: Report on Examination of Financial Condition and Operations for the 13½ Years Ended June 30, 1916" (1916), 8, Virginia Iron, Coal, and Coke Company Records 1899-1969, McConnell Library, Radford, VA.

its significant debt, the company's cash supply to improve its facilities and purchase new properties was constantly limited. This allowed limited room for the company to improve itself in any manner beyond reducing its debt. Another problem facing management was the diminishing productivity of the company's iron ore mines. As noted in the same report, "The chief reason for the steady losses incurred by the Company of late years is the relatively high cost of producing pig iron as against the price received for it."¹⁶⁵ The ore deposits that were sold as being rich and abundant a few short years ago were proving to be limited in quality and quantity. The company's few open pit mines were being exhausted and the company was forced to mine underground; a costly operation that often did not produce a quality product. By seeking ores on the open market the company was able to acquire quality ore, but by purchasing their ore while also paying for leases on inactive or exhausted ore properties the company's iron department consistently lost money.

Until 1911, the company's mines produced around 300,000 tons of ore per year for less than a \$1.70/ton. Iron ore production dropped from 294,427 tons in FY 1911 to 204,383 tons in FY1912, a decline of nearly 33 percent. The cost per ton jumped from \$1.58/ton in FY1911 to \$1.76 in FY1912. By 1916 the VIC&CC barely mined 100,000 tons/year at their mines and the production cost per ton had risen to over \$2.16/ton. This was barely one third of what they had been only a few short years ago while costing approximately 25 percent more. The policy of purchasing supplemental ores from the open market meant that the company had to ship these ores to their furnaces and compete with other pig iron producers for the best price,

¹⁶⁵ VIC&CC: Report on Examination of Financial Condition (1916), 10, VIC&CC Company Records.

which only drove their final production costs up. Even though management invested heavily in modernizing their equipment, the exhaustion of open pit mines and limited quality of ores only exacerbated the problem.¹⁶⁶ Between the company's efforts to reduce their bonded debt and the increasingly high cost of producing pig iron, the VIC&CC made less and less pig iron.

Henry McHarg's departure from the company seemed to signal the decline of pig iron production as John Newton assumed control. During the final year of McHarg's tenure, the company posted a loss of \$276,143.53, and the first year of Newton's leadership, the company posted a net loss of \$385,857.97. Pig iron production fell 33.4 percent from the previous year to 79,431 tons, although the company did manage to reduce its pig iron stockpiles by 23,785.25 tons and shipped a total of 103,216.25 tons of pig iron during FY1912. The average selling price for pig iron dropped approximately \$1.50/ton, which was well below the cost of production in that year. The company continued to produce its own coke and would continue during the company's life as an iron producer. Largely due to pig iron's drop in selling price the VIC&CC's furnaces posted a loss of \$29,094.91 for FY1912. This signified the continuing decline of the company's iron department as the company's ore cost continued to rise. Only the year previous the company had managed to net \$87,006.76 from its iron furnaces. While their overall production

¹⁶⁶ VIC&CC: Report on Examination of Financial Condition (1916), 12, Schedule II, VIC&CC Company Records.

for the year had fallen by 33 percent, the total cost of their iron ore only fell 19 percent, which signified the growing cost of company's ore.¹⁶⁷

While the VIC&CC's pig iron production numbers for FY1912 were dismal, coal production showed an increase for the year. The amount of coal mined increased by 11.3 percent from FY1911, and the company's five operating coalmines were in full swing during the year. During FY1912 coal netted the company \$308,419.08 profit, a dramatic 36 percent increase from the previous years.¹⁶⁸ This increase in profit and the growing demand for coal, led management to continue pouring money into coal production and turn away from iron production.

Even though the fiscal year of 1913 showed a considerable profit from both its iron and coal departments the company still posted a loss for the year. This was largely due to the failure of a prospective iron ore property. Although the company posted a net loss of \$190,392.32 for FY1913, agents did manage to book sales for 230,000 tons of iron during the market jump in the summer of 1912. This allowed the company to keep its Radford and Roanoke blast furnaces in operation throughout FY1913 and to reduce its large pig iron stockpiles by over 100,000 tons to only 60,000 tons by the summer of 1913. During the year the company's furnaces produced 133,347 tons of pig iron for a total profit of \$185,827.75. Coal also posted a considerable profit during 1913 and profits increased 15.3 percent from the previous year to \$355,655.04.¹⁶⁹ Even though coal and iron both netted the

¹⁶⁷ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, Schedule II, VIC&CC Company Records.

¹⁶⁸ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, Schedule II, VIC&CC Company Records.

¹⁶⁹ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, Schedule II, VIC&CC Company Records.

company considerable profits during FY1913 the company still posted a considerable loss for the year. Aside from the heavy interest payments that the company paid on its outstanding debt every year, the VIC&CC posted a considerable loss of \$143,642.62 on its additions and improvements made at its Potts Valley iron ore lease in the two rural Virginia counties of Craig and Giles.¹⁷⁰

Purchased early in the McHarg tenure, the Potts Valley lease held iron ore deposits and the company began the initial steps toward mining the ore; several structures were built and a proposed mining site was developed. The only access to the Potts Valley lands was along a proposed branch of the Norfolk & Western Railway, but before the rail line reached the mining site, the railroad company abandoned these iron prospects. Instead the Norfolk & Western sought to exploit the Potts Valley's rich timber stands. According to historian Will Sarvis, the Norfolk and Western took this course of action because the Great Lakes iron ore industry held "more advanced technology and better freight rates" for shipping iron ore.¹⁷¹ The VIC&CC was able only to pay royalties on the Potts Valley lands since they leased the property and invested considerably in building facilities for their miners and ore storage before the Norfolk & Western ever bought iron ore from the company.¹⁷² This cost the VIC&CC considerably and was a prime example of how the iron ores of the Great Lakes slowly overshadowed the entire iron industry of Virginia and Tennessee. Although FY1913 saw increased coal and pig iron

¹⁷⁰ VIC&CC: Report on Examination of Financial Condition (1916), Exhibit C, VIC&CC Company Records.

¹⁷¹ William Sarvis, "The Potts Valley Branch Railroad and Tri-State Incline Lumber Operation in West Virginia and Virginia," *West Virginia History* 54 (1995), 42-58.

¹⁷² Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1907), 5.

production for the VIC&CC, the year was still a loss for iron as evidenced by the termination of the Potts Valley lease.

The VIC&CC's trend of diminishing pig iron production as coal production expanded continued into fiscal year 1914. For the year, the company posted a total net loss of \$146,712.71. But the company also began to reduce its iron manufacturing. The company put one of its two furnaces in Roanoke out of blast, leaving only its furnace at Radford and charcoal furnace to continue operation. This action, coupled with falling sale prices resulted in a 22.5 percent decline in pig iron production for the year. The company's unsold stockpiles grew by 29 percent to 84,631 tons of pig iron. Iron's poor showing during the year was indicative of Virginia and Tennessee's declining iron industry, but coal production continued to grow during 1914.¹⁷³

Coal profits soared by 26.5 percent during the year to \$449,775.40 after 1,988,015 tons were mined. These jumps in production can be explained by the company's continued modernization of its coalmines. Its largest coal operation at Toms Creek saw the completion of a large all-steel tippie and washery that easily handled the increasing volume being pulled from the mines.¹⁷⁴

The VIC&CC's continued decline in iron production and increase in coal production continued through 1915. The company reduced its production of pig iron by only keeping one furnace in blast during the year; it was unable to sell as

¹⁷³ VIC&CC: Report on Examination of Financial Condition, (1916), Exhibit C, Schedule II, VIC&CC Company Records.

¹⁷⁴ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1914), 4.

much as they produced.¹⁷⁵ This led to a fall in pig iron production by nearly 50 percent, and its unsold stockpiles grew 35.6 percent to 114,720 tons. Coal profits for the year actually fell 10 percent to \$405,242.32. During the year the VIC&CC posted a total net loss of \$285,079.93, and Henry McHarg, Sr., formally separated himself entirely from the VIC&CC. McHarg, Sr. had remained on the company's Board of Directors since stepping down as president, but in 1915, he resigned from the board.

The VIC&CC did not see an increase in business until January 1916 when wartime production and sales brought a boom to iron and coal production. With a dismal first half of FY1916 the company still posted a net loss of \$262,266.29, but was able to put all of their iron furnaces into blast and output for the year increased by 50 percent from the previous year.¹⁷⁶ Although it is unclear as to who was purchasing the pig iron the company shipped 224,302 tons of pig iron during the year, which signified a dramatic reduction of the company's stockpiles that had increased greatly over the last few years. Profits from coal production fell a dramatic 41 percent to \$239,231.80 during FY1916 because the company was suddenly using more of its coal for coke production to fuel the blast furnaces now in operation.¹⁷⁷

During World War I the VIC&CC's iron furnaces ran at full blast and produced numbers similar to the results expected when the company first organized in 1899.

¹⁷⁵ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1915), 3.

¹⁷⁶ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1916), 3.

¹⁷⁷ VIC&CC: Report on Examination of Financial Condition, (1916), Exhibit C, Schedule II, VIC&CC Company Records.

For instance, between June 1916 and December 1917 the company's furnaces produced 354,508 tons of iron ore and shipped 372,738 tons of pig iron. They also managed to do this after selling their Bristol and Graham furnaces. This suggests that the improvements made at their Radford and Roanoke furnaces were paying off. During the boom in iron production more of the company's coal went to the production of coke for their furnaces, so coal profits actually shrank during the war while coal production increased. The staggering jump in its iron production also produced a staggering profit for the company between June 1916 and December 1917 of \$1,897,543.72.¹⁷⁸ The iron boom experienced by the company during World War I allowed, "the company's indebtedness [to be] cut in half."¹⁷⁹ This boom proved to last only as long as the war did and soon after the war concluded, so too did the VIC&CC's pig iron production decline. Within a few years the company found itself in a familiar position as a pig iron producers and its pigs could not compete with the superior pigs of the Pittsburgh, the Great Lakes, and Birmingham. This led to the total abandonment of its pig iron department after nearly two decades of consistent losses in producing iron. By 1921, the VIC&CC had shut down all of its iron furnaces after operating at less than 10 percent of their normal capacity only a short time after producing record numbers during the First World War.¹⁸⁰

¹⁷⁸ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1918), 1-7.

¹⁷⁹ Mann, "The Virginia, Iron, Coal, and Coke Company", 53.

¹⁸⁰ Virginia Iron, Coal, and Coke Company, *Annual Report of The Virginia Iron, Coal, and Coke Company* (Roanoke, VA: The Company, 1922), 3.

Although the VIC&CC's iron department excelled during the American involvement in World War I, it was recognized by management that it was doubtful the company would ever succeed as a pig iron producer during normal market conditions. The reasons for iron's failure in southwest Virginia and east Tennessee were abundantly clear by 1917. In an in depth financial report performed by the accounting firm Arthur Young & Company, the VIC&CC's shortcomings were clearly laid out. Aside from the company's huge burdening bonded debt, its pig iron department was increasingly forced to purchase iron ore on the open market to blast. This dramatically raised the cost of production, especially considering how much the company invested in ore properties. The irregular operation of its furnaces was also costly because blowing furnaces in and out of blast was both a timely and cost intensive process. Because of the rising cost to produce iron, the pig iron industry of Virginia and east Tennessee, and especially the VIC&CC simply could not compete with other producing regions in the country.

During the decade following World War I, the company shut down its pig iron department at a heavy loss to the company. The 1930s saw the failure of the VIC&CC's coal and coke operations. Diminishing returns and the ultimate exhaustion of their once profitable coal mines and the failure of the entire iron industry of southern Appalachia left little local market for coke. During the early 1940s the company closed its remaining mines, sold its equipment and became a lessor of coal properties.¹⁸¹ The VIC&CC continued as a lessor of coal properties until 1969 when Bates Manufacturing Company, a larger manufacturing group,

¹⁸¹ New York Curb Exchange Listing Application NO. 1802, November 1, 1951, Virginia Iron, Coal, and Coke Company Records 1899-1969, McConnell Library, Radford, VA.

purchased it.¹⁸² Although the company's coal properties provided the company a source of liquidity for several decades after the failure of its iron interests, the company's original purpose to be a pig iron producer became a thing of the past barely two decades after it began.

¹⁸² Mann, "The Virginia, Iron, Coal, and Coke Company", 59.

Conclusion

As a region, southern Appalachia played an important role in the emergence of the New South. At the close of Reconstruction much of the timber, iron, and coal reserves in the region remained untouched. The rush of investment into the region signified a break from the slave based plantation economy of the antebellum South. Although racial segregation persisted well into the twentieth century the industrial economy that emerged in southern Appalachia looked much different than the textile and agricultural driven economies of the southern piedmont and delta regions. Timber and railroad companies eager to access the mountains' resources consolidated the ownership of large tracts of land and fueled a burst of economic growth during the 1880s. This included a large-scale modernization and expansion of the iron industry of southwest Virginia and east Tennessee. Although much of the financing for this growth failed with the Panic of 1893, the modernized furnaces, ore deposits, coalfields, and timber stands remained. During this time, several of these furnaces, foundries, and resource bases were consolidated under the ownership of larger, integrated companies. The Virginia Iron, Coal, and Coke Company (VIC&CC) represents one such company.

When the VIC&CC organized in 1899 it seemed poised to become a competitive producer of pig iron on a national level. The region's brown ores and rich deposits of bituminous coal had been accessed and charted during the last several decades of the nineteenth century and the formation of the large vertically integrated VIC&CC promised an optimistic future for pig iron production in southwest Virginia and east Tennessee. This optimistic vision for the future proved

to be short lived as the competitive realities of more developed, better-located regions slowly reduced the company's market share. Although by the 1880s the nation's growing railroad and communications networks had integrated the region into the national economy, by the 1920s the entire pig iron industry of southwest Virginia and east Tennessee had been completely overshadowed by those along the Great Lakes and southwest Pennsylvania. On top of having a more established industrial base, these regions were taking advantage of being situated between the rich ore beds of the Lake Superior region and the rich coal deposits of southern Appalachia. As steel overtook iron the pigs produced in these northern areas were better suited for the Bessemer and open-hearth furnaces, which were the primary modes of steel conversion during the day.

The man responsible for the organization of the VIC&CC, George L. Carter, also represents the break in regional economic power from the antebellum period. Carter was a child during the Civil War, and although he was born to a well respected farming family, he was introduced to the industrial world as a young man. Carter worked as a store clerk in Hillsville before entering the mineral industry as an assistant manager. Through contacts he made with the Norfolk & Western Railway, Carter entered the iron industry, and capitalized on the most active period of industrial expansion in the region. He proved to be an adept iron master and businessman until he grew his iron enterprise to what became the VIC&CC. By agreeing to run such a large enterprise backed by the brokerage firm of Moore & Schley, Carter quickly exceeded his managerial ability and became vulnerable to the limited value of Appalachia's iron resources and the financial power of Wall Street.

From the outset the VIC&CC struggled as an iron producer and the few profitable periods they experienced were early in the company's existence and corresponded with national iron booms. In only two years the company defaulted on interest payments, Carter was forced out of the enterprise all together, and the company fell into receivership.

The man called in to restructure the VIC&CC, Henry K. McHarg, represents more fully the emergence of a colonial economy in the region. McHarg's experience in running large enterprises and personal wealth allowed him to essentially make the company his own source of income. McHarg took a huge personal stake in the company, and although he did much to modernize the company and streamline production as company president, his personal loan to the company allowed him to enjoy a large percentage of the company's profit during the VIC&CC's few flush years. In addition, McHarg also made significant progress in reducing the company's debt. By 1911 he had reduced the debt by \$2,459,500, or 31.75 percent, a remarkable accomplishment. It has been shown that McHarg personally benefitted from his leadership of the company as he made it a primary policy to pay down the debt as quickly as possible. By the time McHarg retired as president in 1911 the company's indebtedness was drastically reduced, but it was becoming increasingly clear that the company would never succeed as a pig iron producer.

The company slowly recognized that its future was in its coal holdings, which were vast and of a quality that was high in demand among railroads, steam engines, and as home heating fuel. The company's failing iron department and the profitability of coal was temporarily reversed during World War I when the

company briefly recorded record high profit margins as a pig iron producer, but shortly after the war ended the company's iron department failed. By 1922, the company shut down its iron furnaces and slowly sold them off as the inevitable was finally recognized. For the next two decades the company's coal mines succeeded in supporting the company, but by the early 1940s its developed mines were exhausted and the company switched to the position of a coal lessor as it still owned hundreds of thousands of acres of coal lands in eastern Kentucky, Virginia, and Tennessee.

In the case of the Virginia, Iron, Coal, and Coke Company it seems that the colonial thesis largely holds true as absentee owners controlled the company and much of the coal and iron was shipped directly to ports at either Norfolk or Charleston for use in other regions of the country. George Carter represents the rise of a southern business class that eagerly participated in the capitalistic industrial economy of the day, but his shortcomings as president were exposed when the size and complexity of the company grew beyond his means. This allowed for his complete removal from the company and gave space for a New York banker to seize near complete control of the company. Even though the VIC&CC was originally structured to produce its own pig iron and iron products with its own ore and fuel supply, the company rapidly came to rely on profits from the sale of its cheaply mined coal. Through the VIC&CC, it is possible to view the dramatic restructuring of southwest Virginia and east Tennessee's economy and the rise of the so-called New South. The continued study of this company will provide important insight into the region's trajectory during a transformative period in southern Appalachia's history.

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