In the shadow of steel: Leetonia, Ohio and independent iron manufacturers in the Mahoning and Shenango Valleys, 1845-1920

Rocco Samuel Di

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A Dissertation

entitled

In the Shadow of Steel:
Leetonia, Ohio and Independent Iron Manufacturers in the
Mahoning and Shenango Valleys, 1845-1920

by

Samuel Di Rocco, II

Submitted to the Graduate Faculty as partial fulfillment of the requirements for

The Doctor of Philosophy Degree in History

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Dr. Diane F. Britton, Committee Chair

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Dr. Kevin F. Kern, Committee Member

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Dr. Patricia R. Komuniecki, Dean
College of Graduate Studies

The University of Toledo
December 2012
An Abstract of

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After nearly fifty years as a center of coal mining, beehive coking, and iron manufacturing, residents of the village of Leetonia were “jubilant” following the announcement that the state of Ohio formally incorporated the $2,000,000 charter application of the Leetonia Steel Company in March 1913. The McKeefrey family of Leetonia in partnership with Pittsburgh industrialists provided the impetus and initial financial backing for the proposed single-process sheet steel mill. Located in eastern Ohio, Leetonia’s once vibrant coal, coke, and iron industries were struggling to remain viable during the second decade of the twentieth century. In response to diminishing demands for specialized iron products due to the pervasive reach of the steel industry, the McKeefrey family and their Pittsburgh supporters forged ahead with the construction of two 70-ton open-hearth steel furnaces and accompanying billet, bar, and sheet mills.

Investigating the motivations behind the McKeefrey family’s decision to construct a steel mill after manufacturing iron at Leetonia for more than twenty-five years creates an opportunity for historians to more accurately understand the heterogeneous characteristics of late nineteenth century American iron manufacturing. This study re-
conceptualizes the field of iron and steel manufacturing by documenting the successes and failures of nearly a dozen iron manufacturers in eastern Ohio and western Pennsylvania – the geographic center of Gilded Age industrialization. This dissertation contends that the widespread adoption of Bessemer process steel manufacturing did not immediately displace iron manufacturers during the 1870s and 1880s. Moreover, continued access to high-grade raw materials, which allowed for the manufacturing of specialized iron products in the wake of Bessemer process steel, created profitable niche markets for independent iron manufacturers who chose not to transition to steel production during the late nineteenth century. Detailing the heretofore under-examined topic of independent iron manufacturers presents new perspectives into American Business history and offers an opportunity to redirect historians’ understanding of the iron and steel industry in eastern Ohio and western Pennsylvania during the “Age of Steel.”
In memory of

Paul Edward Di Rocco

(January 27, 1923 – September 12, 1938)

&

Samuel Joseph Di Rocco

(June 23, 1925 – July 12, 2010)

First-generation Italian-American brothers and lifelong residents of Leetonia, Ohio.
Acknowledgements

I want to begin by thanking my wife Melanie M. Di Rocco for her unwavering support and patience during my many years of graduate work. My academic advisor and dissertation committee chair, Dr. Diane F. Britton, provided superb academic guidance and encouragement during the course of this project and throughout the duration of my graduate work at the University of Toledo. I enrolled at the University of Toledo with the hope of working with Dr. Britton and I greatly appreciate her willingness to serve as my academic mentor. I am also indebted to my dissertation committee, Dr. Todd M. Michney, Dr. J. D. Britton, and Dr. Kevin F. Kern. I greatly appreciate these scholars’ insightful suggestions, overall availability, and willingness to serve on this committee. I want to thank members of the University of Toledo’s Department of History who directly influenced my training as a historian, specifically Dr. Ronald G. Lora, Dr. Charles N. Glaab, Dr. Larry D. Wilcox, Dr. Michael Jakobson, Dr. William J. O’Neal, and Dr. Glenn Ames. Cheri Taylor of the Leetonia Public Library, Marci Buchanan of the Mineral Ridge Historical Society, Dr. John Weaver of Sinclair Community College, and Dr. Larry L. Nelson of Bowling Green State University are also commended for their support during the past several years. A special thanks to Dr. William D. Jenkins, one of my graduate school advisors at Youngstown State University, for his years of mentoring and words of encouragement. Lastly, my parents Paul and Cynthia, my brother Robert, and my extended family deserve thanks for their continued support.
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Chapter One

Introduction

On Friday March 21, 1913, the front-page headline of The Leetonia Reporter proudly exclaimed “No More Doubt About Steel Plant Locating in Leetonia” following months of speculation, several village council meetings, and stock subscription fundraising drives. After nearly fifty years as a center of coal mining, beehive coking, and iron manufacturing, residents of the village of Leetonia were “jubilant” following the announcement that the state of Ohio formally incorporated the $2,000,000 charter application of the Leetonia Steel Company. The McKeefrey family of Leetonia in partnership with “Archibald G. Smith, Andrew Cullen, and several other steel men of the Pittsburgh district” provided the impetus and initial financial backing for the proposed single-process sheet steel mill. In an interview with The Leetonia Reporter, Leetonia


Steel Company president Albert P. Myer indicated that the new firm purchased the McKeefrey family’s Salem Iron Company at Leetonia “as a foundation for its new [steel] plant” as well as eight miles of railroad sidings and forty-five acres of land. After acquiring the McKeefrey family’s independent blast furnace stack and receiving more than $50,000 worth of stock subscriptions from Leetonia residents, the Leetonia Steel Company broke ground south of Main Street along the village’s intersecting railroads in late April. Located in eastern Ohio, in northern Columbiana County where the Pittsburgh, Fort Wayne, & Chicago Railroad intersected the Niles & New Lisbon Railroad, Leetonia’s once vibrant coal, coke, and iron industries were struggling to remain viable during the second decade of the twentieth century. In response to diminishing demands for specialized iron products due to the pervasive reach of the steel industry, the McKeefrey family and their Pittsburgh supporters forged ahead with the construction of two 70-ton open-hearth steel furnaces and accompanying billet, bar, and sheet mills in the spring of 1913.

Once completed, the Leetonia Steel Company would be capable of producing five hundred tons of steel each day and hoped to employ four to six hundred individuals in addition to those already working at the nearby blast furnace. With “work on the new steel plant . . . progressing nicely” in late May, company officials remained optimistic


5 Ibid.


7 “Steel Plant for Leetonia on Tap,” The Leetonia Reporter (March 7, 1913): 1.
that a “finished product would be turned out by next October or November.”

One month later, more than three hundred laborers continued to work day and night “grading and digging for foundations . . . at various points for the different buildings” while delivery dates were set for contracted equipment assembled at Alliance, Ohio, Youngstown, Ohio, and Pittsburgh. The trade journal The Iron Age described the extensive construction under way at Leetonia, noting in late May that the Company had already “let a contract to the Penn Bridge Company, Beaver Falls, Pa., . . . for . . . [a] 70ʹ x 320ʹ . . . bar mill building [and a] . . . 70ʹ x 96ʹ storage building.”

Image 1-1 Stock Certificate Drawing of the Leetonia Steel Company

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9 “Work Goes on at Steel Plant,” The Leetonia Reporter (June 20, 1913): 1.


Less than three weeks later, however, construction ceased abruptly on Monday July 7 following the failure of the First-Second National Bank of Pittsburgh.\(^{12}\) The banking firm failed because of a rehypothecation plan initiated by Oscar L. Telling and Francis H. Richard – president and cashier of the First-Second National Bank. In short, Telling and Richard used pledged collateral assigned to the Pittsburgh bank as collateral in order to borrow additional money from a variety of banks in New York. As outlined by the *Leetonia Reporter*, “the men at the head of the steel company [McKeefrey family and associates] depended [upon the bank] to a considerable extent for their financial support in the extensive project” at Leetonia.\(^{13}\) The vast amount of capital needed in order to construct a modern steel mill placed control of the Leetonia Steel Company in the hands of non-local financiers and professional businessmen rather than the McKeefrey family. Acquiescing control to outside investors and non-family members occurred often during the late nineteenth and early twentieth centuries as independent iron manufacturers, struggling to remain viable, attempted to transition to steel manufacturing.\(^{14}\) Telling’s and Richard’s nefarious financial scheme amounted to approximately $200,000,000 in failures and signaled the beginning of the end of independent iron manufacturing at Leetonia.\(^{15}\)


While the officers of the Leetonia Steel Company assured the local newspaper that “the outlook is bright and . . . they expect[ed] to be able to resume entire operations as before in a very short time,” construction of the mill never resumed at Leetonia, ending the McKeefrey family’s goal of becoming successful open-hearth steel manufacturers. Leetonia citizens who purchased stock in the failed steel company were never reimbursed, while several hundred laborers remained unemployed for nearly two years. On November 16, 1914, local attorney E. H. Van Fossan purchased the holdings of the bankrupt Leetonia Steel Company for a mere $32,500 at a public auction at Lisbon, Ohio – the county seat of government for Columbiana County.  

On July 29, 1915, the McKeefreys succeeded in purchasing from Van Fossan their former blast furnace complex as well as the site of the proposed Leetonia Steel Company for $66,000. Following the purchase, the family reorganized their former Salem Iron Company furnace as the McKeefrey Iron Company with a capital stock of $100,000 and resumed producing various grades of iron intermittently over the course of the next decade as an independent iron firm.  

Investigating the motivations behind the McKeefrey family’s decision to construct an open-hearth steel mill after manufacturing iron at Leetonia for more than twenty-five years creates an opportunity for historians to more accurately understand the heterogeneous characteristics of late nineteenth century American iron manufacturing. This study re-conceptualizes the field of iron and steel manufacturing by documenting the successes and failures of nearly a dozen iron manufacturers in eastern Ohio and western

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Pennsylvania – the geographic center of Gilded Age industrialization. This dissertation contends that the widespread adoption of Bessemer process steel manufacturing did not immediately displace iron manufacturers during the 1870s and 1880s. Moreover, continued access to high-grade raw materials, which allowed for the manufacturing of specialized iron products in the wake of Bessemer process steel, created profitable niche markets for iron manufacturers who chose not to transition to steel production during the late nineteenth century.

The primary questions this dissertation deals with are summarized as follows: What factors led to the development of iron manufacturing in eastern Ohio and western Pennsylvania during the mid-nineteenth century? How did the quality and extent of available mineral resources and access to rail transportation determine the profitability of iron manufacturing firms west of the Appalachian Mountains? What role did these external factors play in an iron company’s long-term viability following the widespread adoption of Bessemer process steel manufacturing? How did independent iron manufacturers respond to increasing demand for Bessemer process and later open-hearth steel? And finally: How were independent iron manufacturers able to persist for so long in an industry known for its massive vertically integrated firms? Detailing the heretofore under-examined topic of independent iron manufacturers presents new perspectives into American Business history and offers an opportunity to redirect historians’ understanding of the iron and steel industry in eastern Ohio and western Pennsylvania during the “Age of Steel.”

Any study of the history of the iron and steel industry during the late nineteenth and early twentieth centuries must begin with an examination of three seminal works:

Temin, an economist and later a Professor of Economics at Massachusetts Institute of Technology used economic analysis to examine how technological advancements within the iron and steel industry from 1830 through 1900 transformed both “the organization of production and the character of demand.”¹⁹ For Temin, increasing demand for Bessemer process steel rails following the end of the Civil War resulted in significant changes within the iron industry, namely greater reliance on bituminous coal located west of the Appalachian Mountains. The transition to bituminous coal and coke as the primary smelting fuel in blast furnaces resulted in higher capacity furnaces with higher stacks, which subsequently led to innovations in the requisite blowing equipment because these minerals were capable of withstanding higher temperatures and pressures within the enlarged furnace stacks. As Professor Temin indicates, the ever-increasing demands for steel rails “advanced the trend toward greater exploitation of the available heat and power, which facilitated the further growth of the economy and the demand for iron and steel.”²⁰

¹⁸ W. David Lewis’s *Iron and Steel in America* (Greenville, Delaware: The Hagley Museum, 1976) offers an exceptionally concise description of iron and steel manufacturing through World War II.


²⁰ Ibid., 5.
Using supply and demand models as well as cost and price data, Temin’s work succeeds in detailing how macroeconomic forces influenced the development and expansion of Bessemer process steel rails during the 1870s and 1880s. Steel rails produced in America surpassed iron rails in total production in 1877, and unlike iron rails, remained durable for several decades rather than just a few years. Named after English inventor and engineer Sir Henry Bessemer, the innovative steel making process, which began in the United Stated in 1866, consisted of blowing cold air through molten pig iron held within a refractory lined pear shaped vessel (converter) in order to remove carbon, silicon, manganese, and other impurities from the molten pig iron. After approximately twenty minutes, workers tilted the pear shaped converter in order to pour molten steel into ingot molds. The Bessemer process revolutionized steel manufacturing because it allowed for mass production of a uniform steel at a reduced cost by relatively unskilled laborers. The influence of the new steel making process was immediate. Steel production within the United States increased from approximately 19,000 tons in 1865 (mostly blister and crucible steel) to more than 11,000,000 tons by 1900. The Bessemer process spurred the shift to steel as the structural backbone of America’s rapidly expanding transportation network of railroads and vessels.

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23 Temin, Iron and Steel in Nineteenth Century America: An Economic Inquiry, 50; and Rogers, An Economic History of the American Steel Industry, 33. Refer to Appendix A for definitions of blister and crucible steel.
By the early twentieth century, however, as steel continued to supplant more and more iron products, open-hearth process steel started to surpass Bessemer process steel in total production. In fact, by the start of World War I, Bessemer steel accounted for only one-third of all the steel manufactured in the United States.\textsuperscript{25} First introduced in 1868, the open-hearth process of making steel, as described by historian Diane F. Britton consisted of “melting by direct flame action a mixture of pig iron and iron and scrap iron . . . on a hearth . . . accessible through furnace doors for inspection, sampling, and testing.”\textsuperscript{26} Despite taking anywhere from six to ten hours to make and remaining extremely expensive to operate initially, open hearth steel manufacturing eventually replaced Bessemer steel as a result of the shift in demand from steel rails to structural steel. As explained by historian Thomas J. Misa, “Urban structures required a new steel,

\begin{table}
\centering
\begin{tabular}{|c|c|c|c|}
\hline
Year & Crucible and Blister Steel & Bessemer Steel & Open-Hearth Steel \\
\hline
1860 & 13,000 & 0 & 0 \\
\hline
1880 & 81,000 & 1,203,000 & 113,000 \\
\hline
1885 & 66,000 & 1,702,000 & 149,000 \\
\hline
1890 & 84,000 & 4,132,000 & 575,000 \\
\hline
1895 & 77,000 & 5,498,000 & 1,274,000 \\
\hline
1900 & 118,000 & 7,487,000 & 3,806,000 \\
\hline
\end{tabular}
\caption{American Steel Production in Tons, 1860-1900\textsuperscript{24}}
\end{table}


\textsuperscript{25} Temin, \textit{Iron and Steel in Nineteenth Century America: An Economic Inquiry}, 4 and 218-230.

more ductile and above all more regular, consistent, and predictable than Bessemer rail steel.”

Table 1.2 American Steel Production in Tons, 1905-1920

<table>
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<tr>
<th>Year</th>
<th>Crucible Steel</th>
<th>Electric Furnace Steel</th>
<th>Bessemer Steel</th>
<th>Open-Hearth Steel</th>
</tr>
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<tr>
<td>1905</td>
<td>110,000</td>
<td>10,000</td>
<td>12,250,000</td>
<td>10,050,000</td>
</tr>
<tr>
<td>1910</td>
<td>140,000</td>
<td>60,000</td>
<td>10,540,000</td>
<td>18,490,000</td>
</tr>
<tr>
<td>1915</td>
<td>130,000</td>
<td>80,000</td>
<td>9,280,000</td>
<td>26,520,000</td>
</tr>
<tr>
<td>1920</td>
<td>80,000</td>
<td>570,000</td>
<td>9,950,000</td>
<td>36,590,000</td>
</tr>
</tbody>
</table>

In addition to the shift in demand for structural steel, several additional factors led to the dominance of open-hearth steel. The process of making steel in an open hearth allowed manufacturers to analyze, modify, and control the characteristics of the steel during the steel making process. Open-hearth furnaces were also more efficient in using scrap steel as well as iron ores from the Mesabi range in Minnesota, which became one of the leading iron ores mined in the Lake Superior ranges during the 1890s. As detailed in Tables 1.1 and 1.2, the nation’s total steel production increased from approximately eleven million tons to more than forty-seven million tons during the first two decades of the twentieth century, with open-hearth steel accounting for more than three quarters of all steel.

Although useful for understanding the macroeconomic forces associated with the development and growth of the American steel industry Temin’s Iron and Steel in 27

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27 Misa, A Nation of Steel: The Making of Modern America, 1865-1925, 84.


Nineteenth Century America does not sufficiently explain the specific variations of raw materials used by the nation’s diverse and varied iron manufacturing firms before and after the dominance of Bessemer and then open-hearth steel manufacturing. This omission is important because the characteristics, quality, and extent of mineral resources needed in the production of iron during the mid-nineteenth century proved critical for iron manufacturers as steel became the nation’s dominant manufactured metal. William T. Hogan’s Economic History of the Iron and Steel Industry in the United States provides an expansive and far more instructive interpretation of the iron and steel industry from 1860 to 1970.30 Hogan’s prodigious work details every stage in the varied and seemingly always changing process of iron and steel manufacturing. Hogan is commended for the extensive scope of his work, but unfortunately, this approach often results in terse chapters that introduce critical themes associated with the history of the iron and steel industry but lack nuance, in-depth analysis, or thoughtful explanation. For example, Hogan describes the American iron industry prior to 1860 in less than six full pages.31 Nevertheless, the strengths within Economic History of the Iron and Steel Industry in the United States outweigh these drawbacks.

The first two volumes of Economic History of the Iron and Steel Industry in the United States prove integral when beginning the process of categorizing and analyzing nineteenth century iron manufacturers in western Pennsylvania and eastern Ohio.32 One

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30 Rev. William T. Hogan, often referred to as “The Steel Priest,” served as the Director of the Industrial Economic Research Institute and was a Professor of Economics at Fordham University from 1950 until his death in 2002. “Archives and Special Collections at Fordham University,” http://www.library.fordham.edu/archives/a_to_z_list.html.

of the many strengths within Hogan’s work is his inclusion of innumerable statistics illustrating nationwide trends and developments within the iron and steel industry from 1860 through 1900. Some of the tables associated with the quantitative data include: the total annual production of pig iron in the United States, the smelting fuels used in the production of pig iron, and the states with the highest gross tons of iron ore by decade.\(^{33}\) Hogan’s inclusion of these figures is critically important for this study because they provide the foundation for understanding the raw materials, products, and markets associated with the nation’s iron industry from the Civil War through the era of corporate consolidations.

As indicated in Table 1.3, by 1875 bituminous coal surpassed anthracite coal as the leading smelting fuel in the production of pig iron because, as Hogan describes, “the iron industry west of the Alleghenies [Mountains] grew rapidly, and the only fuel available there was bituminous coal.”\(^{34}\) Bituminous coal, unlike anthracite coal, is often described as being “soft” coal and is characterized by its volatile hydrocarbons, relatively low moisture content, varying degrees of ash and sulfur, and moderate to high carbon content ranging between 45 and 86 percent. Anthracite coal, colloquially referred to as “hard” coal and amounting to only two percent of the world’s coal, is characterized by its low volatile contents and high carbon content, ranging between 86 and 98 percent.


\(^{33}\) Refer to Hogan, Chapters 1 through 3 in Volume I.

Table 1.3 Blast Furnace Smelting Fuels in Net Tons, 1860-1900

<table>
<thead>
<tr>
<th>Year</th>
<th>Charcoal</th>
<th>Anthracite Coal</th>
<th>Bituminous Coal &amp; Coke</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>278,331</td>
<td>519,211</td>
<td>122,228</td>
</tr>
<tr>
<td>1866</td>
<td>332,580</td>
<td>749,367</td>
<td>268,396</td>
</tr>
<tr>
<td>1872</td>
<td>500,587</td>
<td>1,369,812</td>
<td>984,159</td>
</tr>
<tr>
<td>1875</td>
<td>410,990</td>
<td>908,046</td>
<td>947,545</td>
</tr>
<tr>
<td>1880</td>
<td>537,558</td>
<td>1,807,651</td>
<td>1,950,205</td>
</tr>
<tr>
<td>1885</td>
<td>399,844</td>
<td>1,454,390</td>
<td>2,675,635</td>
</tr>
<tr>
<td>1890</td>
<td>703,522</td>
<td>2,448,780</td>
<td>7,154,693</td>
</tr>
<tr>
<td>1895</td>
<td>252,381</td>
<td>1,423,406</td>
<td>8,904,076</td>
</tr>
<tr>
<td>1900</td>
<td>380,658</td>
<td>1,879,293</td>
<td>13,134,927</td>
</tr>
</tbody>
</table>

The depletion of woodlands near iron ore deposits east of the Appalachian Mountains coupled with limited access to anthracite coal deposits in eastern Pennsylvania led to this pivotal shift in the requisite smelting fuels for pig iron production during the mid-nineteenth century. The construction of railroads west of the Appalachian Mountains from Pittsburgh spurred the development of bituminous coal mining and accompanying blast furnace operations.

This westward shift in the production of pig iron from bituminous coal and coke is thoroughly detailed and analyzed in Kenneth Warren’s *The American Steel Industry, 1850-1970: A Geographical Interpretation*. Warren’s work, which he completed before the publication of “Father Hogan’s great work,” illustrates how the location of valuable minerals (e.g. coal and iron ore) resulted in significant geographic shifts regarding the

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location of the iron and steel industry. As an economic geographer, Warren emphasizes locational changes as a way to examine patterns of growth and decline within the iron and steel industry. As discussed in the following chapters, the westward movement of iron manufacturing developed following the unearthing of high quality bituminous coal and iron ore in western Pennsylvania and eastern Ohio. High quality Washingtonville coal, raw block coal, as well as local deposits of black-band iron ore, became the foundation upon which iron manufacturing concerns developed at Leetonia and throughout the Mahoning and Shenango Valleys.

The greatest strength within The American Steel Industry, 1850-1970: A Geographical Interpretation is Warren’s ability to document how technological changes in transportation, mining, and iron and steel manufacturing influenced the location of manufacturing firms. For example, over time the cost to transport one long haul of coal, coke, iron ore, or finished iron and steel became cheaper than the cost to ship the freight to and from an intermediate point between the location of the raw materials or the point of sale of the finished product. Therefore, as steel production started to dominate the nation’s manufacturing sector and the mining of coal and iron ore shifted to the Connellsville coking region and the Lake Superior iron ranges, iron manufacturers at Leetonia and throughout the Valleys struggled to remain viable during the late nineteenth century.

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Table 1.4 Location and Production of Iron Ore in Tons, 1860-1900

<table>
<thead>
<tr>
<th>Year</th>
<th>Pennsylvania</th>
<th>Michigan</th>
<th>Missouri</th>
<th>Alabama</th>
<th>Minnesota</th>
</tr>
</thead>
<tbody>
<tr>
<td>1860</td>
<td>1,351,000</td>
<td>114,410</td>
<td>35,000</td>
<td>3,720</td>
<td>0</td>
</tr>
<tr>
<td>1870</td>
<td>2,337,286</td>
<td>859,508</td>
<td>126,212</td>
<td>11,350</td>
<td>0</td>
</tr>
<tr>
<td>1880</td>
<td>1,951,495</td>
<td>1,948,334</td>
<td>344,818</td>
<td>171,139</td>
<td>0</td>
</tr>
<tr>
<td>1890</td>
<td>1,560,234</td>
<td>5,856,169</td>
<td>265,718</td>
<td>1,570,319</td>
<td>864,508</td>
</tr>
<tr>
<td>1900</td>
<td>877,684</td>
<td>9,926,727</td>
<td>41,366</td>
<td>2,759,247</td>
<td>9,834,399</td>
</tr>
</tbody>
</table>

Hogan’s and Warren’s discussion of the factors contributing to iron and steel manufacturers’ transition from relying on local iron ore deposits to mining and purchasing ores located within the Lake Superior iron ranges also aids in the process of assessing the changes taking place within the iron industries under examination in this study. As Table 1.4 indicates, Michigan nearly equaled Pennsylvania in total production of mined iron ore in 1880. The opening of the Sault Ste. Marie Canal in June 1855, which allowed for the easy passage of vessels between Lake Superior and Lake Huron from iron ore mines in Michigan’s Upper Peninsula to the port of Cleveland, precipitated the shift to Lake Superior iron ore. Larger Great Lake steamers capable of transporting heavier loads of Lake Superior iron ore increased the amount of iron ore available to iron manufacturers in Ohio and Pennsylvania. As detailed by Terry S.

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39 Refer to Hogan, Economic History of the Iron and Steel Industry in the United States, Volume I, 17-23; Rogers, An Economic History of the American Steel Industry, 28-31; Larry Lankton, Hollowed Ground: Copper Mining and Community Building on Lake Superior, 1840s-1990s (Detroit, Michigan: Wayne State University Press, 2010), 7-40; and Terry S. Reynolds and Virginia P. Dawson, Iron Will:
Reynolds and Virginia P. Dawson, the opening of the Sault Ste. Marie Canal removed the “. . . mine to harbor transport problem . . .” and led to a drop in the price of a ton of ore shipped “. . . from Marquette to Cleveland from $5 to $2.09 by 1858.” As local iron ore deposits became more and more scarce during the 1870s, iron manufacturers throughout the Mahoning and Shenango Valleys entered into Lake Superior iron ore mining (Refer to Chapters 6 and 8). Although profitable, access to this critically important mineral, as well as access to coal fields in the Connellsville coking district, did not guarantee continued manufacturing successes during the late nineteenth century.

Although Hogan does focus specifically on nine different iron companies and rolling mills in operation from 1860-1880, the selected firms are not located within the Mahoning or Shenango Valleys nor are they directly related to iron manufacturers at Leetonia. Similarly, although Warren includes discussion of pig iron capacity totals in the Valleys during the late nineteenth century, analysis of iron production totals by specific manufacturers within the Valleys does not appear in his work. In fact, John N. Ingham’s Making Iron and Steel: Independent Mills in Pittsburgh, 1820-1920 remains the only scholarly monograph to date that addresses the topic and historical significance of independent iron and steel manufacturers.

Despite remaining focused on independent iron and steel firms in the nation’s “Steel City,” Ingham succeeds in documenting how these industrialists were “neither the swashbuckling robber baron entrepreneur of the ilk of Andrew Carnegie or Charles


41 Refer to Hogan, Chapter 7, Volume I.

42 Refer to Warren, The American Steel Industry, 1850-1970, 54-60
Schwab nor the cool, calculating professional manager and bureaucrat” analyzed by historian Alfred D. Chandler in his authoritative *The Visible Hand: The Managerial Revolution in America*. Rather, the individuals under examination within *Making Iron and Steel* remained free from the ever-expanding integrated steel companies because as small business owners, they continued to manufacture “specialized goods for niche markets.” Manufacturers’ ability to remain viable by offering specialized products is a relatively recent theme explored by a variety of business historians and economists. As discussed in Chapters 7, 8, and 9 of this work, independent iron manufacturers started marketing their iron under unique names in order to increase the marketability of their specialized products during the last two decades of the nineteenth century.

The individuals examined in this work were certainly not big business owners like Andrew Carnegie or Henry Clay Frick nor were they influential financiers like J. P. Morgan and Charles M. Schwab. Similarly, these individuals did not operate “mom and pop” scale enterprises catering only to a small local market. Rather, the iron

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manufacturers under examination here fall into what preeminent scholar of small business history Mansel G. Blackford calls “a ‘gray,’ intermediate area” between fully integrated steel works and local family concerns.\textsuperscript{46}

In addition to Ingham’s \textit{Making Iron and Steel} and his earlier work \textit{Iron Barons: A Social Analysis of an American Urban Elite, 1874-1965}, there are only a few scholarly works that offer case studies of iron and steel companies during the late nineteenth and early twentieth centuries. Diane Britton’s \textit{The Iron and Steel Industry on the Far West: Irondale, Washington}, H. Lee Scamehorn’s two volume history of the Colorado Fuel and Iron Company, and Mansel G. Blackford’s \textit{A Portrait Cast in Steel: Buckeye International and Columbus, Ohio, 1881-1890} each examine a geographic region and or city and its accompanying iron and steel industries in order to provide precise insights into how the transition from iron to steel manufacturing affected various locales and their accompanying communities.\textsuperscript{47} Many of the broader themes appearing within the works of Temin, Hogan, Warren, and Rodgers, are addressed and analyzed within these case studies. This dissertation, therefore, utilizes the broad macro-findings presented by Temin, Hogan, Warren, and Rogers as well as the case studies offered by Ingham, Britton, Scamehorn, and Blackford in order to explain how independent iron manufacturers remained viable despite the nation’s increasing demand for steel. This study, therefore, presents the first narrative account of the iron industries of Leetonia and

\textsuperscript{46} Blackford, \textit{A History of Small Business in America}, xiii.

the Mahoning and Shenango Valleys during the nineteenth century and places that history within a larger regional and national context.

Map 1-1 Leetonia, Ohio and the Mahoning and Shenango Valleys

As the title of this dissertation indicates, the independent iron manufacturers examined within the following chapters owned and operated coal and iron ore mines, coking works, blast furnaces, and rolling mills at Leetonia and throughout the Mahoning

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48 Kmusser, “Map of the Beaver River Watershed,” http://en.wikipedia.org/wiki/File:Beaverriverpamap.png. Refer to http://creativecommons.org/licenses/by-sa/3.0/deed.en. The author of this work added the dot representing the location of Leetonia, the word Leetonia, and the parallelogram to the map created by Kmusser.
and Shenango Valleys. The parallelogram on Map 1-1 denotes the geographic area under examination within this work, an often neglected region of iron manufacturing between the more well-known steel producing cities of Pittsburgh and Cleveland. The shaded area on the map represents the watersheds for the Mahoning, Shenango, and Beaver Rivers, which define geographically the Mahoning, Shenango, and Beaver Valleys.

The one hundred and eight mile long Mahoning River begins in northeastern Stark County and after passing through the southeastern corner of Portage County enters the northwest corner of Mahoning County. After entering into the southwestern corner of Trumbull County, the Mahoning River passes through the city of Warren, the seat of government for both the Western Reserve and for Trumbull County. The River then flows in a southeasterly direction passing near the communities of Niles and Girard before re-entering Mahoning County. The Mahoning continues through downtown Youngstown and after passing through Lowellville crosses the Ohio-Pennsylvania state line. The River then continues in a southeasterly direction through Lawrence County before joining the Shenango River southwest of New Castle, Pennsylvania. The ninety-two mile long Shenango River begins in Crawford County, runs north to south near the Ohio-Pennsylvania state line, and flows circuitously through Mercer County near the communities of Sharpsville, Sharon, Wheatland, and West Middlesex before entering

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49 “Biological and Water Quality Study of the Mahoning River Basin: Ashtabula, Columbiana, Mahoning, Stark, and Trumbull Counties (Ohio), Lawrence and Mercer Counties (Pennsylvania),” OEPA Technical Report MAS/1995-12-14, Volume I (Columbus, Ohio: State of Ohio Environmental Protection Agency, Division of Surface Water Monitoring and Assessment Section, May 1, 1996), 1. As detailed in Frederick J. Blue, et al., Mahoning Memories: A History of Youngstown and Mahoning County (Virginia Beach, Virginia: The Donning Company Publishers, 1991), 13, the name of the Mahoning River dates to the Native American word(s) for salt lick – “Mohoning” or “Mahonik”,” with the River initially referred to as the Big Beaver River or the Salt Springs River.

into Lawrence County. The confluence of the Mahoning and Shenango Rivers near New Castle forms the Beaver River. Although outside of the aforementioned watersheds and Valleys, the coal, coke, and iron industries established at Leetonia during the mid-nineteenth century share many characteristics with the iron industries that developed along the Mahoning River at Niles, Mineral Ridge, and Youngstown and along the Shenango River at Sharpsville, Sharon, Wheatland, West Middlesex, and New Castle.

The chapters within this work are organized according to: the geographic location, characteristics, and quality of the raw materials originally used in the production of iron during the mid-nineteenth century; the successive owners operating the iron companies at Leetonia and throughout the Mahoning and Shenango Valleys; the specific iron products manufactured by these firms; and the professional and personal relationships that existed among many of these iron manufacturers. Familial associations through business partnerships as well as through the marriage of business partners’ children influenced the selection of iron manufacturers included within this work as well as the organization of the chapters. These familial ties created continuity among many of the ironmasters with fathers inducting their sons or sons-in-law into the business, a theme few scholars have fully developed or analyzed. The chapters, therefore, are not arranged chronologically, but rather according to the direct and indirect associations among the various owners of several independent iron manufacturing firms at Leetonia and throughout the Mahoning and Shenango Valleys. Appendix B lists the chronology of ownership at each of Leetonia’s two blast furnace sites. As detailed throughout the chapters, many of the

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52 Ingham’s *Iron Barons: A Social Analysis of an American Urban Elite, 1874-1965* offers broad suggestions regarding this theme.
individuals included within this study shared similar experiences as recent newcomers to western Pittsburgh or to Ohio’s Western Reserve; with many initially starting as merchants or store owners before transitioning to coal mining and iron manufacturing.

The individuals examined within this study were pioneers in the iron industry during the mid-nineteenth century. Their careers span critical transitions within the nation’s iron and steel industry. These ironmasters played primary roles in the shift from charcoal and anthracite coal as a smelting fuel to the more readily available bituminous coal located west of the Allegheny Mountains. Intimately tied to the development of bituminous coal mining and coking was the rapid development of railroads west from Pittsburgh to the Mississippi River. As detailed in Chapters 2, 3, and 4, individuals associated with the construction of railroads in western Pennsylvania and eastern Ohio during the mid-nineteenth century frequently became the primary promoters of coal mining and iron manufacturing concerns. Access to local deposits of high quality bituminous coal and iron ore coupled with nearby inter-regional rail service initially determined the productivity and long-term success of these pioneer iron manufacturers from 1845 through 1872.

Although first used in 1865-1866, the Bessemer process of making steel did not become dominant within the iron and steel industry for another two decades. As detailed by historian John Ingham, Bessemer steel did not surpass iron as the industry’s primary product until 1886.53 While Bessemer steel manufacturers focused initially on producing steel rails for the nation’s rapidly expanding rail network, iron manufacturers in western Pennsylvania and eastern Ohio continued to make a variety of unfinished, semi-finished, and finished iron products. Iron bars, blooms, wires, nails, sheets, and plates remained in

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high demand in the decades immediately following the Civil War. In fact, iron accounted for more than three quarters of the nation’s total iron and steel output a decade after Alexander Holley introduced the Bessemer process at Troy, New York. Continued access to coal and iron ore ultimately determined the productivity and ultimate success of these iron manufacturers.

The pioneer ironmasters and their successors who did not transition to steel production eventually became “small” producers by early twentieth century standards as steel continued to dominate more and more sectors of the nation’s manufacturing sector. Nevertheless, iron manufacturers not directly controlled or in formal partnerships with steel mills (i.e. independent or merchant furnaces) remained viable during the late nineteenth century by producing specialized iron products for niche markets. In addition to making specialized iron products, some independent iron manufacturers added Bessemer grade iron to their production capabilities in an attempt to capitalize during peak demands for steel.

External pressures such as diminishing access to local coal and iron ore deposits coupled with waning demand for iron products left independent iron manufacturers with few options by the 1890s. The Panic of 1893 created the pretext for a wave of mergers in American heavy industries and catalyzed the slow demise of independent iron manufacturers. Despite securing access to Lake Superior iron ore and Connellsville coke during the late nineteenth century, independent iron manufacturers struggled to compete as merchant producers in the wake of corporate mergers and steel consolidations during the early twentieth century. As a result, independent iron manufacturers at Leetonia and throughout the Valleys either sold their iron works and retired or attempted to transition
to steel manufacturing because remaining an independent manufacturer was becoming financially impossible. While iron manufacturers throughout the Mahoning and Shenango Valleys, specifically those in Youngstown and New Castle, successfully transitioned to steel manufacturing during the era of corporate consolidations, iron manufacturers at Leetonia, such as the McKeefrey Family, ceased production forever by the late 1920s.
Chapter Two

The Mineral Wealth of Washingtonville Coal and Coke

“The Leetonia [Washingtonville] coal field is an important one. It covers, not the heaviest, but, all things considered, the most valuable deposit of the Lower Kittanning coal in the State.”


The development and expansion of railroads throughout western Pennsylvania and eastern Ohio during the 1850s and the subsequent unearthing of profitable raw materials led to the development of coal, coke, and iron manufacturing industries. As detailed by the various Geological Surveys of Ohio, the bituminous coal located in southern Mahoning County and northern Columbiana County contained an exceptionally high carbon content with low amounts of ash and sulfur. The coke made from this coal proved to be of a remarkable quality – surpassing the highly prized Connellsville coal and coke of southwestern Pennsylvania. Examining and analyzing the quality and quantity of coal deposits located along the Ashtabula & New Lisbon Railroad in eastern Ohio is necessary when attempting to assess why iron manufacturers constructed blast furnace operations near the village of Washingtonville during the 1860s. The laborious
construction of the Ashtabula & New Lisbon Railroad and the mining of high quality bituminous coal forever altered the economic and industrial foundations of southern Mahoning County and northern Columbiana County. These changes took place during Ohio’s mid-nineteenth century transition into one of the nation’s leading iron manufacturers.

The growth of railroads as a reliable and profitable mode of transportation slowly became a reality in Ohio during the 1840s. During the decade, the state approved seventy-six charters for railroad entities and soon Ohio’s railroad mileage increased from no more than forty miles in 1841 to 299 miles by 1850.1 During the 1850s, mileage increased significantly from 572 miles in 1851 to 2,702 miles in 1855. By 1861, the state’s 3,024 miles of rails made Ohio the most widely traversed state in the Union.2 One of the 140 railroads established in Ohio during the 1850s was the Ashtabula & New Lisbon Railroad Company. Incorporated on February 18, 1853 “with a capital of $1,000,000” this venture initially aimed to construct a rail line in eastern Ohio from Ashtabula on Lake Erie eighty-seven miles southward to New Lisbon, Ohio.3 After more than a decade, construction of the proposed line remained unfinished with only thirty-one miles south from Ashtabula completed. In July 1864, the New Lisbon Railway


3 History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume I (Cleveland, Ohio: H.Z. Williams & Bro., 1882), 105.
Company, organized six months earlier, formally leased the Ashtabula & New Lisbon Railroad Company’s road “lying south and west of the Cleveland and Mahoning Railroad . . . for ninety nine years.” The Company agreed to ensure completion and operation of the line “from some point on the Cleveland and Mahoning Railroad in Wethersfield Township . . . through the counties of Trumbull, Mahoning, and Columbiana by way of New Lisbon.” Before the initial failure of the Ashtabula & New Lisbon Railroad in 1864, the company’s owners did succeed in commissioning Dr. John Strong Newberry to survey and assess the geological composition along the proposed rail line.

The grandson and son of prominent Connecticut settlers to Ohio’s Western Reserve, John Strong Newberry was born in Windsor, Connecticut on December 22, 1822, the youngest of nine children. Henry Newberry, John Strong’s father, relocated to Manchester, Ohio in 1824 along the Cuyahoga River to “look after [the family’s] landed interests.” Manchester, which was soon renamed Cuyahoga Falls, included some 375 residents by 1834 and within three years elected Newberry as the first mayor of the town. Newberry’s holdings along the Cuyahoga River, some thirty-five miles south of Lake Erie, included mill works and coal mines that he eventually connected to the ever-

4 George B. Wright, Annual Report of the Commissioner of Railroads and Telegraphs to the Governor of the State of Ohio For the Year ending June 30, 1868 (Columbus: Columbus Printing Company, State Printers, 1868), 180; Thirty-Fourth Annual Report of the Commissioner of Railroads and Telegraphs to the Governor of the State of Ohio For the Year 1901 (Columbus: F.J. Heer, State Printer), 78 & 297; Burgess and Kennedy, Centennial History of The Pennsylvania Railroad Company, 1846-1946 (1949), 225-226; and History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume I (Cleveland, Ohio: H.Z. Williams & Bro., 1882), 105.


expanding network of rail lines terminating in the burgeoning city of Cleveland. The Newberry family’s social and political preeminence and continued economic successes allowed John Strong’s “early life [to pass] under conditions of affluence and intelligent refinement, leaving him to follow his intellectual bent [which] as a boy . . . was deeply interested in natural science, and had become familiar with the plants and animals of the State.” Much of young Newberry’s interests focused on the fossils he unearthed near his family’s coal mines and the flora and fauna situated along the Cuyahoga River that he examined with great curiosity.

Image 2-1 John Strong Newberry (December 22, 1822 – December 7, 1892)

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After studying at the Western Reserve Preparatory School in Hudson, Ohio, Newberry became the recording secretary of the Cleveland Academy of Natural Science in 1845 and a year later graduated from Western Reserve College. Newberry then enrolled at Western Reserve Medical School where he earned a degree in medicine in 1848. After marrying Sarah Brownell Gaylord of Cleveland in 1849, Newberry travelled to Paris where he continued his medical studies and enrolled in botany courses at the famed Jardin des Plantes. By 1851, the couple returned to Cleveland whereupon the erudite Newberry began practicing medicine. Despite having great success as a physician in Cleveland, Newberry’s “love for the natural sciences was in no way diminished, but rather increased, as the years went on” according to Charles A. White. Before participating in three separate western expeditions commissioned by the Federal Government during the late 1850s, John Strong Newberry found an outlet for his continued interest in geology and botany when he agreed to offer his expertise in surveying the line of the recently incorporated Ashtabula & New Lisbon Railroad.

On December 25, 1856, Columbian College Professor of Geology and Natural History John Strong Newberry, M. D. submitted his Report on the Economical Geology of the Route of the Ashtabula and New Lisbon Railroad to the president of the railroad


12 In 1855, Newberry served as geologist and botanist of Lieutenant R. S. Williamson’s expedition to Oregon and California. In 1857, he served as physician and naturalist for the Colorado Exploring Expedition under Lieutenant Joseph C. Ives and in 1859 he served a geologist for the San Juan Exploring Expedition under Captain J. N. Macomb.
Eben Newton.\textsuperscript{13} Newberry’s \textit{Report} divided the proposed rail line into three divisions: the Northern Division (Ashtabula to Niles); the Middle Division (Niles to New Lisbon); and the Southern Division (New Lisbon to Ohio River). Newberry also presented a detailed analysis “of the country traversed by [the] road, with special reference to its mineral resources,” which the professor analyzed through “chemical tests as would, in some degree, determine their value.”\textsuperscript{14} Newberry’s terse description of the Northern Division of the Ashtabula & New Lisbon Railroad, which spanned approximately forty miles, includes discussion of the region’s agricultural resources, character of the soil, and the location and character of manufacturing establishments.\textsuperscript{15} For Newberry, the Northern Division of the road “contains few valuable minerals” and because he “formerly traversed nearly all of it” he dedicated the majority of his \textit{Report} to the Middle Division of the road.

When describing the geological transition from the Northern Division to the Middle Division, south of Niles in Trumbull County, Newberry stated:

The Rail Road passes from a region agriculturally rich, but nearly destitute of valuable minerals, into a district uniting to great agricultural resources an amount of mineral wealth unsurpassed, if, indeed, it is equalled [sic] by that of any other portion of our favored country; and which, if properly developed, must sustain and enrich a large population, and give to your Road a permanent and profitable business.\textsuperscript{16}

\textsuperscript{13} Established in 1821 in Washington D.C., Columbian College was renamed The George Washington University in 1904. \url{http://www.gwu.edu/explore/aboutgw/history}.


\textsuperscript{15} Ibid., 3-7.

\textsuperscript{16} Ibid., 7.
Newberry’s Report offers revealing documentation of the location and thickness of coal seams, the chemical composition of locally mined and coked coal, as well as the characteristics of available iron ore, limestone, and sandstone unearthed along the railroad in Weathersfield, Austintown, and Canfield Townships. Following the road south of Canfield into Green Township, Newberry investigated a somewhat extensive stretch of coal mines owned and operated by the Roller, Walter, Whistler [Wisler], and Carsh families in the immediate vicinity of the village of Washingtonville, south of Green Village. Located within both Green and Salem Townships, the state of Ohio formally incorporated the village of Washingtonville in 1844.17

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17 Michael Frederick initially plotted Washingtonville in 1832. Horace Mack, History of Columbiana County, Ohio with Illustrations and Biographical Sketches of Some of Its Prominent Men and Pioneers (Philadelphia: D.W. Ensign & Co., 1879), 240 & 305. At the time of Newberry’s assessment, the Whistler family mine employed only two to three miners. Fourth Annual Report of the State Inspector Mines to the Governor of the State of Ohio For the Year 1877 (Columbus: Nevins & Myers, State Printers, 1877), 100.
For Newberry, the coal mined by these Washingtonville families was of “great similarity of character and nearly equal purity . . . [and] it is here the purest coal on the

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line of the road, and, indeed, contains a less amount of ash than any coal I have examined in Ohio.”

Newberry’s favorable remarks continued further following his analysis of the chemical composition and characteristic of the coke made from coal unearthed at these mines. Newberry asserted boldly that coke made from the Whistler [Wisler], Roller, and Walter coal mines “is considered by foundry men who have used it [to be] better than that made from the Pittsburgh coal.”

Before discussing his findings along the Southern Division of the road south of New Lisbon to the Ohio River, Professor Newberry offered the following prophetic concluding comment:

The abundance of ore in the vicinity of Washingtonville, and the excellence of the coal, should make this an important point in the business of the Road. It is to be regretted that the coal is not of greater thickness, but the coal and the ore overlaying it may perhaps be worked advantageously together.

Professor Newberry developed further his experimental and analytical findings within his 1856 Report during his appointment as State Geologist of Ohio from 1869 to 1882.

Ohio’s state legislature created the Geological Survey of Ohio on March 27, 1837 with the objective of “investigat[ing] the mineral resources of the state” as well as Ohio’s “flora, fauna, soils, and agriculture.” Ohio’s first State Geologist William Mather conducted the first survey of the state from 1837 through 1838, and his work and findings

19 Newberry, Report on the Economical Geology of the Route of the Ashtabula and New Lisbon Rail Road, 21-23.

20 Ibid., 23.

21 Ibid., 24.

are commonly referred to as the Mather Survey. Michael C. Hansen and Horace R. Collins suggest that despite the brevity of Mather’s findings “the most significant accomplishment of the first Geological Survey of Ohio was the delineation of the general stratigraphic sequence in the state and the basic geological structure.”

Despite several attempts to “reactivate the Geological Survey,” the state did not commission another assessment until 1869 when officials named John Strong Newberry Ohio’s second State Geologist.

Professor of Geology and President of Ohio A&M College Edward Francis Braxton Orton, Sr. served as assistant geologist during Newberry’s tenure as State Geologist and then followed Newberry as Ohio’s third State Geologist – serving from 1882 until his death in 1899. The findings and writings of both Newberry and Orton during the years 1869 through 1888 are commonly categorized as the second organization of the Ohio Geological Survey with Professor Orton’s work from 1888 until his death as being delineated as the third organization of the Geological Survey. Detailed analyses of Newberry’s and Orton’s exhaustive findings appearing in the Geological Surveys of Ohio (1873, 1874, 1875, 1878, 1882, and 1884) provide useful data associated with the geological composition of eastern Ohio and offer more detailed analysis of the chemical

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24 Hansen and Collins briefly discuss how Newberry was among several qualified candidates for the position, and that “political deals” and back room agreements played a direct role in selecting the next State Geologist. Refer to Hansen and Collins, 8-9.

25 Past Presidents of The Ohio State University, Office of the President http://president.osu.edu/past_presidents.php. Ohio State University was originally known as Ohio A&M College.

26 Hansen and Collins, “A Brief History of the Ohio Geological Survey,” 3 and 8-10. The Fourth Ohio Geological Survey is described as being from 1900 to the present.
characteristics and overall mineral wealth of coal mined and coked at Washingtonville along the proposed regional railroad.

Forming some 320 to 245 million years ago during the Pennsylvanian and Permian Geological Periods, Ohio’s coal deposits are part of the Pennsylvanian System. All “coal-bearing strata” in Ohio are located geographically within the northern region of the bituminous Appalachian Coal Basin (Field). Bituminous coal, unlike anthracite coal, is often described as being “soft” coal and is characterized by its volatile hydrocarbons, relatively low moisture content, varying degrees of ash and sulfur, and moderate to high carbon content ranging between 45 and 86 percent. Anthracite coal, colloquially referred

Image 2-2 Edward Orton (March 9, 1829 – October 16, 1899)  

Forming some 320 to 245 million years ago during the Pennsylvanian and Permian Geological Periods, Ohio’s coal deposits are part of the Pennsylvanian System. All “coal-bearing strata” in Ohio are located geographically within the northern region of the bituminous Appalachian Coal Basin (Field). Bituminous coal, unlike anthracite coal, is often described as being “soft” coal and is characterized by its volatile hydrocarbons, relatively low moisture content, varying degrees of ash and sulfur, and moderate to high carbon content ranging between 45 and 86 percent. Anthracite coal, colloquially referred
to as “hard” coal and amounting to only two percent of the world’s coal, is characterized by its low volatile contents and high carbon content, ranging between 86 and 98 percent. The northern region of the Appalachian Coal Basin encompasses western Pennsylvania, eastern and southern Ohio, northern West Virginia, and small portions of Maryland’s western panhandle. The entire extent of the Appalachian Coal Basin includes the central and southern coal regions that extend into southwest West Virginia, eastern Kentucky, southwest Virginia, central Tennessee, and northern Alabama. The development of extensive coal mining operations in the northwestern portion of the Northern Appalachian Coal Basin ultimately transformed Ohio’s post-Civil War industrial economy.

Professor Orton and State Inspector of Mines Andrew Roy estimated that the entire Appalachian Coal Basin equaled roughly 60,000 square miles with approximately 10,000 to 12,000 square miles within the state of Ohio. When attempting to categorize, analyze, and describe the various coal seams (beds) throughout the northern Appalachian Coal Basin within the state of Ohio, Professors Newbery and Orton correlated their findings with Henry Darwin Rodgers’s First Geological Survey of Pennsylvania (1836).

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30 Knepper, Ohio and Its People, 132, 227, 286, and 289-301.

Ohio’s geologist did this because, according to Orton, Rodgers’s survey “had been accepted and followed, at least in its main features, by all the geologists that have subsequently worked in the territory to which this classification applies.” This is significant because, although located in adjoining states and analyzed by a variety of scientists, the vast bituminous coal deposit is within the same coal field.

Rodgers subdivided the Appalachian Coal Basin into the following five measures: Upper Barren Measures (950’ thick), Upper Coal Measures (250’ thick), Lower Barren

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32 Figure 1 in Leslie Ruppert, Susan Tewalt, and Linda Bragg, “Coal Resources of Selected Coal Beds and Zones in the Northern and Central Appalachian Basin,” U.S. Geological Survey, Fact Sheet 004-02, Online Version 1.0.

Measures (500' thick), Lower Coal Measures (600' thick), and the Serial Conglomerate (500' thick). After conducting field work for the Second Geological Survey of Ohio and correlating his findings and analyses with the work of geologists in Pennsylvania, Professor Orton concluded that

... the order of the coal measure rocks in western Pennsylvania is in all respects identical with the order of these rocks in eastern Ohio with the order of the coal measure found equally on both sides of the line [state boundary between Ohio and Pennsylvania].

All of the mineable coal seams (beds) located in Ohio are within either the Upper Coal Measures or the Lower Coal Measures of the Appalachian Coal Basin. The extent, quality, and unique mineral characteristics of the various coal seams within the Lower Coal Measures of eastern Ohio directly influenced the degree to which certain coal seams were developed as profitable mining operations.

Table 2.1 Stratigraphy of Ohio Coal

<table>
<thead>
<tr>
<th>Type</th>
<th>Bituminous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin</td>
<td>Appalachian Coal Basin (Field)</td>
</tr>
<tr>
<td>Region</td>
<td>Northern Region of Appalachian Coal Basin (Ohio Coal Field)</td>
</tr>
</tbody>
</table>
| Measures   | Upper Coal Measures  
              Lower Coal Measures |

34 Ibid., 1; and Edward Orton, “The Lower Coal Measures of Ohio,” The Ohio Mining Journal 1, no. 3 (May 15, 1883), 98.


37 A coal basin or coalfield is a region within a country where coal is known to exist. A coal measure is all of the strata associated with a coal bed or seam. A coal seam or coal bed is an extended deposit of coal. Andrew Roy, “Glossary of Technical Mining Terms,” The Ohio Mining Journal 2, no. 4 (August 15, 1884), 175-185.
Identifying and naming the various coal seams comprising the Lower Coal Measures of eastern Ohio, and then correlating these seams with those identified and named by geologists in Pennsylvania proved a laborious task for Ohio’s geologists during the 1870s and 1880s. Professor Newberry adopted a numerical system when identifying and categorizing coal seams throughout Ohio, and then upon further analysis and investigation amended or revised the numbers by adding letter subsets (e.g. 6 became 6(a) and 6(b)). Other geologists, primarily those in Pennsylvania, often provided a name for a specific coal seam associated with its location (e.g. Lower Freeport). Professor Orton rejected the use of a numerical system because it proved too “inadequate, inconsistent, confusing, and misleading.”

Despite Orton’s dislike of the numerical system, members of the Geological Surveys of Ohio continued to include the various identifiers for the coal seams of the Lower Coal Measures. The twelve mineable coal seams located within the Lower Coal Measures of Ohio (along with their various names and numbers) are listed in Table 2.2. The coal mined by the aforementioned families along the Middle Division of the Ashtabula & New Lisbon Railroad in Green and Salem Townships near Washingtonville are more accurately categorized and described in greater detail by Professor Orton, Inspector Roy, and state chemist N.W. Lord in Volume V of the Report of the Geological Survey of Ohio (1884).

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Table 2.2 Coal Seams of the Lower Coal Measures of Ohio\textsuperscript{39}

<table>
<thead>
<tr>
<th></th>
<th>Coal Seam</th>
<th>Coal No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.</td>
<td>Upper Freeport Coal</td>
<td>Coal No. 7</td>
<td>Big Vein of Salineville, Dell Roy Seam, Cambridge, Alexander, Bayley’s Run, Norris, Happy Hollow, Waterloo</td>
</tr>
<tr>
<td>11.</td>
<td>Lower Freeport Coal (Upper Kittanning Coal)</td>
<td>Coal No. 6 (a)</td>
<td>Roger, Steubenville Shaft, Hamden Furnace, Hatcher</td>
</tr>
<tr>
<td>10.</td>
<td>Middle Kittanning Coal (No. 5a Coal)</td>
<td>Coal No. 5</td>
<td>Strip Vein Coal, Hammondsville, Osnaburg, Pike Run, Dennision,, Coshocton, Zanesville, Straitsville, Nelsonville</td>
</tr>
<tr>
<td>9.</td>
<td>Lower Kittanning Coal</td>
<td>Coal No. 5</td>
<td>Carbondale, Sheridan, Leetonia, Mineral Point, New Castle, Lower New Lexington, Creek Vein, Hammondsville</td>
</tr>
<tr>
<td>8.</td>
<td>Upper Clarion Coal</td>
<td>Coal No. 4 (a)</td>
<td>Canfield Cannel, Creek Vein, New Lisbon, Limestone Coal of Vinton County, Scrub Grass</td>
</tr>
<tr>
<td>7.</td>
<td>Lower Clarion Coal</td>
<td>Coal No. 4</td>
<td>Gray Limestone Coal of Stark County, Ohio, Evansdale, Greentown, etc.</td>
</tr>
<tr>
<td>6.</td>
<td>Brookville Coal</td>
<td>Coal No. 4</td>
<td>Bolivar, McArthur, (Newland’s), Vinton Furnace</td>
</tr>
<tr>
<td>5.</td>
<td>Tionesta Coal</td>
<td>Coal No. 3</td>
<td>Bryce Coal of Canfield, Bedford Cannel, Coshocton County, Ohio</td>
</tr>
<tr>
<td>4.</td>
<td>Upper Mercer Coal</td>
<td>Coal No. 3</td>
<td>Blue Limestone Coal, Wick &amp; McDowell’s Coal of Canfield, Flint Ridge Cannel</td>
</tr>
<tr>
<td>3.</td>
<td>Lower Mercer Coal</td>
<td>Coal No. 3</td>
<td>Wellston (?)</td>
</tr>
<tr>
<td>2.</td>
<td>Quakertown Coal</td>
<td>Coal No. 2</td>
<td>Block Coal, Brier Hill, Youngstown, Massillon, Jackson Shaft (?)</td>
</tr>
<tr>
<td>1.</td>
<td>Sharon Coal</td>
<td>Coal No. 1</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{39} Orton, “Chapter I: The Stratigraphical Order of the Lower Coal Measures of Ohio,” 127. Also refer to Orton, “The Lower Coal Measures of Ohio,” \textit{The Ohio Mining Journal} 1, no. 3 (May 15, 1883), 108.
The highest quality coals contain high fixed carbon content with low ash, sulfur, and water content. Professor Orton explains “the percentage of sulphur falls below 1 per cent. in our best coals” throughout Ohio while there is “little coal in Ohio markets that yields less than 4 per cent. [sic] of ash.” A brief description of the general characteristics and extent of the Sharon, Mercer, Clarion, Kittanning, and Freeport coal seams helps to contextualize the true value and significance of the coal mined at Washingtonville and throughout the Mahoning and Shenango Valleys. The Sharon Coal (Mahoning Valley Block Coal and Mercer Block Coal) is the deepest mineable coal within the Lower Coal Measures and “contains many gradations in quality” with the highest quality coal containing between 52 and 56 percent fixed carbon, less than one percent ash, and variable amounts of sulfur, with an average above five percent. The Mercer Coals are quite extensive appearing in thirteen Ohio counties, especially in Perry, Hocking, and Vinton Counties in south central Ohio. But, according to Orton, “as to the amount and color of ash, as to percentage of sulphur [sic], as to the structure and thickness of the seam, no general statements can be made.” The Clarion Coals are “quite uniform” but a “rather weak coal” without “an excessive amount of ash but always high in sulphur [sic].” The Lower Freeport Coal “is nowhere of the highest quality” while the Upper Freeport Coal ranks “second in the quantity of coal” and contains

40 Orton, “Chapter II: The Coal Seams of the Lower Coal Measures of Ohio – In Part,” 149-150. Professor Orton also indicates that the overall average for all Ohio coals is close to five percent ash.

41 Ibid., 156-157. Discussion of the Mahoning Valley Block Coal and Mercer Block Coal deposits appear in chapters six and eight of this work.

42 Ibid., 158-159.

43 Ibid., 162.
between 52 and 55 percent carbon.\textsuperscript{44} The Kittanning Coals are “the most important seams in the Ohio series . . . and in northern Columbiana [County] the bed attains great excellence” with a fixed carbon content above 50 percent.\textsuperscript{45}

The highly praised Lower Kittanning Coal of the Lower Coal Measures first appears in Ohio at Green Station in Green Township – approximately one half mile south of J.M. Petit’s farm in Green Township. The coal mined in these sections, which are at times also referred to as New Albany coal, appears along the Middle Division of the Ashtabula & New Lisbon Railroad as noted by Professor Newberry in 1856.\textsuperscript{46} The Walters family’s coal mine, located in Green Township, is also of the Lower Kittanning coal seam and “lies level with the railroad.”\textsuperscript{47} Professor Orton further confirms Newberry’s original assessment by stating that the coal located in Green and Salem Townships along the railroad “is an important one [covering] not the heaviest, but, all things considered, the most valuable deposit of the Lower Kittanning coal in the State.”\textsuperscript{48} The coal in Salem Township (Washingtonville / Leetonia coal) appears in two benches, the upper being a mere eight inches thick while the “much purer” lower bench being approximately twenty inches thick, making this highly prized coal “the thinnest . . . now worked in . . . [a] large way in Ohio.”\textsuperscript{49} Professor Orton indicates that the mines in Green

\textsuperscript{44} Ibid., 166-167.

\textsuperscript{45} Ibid., 163-164.


\textsuperscript{47} Orton, “Chapter I: The Stratigraphical Order of the Lower Coal Measures of Ohio,” 32-33.


\textsuperscript{49} Ibid., 190.
and Salem Townships near Washingtonville had “worked about 400 acres of this seam” at the time of his observation in 1884.\textsuperscript{50}

In fact, by 1860, miners in Columbiana County had extracted a total of 751,316 tons of coal, while miners in adjoining Mahoning County had extracted 1,305,352 tons of coal.\textsuperscript{51} A piece of information one must not overlook is that the state of Ohio created Mahoning County from portions of Trumbull and Columbiana Counties on February 16, 1846. The state requisitioned Columbiana County’s five northernmost townships of Smith, Goshen, Green, Beaver, and Springfield to form the southern third of Mahoning County and removed Trumbull County’s southernmost townships to form the remainder of the new county.\textsuperscript{52} It is unclear whether the much sought after Lower Kittanning Coal mined in Green Township is included within the totals of the recently incorporated Mahoning County or of Columbiana County in yearly totals during the late 1840s through the Civil War.

The fact that most of the coal mined in Green Township was sent to Salem Township via the Ashtabula & New Lisbon Railroad to be used in the soon to incorporated Leetonia Iron & Coal Company’s beehive coke ovens, blast furnaces, and

\textsuperscript{50} Ibid., 190.


\textsuperscript{52} Joseph G. Butler, Jr., \textit{History of Youngstown and the Mahoning Valley, Ohio}, Volume I (Chicago and New York: American Historical Society Publishers, 1921), 544. The southern townships of Trumbull County that became a part of Mahoning County are Berlin, Ellsworth, Canfield, Boardman, Poland, Milton, Jackson, Austintown, Coitsville. Mack, \textit{History of Columbiana County}, 26 and 287.
rolling mill also confounds attempts to specify exact production totals of specific seams of coal in southern Mahoning and northern Columbiana Counties.

Map 2-3 Columbiana and Mahoning Counties

Furthermore, Reports by Ohio’s State Inspector of Mines, first appearing in 1875, categorize the coal mining operations in Columbiana County into the “Leetonia and New Lisbon” district without delineating whether this classification refers to only the mines located in these two Columbiana County villages or to the mines owned and operated by manufacturers at these localities.

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One certainty associated with the coal mined in Green Township (Mahoning County) and Salem Township (Columbiana County) is that the “coke manufactured from the Leetonia seam holds a high place among Ohio cokes, both as to strength and purity.” As described by one of Professor Newberry’s colleagues Henry Newton, “coke is the combustible residue remaining after the volatile parts of a bituminous coal have been expelled by” heating the coal in the absence of air in either heaps, pits, or ovens. In most cases, high quality coal (low ash, sulfur, and water contents with high carbon content) yields high quality coke, proving critical in the process of manufacturing high quality pig iron in blast furnaces. The following table appearing in Volume V of the Report of the Geological Survey of Ohio (1884) illustrates why geologists and “furnace men” alike praised Washingtonville Coal and Coke (i.e. the coal seams of the Lower Kittanning coal in Green and Salem Townships).

Table 2.3 Analysis of American Cokes

<table>
<thead>
<tr>
<th>Location</th>
<th>Water</th>
<th>Volatile</th>
<th>Carbon</th>
<th>Sulfur</th>
<th>Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mingo Junction, Ohio</td>
<td>0.40</td>
<td>1.30</td>
<td>91.25</td>
<td>1.97</td>
<td>7.38</td>
</tr>
<tr>
<td>Washingtonville, Ohio</td>
<td>.......</td>
<td>.......</td>
<td>95.50</td>
<td>1.20</td>
<td>3.30</td>
</tr>
<tr>
<td>Leetonia, Ohio</td>
<td>.......</td>
<td>.......</td>
<td>89.30</td>
<td>2.66</td>
<td>8.04</td>
</tr>
<tr>
<td>Connellsville, Penn.</td>
<td>0.49</td>
<td>.......</td>
<td>87.456</td>
<td>0.693</td>
<td>11.332</td>
</tr>
<tr>
<td>Connellsville, Penn.</td>
<td>0.657</td>
<td>1.404</td>
<td>84.289</td>
<td>0.711</td>
<td>13.65</td>
</tr>
</tbody>
</table>


56 Ibid., 559-560.
In the words of Ohio’s third State Geologist Professor Edward Orton, “these are remarkable results, and they place this little seam [Washingtonville] almost at the head of Ohio coals as far as quality is concerned.”\textsuperscript{57} Joseph D. Weeks’ “Report on the Manufacture of Coke” appearing within \textit{A Special Report Prepared for the Tenth Census of the United States, Volume 10} (1884), which documents how coke made at Leetonia from “no. 4 coal” contained 93.75 and 95.5 carbon percent respectively, demonstrates further the mineral wealth of Washingtonville coal and coke.

The fact that these analyses yielded a higher carbon content in the coke made from Washingtonville coal as compared to that made from the world renowned Connellsville coal is truly remarkable. Furthermore, these scientific findings provide the context for understanding entrepreneurs’ motivations for establishing extensive coal, coke, and iron manufacturing works south of Washingtonville at the intersection of the Ashtabula & New Lisbon Railroad and the Pennsylvania Railroad’s Pittsburgh, Fort Wayne, & Chicago line. Before focusing on the establishment of these iron manufacturing firms in Salem Township, an account of the development of two major inter-regional railroads through Ohio is needed in order to understand how industrialists’ profited from having access to Washingtonville coal and coke.

\textsuperscript{57} Orton, “Chapter III: The Coal Seams of the Lower Coal Measures of Ohio – Continued,” 190.
Chapter Three

The Pennsylvania Railroad’s “Great Western Expansion” and the Construction of the Atlantic & Great Western Railway

“There are few territories of equal extent with the State of Ohio, that are so abundantly provided with the means of industrial wealth.”


While the mineral wealth of Washingtonville coal and coke was becoming more well-known, entrepreneurs and industrialists were eagerly launching grandiose inter-regional railroad projects throughout western New York, western Pennsylvania, and Ohio, which once completed, linked numerous towns and locations where families operated small-scale coal and coke operations. The Pennsylvania Railroad Company’s “great western expansion” into Ohio and the completion of the Atlantic & Great Western Railway during the late 1850s and early 1860s spurred the development of coal mining and coking and iron manufacturing west of the Appalachian Mountains. These inter-regional railroads traversed through rich mineral deposits and eventually connected several Midwestern communities to distant markets along the East Coast and the Mississippi River. Detailing the arduous task of constructing these rail lines reveals
entrepreneurs’ motivations for establishing iron manufacturing concerns in southern Mahoning and northern Columbiana Counties, while at the same establishing the professional and familial associations among the region’s emerging industrialists. More importantly, many of the entrepreneurs, surveyors, and directors who promoted these railroads helped establish the Leetonia Iron & Coal Company in 1865-1866.

On November 1, 1855, Pennsylvania Railroad Company President J. Edgar Thomson declared the two hundred and forty-five mile main line across the Keystone State stretching from the state capitol of Harrisburg to the burgeoning western city of Pittsburgh “complete.”¹ Chartered in April 1846, the Pennsylvania Railroad Company in its entirety also included more than one hundred miles of double track east from Harrisburg to Philadelphia, which the Commonwealth of Pennsylvania formally operated. Although extending to Pittsburgh, the Pennsylvania Railroad terminated at the confluence of the Monongahela and Allegheny Rivers, failed to span the Ohio River, and maintained no connections with neighboring rail lines.² Prior to completing its main line to Pittsburgh, the Pennsylvania Railroad Company aimed to expand west of the Ohio River as competition continued to develop with the Baltimore & Ohio Railroad, the Erie Railroad, and the New York Central Railroad during the late 1840s and early 1850s. These eastern railroad companies competed against one another in the development of profitable western lines to the ever-expanding populous Midwestern cities of Cincinnati, Cleveland, Chicago, and St. Louis. The Pennsylvania Railroad Company’s “western expansion” by way of its Pittsburgh, Fort Wayne, & Chicago line originated with the

² Ibid., 83.
incorporation and construction of three separate railroad entities: the Ohio & Pennsylvania Railroad Company, the Ohio & Indiana Railroad Company, and the Fort Wayne & Chicago Railroad Company.³

Incorporated in Ohio in February 1848 and in Pennsylvania two months later, the Ohio & Pennsylvania Railroad Company originally planned to construct a line from Mansfield, Ohio in Richland County

eastward by way of the towns of Wooster, Massillon, and Canton, to some point in the eastern boundary of Ohio, within the county of Columbiana . . . hence to the city of Pittsburgh . . . [as well as a rail line] from the said town of Mansfield westwardly, by way of Bucyrus, in Crawford County, until it intersects the west line of the State of Ohio.⁴

Surveys and gradings commenced in western Pennsylvania through the Beaver River Valley and in eastern Ohio in Columbiana County during the summer of 1848. A twenty-eight mile rail line from Federal Street in Allegheny City, Pennsylvania (across the River from Pittsburgh) to New Brighton, Pennsylvania opened for traffic in late July 1851. Construction of the line “pressed forward with much energy” and soon workers laid another thirty-one miles of rail in a northwestern direction to Clark’s Summit, Enon Valley, and then across the Ohio-Pennsylvania state line into the Columbiana County villages of East Palestine and Columbiana.⁵ A completed rail line thirteen miles in distance from Salem, Ohio in Perry Township, Columbiana County through the


⁴ Ibid., 66; Burgess and Kennedy, Centennial History of The Pennsylvania Railroad Company, 76; and The Corporate History of the Pittsburgh, Fort Wayne, and Chicago Railway Company (Pittsburgh: Stevenson & Foster, 1875), 3.

⁵ Rev. William L. Woodall, The History of Leetonia (L.C.O.), 3; and The Corporate History of the Pittsburgh, Fort Wayne, and Chicago Railway Company (Pittsburgh: Stevenson & Foster, 1875), 3.
southwestern corner of Mahoning County to the city of Alliance in neighboring Stark County opened for traffic on November 27, 1851. Grading and constructing the ten-mile rail bed through Fairfield, Salem, and Perry Townships between the villages of Salem and Columbiana, however, turned out to be a difficult task. Irish and German immigrants previously employed at the Sandy & Beaver Canal in central Columbiana County proved formidable laborers for the blasting, picking, shoveling, and hauling needed for cutting through a rock outcrop thwarting the proposed rail line near Green Creek in Salem Township immediately north of Franklin’s Station. Finally, on January 6, 1852, the Ohio & Pennsylvania Railroad opened for through traffic from Allegheny City to Alliance – a distance of approximately ninety-five miles.

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7 Refer to Map 2-1 in Chapter 2.

8 Franklin’s Station, now known as Franklin Square, was a heavily traversed crossroad in Section 22 of Salem Township. Construction on the Sandy & Beaver Canal finally concluded in 1848, some twenty years after the State of Ohio issued its charter. The Canal, which cut through the center of Columbiana County near New Lisbon, spanned seventy-three miles, contained ninety locks, and connected Bolivar, Ohio to Glasgow, Pennsylvania. http://www.ohiohistorycentral.org/entry.php?rec=797.

After completing the line from Pittsburgh to Alliance, the Ohio & Pennsylvania Railroad struggled financially in constructing the remaining ninety miles of track from Alliance to the central Ohio village of Crestline, located in Crawford and Richland Counties. Extending a reliable line to Crestline proved pivotal for the Ohio & Pennsylvania Railroad because the Cleveland, Columbus, & Cincinnati Railroad (the forerunner of the Big Four Railroad – Cleveland, Columbus, Cincinnati, and St. Louis Railroad) already serviced rail traffic through the small Ohio village. Ohio & Pennsylvania Railroad Company officials looked to the Pennsylvania Railroad Company for financial assistance during the fall of 1851 following the Board of Directors’

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September resolution approving the subscription of 5,000 shares of stock in the struggling Ohio & Pennsylvania Company. Nevertheless, by February 1852, a special committee informed the Ohio and Pennsylvania Railroad that

we [the directors of the Pennsylvania Railroad] cordially approve the great work of the Ohio and Pennsylvania Railroad Company, and earnestly desire its completion and success, but that it is not expedient, at present, for this Company [Pennsylvania Railroad], with an unfinished road, to authorize a subscription to its stock [Ohio and Pennsylvania Railroad].

Despite these difficulties, by April 1853 the Ohio & Pennsylvania line opened for through traffic to Crestline, a distance of one hundred and eighty-seven miles from Allegheny City. Despite the Company’s original charter, the Railroad’s Board of Directors had decided as early as September 1850 to make Crestline the terminus “provided the Ohio and Indiana Railroad Company shall locate and construct their road to Bucyrus, intersecting the Cleveland, Columbus, and Cincinnati Railroad at the point thus chosen by the Ohio and Pennsylvania Railroad Company.”

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12 Burgess and Kennedy, *Centennial History of The Pennsylvania Railroad Company*, 76.

Incorporated in Ohio in March 1850 and in Indiana in January 1851, the Ohio & Indiana Railroad Company aimed to construct a one hundred and thirty one mile line from Crestline at the point where the Ohio and Pennsylvania Railroad intersects the Cleveland, Columbus, and Cincinnati Railroad . . . thence to Bucyrus in the county of Crawford, thence to Upper Sandusky in the county of Wyandotte [sic], and thence . . . to the west line of the state of Ohio, and thence to Fort Wayne in the state of Indiana.\(^{15}\)

The contractors’ “commendable energy” assured completion of the Ohio & Indiana line by November 1, 1854, making rail access open from Allegheny City to Fort Wayne a

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\(^{15}\) Ibid., 4-5. After passing through Upper Sandusky, the proposed rail line continued west by southwest to the communities of Ada in Hardin County and Lima in Allen County, and then progressed north by northwest through Van Wert in Van Wert County. The Official Ohio Railroad Map: 2007-2009 (Columbus: The Ohio Rail Development Commission & The Ohio Department of Transportation, June 2007).
mere six and one half years after the original charter of the Ohio & Pennsylvania Railroad.\textsuperscript{16} During the course of constructing the line to Fort Wayne, delegates and financiers “from Illinois, Indiana, Ohio, and Pennsylvania representing large, varied, and important interests, from the seaboard to the Mississippi river” convened in Warsaw, Indiana and resolved to construct a one hundred and fifty two mile railroad from Fort Wayne to Chicago.\textsuperscript{17} Unlike the rapid construction of the line between Crestline and Fort Wayne, the Fort Wayne to Chicago line progressed at an anemic pace from 1853 through 1855.

In fact by February 1856, the proposed line extended a mere nineteen miles from Fort Wayne to Columbia City, Indiana and in the process “exhausted its [Fort Wayne and Chicago Railroad] credit.”\textsuperscript{18} The Fort Wayne & Chicago Railroad’s insolvency weakened the Ohio & Indiana Railroad’s line, which although complete was not fully ballasted and in need of significant upgrades and maintenance.\textsuperscript{19} Similarly, the Ohio & Pennsylvania Railroad continued its futile effort to construct a bridge across the Ohio River to connect with the city of Pittsburgh across from Allegheny City, which similarly continued to deplete the company’s overextending credit. The Ohio & Pennsylvania line also struggled to compete with the movement of their freight in conjunction with

\textsuperscript{16} The Corporate History of the Pittsburgh, Fort Wayne, and Chicago Railway Company, 5. Allegheny to Fort Wayne is a distance of three hundred and eighteen miles.

\textsuperscript{17} Ibid., 6.

\textsuperscript{18} The Corporate History of the Pittsburgh, Fort Wayne, and Chicago Railway Company, 7; and Burgess and Kennedy, Centennial History of The Pennsylvania Railroad Company, 176-177.

\textsuperscript{19} A ballasted railroad contains gravel, stone, slag, or backfill placed underneath railroad ties in order to stabilize tracking of rails. A properly ballasted railroad disperses a train’s immense weight and also ensures adequate run-off of water along the line.
competing trunk lines, especially those intersecting the Allegheny City to Crestline line in the communities of Alliance, Canton, Massillon, Wooster, Mansfield, and Crestline.

Map 3-3 Fort Wayne to Chicago Line

As a result of these operational and financial difficulties, the Pennsylvania Railroad Company had by 1855 “subscribed $300,000 each to the stocks of the Ohio and Pennsylvania and the Ohio and Indiana Railroads, and by reason of certain dividends declared in stock, it carried the joint investment of $625,000.”21 The Ohio & Pennsylvania, Ohio & Indiana, and Fort Wayne & Chicago Railroads also carried approximately $1,400,000 in unfunded debt as well as combined mortgage debts

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21 Burgess and Kennedy, Centennial History of The Pennsylvania Railroad Company, 176-177.
approaching $6,000,000.\textsuperscript{22} Due to these clear financial difficulties, the directors of all three interconnected rail lines agreed in the necessity of consolidating into one railroad company – the Pittsburgh, Fort Wayne, & Chicago Rail Road Company. Incorporated on July 29, 1856, J. Edgar Thomson and the other fourteen directors of the Pittsburgh, Fort Wayne, & Chicago Rail Road Company moved quickly to solidify the road. By the end of 1856, the line between Fort Wayne and Chicago extended forty-five miles west from Columbia City to Plymouth, Indiana. During 1857, the Pittsburgh, Fort Wayne, & Chicago completed the essential bridge linking Allegheny City to Pittsburgh, with an actual rail connection to the main line of the Pennsylvania Railroad occurring the following year. The directors also assured the much needed ballasting of all but thirty miles of the line west from Crestline.\textsuperscript{23} With a reliable railroad open for traffic from Pittsburgh to Chicago by early 1859, the Pennsylvania Railroad’s investment and influence in the four hundred and sixty-eight mile Pittsburgh, Fort Wayne, & Chicago Rail Road ensured its preeminent position in the Midwest and the realization of the Company’s long desired “western expansion.”\textsuperscript{24}

\textsuperscript{22} Ibid., 177.

\textsuperscript{23} Thirty-Fourth Annual Report of the Commissioner of Railroads and Telegraphs to the Governor of the State of Ohio For the Year 1901, 67-68; Burgess and Kennedy, Centennial History of The Pennsylvania Railroad Company, 176-177; and The Corporate History of the Pittsburgh, Fort Wayne, and Chicago Railway Company (Pittsburgh: Stevenson & Foster, 1875), 8-11.

\textsuperscript{24} Only two years after offering rail traffic from Pittsburgh to Chicago, a receiver was appointed for the Pittsburgh, Fort Wayne, & Chicago Railroad on June 10, 1861. On February 26, 1862, the Pittsburgh, Fort Wayne, & Chicago Railroad was reorganized in the state of Pennsylvania. Thirty-Fourth Annual Report of the Commissioner of Railroads and Telegraphs to the Governor of the State of Ohio For the Year 1901, 67-68.
In addition to competing with the Baltimore & Ohio Railroad, the New York Central Railroad, and the Cleveland, Cincinnati, Chicago, & St. Louis Railroad (The Big Four), the Pittsburgh, Ft. Wayne, & Chicago line contended directly with the Atlantic & Great Western Railway (later a part of the Erie Railroad) for transportation predominance.

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in Ohio and throughout the Midwest. Similar to the Pittsburgh, Fort Wayne, & Chicago Railroad, the Atlantic & Great Western Railway formed through the consolidation of three separate railroads located in western New York, northwestern Pennsylvania, and eastern Ohio. The first regional railroad later to become a part of the Atlantic & Great Western appeared in the two westernmost counties of New York in the summer of 1851. Residents of Jamestown, New York in Chautauqua County, feeling “snubbed” by the Erie Railroad’s decision to originate their line some thirty-five miles east along the Allegheny River at Bucktooth (renamed Salamanca in 1862) in Cattaraugus County, New York, met in late June 1851 to charter a petition for construction of a railroad to service their community. The resulting Erie & New York City Railroad was to extend from where the Erie line terminated at Bucktooth westward through the village of Randolph, then into Chautauqua County and through Jamestown, before terminating at the Pennsylvania state line. Surveys and gradings for the railroad commenced in May 1853, but by January 1855, all construction ceased because of a lack of necessary funds.26

The second regional railroad that eventually became a part of the Atlantic & Great Western Railway originated with a groundbreaking ceremony in Meadville, Pennsylvania in August 1853. The Commonwealth of Pennsylvania, however, did not formally charter the Meadville Railroad Company until April 3, 1857. Three months later, the Meadville Railroad Company named William Reynolds president and commissioned the

construction of a forty-mile rail line from Meadville north to the pivotal Lake Erie port of Erie. On July 23, 1857, the Meadville Railroad Company purchased the rights of way to connect with the financially strapped Erie & New York City Railroad in western New York and the rapidly expanding Franklin & Warren Railroad in eastern Ohio from the Pittsburgh & Erie Railroad for $400,000. After agreeing to various construction contracts with A.C. Morton, Henry Doolittle, and Worthy S. Streator to connect with these neighboring rail lines and failing to acquire much needed capital from European investors during 1857, the Meadville Railroad Company formally changed its name to the Atlantic & Great Western Railroad Company of Pennsylvania on April 15, 1858. The remaining regional railroad, and arguably the most important, to become a part of the Atlantic & Great Western Railway Company was the Franklin & Warren Railroad Company.

Marvin Kent, an esteemed merchant and civic leader in Franklin Mills, Ohio, provided the impetus, financial backing, and organizational leadership needed in the formation of the Franklin & Warren Railroad. The son of a pioneering family to Ohio’s Western Reserve, Marvin Kent was born on September 21, 1816 in Ravenna, Portage County, Ohio. Zenas Kent, Marvin’s father, arrived in Portage County in 1812 at the age of twenty-five. After operating a tannery in Hudson Township for approximately three years, Kent relocated to Ravenna whereupon he opened a general merchandise


28 Ibid; and History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume I (Cleveland, Ohio: H.Z. Williams & Brother, 1882), 106.

29 Harriet Taylor Upton, History of Western Reserve, Volume II (Chicago: The Lewis Publishing Company, 1910), 748.
business. After successfully leading the construction of Ravenna’s “New England style” courthouse from 1826 to 1830, Zenas Kent devoted his energy to acquiring five hundred acres of land in nearby Franklin Mills in 1832.\textsuperscript{30} Over the course of the next seven years, Zenas Kent opened a profitable flour mill, developed a lucrative tannery business, constructed an imposing four-story commercial block in downtown Franklin Mills, and sold his real estate holdings to the Franklin Land Company for $75,000.\textsuperscript{31} By 1845, Zenas’s sons Marvin and Charles H. Kent assumed responsibility of the family’s burgeoning mercantile interests in Portage and Summit Counties, but the Kent family’s patriarch remained active in the continued commercial development of Franklin Mills until his death in October 1865.\textsuperscript{32}

After opening and operating a glass factory business in Franklin Mills within five years of acquiring his father’s commercial holdings, Marvin Kent became fixated on the promotion and construction of a rail line through Franklin Mills. Kent envisioned such a line as being the first step in the construction of an inter-regional railroad connecting New York City to St. Louis, Missouri.\textsuperscript{33} As described by William Henry Perrin, after “having carefully traced upon the map the route to be traversed . . . Mr. Kent set himself quietly . . . at work to perfect his plan . . . in order not to arose the jealousy and


\textsuperscript{31} Di Paolo suggests that Zenas Kent’s four story structure “was said to be the tallest in northeastern Ohio at the time.” Di Paolo also indicates that Zenas Kent’s 1837 transaction equals $1.4 million dollars in 2008.

\textsuperscript{32} Ibid.

\textsuperscript{33} Upton, History of Western Reserve, Volume II, 749.
opposition of competing lines.”  In the winter of 1850-1851, Marvin Kent traveled to the Ohio state house in Columbus “with a bill drafted by his own hand” hoping to secure a charter for his grandiose rail line. Once in Columbus, Kent received assistance from State Senator Milton Sutliff of Warren, Ohio who encouraged Kent to submit his bill as “the charter of a seemingly local road . . . under the title ‘Coal Hill Railroad’” and then before final passage of the bill change “the title to the more modest ‘Franklin and Warren Railroad.’”  Thanks to Senator Sutliff’s guidance, the state of Ohio awarded Marvin Kent a charter for the Franklin & Warren Railroad on March 10, 1851 with a capital stock “not exceeding two million dollars.” Kent’s “liberal” charter called for the construction of

a railroad from the village of Franklin, in the county of Portage, to Warren in the county of Trumbull, and from thence to the east line of Ohio . . . [and then] . . . continue the same from its place of beginning, in a westerly or southwesterly direction, to connect with any other railroad within the State, which the directors of said company may deem advisable.

Before electing directors to the Franklin & Warren Railroad in July 1851, Kent personally subscribed the mandatory $20,000 in stock required by the company’s charter.  On July 8, 1851, the directors selected Marvin Kent president of the Franklin & Warren Railroad, a position he would retain until the summer of 1864.

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35 Ibid.
36 Ibid.
Following Jacob G. Chamberlain’s survey of the proposed line between Warren and Franklin Mills on behalf of Marvin Kent in the spring of 1853, construction of the two hundred and forty mile railroad began on July 4, 1853 when Kent “broke ground for the new road, by removing the first shovelful of earth with his own hands.” Two weeks later during a meeting of the railroad’s stockholders, Kent described to those in attendance “how the general interests of the country require a great Eastern and Western railway communication . . . [with] a continuous route from the Atlantic to the Pacific

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40 “Necrological,” *The Ohio Mining Journal* 27 (1898): 131-135; and Harriet Taylor Upton, *History of Western Reserve*, Volume II, 749. As Map 3.5 indicates, there is a Warren and a Franklin in Pennsylvania, these must not be confused with Warren and Franklin Mills, Ohio, which also appear on Map 3.5. Note that the length of the line is indicated to be 246 miles on page 106 in *History of Trumbull and Mahoning Counties*, Volume I (1882).
shores.” Kent went on to say that because of the geographic importance and economic potential of central Ohio “your road [Franklin & Warren] may therefore be emphatically denominated the Atlantic & Great Western Railway.” 

In September 1853, the Franklin & Warren Railroad legally became the Atlantic & Great Railroad Company and by January 1854 the new company’s directors increased the capital stock from two to four million dollars. Yet, after two years of “considerable progress . . . made all along the line,” construction slowed in 1855 and in the wake of the Panic of 1857 ceased entirely by 1858.

Map 3-5 The Atlantic & Great Western Railway in Western New York, Northwestern Pennsylvania, and Northeast Ohio

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41 Perrin, ed., History of Summit County, with an Outline Sketch of Ohio, 295.

42 Ibid., 296; and Western New York Railroad Archive http://wnyrails.org/railroads/agw/agw_timeline.htm.

With construction stopped on the Erie & New York City Railroad, the Atlantic & Great Western Railroad Company of Pennsylvania (Meadville Railroad), and the Atlantic & Great Western Railroad (Franklin & Warren Railroad), renowned railroad contractor Henry Doolittle, who had concurrent construction contracts with all three railroads, travelled to Europe with William Reynolds and C. L. Ward during the spring and summer of 1858 in an attempt to secure investments for the completion of these three lines.\textsuperscript{44} Upon their arrival, Doolittle, Reynolds, and Ward met with “Anglo-American railway magnate” James McHenry in London.\textsuperscript{45} After describing their financial difficulties in completing the proposed lines, McHenry agreed to provide £10,000 in sterling if the three Americans agreed to allow Thomas W. Kennard, McHenry’s engineer, to survey the remaining sections of the line.\textsuperscript{46} Following McHenry’s initial investment, the state of New York chartered the Atlantic & Great Western Railroad Company of New York on May 7, 1859, which absorbed the failing Erie & New York City Railroad’s thirty-eight miles of track.\textsuperscript{47} Sixteen months later, the Atlantic & Great Western Railroad of New York succeeded in finishing the construction of the originally proposed line from Bucktooth (Salamanca) west through Randolph to Jamestown.\textsuperscript{48}

\textsuperscript{44} William Frederick Doolittle, M. D., The Doolittle Family in America, Part IV (Cleveland: The Savers & Waite Printing Company, 1904), 523; and “Timeline of Important Events of the A&GW RR and its Predecessors,” www.kentohiohistory.org/resources/RR-timeline.pdf.

\textsuperscript{45} “Erie and M’Henry - What the Transatlantic Capitalist Proposes to Do: History of the Atlantic and Great Western Road, How the Erie was Captured from Gould, Attempts to Unite the Two Great Highways,” The New York Times (May 2, 1874).


\textsuperscript{47} History of Trumbull and Mahoning Counties, Volume I (1882), 106.

\textsuperscript{48} Note: Henry Doolittle died on August 19, 1860 while in San Antonio, Texas. William Frederick Doolittle, M. D., The Doolittle Family in America, Part IV, 523.
Although the United States was on the verge of Civil War, construction resumed in all three states as McHenry continued in his efforts to secure further financial backing from European investors. In fact, during 1860 and 1861 McHenry secured a £200,000 investment from Don Jose de Salamanca, the Marquis of Salamanca and a £300,000 investment from Queen Christina of Spain for the ongoing project. Salamanca’s generous financial support and continued involvement with the Atlantic & Great Western Railroad of New York led directly to the renaming of Bucktooth to Salamanca on April 17, 1862. Construction continued in western New York and on May 7, 1861 the line extended to Corry, Pennsylvania – seven miles south of the New York-Pennsylvania state line and some sixty miles from Salamanca. Following a brief suspension of construction during the summer of 1861, the directors and presidents of the three distinct Atlantic & Great Western lines agreed on March 12, 1862 to establish a central board consisting of two directors from each of the railroads. Thomas W. Kennard continued to supervise the construction of the Franklin to Dayton portion of the line and in April 1863 he and other supporters celebrated the completion of the line to Akron, Ohio.

The Atlantic & Great Western continued to increase its holdings with the leasing of the eighty-mile long Cleveland & Mahoning Railroad for ninety-nine years in July

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49 Ellis, ed., History of Cattaraugus County, New York, 345; and B. Parry, Over the Atlantic and Great Western Railway, (London: Sampson Low, son, and Marston, 1866), 14.


Although chartered on February 22, 1848, the Cleveland & Mahoning Railroad, which connected Cleveland to Youngstown and intersected the Atlantic & Great Western at Leavittsburg near Warren, did not open for service until 1856-1857. This acquisition provided a crucial connection to the coal fields in eastern Ohio and the oil fields in northwest Pennsylvania with the port of Cleveland.

Five months later at a stockholders meeting on November 5, 1863, president Kent and engineer Kennard led the move to increase the company’s stock from four to six million dollars in order to ensure its completion to Dayton. With William Lee of Sidney, Shelby County, Ohio serving as superintendent of construction, the Atlantic & Great Western finally reached Dayton, Ohio on June 22, 1864.

Prominent Ohio suffragist advocate Harriet Taylor Upton offered the following description of the ceremony surrounding the completion of the line:

The ceremony of spiking was introduced with considerable merriment, Mr. Kennard driving the first spike in the last rail at four sturdy blows. Others followed in succession, one or two driving home in three, but the major portion [driving them] in from four to a dozen sledge hammer strokes each. At ten o’clock in the morning President Kent took the sledge

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52 History of Trumbull and Mahoning Counties, Volume I (1882), 105. It should be noted that the date for this acquisition is listed as October 1863 in Wiggins and McKillop, eds., Youngstown, Past and Present: Containing A History of the Settlement of the Mahoning Valley; Rise and Progress of Its Mining and Manufacturing Industries, with an Exhibit of the Trade and Commerce of Youngstown, for 1873-1874 (Cleveland: Ohio and Pittsburgh: Pennsylvania, Wiggins & McKillop, 1875), 33.


and addressed the company briefly . . . [saying] . . . “Gentlemen: Before proceeding the last spike, I desire to call your attention to the fact that on the 4th of July 1853, in company with several warm friends of this enterprise, we proceeded to the line of this railway and broke the first ground, and as I had the pleasure of removing the first earth it is especially gratifying to me to be present on the occasion of laying the last rail and driving the last spike.”

Following the ceremony, Kent “retired from the railroad business” able to proclaim proudly that the Atlantic & Great Western Railway for which he played such a pivotal role now provided access from New York City (New York City to Salamanca via Erie Railroad) to St. Louis, Missouri (Dayton to St. Louis via Cincinnati, Hamilton, and Dayton Railroad).

Similar to the rapid development of the community of Crestline following the intersecting of the Pittsburgh, Ft. Wayne, & Chicago with the Cleveland, Columbus, & Cincinnati the outposts of Bucktooth (Salamanca), Jamestown, Randolph, Meadville, and Corry soon burgeoned with the completion of the Atlantic & Great Western Railway. Special Commissioner of the Money Market Review B. Parry provided detailed descriptions of the many communities appearing along the rapidly expanding line and the great excitement associated with the railroad in a series of twelve letters he authored while travelling on the Atlantic & Great Western from May through July 1866. Parry’s letters describe how Salamanca transformed from one water tanker servicing the Erie

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56 Upton, History of Western Reserve, Volume II, 749.
57 “Marvin Kent Dead: Pioneer Railroad Man and Banker Passes Away at 92,” The New York Times (Dec. 12, 1908); Perrin, ed., History of Summit County, with an Outline Sketch of Ohio, 295; and “Timeline of Important Events of the A&GW RR and its Predecessors,” and Western New York Railroad Archive. Despite these successes, the Erie Railroad soon leased and then formally acquired the Atlantic & Great Western Railway in 1868. Refer to Map 3.6 at the conclusion of this Chapter.
58 B. Parry, Over the Atlantic and Great Western Railway, (London: Sampson Low, Son, and Marston, 1866).
Railroad in 1862 to a town with “decent streets, middling shops, fair cottages, and three churches.” At the time of his visit in May 1866, Salamanca was in the process of laying a stone foundation for an eleven stall engine house, with plans to construct an engine house, car shop, and blacksmith shop.  

The residents of Jamestown who provided the original impetus for a railroad to connect with the Erie at Bucktooth (Salamanca) also witnessed their community flourish with the completion of the line. Parry depicted Jamestown as a “sweet place” where manufacturers flourish with four saw mills, three furniture stores, two woolen factories, three sash, door, and blind factories, two machine shops, two edge tool shops, and a gas work . . . [as well as] . . . five hotels, three banks, eight churches, and two newspapers.

Similarly, Parry documented how the railroad influenced the oil rich outposts of Corry and Meadville, Pennsylvania. According to Parry, “in 1860 there was no Corry,” but by the time of his visit the “straggling busy town [had] churches, hotels, numerous manufacturing concerns and a population that perhaps exceeds five thousand.” West of Corry at Meadville, increased rail traffic due to the profitable extraction and exporting of oil to Erie and Cleveland resulted in the completion of a twenty-five stall railroad roundhouse, with plans for an additional thirteen stalls. Parry contended that this economic boom led to a doubling of Meadville’s five thousand residents between 1862 and 1866. The completion of the Atlantic & Great Western Railway certainly

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59 Ibid., 14-17.
60 Ibid., 22-23.
61 Ibid., 24.
62 Ibid., 3-4.
quICKENED THE EXTRACTION OF VALUABLE MINERALS AND THE ECONOMIC VIABILITY OF SMALL COMMUNITIES ALONG THE LINE IN WESTERN NEW YORK, NORTHWESTERN PENNSYLVANIA, AND THROUGHOUT OHIO.

Map 3-6 The Atlantic & Great Western Railway and Connections

Chapter Four

Jacob G. Chamberlain and the
Leetonia Iron & Coal Company, 1850-1873

“Mr. Chamberlain might be styled the founder of the town of Leetonia, inasmuch as he not only laid it out, but has done more, perhaps, than any other man to advance its growth and prosperity”


The mining of high quality bituminous coal and the laborious construction of railroads in eastern Ohio during the 1850s and 1860s forever altered the economic and industrial foundations of northern Columbiana County and southern Mahoning County. The arrival of the railroads quickly transformed the sparsely populated rural setting into a region heavily dependent on coal, coke, and iron related industries. The completion of the Pittsburgh, Fort Wayne, & Chicago Railroad and the Ashtabula & New Lisbon Railroad through Salem and Green Townships quickened the extraction of local coal and ultimately led to the formation of two profitable coal and coke fueled iron manufacturing companies in Columbiana County. Both of these companies relied on the area’s highly prized coal and utilized the nearby intersecting railroads as both a means to import limestone and iron ore for use in their blast furnaces and as avenues to export finished
iron products. Jacob G. Chamberlain and those associated with Leetonia Iron & Coal Company were some of the earliest ironmasters to profit from access to high quality bituminous coal and coke as a smelting fuel for iron manufacturing west of the Appalachian Mountains.

The 1860 Census recorded forty-eight pig iron establishments operating throughout the Buckeye State, which ranked second in the nation behind Pennsylvania. Ohio’s pig iron firms produced 117,754 net tons of iron in 1860, second again to the keystone state’s 580,049 net tons of iron (60 percent of the nation’s 987,559 total net tons of iron production).¹ Thirty-five of the pig iron firms in Ohio were located in the southern portion of the state along the Ohio River in Lawrence, Gallia, Scioto, Jackson, Vinton, and Hocking Counties. All of these firms used charcoal as the primary smelting fuel within their furnaces. Eight of the remaining thirteen pig iron furnaces were located in Mahoning and Trumbull Counties and relied primarily on local “raw” block coal as the primary smelting fuel. The remaining five pig iron establishments were located in Stark, Tuscarawas, Muskingum, Lake, and Erie Counties.² With the creation of Mahoning County in 1846, Columbiana County’s population decreased significantly from 42,662 in 1840 to 33,621 by 1850. On the eve of the Civil War, Columbiana County’s reduced


population remained fixed at roughly its 1850 total – 32,836. Pig iron industries were non-existent in the county, and according to the decennial Census, there were only two iron casting establishments employing less than two dozen “hands” in 1860.

By 1870, pig iron production in Ohio had increased to 306,363 net tons with Mahoning County ranking first in total production with 85,941 net tons by 1871. Although non-existent in pig iron production a decade earlier, Columbiana County now ranked seventh in the state according to total net tons with 19,767. In fact, Columbiana County and Cuyahoga County were the only newcomers to the state’s top ten pig iron producing counties, with the latter only having a 3,400 net ton total. Two different partnerships established in Salem Township in 1866, using high quality bituminous coal and coke as smelting fuels, produced all of Columbiana County’s total net pig iron in 1870. By 1872, the two companies in Salem Township nearly doubled the county’s 1870 total, manufacturing 33,901 tons of pig iron. Jacob G. Chamberlain proved to be the most influential individual involved in Columbiana County’s transformation into a burgeoning center of coal, coke, and iron enterprises during the 1850s and 1860s.

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6 *Annual Report of the Secretary of State for the Governor of the State of Ohio for the Year 1871*, 63.

7 *History of the Upper Ohio Valley, Volume II, Illustrated* (Madison, Wisconsin: Brant & Fuller, 1891), 87; and *Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year 1874* (Columbus: Nevins & Myers, State Printers, 1875), 292-293.
A descendant of well-established New England families, Jacob Gerrish Chamberlain was born on September 11, 1829 in London, Merrimack County, New Hampshire – the youngest of three children. While a teenager, Chamberlain’s attempts to find satisfying employment in the machine shops, cotton factories, boarding houses, and chair factories of New Hampshire and Massachusetts proved futile. After spending one year respectively at Gilmanton Academy and Fisherville Academy in his native New Hampshire, twenty-one year old Jacob G. Chamberlain “decided to become an engineer”

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8 “Necrological,” The Ohio Mining Journal 27 (1898).


and in the fall of 1850 departed for Ohio “with sixty dollars.” Chamberlain’s various means of transport during his trek to Ohio illustrate the nation’s inchoate transportation network during the mid-nineteenth century. Chamberlain first traveled by rail from Boston, Massachusetts to Hollidaysburg, Pennsylvania and then by stagecoach to Pittsburgh. In Pittsburgh, Chamberlain boarded a steamboat going to Wheeling, Virginia. After arriving in Wheeling, he again boarded a stagecoach bound for Aetna, Ohio in Licking County via the National Road.

After teaching school during the winter academic term in nearby Pataskala, Ohio, Chamberlain ventured north to Cleveland where he found employment as an axman with the Cleveland, Painesville, & Ashtabula Railroad. In the spring of 1851, railroad construction engineer John H. Devereux named Chamberlain rodman in the engineering division and dispatched the New Engander east to Unionville, Ohio in Lake and Ashtabula Counties. While in northwestern Ohio from July 1851 through December 1852, Chamberlain served as assistant engineer during the Cleveland, Toledo, & Norwalk Railroad’s construction of a line from Grafton, Ohio in Lorain County west to Norwalk,

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11 Ibid., 132.

12 Ibid.

13 Ibid., 132-133; and Brennan, ed., The Biographical Cyclopaedia and Portrait Gallery, 573.

14 Ibid., 133; and Ibid., 573. The Encyclopedia of Cleveland History describes John H. Devereux as a “leading Midwest railroad manager” who held a variety of positions associated with civil engineering and railroad construction in Ohio during the early 1850s and in Tennessee from 1852 to 1861. Following the Civil War, Devereux returned to Ohio where he served as general superintendent and vice president of the Cleveland and Pittsburgh Railroad (Cleveland to Hudson to Ravenna to Wellsville), vice president and president of the Lake Shore Railroad, president of the Cleveland, Columbus, Cincinnati, and Indianapolis Railroad, and president of the Atlantic and Great Western Railroad. “John H. Devereux,” The Encyclopedia of Cleveland History, Case Western Reserve University, http://ech.case.edu/ech- cgi/article.pl?id=DJH1.
Ohio in Huron County. Following his marriage to Harriet Bugbee of Stockton, New York on December 31, 1852, Chamberlain relocated to Windham, Ohio in Portage County after agreeing to survey the proposed line of Marvin Kent’s Franklin & Warren Railroad.

After participating in the construction of various railroad projects throughout Ohio from 1851 to 1853, Chamberlain relocated to Chicago, Dubuque, Iowa, and then Marquette, Michigan for approximately two years. Before returning to Cleveland in 1855, Chamberlain supervised the construction "of a tramroad [sic] from Marquette to the Jackson & Cleveland Iron Mining Co.’s mines [sic Cleveland Iron Mining Co.]” where “he had the honor . . . of loading the first two cars of iron ore shipped from the Lake Superior mines.” Within approximately five years, Chamberlain would utilize this experience in the construction of another tram-road in Mahoning and Columbiana Counties.

Jacob G. Chamberlain became acquainted directly with Professor John S. Newberry and his on-going geological examinations in eastern Ohio when Eben Newton appointed Chamberlain division engineer of the proposed rail line from Niles to New Lisbon in 1856. Similar to the Newberry and Kent Families, Eben Newton arrived in Ohio’s Western Reserve in 1814, and within a decade began practicing law in Canfield, Ohio. A few months before Marvin Kent travelled to Columbus in the hopes of securing

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15 “Necrological,” The Ohio Mining Journal 27 (1898): 133; and Brennan, ed., The Biographical Cyclopaedia and Portrait Gallery, 573.

16 Ibid., 133; and Judge Job Barnard, Genealogical Sketch of the Andrew Putnam Family for the Chautauqua County Historical Society (Conneaut, Ohio: The Conneaut Printing Company, 1919), 12. Barnard’s entry on Harriet Bugbee indicates that she and Jacob had six children.

17 Ibid., 133; and Brennan, ed., The Biographical Cyclopaedia and Portrait Gallery, 573.

18 Ibid., 133.
a railroad charter, Newton left the state capitol after serving nine years as a state senator to take his seat in the United States Congress. Before returning to the Ohio state senate in 1862, Newton served as President of the Ashtabula & New Lisbon Railroad from 1856 to 1859. Within a year of becoming President of the railroad, Newton appointed his division engineer, Chamberlain, to chief engineer where he remained until 1860. During this appointment, Chamberlain, Professor Newberry, and William Wetmore of nearby Canfield became business partners in order to take advantage of the high quality Washingtonville coal.

Image 4-2 Eben Newton (October 16, 1795 – November 6, 1885)


20 Ibid., 573.

21 History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II (Cleveland, Ohio: H.Z. Williams & Brother, 1882), facing page 9.
Prior to this partnership, the Wetmore family was aware of the value of the area’s coal. According to Professor Newberry’s *Report on the Economical Geology of the Route of the Ashtabula and New Lisbon Railroad* (1856) a “John and William Wetmore” maintained an “extensively worked” mine of “Coal Seam No. 4 – ‘Cannel Vein’ in the south-east part of the township [Canfield Township].” With growing demand for coal, Wetmore, along with his new business associates Chamberlain and Newberry, expanded mining operations by acquiring the mineral rights to two hundred acres of land from Anthony Whistler [Wisler] and proceeded to construct coke ovens adjacent to the proposed rail line in Canfield and Green Townships in 1857. After only a brief time, Wetmore “sold his interest” in the venture to Canfield lawyer and Mahoning County Probate Judge Garretson I. Young, whereupon the partnership became Young & Chamberlain. After purchasing Whistler’s coal mine in 1858, Chamberlain and Young supervised the extraction and production of high quality Washingtonville coal and coke which “they hauled . . . by wagon to Columbiana[,] . . . Massillon and other points.” After Ashtabula’s Edward W. Fisk joined Young & Chamberlain in 1859, the new venture (Young, Fisk, & Company) took a significant step toward ensuring adequate distribution of their high quality coal.

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25 Ibid., 133; and Fourth Annual Report of the State Inspector Mines to the Governor of the State of Ohio For the Year 1877 (Columbus: Nevins & Myers, State Printers, 1877), 100.
Washingtonville coal and coke throughout the region’s ever-expanding railroad network.\textsuperscript{26}

Utilizing previous experience acquired while in Marquette, Chamberlain succeeded in 1861 in constructing a “strap tram railroad” from the Washingtonville coal mines and coke works south to the Pittsburgh, Ft. Wayne, & Chicago line in Salem Township.\textsuperscript{27} This “strap tram railroad” refers to the strap rail design that preceded the development of iron and steel “T-rail” designs in the United States. Strap rails consisted of “a rail of flat iron spiked to the surface of timber fashioned to receive it” approximately “two and one half inches wide and five eighths of an inch” in thickness.\textsuperscript{28}

Mechanical engineer and prolific author Anthony J. Bianculli, provides the most instructive descriptions of strap rail designs and railroad construction in his four volume series \textit{Trains and Technology}.\textsuperscript{29} For Bianculli, “facing or ‘plating’ a wooden stringer with strap rail was a common method of construction employed by all the pre-steam locomotive railroads in the United States.”\textsuperscript{30} Furthermore, according to engineering

\textsuperscript{26} Ibid., 133; and Harriet Taylor Upton, \textit{History of Western Reserve}, Volume II (Chicago: The Lewis Publishing Company, 1910), 1228-1229. Upton’s work indicates that Fisk remained involved in this coal and coke venture from 1859 to 1864, whereupon he redirected his interests into Ashtabula’s flour and customs industries.

\textsuperscript{27} Brennan, ed., \textit{The Biographical Cyclopaedia and Portrait Gallery}, 573; “Necrological,” \textit{The Ohio Mining Journal} 27 (1898): 134; and Chamberlain, “The Iron Industries of Columbiana County, Ohio,” \textit{The Ohio Mining Journal} (February 15, 1883): 79. It is worth noting that Brennan’s work describes Chamberlain’s strap rail as “a horse railroad.”


author George Packer Raidabaugh “the flat or ‘strap’ rail was the only form of rail that could be rolled upon American mills up to 1844.” In response to the increasing weight of railroad freight, mass production of the more reliable iron and then later steel “T-rail” soon supplanted the strap rail design throughout the United States. Despite these inherent design flaws, Chamberlain’s strap rail connected his partnership’s infant coal and coke venture to a reliable east-west trunk line, which ultimately proved crucial in the development of local iron industries.

During the Civil War, Chamberlain’s Young, Fisk, & Company succeeded in shipping “large quantities” of Washingtonville coal and coke to Newburgh, Ohio in Cuyahoga County, which “fully established the reputation given [to] it by Prof. Newberry.” This is of great significance because the firm Stone, Chisholm, & Jones’s rolling mill and blast furnace complex was located at Newburgh. Approximately six miles southeast of downtown Cleveland, Newburgh developed “as an early population and economic center for the area” following the completion of the Cleveland & Pittsburgh Railroad through Newburgh township in 1853. Described as “one of the pioneers in establishing [the iron] industry in Cleveland,” Stone, Chisholm, & Jones

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32 Hogan indicates that the Mount Savage Rolling Mill in Allegheny County, Maryland and the Montour Rolling Company of Danville, Pennsylvania starting producing “a T-rail weighing up to fifty pounds per yard… at about the same date” in 1844. Hogan, Economic History of the Iron and Steel Industry in the United States, Volume 1, 38.


dated to 1856 when brothers David I. and John Jones established Jones & Company.\textsuperscript{35} The Jones brothers immigrated to the United States from Wales in 1845 and after spending a decade working for the Phoenix Iron Company in Pennsylvania relocated to Cleveland in 1856. During the spring of 1857, the Jones brothers purchased land in Newburgh Township in order to construct a rail mill and soon thereafter became business partners with Henry Chisholm – “the father of the Cleveland steel trade.”\textsuperscript{36}

Born in Scotland on April 22, 1822, Henry Chisholm arrived in Cleveland in 1850 at the age of twenty-eight after spending half of a dozen years in Montreal, Canada. From 1850 to 1857, Chisholm designed and supervised the construction of a breakwater for the Cleveland & Pittsburgh Railway Company as well as several successful pier and dock construction projects along Lake Erie.\textsuperscript{37} Having “amassed a modest fortune . . . of about twenty-five thousand dollars” from these projects, Chisholm joined David I. and John Jones and established Chisholm, Jones, & Company.\textsuperscript{38} The new partnership succeeded in constructing a rolling mill at Newburgh to reroll “worn-out iron rails” and within a year, the company’s one hundred and fifty laborers produced “fifty tons of


\textsuperscript{38} A History of Cleveland and Its Environs: The Heart of New Connecticut, Volume II: Biography, 504.
rerolled rails daily.” After Andros B. Stone entered the partnership in 1858, the firm (Stone, Chisholm, & Company) erected a puddling plant and “the first blast furnace in that part of Ohio” in 1859, followed by another blast furnace stack the following year.

During the next several years, “with Mr. Chisholm as the organizing genius,” Stone, Chisholm, & Company’s Newburgh facility produced “pig iron, railroad iron, merchant iron, beams, horseshoes, and other iron articles.” After absorbing the Cleveland Railroad Iron Mill Company, the Newburgh mills and furnaces formally


41 Cleave, Cleave’s Biographical Cyclopaedia of the State of Ohio: City of Cleveland and Cuyahoga County, 40-42.
became the Cleveland Rolling Mill Company in 1864 with a capital stock of $500,000. According to Fr. William T. Hogan, Chisholm’s and Stone’s control “equal[ed] . . . almost 50%.”

Cleveland’s vital role as a port city and railroad terminus for iron ore, coal, coke, and iron during the Civil War is illustrated by the fact that according to historian Kenneth Warren “by 1865 local sales [Cleveland area] of manufactured iron were over $6,000,000.”

Henry Chisholm’s Cleveland Rolling Mill Company played a pivotal role in the industrial development of Cleveland, and in October 1868 the company became the fifth firm in the United States to successfully make steel using the Bessemer process.

The Cleveland Rolling Mill Company’s expanding iron and steel complex in Newburgh is the destination that Young, Fisk, & Company shipped their high quality Washingtonville coal and coke to during the Civil War. Despite making a significant profit from these coal and coke shipments, Jacob G. Chamberlain soon began contacting

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45 Kenneth Warren indicates in passing in The American Steel Industry, 1850-1870 that “At first some Brier Hill coal from the Mahoning Valley was used, but by the late 1870s Connellsville coke was the only fuel” at the Newburgh works. The Cleveland Encyclopedia of History also mentions briefly and rather vaguely, “the Newburgh facility initially used “coal from the Mahoning Valley. Unfortunately, both of these sources do not mention Washingtonville coal or coke, despite the fact that these high quality materials were shipped to and used by Cleveland’s early iron and steel manufacturers.
previous business associates and like-minded industrialists who shared the objective of establishing an independent iron firm immediately adjacent to Young, Fisk, & Company’s coal and coke operations and strap rail line in Canfield, Green, and Salem Townships.

Soon after construction of Young, Fisk, & Company’s strap rail line, Marvin Kent and William Lee, president and superintendent respectively of the Atlantic & Great Western Railway, became involved with Chamberlain’s coal and coke interests.\(^{46}\) Jonathan Warner and Joseph H. Brown of Youngstown, Dr. Lemuel Wick of Cleveland, and Marvin Kent’s old political ally while visiting Columbus in 1851 Milton Sutliff also joined Chamberlain’s increasingly profitable venture.\(^{47}\) Before becoming a state senator and assisting Marvin Kent in securing a charter for the Franklin & Warren Railroad (1850-1851), Sutliff graduated from Western Reserve College in 1833, participated in the formation of the American Anti-Slavery Society in Philadelphia, opened a law practice in Warren, and traveled throughout Ohio as a vocal anti-slavery advocate.\(^{48}\) After serving one term as state senator, Sutliff became a judge on Ohio’s Supreme Court in February 1858, and during his last year on the bench in 1863 presided as Chief Justice.\(^{49}\) After

\(^{46}\) “Necrological,” The Ohio Mining Journal 27 (1898): 134.

\(^{47}\) Ibid., 133.


holding these prominent political and legal positions, Judge Sutliff returned to Warren to practice law and later became involved with iron manufacturing concerns in Mahoning and Columbiana Counties until his death in 1878.\textsuperscript{50}

At roughly the same time that Sutliff, Warner, Brown, and Wick associated themselves with Chamberlain, Marvin Kent’s Atlantic & Great Western Railroad was acquiring the eighty-mile long Cleveland & Mahoning Railroad (July 1863). Soon thereafter, the Ashtabula & New Lisbon Railroad transferred its Niles to New Lisbon line to Kent’s expanding railroad.\textsuperscript{51} Unsurprisingly, Chamberlain became chief engineer of the railroad section and remained in that capacity until 1866. After becoming chief engineer of the same line he failed to complete for Eben Newton from 1857-1860, Chamberlain began working with Chauncey H. and Wallace C. Andrews of Youngstown to ensure completion of the road to Niles. Chamberlain and the Andrews brothers also began surveys of additional rail lines east from Youngstown to Sharon, Pennsylvania, which in time provided additional access and mineral rights to several valuable coal veins.\textsuperscript{52} When the Niles & New Lisbon rail line finally intersected the Pittsburgh, Fort Wayne, & Chicago Railroad near the farm of Jacob Anglemeyer in Salem Township (east of the Green Creek Switch) and “opened for passengers and traffic in 1865,”

\textsuperscript{50} “Milton Sutliff,” The Supreme Court of Ohio and The Ohio Judiciary System, http://www.sconet.state.oh.us/SCO/formerjustices/bios/sutliff.asp.

\textsuperscript{51} Brennan, ed., The Biographical Cyclopaedia and Portrait Gallery, 573.

\textsuperscript{52} “Necrological,” The Ohio Mining Journal 27 (1898): 134. The influential roles of Jonathan Warner and Joseph H. Brown in the development of coal mining enterprises and iron manufacturing companies throughout the Mahoning Valley are the focus of Chapter 6.
Chamberlain and his co-associates were moving forward in the creation of a local blast furnace complex.\textsuperscript{53}

In late 1865 “after due deliberation,” Chamberlain, Lee, Judge Sutliff, Wick, Brown, Warner, and William Mathers of New Lisbon purchased six hundred acres of land adjoining the Niles & New Lisbon line and formally organized the Leetonia Iron & Coal Company.\textsuperscript{54} After the seven “charter members of the company” received a certificate of incorporation from the state of Ohio on January 29, 1866, they started to develop plans for a town near the intersecting railroads.\textsuperscript{55} The proprietors selected Dr. Wick and Chamberlain to serve as president and general manager respectively of the new company.\textsuperscript{56} The 1860 United States Census places Wick in Cleveland’s Second Ward and lists him as a fifty-six year old banker married to Anna Wick. The Census records Wick’s real estate value at $10,000 with his personal estate valued at $50,000. A decade later, Lemuel and Anna Wick appear in Cleveland’s Fifth Ward with Lemuel still listed as a banker.\textsuperscript{57} With the wealthy Wick as president, the Leetonia Iron & Coal Company

\begin{footnotesize}

\textsuperscript{54} Mack, History of Columbiana County, Ohio, 239 and 243.

\textsuperscript{55} Chamberlain, “The Iron Industries of Columbiana County, Ohio,” The Ohio Mining Journal (1883): 80; and Annual Report, Secretary of State to the Governor of the State of Ohio for the Year 1866 (Columbus, Ohio: L.D. Myers & Bros. State Printers, 1867), 19.

\textsuperscript{56} Mack, History of Columbiana County, Ohio, 243

\textsuperscript{57} Eighth Census of the United States (1860); and Ninth Census of the United States (1870). Note that this “Lemuel Wick” is not the same “Lemuel Wick” living in Youngstown and associated with a variety of business ventures at this time. The “Lemuel Wick” associated with the Leetonia Iron & Coal Company is the Wick from Cleveland.
\end{footnotesize}
further increased its “coal lands” in 1865 and 1866 with the purchase of “two hundred acres of land, on [sic] Section 12, from John Yoder and Jacob Anglemeyer, and the right to the minerals on the Frederick, Roller, Leyman, and Kirsch farms.”\textsuperscript{58} Additionally, according to Chamberlain “the owners of the Washingtonville mines [Chamberlain’s Young, Fisk, & Co.] leased and purchased over one thousand acres of coal lands adjoining the property” which the Leetonia Iron & Coal Company then acquired “when it purchase[d] [the] Washingtonville mines.”\textsuperscript{59} The Company’s name and the name of the proposed town were in reverence to William Lee, who was described as an individual with “great energy . . . [and] ability as a manager of laboring men.”\textsuperscript{60}

Despite being the namesake for the recently organized company and for a proposed town, there are few extant documents detailing William Lee’s time as superintendent of the Atlantic & Great Western Railroad or his role in the formation of the Leetonia Iron & Coal Company. Born in New Bliss, Ireland in 1824 to a Colonel Edward Lee, William Lee immigrated to the United States “when [he was] quite young” whereupon he “began an extensive business as a railroad contractor.”\textsuperscript{61} From 1851 to 1866, Lee’s various railroad appointments kept him in Sidney, Ohio where the Cleveland, Cincinnati, Chicago, & St Louis Railroad (forerunner to the Big Four Railroad) traversed Shelby County.\textsuperscript{62} While in Sidney, Marvin Kent appointed Lee superintendent of

\textsuperscript{58} McCord, History of Columbiana County, Ohio, 135; and Mack, History of Columbiana County, Ohio, 243-244.


\textsuperscript{60} William Adams, ed., Historical Gazetteer and Biographical Memorial of Cattaraugus County, New York (Syracuse, New York: Lyman, Horton, and Company Limited, 1893), 1063.

\textsuperscript{61} Ibid.
construction for the Atlantic & Great Western presumably because Lee was “successfully completing several large railroad jobs.” On June 2, 1856, Lee married Anna Elizabeth Wallace (October 24, 1839 – April 29, 1902) in Perrysburg, Ohio.

Following the formation of the Leetonia Iron & Coal Company, William and Anna relocated to Randolph, New York, where they raised their four children and resided for the remainder of their lives. Randolph, as previously discussed, became an important town along the Atlantic & Great Western’s line in Cattaraugus County. Lee’s principal role in the construction of the line is most likely why the Lee family relocated to the western New York town. J. Fletcher Brennan’s statement that Mr. Chamberlain might be styled the founder of the town of Leetonia inasmuch as he not only laid it out, but has done more, perhaps, than any other man to advance its growth and prosperity is well founded. Lee remained detached during Leetonia’s formative years while Chamberlain became the most influential individual within the town for the next three decades.

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63 Adams, ed., Historical Gazetteer and Biographical Memorial of Cattaraugus County, New York, 1063.


65 Adams, ed., Historical Gazetteer and Biographical Memorial of Cattaraugus County, New York, 1063. Please note that the United States Census of 1860 places William Lee in Shelby County, Ohio and lists him a ‘Railroad conductor” and husband of Anna Wallace. The Lee children were Edward Wallace, James B, Elva, and Ellie Lee.

Company officials commenced construction of a blast furnace and began conducting surveys for streets and residential plots during the latter months of 1866 and into 1867. The Company surveyed and graded Front, Main, High, Park, and Summit Streets east to west parallel to the Pittsburgh, Fort Wayne, & Chicago Railroad. These streets were bordered to the east by the Niles & New Lisbon Railroad and to the west by Washington Street. The Leetonia Iron & Coal Company owned all of the land from Washington Street east to the location of the soon to be ignited blast furnace adjacent to the Niles & New Lisbon line. Although “not all plotted at once,” the Company then graded Chestnut, Walnut, Elm, Oak, Pine, and Ash Streets from the intersecting railroads north toward Washingtonville. The Company did reserve “about four acres for a park bound by Park, High, Elm, and Walnut Streets,” which eventually would be named Wick Park in honor of Cleveland’s Dr. Lemuel Wick. In the spring of 1867, the Leetonia Iron & Coal Company ignited the first blast of its “No. 1 stack” and became the third blast furnace to produce iron successfully in Columbiana County.

The first successful blast furnace in Columbiana County commenced production in 1807 near New Lisbon and used charcoal as a smelting fuel. Known locally as the “Rebecca Furnace,” the original proprietor, a Mr. Hughes, sold the hillside furnace along the middle fork of Little Beaver Creek to John McKinley (grandfather of William

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67 Worman, Salem Township History and the Story of Leetonia, 58; and Crowl, “Cherry Valley’s Coke Ovens, Timeline, 34. Washington Street is the boundary between Sections 12 and 11 of Salem Township (Section 12 is east of Washington Street and Section 11 is west of Washington Street). Refer to Image 4-6 located at the end of this chapter.

68 Mack, History of Columbiana County, Ohio, 243; and Worman, Salem Township History and the Story of Leetonia, 58.

69 The Leetonia Iron and Coal Company opened another coal mine (slope) on its extensive property holdings in 1867. Fourth Annual Report of the State Inspector Mines to the Governor of the State of Ohio For the Year 1877 (Columbus: Nevins & Myers, State Printers, 1877), 101.
McKinley) sometime in 1814-1815. The county’s first furnace produced iron intermittently through several proprietors until 1839. The county’s second blast furnace operation appeared a year later in St. Clair Township near present day Calcutta, Ohio. Owned and operated by Arnold Downey, the “Downey Furnace” used both charcoal and then bituminous coal as smelting fuels, but after some initial successes ceased operations sometime before 1842. Unlike its predecessors, the Leetonia Iron & Coal Company’s furnace was what William T. Hogan describes as a “new furnace . . . made of a cylindrical iron shell lined with firebrick . . . [that] stood in the open on level ground” relying strictly on bituminous coal and coke. According to general manager Chamberlain, “the quality of the Washingtonville coke more than filled the expectations of the company,” which in January 1868 succeeded in producing a substantially high weekly total of “two hundred and one tons of iron.”

The Niles & New Lisbon Railroad linked the Leetonia Iron & Coal Company’s “inexhaustible veins of coal” and high quality coke with the Mahoning Valley’s highly prized iron ore deposits and nearby limestone quarries. Chamberlain’s Company, therefore, maintained access to all of the crucial mineral components needed in the manufacturing of high-grade pig iron. Within a few decades when the Mahoning Valley’s iron ore deposits started to vanish, the Pittsburgh, Fort Wayne, & Chicago

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70 Refer to Chamberlain, “The Iron Industries of Columbiana County, Ohio,” The Ohio Mining Journal (1883): 74-82.


73 Mack, History of Columbiana County, Ohio, 239. The Mahoning Valley’s iron ore deposits are discussed in Chapter 6.
Railroad and the Cleveland & Mahoning Railroad connected Columbiana County’s iron industries to the vast Lake Superior iron ore ranges.\textsuperscript{74} With two 55’ x 13’ blast furnace stacks in full production by 1869, local officials moved toward having the Company’s town plots formally recognized as an incorporated Columbiana County village.\textsuperscript{75} As described by Thomas Mack “a petition was presented by M. E. Taggart to the commissioners of the county (dated on March 1, 1869, and signed by 110 voters), praying for the incorporation of a village, to be called ‘Leetonia.’”\textsuperscript{76} Two months later, after some minor revisions, county commissioners “Samuel Burger, Uriah Thomas, and Andrew Armstrong – passed the order for incorporation, and further ordered an election to be held on Aug. 23, 1869, for a mayor, recorder, and five trustees.”\textsuperscript{77} The incorporated village of Leetonia consisted of all of Section 12, three-quarters of Section 11, and a northern portion of Section 14 in Salem Township.\textsuperscript{78}

Unsurprisingly, Chamberlain was one of the five individuals elected to serve as a trustee for the new village. Chamberlain had already served as the first postmaster of the then unincorporated village and according to Rev. William L. Woodall he received $80.00 for his services from April 1866 through June 1867.\textsuperscript{79} Leetonia’s post-office was originally located in the village’s railroad depot building, which serviced both of the

\textsuperscript{74} Ibid.

\textsuperscript{75} \textit{The Ironworks of the United States: A Directory of the Furnaces, Rolling Mills, Steel Works, Forges, and Bloomeries in Every State} (Philadelphia, Pennsylvania: James B. Chandler’s Steam Printing Establishment, 1876), 49.

\textsuperscript{76} Mack, \textit{History of Columbiana County, Ohio}, 239.

\textsuperscript{77} Ibid., 240.

\textsuperscript{78} Ibid., 244. A. F. Hill was elected mayor, M. E. Taggart recorder, F. Fillnagle treasurer, and along with Chamberlain as trustees Samuel C. Mellinger, W. S. Church, H. F. Christy, and J. M. Mowrey. Refer to Image 4-6 at the conclusion of this chapter for a map of Leetonia in 1872.

\textsuperscript{79} Ibid., 240; and Rev. William L. Woodall, \textit{The History of Leetonia} (L.C.O.), 8.
intersecting railroads. Chamberlain, while jointly serving in his nearly innumerable positions and appointments that now also included president of the Automatic Fire-Alarm Company in Leetonia, helped organize the Leetonia Banking Company with William Lee, F. G. Servis, and Richard Pow in 1869. Although not elected president or cashier of the Leetonia Bank, Chamberlain did help secure its original capital of $20,000 and made sure the new venture remained financially tied to the Leetonia Iron & Coal Company’s expanding production capabilities.  

![Image 4-4 Union Depot, Leetonia, Ohio Postcard (Unknown Date)](image)

Just a few years after pouring its first molten pig iron, the Leetonia Iron & Coal Company’s holdings had expanded to include:

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80 Ibid., 245; Ibid., 11; and Worman, Salem Township History and the Story of Leetonia, 58.

81 In author’s possession.
the mineral rights of more than one thousand acres of land, ownership of approximately five hundred acres of land, two fully operational coal mines, one hundred thirty-three coke ovens, two blast furnace stacks, railroad sidings, over one hundred surveyed and platted town lots, thirty-three residences, an office building, a store, a hotel, and three-quarters of the Wick Block on Main street.\textsuperscript{82}

After filing to increase its capital stock to $300,000 on December 9, 1869, the Leetonia Iron & Coal Company added a rolling mill to its already grandiose holdings in order to manufacture further their locally produced pig iron.\textsuperscript{83} According to Chamberlain, this was the second rolling mill constructed in Columbiana County.\textsuperscript{84} Located immediately south of the Company’s blast furnaces along the Niles & New Lisbon Railroad, the rolling mill consisted of “sixteen puddling furnaces, one scrap furnace, three trains of rolls, [an] eight inch guide train, [a] sixteen inch bar mill, and [an] eighteen inch muck train.”\textsuperscript{85}

Two years after opening its rolling mill, the Company created another finishing plant, the Leetonia Nail Works. This facility “consisted of twenty nail machines and [a] train of rolls to make nail plate[s].”\textsuperscript{86} Ancillary iron-related companies not directly owned or operated by the Leetonia Iron & Coal Company, but intimately tied to its success, soon appeared in the now bustling village of “about eighteen hundred”

\textsuperscript{82} Worman, Salem Township History and the Story of Leetonia, 58.

\textsuperscript{83} Annual Report of the Secretary of State, to the Governor of the State of Ohio for the Year 1870 (Columbus, Ohio: Nevins & Myers, State Printers, 1870), 103.

\textsuperscript{84} Chamberlain, “The Iron Industries of Columbiana County, Ohio,” The Ohio Mining Journal (1883): 81.

\textsuperscript{85} Ibid.

\textsuperscript{86} Ibid.
residents.\textsuperscript{87} Established in 1871 by Garver and Reeves, the Leetonia Boiler Company manufactured “all kinds of sheet-iron work and boilers.” During the same year, the Davis Brothers started the Leetonia Manufacturing Company, which made “stoves and hollow ware castings.”\textsuperscript{88} By 1872, despite its vast mineral holdings and success manufacturing 18,144 tons of high quality iron products – well above annual production totals for blast furnace and rolling mill operations – the Leetonia Iron & Coal Company’s continued expansions proved detrimental to its fiscal solvency and by the end of the year faced a severe financial crisis.\textsuperscript{89}

Approximately one year before the disastrous Panic of 1873 devastated thousands of companies, railroads, and banks throughout the United States, the namesake of the Leetonia Iron & Coal Company and the village of Leetonia died suddenly at the age of forty-eight in Randolph, New York on February 9, 1872.\textsuperscript{90} Lee’s death occurred less than two months after the Company “discharged” blast furnace laborers who “struck for 10% advance wages.”\textsuperscript{91} Included within the 6,984 firms that failed during the two years preceding the Panic of 1873 was the Leetonia Iron & Coal Company.\textsuperscript{92} In late November 1872, the Company “was compelled to make an assignment” and after six years of

\textsuperscript{87} Mack, History of Columbiana County, Ohio, 244; and Henry Howe, Historical Collections of Ohio: An Encyclopedia of the State, Volume I (Cincinnati, Ohio: C.J. Krehbiel & Co., Printers and Binders, 1902), 465.

\textsuperscript{88} Mack, History of Columbiana County, Ohio, 244-245; and Worman, Salem Township History and the Story of Leetonia, 58.

\textsuperscript{89} Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year 1874, 292. Refer to Ingham, The Iron Barons, xvii.


\textsuperscript{91} Wayne County Democrat (December 27, 1871): 3.

\textsuperscript{92} Nevins, The Emergence of Modern America, 294.
stunning manufacturing successes “business was consequently prostrated in the hitherto thriving village” of Leetonia. The nation’s post-Civil War economic boom resulted in industrial and agricultural overproduction, which when coupled with over extension of loans and credit, proved devastating. As described by historian Allan Nevins “the national bank deposits increased only forty-three million dollars, but the bank loans for the same period rose by two hundred and eighty-three million dollars” during the five years preceding 1873. The nation’s insolvency culminated during the summer of 1873 with the failure of Jay Cooke’s banking enterprise.

Several months before the Panic of 1873 enveloped the nation, the Massillon, Ohio Independent described the scene in nearby Leetonia.

The last miner gives a fuller account . . . of the financial disaster last week at Leetonia . . . and states that no less than four companies have gone by the board -- The Leetonia Iron and Coal Company, the Leetonia Banking Company, Chase, Shears, and Company, and Chamberlain and Mathers. It represents the loss as amounting to over one million dollars and will seriously affect several banking houses in the Valley, Cleveland, Pittsburgh, and Wheeling. The Wicks, wealthy men, are referred to as heavy losers . . .

Leetonia’s several hundred coal miners, coke and iron workers, and iron puddlers were among the nation’s estimated half of one million unemployed workers. In mid-February 1873, with work “entirely suspended,” the creditors of the Leetonia Iron & Coal Company “directed the assignee to close up the business and dispose of the property

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93 Mack, History of Columbiana County, Ohio, 244.

94 Nevins, The Emergence of Modern America, 293.

95 Massillon Independent (December 5, 1872), 3.
immediately.”\textsuperscript{96} As the economic depression persisted throughout the nation, Anna Elizabeth Wallace Lee “made several trips to Ohio to salvage what she could” even though, according to Thomas Crowl, she believed her deceased husband’s “investments appeared to be almost worthless.”\textsuperscript{97}

Jacob G. Chamberlain’s participation in the mining of high quality bituminous coal and the construction of railroads in southern Mahoning and northern Columbiana Counties from 1856-1865 resulted in his preeminent role in the creation of the Leetonia Iron & Coal Company and the village of Leetonia. Within four years of its founding, the Leetonia Iron & Coal Company’s production successes placed Columbiana County seventh in the state according to total net tons of pig iron. By 1871, Chamberlain’s firm and the nearby Grafton Iron Company nearly doubled the county’s pig iron production total, manufacturing 33,901 tons. Despite these successes, the Leetonia Iron & Coal Company failed in the months immediately preceding the Panic of 1873. Within a year of the failure, however, Chamberlain and Jonathan Warner’s son Edwin J. Warner led a group of investors who purchased the bankrupt company’s “rights, title, interest[s] . . . appurtenances . . . and indebtedness [in the amount of] $850,000.”\textsuperscript{98} Before detailing the Leetonia Iron & Coal Company’s successor, it is necessary to examine Pittsburgh industrialists’ role in iron manufacturing at Leetonia as well as the Warner family’s preeminent role in the development of the Mahoning Valley as a center for coal mining and iron manufacturing.

\textsuperscript{96} Mansfield Herald (February 13, 1873): 2.

\textsuperscript{97} Crowl, “Cherry Valley’s Coke Ovens, Timeline, 39.

\textsuperscript{98} Mack, History of Columbiana County, Ohio, 244.
Image 4-5 Bird’s Eye View of Leetonia, Columbiana County, 1872

99 T. M. Fowler & H. H. Bailey Painting. Leetonia Public Library, Leetonia, Ohio. The Leetonia Iron & Coal Company’s rolling mill, blast furnaces, beehive coke ovens, and coal mines, located along the Niles & New Lisbon Railroad, are depicted near the center of the map.
Chapter Five

Pittsburgh Ironmasters: Graff, Bennett, & Company, 1845-1888

“With the exception of B[enjamin] F. Jones and James Laughlin, the Graffs were perhaps the most dynamic individuals in Pittsburgh’s midcentury iron industry.”


As the Leetonia Iron & Coal Company commenced iron production in 1866, the highly prized Washingtonville coal and coke and nearby interesting railroads attracted Pittsburgh ironmasters to northern Columbiana County. The firm of Graff, Bennett, & Company played an instrumental role in Pittsburgh’s mid-nineteenth century development from a western outpost with several rolling mill operations to “the largest aggregate producer of pig iron in the country by the 1880s.”¹ In addition to being innovative ironmasters in Pittsburgh during the late 1850s, Graff, Bennett, & Company expanded its iron production holdings into northwestern Ohio and then into eastern Ohio near the soon to be incorporated village of Leetonia during the 1860s. Despite successfully expanding its operations and diversifying its production capabilities during the 1870s, continued competition with Pittsburgh’s emerging iron and steel

¹ John Ingham, Making Iron and Steel: Independent Mills in Pittsburgh, 1820-1920 (Columbus, Ohio: Ohio State University, 1991), 27.
manufacturers, coupled with devastating fires at multiple production sites, ultimately proved too much for Graff, Bennett, & Company. The firm’s failure in 1888 offers an early example of one iron manufacturing company’s inability to succeed after attempting to transition to profitable steel production in the wake of Andrew Carnegie’s growing dominance within the steel industry.

The iron-manufacturing firm of Graff, Bennett, & Company dates to 1853 when James I. Bennett, Robert K. Marshall, William B. English, Edward Rahm, and W. P. Jones purchased the Clinton Rolling Mill from Cuddy, Jones, & Company.² Built by Arnold Plummer and William Ebbs in 1845, the Clinton Rolling Mill, according to historian Kenneth Warren, was “a plant of about average size in the Birmingham district of Pittsburgh, opposite the Point . . . that used some coke iron in its operations.”³ J. P. Lesley’s *The Iron Manufacturer’s Guide to the Furnaces, Forges, and Rolling Mills of the United States* (1859) describes the location of Bennett, Marshall, & Company’s Clinton Rolling Mill as “a furlong below the bridge . . . on the south side of the Monongahela River” clustered among the city’s various rolling mill enterprises.⁴ Table 5.1 lists Pittsburgh’s thirteen active rolling mill operations in 1845, the year the mills were

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⁴ J. P. Lesley, *The Iron Manufacturer’s Guide to the Furnaces, Forges, and Rolling Mills of the United States with Discussions of Iron as a Chemical Element, An American Ore, and a Manufactured Article in Commerce and in History* (New York: John Wiley Publisher, 1859), 248-249. A furlong is approximately two hundred and twenty yards in distance, which is roughly one eighth of a mile. *Oxford English Dictionary*. 

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constructed, and the location of the iron firms along the confluence of the Monongahela and Allegheny Rivers.

Table 5.1 Pittsburgh Rolling Mills, 1845

<table>
<thead>
<tr>
<th>Name</th>
<th>Year Built</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sligo Rolling Mill</td>
<td>1825</td>
<td>south side of the Monongahela River just below the bridge</td>
</tr>
<tr>
<td>Juniata Rolling Mill</td>
<td>1826</td>
<td>between Mechanic, Pike, &amp; Adams Streets and the Allegheny River</td>
</tr>
<tr>
<td>Etna Rolling Mill</td>
<td>1828</td>
<td>one mile from the mouth of Pine Creek on the west side of the Allegheny River</td>
</tr>
<tr>
<td>Wayne Rolling Mill</td>
<td>1829</td>
<td>foot of Wayne Street on the east side of the Allegheny River</td>
</tr>
<tr>
<td>Sable Rolling Mill</td>
<td>1830</td>
<td>foot of Walnut Street on the east bank of the Allegheny River</td>
</tr>
<tr>
<td>Pittsburgh Steel Works</td>
<td>1835</td>
<td>three squares above the Monongahela Bridge</td>
</tr>
<tr>
<td>Pittsburgh Rolling Mill</td>
<td>1837</td>
<td>south side of the Monongahela River</td>
</tr>
<tr>
<td>Hecla Rolling Mill</td>
<td>1841</td>
<td>furlong above the Birmingham ferry</td>
</tr>
<tr>
<td>Pennsylvania Forge Rolling Mill</td>
<td>1844</td>
<td>north side of the Monongahela River, one mile above the bridge</td>
</tr>
<tr>
<td>Western Tack Factory</td>
<td>1845</td>
<td>one half mile above Birmingham ferry</td>
</tr>
<tr>
<td>Vesuvius Rolling Mill</td>
<td>1845</td>
<td>canal, west side of Allegheny</td>
</tr>
<tr>
<td>Kensington Rolling Mill</td>
<td>1845</td>
<td>north side of Monongahela River</td>
</tr>
</tbody>
</table>

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Clinton Rolling Mill 1845 south side of the Monongahela River, a furlong below the bridge, between the Sligo and Pittsburgh Rolling Mills

According to historian John Ingham, the Sligo, Juniata, and Etna Mills “produced about half of the iron made in Pittsburgh in 1826 and employed 130 workers.”

During the late 1820s, Pittsburgh’s eight active rolling mills averaged a total of eight thousand tons of rolled iron annually. Finished iron output increased significantly during the 1830s with nine rolling mills and eighteen foundries in operation. By 1841, the city’s three oldest active rolling mills (Sligo, Juniata, and Etna) alone produced a total of eight thousand tons of rolled iron. The combined population of Pittsburgh and nearby Allegheny City equaled 67,863 by 1850. At the time of Bennett, Marshall, & Company’s acquisition of the Clinton Mill, Pittsburgh had become “the outstanding western mill centre [sic]” according to Warren “having a third of all the production of rolled iron west of the Alleghenies.”

In fact, twenty different iron-rolling firms throughout Allegheny County produced seventy-seven thousand tons of rolled iron in 1856. Despite the fact that Allegheny County mills’ produced ninety thousand tons of finished iron in 1858-1859, whereas the second highest county output in the nation equaled a mere thirty thousand tons annually, Pittsburgh continued to be a “center for secondary ironworks . . .

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7 Ibid., 27.


10 Thurston, Allegheny County’s Hundred Years, 147.
that finished pig iron produced at furnaces outside the city.”11 By the end of the decade, however, innovative decisions by the proprietors of the Clinton Rolling Mill forever altered Pittsburgh’s position within the nation’s industrial development and ultimately quickened significant changes within the manufacturing of iron and steel.

After the retirement of Edward Rahm and W. P. Jones in 1854, John Graff joined Bennett, Marshall, & Company whereupon the partnership became Graff, Bennett, & Company.12 The eldest child of Henry Graff and Elizabeth Lobinger, John Graff was born on January 14, 1821 in Pleasant Valley, Westmoreland County, Pennsylvania.13 John Graff’s partnership with James Bennett and Robert Marshall in 1854 was not the Graff family’s first encounter with iron manufacturing concerns in western Pennsylvania. Initially during the 1820s, Henry Graff and his brothers Peter, Matthew, and John owned and operated “country stores” in Pleasant Valley and at nearby New Derry in Westmoreland County. In 1833, the Graff brothers relocated to Indiana County, northeast of Westmoreland County, whereupon they expanded their merchant supply company in Blairsville.14 The Graffs’s Blairsville store prospered, and “they did a very extensive business and . . . they built a large grain house on the Conemaugh River, in the town.”15 The brothers were also actively involved in the continued development of Pennsylvania’s canal and railroad transportation networks during the early nineteenth


12 Thurston, Allegheny County’s Hundred Years, 146.


14 Ibid., 142.

15 Ibid.
century. In fact, the Graffs owned and operated the Union Canal Company, “which at the
time offered the only means of transportation between Pittsburgh and Philadelphia,”
thereby ensuring reliable distribution of the family’s commodities.16 Because of their
continued commercial successes, brothers Henry and Peter relocated permanently to
Pittsburgh during the late 1830s.17

While his father and uncles managed the family’s growing assets in western
Pennsylvania, John Graff, “while still in his teens . . . went to Philadelphia, where he was
employed in one of the transportation offices of the canal company.”18 With John in
Philadelphia, the Graff family entered into the iron manufacturing industry in April 1845
when Henry, along with John Lindsay, William Larimer, Jr., and Christopher Zug
purchased the struggling Lippincott Nail & Shovel Factory from Colonel James
Anderson. Located along the east bank of the Allegheny River, the Lippincott Factory
opened in 1830 when Zebulon Packard constructed an iron works in order to manufacture
shovels and nails. Approximately a decade later, Colonel Anderson added puddling
furnaces and rolls to the Factory, but failed to make the iron works financially solvent.19
After purchasing the Lippincott mill, Graff, Lindsay, & Company renamed the facility
the Sable Iron Works.20 Upon his return to Pittsburgh in 1845, twenty-three year old

16 “Obituary-John Graff,” The Age of Steel, Vol. XC, No. 23 (St. Louis, Missouri, December 7,

17 Jordan, A Century and a Half of Pittsburgh and Her People, 142; Ingham, Making Iron and
Steel: Independent Mills in Pittsburgh, 1820-1920, 29; and “Obituary – John Graff,” American
Manufacturer and Iron World vol. 69, no. 19 (November 1901), 1373.


19 Thurston, Allegheny County’s Hundred Years, 143-144.

20 American Manufacturer and Iron World, Vol. 70, No. 3 (January 16, 1902): 74; The Successful
American, Vol. II, No. 5 (November 1900): 8; and The Bulletin of the American Iron and Steel
John Graff served as a sales representative for the Sable Iron Works until 1853 when according to John Ingham, John’s father “sold out to his partners . . . [and] . . . at the same time also disposing of his canal interests.”21 With Henry Graff no long a partner, the firm became Zug, Lindsay, & Company, with Jacob Painter joining the partnership the following year. The new partnership remained the proprietors of the Sable Iron Works and prospered for several decades as a leading iron manufacturing concern in the Pittsburgh district. Within a year of his father leaving the Sable Iron Works, John Graff joined Bennett, Marshall, & Company where he quickly became the leading individual within the firm’s management of the Clinton Rolling Mill.22

With company offices in downtown Pittsburgh, John Graff’s new partnership continued to successfully operate the Clinton Rolling Mill, which by 1857-1858 included twenty-eight furnaces, five trains of rolls, and twenty-one nail machines. Using steam power, the Clinton Mill manufactured approximately five thousand tons of iron bars, plates, and nails from mixed coke and charcoal pig iron in 1857. This annual total is roughly commensurate to the annual production totals of the Sligo, Etna, Juniata, and Hecla Rolling Mills in 1856-1857.23 According to Kenneth Warren, up until the mid-nineteenth century “integration between blast furnaces and rolling mills was markedly lacking” with the nation’s “biggest mill centres [sic], including . . . Pittsburgh . . .

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[having] no neighboring blast furnace plants.”

Yet, soon after Graff joined the partnership, the proprietors of the Clinton Rolling Mill commenced plans to “integrate its operations backward into iron production” by constructing a blast furnace adjacent to their rolling mill.

After “blowing in” their Clinton Furnace on October 31, 1859, Graff, Bennett, & Company became only the second firm to produce smelted pig iron successfully within the city limits of Pittsburgh “since George Anshutz’s short-lived operation in the Shadyside district over sixty years earlier.” More importantly, the “pioneer” Clinton Furnace used coke from the Connellsville coal seam in Fayette County southeast of Pittsburgh as a smelting fuel rather than locally mined coal or coke from the Pittsburgh coal bed, which underlay the southern half of Allegheny County. After initially using Connellsville coke, Graff, Bennett, & Company tried using local coal and coke as a cost saving measure, but eventually reverted to Connellsville coke because the ironmasters deemed the local fuels to be too poor in quality.

Stewart Strickler’s coal and coke holdings, constructed in 1860 along the Youghiogheny River between Dawson and Connellsville, initially supplied Graff, Bennett, & Company’s Clinton Furnace.

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As the first Pittsburgh blast furnace fueled by bituminous coke, the production successes of the Clinton Furnace’s average sized single 45’ x 12’ stack “led to the building of other coke furnaces at Pittsburgh” and ultimately proved pivotal in the city’s development as a principle iron-producing center within the western district.\(^{29}\) Railroads connecting Pittsburgh’s established rolling mills to the Connellsville coal basin in Westmoreland and Fayette Counties hastened the development of blast furnaces in the soon to be christened “iron city.” Three years after the Pennsylvania Railroad reached Pittsburgh, the Pittsburgh & Connellsville Railroad “struck the main coal basin five miles west of Connellsville” along the Youghiogheny River. The Pennsylvania Railroad soon followed, constructing a branch east from its main line to Greensburg and then south to Connellsville.\(^{30}\) According to the Pennsylvania Historical and Museum Commission, the technological significance of the Clinton Furnace’s huge output . . . of 11,000 tons of iron a year, [which] was more than twice that of the typical anthracite furnace and six times what charcoal furnaces produced on average, . . . rested with its high blast pressure of eight pounds per square inch . . . [whereas] most furnaces in 1859 drove air under a pressure of three to five pounds per square inch into the bosh where iron ore was smelted.\(^{31}\)

When assessing the historical significance of the Clinton Furnace, the Commission concluded that


When Graff, Bennett and Company erected [the] Clinton Furnace, few would have envisioned how this step would help transform the iron and steel industries. Opening this furnace was one in a chain of events that contributed to far bigger iron furnaces, the dominance of bituminous-coke furnaces, and the growth of an integrated steel industry, particularly in the Pittsburgh region.  

Professor John Ingham confirms further the Commission’s findings by asserting, “with the exception of B[enjamin] F. Jones and James Laughlin, the Graffs were perhaps the most dynamic individuals in Pittsburgh’s midcentury iron industry.”

Shortly after ushering in the production of coke-fueled iron in Pittsburgh, Graff, Bennett, & Company began expanding its local iron finishing holdings while at the same time venturing into charcoal fueled iron production in northwest Ohio. In 1863, Graff’s partnership purchased the Millvale Rolling Mill from Kloman & Phipps. Located several miles up the Allegheny River, the Millvale Mill was established sixteen years earlier as an iron forge by Thomas Stewart. During the next several years, Graff’s partnership expanded the rolling capabilities of the Millvale Mill to the point that the new site nearly equaled the finishing capabilities of the Clinton Mill. Within a year of purchasing the Millvale Mill, Graff, Bennett, & Company became the primary financial backers in the construction and operation of a charcoal fueled iron furnace in Paulding County, Ohio – approximately three hundred miles northwest of Pittsburgh.

32 Ibid.
Established by the state of Ohio on April 1, 1820 and “all within the Black Swamp tract,” Paulding County encompassed approximately four hundred and twenty miles. The County’s population totaled a mere one hundred and sixty-one people in 1830. According to Nelson R. Webster, Paulding County “. . . was one of the very last counties [in Ohio] to become thoroughly settled” by non-indigenous peoples and “. . . was still largely covered with primeval forests.” By 1840, Paulding County remained sparsely populated with only one thousand thirty-four inhabitants residing within Auglaize, Brown, Carryall, and Crane Townships. According to Professor Everett A. Budd, the outposts of New Rochester (the original county seat) and Cecil south of the


Ibid.
Maumee River in Crane Township were “at that time the most flourishing place in the county, containing some thirty or forty families, three hotels, [a] three store room, two blacksmith shops [and] two tailor shops.”

Similar to developments in Columbiana County, the construction of a railroad through Paulding County during the 1850s, which eventually rendered the Miami & Erie Canal and the Wabash & Erie Canal obsolete, quickened the pace of settlement to the county and precipitated the development of iron industries.

In July 1855, the Toledo, Wabash, & Western Railroad (forerunner of the Wabash, St. Louis, & Pacific Railroad) completed construction of its line from Toledo, Ohio to Fort Wayne, Indiana. Eighteen miles of the line traversed Emerald, Crane, Carryall, and Harrison Townships in Paulding County before entering into Indiana. When the Cleveland, Toledo, & Norwalk Railroad opened for service in late 1852, Paulding County’s isolated settlements were now connected by rail to nearby Toledo, and to Cleveland, Youngstown, Chicago, and Pittsburgh via the state’s ever-expanding rail network.

Within a decade of the opening of the Toledo, Wabash, & Western line, proprietors from Pittsburgh and Cleveland “invited by . . . the abundance of wood for charcoal” established two separate blast furnace operations and began producing pig iron in Paulding County.

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41 Winter, A History of Northwest Ohio, 254-260; Budd, Historical Hand Atlas: History of Northwestern Ohio and Paulding County; and Howe, Historical Collections of Ohio in Two Volumes: An Encyclopedia of the State Volume II, 373-381.

42 Nelson R. Webster, “Paulding County,” 538.
The Paulding Furnace, located at Cecil in Crane Township, commenced charcoal fueled iron smelting in 1864. Owned and operated by Graff, Bennett, & Company, the Paulding Furnace’s single 42’ x 10’ stack utilized locally kilned charcoal, limestone unearthed along the Maumee River, and Lake Superior iron ore delivered via the Toledo, Wabash, & Western Railroad for smelting iron. James I. Bennett served as chairman of the furnace company, with J. H. King acting as treasurer, and S. Frank Eagle holding the positions of secretary and superintendent. A year later, Cleveland proprietors commenced charcoal fueled iron smelting in a single 42’ x 7’ stack near the village of Antwerp along the Maumee River. Unlike the Clinton Furnace in Pittsburgh, which

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received bituminous coke from Connellsville, Graff’s iron manufacturing complex in Paulding County included several charcoal kilns immediately adjacent to the furnace. The vast forest permeating Paulding County fed these kilns and provided the necessary charcoal for the area’s two blast furnace stacks.

Image 5-1 The Paulding Furnace, Including Charcoal Kilns⁴⁵

Three years after commencing charcoal fueled iron production in northwest Ohio, Graff, Bennett, & Company expanded their Paulding County site by adding a finishing plant in the form of an iron bloomery. Graff’s Paulding Forge, which included eight fires and a single steam hammer, finished the locally produced pig iron into charcoal blooms for general use. From 1867 through 1872, the Paulding Forge remained the only active

⁴⁵ Howe, Historical Collections of Ohio in Two Volumes: An Encyclopedia of the State, Volume II, 378.
bloomery in the state of Ohio and produced, during a single turn, an average of one thousand five hundred net tons of iron annually.⁴⁶ By 1866-1867, Graff, Bennett, & Company’s ironmasters owned and operated: two rolling mill plants in Pittsburgh, a single stack coke-fueled blast furnace in Pittsburgh, a single stack charcoal fueled blast furnace in Cecil, Ohio, and an accompanying iron forge. Despite possessing these numerous, varied, and profitable iron enterprises, John Graff’s partnership continued to expand during the 1860s by constructing another coke fueled blast furnace near the soon to be incorporated village of Leetonia.

In December 1864, Pittsburgh’s John Graff and Henry King purchased fifteen acres of land from the John Betz family in Section 11 of Salem Township, Columbiana County. Graff’s and King’s purchase “lay on both sides of the Pennsylvania Railroad tracks [Pittsburgh, Fort Wayne, and Chicago line] and Green Creek” west of the Leetonia Iron & Coal Company’s extensive property.⁴⁷ The grandson and son of prominent Massachusetts settlers to Ohio’s Western Reserve, Henry King was born in Franklin Township, Portage County in June 1833. At the age of five, Henry’s parents, Robert and Rhoda Bishop King, relocated to nearby Ravenna where they raised their three children. After “receiving a liberal education for his day” seventeen-year-old Henry King became a member of the Cleveland & Pittsburgh Railroad’s Engineer Corps, which commenced


gradings and surveys between Cleveland and Ravenna during the fall of 1850. On March 13, 1851, the steam locomotive Ravenna successfully completed the first round trip on the line from Cleveland to its namesake. As the first completed railroad through Portage County, the Cleveland and Pittsburgh preceded Marvin Kent’s construction of the Franklin & Warren Railroad by several years. As illustrated by the map of Portage County (Map 5.3), the Cleveland & Pittsburgh Railroad traversed the county in a northwesterly direction. After passing through Ravenna, the county seat of government, Kent’s Franklin & Warren line, when completed, intersected the Cleveland & Pittsburgh in Franklin Township before both lines entered into Summit County to the west destined for Dayton and Cleveland respectively.


With the Cleveland & Pittsburgh Railroad completed through his hometown, King relocated to Columbiana County in 1855, settling in the city of Salem. While working in the city’s machine shops and foundries, King married Sarah Sharp in February 1856. By 1860, the decennial Census listed the twenty-seven-year old King

50 History of Portage County, Ohio, Illustrated, following viii.
51 Ibid., 690
as a “master machinist” with a seventeen-year-old apprentice named I. C. Lawrence. Three years after purchasing fifteen acres of land from the Betz family in Salem Township, King, along with Graff, and John and Julia Kelly of Salem established the Grafton Iron Company. The State of Ohio formally incorporated the Grafton Iron Company on February 15, 1867. Pittsburgh’s innovative ironmaster became president of the Company with King serving as superintendent. The Company purchased more than 100 additional acres of land and immediately opened a shaft mine “one half to three quarters of a mile in extent northwest” of the railroad tracks in order to take advantage of the area’s highly prized coal deposits. Construction of a single stack blast furnace, sixty beehive coke ovens, and “tenements” between the coal mine and the railroad tracks commenced in 1866. On October 9, 1867, approximately six months after the nearby Leetonia Iron & Coal Company ignited the first blast of its “No. 1 stack,” John Hicks ignited the first blast of the Grafton Iron Company’s 54’ x 14’ coke fueled stack. The soon to be incorporated village of Leetonia, along the bustling intersecting railroads, now

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53 Annual Report of the Secretary of State to the Governor of the State of Ohio For the Year 1866 (Columbus: L.D. Myers & Bro., State Printers, 1867), 26.

54 Worman, Salem Township History and the Story of Leetonia, 57; Mack, History of Columbiana County, Ohio, 244; First Annual Report of the State Inspector of Mines to the Governor of the State of Ohio for the Year 1874 (Columbus, Ohio: Nevins & Myers State Printers, 1875); and History of the Upper Ohio Valley, Volume II, Illustrated (Madison, Wisconsin: Brant & Fuller, 1891), 90.

55 Mack, History of Columbiana County, Ohio, 244. The Grafton Iron Company’s blast furnace, coke ovens, coal mine, and accompanying houses appear in the bottom left corner of Image 4-6 in the previous chapter.

included two separate coal, coke, and iron producing companies. Despite adding the Grafton Iron works to its robust and diverse iron producing and finishing conglomerate, Graff, Bennett, & Company entered the next decade intent on expanding their production capabilities by erecting large capacity furnaces in Pittsburgh.

Several of Pittsburgh’s leading ironmasters displeased with the annual output capabilities of the city’s seven furnace stacks (48,000 tons), coalesced into two separate consortiums in 1870 and proceeded to construct large capacity furnaces that ushered in “a new era in coke furnace practice.” The first association included Lewis Dalzell & Company, Jacob Painter & Sons, Spang, Chalfant, & Company, Henry Oliver, William Smith, and Graff, Bennett, & Company. These six iron firms established the Isabella Furnace Company and commenced construction of two blast furnace stacks. The Isabella Furnace stacks were located five miles from Allegheny City “on the north bank of the Allegheny River” near the Borough of Etna. The firms of Jacob Painter & Sons and Spang, Chalfant, & Company held dominant roles within the new Company. After becoming involved with the Sable Iron Works in 1854, Jacob Painter along with his sons Augustus, Park, and Jacob Jr. established the Pittsburgh Iron Works during the late

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59 The Age of Steel, Volume LXXXII, No. 21 (November 20, 1897): 22.
1850s. The Painters’ Pittsburgh Iron Works ranked behind only Jones and Laughlin’s American Iron Works and Andrew Carnegie’s Union Mills in total iron production.\(^{60}\)

On December 1, 1870, a second group of ironmasters, consisting of Andrew Kloman, Henry Phipps, Jr., and Thomas and Andrew Carnegie, established the firm of Kloman, Carnegie, & Company. Carnegie’s partnership “began the construction of a blast furnace at Fifty-first Street, Pittsburgh” on the south bank of the Allegheny River across from the Borough of Etna and the Isabella stacks.\(^{61}\) As detailed by James Howard Bridge in *The Inside Story of the Carnegie Steel Company* (1903), Andrew Carnegie’s Union Iron Works initially considered joining the Isabella consortium, but after consideration decided “. . . it would be better for them [Union Iron Works] to build one furnace themselves than to own one-seventh of two furnaces which would not be under their control or management.”\(^{62}\) What transpired along the banks of the Allegheny River between these two rival iron manufacturing partnerships’ Isabella and Lucy furnaces during the 1870s “ultimately contributed to Pittsburgh’s prominence in the trade,” while at the same time beginning Graff, Bennett, & Company’s piecemeal slide into insolvency.\(^{63}\)

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Professor Warren correctly contends that Pittsburgh’s “large local market enabled the iron industry to perform well throughout most of depression which began in 1873.” In fact, by 1874, Pittsburgh’s ironmasters had increased the annual total output of their furnaces to “well over 200,000 tons,” which more than quadrupled the city’s 1870 net total of 48,000 tons. The significant increase in iron production rested on newly constructed furnaces’ larger production capacities. Both the Isabella and Lucy furnace stacks, which commenced production during the summer of 1872, were “prototypes of modern blast furnaces” because their 75’ x 20’ were twice as large as the “standard” mid-nineteenth century furnace stacks. Additionally, the adoption of the Whitwell stove in place of cast iron pipes to pre-heat air blasts and “better blowing equipment” that created higher pressure combined to ensure increased daily iron output. Moreover, these advancements led to a greater reliance on Connellsville coal and coke because these minerals were able to withstand higher temperatures and pressures within the newly constructed and enlarged blast furnaces. These technological innovations coupled with the practice of “hard driving” furnaces exacerbated the rivalry between the Isabella and Lucy furnace stacks, which by February 1881 culminated with weekly production totals surpassing 1,000 net tons. By December 1882, Pittsburgh’s nine active blast furnace

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65 Ibid; and William T. Hogan, Economic History of Iron and Steel Industry in the United States, Volume I (Lexington, Massachusetts: D.C. Heath and Company, 1971), 31. Hogan indicates that the 1870 annual total of Pittsburgh’s seven furnaces equaled 70,000 net tons while Warren contends that all of Allegheny County produced 144,000 net tons in 1874. Either way, the city’s total annual pig iron totals increased significantly in a mere four years (48,000 to 144,000 or 70,000 to over 200,000).


stacks produced an average of 2,700 tons of pig iron each week. At the national level, the aforementioned technological advancements in iron production equipment as well as a greater reliance on high quality Connellsville coal and coke and Lake Superior iron ore resulted in staggering increases in pig iron production totals.

Despite the nation’s continued economic downturn, on September 1, 1875 Andrew Carnegie’s Edgar Thomson Works at Braddock, Pennsylvania became Pittsburgh’s thirty-ninth iron and steel works and the eleventh American firm to roll steel rails using the Bessemer process. Initially, both the Isabella and Lucy Furnaces supplied Carnegie’s “technological and organizational marvel” with their heretofore-unprecedented pig iron production output. As detailed by Professor Ingham, annual pig iron production totals throughout the nation increased from 2,854,000 net tons in 1870 – 1872 to 10,307,000 tons in 1890. Similarly, the nation’s steel production increased from approximately 19,000 tons in 1865 (mostly blister and crucible steel) to some 10,000,000 tons by 1900. By 1880, the Edgar Thomson Works alone accounted for one seventh of the nation’s total Bessemer steel production and by the end of the year Carnegie’s Edgar

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72 Ibid., 50. Blister and Crucible steel preceded Bessemer and Open-Hearth produced steel.
Thomson Steel Company Ltd. added two large capacity blast furnaces to the sprawling “model of modern integration.” With Carnegie’s iron and steel mill at Braddock booming, Graff, Bennett, & Company faced significant difficulties as two separate fires destroyed considerable portions of their furnace and mill complexes at Leetonia and Pittsburgh during the late 1870s and early 1880s.

In May 1878, six years after adding another standard sized furnace stack (54’ x 16’) to the Grafton Iron Company complex, a fire destroyed a significant amount of Graff, Bennett, & Company’s machinery and stock at Leetonia. Although insured for $15,000, estimates placed the Company’s property damage at $30,000. Despite this financial setback, Graff’s partnership rebuilt its Leetonia properties and resumed iron production. With John Graff remaining as company president and Henry King now serving as secretary and treasurer, the Grafton Iron Company’s two furnace stacks (53’ x 13’ and 53’ x 15’) produced approximately 2,400 tons of foundry and forge iron per month following the 1878 fire. The Grafton Iron Company’s annual production capabilities following the 1878 fire (28,800 tons) were nearly three times higher than the 1879 national annual average (10,000 tons) for a blast furnace operation.

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75 Mack, History of Columbiana County, Ohio, 244; and Ingham, The Iron Barons, xvii. Before becoming secretary and treasurer of the Grafton Iron Company, King remained superintendent of the Leetonia works through 1875. After adding a second furnace stack, the Grafton Iron Company’s annual production totals equaled 15,757 tons in 1872, 10,921 tons in 1873, 14,803 tons in 1874 and 10,042 tons during the first half of 1875. By 1881, the Grafton Iron Company employed 300 workers at its two furnace stacks and 58 coke ovens, and approximately ninety-two miners at its shaft coal mine from 1874 through 1876. Annual Report of the Secretary of State to the Governor of Ohio for the Year 1875 (Columbus: Nevins & Myers, State Printers, 1876), 431; J. Wiggins & Co.’s Leetonia Directory, 1874-
From 1876 to 1888, the Clinton Furnace’s single coke fueled stack maintained an annual production total of 12,000 net tons of iron, while the Paulding Furnace Company’s single charcoal fueled stack produced an average of 6,000 net tons in 1880 before increasing its annual production totals to 10,000 tons of iron from 1882-1888. 

1875 (unknown publication, unknown publication date), 199; National Labor Tribune (February 19, 1881): 1; First Annual Report of the State Inspector of Mines to the Governor of Ohio For the Year 1874 (Columbus: Nevins & Myers, State Printers, 1875), 83; Second Annual Report of the State Inspector of Mines to the Governor of Ohio For the Year 1875 (Columbus: Nevins & Myers, State Printers, 1876), 83; and Third Annual Report of the State Inspector of Mines to the Governor of Ohio For the Year 1876 (Columbus: Nevins & Myers, State Printers, 1876), 184.

76 Sanborn Fire Insurance Maps, 1867-1980, electronic resource (Ann Arbor, Michigan: ProQuest Information and Learning Company, 2001), http://dmc.ohiolink.edu/cgi/i/image/image-id?rgn1=ic_all;q1=leetonia;size=50;c=sanborn;back=back1330039494;subview=detail;resnum=6;view=entry;lastview=reslist;cc=sanborn;entryid=x-reel34-6760-00005.jpg;viewid=REEL34-6760-00005.JPG.

77 “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Forges, and Bloomaries in Every State and Territory, Corrected to March 15, 1880, The American Iron and Steel Association, 34, 68, and 69; and “Directory to the Iron and Steel Works
On Sunday December 11, 1881, three and one half years after the fire at Leetonia, another significant fire “first discovered in the carpenter shop, and . . . believed to have been the work of an incendiary . . . totally destroyed” Graff, Bennett, & Company’s Millvale Rolling Mill. Although insured for $150,000, the fire destroyed an estimated $300,000 worth of property and material while also displacing approximately one thousand workers. The Company proceeded to rebuild and expand the Millvale site, which according to the American Iron and Steel Association’s 1882 Directory, consisted of twenty-one single and two double puddling furnaces, ten Danks rotary puddling machines, sixteen heating furnaces, eight trains of rolls, and one hammer. The new iron rolling equipment at Millvale, when coupled with the Clinton Rolling Mill’s twenty-six single puddling furnaces, ten heating furnaces, six trains of rolls, and forty-one nail machines, placed Graff, Bennett, & Company’s total annual capacity at 35,000 net tons of finished iron bars, sheets, plates, and nails. With recently rebuilt furnaces and substantially expanded rolling mill capabilities Graff, Bennett, & Company entered the 1880s focused primarily upon becoming a fully integrated steel company.

[References]


Undeterred by their financial woes in the wake of the destructive fires, Graff, Bennett, & Company formally acquired the Fort Pitt Iron & Steel Works from the firm of Reese, Graff, & Wood “for the purpose of engaging in the manufacture of steel.”\textsuperscript{80} John Graff’s younger brother, Matthew (1834-1896), appears to be the conduit between Graff, Bennett, & Company and Reese, Graff, & Wood, with the younger Graff serving as “a partner in Graff & Woods, an iron rolling mill.”\textsuperscript{81} Originally constructed in 1862 by the firm Reese, Graff, & Dull and located on the south bank of the Allegheny River, the Fort Pitt Iron & Steel Works by 1882 included twenty-one puddling furnaces, eighteen heating furnaces, seven hammers, eight trains of rolls (two 22″, two 16″, one 12″, one 9″, and two 8″), and two 30-pot Siemens steel melting furnaces.\textsuperscript{82} According to the American Iron and Steel Association, this equipment allowed the Fort Pitt Iron & Steel Works to produce plates, sheets, guide iron, bar iron, light T-rails as well as German [shear] steel and cast steel, with annual capacities of 12,000 net tons of merchant iron, 4,000 tons of tool steel, and 6,000 tons of special steel.\textsuperscript{83} As described by Professor Diane F. Britton in \textit{The Iron and Steel Industry in the Far West} (1991) the open hearth process of making steel, also known as the Siemens – Martins Process, “consists in melting by direct flame


\textsuperscript{82} Thurston, \textit{Allegheny County’s Hundred Years}, 149-150; and “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Forges, and Bloomaries in Every State and Territory, Corrected to July 25, 1882 \textit{The American Iron and Steel Association}, 117.

\textsuperscript{83} “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Forges, and Bloomaries in Every State and Territory, Corrected to July 25, 1882 \textit{The American Iron and Steel Association}, 117.
action a mixture of pig iron and iron and scrap iron . . . on a hearth . . . accessible through
furnace doors for inspection, sampling, and testing.” Soon after successfully producing
open-hearth steel at the Fort Pitt Iron & Steel Works, however, Graff, Bennett, &
Company teetered on the brink of insolvency and began having difficulties managing the
finances of its extensive and diverse iron and steel holdings.

In June 1883, rumors of the imminent failures of Pittsburgh’s Graff, Bennett, &
Company, Robinson, Rae, & Company, and the Elba Iron Company permeated the iron
city. The Grafton Iron Company’s request for an extension of credit on June 2 appears
to be the impetus for what The New York Times described as the “panic . . . that things
were generally going to the dogs.” John Graff and Henry King owned a total of
$100,000 and $40,000 of capital stock in the Grafton Iron Company respectively, while
Robinson, Rea, & Company owned the remaining $60,000 of capital stock. The primary
creditors of the Grafton Iron Company consisted of Pittsburgh’s Merchants & Mechanics
Bank, the Citizens Bank, the Peoples Bank, and the Iron City Bank. These creditors
estimated that the iron company’s assets amounted to approximately $289,000 with
liabilities totaling $600,000 and therefore refused the credit extension request. Within
three weeks, rumors again circulated that the insolvency of the Grafton Iron Company
would ultimately prove too much for John Graff’s iron and steel holdings. With Graff,

84 Diane F. Britton, The Iron and Steel Industry on the Far West: Irondale, Washington (Niwot,
Colorado: University Press of Colorado, 1991), 164; and Ingham, Making Iron and Steel: Independent
Mills in Pittsburgh, 1820-1920, 50.

85 “Iron Firms in Trouble-The Grafton Iron Company Asks an Extension, Other Firms Involved,”
The New York Times (June 5, 1883): 1; and “The Pittsburgh Complications-Involved in the Grafton Iron
Company’s Failures, But Not Insolvent,” The New York Times (June 6, 1883).


87 Ibid.
Bennett, & Company having liabilities amounting to $1,282,752 and an additional $330,000 in liabilities tied to the struggling Grafton Iron Company at Leetonia, “eighty-five percent of the creditors of Graff, Bennett, and Company . . . decided to grant the firm [Graff, Bennett, and Company] an extension of three years” on June 21, 1883. Graff’s partnership agreed to pay the creditors forty percent of the extended credit over the course of the next sixteen months with the “payment of the balance . . . secured by bonding their estate.” The future of Graff, Bennett, & Company’s extensive iron and steel holdings rested on their ability to meet these new financial agreements.

Despite remaining heavily in debt three years after receiving an extension of credit, Graff, Bennett, & Company decided to expand further into steel manufacturing. After selling the Fort Pitt Iron & Steel Works to the Carbon Iron Company, Graff’s firm constructed an open-hearth steel plant consisting of two 15-ton Siemens-Martin furnaces at their Millvale Rolling Mill location in 1886. The Company also purchased a 3-ton Clapp-Griffiths converter from a company in Port Henry, New York and started the process of relocating the converter to the Millvale Mill. In addition, the 1888 American Iron and Steel Association Directory indicates that the Company hoped to add the following equipment to the Millvale site: a large blooming mill, another puddling forge, four 31” plate mills, and a universal mill to rework and manufacture structural iron. If completed, the expanding mill would be capable of producing a total annual capacity of

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90,000 net tons of iron and steel – a significant increase when compared to the approximately 20,000 net ton annual capacity of the former Fort Pitt Iron & Steel Works. These additions and production goals, however, proved too grandiose and never materialized.

On February 22, 1888, the front pages of the New York Times and the Washington Post included the headlines “A Big Failure in Pittsburgh--An Iron Firm Goes Under with Liabilities of One Million” and “A Heavy Failure in Pittsburgh.” Five years after receiving an extension of credit, John Graff, James I. Bennett, and Robert Marshall made an assignment to P. H. Miller after failing to make the first of three scheduled installment payments to the New York Life Insurance Company, which “held a mortgage on all the property of the firm for $450,000.” Graff, Bennett, & Company had agreed to pay the Insurance Company in three large installments: the first in the amount of $45,000 on March 28, 1888, the second in the same amount by April 28, 1889, and the remaining amount of $360,000 on April 22, 1890. Bennett’s son-in-law Hay Walker Jr. also held a “general mortgage on all the real estate” that he secured in “14 bonds for various amounts,” with Bennett maintaining six of the bonds in the amount of $90,000. Despite the assignment, the Clinton Furnace, Clinton and Millvale Rolling Mills, and the Grafton Iron Company remained in operation until each site exhausted the raw materials on

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90 Ibid.


92 Ibid.

93 Ibid.
With no realistic avenues for further credit extensions, the once innovative and successful firm of Graff, Bennett, & Company disappeared from Pittsburgh’s iron and steel landscape as nearby iron and steel concerns purchased the company’s various holdings.

After the court appointed receiver filed a final report, Graff, Bennett, & Company’s holdings were put up for auction. In early August 1888, a syndicate of the Company’s largest creditors purchased the Clinton and Millvale Rolling Mills for $729,000 and established the Clinton Iron & Steel Company.\(^95\) The Clinton Iron & Steel Company also became the owners and operators of the former “pioneer” Clinton Furnace, which after a remodel in 1889 that included increasing the stack size (57’ x 12’) and adding three hot blast stoves, started producing Bessemer, foundry, and mill pig iron with a capacity of 20,000 net annual tons. Graff’s coke-fueled furnaces at Leetonia, estimated to be worth $325,000 and producing twelve hundred tons of foundry and forge pig iron each week in 1887, fell into the hands of the McKeefrey Family who continued to operate the furnaces over the course of the next twenty-fives producing Bessemer, foundry, and forge pig iron.\(^96\)

After paving the way for coke fueled iron manufacturing in Pittsburgh in 1859, Graff, Bennett, & Company entered into pig iron manufacturing in northern Columbiana

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\(^{94}\) The Janesville Daily Gazette (Wisconsin), Feb. 24, 1888, 2. Despite remaining owners of the Paulding Furnace and Forge, Graff, Bennett, & Company started to lease these works to S. Frank Eagle, who operated the charcoal stack until 1889 when the equipment and machinery were dismantled and removed.


\(^{96}\) “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Forges, and Bloomaries in Every State and Territory, Corrected to November 1889 with Addenda,” The American Iron and Steel Association (Philadelphia: Allen, Lane, and Scott, 1890), ix, xi, 26, 57, 77, and 119; and Business Review: Columbiana County, 1887 (unknown publication and date, located at Leetonia Public Library), 14.
County in order to take advantage of the area’s highly prized Washingtonville coal and coke and nearby interesting railroads. For more than two decades, John Graff successfully managed the firm’s expansion and diversification, but ultimately failed in his attempt to compete directly against Andrew Carnegie’s rapidly expanding steel manufacturing conglomerate. In addition to playing a significant part in the industrial development of Leetonia, Graff, Bennett, & Company’s failure offers an early example of one iron manufacturing company’s inability to successfully transition from pig iron production to Bessemer steel manufacturing during the late 1880s. Despite the ultimate failings of Graff, Bennett, & Company, or maybe because of them, the American Manufacturer described John Graff as “one of the most conspicuous figures in iron manufacturing circles” following his death in 1901.97

97 “Obituary-John Graff,” American Manufacturer and Iron World vol. 69, no. 19 (November 1901), 1373. Both of the two obituaries of John Graff located as of 2011 fail to mention the failure of Graff, Bennett, and Company. Each describe that Graff “retired” as an iron manufacturer in 1888.
Chapter Six

Mahoning Valley Iron Manufacturers:
Jonathan Warner and Joseph H. Brown, 1845-1895

“Mr. Warner’s career has been one of great activity, and he has done much for the material development of the region in which he has lived.”


“In any technical discussion of the iron and steel industry of the Mahoning Valley the activities of the late Joseph Henry Brown would command frequent attention. As a matter of fact he stood as one of the great iron masters in America for many years.”


Unlike iron manufacturers at Leetonia who relied on nearby Washingtonville coal and coke and Pittsburgh ironmasters who used Connellsville coal and coke as smelting fuels, iron manufacturing throughout the Mahoning Valley during the middle of the nineteenth century developed around the use of raw block coal as a smelting fuel. In 1845-1846, Mahoning Valley iron manufacturers fortuitously learned that the area’s vast block coal deposits (also known as splint coal or Brier Hill coal) could be used
as a smelting fuel in its raw state “thus obviating the necessity of coking.” This realization, which ended the use of charcoal as a smelting fuel in the Mahoning Valley, spurred the development of coal mining and ultimately led to the rapid growth of Youngstown, Ohio. This chapter closely examines the careers of Jonathan Warner and Joseph H. Brown – two of the original seven incorporators of the Leetonia Iron & Coal Company – and their instrumental roles in the growth of the Mahoning Valley as a center of coal mining and iron manufacturing. In addition to being pioneering Mahoning Valley iron manufacturers, Warner and Brown were connected personally through the marriage of their children: Edwin Jonathan Warner and Mary Jane Brown. Detailing these two iron manufacturers’ careers from 1845 through 1895, and placing their successes and failures within the context of larger developments taking place throughout the nation’s iron and steel industries, creates a more complete understanding of Mahoning Valley iron manufacturing before the arrival of Bessemer steel production in Youngstown at the end of the nineteenth century.

The Pittsburgh firm of Wilkes, Wilkinson, & Company ushered in the era of using raw block coal as a blast furnace smelting fuel in the Mahoning Valley when the firm “blew in” their 45’ x 12’ Anna (Mahoning) furnace stack on August 4, 1846 at Lowellville, Ohio. The opening of the eighty-two mile Pennsylvania & Ohio Canal


through Youngstown six years earlier provided the necessary outlet for the Valley’s coal and iron. David Tod, later Governor of Ohio from January 1862 to January 1864, proved instrumental in the construction of the canal through Youngstown and in the early development of mining block coal throughout the Mahoning Valley. In 1835, Tod commenced coal mining underneath his father’s expansive Brier Hill estate some three miles northwest of Youngstown, which had a population of less than fourteen hundred in 1837. Mahoning Valley mining firms shipped 26,000 tons of coal via the canal in 1849 and 185,000 tons in 1852. Tod would later play a pivotal role in the construction of the Cleveland & Mahoning Railroad that opened in 1857. As described by Joseph F. Froggett, the Mahoning Valley’s block coal “was [a] peculiarly dry bituminous mineral, unlike Pittsburgh coal, which because of its tarry nature could not be used for furnace fuel until coked.” Located in veins and beds primarily underneath southern Trumbull County and northern Mahoning County, block coal and nearby black-band iron ore deposits provided the necessary mineral foundation for Mahoning Valley iron manufacturers for more than three decades.


4 Wiggins and McKillop, eds., Youngstown, Past and Present, 32.


6 History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II, 92-98.
Fifteen years before purchasing an interest in Jacob G. Chamberlain’s coal and coke works near Washingtonville (Young, Fisk, & Company) during the late 1850s, Jonathan Warner played a leading role in the development of coal mining operations and iron manufacturing concerns throughout the Mahoning Valley. Shortly after the first blast at Wilkes, Wilkinson, & Company’s Anna (Mahoning) furnace at Lowellville, William Philpot, David Morris, Harvey Sawyer, and Jonathan Warner (W. M. Philpot & Company) began iron production in 1846 at their recently constructed Eagle furnace. Located on Dr. Henry Manning’s property, the Eagle furnace was approximately two miles northwest of downtown Youngstown along the east bank of the Mahoning River near a bluff – some three hundred yards southeast of David Tod’s Brier Hill farm.7 Dr. Manning and the proprietors of the Mahoning Valley’s second raw block coal fueled furnace agreed to a twenty-year lease that permitted the mining of coal on Manning’s land, with the Company agreeing to pay royalties in the amount of

one cent per bushel [of coal] for the first twenty-five thousand bushels, and one half cent per bushel for all over twenty-five thousand bushels dug in one year, and to mine not less than seventy-five thousand bushels per year, or to pay for the quantity if not mined…with the bushel of coal to weigh seventy-five pounds.8

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In addition to the Manning mine, the Company also leased the Wertz coal bank, which yielded both block coal and high quality iron ore. William Philpot, unlike his younger business partner Jonathan Warner, was an experienced owner and operator of coal mines throughout Ohio. From 1835 until the Eagle furnace’s first blast, Philpot engaged in several different coal-mining enterprises throughout Portage, Summit, and Wayne Counties in northeast Ohio.\(^9\)

W. M. Philpot & Company’s 49ʹ x 12ʹ Eagle furnace stack became well known according to Youngstown historian Joseph G. Butler, Jr. “achieving a reputation by producing twenty-eight tons of iron in one day, a record never before equaled in the Mahoning Valley.”\(^{10}\) Realizing the potential financial opportunities associated with the Mahoning Valley’s block coal deposits, Captain James Wood of Pittsburgh, through the firm James Wood & Company, constructed a blast furnace stack northwest of the Eagle furnace near David Tod’s Brier Hill farm in 1847. Tod’s extensive block coal mines supplied the smelting fuel for Wood’s 41ʹ x 14ʹ Brier Hill furnace.\(^{11}\) With weekly iron production capacities at the Mahoning furnace and the Brier Hill furnace equaling twenty

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\(^9\) Maurice Joblin, *Cleveland, Past and Present: Its Representative Men, Comprising Biographical Sketches of Pioneer Settlers and Prominent Citizens with a History of the City* (Cleveland, Ohio: Fairbanks, Benedict, and Company, 1869), 324-326. Philpot also participated in the excavation of the Pennsylvania and Ohio Canal in Portage County, thereafter prospering as a sales agent and local businessperson.


and twenty-five tons respectively, the Eagle furnace remained the most productive raw
coal fueled furnace in the Mahoning Valley for nearly a decade. Jonathan Warner’s
experience while a partner in W.M. Philpot & Company – Warner and Philpot together
owned two-thirds of the company’s shares – certainly influenced his later involvement in
various coal mining and block coal fueled blast furnace operations throughout the
Mahoning Valley.\footnote{William Philpot died on June 2, 1851 in Liberty Township, Trumbull County, Ohio. Joblin, Cleveland, Past and Present, 324-326.}

Born on February 10, 1808 in western New York’s Ontario County, Jonathan
Warner witnessed first-hand the horrors of war when at the age of four his father, Asher,
died as a result of wounds suffered in the failed defense of his hometown during the War
of 1812.\footnote{“Death of a Former Genevan: Jonathan Warner,” The Geneva Gazette (New York) (May 3, 1895); History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume
II, 243; Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume II (Chicago and New
York,” http://www.co.wayne.ny.us/Departments/historian/Hisstodus.htm; and “Battle of Sodus Point-War
of 1812 (The Men),” Historic Sodus Point http://www.historicsoduspoint.com/the-battles/battle-of-sodus-
point-war-of-1812-the-men/. Two obituaries for Jonathan Warner indicate that he was born on February 10
at Sodus Point, New York, which is in present day Wayne County, formerly included within Ontario
County until 1823. The thirty-seven inch bronze bust of Jonathan Warner at the William McKinley
Museum and Birthplace Home & Research Center in Niles, Ohio lists Warner’s birthdate as February 8,
1808 at Oaks Corners, New York. McKinley Birthplace Home & Research Center,
http://mckinley.pastperfect-online.com/35832cgi/mweb.exe?request=record;key=835; and “The Burned
Over District-Evolution of County Boundaries,” http://olivercowdery.com/census/BurnEvlv.htm.}
Following the death of his father, Warner moved to his uncle’s residence at
Sodus Point where he worked in a mercantile business. Warner then found employment
as a clerk in an Oswego town store before selling grain as a teenager. After marrying
Eliza Landon of Oneida County, New York on November 22, 1829, Warner opened two
of his own stores in the village of Sodus and at Sodus Point.\footnote{“Letter from Jonathan Warner in Marquette County, Michigan to Eliza Warner in Mineral Ridge, Ohio,” (November 22, 1879), Hildegrand K. Schnuttgen Ethnic History Collection, Maag Library, Youngstown State University.} After managing these
stores for more than a decade, Jonathan and Eliza Warner – along with their five children – briefly relocated to Pittsburgh before permanently settling in Youngstown during the early 1840s.\footnote{15}

Before focusing primarily on coal and iron concerns throughout the Mahoning Valley, Warner opened a dry goods store on Federal Street near the “Diamond” (Public Square) in downtown Youngstown. In 1846, twenty-four year old Sodus native Myron Israel Arms, who previously worked with Warner at his Sodus stores, joined the Warner family in Youngstown and began working as a clerk in Warner’s dry goods business. Not too long after Warner formally made Arms a partner in his mercantile business (J. Warner & Company), Arms married Jonathan and Eliza’s eighteen-year-old daughter Emaline Eliza on November 30, 1848.\footnote{16} Following his daughter’s marriage, Warner succeeded in having his son-in-law named superintendent and manager of the recently blown in Eagle furnace. Myron I. Arms remained in this position until 1864 when he enlisted in the Union Army.\footnote{17}
In 1854, while Warner’s son-in-law continued to manage successfully the production of iron at the Eagle furnace, Charles T. Howard of Massillon, Ohio and Lemuel Crawford of Cleveland became business partners (Crawford & Howard) and constructed a raw coal fueled blast furnace along the Mahoning River southeast of downtown Youngstown. Despite being roughly the same size as the Mahoning Valley’s first three raw coal fueled furnaces, Crawford & Howard’s Phoenix furnace stack succeeded in producing forty tons of iron in a single day – a near doubling of the daily capacities of the Mahoning, Eagle, and Brier Hill furnaces. Crawford & Howard also decided, according to Joseph G. Butler Jr., to “defy the custom of using a hill as a skip hoist” and instead built “two platforms arranged at one side of the stack” that received loaded and unloaded “barrows” through a “hoisting device” thereby replacing “men and mules for the work of filling the furnace.” Despite these production successes and technological advancements in blast furnace construction, tensions developed between Charles Howard and Lemuel Crawford’s son, W. W. Crawford, culminating in the dissolution of Crawford & Howard.


Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 666; and Joseph G. Butler, Jr., Fifty Years of Iron and Steel-An Address Delivered at the Thirteenth General Meeting of the American Iron and Steel Institute in Cincinnati, Ohio, October 26, 1917 (Cleveland: The Penton Press, 1918), 23.
After Howard sold his entire interest in the firm to Crawford, he constructed his own blast furnace complex a mere two hundred yards from the Phoenix stack. Howard’s 47’ x 14’ Falcon furnace started producing raw block coal iron in 1856 with a daily capacity of fifty tons (Refer to Table 6.1).\(^{20}\) According to J. P. Lesley’s *The Iron Manufacturer’s Guide to the Furnaces, Forges, and Rolling Mills of the United States* (1859), the Mahoning Valley’s first five raw block coal blast furnaces produced 13,956 tons of forge and rolling mill iron from 1856 to 1857.\(^{21}\) As Youngstown and nearby communities along the Mahoning River started to develop into profitable centers of coal mining and iron manufacturing during the mid to late 1850s, Jonathan Warner directed his attention to Weathersfield Township in southern Trumbull County (northwest of Youngstown) and to Austintown, Canfield, and Green Townships in central Mahoning County (west and southwest of Youngstown). The opportunity to capitalize on the highly prized coal and iron ore deposits unearthed at these locations near the still unfinished Niles & New Lisbon Railroad became Jonathan Warner’s primary focus for the next fifteen years.\(^{22}\)


\(^{22}\) Refer to Map 2-1 in Chapter 2.
The earliest attempts at coal mining in southern Weathersfield Township and northern Austintown Township occurred during the early 1830s on properties owned by George Campbell, Warren Eaton, and Michael Ohl, Jr. Roger Hill, an experienced coal miner from Beaver County, Pennsylvania, located a seam of coal 4’ thick after opening a drift mine in 1835 on Michael Ohl’s farm in southwestern Weathersfield Township. After testing a sample of this coal, Hill “pronounced [it] to be bastard cannel coal or blackstone . . . and [it] was left unwrought in the mine, forming the floor of the [coal] bed.” Although there were five mines in operation in 1835, extensive coal and iron ore

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Table 6.1 Blast Furnaces in the Mahoning Valley, 1845-1856

<table>
<thead>
<tr>
<th>Name</th>
<th>Erected</th>
<th>Company / Proprietor</th>
<th>Location</th>
<th>Daily Capacity / Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna / Mahoning</td>
<td>1845 - 1846</td>
<td>Wilkes, Wilkinson, &amp; Co.</td>
<td>Lowellville</td>
<td>20</td>
</tr>
<tr>
<td>Eagle</td>
<td>1846</td>
<td>W.M. Philpot &amp; Co.</td>
<td>Youngstown</td>
<td>28</td>
</tr>
<tr>
<td>Brier Hill No. 1</td>
<td>1847</td>
<td>James Wood &amp; Co.</td>
<td>Youngstown</td>
<td>25</td>
</tr>
<tr>
<td>Phoenix</td>
<td>1854</td>
<td>Crawford &amp; Howard</td>
<td>Youngstown</td>
<td>40</td>
</tr>
<tr>
<td>Falcon</td>
<td>1856</td>
<td>Charles Howard</td>
<td>Youngstown</td>
<td>50</td>
</tr>
</tbody>
</table>

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24 “A History of Trumbull County by Townships-From the Early Times up to the Present Day,” The Warren Record (January 9, 1880).

mining operations did not develop until a decade after these two townships became the boundary between Trumbull and Mahoning counties. In 1854, John Lewis, a Welsh miner who recently settled near the Ohl Family farm at Ohltown, came across the blackstone coal “while sinking a hole in the floor of his working place, to set up a prop.” Lewis “was struck with the similarity of the blackstone to the black-band ore he had mined at the Victoria mines, in the old country.” After tests “proved the correctness of the miner’s [John Lewis] practical knowledge,” that the sample was in fact black-band iron ore, Jonathan Warner and like-minded industrialists soon relocated to the townships’ mineral laden ridge where they soon opened extensive coal and iron ore mines as well as accompanying blast furnace operations.

By the spring of 1858, the editors of Warren’s Western Reserve Chronicle presented a detailed description of the substantial mining operations developing rapidly in Weathersfield Township, some seven to eight miles south of Warren – Trumbull County’s seat of government. Five separate companies owning more than six hundred and fifty acres of land, with aggregate investments nearing a quarter of a million dollars, were operating when the newspaper editors visited the “top of the Mineral Ridge.”


Map 6-1 Weathersfield Township, Trumbull County, Ohio, 1856

Opened in 1856, Tod, Wells, & Company’s 60’ shaft mine, the southernmost operation along the ridge, operated “two first class steam engines . . . for pulling . . . and hoisting coal.”

Morris, Price, & Company’s nearly decade old slope mine (Cambria) – immediately north of Tod, Wells, & Company’s mine – yielded approximately two hundred tons of coal each day. As described by the Chronicle, this firm’s 14” cylinder engine pulled rail cars filled with coal out of the mine by chain “to about fifteen feet above the ground . . . where the coal . . . run[s] over a screen and fall[s] into the Rail

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Road cars.” North of this site, Jonathan Warner operated a 150’ slope mine (Ashland) on one hundred and thirty acres of land he purchased for $50,000 in 1856. Perry, Cross & Company operated the smallest firm along the ridge with access to only eighty acres of land. The most profitable mining site, located between Warner’s holdings and Perry, Cross, & Company’s mine, belonged to Rice, French, Cook & Company who started mining along the ridge in 1853. This Company operated a slope mine (Peacock) on one hundred and fifty acres of land and extracted on average one hundred and eighty tons of coal each day. In 1857, the Company shipped 20,000 tons of coal to Cleveland by way of the firm’s Mineral Ridge Railroad – a two-mile line running north from the Peacock mine to the recently opened Cleveland & Mahoning Railroad at Niles.

According to William G. Darley, who conducted the tour of the mines for the newspaper’s editors, these coal mines along the ridge in Weathersfield Township yielded “about 45,000 tons to the acre.” In addition, these five companies were capable of extracting “about one ton of [black-band iron] ore to every three tons of coal” from these mines. The black-band iron ore, which contained “33 per cent of metal,” was located underneath the ridge’s vast coal deposits in “strata varying from one to ten inches in thickness.” With access to coal and iron ore deposits, Jonathan Warner started to

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expand his mining operations in Weathersfield Township by erecting a blast furnace complex.

Image 6-1 Jonathan Warner (February 10, 1808 – April 18, 1895)\textsuperscript{37}

In 1858, Warner partnered with experienced iron manufacturer Captain James Wood and established Wood, Warner, & Company. Throughout the following year, Warner supervised the construction of a blast furnace, in the amount of $60,000, roughly 200' from his recently purchased coal and iron ore mines.\textsuperscript{38} Construction continued

\textsuperscript{36} Ibid; and History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II, 236.

\textsuperscript{37} Jonathan Warner Painting, Courtesy of Marcia Buchanan, Mineral Ridge Historical Society and the First Presbyterian Church of Mineral Ridge, Ohio.

\textsuperscript{38} “Niles Correspondence,” \textit{Western Reserve Chronicle} (June 27, 1860): 3; “The History of Two Furnaces,” \textit{Mahoning Dispatch} (May 10, 1878); and Butler, Jr., \textit{History of Youngstown and The Mahoning Valley, Ohio}, Volume I, 603.
despite a strike by miners at the Ashland mine in April 1860. Despite this, Wood, Warner, & Company “blew in” their 45’ x 12’ Ashland stack and according to the *Western Reserve Chronicle* cast about eight and one half tons of “excellent quality” pig iron on June 18, 1860. Warner’s blast furnace, the second raw block coal stack in Trumbull County after James Ward, Sr.’s Elizabeth furnace at Niles, maintained a daily capacity of twenty-two tons of pig iron.

Wood, Warner, & Company’s Ashland furnace complex was quite extensive. As detailed by the editors of the *Western Reserve Chronicle*, coal from the Ashland mine arrived directly into a 60’ x 40’ framed stock house via a 360’ trestle. A 30’ x 50’ engine house containing a 22” cylinder engine and a twelve-ton flywheel 16’ in diameter provided the necessary power for the furnace. Wrought iron pipes fed the furnace hot blasts via four tuyeres, and after each blast, molten iron collected at the furnace’s 5’ hearth before being tapped into a 74’ x 49’ framed casting house. Behind the complex, Warner’s company built: a 59’ x 38’ structure to serve as a store and an office, a 32’ x 47’ two-story boarding house, and six 22’ x 32’ two-story houses that they painted white. By December 1861, the Ashland furnace was “making sixteen to eighteen tons of a good quality metal per diem.”

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40 “Niles Correspondence,” *Western Reserve Chronicle* (June 27, 1860): 3; and “Niles Correspondent,” *Western Reserve Chronicle* (April 4, 1860): 3.


42 “Niles Correspondence,” *Western Reserve Chronicle* (June 27, 1860): 3.

Eliza Warner left the bustling city of Youngstown and permanently relocated to rural Weathersfield Township within a year of the first blast at the Ashland stack.\textsuperscript{44}

While Warner and Wood were constructing the Ashland furnace, David Tod’s Brier Hill Iron Company and Vincent C. Himrod’s Furnace Company constructed four more blast furnace stacks in Youngstown; increasing the city’s daily iron output by nearly one hundred and fifty tons.\textsuperscript{45} In 1861, James Wood sold his remaining control of the “old” Brier Hill No. 1 stack to David Tod. Tod added the Mahoning Valley’s third raw block coal stack to his expanding Brier Hill Iron Company, with the stack thereafter referred to as the Tod furnace stack.\textsuperscript{46} In June 1862, James Wood and Jonathan Warner mutually ended their partnership, with Wood devoting his primary attention to iron manufacturing concerns in western Pennsylvania.\textsuperscript{47} Jonathan Warner now maintained complete control of the Ashland blast furnace, which he continued to operate “quite

\textsuperscript{44} In 1860, the population of Youngstown reached 5,300 and as a result the State of Ohio made Youngstown a city. “Youngstown, Ohio,” Ohio History Central: An Online Encyclopedia of Ohio History http://www.ohiohistorycentral.org/entry.php?rec=826; and Blue, et al., Mahoning Memories, 32.

\textsuperscript{45} The Brier Hill Iron Company originated as the Akron Manufacturing Company in 1838 with a capital of $250,000. The Company operated a blast furnace and a foundry in Akron up until 1859, when under the direction of David Tod, the firm dismantled its machinery and relocated to Youngstown. The Mahoning Valley’s block coal and black-band iron ore deposits provided the impetus for this move. After relocating, the Akron Manufacturing Company reorganized as the Brier Hill Iron Company. In 1867, the company reorganized as the Brier Hill Iron and Coal Company. Following Governor Tod’s death in 1868, John Stambaugh of Youngstown became president of the firm. Established in 1859 by Vincent C. Himrod and A.B. Cornell, the Himrod Furnace Company constructed three furnace stacks along Crab Creek north of downtown Youngstown in 1859, 1860, and 1868. After struggling to remain viable during the prolonged Panic of 1873, Robert Walker of Poland took control of the firm as a receiver and leased the stacks to the Brier Hill Iron and Coal Company. Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 667, 710-711; Joseph F. Froggett, “The Mahoning Valley as an Iron Center: Originality in Practice Marked Steady Progress,” The Iron Trade Review, 185; and Blue, et al., Mahoning Memories: A History of Youngstown and Mahoning County, 37.

\textsuperscript{46} Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 181.

\textsuperscript{47} Discussion and analysis of Wood’s role in iron manufacturing in western Pennsylvania is included in Chapter 8.
successfully.” After purchasing Wood’s shares, Warner increased his iron production capabilities by purchasing the idle Meander (Porter) furnace along Meander Creek in Austintown Township – some eight miles south of Warren and a mere one half of a mile south of Ohltown.49

Table 6.2 Blast Furnaces Constructed in the Mahoning Valley, 1856-186550

<table>
<thead>
<tr>
<th>Name</th>
<th>Erected</th>
<th>Company / Proprietor</th>
<th>Location</th>
<th>Daily Capacity/Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meander / Porter</td>
<td>1857</td>
<td>William Porter</td>
<td>Austintown Twp.</td>
<td>15</td>
</tr>
<tr>
<td>Elizabeth</td>
<td>1859</td>
<td>James Ward &amp; Co.</td>
<td>Niles</td>
<td>28</td>
</tr>
<tr>
<td>Himrod No. 1</td>
<td>1859</td>
<td>Himrod Furnace Co.</td>
<td>Youngstown</td>
<td>35</td>
</tr>
<tr>
<td>Grace No. 1</td>
<td>1859</td>
<td>Brier Hill Iron Co.</td>
<td>Youngstown</td>
<td>40</td>
</tr>
<tr>
<td>Grace No. 2</td>
<td>1860</td>
<td>Brier Hill Iron Co.</td>
<td>Youngstown</td>
<td>35</td>
</tr>
<tr>
<td>Ashland No. 1</td>
<td>1860</td>
<td>Wood, Warner, and Co.</td>
<td>Weathersfield Twp.</td>
<td>22</td>
</tr>
<tr>
<td>Himrod No. 2</td>
<td>1860</td>
<td>Himrod Furnace Co.</td>
<td>Youngstown</td>
<td>35</td>
</tr>
<tr>
<td>Ashland No. 2</td>
<td>1862-63</td>
<td>Jonathan Warner</td>
<td>Weathersfield Twp.</td>
<td>21</td>
</tr>
</tbody>
</table>

48 Western Reserve Chronicle (July 16, 1862): 3; and History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II, 237.

49 “A New Furnace,” Western Reserve Chronicle (Warren, Ohio, January 27, 1858): 3; Lesley, The Iron Manufacturer’s Guide to the Furnaces, Forges, and Rolling Mills of the United States, 110; and Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 603. Lesley describes this furnace as being nine miles southwest of the Youngstown Railroad Station on Meander Creek, four miles above its junction with the Mahoning River in Austintown.

William Porter, an Irish immigrant who arrived in Trumbull County in 1837, constructed the 38’ x 12’ Meander furnace after working as a merchant for two decades. A bed of coal “4’ 8” thick and black-band ore 12” to 18” in thickness” fueled Porter’s furnace stack, which Smith, Porter, & Company “blew in” on December 1, 1857. 51 Similar to Morris, Price, & Company’s Cambria slope mine and Warner’s Ashland slope mine, Porter’s Company removed “coal and iron ore . . . directly from the mine up an inclined plane, and unloaded [the materials] . . . in the stock house without change of cars.” During the following two years, Porter’s mines and furnace employed one hundred workers and produced between fifteen and sixteen tons of high quality raw coal iron each day. 52 Despite initial production successes, the Meander furnace ceased operation following Porter’s bankruptcy” in the wake of the Panic of 1857. After remaining idle for several years, Jonathan Warner purchased Porter’s furnace and proceeded to disassemble and relocate the Meander furnace stack to his Ashland furnace complex in Weathersfield Township. Approximately fourteen months before his son-in-law Myron I. Arms enlisted in the Union Army – while “the coal mines at Mineral Ridge [were] all working steadily and disposing of all their coal as fast as mined at high prices”


– Jonathan Warner’s two blast furnace stacks (Ashland No. 1 and No. 2) were “running steadily, making metal copious in quantity and superior in quality.”

In May 1864, while Warner’s “new furnace [was] doing well,” he “blew out his old furnace” and continued to produce an “exceptionally fine grade” of pig iron according to his daughter Emaline Arms. As detailed by Joseph G. Butler, Jr., the iron produced at the Ashland furnaces “became widely known as American Scotch pig [or] Warner’s Scotch pig” iron. Scotch pig iron was a grade of iron highly desirable as a soft foundry iron imported from its namesake during the nineteenth century. Warner’s

53 “Iron and Coal Matters,” Western Reserve Chronicle (March 11, 1863): 3. In one of the earliest surviving letters between Myron I. Arms and Emaline Eliza Warner Arms, Myron tells his wife that “I hope the furnace [Eagle] will continue to grow and do well.” “Letter from Myron I. Arms in Martinsburg, West Virginia to Emaline Arms in Youngstown, Ohio,” (May 19-20, 1864), Hildegrand K. Schnuttgen Ethnic History Collection, Maag Library, Youngstown State University.


55 “Letter from Emaline Eliza Warner Arms in Youngstown, Ohio to Myron I. Arms,” (May 21, 1864), Hildegrand K. Schnuttgen Ethnic History Collection, Maag Library, Youngstown State University; and Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 665.

use of raw block coal and black-band iron ore exclusively in his Ashland furnaces rendered a product similar in structure and use to Scotch iron; thereby allowing Warner to advertise a specific grade of pig iron that foundry workers and owners throughout the Mahoning Valley preferred. According to Myron I. Arms, one ton of Scotch pig iron was worth $72 in New York in July 1864. While the pig iron of the Ashland furnaces was becoming well known throughout the iron industry, Warner – alongside William Lee, Milton Sutliff, Lemuel Wick, William Mathers, Jacob G. Chamberlain and Joseph H. Brown – established the Leetonia Iron & Coal Company in Salem Township. On January 29, 1866, the same day the State of Ohio incorporated the Leetonia Iron & Coal Company, the State of Ohio formally incorporated Warner’s Ashland furnaces as the Mineral Ridge Iron & Coal Company. Warner, Brown, Sutliff, Wick, and Chamberlain signed the application of incorporation having subscribed $200,000 of capital stock in the company. Warner served as both the general manager and superintendent of the Mineral Ridge Iron & Coal Company’s furnaces from its incorporation through 1868.

By 1870, after more than three decades of significant mining, the once “inexhaustible” block coal of the Mahoning Valley was beginning to vanish and the

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58 “Letter from Myron I. Arms at Camp Near Norfolk to Emaline Eliza Warner Arms in Youngstown,” (July 10-11, 1864), Hildegrand K. Schnuttgen Ethnic History Collection, Maag Library, Youngstown State University.

59 Annual Report, Secretary of State to the Governor of the State of Ohio for the Year 1866 (Columbus, Ohio: L.D. Myers & Bros. State Printers, 1867), 19. Marcia Buchanan graciously provided the author with a copy of the original application and approval of the Mineral Ridge Iron & Coal Company, located at the Trumbull County Archives and Microfilm Department, Warren, Ohio. The $200,000 used to capitalize the Mineral Ridge Iron & Coal Company is well above the $145,000 national average for capitalization of a blast furnace operation in 1869. Ingham, The Iron Barons, xvii.

60 History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II, 237; and Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 603.
highly sought after black-band iron ore in southern Weathersfield Township was diminishing as well.\textsuperscript{61} As described by historian Kenneth Warren, block coal throughout the Mahoning Valley dwindled quickly because iron manufacturers needed to use double the amount of coal when smelting iron as compared to furnaces using coke or mixtures of coal and coke as smelting fuels.\textsuperscript{62} As a result, by 1867 Mahoning Valley iron manufacturers started shipping high quality coke from the Connellsville coking fields to their blast furnaces. Initially Mahoning Valley furnace owners mixed Connellsville coke with local block coal, but by 1875 used Connellsville coke exclusively in their furnaces.\textsuperscript{63} Likewise, Lake Superior iron ore and iron ore from Missouri started to replace black-band iron ore in blast furnaces throughout the Mahoning Valley during the 1860s. Because of these developments, Jonathan Warner redirected his focus to iron ore mining in the Lake Superior ranges, while his sons Jacob Bonesteel and Charles M. Warner entered into finding profitable coal mines outside of the Mahoning Valley.

Late in the summer of 1868, while Warner was locating and purchasing access to two additional coal veins in Austintown Township, William H. Brown of Pittsburgh purchased the Mineral Ridge Iron & Coal Company for a “large figure.”\textsuperscript{64} According to Joseph G. Butler, Jr., Brown “was . . . a prominent and successful operator and shipper of

\textsuperscript{61} Butler, Jr., \textit{History of Youngstown and The Mahoning Valley, Ohio}, Volume I, 769-770.


\textsuperscript{63} Ibid; Butler, Jr., \textit{History of Youngstown and The Mahoning Valley, Ohio}, Volume I, 669; and Butler, Jr., \textit{Fifty Years of Iron and Steel}, 30-32.

\textsuperscript{64} \textit{Western Reserve Chronicle} (September 2, 1868): 3; \textit{Western Reserve Chronicle} (September 16, 1868): 3; and \textit{History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches}, Volume II, 237 and 243. These coal veins were each four feet thick and were located on the Jonas Naff and Ward Family farms. William H. Brown of Pittsburgh does not appear to be a relative of Joseph H. Brown.
coal, and as such was known all up and down the Ohio Valley.” Following this transaction, a group of iron manufacturers led by James Ward, Jr. of Niles organized the Brown Iron Company whereupon they operated the Ashland furnaces from 1868 through 1871. In exchange for his shares in the Ashland furnaces, Warner received “several thousand acres of undeveloped mining lands in the Lake Superior region,” which according to Joseph F. Froggett made Warner “one of the first Mahoning valley [sic] prospectors in the newly discovered Michigan ore regions.”

Warner’s Lake Superior iron ore property was located on the east shore of Smith’s Bay in Marquette County – some thirty-six miles from Marquette, Michigan. In the summer of 1870, Warner, Samuel P. Ely, Edward Breitung, Edwin Parsons, and Dr. John C. McKenzie pooled $500,000 and organized the Republic Iron Company. According to John Brandt Mansfield, “the purpose for which this company was organized was to handle the iron ore of the company at Republic, Mich[igan] and the shipping of the ore to Lake Erie ports.” From 1870-1872, with Warner as president, the iron ore mining firm set out to construct a rail line in order to ensure reliable export of the

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valuable mineral. Once the iron ore reached a port on Lake Superior, however, Warner’s company initially relied on other iron ore mining companies to deliver the iron ore to the port of Cleveland on Lake Erie.\textsuperscript{70} In the summer of 1872, miners extracted the first load of iron ore from the Republic mine, and by the end of the year Warner’s company shipped 11,025 gross tons of iron ore to Cleveland. The Republic Iron Company’s iron ore shipments for 1873 equaled 105,453 gross tons, with yearly totals increasing significantly during the next decade.\textsuperscript{71} By 1892, the Republic Iron Company ranked fifth according to total shipment of iron ore from the Marquette iron range.\textsuperscript{72}

While Jonathan Warner transitioned to Lake Superior iron ore mining during the late 1860s and early 1870s, Jonathan and Eliza Warner’s sons Jacob Bonesteel and Charles M. Warner joined Trumbull County native William Leavitt, Sr. and entered into mining block coal in Brazil, Indiana – the seat of government in Clay County.\textsuperscript{73} According to Indiana State Geologist Professor E. T. Cox, “the entire coal area of Clay County comprises about 300 square miles, or 192,000 acres” of the “celebrated” Brazil block coal, which miners started to remove in 1852-1853.\textsuperscript{74} In addition to being mining

\textsuperscript{70} History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II, 243; and Mansfield, ed., History of the Great Lakes: Illustrated in Two Volumes, Volume I, 449-450.

\textsuperscript{71} Swineford, Annual Review of the Iron Mining and Other Industries of the Upper Peninsula, 38-40.


associates in Indiana, Jacob Bonesteel Warner and William Leavitt Sr. were both sons-in-law to Ohltown miner John Lewis – the individual who unearthed and identified the profitable black-band iron ore in Weathersfield Township in 1854. The Warner brothers, Leavitt, and John H. Lewis owned and operated the Birch Creek Coal Company at Brazil, Indiana “for some time” before eventually selling the mining firm to the Lewis Coal Company.\textsuperscript{75}

As the Warner family entered into new iron ore and coal mining enterprises outside of the Mahoning Valley, Jonathan Warner remained committed to seeing the town he and Eliza called home become an incorporated village. The number of individuals settling in the area known as Mineral Ridge “increased rapidly” after Chauncey Hummason Andrews (1823-1893) completed the Niles & New Lisbon Railroad to Niles in 1869.\textsuperscript{76} After personally securing one hundred and eighty-nine signatures from residents along the “thriving and prosperous” ridge in Weathersfield Township, the state of Ohio formally incorporated the area’s 1,200 residents into the village of Mineral Ridge in April 1871.\textsuperscript{77} As illustrated by Map 6.2, Warner owned vast


\textsuperscript{76} History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II, 236; and Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 603 and 761.

\textsuperscript{77} Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 603; Western Reserve Chronicle (March 1, 1871): 4; and A Series of Letters Relating to the Incorporation of the Village of Mineral Ridge, Trumbull County Archives Inc. Co. Volume I. Located at the Trumbull County Archives and Microfilm Department, Warren, Ohio. Transcribed by Marcia Buchanan, Mineral Ridge Historical Society.
amounts of property in southern Weathersfield Township where he maintained significant political and financial influence within the village.

Map 6-2 Mineral Ridge, Trumbull County, 1870

78 “Mineral Ridge, Trumbull County, December 1870”Courtesy of Marcia Buchanan, Mineral Ridge Historical Society, Located at the Trumbull County Archives and Microfilm Department, Warren, Ohio.
In fact, according to the Census of 1870, Jonathan Warner, which the Census lists as a farmer, possessed a real and personal estate totaling $70,000.79 Having secured and profited from access to Lake Superior iron ore, sixty-three year old Jonathan Warner once again assumed control of the Ashland furnaces at Mineral Ridge in 1871-1872 after purchasing the complex from James Ward, Jr. and a group of Niles industrialists.80

In July 1872, a Western Reserve Chronicle editor visited Jonathan and Eliza Warner’s “beautiful home” in the “busy, smoky city of Mineral Ridge” where “four generations met in family re-union” during the Fourth of July holiday.81 The article provides useful information concerning the Warner family’s preeminent position within the community, the family’s lavish home, and the posh atmosphere of the holiday celebration. References to laborers at Warner’s recently reacquired blast furnaces in Mineral Ridge or at his extensive Ohio coal mines and Michigan iron ore mines do not appear in the filiopietistic description of Warner as a successful industrialist. Those in attendance at the party included several dozen family members, close family friends, and Reverend Dalzell of the First Presbyterian Church, which Warner helped establish.82

After the Warner family and their friends “satisfied their appetites, or the good things so


80 “The History of Two Furnaces,” The Mahoning Dispatch (May 10, 1878); and History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II, 237 and 243.


82 Ibid.
lavishly supplied” everyone relocated to the front lawn for a photograph and the releasing of balloons. As the day turned to night, the Chronicle’s editor described the scene as Jonathan and Eliza Warner:

sitting . . . happily, surrounded by so large a family of children, each of them acting their part well in the world’s strife, with an abundance of the good things of this world about them. Wealth garnered into the treasury, looking out over their broad acres, the brilliant light of the fire works but dimly reflected against the background of the sky illumined as it was by the leaping flames of his blast furnaces continually sending forth their dense black smoke, while the thud of the two heavy engines driving them overcame all the whizzing, cracking, and explosions of Roman candles, rockets, serpents, and other ingenious devices…Mr. Warner seemed to enjoy it better, if it was possible where all were fully pleased, than any, and he has occasion to and well may be proud of his family, of his place and its surroundings, and of the city, and of its churches, and its schools, its coal mines and its furnaces; for all its moral and material interests he has been mainly instrumental in building up and sustaining.  

By the end of the month, Warner planned to use his “wealth garnered into the treasury” in the construction of a rolling mill plant immediately north of his Mineral Ridge blast furnaces.  

Warner, along with D.S. Jackson of Niles and other associates, broke ground for a 75’ x 176’ building that would “contain twelve furnaces, with other necessary machinery to constitute a well appointed muck bar.” For the editor of the Chronicle, “this enterprise will give new life to the Ridge, and largely advance the business interests of all classes of citizens.” As the proprietors were “pushing the work rapidly forward,” Warner travelled to St. Louis to purchase the required milling equipment and machinery. Despite these

83 Ibid.


85 Ibid.
plans for expansion, Warner was unable to keep the furnaces operational following the failure of Jay Cooke’s banking enterprise in September 1873. Soon after the failure of James Ward & Company of Niles, and more than a full year after the failure of the Leetonia Iron & Coal Company, Warner made an assignment on his Mineral Ridge furnaces in 1873-1874. Production of American Scotch pig iron at the Mineral Ridge Iron & Coal Company never resumed.\textsuperscript{86}

At the time of these failures during the national Panic, Warner continued to own and operate the Republic iron ore mine in Michigan as well as several coal mines in Weathersfield Township. Warner’s local coal mines included the Ashland mine, Foulk’s mine (opened by Osborne, Wallace, & Company in 1873), the Peacock mine (formerly operated by Rice, French, Cook, & Company), and the McKinney shaft mine (opened by Wick, Powers, & Company in 1871).\textsuperscript{87} By 1875, Warner’s Ashland mine employed 40 miners and extracted 80 tons of coal a day; his Foulk mine employed 150 miners and maintained a daily average of 100 tons; while the McKinney and Peacock mines employed 150 miners who extracted on a daily basis an average of 300 tons of coal.\textsuperscript{88}


\textsuperscript{87} Wiggins and McKillop, eds., Youngstown, Past and Present, 61-65. According to Wiggins and McKillop, Warner’s mines employed approximately two hundred and forty miners who extracted more than twenty-six thousand tons of coal in 1873.

\textsuperscript{88} Ibid; and Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 770.
and then in Georgia. After failing in these endeavors, Warner once again joined his long-time business associate Joseph H. Brown in developing the “famous” Gold King mine in Colorado. By 1880, two of Warner’s sons – Edwin Jonathan Warner, who was married to Joseph H. Brown’s daughter Mary Jane Brown and Jacob Bonesteel Warner – had arrived in Colorado to take part in their father’s latest mining enterprise.

Any history of nineteenth Mahoning Valley iron manufacturers, especially the development of rolling mills along the Mahoning River during the mid to late nineteenth century, must include a discussion of Joseph H. Brown. More importantly, Brown’s association with Jonathan Warner and Jacob G. Chamberlain in the development of iron industries in the Mahoning Valley and at Leetonia as well as his primary role in the development of iron manufacturing companies in western Pennsylvania’s Shenango Valley merits his inclusion within this study. Brown immigrated to the United States with his parents (John Brown Sr. and Elizabeth Swain) from Glamorganshire, Wales at the age of six.

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91 U.S. Bureau of the Census, Tenth Census of the United States, 1880. Edwin J. Warner’s career in iron manufacturing before his move to Colorado in 1879 – 1880 is the primary focus of the early portion of the next chapter.

Upon the family’s arrival, John Brown Sr. and one of Mrs. Brown’s brothers constructed, owned, and operated copper and iron mills at Ellicott’s Mills, Maryland. It was in these mills where Joseph H. Brown “learned thoroughly the business of iron making.” In 1828, Brown relocated to south-central Pennsylvania where he accepted the position of foreman at the Mont Alto Iron Works in southern Franklin County. From 1831 to 1839, Brown worked at iron manufacturing companies in Antietam, Maryland and in Harrisburg, Pennsylvania. Approximately six years after marrying


Susannah Oelg of Franklin County in 1832, Brown moved to Mercer County in western Pennsylvania where he and Shubael Wilder helped construct James D. White’s Cosalo Iron Works at New Castle.\(^{96}\)

The Cosalo Iron Works included two heating furnaces, eight nail machines, and one water-powered train of rolls. Brown managed the rolling mill while Wilder managed the nail factory.\(^{97}\) Following the unexpected death of James D. White in 1839, Brown, Wilder, and Joseph Higgs operated the iron works for approximately one year until the firm of Crawford Brothers & Ritter purchased the site. Soon thereafter, however, because Crawford Brothers & Ritter “had little experience in practical manufacturing,” the Company partnered with Brown and Wilder to form Crawford & Company.\(^{98}\) By 1842, Crawford & Company started using steam power at the Cosalo Iron Works. Three years later, Crawford & Company erected a charcoal blast furnace ten miles north of New Castle at New Wilmington, which they “operated in connection with the [Cosalo] works.”\(^{99}\) In 1846, the firm constructed an entirely new nail factory with thirty nail machines and added one bar mill and one guide mill. Brown remained general manager of the Cosalo Iron Works during these expansions and upgrades until 1848 when he sold all of his company shares to Wilder.\(^{100}\)


\(^{97}\) Hazen, ed., *20th Century History of New Castle and Lawrence County*, 69-70 and 119.

\(^{98}\) Ibid., 120.

\(^{99}\) Ibid.
Three years before formally departing the Cosalo Iron Works, Brown helped establish the Orizaba Iron Works in New Castle with Higgs and Edward Thomas. During its first year of operation, while Brown remained manager of the Cosalo Iron Works, the Orizaba works relied on muck bar manufactured at the Cosalo iron mill. After Robert H. Peeble and Pollard McCormick joined the firm in 1846 (McCormick, Peeble, Brown, & Company), the Orizaba Iron Works expanded its manufacturing capabilities by adding nail machines and muck and merchant bar mills. Less than a year after these expansions, a fire destroyed the iron works in July 1847, which according to J. Fletcher Brennan were “among the largest in the State, thoroughly appointed, and containing the latest improvements in plant and machinery.” After rebuilding the Orizaba site in 1848 – which included adding twenty-four nail machines, a keg factory, and four boiler furnaces – Brown remained in “full control of the mechanical departments, but gave the financial control into the hands of his partners.”

Over the course of the next several years, however, while Brown “was working the mills at good profit,” he started to notice that “errors in the financial management” of

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100 Hazen, ed., 20th Century History of New Castle and Lawrence County, 120; and Brennan, ed., The Biographical Cyclopaedia and Portrait Gallery of Distinguished Men with a Historical Sketch of the State of Ohio, 398.


103 Ibid.
the Company due to poor decisions by McCormick and Peeble “were dissipating the
profits and capital.”104 After realizing his partners’ egregious financial decisions, Brown
disposed of his entire interest in the firm and for the nominal sum of $1, and after sixteen years [of] unintermitting labor to build up a reasonable fortune, found himself entirely stripped of all his hard earnings, and compelled to begin the struggle anew.105

After selling his control of the company, but remaining in the position as superintendent of the Orizaba Iron Works, Brown moved to Youngstown in 1855 where he and other New Castle iron manufacturers established another rolling mill company. Within four years of Brown’s departure to Youngstown, the Orizaba Iron Works ceased production and remained idle until Reis, Richards, & Berger purchased the site in 1863, renaming it the Shenango Iron Works.106

After arriving in Youngstown, Joseph Brown, along with his brothers Richard and Thomas and New Castle iron manufacturers James Westerman and William Bonnell, inspected the idle works of the Youngstown Rolling Mill Company. Located “north of the canal on the ‘Flat’” approximately three hundred yards “above” the Phoenix furnace “in the . . . southwest part of the city,” the Youngstown Rolling Mill “had . . . become a mere wreck” when Brown and his associates visited the site in 1855.107

104 Ibid.

105 Ibid.

106 Hazen, ed., 20th Century History of New Castle and Lawrence County Pennsylvania and Representative Citizens, 118.

1846 by Harvey Fuller and James Dangerfield and managed by a group of Mahoning Valley “capitalists,” the Youngstown Rolling Mill proved to be a manufacturing and financial failure despite significant fiscal support from Youngstown’s prominent Wick Family.\(^{108}\) The Mill, which included eight nail cutting machines, four puddling furnaces, two heating furnaces, one annealing furnace, one muck bar train, one 10′′ bar train, and one nail plate train had the capacity to produce seven tons of bar iron and nails. According to Joseph G. Butler Jr., however, “this output was seldom reached.”\(^{109}\) In fact, by 1855 much of the original equipment had long since been dismantled with a portion of the site “being chiefly used as a stable.”\(^{110}\)

Following their visit, the Brown brothers, Bonnell, and Westerman leased and then purchased the former Mill for $25,000. Within a year, the firm of Brown, Bonnell, Westerman, & Company renamed the site the Mahoning Rolling Mill (also known as “Old Mill” or No. 1 Mill) and successfully produced 1,875 tons of bar iron, spikes, and nails after adding to the works nine puddling furnaces, three heating furnaces, three trains of rolls, and sixteen nail machines.\(^{111}\) Once in Youngstown, Joseph Brown focused on

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\(^{109}\) Ibid. Note, that Froggett indicates that the mill had a 12′′ bar train.

\(^{110}\) Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 671; and Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume II, 180.

managing the company’s sales, while his brother Richard, “a practical roller himself,” managed the rolling mill, with William Bonnell responsible for managing the company’s office.\textsuperscript{112} Similar to Brown, by 1855 James Westerman (November 26, 1819 – July 20, 1884) was an experienced iron manufacturer having worked at the Kensington Iron Works and the Cosalo Iron Works (later renamed Onondaga Iron Works) at New Castle during the late 1830s and early 1840s. Before joining the Brown brothers and William Bonnell at Youngstown, Westerman successfully “superintended the construction of the Iron Works of Reis, Brown, Berger, & Company at New Castle.”\textsuperscript{113}

With a worn-out engine from a Mississippi River steamboat initially providing the necessary steam power, the Mahoning Rolling Mill operated only when the Ohio & Pennsylvania Canal remained ice-free. During the early 1860s, Brown, Bonnell, Westerman, & Company “secured more capital and made extensive additions” to their Mahoning Valley iron mill. Nine years after purchasing the works, Brown’s firm added “a large additional [rolling] mill” in order to “meet the tremendous demand resulting from the Civil War.”\textsuperscript{114} Increased demand for bar iron during 1863 spurred Brown, Bonnell, Westerman, & Company’s expansion; the price of bar iron increased from $92.50 a ton to $123.20 a ton from February to December in 1863. The price of bar iron

\footnotesize{instructive engraving of the Brown, Bonnell, Westerman, & Company’s mill along the Ohio and Pennsylvania Canal and near the Phoenix furnace appears on page 34 in Blue, et al., \textit{Mahoning Memories}.}

\footnotesize{\textsuperscript{112} Froggett, “The Mahoning Valley as an Iron Center: Originality in Practice Marked Steady Progress,” \textit{The Iron Trade Review} (January 21, 1909): 184.}

\footnotesize{\textsuperscript{113} J. G. White, \textit{A Twentieth Century History of Mercer County}, Illustrated, Volume I (Chicago, Illinois: The Lewis Publishing Company), 377-378. It is unclear if Westerman worked at the Kensington Rolling Mill near Philadelphia or the Kensington Rolling Mill near Pittsburgh along the Monongahela River. Lesley, \textit{The Iron Manufacturer’s Guide to the Furnaces, Forges, and Rolling Mills of the United States}, 229 and 250. Refer to Chapter 8 for further discussion of the Onondago Iron Works.}

\footnotesize{\textsuperscript{114} Ibid, 184; and Butler, Jr., \textit{History of Youngstown and The Mahoning Valley, Ohio}, Volume I, 671}
reached “the record breaking price of $168 a ton in December 1864, with iron manufacturers paying puddlers $9 a ton, heaters and rollers $1.25 a ton, while managers of nail machines (Boss Nailers) received $25 a day.” Brown, Bonnell, Westerman, & Company’s financial successes during the Civil War led to the firm purchasing the Mahoning Valley’s third and fourth raw coal fueled blast furnaces – the Phoenix and Falcon stacks – by 1866. In addition to acquiring these two blast furnaces, Brown’s company and the aforementioned Himrod Furnace Company jointly formed the Mahoning Coal Company in order to maintain reliable access to the Valley’s block coal deposits. The Mahoning Coal Company employed six hundred miners and maintained access to a thousand acres of coal lands located a mile south of Youngstown and near Hubbard and Hubbard Township, Ohio. With $225,000 of invested capital and a rail connection with the Cleveland & Mahoning Railroad, miners at the Mahoning Coal Company’s Long Bank, No. 3 Bank, Stewart Bank, and McKennie Bank mines extracted approximately 130,000 tons of coal in 1872 and 84,000 tons in 1873.

Although the Mahoning Valley’s valuable coal and iron ore mines were petering out during the late 1860s, local iron manufacturers continued to construct blast furnaces and rolling mills throughout the Valley. As described by historian George W. Knepper, reliable rail access to the ever-expanding Lake Superior iron ore ranges and to the highly


117 Wiggins and McKillop, eds., Youngstown, Past and Present, 61-65. In 1875, four thousand miners throughout the Mahoning Valley extracted approximately 3,500,000 tons of coal; the Mahoning Coal Company’s mines yielded eight hundred tons per day on average. Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 769-770.
prized coal mines and coking works at Connellsville, Pennsylvania allowed Mahoning Valley iron manufacturers “. . . to prosper since the cost of importing raw material was but a small part of the cost of the finished product.” In addition, the expansion in the number of blast furnace stacks throughout the Mahoning Valley during these years occurred in part because of the rapid expansion of iron “finishing” plants throughout Pittsburgh. As detailed by Kenneth Warren,

in 1873 Allegheny County made 158,000 gross tons of pig iron, but forges, mills, and foundries there were estimated to need 400,000 tons. In fact some estimates suggest that 280,000 tons of pig iron were brought in by rail and 18,000 tons by river to Pittsburgh. Growth in Pittsburgh finishing justified much of the tenfold increase in Valley pig iron production from 1856 – 1872. At this time iron production there was well over half as much again as in Allegheny County, and Valley iron was, as [W. P.] Shinn put it, ‘by far the chief supply’ of outside pig iron to Pittsburgh. By the end of the decade, however, this supply and demand relationship started to change dramatically as Pittsburgh iron manufacturers started erecting more and more blast furnace stacks throughout the iron city. While Jonathan Warner’s Mineral Ridge Iron & Coal Company and Jacob G. Chamberlain’s Leetonia Iron & Coal Company failed during the early 1870s, Brown’s rolling mill and blast furnaces, which employed five hundred people, survived the nation’s prolonged economic depression. In fact in 1875, while the Mahoning Valley’s twenty-one blast furnaces produced some 250,000 tons of iron,

118 George W. Knepper, Ohio and Its People (Kent, Ohio: The Kent State University Press, 1997), 291.

Brown’s rolling mill and blast furnace operations were formally incorporated as Brown, Bonnell, & Company.  

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<thead>
<tr>
<th>Name</th>
<th>Erected</th>
<th>Company / Proprietor</th>
<th>Location</th>
<th>Daily Capacity / Tons</th>
</tr>
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<td>1867</td>
<td>Andrews &amp; Bros.</td>
<td>Youngstown</td>
<td>40</td>
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<tr>
<td>Girard</td>
<td>1867</td>
<td>Girard Furnace Company</td>
<td>Girard</td>
<td>50</td>
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<tr>
<td>Haselton No. 2</td>
<td>1868</td>
<td>Andrews &amp; Bros.</td>
<td>Youngstown</td>
<td>60</td>
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<tr>
<td>Hubbard No. 1</td>
<td>1868</td>
<td>Andrews &amp; Hitchcock</td>
<td>Hubbard</td>
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<tr>
<td>Himrod No. 3</td>
<td>1868</td>
<td>Himrod Furnace Co.</td>
<td>Youngstown</td>
<td>40</td>
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<tr>
<td>Anna</td>
<td>1869</td>
<td>Struthers Furnace Co.</td>
<td>Struthers</td>
<td>56</td>
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<td>1870</td>
<td>William Ward &amp; Co.</td>
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<td>Richard &amp; Sons</td>
<td>Warren</td>
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<tr>
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<td>Andrews &amp; Hitchcock</td>
<td>Hubbard</td>
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</tr>
</tbody>
</table>

The purchasing of James Westerman’s interest in Brown, Bonnell, Westerman, & Company by a group of Chicago industrialists precipitated the formal incorporation of the firm in September 1875. At the time of the firm’s incorporation, the Mahoning

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120 Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 668 and 671; Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume II, 181; History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume I, 372.

121 Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 667-668, 682; History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume I, 368-373; History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume II, 232; Swank, History of The Manufacture of Iron in All Ages, and Particularly in the United States from Colonial Times to 1891, 310-313; and “Town and Crossroads-West Austintown,” The Youngstown Vindicator (unknown date).

Valley’s rolling mill operations were capable of producing approximately 175,000 tons of iron products annually. Joseph H. Brown initially served as president of the newly incorporated Brown, Bonnell, & Company until 1876 when Chicago’s Herbert Copland Ayer purchased his shares. Ayer, son of prominent Chicago iron broker John V. Ayer (John V. Ayer & Sons) and husband of soon-to-be famed cosmetic magnate Harriet Hubbard Ayer, eventually became president of Brown, Bonnell, & Company. Ayer’s ascension to the position of company president occurred on January 22, 1879, when he succeeded in acquiring control of a majority of the firm’s stock, thus dissolving the firm’s original partnership. The new proprietors of these iron works retained the name Brown, Bonnell, & Company even though no one with those surnames remained connected to the enterprise. With Chicago industrialists now firmly in control of the Mahoning Rolling Mill and the Phoenix and Falcon furnace stacks, Joseph Brown directed his focus toward the construction of a rolling mill along the Calumet River in South Chicago while Richard Brown and William Bonnell’s sons, Henry O. and W. Scott Bonnell, purchased the idle Ridgeway Iron Works.

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Table 6.4 Mahoning Valley Rolling Mills, 1875-1876\textsuperscript{125}

<table>
<thead>
<tr>
<th>Proprietor</th>
<th>Rolling Mill</th>
<th>Location</th>
<th>Est.</th>
<th>Annual Capacity Net Tons</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown, Bonnell, &amp; Co.</td>
<td>Mahoning Works</td>
<td>Youngstown</td>
<td>1846</td>
<td>25,000</td>
<td>merchant bar, sheets, nails, &amp; railroad and boat spikes</td>
</tr>
<tr>
<td>Cartwright, McCurdy, &amp; Co.</td>
<td>Enterprise Iron Works</td>
<td>Youngstown</td>
<td>1863</td>
<td>6,000</td>
<td>hoop, band iron, &amp; steel mixed carriage tire</td>
</tr>
<tr>
<td>Girard Rolling Mill Co.</td>
<td>Girard Rolling Mill</td>
<td>Girard</td>
<td>1873</td>
<td>7,000</td>
<td>all sizes of merchant bar, &amp; a special 8lb. and 12lb. T-rails</td>
</tr>
<tr>
<td>Jesse Hall &amp; Son</td>
<td>Hall Iron Works</td>
<td>Hubbard</td>
<td>1872</td>
<td>10,000</td>
<td>Merchant bar iron, horse shoe bar, &amp; bolt and nut iron</td>
</tr>
<tr>
<td>Niles Iron Co.</td>
<td>Niles Iron Works</td>
<td>Niles</td>
<td>1872</td>
<td>12,000</td>
<td>bar, sheet, rod, skelp, &amp; band iron</td>
</tr>
<tr>
<td>William Richards &amp; Sons</td>
<td>Warren Iron Works</td>
<td>Warren</td>
<td>1870</td>
<td>9,000</td>
<td>muck &amp; merchant bar iron</td>
</tr>
<tr>
<td>Wick, Ridgeway, &amp; Co.</td>
<td>Ridgeway Iron Works</td>
<td>Youngstown</td>
<td>1871</td>
<td>65,000</td>
<td>railroad &amp; bar iron</td>
</tr>
<tr>
<td>L.B. Ward</td>
<td>Russia Sheet Iron Mills</td>
<td>Niles</td>
<td>1864</td>
<td>7,500</td>
<td>sheet &amp; plate iron</td>
</tr>
<tr>
<td>Falcon Iron &amp; Nail Co.</td>
<td>Falcon Iron &amp; Nail Works</td>
<td>Niles</td>
<td>1842</td>
<td>11,000</td>
<td>nails &amp; guide iron</td>
</tr>
<tr>
<td>James Ward &amp; Co.</td>
<td>Ward’s Old Mill</td>
<td>Niles</td>
<td>1841</td>
<td>14,000</td>
<td>bar &amp; sheet iron</td>
</tr>
<tr>
<td>Youngstown Rolling Mill Co.</td>
<td>Youngstown Rolling Mill</td>
<td>Youngstown</td>
<td>1871</td>
<td>5,500</td>
<td>hoop and band iron, charcoal horse shoe bar, &amp; compound steel buggy tire</td>
</tr>
</tbody>
</table>

Constructed northeast of downtown Youngstown in 1871 along Crab Creek and originally known as the Valley Iron Company, the Ridgeway Iron Works commenced iron rail production “just in time to encounter the terrific depression of 1873.” For two years, the company rolled railroad iron intermittently and then remained idle until 1879 when Richard Brown, Henry O. Bonnell, and W. Scott Bonnell purchased the expansive site. The drastic drop in the price of iron rails from $95 to $45 due to the Panic of 1873 led to the failure of the Ridgeway Iron Works. After purchasing the property and retaining Charles D. Arms as a partner, Brown and the Bonnell brothers renamed the works the Mahoning Valley Iron Company whereupon they focused solely on producing bar iron. Henry O. Bonnell served as president of the Mahoning Valley Iron Company while his brother W. Scott Bonnell served as secretary. Leading up to and during these changes in the ownership and control of Mahoning Valley blast furnaces and rolling

126 Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 673.

127 Caleb B. Wick, H. K. Wick, Ralph J. Wick, M. S. Ridgeway, Charles D. Arms, and Peter Gillen owned and operated the Ridgeway Iron Works, which included fourteen engines, two rail trains (one 16” and one 20”), one 16” butt train, one 16 bar mill, one 20 muck train, and twelve heating furnaces. As indicated by Table 6.4 the Company maintained an annual production capacity of 65,000 tons of iron rails and bars, employed some 450 “hands,” and hoped to sell $2,000,000 worth of products in a year. Ibid, 673; Comley and D’Eggville, Ohio: The Future Great State: Her Manufacturers and a History of Her Commercial cities, Cincinnati and Cleveland, 425; Froggett, “The Mahoning Valley as an Iron Center: Originality in Practice Marked Steady Progress,” The Iron Trade Review, 184; and History of Trumbull and Mahoning Counties with Illustrations and Biographical Sketches, Volume I, 373.


mills, a group of Youngstown industrialists began constructing beehive coke works in the Connellsville coke region despite the nation’s continued economic malaise. Before the Ayer-led takeover, Brown, Bonnell, Westerman, & Company built the Mahoning Coke Works near Dunbar, Pennsylvania in 1871.\textsuperscript{130} Eight years later, John Stambaugh, Henry O. Bonnell, Augustus Cornell, and Thomas Kennedy, all of Youngstown, established the Youngstown Coke Company and started constructing the Stambaugh beehive coke ovens between Dunbar and Uniontown, Pennsylvania. According to Kenneth Warren, by 1882 the Youngstown Coke Company’s Connellsville site “contained 240 ovens whose whole output was shipped to Youngstown.”\textsuperscript{131} Access and ownership to Connellsville coal and coke ensured continued iron production throughout the Mahoning Valley.

With his former business partners and their sons remaining committed to securing Connellsville coke for their iron manufacturing firm in the Mahoning Valley, Joseph Brown along with several associates formed Joseph H. Brown & Company.\textsuperscript{132} On July 5, 1875, a “festive” groundbreaking ceremony to “lay the cornerstone of the Joseph H. Brown Iron and Steel Company” took place one half mile from the mouth of the Calumet River in South Chicago.\textsuperscript{133} The following August, with Brown serving as president, the South Chicago mill – consisting of six double puddling furnaces, two scrap furnaces, five


\textsuperscript{131} Ibid., 59.

\textsuperscript{132} Brennan, ed., \textit{The Biographical Cyclopeadia and Portrait Gallery of Distinguished Men with a Historical Sketch of the State of Ohio}, 399.

heating furnaces, four trains of rolls, and seventy-five nail machines – commenced production of merchant bar iron and nails.  

By 1880, the Company added a 75’ x 18’ closed top blast furnace stack in order to manufacture one hundred and thirty net tons of foundry pig iron each day. After serving six years as president of the Joseph H. Brown Iron and Steel Company, Brown, now in his seventies, sold his South Chicago company and “returned to his former home and congenial associations in Youngstown.” Before his death in Youngstown on November 17, 1886, Brown assisted Jonathan Warner, Jacob Bonesteel Warner, and his son-in-law Edwin Jonathan Warner in the opening of the Gold King mine in Arapahoe County, Colorado.

In 1887, thirteen years after shuttering his Mineral Ridge blast furnaces, Jonathan Warner sold his interest in the Gold King mine to a group of industrialists from St. Louis whereupon he began “living the retired life on his farm at Mineral Ridge.” At the time of Brown’s death and Warner’s retirement, the production capabilities of Pittsburgh’s blast furnaces had caught up the city’s ever-expanding rolling mill and steel manufacturing demands. In fact, as Kenneth Warren instructively notes “… by the mid


138 Ibid; and The Youngstown Vindicator (April 19, 1895).
1880s most of the iron used in Pittsburgh was made there,” therefore making the need for importing Valley iron to Pittsburgh only necessary “in times of exceptional demand.” According to Joseph G. Butler, Jr. “the handicap of paying freight on Youngstown pig iron to Pittsburgh and Wheeling [West Virginia], and also on the steel which was there made from it and returned to Youngstown rolling mills” exacerbated the supply and demand disadvantage that Mahoning Valley iron manufacturers faced during the mid to late 1880s. As a result, many of the Mahoning Valley’s leading iron manufacturers put forth $600,000 of capital and established the Ohio Steel Company in July-August 1892 with the objective of erecting a Bessemer process steel mill. Those selected to lead the construction of the Mahoning Valley’s first steel plant included: Henry Wick, president; Henry O. Bonnell, vice president; Joseph G. Butler, Jr., secretary; as well as Edmund L. Brown, Myron C. Wick, Edward L. Ford, and Lucius E. Cochran.

In November 1892, five months after the bloody battle between locked out iron and steel workers and Pinkerton agents at Andrew Carnegie’s Homestead Works and some six months before the onset of the Panic of 1893, construction began on the Ohio Steel Company, west of downtown Youngstown along the Mahoning River. As the economic depression worsened during the spring and summer of 1893, the directors

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increased the Company’s capital stock to $1,000,000. Construction of the steel mill, “went forward . . . with some hesitation . . . as every mill in Youngstown was shut down for more than four months.” In the midst of these developments, Jonathan and Eliza Warner quietly left their Mineral Ridge home and moved into their widowed daughter Emaline Eliza Warner Arms’s elegant home along Wick Avenue. After construction was completed with “a three years’ [sic] loan of $250,000 was secured from the stockholders on Jan. 1, 1895,” the Ohio Steel Company successfully made the first Bessemer process steel in the Mahoning Valley on the bitterly cold day of February 4, 1895. Blast furnaces throughout the Mahoning Valley and at Leetonia initially supplied the Ohio Steel Company with “Bessemer limit” pig iron.

Table 6.5 Active Blast Furnaces in the Mahoning Valley, including Columbiana County, March 1894

<table>
<thead>
<tr>
<th>Proprietor</th>
<th>Furnace Stacks</th>
<th>Location</th>
<th>Annual Capacity Net Tons</th>
<th>Specialty / Product</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brier Hill Iron &amp; Coal Co.</td>
<td>Grace No. 1</td>
<td>Youngstown</td>
<td>100,000</td>
<td>Bessemer pig iron</td>
<td>“Brier Hill”</td>
</tr>
<tr>
<td></td>
<td>Grace No. 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown, Bonnell, &amp; Co.</td>
<td>Phoenix</td>
<td>Youngstown Struthers</td>
<td>75,000</td>
<td>forge pig iron</td>
<td>not listed</td>
</tr>
<tr>
<td></td>
<td>Anna</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherry Valley</td>
<td>Cherry</td>
<td></td>
<td></td>
<td>“American Scotch”</td>
<td>“Cherry”</td>
</tr>
</tbody>
</table>

142 Ibid., 692.


145 Ibid., 266.

<table>
<thead>
<tr>
<th>Iron Works</th>
<th>Valley</th>
<th>Leetonia</th>
<th>55,000</th>
<th>foundry pig iron</th>
<th>Valley”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girard Iron Company</td>
<td>Mattie</td>
<td>Girard</td>
<td>68,000</td>
<td>Bessemer, foundry, &amp; forge pig iron</td>
<td>“Girard”</td>
</tr>
<tr>
<td>Mahoning Valley Iron Co.</td>
<td>Hannah</td>
<td>Youngstown</td>
<td>65,000</td>
<td>mill pig iron</td>
<td>not sold on market</td>
</tr>
<tr>
<td>Andrews Brothers</td>
<td>Haselton</td>
<td>Youngstown</td>
<td>72,000</td>
<td>Bessemer, foundry, mill pig iron, &amp; “American Scotch” pig iron</td>
<td>“Haselton”</td>
</tr>
<tr>
<td>Andrews &amp; Hitchcock Iron Co.</td>
<td>Hubbard (2)</td>
<td>Hubbard</td>
<td>130,000</td>
<td>foundry pig iron</td>
<td>“Hubbard” strong foundry “Hubbard Scotch”</td>
</tr>
<tr>
<td>Ohio Iron &amp; Steel Co.</td>
<td>Mary</td>
<td>Lowellville</td>
<td>58,000</td>
<td>strong neutral foundry pig iron &amp; “Ohio black-band Scotch”</td>
<td>“The Mary” “Ohio Scotch”</td>
</tr>
<tr>
<td>Salem Iron Company</td>
<td>Seneca (2)</td>
<td>Leetonia</td>
<td>60,000</td>
<td>Bessemer, foundry, &amp; forge pig iron</td>
<td>not listed</td>
</tr>
<tr>
<td>Thomas Furnace Co.</td>
<td>Thomas</td>
<td>Niles</td>
<td>72,000</td>
<td>Bessemer &amp; foundry pig iron</td>
<td>“Thomas”</td>
</tr>
<tr>
<td>Youngstown Steel Company</td>
<td>Tod</td>
<td>Youngstown</td>
<td>54,000</td>
<td>Bessemer &amp; foundry pig iron</td>
<td>“Youngstown Scotch”</td>
</tr>
</tbody>
</table>

On April 18, 1895, a mere two months after the first steel was produced in the Mahoning Valley, Jonathan Warner died at the age of eighty-seven; ending an era of iron manufacturing in the Mahoning Valley. Jonathan Warner and Joseph H. Brown – two of the original seven incorporators of the Leetonia Iron & Coal Company – were instrumental in the growth of the Mahoning Valley, particularly Youngstown, as a center of coal mining and iron manufacturing. The half-century long careers of Warner and

Brown spanned the Mahoning Valley’s transitions from charcoal to raw block coal and then to Connellsville coke as smelting fuels as well as from local deposits of black-band iron ore to the higher quality and more readily available Lake Superior iron ore. In addition to being pioneering Mahoning Valley iron manufacturers, Warner and Brown were connected personally through the marriage of their children: Edwin Jonathan Warner and Mary Jane Brown. Before examining Warner’s and Brown’s association with iron manufacturing throughout the Shenango Valley, it is necessary to detail Edwin J. Warner’s role in iron manufacturing at Leetonia following the failure of the Leetonia Iron & Coal Company in 1872-1873. The younger Warner’s iron manufacturing career serves as a transition from the pioneer iron masters of the mid-nineteenth century to the second generation of iron manufacturers operating blast furnaces at Leetonia and throughout the Mahoning and Shenango Valleys.
Chapter Seven

Leetonia’s Cherry Valley Iron, 1873-1899

“The Cherry Valley Iron and Coal Company . . . has passed through many vicissitudes but has been, and is, by far, the most important industry of Leetonia and the most important manufacturer of iron, from the ores, that has existed in Columbiana County.”

– History of the Upper Ohio Valley, Volume II, Illustrated (Madison, Wisconsin: Brant & Fuller, 1891), 90.

“The practical and economical administration which has characterized the enterprise and progressive operations of the Cherry Valley Iron Works has given its products a prominence in all markets of the Union.”


While iron manufacturers throughout the Mahoning Valley transitioned to using Connellsville coke as a smelting fuel during the 1870s and 1880s, the Cherry Valley Iron & Coal Company and the Cherry Valley Iron Works, successors of the Leetonia Iron & Coal Company, continued to rely on Washingtonville coal and coke to manufacture a variety of iron products. Access to this local coal ensured the viability of these firms as independent iron manufacturers for nearly three decades. As an independent iron manufacturer, the Cherry Valley Iron Works started advertising its iron as a specialized
product under the brand “American Scotch” foundry pig iron during the 1880s. As detailed by historian Naomi Lamoreaux, product differentiation allowed non-Bessemer grade pig iron manufacturers to “cater to the special needs of a multitude of small rolling mills, foundries, and machine shops.”

The Cherry Valley Iron Works’ ability to maintain sufficient markets for their specialized product through the Columbus firm of King, Gilbert, & Warner ultimately determined the firm’s viability as more and more iron manufacturers transitioned to Bessemer grade iron production during the late nineteenth century. When the Columbus firm successfully transitioned into Bessemer steel production, the Cherry Valley Iron Works struggled to remain viable as an independent iron manufacturer and ultimately fell into the hands of Pittsburgh industrialists.

On November 6, 1873, approximately nine months after the creditors of the Leetonia Iron & Coal Company sold the bankrupt firm’s coal mines, coke oven batteries, blast furnaces, and rolling mill, the State of Ohio formerly incorporated the Cherry Valley Iron & Coal Company with a capital stock of $40,000. This figure pales in comparison to the 1869 national capitalization average of $145,000 for a blast furnace operation.

The newly incorporated company purchased the defunct Leetonia Iron & Coal Company’s “rights, title interest[s] . . . appurtenances . . . and indebtedness [in the amount of] $850,000” and agreed to repay the liabilities within ten years.

Forty year-old

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Edwin Jonathan Warner – Jonathan and Eliza Warner’s eldest son and Joseph H. Brown’s son-in-law – became president of the Cherry Valley Iron & Coal Company upon its incorporation in 1873. After arriving in the Mahoning Valley with his parents and siblings during the early 1840s, Edwin J. Warner (September 1832 – 1924) worked as a clerk in his father’s dry goods store in downtown Youngstown and in 1855 married eighteen-year-old Mary Jane Brown. After their marriage, Edwin J. and Mary J. Warner and their three children resided in Youngstown while Edwin worked as a merchant. During the early 1860s, Edwin Warner also worked for his brother-in-law Myron Israel Arms who was superintendent of the Eagle blast furnace in Youngstown.

By 1870, Edwin and Mary Warner had relocated with their six children to downtown Cleveland’s First Ward. According to the Ninth Census of the United States (1870), Warner was employed as a manufacturer of iron axles with a real and personal estate valued at $12,000. During the Cherry Valley Iron & Coal Company’s first full

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4 J. Wiggins & Co.’s Leetonia Directory, 1874-1875 (unknown publisher, unknown date), 194.

5 U.S. Bureau of the Census, Seventh Census of the United States, 1850; U.S. Bureau of the Census, Eighth Census of the United States, 1860; U.S. Bureau of the Census, Twelfth Census of the United States, 1900; “Civil War Draft Registration Records, 1863-1865,” Consolidated Enrollment Lists, 1863 – 1865, Civil War Union Draft Records, Volume 2; and “Letter from Emaline Eliza Warner to Myron Israel Arms (May 18, 1864), Hildegrand K. Schnuttenghen Ethnic History Collection, Maag Library, Youngstown State University. The 1860 Census lists Edwin Warner’s personal real estate to be worth $3,000. In the May 18 letter to her husband Myron Israel Arms, Emaline Eliza Warner describes how “Ed [Edwin] came very near going with you [to enlist in the U.S. Army]. The day you left he got his things ready intending to meet you at Niles, but Mary [his wife Mary Jane] made such a fuss and felt so bad that father [Jonathan Warner] persuaded him not to go.”


7 U.S. Bureau of the Census, Ninth Census of the United States, 1870.
year of production, the Warners left Ohio’s second most populous city and moved into Leetonia’s most luxurious residence at 110 Walnut Street. Located north of downtown between High and Park Streets and completed in 1870-1871 by architect David Ames Gerrish, the Queen Anne-Italianate-Colonial Revival architecture of the Warner’s Leetonia residence remains an imposing structure nearly one-hundred a forty years after the family’s arrival.8

![Image 7-1 Warner Family’s Leetonia Residence, 1874-1879](image)


9 Photo by Melanie M. Di Rocco. The exact date of the Warner Family’s permanent relocation to Leetonia is unknown. In fact, J. Wiggins & Co.’s Leetonia Directory, 1874-1875 lists E. J. Warner as a resident of Cleveland. As indicated on a plaque outside the residence at 110 Walnut Street, the home was rebuilt in 1892 after a fire.
Joining Warner in the management of the Cherry Valley Iron & Coal Company’s extensive coal, coke, and iron holdings were John K. Shinn of New Castle, Pennsylvania and Jacob G. Chamberlain. Shinn served as secretary of the firm while Chamberlain remained superintendent of works.\(^\text{10}\) In fact, Chamberlain led the way in establishing the Cherry Valley Iron & Coal Company and assured its absorption of the defunct Leetonia Iron & Coal Company’s properties.\(^\text{11}\) After “making extensive repairs [to] the whole works including the rolling mills,” the Cherry Valley Iron & Coal Company hired 120 miners to work at its Leetonia drift mine and at its two slope mines at Washingtonville near Green Creek along the Niles & New Lisbon Railroad.\(^\text{12}\) Cherry Valley miners extracted 125,000 tons of coal from these three mines in 1874. Another two dozen employees worked outside the mines preparing the high quality Washingtonville coal for charging in the Company’s more than one hundred coke ovens.\(^\text{13}\) At the coke oven batteries, several dozen individuals worked as chargers, levelers, daubers, and pullers during the multi-stage coking process. Depending upon the amount of coal charged into the ovens, typically between 5½ to 9½ tons, the coking process lasted from forty-eight to

\(^{10}\) J. Wiggins & Co.’s Leetonia Directory, 1874-1875 (unknown publisher, unknown date), 194, 203, 204, and 206. The Directory also lists an R. M. Gilbert employed as a bookkeeper residing on Chestnut Street. The Ninth Census of the United States (1870) lists a Riley Gilbert, age 23, employed as a bookkeeper at Leetonia. Although not specifically listed as the Secretary of the Cherry Valley Iron & Coal Company, the young Riley M. Gilbert more than likely worked for the Cherry Valley Iron & Coal Company. U.S. Bureau of the Census, Ninth Census of the United States, 1870.


\(^{12}\) “Resumption of Work by the Cherry Valley Iron Co.,” National Labor Tribune (March 5, 1874): 1.

\(^{13}\) First Annual Report of the State Inspector of Mines to the Governor of the State of Ohio for the Year 1874 (Columbus: Nevins & Myers, State Printers, 1875), 72 and 83; and Second Annual Report of the State Inspector of Mines to the Governor of the State of Ohio for the Year 1875 (Columbus: Nevins & Myers, State Printers, 1876), 72.
ninety-six hours. After the requisite coking, workers quenched the high-carbon Washingtonville coke and after pulling the material by hand from the ovens loaded the coke into barrows destined for the firm’s two 55’ x 14’ closed top furnace stacks. Laborers then charged the Washingtonville coke into the furnaces along with native and Lake Superior iron ores and limestone. Cherry Valley’s furnaces and rolling mill maintained annual capacities of 20,000 and 10,000 net tons of iron respectively.

After only manufacturing a mere 373 net tons of pig iron in 1873, the Cherry Valley Iron & Coal Company blew in their “No. 2 furnace” stack in March 1874 and by the end of the year successfully produced a total of 4,498 tons of pig iron. The new firm’s production totals, however, were well below the Leetonia Iron & Coal Company’s 1872 total of 18,144 tons of pig iron. The company’s production total also paled in comparison to the nearby Grafton Iron Company’s annual production totals of 15,757, 10,921, and 14,803 tons of pig iron from 1872 through 1874. After a brief stoppage of work by iron puddlers in March 1875, the Cherry Valley Iron & Coal Company “started their rolling mill in full force . . . giving employment to about one hundred men.”

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15 Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year 1874, 289.

16 “Resumption of Work by the Cherry Valley Iron Co.,” National Labor Tribune (March 5, 1874): 1; Pittsburgh Commercial (March 5, 1874): 1; and Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year 1875 (Columbus: Nevins & Myers, State Printers, 1876), 431.

17 Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year 1874 (Columbus: Nevins & Myers, State Printers, 1875), 292-293; and Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year 1875, 431.

18 Steubenville Daily Herald and News (April 28, 1875): 3; Defiance Democrat (March 11, 1875): 2; and The Coshocton Age (March 12, 1875): 1.
detailed by Horace Mack, by 1876 “the new company employed four hundred men in the mines, furnaces, and mills to whom $25,000 were paid monthly.” The individuals employed by the Company equaled approximately one-third of Leetonia’s entire population.

Map 7-1 Perry County, Ohio

With iron production totals increasing at the Cherry Valley Iron & Coal Company’s Leetonia works, Jacob G. Chamberlain departed Columbiana County for Perry County, Ohio in 1876. Established in 1817 and named in honor of Oliver Hazard Perry, the western and southern portions of Perry County are located within southeastern

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20 The population of Leetonia in 1874 was 1200, a significant decrease from the 1800 individuals residing in the village three years earlier. The population decrease was a result of the failures of the Leetonia Iron & Coal Company, the Leetonia Banking Company, and several other concerns (Refer to Chapter 4). Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year 1874, 161.

Ohio’s Hocking River Valley watershed.\textsuperscript{22} Coal mining and iron manufacturing concerns using bituminous coal as a smelting fuel developed rapidly throughout the Hocking River Valley following the completion of the Columbus & Hocking Valley Railroad in 1869-1870. The seventy-six mile line opened from Columbus to Nelsonville in Athens County in August 1869, reaching Athens in July of the following year.\textsuperscript{23} The Railroad traversed over what geologists and industrialists referred to as the “Great Coal Vein.” According to T. Sterry Hunt, the “Great Coal Vein” of the Hocking Valley “ . . . appears . . . as a dry-burning or non-coking coal of superior quality, with a thickness varying from six feet (rarely less) to twelve feet.”\textsuperscript{24} The Hocking Valley coals – also referred to as Straitsville, Shawnee, Monday Creek, Sunday Creek, Corning, Haydensville, or Nelsonville coal – appear within the Middle and Lower Kittanning coal seams; the same seams of coal mined and coked at Washingtonville and Leetonia.\textsuperscript{25} The opportunity to capitalize on the Hocking Valley’s relatively untouched coal deposits via railroad construction and iron manufacturing attracted Chamberlain to southern Perry County.

\textsuperscript{22} Henry Howe, Historical Collections of Ohio in Two Volumes: An Encyclopedia of the State, Volume II (Norwalk, Ohio: Published by the State of Ohio-The Laning Printing Company, Public Printers, 1896), 382; Albert Adams Graham, History of Fairfield and Perry Counties, Containing a Comprehensive History of Ohio (Chicago: W.H. Beers & Company, 1883), 43.


\textsuperscript{25} Ibid., 5 and 70; Howe, Historical Collections of Ohio in Two Volumes, Volume II, 382; and Clement L. Martzolff, History of Perry County Ohio (New Lexington, Ohio: Ward & Weiland and Columbus, Ohio: Press of F. J. Heer, 1902), 27-29. Refer to Table 2-2 Coal Seams of the Lower Coal Measures of Ohio in Chapter 2.
As the Columbus & Hocking Valley Railroad neared completion in 1869, “a number of enterprising and public citizens of New Lexington” organized the Atlantic & Lake Erie Railroad with the goal of connecting Toledo in northwestern Ohio to Pomeroy, Meigs County in southeastern Ohio. As detailed by Ohio’s Commissioner of Railroads and Telegraphs, “a large amount of work was done between its [Atlantic & Lake Erie Railroad] termini . . . and several miles of track [were] laid between New Lexington and Moxahala, in Perry County” beginning in June 1870.

Map 7-2 Railroads in southern Perry, northeastern Hocking, and northern Athens Counties, 1898

26 Graham, History of Fairfield and Perry Counties, Containing a Comprehensive History of Ohio, 86-87.

Located approximately fifty miles southeast of Columbus, New Lexington served as the seat of government for Perry County and developed into a transportation hub for major trunk lines traversing the Hocking River Valley during the 1870s (Toledo & Ohio Central Railroad, Cincinnati & Muskingum Valley Railroad, and the Baltimore & Ohio). New Lexington also became a terminus for several railroad sidings and spurs connecting the ever-increasing number of coal mines, iron ore mines, and blast furnace sites appearing along the Monday and Sunday Creek Valleys throughout southern Perry County.29

Construction of the Atlantic & Lake Erie line from New Lexington to Toledo neared completion in 1873 and within three years the line reorganized as the Ohio Central Railway Company.30 Upon his arrival to Perry County in 1876, the Moxahala Iron Company hired Chamberlain to supervise the construction of a furnace stack at Moxahala.31 Located in Pleasant Township half way between New Lexington and Corning, Moxahala was within the northern third of the highly prized Hocking Valley coal field.32 Additionally, deposits of black-band iron ore, “about one hundred and fifty feet above the Great Coal Seam,” underlay much of southern Perry County’s Sunday

28 R. S. Kayler, “Railroad Map of Ohio Published by the State,” (Columbus, Ohio: The Columbus Lithograph Company, 1898), Library of Congress, Geography and Map Division. http://www.loc.gov/rr/geogmap/. The red line marked C & M. V. is the Cincinnati & Muskingum Valley Railroad. The line marked with the number 37 on Map 7-2 is the Toledo & Ohio Central Railroad, while the gray line indicates the Baltimore & Ohio Railroad. The line marked with the number 17 in the bottom left hand corner is the Columbus & Hocking Valley Railroad.

29 Howe, Historical Collections of Ohio in Two Volumes: An Encyclopedia of the State, Volume II, 393;

30 Ibid.


Creek Valley. First mined near Shawnee atop a hill thereafter known as Iron Point, the Hocking Valley’s black-band iron deposits “were a source of surprise to the geologists who were best acquainted with the field” according to State Geologist Edward Orton. Analyses of iron ore mined at Moxahala, New Lexington, Section 14 in Pike Township, and Section 16 in Bearfield Township yielded between 41.3 and 55.7 percent iron content; a significantly higher amount of iron when compared to the Mahoning Valley’s black-band iron ore deposits. Access to the black-band iron ore deposits and the “Great Coal Vein” led to the rapid development of iron manufacturing throughout the Hocking River Valley during the 1870s. In fact, by 1880, thirteen iron manufacturing firms operated fourteen coal – coke fueled blast furnace stacks throughout the Valley.

Table 7.1 Hocking Valley Bituminous Coal – Coke Fueled Blast Furnaces, 1880

<table>
<thead>
<tr>
<th>Company</th>
<th>Furnace</th>
<th>Location, County</th>
<th>“blown in”</th>
<th>Annual Capacity Net Tons</th>
<th>Specialty - Product “Brand”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akron Iron Co.</td>
<td>Akron</td>
<td>Bessemer, Athens</td>
<td>Nov. 30, 1877</td>
<td>8,500</td>
<td>No. 1 foundry</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Company Name</th>
<th>Furnace</th>
<th>Location</th>
<th>Date</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moss &amp; Marshall</td>
<td>Bessie</td>
<td>New Straitsville, Perry</td>
<td>Jan. 21, 1878</td>
<td>10,000</td>
<td>Strong &amp; soft foundry, gray forge pig iron, “Bessie”</td>
</tr>
<tr>
<td>Crafts Iron Co.</td>
<td>Crafts</td>
<td>Greendale, Hocking</td>
<td>Nov. 8, 1879</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licking Iron Co.</td>
<td>Fannie No. 1</td>
<td>Shawnee, Perry</td>
<td>Sept. 15, 1876</td>
<td>5,000</td>
<td>Foundry pig iron, “American Scotch”</td>
</tr>
<tr>
<td></td>
<td>Fannie No. 2</td>
<td>Shawnee, Perry</td>
<td>Oct. 10, 1877</td>
<td>8,000</td>
<td></td>
</tr>
<tr>
<td>Franklin Iron Works Co.</td>
<td>Franklin</td>
<td>Columbus, Franklin</td>
<td>Nov. 1873 (completed)</td>
<td>18,000</td>
<td></td>
</tr>
<tr>
<td>Hocking Iron Co.</td>
<td>Helen</td>
<td>Orbiston, Hocking</td>
<td>Dec. 1877</td>
<td>12,000</td>
<td>Foundry pig iron</td>
</tr>
<tr>
<td>Hocking Iron Co.</td>
<td>Lee</td>
<td>Orbiston, Hocking</td>
<td>March 1878</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joseph Vilas</td>
<td>Mollie</td>
<td>Shawnee, Perry</td>
<td>Nov. 10, 1877</td>
<td>9,000</td>
<td></td>
</tr>
<tr>
<td>Moxahala Iron Co.</td>
<td>Moxahala</td>
<td>Moxahala, Perry</td>
<td>Jan. 5, 1878</td>
<td>10,000</td>
<td>Soft fluid foundry pig iron, “Moxahala”</td>
</tr>
<tr>
<td>Thomas Iron Works</td>
<td>Gore</td>
<td>Gore, Hocking</td>
<td>Dec. 8, 1876</td>
<td>6,000</td>
<td>“American Scotch” pig iron</td>
</tr>
<tr>
<td>Winona Iron Co.</td>
<td>Winona</td>
<td>Hocking</td>
<td>Feb. 20, 1878</td>
<td>6,000</td>
<td></td>
</tr>
<tr>
<td>Sandusky &amp; Shawnee Coal and Iron Co.</td>
<td>XX</td>
<td>Shawnee, Perry</td>
<td>Jan. 18, 1877</td>
<td>25 net tons /daily</td>
<td>Foundry pig iron</td>
</tr>
</tbody>
</table>

On January 5, 1878, the Moxahala Iron Company “blew in” its 55½’ x 15’ Moxahala furnace stack and started manufacturing soft fluid foundry pig iron from nearby deposits of Hone and Norris iron ore.37 The Moxahala furnace, which had a

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capacity of producing 10,000 net tons per year, was the tenth coal fueled blast furnace to commence iron manufacturing within the Hocking River Valley since the completion of the Columbus & Hocking Valley Railroad. In addition to serving as superintendent of the Moxahala Iron Company’s blast furnace, Chamberlain became “chief engineer of the Columbus & Sunday Creek Valley Railroad” Company. Incorporated by the State of Ohio on November 22, 1878 with a capital stock of $750,000, the Columbus & Sunday Creek Valley Railroad purchased the bankrupt Ohio Central Railway’s line from Thurston in Franklin County to Corning in Perry County in March 1878. Following its incorporation, the Railroad extended the rail line northwest to Alum Creek in eastern Franklin County. Chamberlain and Wilson C. Lemert, president and treasurer of the Moxahala Iron Company, supervised the Railroad’s construction of seven miles of track south of Moxahala in order to extend the line to coal deposit of “much prospect.” The most laborious aspect of extending the line southward centered on the construction of the 920’ long Moxahala Tunnel “through solid rock.” The company’s nearly four hundred laborers finished construction of the tunnel in late 1879 thereby providing another avenue to additional coal deposits. Following the opening of the line from Columbus to Corning, “a syndicate of capitalists” purchased the Columbus & Sunday Creek Valley Railroad

38 Brennan, ed., The Biographical Cyclopaedia and Portrait Gallery of Distinguished Men, with an Historical Sketch of the State of Ohio, Volume II, 573

39 Annual Report of the Secretary of State to the Governor of the State of Ohio for the Year 1879 (Columbus: Nevins & Myers, State Printers, 1880), 124-125; and Thirty-Eighth Annual report of the Commissioner of Railroads and Telegraphs to the Governor of the State of Ohio for the Year 1905, 99.

40 Railway World Vol. 5, No. 5 (February 1, 1879): 110.

and the Ohio Central Railway for $1,000,000 and combined the two lines into the Ohio Central Railroad Company on December 20, 1879.\textsuperscript{42}

\begin{center}
\includegraphics[width=\textwidth]{Map_7-3.jpg}
\end{center}

Map 7-3 Toledo & Ohio Central Railway Company\textsuperscript{43}

Similar to Columbiana County two decades earlier, the construction of railroads to access the Hocking Valley’s valuable coal and iron ore deposits transformed the character and development of communities within Perry County and throughout the

\begin{itemize}
\item \textsuperscript{42} Annual Report of the Secretary of State to the Governor of Ohio for the Year 1880 (Columbus: G. J. Brand & Company, 1881), 162; “Railroad Enterprise and Work,” The New York Times (December 21, 1879); Graham, History of Fairfield and Perry Counties, Containing a Comprehensive History of Ohio, 89; Thirty-Eighth Annual Report of the Commissioner of Railroads and Telegraphs to the Governor of the State of Ohio for the Year 1905, 98-99; The Athens Messenger (January 15, 1880); and The Athens Messenger (January 22, 1880).
\item \textsuperscript{43} The Ohio Central Railroad became the Toledo and Ohio Central Railway Company in April 1885. “The Unofficial Home Page of the Toledo and Ohio Central Railroad,” http://www.titchenal.com/trails/nwohio/OG1910TOCMapBWx2.gif.
\end{itemize}
Valley. As detailed by Ohio State Archeological and Historical Society promoter Albert Adams Graham:

The Ohio Central Railroad and its predecessors, have made the towns of Corning, Moxahala, Rendville, Hemlock, and Buckingham, and developed an immense coal trade, in the “Great Vein” Region. The road now ships about three hundred cars daily, and its expects to ship six hundred or more per day, when more shafts are sunk, and more mines opened, and a greater number of coal cars, and the requisite additional rolling stock added. ⁴⁴

In 1880, a mere decade after the Columbus & Hocking Valley Railroad reached Athens, Perry County ranked first in Ohio according to annual county coal production totals with 1,058,254 gross tons. More than two thousand miners working at twenty-seven different mines extracted Perry County’s enormous amount of coal in 1880, which the state valued at $1,142,934. State Inspector of Mines Andrew Roy estimated that Ohio’s total coal production would equal 7,000,000 gross tons by December 31, 1880 with a value of $8,281,979. Trumbull, Athens, and Columbiana Counties ranked behind Perry with 673,206, 589,195, and 541,466 gross tons respectively. ⁴⁵

As Jacob G. Chamberlain directed his focus toward railroad construction and iron manufacturing in the Hocking River Valley during the mid to late 1870s, Charles Nelson Schmick of Canfield, Ohio formally joined the Cherry Valley Iron & Coal Company in June 1876. Born in Green Township in northern Columbiana County on February 26, 1841, Charles Schmick was the youngest child of William and Rhoda Brookhart Schmick. After attending Canfield’s public schools, Schmick studied under Williams

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⁴⁴ Graham, History of Fairfield and Perry Counties, Containing a Comprehensive History of Ohio, 89.

College graduate David Hine at the Mahoning Academy. Following his studies at the Academy, twenty-year old Charles Schmick started working at William Schmick & Son – a dry goods store in Canfield owned and operated by his father and older brother William Henry Schmick. Charles Schmick’s brother and father were also members of the Canfield banking firm Vanhyning & Company.

On June 4, 1867, approximately six years after joining William Schmick & Son, Charles Schmick married twenty-year-old Jennie M. Welker. Jennie Welker was the daughter of Canfield merchant Peter Welker and the older sister of Scott E. Welker. While his brother partnered with Niles iron manufacturer James Ward, Jr. “in a general mercantile business, under the firm name of W.H. Schmick & Company” from 1869 through 1870, Charles Schmick continued to manage the family’s commercial affairs at Canfield. During the Cherry Valley Iron & Coal Company’s first full year of operation, Charles Schmick purchased stock in the firm and on April 1, 1875 he sold his Canfield


48 Ibid., 515.


business. Two years later in March 1877, Charles and William H. Schmick opened the Leetonia merchant firm W.H. Schmick & Co. The Schmick Brothers also opened a private bank at Leetonia – Schmick Brothers & Co. Within a year of commencing these business interests at Leetonia, the directors of the Cherry Valley Iron & Coal Company named Charles Schmick treasurer and secretary of the firm during a meeting in the early summer of 1878. At the same meeting, the Company’s directors re-elected Edwin J. Warner president and named him superintendent of the works to replace Jacob G. Chamberlain.

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51 Ibid., 515 and 551; and Progressive Men of Northern Ohio, 50.


Although no longer formally a part of the management of the Cherry Valley Iron & Coal Company, Chamberlain remained a prominent member of Leetonia through his real estate holdings and business associations. In fact, before the failure of the Leetonia Iron & Coal Company in 1872-1873, Chamberlain purchased a significant amount of property southeast of Leetonia’s intersecting rail lines. As detailed by John Worman, Chamberlain “bought the remainder of John Summers[’s] farm lying between Columbia St. and Toomey[’s] addition laying out Somer Street[,] Spruce St.[,] Cherry St.[,] and Mill St.[,] south of Columbia St.”\(^54\) Chamberlain was able to purchase this property and complete residential surveys during the 1870s because, according to Worman, various Leetonia residents “. . . of any financial ability from Anglemyer to Zimmerman” loaned him the requisite money in various amounts ranging from a few hundred dollars to several thousand dollars.\(^55\)

Sometime in late 1878 while Chamberlain continued to supervise the construction of the Moxahala Tunnel, he filed for “voluntary” bankruptcy because he “was over extended and foresaw that he would be unable to meet his [financial] obligations” at Leetonia. Similar to the failure of the Leetonia Iron & Coal Company in 1872-1873, Chamberlain’s bankruptcy led to the failure of the Cherry Valley Iron & Coal Company and the local banking firm of Gilson & Townsend.\(^56\) S. W. Gilson of Canfield and Charles Townsend of Leetonia opened Gilson & Townsend following the failure of the Leetonia Banking Company in 1872-1873. Similar to its predecessor, Gilson’s and

\(^{54}\) John Worman, *Salem Township History and the Story of Leetonia* (Leetonia, Ohio: National Printing Service, 1976), 60. Refer to Image 4-6 at the conclusion of Chapter 4. The property Worman is describing appears in the lower left hand corner of Map 4-6 and is today known as the south side of Leetonia.

\(^{55}\) Worman, *Salem Township History and the Story of Leetonia*, 60.

\(^{56}\) Ibid., 60.
Townsend’s bank was unable to remain solvent following the failure of the Cherry Valley Iron & Coal Company, which did not affect the recently established Schmick Brothers & Company.57

On February 27, 1879, six years after its incorporation, the Cherry Valley Iron & Coal Company formally “made an assignment to its creditors” with an estimated $600,000 in liabilities. The bankrupt firm’s liabilities stemmed from the “bonded indebtedness for the original purchase of the property.” According to the Ohio Democrat of New Philadelphia, “. . . the general depression of real estate, furnace and rolling mill property, with the depreciated condition of the iron trade” resulted in the firm’s failure.58 The assignment of the Cherry Valley Iron & Coal Company displaced several hundred miners, laborers, and iron puddlers and occurred five days after the birth of Charles and Jennie Schmick’s daughter Jenney Josephine in Leetonia.59 With Schmick serving as one of the assignees along with Charles Bissell of the First National Bank of Cleveland, the Cherry Valley Iron & Coal Company’s coal mines, coke ovens, blast furnace stacks, and rolling mill were sold at a sheriff’s sale on May 6, 1879.60

After remaining idle for nearly six months, the Cherry Valley Iron Works purchased the extensive property and equipment of the insolvent Cherry Valley Iron & Coal Company. Incorporated with a modest capital stock of $10,000 by the state of Ohio on August 16, 1879, the Cherry Valley Iron Works commenced mining, coking, and iron

57 Ibid., 59; and J. Wiggins & Co.’s Leetonia Directory, 1874 – 1875, 197, 204, and 205.
58 Ohio Democrat (March 6, 1879): 2; and Mack, History of Columbiana County, Ohio, 244.
59 Ohio Births and Christening Index, 1800-1962; and National Labor Tribune (March 1, 1879): 4.
60 Brennan, ed., The Biographical Cyclopaedia and Portrait Gallery, 551; National Labor Tribune (April 26, 1879): 4; and Mack, History of Columbiana County, 244.
manufacturing during the fall of 1879. In a November 22, 1879 letter to his wife Eliza, Jonathan Warner described recent events at Leetonia regarding their son Edwin. Jonathan Warner stated

I enclose you a letter from Edwin as he requested me giving. I suppose only a part of the details of the dreadful time he had. I have answered his letter. I have had a letter from Bone [Jacob Bonesteel] also and giving about the same account, only in more detail. I shall answer Bone’s letter tomorrow.

The failure of the Company and the accompanying “dreadful time” presumably precipitated the Warner’s departure from Leetonia. Upon his arrival in Denver, forty-seven year old Edwin J. Warner joined his brother Jacob Bonesteel Warner in the smelting works of the Gold King mine. The former president of the Cherry Valley Iron & Coal Company remained in Colorado until his death in 1924.

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61 Annual Report of the Secretary of State to the Governor of Ohio for the Year 1879 (Columbus: Nevins & Myers, State Printers, 1880), 116-117.

62 U.S. Bureau of the Census, Tenth Census of the United States, 1880. The Warner’s children included Lizzie (Mary Elizabeth) age twenty four, Lawrence age twenty, Joe B. age eighteen, Lida age sixteen, Eddie J. age fourteen, Emma age ten, Helen age six, and Paul age two. Twenty-year-old Susanna is not listed as residing with her parents on June 1, 1880. Helen and Paul were both born while the Warner’s lived in Leetonia. The Census also lists three servants residing with the family: Phoebe Delano, Annie Curron, and Mary Lenoir.


64 Tenth Census of the United States, 1880; Twelfth Census of the United States, 1900; Thirteenth Census of the United States, 1910; and Fourteenth Census of the United States, 1920. The 1920 Census lists the eighty-seven year old retired widower as residing, along with his brother Jacob Bonesteel, with his youngest daughter Helen W. Fish.
Following the failure of the Cherry Valley Iron & Coal Company, Charles N. and Jennie M. Schmick moved into the Warner family’s former residence at 110 Walnut Street. Upon the incorporation of the Cherry Valley Iron Works, the directors elected Schmick to his previous positions as secretary and treasurer. Despite being a significant contributor in the failure of the Cherry Valley Iron & Coal Company, Jacob G. Chamberlain returned to Leetonia following the formation of the Ohio Central Railroad Company whereupon he once again became superintendent of the Cherry Valley Iron Works. John H. King joined Schmick and Chamberlain in the management of the firm as president. Two months after its incorporation, the Cherry Valley Iron Works resumed production advertising that “the old hands who formerly worked in the mill will have the preference.” During the first six months after its incorporation, the Cherry Valley Iron Works’ rolling mill became an “unusual state of life and activity” with 150 to 160 individuals working “double turn in all the departments.”

The expansive rolling mill consisted of sixteen puddling furnaces, two heating furnaces, three trains of rolls (one 8”, one 16”, and one 18”) and maintained an annual capacity of producing 10,000 net tons of muck and merchant bar iron and guide iron.

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North of the rolling mill at Washingtonville, 275 miners resumed the removal of coal and sent the high quality fuel to the Company’s 127 coke ovens. The Cherry Valley Iron & Coal Company’s coke ovens were one of fifteen coking works located within the state of Ohio in 1880. The Company’s beehive ovens accounted for 20.81 percent of the State’s total number of coke ovens. Columbiana County’s 195 cokes ovens produced 39,424 tons of coke valued at $125,652 in 1880, ranking second behind Jefferson’s County’s 344 coke ovens, which produced 57,684 tons of coke valued at $156,902. In fact, Jefferson and Columbiana Counties – which combined accounted for 89 percent of all the coke made in Ohio – ranked eighth and eleventh in the nation according to total coke production by county.

The one hundred men working at the Cherry Valley blast furnaces, charged the coke with raw coal into the stacks along with a mixture of “native” and Lake superior iron ores. By March 1880, the company’s furnaces had an annual capacity of producing 24,000 tons of American-Scotch foundry pig iron under the brand name “Cherry Valley.” Just as Jonathan Warner had done a decade earlier at Mineral Ridge, the Cherry Valley Iron Works started advertising its iron as a specialized iron product in the hope of ensuring steady production and sales totals. While Chamberlain managed the

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71 National Labor Tribune (January 10, 1880): 4; and “Directory to the Iron and Steel Works of the United States, Corrected to March 15, 1880, The American Iron and Steel Association, 67. The National Labor Tribune indicates that the Company was also in the process of constructing an additional fourteen coke ovens in January 188.
more than 500 hundred laborers at the Cherry Valley Iron Works, he also continued to serve as superintendent of the Moxahala Iron Company’s furnace. The Moxahala Iron Company also began to market its soft fluid foundry pig iron as a specialized product under the brand name “Moxahala” by 1880.72

After a month-long strike by workers at its rolling mill, the Cherry Valley Iron Works signed a one-year agreement with its coal miners in April 1880.73 One month later, the firm “completed the laying of an eight inch cast iron pipe from their [sic] furnace to their rolling mill, a distance of three hundred yards, through which to convey steam to operate the machines of the latter.”74 The cast iron pipe allowed for production increases while at the same time reducing the number of laborers needed at the rolling mill. Following this addition, the Cherry Valley Iron Works resumed full operations in early July. By February 1881, the firm was using more than 6,000 tons of coal each month and employed 600 laborers at its extensive coal, coke, furnace, and milling works.75 The Cherry Valley Iron Works continued producing high quality American Scotch pig iron with annual production capacities of 24,000 net tons through 1882 – well above the 1879 national average of 10,000 tons per year.76 After adding one scrap furnace and another heating furnace to its rolling mill complex between March 1880 and July 1882, the Cherry Valley Iron Works rebuilt and increased the size of its No. 2

75 National Labor Tribune (July 3, 1880): 4; National Labor Tribune (February 19, 1881): 1; and Ohio Democrat (March 31, 1881): 2.
76 Ingham, The Iron Barons, xvii.
furnace stack from 55ʹ x 14ʹ to 75ʹ x 16ʹ in 1883. The expansion increased the annual capacity of the two stacks to 33,000 net tons. The rolling mill’s annual capacity remained fixed at 10,000 net tons of muck and merchant bar iron and guide iron despite adding one double puddling furnace in 1883-1884. These production expansions pale in comparison to Andrew Carnegie’s Edgar Thomas Furnaces and Union Iron Mills near Pittsburgh, which maintained annual capacities of 250,000 and 45,000 net tons respectively.

By the fall of 1884, the firm of King, Gilbert, & Warner had become the selling agents for Cherry Valley’s American Scotch foundry pig iron, muck and merchant bar iron, and guide iron. Cherry Valley Iron Works president John H. King established the agency in Columbus with former Leetonia resident Riley Miles Gilbert and Randolph S. Warner. Randolph S. Warner, no relation to the Jonathan and Eliza Warner Family, arrived in Columbus in 1877 and three years later was boarding along with Riley Miles and Annie E. Gilbert on East Broad Street. In addition to being the selling agents for King’s Leetonia iron works, King, Gilbert, & Warner sold the Baird Iron Company’s “Baird” brand No. 1 foundry pig iron and started leasing the Franklin Iron Works Company’s recently rebuilt 64ʹ x 15ʹ Franklin furnace at Columbus in 1883-1884. (Refer

77 “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Forges, and Bloomaries in Every State and Territory, Corrected to July 25, 1882 The American Iron and Steel Association (Philadelphia: Allen, Lane, & Scott, 1882), 65 and 139; and “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Forges, and Bloomaries in Every State and Territory, Corrected to September 1, 1884 The American Iron and Steel Association (Philadelphia: Allen, Lane, and Scott, 1884), 26, 60, 121, and 139.


to Table 7.1) The Baird and Franklin furnaces maintained annual production capacities of 6,100 and 20,000 net tons respectively in 1884, with the latter company specializing in the manufacturing of strong foundry pig iron.\(^8^0\) (Appendix C lists King, Gilbert, & Warner’s blast furnaces, rolling mills, and steel works.) While John H. King expanded and diversified his manufacturing and sales capabilities into the Hocking River Valley through King, Gilbert, & Warner, the Moxahala Iron Company struggled to remain viable.

After receiving an assignee in 1884, the American Iron and Steel Association listed the Moxahala furnace in July 1886 as being out of blast “for several years.” During the following year, King, Gilbert, & Warner purchased the idle furnace complex; renaming the site the Glasgow furnace. By November 1887, King’s firm enlarged the size of the single furnace stack to 70’ x 16½’, which nearly tripled its annual production capacity from 10,000 to 27,000 net tons. King, Gilbert, & Warner’s Glasgow furnace used coke and black-band iron ore for its specialized brand of “Glasgow American Scotch pig iron.”\(^8^1\) Before purchasing and rebuilding the Moxahala furnace, King, Gilbert, & Warner became the lessees of the Wellston furnace located within Ohio’s

\(^8^0\) “Directory to the Iron and Steel Works of the United States, Corrected to September 1, 1884, The American Iron and Steel Association, 58-59. The earliest listing of King, Gilbert, & Warner within the American Iron and Steel Association’s Directory is in the 1882 edition, which lists the firm as one of the selling agents for the Jefferson Iron Works of Steubenville, Ohio. The Jefferson Iron Works manufacturing specialty was gray forge pig iron and was advertised under the brand name “Jefferson.” “Directory to the Iron and Steel Works of the United States, Corrected to July 25, 1882 The American Iron and Steel Association, 66.

Following the discovery of a seam of coal at Wellston by H. S. Bundy in 1872, the Wellston Coal & Iron Company built two 53’ x 11½’’ furnace stacks with annual capacities of 12,000 net tons in 1874-1875. After remodeling the No. 2 stack in 1879, the Wellston Coal & Iron Company dismantled its No. 1 Furnace stack and started marketing its product as a “neutral foundry pig iron made from native ores.” When King, Gilbert, & Warner became the lessees of the single 52’ x 13’ furnace stack in 1885, the Wellston furnace maintained an annual production capacity of 7,300 net tons. King, Gilbert, & Warner continued to manufacture neutral foundry pig iron at the Wellston furnace.

The Columbus firm also became the selling agents for the Standard Nail & Iron Company’s works located at Middleport, Ohio along the Ohio River in Meigs County. Originally built in Clifton, West Virginia in 1867, the Standard Nail & Iron Company had relocated to southern Ohio in 1885. When production resumed at Middleport on February 22, 1886, the nail works consisted of three heating furnaces, one 20” train of rolls, and 102 nail machines. With King, Gilbert, & Warner as selling agents, the Standard Nail & Iron Works maintained a production capacity of 250,000 kegs of steel nails branded under the name “Standard.”

By 1886-1887, King, Gilbert, & Warner had

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become profitable iron manufacturers and brokers for a variety of specialized iron products.

Eight years after its incorporation, the Business Review, Columbiana County, O., 1887 boasted that the Cherry Valley Iron Works at Leetonia have regained the proud and prominent position it formerly occupied and largely increased the magnitude of its trade and widened the territory in which its products find a ready sale, embracing nearly all the western states and territories. This company enjoys the fullest facilities for securing supplies and the most economic administration of their extensive business.  

King, Gilbert, & Warner’s association with the Cherry Valley Iron Works certainly aided in the distribution of its specialized iron products to distant markets while at the same time making the company “...the most important concern in... [Columbiana] county.” With a capital stock of $250,000 and an average of 600 to 1,000 employees by 1887, the Company’s buildings and equipments [sic] have secured most ample space, the plant covering an area of 48,780 square feet, while the motive power and newest improved mechanical appliances are utilized in the various departments of their operations, to secure the highest excellence and proficiency, and the annual business will amount to from $1,250,000 to $1,500,000.

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84 “Leetonia,” Business Review, Columbiana County, O., 1887 (unknown publisher and publication date), 13. Copies of the Business Review are located at the Leetonia Public Library, Leetonia, Ohio.

85 Ibid., 13.

86 Ibid., 13.
The business association between King, Gilbert, & Warner and the Cherry Valley Iron Works strengthened further following Riley Miles Gilbert’s appointment as vice president of the Leetonia firm in 1887.\(^{87}\)

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Image 7-3 Cherry Valley Iron Works Rolling Mill (Top) and Blast Furnaces (Below), 1888\(^{88}\)

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\(^{87}\) Ibid., 13.

Cherry Valley’s coal mines at Washingtonville and Leetonia continued to produce “an average of 75,000 tons annually, supplying the demands of their work and the local trade.” The majority of this coal remained destined for the Company’s furnaces and rolling mill, which maintained annual production capacities of 33,000 and 10,000 tons respectively through November 1889. These production capabilities are comparable to the 1889 national annual averages of 29,000 and 14,000. A twenty-five page Price List published between 1884 and 1887 details the Cherry Valley Iron Works’ plethora of iron products available for sale through King, Gilbert, & Warner. These iron products manufactured at Leetonia included: special fancy irons, flat bar, iron rounds and squares, horse shoes, oval iron, half oval and half round iron, heavy and light bands, hoop iron, T-rails, railroad links and pins, bead iron, fancy tire iron, channel iron, half rounds and ovals, fence pickets, wagon box iron, collar iron, fancy “D” iron, regular irons, and “T” and “J” fence rails. In addition to all of these specialty items, the Price List includes


91 Price List Cherry Valley Iron Works, Leetonia, Ohio: Manufacturers of Bar, Muck and Pig Iron, Washingtonville Coke, and Miners of Coal (unknown publisher and publication date). Located at Anderson Library, The University of Minnesota, Minneapolis, Minnesota. The author of this work has determined that the Price List was published between 1884 and 1887 because it lists J. H. King president, C. N. Schmick secretary and treasurer, and J.G. Chamberlain as superintendent.

92 Ibid., 3-11. The Price Lists includes drawings of all the various iron products and the innumerable available sizes of each.
two full-page advertisements for the Company’s “Celebrated Cherry Valley American-Scotch Pig Iron.” The Price List describes the specialty product as follows:

This iron is made from Lake, Black Band, and Shell Ores, which gives it good strength and is also very soft and fluid. It will neutralize the shrinkage of other iron and at the same time carry a larger amount of scrap or hard irons than any other in the country, and is especially adapted for stove plate, agricultural work and machine castings.  

Businesses manufacturing and selling stove plate, agricultural work, and machine castings at Leetonia during the late 1880s included the Leetonia Boiler Works Company, Cochel & Rendell, and Dalzell & Kuegle.

After struggling financially following the failure of the Leetonia Iron & Coal Company, the Leetonia Boiler Works “had an extensive business in the manufacture of all kinds of boilers, oil tanks, iron bridge work, [and] plate and sheet iron work” by 1887. Both Cochel & Rendell and Dalzell & Kuegle specialized in selling hardware implements such as tools, table and pocket cutlery, and blacksmith and builder supplies, as well as agricultural equipment such as riding and walking plows, cultivators, reapers, and mowers. The financial success of these establishments coupled with Cherry Valley’s robust earnings led to the chartering of the First National Bank of Leetonia in July 1886 with a capital stock of $100,000. William H. and Charles N. Schmick served as president and vice-president respectively of the bank, ending the banking firm of Schmick Brothers & Company.

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93 Ibid., 12 and 25.
95 Ibid., 13, 14, and 16.
Despite the production and sales successes of the Cherry Valley Iron Works, the ever-restless Jacob G. Chamberlain resigned his position as superintendent in May 1887. Three decades after commencing coal mining and coking operations at Washingtonville, Chamberlain departed Leetonia “to take charge of the Alabama and Tennessee Coal & Iron Company.” Upon arriving in Alabama, Chamberlain managed the Company’s 70,000 acres of coal land and supervised the construction and operation of 300 coke ovens at Jasper – the county seat of government for Walker County, Alabama. When the Alabama and Tennessee Coal & Iron Company purchased the Sheffield & Birmingham Railroad, Chamberlain became chief engineer of the railroad and supervised the extension of the line eighty-six miles to Jasper. After serving as general manager for the Railway Company’s construction of three 75’ x 18’ furnace stacks at Sheffield, Alabama during 1888, Chamberlain was named receiver of the financially insolvent firm the following year. “In the course of a few months,” Chamberlain sold the property and relocated to Goshen Bridge, Virginia where he accepted the position of general manager of the Virginia Iron & Railway Company. After assisting in the Virginia company’s acquisition of “valuable coal and ore lands in West Virginia,” Chamberlain once again relocated, this time to Los Angeles, California in 1892. Before his death on May 30, 1897, Chamberlain served as manager of the Los Angeles Iron & Steel Company. The Denver based firm manufactured iron and steel

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sheets and light plates under the brand name “Los Angeles Iron and Steel,” and maintained an annual capacity of 7,000 net tons.  

Similar to Graff, Bennett, & Company’s decision to transition to steel manufacturing during the early 1880s, King, Gilbert, & Warner added Bessemer steel production to the firm’s ever-expanding manufacturing capabilities in 1887 in an attempt to profit from the nation’s expanding demand for steel. After serving as the selling agents for the Standard Nail & Iron Company for approximately a year, King, Gilbert, & Warner purchased the Middleport complex and renamed the facility the Middleport Steel & Iron Works. When King, Gilbert, & Warner added two 3 gross-ton Bessemer converters to the site in 1887, the Middleport Steel & Iron Works became the sixth completed Bessemer steel works in the state of Ohio. In addition to being capable of producing 40,000 net tons of Bessemer steel slabs and billets, the Middleport works also had the capacity to manufacture 250,000 kegs of nails per year. As detailed by historian Fr. William T. Hogan, “steel production rose sharply . . . as it increased from 1.4 million net tons in 1880 (for all processes, Bessemer, open-hearth, and crucible), to

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4.8 million net tons in 1890 . . . [to] 11.4 million tons in 1900 – an eightfold increase.”

When King, Gilbert, & Warner commenced Bessemer steel production in 1887, the nation’s annual steel output consisted of 3,288,357 net tons of Bessemer steel, 360,717 net tons of open-hearth steel, and 70,685 net tons of crucible steel. With demands for steel steadily increasing, King, Gilbert, & Warner enlarged the production capacities at its Bessemer works to 50,000 net tons of steel slabs and billets and 300,000 kegs of nails. The firm also added one 28” blooming train of rolls at the Middleport steel facility.

Table 7.2 Bessemer Steel Works in Ohio, November 1887

<table>
<thead>
<tr>
<th>Company</th>
<th>Location, County</th>
<th>First “Blown In”</th>
<th>Annual Capacity (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland Rolling Mill Co.</td>
<td>Cleveland, Cuyahoga</td>
<td>Oct. 15, 1868</td>
<td>150,000</td>
</tr>
<tr>
<td>Bellaire Nail Works</td>
<td>Bellaire, Belmont</td>
<td>April 28, 1884</td>
<td>250 – 300 daily</td>
</tr>
<tr>
<td>Otis Iron &amp; Steel Co.</td>
<td>Cleveland, Cuyahoga</td>
<td>Aug. 5, 1884</td>
<td>35,000</td>
</tr>
<tr>
<td>Laughlin &amp; Junction Steel Co.</td>
<td>Mingo Junction, Jefferson</td>
<td>Feb. 8, 1886</td>
<td>75,000</td>
</tr>
<tr>
<td>Jefferson Iron Works</td>
<td>Steubenville, Jefferson</td>
<td>March 12, 1887</td>
<td>400,000 kegs (steel nails)</td>
</tr>
<tr>
<td>Middleport Steel &amp; Nail Works</td>
<td>Middleport, Meigs</td>
<td>1887</td>
<td>40,000</td>
</tr>
</tbody>
</table>


102 Ibid.


After commencing steel manufacturing, King, Gilbert, & Warner continued to operate the Glasgow, Franklin, and Wellston furnaces in Perry, Franklin, and Jackson Counties. Between November 1887 and February 1892, the Columbus based firm formally changed its name to The King, Gilbert, & Warner Company and made significant additions at its various blast furnace sites. The Company increased the production capacity of the 70’ x 16½’ Glasgow furnace from 27,000 to 40,000 net tons and changed the furnace’s product to Bessemer grade pig iron. The firm also enlarged the Franklin furnace stack to 70’ x 16’ in 1890, thereby increasing its production capacity from 25,000 to 40,000 net tons. The Company also added Bessemer grade iron as a product while continuing to manufacture the original “Franklin” strong foundry iron brand. At Leetonia, the Cherry Valley Iron Works, where John H. King remained president, dismantled the No. 1 stack in 1890, increased the production capacity of the remaining 75’ x 16’ stack from 33,000 to 50,000 net tons, but kept the site’s manufacturing specialty as American Scotch pig iron. By February 1892, Charles Schmick’s brother-in-law Scott E. Welker joined the Cherry Valley Iron Works as secretary, replacing Riley Miles Gilbert who was now serving as president of the Middleport Steel & Nail Works.105

After once again enlarging the Franklin furnace stack to 75’ x 17’ and adding three 65’ x 18’ Massicks & Crookes stoves to the site in 1892-1893, The King, Gilbert, & Warner Company installed two 4 gross ton Bessemer converters at Middleport. These additions increased the steel production capacity of the works to 100,000 net tons of steel. Despite larger capacity Bessemer steel converters and access to more than 100,000 net tons of Bessemer grade iron manufactured at the Glasgow and Franklin furnaces, John H. King, Riley M. Gilbert, and Randolph S. Warner decided to construct a Bessemer steel plant at Columbus. In November 1894, the firm started to disassemble the Middleport Steel & Nail Works and removed the equipment to South High Street in Columbus’s south side. The King, Gilbert, & Warner Company commenced steel manufacturing in Columbus on May 2, 1895 near the intersection of the Baltimore &

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106 In author’s possession.

Ohio and Columbus & Hocking Valley Railroads. The Company’s new Columbus steel plant included two four ½ gross ton Bessemer steel converters, one soaking pit, one heating furnace, and three trains of rolls (one 32” reverse blooming, one 20” sheet bar, and one 24” small billet). The steel plant maintained an annual production capacity of 120,000 gross tons of steel slabs, billets, and sheet bars. In order to ensure reliable and steady supplies of Bessemer grade iron, the Company added a second stack to the Franklin blast furnace complex in 1895. The two 75’ x 17 ½’ Franklin furnace stacks maintained a combined capacity of 90,000 gross tons of Bessemer grade iron. After abandoning the Moxahala furnace in 1897, The King, Gilbert, & Warner Company constructed another blast furnace stack adjacent to its existing operations in 1897. The 80’ x 18’ Steelton furnace complex included three 75’ x 19½’ Massicks & Crookes stoves and had an annual capacity of 120,000 gross tons of Bessemer grade iron. As a result of these significant additions, by 1898 The King, Gilbert, and Warner Company operated “one of the largest steel plants in the country” with well over 1,000 laborers at its furnaces and steel mill.

The King, Gilbert, and Warner Company’s successful transition to Bessemer steel production rendered their non-Bessemer grade blast furnace at Leetonia obsolete for their continually expanding steel product line. As a result, between February 1893 and March

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108 Daily Public Ledger (Maysville, Kentucky, November 28, 1894): 1; and Tom Dunham, Columbus’s Industrial Communities: Olentangy, Milo-Grogan, and Steelton (Bloomington, Indiana: AuthorHouse, 2010), 71 and 74.


1894, Charles N. Schmick replaced John H. King as president of the Cherry Valley Iron Works; ending formal ties between the Columbus based sales agency and the Leetonia iron company. William H. Potter joined the firm as vice president with Scott E. Welker serving as secretary and general manager. Schmick, Potter, and Welker held these positions until 1899 when outside syndicates purchased the Cherry Valley Iron Works. In the wake of the Panic of 1893 and during the height of the “great merger wave” of 1895 to 1904, Schmick and his associates sold the Cherry Valley rolling mill to the recently incorporated Youngstown based Republic Iron & Steel Company in 1899. Soon thereafter, Schmick sold the Cherry Valley coal mines, beehive coke ovens, and blast furnace stack to Joshua W. Rhodes and Edwin N. Ohl of Pittsburgh. Consistent production of American Scotch foundry pig iron at Leetonia started to wane as the production of steel became the center of the nation’s manufacturing sector.

Unlike iron manufacturers in Pittsburgh and throughout the Mahoning and Shenango Valleys who transitioned to Connellsville coke as a smelting fuel during the 1870s and 1880s, Cherry Valley’s continued access to high quality Washingtonville coal allowed them to manufacture non-Bessemer grade specialty iron products. The Leetonia firm’s renowned reputation as manufacturers of American Scotch pig iron during the last three decades of the nineteenth century, allowed them to cater to niche markets during an

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era of increasing steel production and eventual corporate consolidations. Following the
great merger wave of the late nineteenth and early twentieth centuries, however, Cherry
Valley’s coal mines in southern Mahoning County and northern Columbiana County
started to peter out. Without reliable access to their once highly prized Washingtonville
coal, Cherry Valley struggled to remain viable as an independent iron manufacturer and
ultimately fell into the hands of Pittsburgh industrialists.
Chapter Eight

Shenango Valley Iron Manufacturers:
Samuel & Peter Kimberly and John J. Spearman, 1845-1901

“The Sharon or Mercer Block Coal, which has been so extensively mined in this immediate vicinity, possesses qualities of such a peculiar nature so well adapted to the making of iron as to have become regarded as one of the strongest factors in the prosperity of this particular section.”


“John J. Spearman of Sharon, Pa., is probably the oldest man living who during his entire career has been identified with the manufacture of pig iron in the United States. Speaking of...the changes which he encountered from the time he was a boy around the old cold-blast charcoal furnaces in Pennsylvania until the time opportunity reached out from west of the Allegheny mountains...Mr. Spearman says a record would read more like a fairy tale than a recital of the progress of the great industry from its infancy to the stage at which he now looks upon it from his retirement.”


Similar to developments in the Mahoning Valley during the mid-nineteenth century, pioneering ironmasters relocated to western Pennsylvania in order to take advantage of the Shenango Valley’s valuable Mercer County block coal deposits.
Advancements in transportation through the Shenango Valley beginning in the 1840s spurred coal mining operations and ultimately led to the development of profitable iron industries at Sharon, Sharpsville, and New Castle. In addition to mirroring the careers of iron manufacturers at Leetonia and throughout the Mahoning Valley, Samuel and Peter Kimberly and John J. Spearman played instrumental roles in the growth of the Shenango Valley as a center of coal mining and iron manufacturing during the second half of the nineteenth century. Moreover, Edwin N. Ohl and William D. McKeefrey – protégés of Samuel Kimberly and John J. Spearman during the 1880s – became independent iron manufacturers at Leetonia during the late nineteenth and early twentieth centuries. A detailed examination of these individuals’ careers from 1845 until the onset of corporate consolidations and mergers during the late 1890s offer instructive insights into the development of Shenango Valley iron manufacturing while at the same time illustrating the influence of familial associations among independent iron manufacturers throughout eastern Ohio and western Pennsylvania.

The opening of the Beaver & Erie Canal in northwestern Pennsylvania in 1844 provided a transportation outlet for Shenango Valley farmers while at the same time encouraging the development of the region’s infant coal mining and iron manufacturing enterprises. Constructed between 1831 and 1844, the 136 mile long Canal and its accompanying locks connected the Ohio River to Lake Erie. Starting along the Ohio River at Beaver in Beaver County, the Canal followed the Shenango River northward near the Ohio – Pennsylvania state line to Greenville in Mercer County – a distance of seventy-two miles. From Greenville, the Canal continued into Crawford County and joined the Little Crooked Creek before reaching the port of Erie in Erie County – an
additional sixty-three miles from Greenville. Approximately seven miles southwest of New Castle, the Beaver & Erie Canal met the Pennsylvania & Erie Canal at Mahoningtown, thereby, providing a navigable east-west route connecting the Mahoning and Shenango Valleys.\(^1\) The opening of the canal spurred economic development and attracted people to western Pennsylvania.\(^2\) As detailed by John G. White, the Mercer County communities of Sharon, Sharpsville, Clarksville, Shenango, and Greenville “were benefited by the canal, and the result of the entire Shenango valley was such that it became the seat of many industries and a gained a commercial supremacy.”\(^3\)

The first canal boat to arrive at the port of Erie containing Mercer County block coal was the R.S. Reed on December 5, 1844.\(^4\) The coal appearing throughout much of Mercer County, due north of the Pittsburgh coal seam, is within the same seam of coal that appears throughout Mahoning and Trumbull Counties in eastern Ohio. Pennsylvania State Geologist Henry Darwin Rogers, and subsequent geologists and industrialists, referred to this coal seam as Mercer County Block Coal or Sharon Coal.\(^5\) Described as a “species of semi-cannel coal, with a slaty structure and a dull, jet black lustre [sic], with a


\(^3\) Ibid., 69.


\(^5\) Refer to Chapter 2, Table 2.2 Coal Seams of the Lower Coal Measures of Ohio.
thickness of from three to four feet,” the block coal seam of Mercer County, according to the Pennsylvania Bureau of Statistics, “produce[s] the most valuable coal in the United States.”

Approximately 131,000 acres of coal underlay Mercer County, with only the northwestern townships of Greene and West Salem lacking deposits.

Map 8-1 Bituminous Coal Field of Western Pennsylvania

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Similar to the creation of Mahoning County from portions of southern Trumbull and northern Columbiana Counties in February 1846, the Commonwealth of Pennsylvania established Lawrence County by removing portions of southern Mercer and northern Beaver Counties in March 1849. The creation of the new county was in response to the unearthing of the highly prized Mercer block coal and the subsequent resettlement of families to the Shenango Valley. After nearly three decades of debate, the rapid development of New Castle following the opening of the Beaver & Erie Canal provided the necessary political backing for the creation of a new county.\(^9\) As described by Samuel and Pliny Durant,

> The line between Beaver and Mercer counties passed through the borough of New Castle, cutting it in twain, and compelling its inhabitants to attend the two widely separated capitals of Beaver and Mercer counties, in the transaction of all their legal business.\(^{10}\)

Following the surveying of new borders, Lawrence County contained 21,079 residents in 1850. New Castle, where 1,614 individuals resided, became the seat of government for the new county. To the north, the reduced Mercer County included 33,172 inhabitants, with the southwestern townships of Hickory and Shenango containing 2,089 and 1,574 residents respectively. The Borough of Mercer, the county’s seat of government, had a population of 1,004 residents in 1850 while 541 individuals resided in Hickory.


\(^{10}\) Samuel W. and Pliny A. Durant, *History of Lawrence County, Pennsylvania*, 11.
Township’s Borough of Sharon.\textsuperscript{11} These communities, along with Sharpsville, Wheatland, and West Middlesex, soon developed into thriving centers relying primarily around coal mining, railroad construction, and iron manufacturing. Similar to the Mahoning Valley, and later near Washingtonville, the unearthing of coal throughout the Shenango Valley spurred the region’s development as a center of iron manufacturing.

The Mercer County firm of Vincent & Himrod (B. B. Vincent and David Himrod and) ushered in the era of using raw block coal as a blast furnace smelting fuel in the Shenango Valley a few months after the proprietors “blew in” the 39’ x 10’ Clay furnace stack on July 19, 1845. Named in reverence to Kentucky Senator Henry Clay’s continued promotion of internal improvements, the proprietors initially used charcoal as a smelting fuel before transitioning to the Shenango Valley’s more readily available and profitable block coal deposits.\textsuperscript{12} By the end of 1846, eight additional raw coal fueled blast furnaces appeared throughout Mercer County. By the end of the decade, there were eight active blast furnaces using raw block coal as a smelting fuel in western Pennsylvania, with several located near the Mercer County communities of Sharon and

\textsuperscript{11} U.S. Bureau of the Census, Seventh Census of the United States, 1850, 172 and 175; and White, A Twentieth Century History of Mercer County Pennsylvania, Illustrated, Volume I, 97.

By 1860, Mercer County’s five pig iron manufacturing firms employed eighty people and were estimated as having an impressive pre-Civil War cumulative value of $253,000.\textsuperscript{14}

### Table 8.1 Mercer County Raw Coal Blast Furnaces, 1846\textsuperscript{15}

<table>
<thead>
<tr>
<th>Name (Blanche)</th>
<th>Built</th>
<th>Built by</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>1845</td>
<td>Vincent &amp; Himrod</td>
<td>2.5 miles southeast of Clarksville</td>
</tr>
<tr>
<td>Middlesex</td>
<td>1845</td>
<td>Sennett, Clark &amp; Co.</td>
<td>West Middlesex</td>
</tr>
<tr>
<td>Big Bend</td>
<td>1846</td>
<td>McFarland &amp; King</td>
<td>Big Bend</td>
</tr>
<tr>
<td>Esther</td>
<td>1846</td>
<td>Power, Waugh, &amp; Reed</td>
<td>Greenville</td>
</tr>
<tr>
<td>Greenville</td>
<td>1846</td>
<td>Vincent, Himrod, &amp; Woodworth</td>
<td>Greenville</td>
</tr>
<tr>
<td>Hamburg</td>
<td>1846</td>
<td>Mills &amp; Lowry</td>
<td>Hamburg</td>
</tr>
<tr>
<td>Sharon</td>
<td>1846</td>
<td>Shoenberger, Agnew, &amp; Co.</td>
<td>b/w Sharon and Sharpsville</td>
</tr>
<tr>
<td>Mazeppa</td>
<td>1846</td>
<td>Garrett, McGaw, &amp; Co.</td>
<td>1 mile east of Mercer</td>
</tr>
</tbody>
</table>

The development of Sharon as a center of coal mining and iron manufacturing dates to the construction of the Sharon furnace along the east side of the Shenango River.


\textsuperscript{14} White, A Twentieth Century History of Mercer County Pennsylvania, Illustrated, Volume I, 355.

in 1846 by renowned ironmaster Dr. Peter Shoenberger and David Agnew. Before arriving in Mercer County, Shoenberger and Agnew worked together as proprietors at the Maria forges in Huntingdon County, Pennsylvania, the Juniata Iron Works at Pittsburgh, and at a rolling mill in Wheeling, Virginia. Four years after blowing in the Sharon stack, Shoenberger and Agnew established the Sharon Iron Company with a capital stock of $70,000. Soon thereafter, Mercer County coal merchant General Joel B. Curtis, Beaver & Erie Canal surveyor George Boyce, and Pittsburgh iron roller John Ashton joined the company. With Curtis and Agnew serving as president and manager respectively, the Sharon Iron Company “commenced iron and nail production in December 1850.”

During the following September, the firm acquired “a controlling interest in” the 640-acre Jackson iron ore mine in Jackson County, Michigan. After securing access to the Jackson mine, the Sharon Iron Company’s Clay furnace and David and John P. Agnew’s recently acquired Sharpsville furnace “revolutionized the manufacture of iron in Mercer County and western Pennsylvania” when both furnaces successfully smelted Lake Superior iron ore. The first of four boatloads containing seventy tons of Jackson iron

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17 Swank, History of The Manufacture of Iron in All Ages, 324-325; White, A Twentieth Century History of Mercer County Pennsylvania, Illustrated, Volume I, 98, 355 and 385; and History of Mercer County, Pennsylvania: Its Past and Present, Volume I, 195. Note that the last source listed indicates that the Sharon Iron Company started with $20,000 capital.

18 Swank, History of The Manufacture of Iron in All Ages, 325.

ore arrived at the Sharpsville furnace via the Beaver & Erie Canal during the fall of 1853.\textsuperscript{20} According to David Agnew

the ore was used in the furnace partly alone and partly in mixture with native ores and the experiment was highly successful, the furnace working well and producing an increased yield of metal, which was taken to the Sharon Iron Works and there converted into bar iron and nails of very superior quality. The second boat load was also brought to Sharpsville, but having been intended to be left at the Clay furnace, owned by the Sharon Iron Company, was returned and used at the establishment.\textsuperscript{21}

In a letter to the Cleveland Iron Mining Company, General Curtis further extolls the usefulness of the Jackson iron ore and advocates the construction of a reliable railroad to connect the Shenango Valley to the Great Lakes’ ports. Curtis states:

As you are anxious to hear the results of our test of Lake Superior ore in a blast furnace, I hasten to give it to you. It was fully successful, more than we asked for. We worked the furnace [Clay] for several days on Lake Superior ore entire, no mixture whatever with it, and yielded fully 80 per cent of metal per ton. We have not tried the metal, but it looks very well and there is no doubt of its quality. This settles the question as to the matter of converting the ore and calls for a road at once. There are furnaces now built on the canals, on the Cleveland and Erie, to use all the ore that we can mine the first year and there should be no delay in pushing our road and dock.\textsuperscript{22}

Despite these iron manufacturing achievements using Mercer County block coal and Lake Superior iron ore, the Shenango Valley’s blast furnaces continued to use the Canal

\textsuperscript{20} Swank, History of The Manufacture of Iron in All Ages, 324; and “Sketch of John J. Spearman,” The Bulletin of the American Iron and Steel Association Vol. XLI, No. 17 (Philadelphia: November, 10, 1907), 133

\textsuperscript{21} Williams, The Honorable Peter White: A Biographical Sketch of the Lake Superior Iron Country, 67.

\textsuperscript{22} Ibid., 67. Also refer to Swank, History of The Manufacture of Iron in All Ages, 324-325.
or transport their iron overland because the Valley lacked a direct rail link to Erie, Pittsburgh, Youngstown, and Cleveland for more than a decade.

Seven years after the Cleveland & Mahoning Railroad opened up the Mahoning Valley’s block coal fields by connecting Youngstown to Cleveland, the Erie & Pittsburgh Railroad traversed through Mercer County in 1864 and opened for “through trains from Erie to New Castle . . . after October 31, 1864.” Originally chartered in 1845 as the Pittsburgh and Erie Railroad, the Commonwealth of Pennsylvania incorporated the Erie & Pittsburgh Railroad Company on April 1, 1858. The eighty-one and one half mile Erie & Pittsburgh traversed the Valley alongside the Beaver & Erie Canal. By 1870, the Erie & Pittsburgh maintained connections with the Lake Shore & Michigan Southern Railway in Erie County and with the New Castle & Beaver Valley Railroad at New Castle, with the latter having an extension to the Pittsburgh, Ft. Wayne, & Chicago Railroad at Homewood Junction in Beaver County. Similar to the Atlantic & Great Western Railroad’s acquisition of the Cleveland & Mahoning Railroad (July 1863), the Pennsylvania Railroad formally leased the Erie & Pittsburgh Railroad for 999 years on March 24, 1870. The opening of various railroads through the Shenango Valley during the 1860s (Atlantic & Great Western, Lake Shore System, and Sharpsville Railroad),

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which connected with major east-west trunk lines, quickened the development of blast furnace operations and rolling mill enterprises throughout the region.\textsuperscript{26}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{map8-2.png}
\caption{Map 8-2 Railroads in Western Pennsylvania and Eastern Ohio\textsuperscript{27}}
\end{figure}

\begin{flushleft}
\end{flushleft}

\begin{flushleft}
\textsuperscript{27} J. Sutton Wall, “Rail Road Map of Pennsylvania Published by the Department of Internal Affairs of Pennsylvania, 1895,” (Harrisburg, Pennsylvania: 1895), Library of Congress, Geography and
\end{flushleft}
Approximately two years before the Erie & Pittsburgh Railroad opened up the Shenango Valley’s extensive coal fields, Samuel Kimberly (November 17, 1817-February 25, 1885) of Youngstown relocated to Sharon to commence coal mining operations. Born in Salem Township to Amos E. and Jane Pennock, Samuel Kimberly “was reared in Columbiana County” before relocating to Austintown Township. Kimberly and his second wife Catherine were still living in Austintown in June 1860, whereupon the Census listed the forty-three year old as a farmer with a combined real estate and personal estate valued at $52,000. Kimberly’s substantial wealth in 1860 stemmed from his association with the “highly successful operation” of Lanterman’s Mill. In 1845-1846, Kimberly and his then brother-in-law German Lanterman constructed a gristmill along the Falls of Mill Creek. German Lanterman was the brother of Kimberly’s first wife – Minerva Lanterman. Located southeast of Austintown and south of Youngstown in Boardman Township, Lanterman’s Mill included “three sets of

Map Division. http://memory.loc.gov/cgi-bin/query/h?ammem/gmd:@field(NUMBER+@band(g3821p+rr002970)). The Erie & Pittsburgh Railroad is the Red line appearing in northern Mercer County that circuitously traverses through Sharpsville and then passes near Sharon, Wheatland, and West Middlesex before entering into Lawrence County and heading toward New Castle. This map indicates instructively the various railroads passing near the Mahoning and Trumbull County communities of (east to west) Lowellville, Youngstown, Brier Hill, Niles, and Mineral Ridge. The Red line in the bottom left hand corner is the Pittsburgh, Ft. Wayne, & Chicago Railroad intersecting the Niles & New Lisbon at Leetonia. The Niles & New Lisbon reappears on the map at Ohltown and Mineral Ridge before terminating at Niles.

grinding stones" and was the third grinding stone mill constructed at that location along the Falls.\textsuperscript{32} As the flouring mill continued to flourish, Kimberly redirected his focus to coal mining and iron manufacturing, becoming an associate of Myron I. Arms and the Eagle furnace at Youngstown.

Myron I. and Emaline Eliza Warner Arms refer to Kimberly on eight different occasions within a series of nearly thirty letters written during the spring and summer of 1864 following Myron’s enlistment in the U.S. Army.\textsuperscript{33} There are several references to letters written between Kimberly and Myron regarding the management and productivity of the Eagle furnace or to letters attached to Emaline’s letters from either man. A July 7 letter from Emaline to Myron, however, offers insight into Kimberly’s and Arms’s coal mining concerns in Mercer County. In the letter, Emaline relays to her husband that “Coal brings $4.50 at the mines and has advanced. Mr. K. says he has sold eleven or twelve thousand dollars [sic] worth from the bank near Sharon.”\textsuperscript{34} This is a significantly high price of coal when compared to the 1860 average price per ton of $1.34. Continued demand for coal during the Civil War increased the price of the valuable fuel, which University of Florida Associate Professor of History Sean Adams places at forty-five percent higher than its 1860 value.\textsuperscript{35}

\textsuperscript{32} “The History of Lanterman’s Mill,” Mill Creek MetroParks http://millcreekmetroparks.org. For reference to the location of Boardman Township and Mill Creek, refer to Chapter 2, Map 2-1 Portion of the Ashtabula and New Lisbon Railroad.

\textsuperscript{33} The references appear in Letters dated May 21; June 16, 18, 24, and 25; July 7, 10-11, and 24. Hildegrand K. Schnuttgen Ethnic History Collection, Maag Library, Youngstown State University.

\textsuperscript{34} “Letter from Emaline in Youngstown to My Dear Husband (July 7, 1864), Hildegrand K. Schnuttgen Ethnic History Collection, Maag Library, Youngstown State University.

Emaline’s letter describing Kimberly and the price of coal is referencing the Keel Ridge coal bank located four miles from Sharpsville on the Titus family farm in Hickory Township. Enoch Filer opened the Keel Ridge shaft mine in 1863 for Kimberly, Arms, and Henry Forker. In fact, in 1859 Filer “sank a large shaft in Hickory township and introduced for the first time in Mercer County machinery for hoisting coal.” In addition to the Keel Ridge site, Kimberly was also associated with Filer and the development of coal mines east of Hickory Township at Mt. Pleasant and Lackawannock Township. As detailed by John G. White, Hickory Township soon developed into the primary center of Mercer County coal and iron industries. By 1864, eleven coal mining companies located in Hickory Township near the Borough of Sharon extracted 460,000 tons of Mercer County block coal. Kimberly’s extensive coal mining interests in Hickory Township aided his transition into the manufacturing and rolling of iron outside of the Mahoning Valley following the death of his colleague Myron I. Arms in September 1864.

Table 8.2 Active Coal Mines in Hickory Township Near Sharon, 1864

<table>
<thead>
<tr>
<th>Proprietor</th>
<th>Location</th>
<th>Coal Production in Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pierce &amp; Company</td>
<td>Sharpsville</td>
<td>55,000</td>
</tr>
<tr>
<td>Kimberly, Forker, &amp; Co.</td>
<td>Near Sharpsville</td>
<td>25,000</td>
</tr>
<tr>
<td>Curtis &amp; Boyce</td>
<td>Sharon</td>
<td>40,000</td>
</tr>
</tbody>
</table>

http://eh.net/encyclopedia/article/adams.industry.coal.us.html


38 Ibid., 342.
<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Porter, Forker, King, &amp; Co.</td>
<td>Sharon</td>
<td>130,000</td>
</tr>
<tr>
<td>Andrews &amp; Bro.</td>
<td>Sharon</td>
<td>25,000</td>
</tr>
<tr>
<td>Irvine &amp; Andrews</td>
<td>Near Sharon</td>
<td>40,000</td>
</tr>
<tr>
<td>Wheeler &amp; McCleery</td>
<td>Sharon</td>
<td>10,000</td>
</tr>
<tr>
<td>Tom Taylor &amp; Company</td>
<td>Sharon</td>
<td>10,000</td>
</tr>
<tr>
<td>Wheeler &amp; Bell</td>
<td>Sharon</td>
<td>5,000</td>
</tr>
<tr>
<td>Arms, Wick, &amp; Co.</td>
<td>Not Listed</td>
<td>40,000</td>
</tr>
<tr>
<td>Not Listed</td>
<td>Middlesex</td>
<td>80,000</td>
</tr>
</tbody>
</table>

After remaining idle for four years following the Panic of 1857, General Curtis sold the Sharon Iron Company to a group of Youngstown iron manufacturers that included Caleb B. Wick, Jr., P. W. Keller, William Coleman, and James Westerman of Brown, Bonnell, Westerman, & Company. The Sharon works formally became the Westerman Iron Company in 1865 when Chauncey H. Andrews, Christian H. Buhl, and W. J. Hitchcock joined the partnership following the exit of Coleman and Wick. Samuel Kimberly and John Ashton, the former manager of the Sharon works, also became associated with the Westerman Iron Company upon its formation. The following August, Kimberly purchased the idle Wampum blast furnace at an assignee’s sale. Located south of New Castle in the Borough of Wampum, where the “coal business . . . is quite extensive,” the single 50’ x 13’ Wampum furnace stack manufactured between

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7,000 and 8,000 tons of “pig iron exclusively per annum.” According to Aaron L. Hazen, Kimberly’s Wampum Furnace Company

. . . owned, in connection with their furnace, extensive coal and limestone deposits. The amount of coal taken out of their mines being annually from 40,000 to 50,000 tons. The capital invested in the furnace property, in coal mines, stone quarries, cars, coal-chutes, etc. was full $250,000.

Three years later, Kimberly again added to his ever-increasing Mercer County coal and iron interests when the firm Samuel Kimberly & Company constructed the single 55’ x 13’ 2/3” Keel Ridge furnace stack in Hickory Township. Located adjacent to Alexander, Ashton, & Company’s Atlantic Iron & Nail Works, the Keel Ridge blast furnace maintained a daily capacity of thirty-five tons of pig iron. By 1870, these extensive coal and iron holdings increased Kimberly’s real estate and personal estate to an estimated $75,000.

   Constructed by Alexander, Ashton, & Company in 1867, the Atlantic Iron & Nail Works included four boiling furnaces, one heating furnace, eighteen nail machines, and maintained a daily capacity of eight tons of muck bar. Between the opening of John

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42 Ibid., 230.


44 U.S. Bureau of the Census, Ninth Census of the United States, 1870.

Ashton’s iron works and Samuel Kimberly’s blast furnace, twenty-two year old Peter Lanterman Kimberly (January 5, 1846-June 4, 1905), Samuel and Minerva Kimberly’s son, “bought Alexander’s interest and the firm became Kimberly, Ashton, & Company.” After Ashton sold his control within the company to Colonel James Carnes in February 1871, Peter Kimberly’s firm (Kimberly, Carnes, & Company) expanded into iron rolling through the purchase of the Greenville Rolling Mill at Greenville.  

Built in 1871 just north of Sharon along the Shenango River and the Erie & Pittsburgh Railroad, the 165’ x 130’ engine powered Greenville Rolling Mill consisted of ten boiling furnaces, two heating furnaces, and three trains of rolls. During its first year of operation, the Greenville mill manufactured approximately 2,000 tons of bar and hoop iron. By 1873-1874, the mill maintained an annual capacity of 5,000 net tons and consisted of two heating furnaces, five single puddling furnaces, and three trains of rolls (one 16” muck, one 16” bar, and one 8” hoop).

In order to secure unimpeded access to high quality iron, Peter Kimberly, along with his older brother George and W. E. and George Reis, formed the Neshannock Iron Company in 1872. Located at New Castle, the single 60’ x 14’ Neshannock stack used Lake Superior ores exclusively and “when in full running order” had an annual production capacity of 18,000 tons – well above the annual 1879 production average of 10,000 tons. In addition to the Neshannock stack, Kimberly, Carnes, & Company

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formally purchased the Keel Ridge blast furnace from Samuel Kimberly in 1873. In March of the following year, Kimberly, Carnes, & Company started leasing the Onondago Iron & Nail Works at New Castle. These were the same iron and nail works (Cosalo Iron Works) that Joseph H. Brown and James Westerman were associated with during the late 1830s and early 1840s. While his son succeeded in acquiring multiple blast furnaces and rolling mills throughout the Shenango Valley, Samuel Kimberly also expanded his holdings in 1872 by acquiring two 50’ x 12’ blast furnace stacks at New Castle. In November 1874, Kimberly, Carnes, & Company’s Onondago Iron & Nail Works and Samuel Kimberly’s two furnace stacks consolidated into one firm: the Etna Iron Company. The Etna Iron Company, which employed several hundred workers, consisted of twenty boiling furnaces, five heating furnaces, a muck bar mill, a guide bar mill, and more than fifty nail machines. The following Table lists the thirty-two blast

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furnace stacks in operation throughout the Shenango Valley at approximately the time Samuel and Peter Kimberly significantly expanded their iron manufacturing concerns.

Table 8.3 Shenango Valley Bituminous Coal – Coke Blast Furnaces, 1873-1874

<table>
<thead>
<tr>
<th>Furnace(s)</th>
<th>Company</th>
<th>Location, County</th>
<th>Built - Blown in (# of stacks)</th>
<th>Annual Capacity Net Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen</td>
<td>Henderson, Allen, &amp; Co.</td>
<td>Sharpsville, Mercer</td>
<td>1868 (1)</td>
<td>9,000</td>
</tr>
<tr>
<td>Clara</td>
<td>Crowther Iron Co.</td>
<td>New Castle, Lawrence</td>
<td>May, 1872 (1)</td>
<td>16,000</td>
</tr>
<tr>
<td>Douglas</td>
<td>Pierce, Kelley, &amp; Co.</td>
<td>Sharpsville, Mercer</td>
<td>1871 (1) 1872 (1)</td>
<td>20,000 combined</td>
</tr>
<tr>
<td>Erie</td>
<td>Rawle, Noble, &amp; Co.</td>
<td>Erie, Erie County</td>
<td>1869 (1)</td>
<td>9,000</td>
</tr>
<tr>
<td>Etna</td>
<td>Etna Iron Co.</td>
<td>New Castle, Lawrence</td>
<td>1867-1868 (2)</td>
<td>18,000</td>
</tr>
<tr>
<td>Fannie</td>
<td>Wheeler Iron Co.</td>
<td>West Middlesex, Mercer</td>
<td>1873 (1)</td>
<td>9,000</td>
</tr>
<tr>
<td>Keel Ridge</td>
<td>Samuel Kimberly</td>
<td>Sharon, Mercer</td>
<td>1869 (1)</td>
<td>12,000</td>
</tr>
<tr>
<td>Middlesex</td>
<td>Middlesex Furnace Co.</td>
<td>Middlesex, Mercer</td>
<td>not listed (1)</td>
<td>6,000</td>
</tr>
<tr>
<td>Mt. Hickory</td>
<td>Mt. Hickory Iron Co.</td>
<td>Sharpsville, Mercer</td>
<td>1869 (2)</td>
<td>18,000 combined</td>
</tr>
<tr>
<td>Neshannock</td>
<td>Neshannock Iron Co.</td>
<td>New Castle, Lawrence</td>
<td>1872 (1)</td>
<td>12,000</td>
</tr>
<tr>
<td>Onondago</td>
<td>Onondago Iron Co.</td>
<td>New Castle, Lawrence</td>
<td>not completed (1)</td>
<td></td>
</tr>
<tr>
<td>Ormsby</td>
<td>Ormsby Iron Co.</td>
<td>Sharpsville, Mercer</td>
<td>Feb. 15, 1873 (1)</td>
<td>9,000</td>
</tr>
<tr>
<td>Sharon</td>
<td>Boyce, Rawle, &amp; Co.</td>
<td>Sharon, Mercer</td>
<td>1845 (1)</td>
<td>9,000</td>
</tr>
<tr>
<td>Sharpsville</td>
<td>James Pierce &amp; Sons</td>
<td>Sharpsville, Mercer</td>
<td>1846 (1)</td>
<td>9,000</td>
</tr>
<tr>
<td>Shenango</td>
<td>Shenango Furnace Co.</td>
<td>Middlesex, Mercer</td>
<td>1859-1860 (2)</td>
<td>17,000 combined</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Town</th>
<th>Year (1)</th>
<th>Year (2)</th>
<th>Capacity (combined)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sophia, Little Pet, &amp; Rowena</td>
<td>Reis, Brown, &amp; Berger’s Shenango Iron Works</td>
<td>New Castle, Lawrence</td>
<td>1853</td>
<td>1872</td>
<td>40,000</td>
</tr>
<tr>
<td>Spearman</td>
<td>Spearman Iron Co.</td>
<td>Sharpsville, Mercer</td>
<td>1872</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td>Stewart</td>
<td>Stewart Iron Co.</td>
<td>Sharon, Mercer</td>
<td>1870</td>
<td>1872</td>
<td>20,000</td>
</tr>
<tr>
<td>Wampum</td>
<td>Wampum Furnace Co.</td>
<td>Wampum, Lawrence</td>
<td>1856</td>
<td></td>
<td>8,000</td>
</tr>
<tr>
<td>Westerman</td>
<td>Westerman Iron Co.</td>
<td>Sharon, Mercer</td>
<td>1865</td>
<td>1866</td>
<td>18,000</td>
</tr>
<tr>
<td>Wheatland</td>
<td>James Wood, Sons, &amp; Co. (insolvent)</td>
<td>Wheatland, Mercer</td>
<td>1860-1865</td>
<td></td>
<td>30,000</td>
</tr>
</tbody>
</table>

By the mid-1870s, therefore, Samuel and Peter Kimberly had achieved prominent positions within the Shenango Valley’s burgeoning iron industry.

Assisting Samuel and Peter Kimberly in the operation and management of their extensive and varied Shenango Valley iron holdings was Mahoning Valley native Edwin Newton Ohl. The oldest son of Michael Ohl Jr. and Eliza Jane Campbell, Edwin was born on February 3, 1850 at Ohltown in southern Weathersfield Township. At the age of seventeen, Ohl starting working at Jonathan Warner’s Mineral Ridge Iron & Coal Company, and after “one and one-half years . . . went to Youngstown, where he was in the employ of . . . Warner for eight months.”\(^{53}\) Ohl relocated to Sharon in March of the

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\(^{53}\) Hazen, ed., 20\(^{th}\) Century History of New Castle and Lawrence County Pennsylvania and Representative Citizens, 367 and 831-832; “Obituary,” The Iron Age Volume 110, No. 10 (September 7, 233
following year whereupon he started working for Samuel Kimberly. In fact, the 1870 Census lists the twenty-year-old newcomer to Sharon as residing with Samuel and Catherine Kimberly and their two adult children – Peter L. and Kate Kimberly.\textsuperscript{54} In addition to working and living with the Kimberly family, Ohl also became “a successful merchant in the hardware trade through the firm Fruit, Ohl, & Company.” Located on State Street, Ohl’s Sharon store sold a variety of iron products including

\begin{quote}
hardware, cutlery, mechanics’ tools, machinists’ appliances, carriages and harness goods, builders’ requisites, nails, bar iron, blacksmiths’ supplies, paints, oils, glass, agricultural implements, and a host of other goods incidental or essential to a superb hardware stock.\textsuperscript{55}
\end{quote}

The success of Fruit, Ohl, & Company eventually enticed Edwin’s youngest brother Charles N. Ohl to relocate to Sharon to work in the profitable store.\textsuperscript{56}

By 1873-1874, Edwin Ohl, through the firm of Herron, Ohl, & Company, started leasing one of the four Wheatland furnace stacks owned by the financially insolvent firm of James Wood, Sons, & Company (See Table 8.3). Located in the southwestern corner of Hickory Township along the route of the Beaver & Erie Canal, the Commonwealth of Pennsylvania incorporated the Borough of Wheatland in February 1872 – a full decade after Captain James Wood constructed the Wheatland furnaces.\textsuperscript{57}

\begin{footnotes}
\item[55] \textit{Manufacturing and Mercantile Resources of Mercer County}, 61; and Hazen, ed., \textit{20\textsuperscript{th} Century History of New Castle and Lawrence County Pennsylvania and Representative Citizens}, 367.
\item[56] Hazen, ed., \textit{20\textsuperscript{th} Century History of New Castle and Lawrence County Pennsylvania and Representative Citizens}, 367.
\end{footnotes}
Brier Hill furnace northwest of Youngstown in 1847, James Wood worked as a riverboat captain and then settled in Pittsburgh in 1835. After a fire destroyed his cotton-mill in 1845, Wood entered Pittsburgh’s burgeoning iron rolling industry through the firm Wood, Edwards, & McKnight; operating the Hecla Iron Works. In 1850, Wood helped build the Eagle Rolling Mills “on the left bank of the Ohio River . . . one mile below the Monongahela Bridge.” Wood’s vast Eagle mill included thirty-one furnaces, seven trains of rolls, and thirty-eight nail and spike machines, and manufactured “about 8,000 tons of nails and spikes, bar and steel iron, and plough steel” in 1856.

Image 8-1 (Left) Edwin Newton Ohl (February 3, 1850 – September 3, 1922)

Image 8-2 (Right) James Wood (December 17, 1789 – November 2, 1867)

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60 “Obituary,” The Iron Age Volume 110, No. 11(September 14, 1922), 687.
One year before joining Jonathan Warner (Wood, Warner, & Company) in the construction of the Ashland furnace in southern Weathersfield Township, Wood built a charcoal fueled furnace along the Beaver River where the New Castle & Beaver Valley Railroad intersected the Pittsburgh, Fort Wayne, & Chicago line in Beaver County. Wood’s Homewood Junction furnace maintained a daily capacity of five tons of pig iron and remained in operation until 1867-1868.62 A disagreement with the manager of the Cleveland & Mahoning Railroad regarding the rate of iron ore destined for Wood, Warner, & Company’s furnaces at Mineral Ridge resulted in Wood disassembling his recently built Wheatland furnace and relocating the stack to southwestern Hickory Township.63 According to John G. White,

Captain Wood . . . had often noticed in passing along the canal between Newcastle and Sharon the beautiful site where Wheatland now stands, and as a result finally purchased the tract from the family which first settled there.64

After rebuilding his Wheatland stack in southwestern Mercer County, Wood platted a community, which he named Wheatland, and then constructed three additional blast


63 In late 1860, James Wood started constructing a blast furnace near the Ashland stack in Weathersfield Township. As detailed by the Western Reserve Chronicle, Wood named the stack “Wheatland” in homage to outgoing President James Buchanan’s Pennsylvania residence. Western Reserve Chronicle (December 12, 1860), 3; Western Reserve Chronicle (December 18, 1861), 3; Western Reserve Chronicle (May 14, 1862), 3; “The History of Two Furnaces,” Mahoning Dispatch (May 10, 1878); and Reed, ed., Century Cyclopedia of History and Biography of Pennsylvania, Volume II, 97.

64 White, A Twentieth Century History of Mercer County Pennsylvania, Illustrated, Volume I, 144.
furnace stacks between 1862 and 1865. John J. Spearman, a thirty-eight year old iron manager from Sharon, joined James Wood & Sons in 1862 as general manager of the Wheatland furnaces.

Born at McKee’s Gap in Huntingdon County, Pennsylvania to Francis Spearman and Elizabeth Ambrose, John J. Spearman (December 27, 1824-May 31, 1911) arrived at the Wheatland furnaces with twenty years of experience as an associate of Dr. Peter Shoenberger. After working as a “bellows boy,” store clerk, and “driver of a horse and cart,” Spearman began working at Shoenberger’s Sarah furnace in Greenfield Township, Huntingdon County in 1841. The following spring, Spearman became the head clerk and book keeper at Shoenberger’s Rebecca furnace in Huston Township, Huntingdon County. Shoenberger transferred the twenty-one-year old Spearman back to McKee’s Gap three years later to serve as an assistant manager of the Upper, Middle, and Lower Maria forges. After Shoenberger and David Agnew built the Sharon furnace in 1846, Shoenberger once again transferred Spearman, this time to Mercer County where he “assumed charge of the business management of the Sharon furnaces.” Approximately five years after arriving in Mercer County, Spearman married Sharon native Cordelia Breed. While still an employee of Shoenberger, Agnew, & Company, Spearman was

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present when the Clay furnace successfully smelted Jackson iron ore for the first time in 1853.\footnote{67}

Image 8-3 John J. Spearman as a 22-year-old Associate of Dr. Peter Shoenberger, ca. 1846-1847\footnote{68}

Image 8-4 John J. Spearman as a Retired Iron Manufacturer, 1907\footnote{69}

In addition to holding these various positions under Shoenberger, Spearman purchased and then operated singlehandedly the 30’ x 9’ Mazeppa furnace from 1853-


\footnote{68}{Williams, The Honorable Peter White: A Biographical Sketch of the Lake Superior Iron Country, 74.}

\footnote{69}{White, A Twentieth Century History of Mercer County Pennsylvania, Illustrated, Volume I, between pages 362 and 363.}
1859. According to J. P. Lesley, Spearman’s Mazeppa furnace in 1854 manufactured 815 tons of iron “out of buhrstone fossiliferous blue carbonate from the Lower coal measures mined closed by.” Unable to profitably operate the Mazeppa furnace and with an expanding family, Spearman agreed to be the general manager of General James Pierce’s recently “refitted” Sharpsville furnace in 1859. Pierce purchased the Sharpsville furnace from David and John P. Agnew in 1855, whereupon he converted the stack into a hot blast furnace by adding new blowing machinery. Spearman remained general manager of the Sharpsville furnace until 1862 when the new firm James Pierce & Sons named Jonas J. Pierce – General Pierce’s oldest son – manager of works. One year after agreeing to manage Wood’s Wheatland furnaces, Spearman became a partner in the firm of James Wood, Sons, & Company in 1863. Spearman remained with the Wheatland furnaces until August 1870, whereupon he moved back to Sharon intent on owning and operating his own iron manufacturing company.

In June 1870, John and Cordelia Spearman were once again living in Sharon with their four children. Unlike Samuel Kimberly’s estimated $75,000 estate, the Census lists Spearman’s personal estate in 1870 at a mere $500. Nevertheless, Spearman, along

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73 U.S. Bureau of the Census, Ninth Census of the United States, 1870.
with Joseph Forker, Branton H. Henderson, John Philips, and Walter Pierce, established the Spearman Iron Company in 1871-1872. Before commencing iron manufacturing at Sharpsville, in January 1872 Spearman became President of the First National Bank of Sharon, which he helped organize on August 31, 1868 with $125,000 capital. With Spearman serving as manager, the Spearman Iron Company successfully blew in its 50’ x 14’ No. 1 open top furnace stack on January 15, 1873. During its second full year of operation, the Spearman Iron Company employed twenty-seven laborers and manufactured 11,436 tons of iron from raw Sharon coal and coke and Lake Superior iron ores. Pennsylvania’s Secretary of the Interior valued the Spearman Iron Company’s iron product at $286,000. On September 20, 1875, Spearman’s company “blew in” its 50’ x 14’ No. 2 open top furnace stack. The Spearman Iron Company, however, only operated one stack for eight months during 1876, producing 7,793 gross tons of iron valued at $171,546.

Spearman, Ulp, & Company’s Hickory Mine provided the Spearman stacks with high quality Sharon block coal. Located in Hickory Township along the Sharpsville Railroad seven miles from the Erie & Pittsburgh Railroad, the firm’s sixty-four miners


extracted 12,600 tons of coal valued at $25,000 from the 110ʹ deep shaft mine during 1875-1876. A few years later, Spearman partnered with Kimberly’s coal associate Enoch Filer and established the Hickory Coal Company. This firm employed “about 75 men” who mined a 4ʹ thick vein of coal on 150 acres of land in Hickory Township. The majority of the 150 tons of coal extracted from this mine each day were sent to the Spearman furnaces via the Sharpsville Railroad. In fact, Shenango Valley companies shipped between 4,000,000 to 5,000,000 tons of Sharon block coal via the Sharpsville Road by 1882.\footnote{\parbox{\textwidth}{\footnotesize Annual Report of the Secretary of Internal Affairs of the Commonwealth of Pennsylvania for 1875-1876, Part III – Industrial Statistics, Volume 4, 666; Annual Report of the Secretary of Internal Affairs of the Commonwealth of Pennsylvania for 1877-1878, Part III – Industrial Statistics, Volume VI (Harrisburg: Lane S. Hart, State Printer - Binder, 1879), 196, 202, and 210-231; and Manufacturing and Mercantile Resources of Mercer County, 128 and 144;}}

After adding closed tops to its furnace stacks in order to capture gasses being expelled during each blast, the Spearman Iron Company maintained an annual manufacturing capacity of 36,000 net tons of Bessemer, foundry, and red short mill pig iron under the brand name “Spearman” from September 1878 through July 1882. Once again, these annual production capacities are well above the national average of 10,000 in 1879 and 29,000 in 1889.\footnote{\parbox{\textwidth}{\footnotesize “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Catalan Forges, and Bloomeries in Every State and Territory, Corrected to September 1, 1878,” The American Iron and Steel Association (Philadelphia: James B. Chandler’s Steam Printing Establishment, 1878), 30; “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Forges, and Bloomeries in Every State and Territory, Corrected to March 15, 1880, The American Iron and Steel Association (Philadelphia: The Chandler Printing House, 1880), 33; “Directory to the Iron and Steel Works of the United States: Embracing the Blast Furnaces, Rolling Mills, Steel Works, Forges, and Bloomeries in Every State and Territory, Corrected to July 25, 1882 The American Iron and Steel Association (Philadelphia: Allen, Lane, & Scott, 1882), 32; Manufacturing and Mercantile Resources of Mercer County, 145; and Ingham, The Iron Barons, xvii.}} In addition to the Spearman furnaces, Forker, Henderson, and Spearman “acquired the proprietorship” of Henderson, Allen, & Company’s single 50’ x 12’ Allen furnace stack at Sharpsville. Organized on April 1, 1882, Henderson,
Forker, & Company “completely remodeled and vastly improved” the Allen furnace, enlarging the stack to 60’ x 12’ and renaming it the Henderson furnace. By July, the Henderson stack had an annual production capacity of 15,000 net tons of Bessemer, foundry, and mill pig iron. During the course of the following three years, the Spearman Iron Company nearly doubled its annual production capacity to 60,000 net tons by enlarging both of its stacks to 63’ x 14’. Between September 1884 and July 1886, Spearman’s company further expanded its manufacturing capabilities by adding three Whitwell stoves while at the same time following in the footsteps of Mahoning Valley iron manufacturers in their transition to strictly using coke as a smelting fuel. By 1887, Mercer County’s seventeen blast furnace stacks produced 279,236 net tons of pig iron. The County’s six rolling mills manufactured 47,519 net tons of iron plates, sheets, and rails, and 66,625 kegs of nails.

As John J. Spearman became a profitable Shenango Valley coal operator and furnace owner during the 1870s, Samuel Kimberly sold his Shenango Valley coal and

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iron companies in the wake of the Panic of 1873 and relocated to Geneva, Illinois.\textsuperscript{80} Similar to Jonathan Warner, Kimberly entered into mining iron ore in Michigan. In 1879, Kimberly established the Emmett Mining Company with George Boyce, R. Williamson, E. P. Foster, and M. Harrington at Waucedah, Michigan. The Emmett Mining Company operated the Keel Ridge mine in the Menominee iron ore range – located in the center of Michigan’s Upper Peninsula. During its first two years of operation an average of 120 miners extracted 30,507 gross tons of iron ore from the Keel Ridge mine.\textsuperscript{81} While Samuel Kimberly transitioned to Lake Superior iron ore mining during the late 1870s and early 1880s, Peter L. Kimberly bought out Colonel James Carnes’s interest in Kimberly, Carnes, & Company and with T. M. Sweeney, E. Roberts, William Roberts, and R.F. Wolfkill established P. L. Kimberly & Company.\textsuperscript{82}

By September 1884, P. L. Kimberly & Company operated three rolling mills in the Shenango Valley: the Atlantic Iron & Nail Works at Sharon, the Greenville Rolling Mill at Greenville, and the New Castle Iron Works at Sharon. Combined these relatively average sized facilities included three double puddling furnaces, sixty-seven single puddling furnaces, fourteen heating furnaces, fourteen trains of rolls, forty nail machines, one hammer, and one reheating furnace. The firm’s extensive machinery, which occupied more than thirty acres and employed more than 500 laborers, allowed for an annual capacity of 38,000 net tons of bar, band, hoop, plate, and rod iron, and iron nails.

\textsuperscript{80} History of Mercer County, Pennsylvania: Its Past and Present, Volume II, 733.


\textsuperscript{82} History of Mercer County, Pennsylvania: Its Past and Present, Volume I, 196; and Manufacturing and Mercantile Resources of Mercer County, 142.
In addition to these extensive finishing facilities, Kimberly’s company continued to own and operate the 55’ x 13’ 2/3” Keel Ridge furnace stack at Sharon, which maintained an annual capacity of 12,000 net tons of No. 1 mill iron. Peter Kimberly’s firm operated these four sites until November 1887, when the firm sold the New Castle Iron Works at Sharon.\(^\text{83}\) After dismantling the Keel Ridge furnace stacks in 1891, Kimberly’s Atlantic and Greenville rolling mills added band steel and cotton-ties to its production line by February 1892, which now had a combined manufacturing capacity of 45,000 net tons.\(^\text{84}\)

Sometime between November 1889 and February 1892, Samuel Kimberly’s protégé Edwin N. Ohl replaced T. M. Sweeny as chairman and manager of the Etna Iron Works Limited at New Castle. When Ohl entered this iron firm, which Samuel and Peter L. Kimberly operated during the 1870s, the company included two double puddling furnaces, twenty-seven single puddling furnaces, five heating furnaces, and four trains of rolls (8”, 16”, 2-high 18”, and 3-high 18”), with an annual capacity of 20,000 net tons of merchant bar iron and pipe iron. The Etna Iron Works Limited also owned and operated the two 75’ x 16’ Etna furnace stacks, which manufactured 60,000 net tons of “Etna” gray forge pig iron. Four 65’ x 18’ Whitwell stoves, added to the site in 1889, provided the requisite heat for the enlarged Etna furnace stacks.\(^\text{85}\) By March 1894, Ohl and Alexis W.


Thompson, secretary and treasurer of the Etna Iron works since 1875, reorganized the New Castle rolling mill and furnaces as the Atlantic Iron & Steel Company. This name by Ohl and Thompson change prompted P. L. Kimberly & Company to begin advertising the iron products made at their Sharon Atlantic rolling mill under the brand name “Atlantic.”

During the course of the following year (1895), Ohl’s Atlantic Iron & Steel Company leased Kimberly’s Atlantic and Greenville Rolling Mills in an attempt to increase their iron production totals as the Shenango Valley transitioned to steel manufacturing. By January 1, 1896, there were four steel manufacturing facilities in Mercer and Lawrence Counties. These four Shenango Valley steel works accounted for 20 percent of the Open-Hearth furnaces and 67 percent of the Bessemer converters in operation outside of Allegheny County (Pittsburgh) during 1895.

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Table 8.4 Steel Works in Mercer and Lawrence Counties, January 1, 1896

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Steel Processing Equipment</th>
<th>Date of first operation</th>
<th>Annual Cap. (gross tons) Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>The American Steel Casting Co. (Formerly Sharon Steel Casting Co.)</td>
<td>Sharon</td>
<td>one 7-gross ton one 15-gross ton open-hearth furnace</td>
<td>Aug. 26, 1887</td>
<td>9,000 steel castings of all kinds</td>
</tr>
<tr>
<td>The Aschman Steel Casting Co.</td>
<td>Sharon</td>
<td>one 5-gross ton open-hearth furnace</td>
<td>June 5, 1891</td>
<td>3,600 steel castings</td>
</tr>
<tr>
<td>Shenango Valley Steel Works</td>
<td>New Castle</td>
<td>two 8-gross ton Bessemer converters</td>
<td>Nov. 2, 1892</td>
<td>180,000 steel billets</td>
</tr>
<tr>
<td>New Castle Steel &amp; Tin Plate Co. (incorporated)</td>
<td>New Castle</td>
<td>one Siemens-Martin improved gas heating furnace</td>
<td>Oct. 1893</td>
<td>12,000 black plates for Company’s tinplate plant</td>
</tr>
</tbody>
</table>

Similar to the Republic Iron & Steel’s acquisition of the Cherry Valley Iron Works’ rolling mill at Leetonia during the height of the “great merger wave” of 1895 to 1904, the Youngstown steel firm absorbed Ohl’s Atlantic Iron & Steel Company while the American Steel Hoop Company acquired control of Kimberly’s Atlantic and Greenville Rolling Mills. William Penn Snyder of the Shenango Furnace Company, who like Spearman began his career as an “office boy” for Dr. Peter Shoenberger, purchased the Spearman Iron Company’s Sharpsville furnace stacks on January 1, 1902; soon thereafter the firm increased the annual capacity of the stacks “to 100,000 tons of Bessemer pig iron only.” While his son-in-law William D. McKeefrey continued to

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Chapter Nine

The McKeefrey Family’s
Independent Leetonia Furnace, 1888-1915

“Leetonia, Columbiana County, Ohio has kept pace in the latter years with the rapid development of the manufacturing industry in northeastern Ohio, and has good reason to be proud of the part she has played in the industrial world. One of the most prosperous of her manufacturing institutions is the Salem Iron Company, of which the gentleman whose name initiates this paragraph [John McKeefrey] is president and general manager...The McKeefreys have been the life of the concern, it being in a rather run down condition at the time of their assuming control.”


Following the failure of Graff, Bennett, & Company in 1888, two relatively inexperienced individuals from Sharpsville, Pennsylvania acquired the Grafton Iron Company’s two furnace stacks at Leetonia. Although newcomers to the iron industry the new proprietors, William D. Hofius and William D. McKeefrey, were the eldest sons of experienced iron manufacturers Seth Hofius, Sr. and John McKeefrey. Seth and William D. Hofius were associates of Jonathan Warner, James Wood, and John J. Spearman. William D. McKeefrey became an associate and son-in-law of Spearman while John McKeefrey remained connected to leading iron manufacturers and merchants at
Pittsburgh. After permanently relocating to Leetonia and organizing the Salem Iron Company, the McKeefrey family successfully operated the former Grafton furnaces for a quarter of a century. The McKeefreys’ ability to secure valuable coal mines and coking works in the Connellsville coke region during the 1890s, coupled with the company’s successful marketing of their Bessemer and non-Bessemer grade pig iron, allowed the Salem Iron Company to remain an independent manufacturing firm during the era of corporate consolidations. Within a decade, however, the McKeefreys’ attempt to transition to open-hearth steel manufacturing jeopardized their coal, coke, and iron concerns, and ultimately precipitated the family’s failure as an independent iron manufacturer.

Born in Hickory Township in May 1829, Seth Hofius held a variety of positions with many leading Mahoning and Shenango Valley iron manufacturers. After working for Vincent & Himrod at West Middlesex while a teenager, Hofius married Elizabeth Maxwell in 1850. Six years after the birth of their eldest child William D. Hofius in September 1852, the family relocated to southern Weathersfield Township where Seth became manager of Wood, Warner, & Company’s Ashland blast furnace stacks. The Hofius family returned to Mercer County when James Wood relocated his Wheatland furnace stack to southwestern Hickory Township. While at Wheatland, Seth Hofius worked alongside John J. Spearman at Wood’s Wheatland furnaces as a superintendent of works during the 1860s. Similar to Spearman’s management of the Mazeppa furnace a decade earlier, Hofius started to manage the two 50’ x 12’ Mount Hickory blast furnace stacks at Sharpsville in addition to his responsibilities with James Wood, Sons, & Company. Following the failure of the Wheatland furnaces, Hofius relocated to Buffalo,
New York to work for the Buffalo Iron & Nail Company. While his father departed the Mahoning and Shenango Valleys during the early 1870s, twenty-year-old William D. Hofius (September 25, 1852-February 27, 1912) “engaged in the iron business as a furnaceman [sic]” at the Geddes Foundry at Sharpsville. Established in 1868 as Geddes, Ainsworth, & Company, the Geddes foundry manufactured rolling mill, blast furnace, and coal mining machinery in addition to “iron and brass castings of all descriptions.” After working at the Geddes foundry, Hofius partnered with Charles F. Eldridge and established the firm Hofius & Eldridge at Sharpsville in 1883. Three years later, Seth Hofius returned to Sharpsville where he “was placed in charge of the Spearman Iron Furnace[s]” by his former colleague John J. Spearman.

Before the elder Hofius’s return to Sharpsville, one of Spearman’s travelling sales representatives, twenty-seven year old William Daniel McKeefrey (February 3, 1858-December 14, 1941), married his twenty-five year old daughter Chloe Breed Spearman (March 31, 1860-August 26, 1935) on December 17, 1885. William D. McKeefrey was the eldest son of Pittsburgh’s John McKeefrey and Mary A. McFarland. Born in


Londonderry, Ireland on March 19, 1837, John McKeefrey arrived in the United States at the age of thirteen. After his family settled in Pittsburgh, McKeefrey worked in the city’s oil industry, married Mary McFarland of Philadelphia in 1860, and then joined the Star Iron Works. Established by the firm Lindsay & McCutcheon (James Henry Lindsay and James McCutcheon) in 1862 at Allegheny City, the Star Iron Works (later the Star Iron & Steel Works) steadily increased its annual production of iron hoops, bands, horse-shoes, cotton-ties, t-hinges, and straps from 8,000 net tons in 1876 to 40,000 gross tons in 1898 before being absorbed by the United States Steel Corporation.

While his father’s “skill and executive ability advanced him [John] to the position of an officer in the Star Mill,” William D. McKeefrey began his iron manufacturing career with the Pittsburgh Iron & Bolt Company. Before relocating to the Shenango Valley and marrying Chloe B. Spearman, McKeefrey briefly found employment with the National Tube Company at McKeesport in Allegheny County and then worked for Stone, Chisholm, & Company’s Chicago Union Rolling Mill Company as a book keeper. After settling in Sharpsville, McKeefrey briefly operated the Sharon furnace alongside his father-in-law and Pittsburgh iron merchant Colonel James Collord. After Spearman, Collord, and McKeefrey refurbished the property they changed the name of the iron

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product from Sharon to Vernon and commenced iron manufacturing in late September 1888. In fact, while operating the Sharon furnace and working as a traveling salesman for Spearman, McKeefrey briefly joined Collord’s iron brokerage firm in Pittsburgh (Collord & McKeefrey). Before William Altsman replaced McKeefrey (James Collord & Company), Collord & McKeefrey served as selling agents for the Jefferson Furnace Company in Jefferson County, Ohio and for Means, Kyle, & Company’s Pine Grove Furnace at Hanging Rock in Lawrence County. McKeefrey & Hofius’s acquisition of Graff, Bennett, & Company’s Leetonia furnaces in 1888, therefore, marked each individual’s first attempt to operate a blast furnace complex as the primary proprietors.

When McKeefrey & Hofius acquired the two Grafton furnace stacks (53’ x 13’ and 54’ x 15’) in 1888 the site had a combined weekly capacity of 1200 tons of foundry and forge pig iron. By November 1889, McKeefrey & Hofius added Bessemer grade iron as a product of the newly named “Seneca” furnaces in an attempt to profit from the rapidly increasing demand for steel. After William D. Hofius departed for the American Northwest to embark on iron and steel manufacturing, William McKeefrey’s father and brother, Neil Joseph McKeefrey, relocated to Leetonia whereupon the three established the firm McKeefrey & Company. Two years later on July 29, 1892, the

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11 Hofius eventually settled in Seattle, Washington where he and William Pigott established a company that eventually became the Hofius Steel & Equipment Company. “W. D. Hofius Residence (The

After adding four iron stoves to its furnace site, the McKeefreys dismantled the 54’ x 15’ furnace stack constructed by Graff, Bennett, & Company in 1872 and enlarged the original 53’ x 13’ stack to 76’ x 17’. The hot stoves and the enlarged furnace stack coupled with the McKeefreys’ transition to using Connellsville coke as a smelting fuel increased the site’s annual production capacity to 72,000 gross tons, which surpassed the capacity of the nearby Cherry Valley Iron Works by 12,000 tons. Similar to other independent iron manufacturers in eastern Ohio and western Pennsylvania, the Salem Iron Company started to advertise and market its specialized Bessemer grade iron products under the brand names “Seneca” for strong Bessemer grade iron and “Grafton” for soft Bessemer grade iron. Unlike the Cherry Valley Iron Works that relied solely on

the Columbus firm of King, Gilbert, & Warner as selling agents, the McKeefreys’ marketed their iron products at Leetonia and Pittsburgh through their firm McKeefrey & Company, while at the same time relying on C. C. Pierson & Company as their selling agents in Boston and in New York. 13 With $233,000 in capital – a modest amount when compared to the average capital invested in blast furnaces during the 1880s and 1890s – and with John McKeefrey serving as president, William D. McKeefrey serving as vice-president, and Neil J. McKeefrey serving as secretary, the Salem Iron Company continued to make improvements at its Leetonia furnace site. After adding three 75’ x 20’ hot blast Cowper-Kennedy stoves in 1896-1897, which increased the temperature of each blast, the firm added another stove of the same size between April 1898 and December 31, 1901.14 As described by Yale Professor of Geology and Geophysics Robert B. Gordon,

E. A. Cowper designed a regenerative stove in 1857 that made full use of the heating potential of blast furnace gas and thereby allowed ironmasters to get much higher blast temperatures . . . Cowper’s stove was a cylindrical iron shell lined with firebrick [that] burned furnace gas mixed


with air in a vertical shaft on one side of the stove and then passed the hot gas downward through brickwork to an exit flue. When the bricks were fully heated, [Cowper] reversed the flow to heat the air blast . . . [with] a second stove heating while air passed through the first.  

Similar to the technological advancements made at the Isabella and Lucy furnaces at Pittsburgh two decades earlier, these improvements allowed the McKeefrey family to increase their production capabilities, if they were able to maintain access to Connellsville coal and coke.

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In author’s possession. The Company’s four Cowper-Kennedy stoves appear in the foreground of this undated postcard.
After an extremely expensive court battle in 1892 over a contract with the increasingly monopolistic H.C. Frick Coke Company, the McKeefreys directed their business acumen toward securing unimpeded access to the highly prized Connellsville coal and coke fields.\textsuperscript{17} In \textit{Wealth, Waste, and Alienation: Growth and Decline in the Connellsville Coke Industry}, historian Kenneth Warren presents a highly instructive history of the development of the Connellsville coke region and the H.C. Frick Coke Company’s preeminent role in coke manufacturing during the late nineteenth and early twentieth centuries. As the demands for pig iron increased during the 1890s to meet steel manufacturers growing requirements, the need for high quality Connellsville coke continued to rise despite the fact that coke operators were, according to Warren, “limited by the fact that they were pressing hard on the physical limits of their resource base.”\textsuperscript{18} Warren describes the Connellsville coke region, also known as Connellsville Proper and later the Old Basin, as an area comprised of

\begin{quote}
. . . the finest and most accessible coking coals . . . found in a narrow basin running roughly north-northeast to south-southwest, straddling the Youghiogheny River…The Connellsville coal seam is part of the famous Pittsburgh [coal] bed, which when opened averaged seven feet in thickness and was persistent over a very wide area, extending into neighboring states…Above all, it proved to be an outstanding coking coal in Fayette and Westmoreland Counties. The long axis of the coke basin in these counties stretched for fifty to sixty miles – depending on the basis of definition; east to west its width was only two-and-a-half or three miles.\textsuperscript{19}
\end{quote}


\textsuperscript{19} Ibid., 13.
For many years coal and coke operators, namely the H.C. Frick Coke Company, believed that any coal mined below the Connellsville seam south of Uniontown in Fayette County and west in Greene County along the Monongahela River was insufficient because of its higher sulfur content.\textsuperscript{20} By the middle of the 1890s, however, advancements in furnace and coal mining technology and greater reliance on washing coal before charging it into coke oven batteries led directly to an influx of independent coal and coke operators into the previously untapped coal supplies throughout the “Lower Connellsville” (Klondike) district.

From 1892 through June 1904, the McKeefreys along with James Henderson and Isaac Taylor of Uniontown, Pennsylvania operated a coal mine and 100 coke ovens within the Connellsville coke district at Crossland, near Uniontown.\textsuperscript{21} The Atlas Coke Company, in which the McKeefreys, Henderson, and Taylor had a controlling interest, owned the Crossland Coke Works. These coke ovens supplied the requisite high quality smelting fuel for the McKeefreys’ modernized Leetonia furnace. By the end of 1904, the H.C. Frick Coke Company’s monopoly of the Connellsville coke region continued to expand when Frick’s firm acquired “about 800 to 1,000 acres of standard coking coal” including the “worked out Crossland Works” for an estimated $2,000,000. Despite the fact that the coal at the Crossland Works was exhausted, the Frick Coke Company controlled the Leith coal interests surrounding the Crossland Works and therefore utilized

\textsuperscript{20} Ibid., 120-123.

\textsuperscript{21} The Courier (Connellsville, March 22, 1895):1; “Report of the Operation and Output of The Coke Ovens of the Connellsville Region, For the week Ending Saturday April 6, 1895,” The Courier (Connellsville, April 12, 1895): 2; and “Report of the Operation and Output of The Coke Ovens of the Connellsville Region, For the week Ending Saturday August 29, 1903,” The Courier (Connellsville, September 4, 1903): 2.
the coke ovens at the Atlas Coke Company’s former site.\textsuperscript{22} As the Frick interest continued to dominate the Old Basin (Connellsville Proper), the McKeefreys redirected their coal and coke interests into the now booming Lower Connellsville (Klondike) coke region.

In 1902, the McKeefreys’ Atlas Coke Company purchased “375 acres of coal land, with 164 acres of surface and 111 [coke] ovens from the Lafayette Coal and Coke Company of Uniontown for $385,000.” The Lafayette coal and coke site was located “on the Redstone branch of the Pittsburgh, Virginia, & Charleston Railroad” and the new owners named the mine Helen for Mr. Henderson’s daughter.\textsuperscript{23} In the fall of 1903, the Atlas Coke Company expanded the number of coke ovens at the Lafayette site to 210. According to the \textit{Report of the Department of Mines of Pennsylvania} (1904), James Henderson served as the General Superintendent of the 232 men employed at the Atlas Coke Company’s Lafayette slope mine and coke works, which produced 186,482 tons of coal and 155,369 tons of coke. The \textit{Report} also ranked the Atlas Coke Company eighth in total annual coal production in the fifth bituminous coal district in the state of Pennsylvania.\textsuperscript{24}

\textsuperscript{22} “Plant Worked Out,” \textit{The Courier} (Connellsville, June 18, 1904): 1; “The Frick Deal Will Amount to $2,000,000,” \textit{The Courier} (Connellsville, December 28, 1904): 1.


Approximately ten years after establishing the Atlas Coke Company, the McKeefreys chartered another company in Pennsylvania called the McKeefrey Coal Company with $100,000 in capital, in order to secure further supplies of Connellsville coke. In October 1905, the McKeefreys succeeded in expanding their coal and coke interests in the Lower Connellsville coke region when the McKeefrey Coal Company purchased “the plant of the Geneva Coke Company . . . for a consideration of $465,000.” Located between Masontown and Leckrone in an area known as Martin, the McKeefreys’ purchase included “300 acres of fine coking coal and 130 [sic 132]

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26 American Manufacturer and Iron World, Vol. 69, No. 26 (December 26, 1901): 1547.

The Weekly Courier of Connellsville, Pennsylvania described the McKeefreys new purchase at Martin “as one of the most desirable properties in Fayette County and is admirably situated along the Monongahela River.” William D. McKeefrey placed his trusted “coke man” James Henderson to serve as the general superintendent of the new Dorothy mine at Martin, but the new company retained Frank R. Crow of Masontown to serve as superintendent. The McKeefrey Coal Company also hired Cornish Bros. of Uniontown to construct an additional 70 ovens at its Martin works.

Map 9-2 McKeefrey Coal Company’s Dorothy Mine at Martin, Pennsylvania

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According to the Report of the Department of Mines of Pennsylvania (1906), the 197 coal miners and coke laborers employed at the McKeefrey Coal Company’s Martin Works extracted 185,788 tons of coal and produced 118,355 tons of coke. In addition to adding seventy coke ovens to the Martin works, improvements made at the Dorothy mine during its first full year of operation included

one 200 k.w. generator; one 10 ton electric mine motor; a Pittsburgh coal washer [with a] capacity [of] 700 tons; 12 double houses; 1 single house, a store, barn, carpenter shop, and two 150 h.p. Erie boilers.\textsuperscript{32}

These improvements increased the annual production of coal at the Dorothy mine from 55,826 tons of coal produced in 1904 by the Geneva Coke Company to 195,212 tons of coal in 1907 by the McKeefrey Coal Company.\textsuperscript{33} Three years later, Sixteenth District Mine Inspector W. H. Howarth calculated that during 1909 the McKeefrey Coal Company produced 120,571 tons of coal – a respectable total for an independent coal and coke company.\textsuperscript{34}

Despite improving their coal and coke interests at Connellsville, by August 1910 the McKeefrey’s blast furnace at Leetonia was one of only ten independent stacks in

\textsuperscript{31} Sherman H. VanSickle, Bureau of Mine Safety, Fayette County Health Center, Pennsylvania Department of Environmental Protection, Uniontown, Pennsylvania.


\textsuperscript{34} The entire Sixteenth District produced a total of 7,402,208 tons of coal in 1909 with H. C. Frick Coke company extracting 2,803,007. “Sixteenth District,” The Weekly Courier (Connellsville, March 10, 1910): 2.
operation throughout the Mahoning and Shenango Valleys.\(^{35}\) Having secured and expanded two distinct coal mining and beehive coking sites in the Lower Connellsville coke region, the McKeefrey Family moved to expand their manufacturing capabilities at Leetonia by entering into open-hearth steel manufacturing. As discussed in Chapter One, the McKeefrey family’s more than 400 coke ovens at its Lafayette and Martin works and their modernized blast furnace complex at Leetonia – which allowed for the successful manufacturing of high quality Bessemer, foundry, and forge pig iron – did not guarantee a smooth transition to steel manufacturing.\(^{36}\) By the second decade of the twentieth century, access to valuable materials now longer ensured entry into profitable steel manufacturing. The era of independent iron manufacturers with secure access to high quality materials and profitable markets for their specialized iron products was gone. Moreover, any realistic chance of entering into the nation’s massive vertically integrated steel industry and succeeding was highly unlikely at best.

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\(^{35}\) The other active independent furnaces were: Cherry Valley Iron, Leetonia; one stack of Andrews & Hitchcock, Hubbard; three stacks of William Penn Snyder’s Shenango Furnace Company, Sharpsville; the Ann stack at Struthers; the Tod stack and the Grace No. 2 stack at Youngstown; and the Stewart stack at Sharon. “Merchant Furnace Now in Operation,” Wall Street Journal (July 26, 1910): 5; and “Steel Mills Forced to New Economies,” The New York Times (August 1, 1910): 8.

\(^{36}\) “List of Coke Ovens in the Lower Connellsville District With their Owners, Address, and Ovens in Blast Corrected to Saturday February 15, 1913,” The Weekly Courier (Connellsville, February 20, 1913): 3.
Image 9-2 Advertisements for the McKeefrey Family’s Coal, Coke, Limestone, and Iron Companies, 1914

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37 The Weekly Courier (Connellsville, May 1914), 27.
Chapter Ten

Conclusion: The End of Independent Iron Manufacturing at Leetonia and throughout the Valleys

“we needed 100 tons of coke to make that iron . . . we had to pay for the freight on that. Generally we paid for the ore on ninety day notes. At one time, some of the manufacturers…never got credit. We had as high as 40,000 tons of pig iron in our storage yard. We kept on making and couldn’t sell at that time…We were gradually put out of business by the fact that we furnished some basic iron [and] some Bessemer iron to the steel companies. The steel companies built their own blast furnaces, then when they had excess iron they went out and competed against…the merchant furnaces, so we finally had to file bankruptcy.”

– Graham Kearny, nephew of William D. McKeefrey and Salesperson for the McKeefrey Family’s coal, coke, and iron companies.1

Iron manufacturers’ ability to produce specialized iron products following the widespread adoption of steel manufacturing during the 1880s initially determined their sustainability as independent manufacturers. Weakening markets for iron products, diminishing access to raw materials, and excessive freight rates for short hauls, coupled with endemic economic instability, overproduction, and severe competition proved to

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be too much for most independent iron manufacturers in eastern Ohio and western Pennsylvania during the early twentieth century. As detailed by Fr. William T. Hogan “Conditions deteriorated to such a degree that out of forty-seven furnaces located in the Shenango and Mahoning vallies [sic] only ten continued to operate and several important companies failed.”² For historian Naomi Lamoreaux the era of corporate consolidations was the product of a particular conjunction of historical events: the development of capital-intensive, mass-production manufacturing techniques in the late nineteenth century; the extraordinarily rapid growth that many capital intensive industries experienced after 1887; and the deep depression that began in 1893.³

As investors and financiers pooled their resources in an attempt to stave off competition and stabilize prices and production during the late 1890s, independent iron manufacturers at Leetonia and throughout the Valleys struggled to remain viable.

Of all the manufacturers detailed in this work, only the Cherry Valley Iron Company of Pittsburgh and the McKeefrey family’s Salem Iron Company at Leetonia remained independent by January 1902. Iron manufacturers throughout the Mahoning and Shenango Valleys, specifically those in Youngstown and New Castle, successfully transitioned to steel manufacturing during the era of corporate consolidations. Four years after pouring its first Bessemer process steel, the National Steel Company absorbed Youngstown’s Ohio Steel Company at the time of its formation on February 25, 1899.⁴

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Incorporated in New Jersey with a capital stock of $59,000,000, National Steel’s holdings included seventeen blast furnaces, ten rolling mills and steel works, several thousand acres of coking coal land at Connellsville, and several iron ore mines in the Mesabi Range. In addition to absorbing the Ohio Steel Company, National Steel also absorbed King, Gilbert, & Warner’s Franklin and Steelton furnaces and Bessemer steel works at Columbus. One year after its formation, Riley Miles Gilbert (formerly of King, Gilbert, & Warner) became second vice president of the National Steel Company.  

Three months after the formation of National Steel, financier John W. Gates helped establish the Republic Iron & Steel Company. Incorporated in New Jersey on May 3, 1899 with a capital stock of $50,000,000, Republic became one of the Mahoning Valley’s largest steel producers during the early twentieth century. With Randolph S. Warner (formerly of King, Gilbert, & Warner) as president, Alexis W. Thompson (formerly of Atlantic Iron & Steel Works) as third vice-president, and Peter L. Kimberly (formerly of P. L. Kimberly & Company) as a member of the board of directors, the Republic Iron & Steel Company owned and operated three blast furnaces, twenty-seven rolling mills and steel works, five hundred fifty acres of property in the Connellsville coke region, and multiple mines in the Mesabi and Marquette iron ranges.  

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Valley Iron Works’ rolling mill at Leetonia, the extensive Youngstown works of Brown, Bonnell, & Company and the Mahoning Valley Iron Company, and the Atlantic Iron & Steel Works at New Castle were included within Republic’s vast holdings. During its first year of operation, Republic spent $1,946,062 in an attempt to “improve and modernize its facilities.” After adding two 5-ton Bessemer converters, four cupolas, and a 32” blooming mill to the Brown, Bonnell, & Company works in 1900, Republic shuttered the outdated rolling mill at Leetonia. During the course of the next decade, Republic made further additions to the Bessemer steel works at Youngstown and relocated its corporate offices from Chicago to Youngstown.\(^8\)

By 1903, the United States Steel Corporation – formed in 1901 with a capital stock of more than one billion dollars by J. P. Morgan and Andrew Carnegie – absorbed National Steel Company’s vast coal, coke, and iron ore properties as well as the firm’s iron and steel facilities. The expanded iron and steel facilities at Youngstown became the Ohio Works of the U.S. Steel Corporation.\(^9\) At the time of America’s entry into World War I, the Mahoning Valley’s fifty blast furnaces and forty-five rolling mills and steel works produced 6,476,051 tons of pig iron, 7,320,153 tons of steel, and 4,080,285 tons of rolled products.\(^10\) Although Youngstown’s steel companies became known as “Little of King, Gilbert, & Warner, retired to Fair Haven, Connecticut when the National Steel Company absorbed the Columbus furnace and steel works. \textit{The Iron Age} Vol. 88, No. 9 (August 31, 1911): 461.


\(^9\) In addition to the National Steel Company and the Republic Iron and Steel Company, James Campbell and George D. Wick of Youngstown established the Youngstown Sheet and Tube Company in 1900, and soon became the “largest locally owned steel company in the United States.” Frederick J. Blue, et al., \textit{Mahoning Memories: a History of Youngstown and Mahoning County} (Virginia Beach, Virginia: The Donning Company Publishers, 1995), 94.
Steel” when compared to Pittsburgh, Cleveland, Gary, and Chicago, the Mahoning Valley flourished as a center of steel manufacturing for the next half century.

In the wake of the formation of these colossal iron and steel companies, New Castle’s Edwin N. Ohl and Pittsburgh iron manufacturer Joshua Walther Rhodes (1872 – June 30, 1908) purchased the Cherry Valley Iron Works from Charles N. Schmick in 1899. After purchasing the single 60’ x 14’ coke fueled Fannie blast furnace at West Middlesex, Pennsylvania from the American Steel Hoop Company, Rhodes and Ohl formed the Cherry Valley Iron Company of Pittsburgh. On May 25, 1900, the Commonwealth of Pennsylvania incorporated the firm with a capital stock of $350,000.11 Rhodes and Ohl operated the Cherry Valley Iron Company as an independent manufacturer of “American Scotch” foundry iron until 1906 – 1907 when the United Iron & Steel Company absorbed the firm. Ohl became president of United Iron & Steel while his former colleague and Republic Iron & Steel vice president Alexis W. Thompson became treasurer.12 By January 1907, the United Iron & Steel Company controlled twelve million tons of Mesabi iron ore, seven hundred acres of coal property in Fayette County, two hundred coke ovens at Leetonia, and the Cherry Valley and Fannie furnace stacks. At the time of United’s takeover, the Leetonia and West Middlesex furnaces

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10 Butler, Jr., History of Youngstown and The Mahoning Valley, Ohio, Volume I, 700.


produced 650 tons of pig iron a day.\textsuperscript{13} Thirteen years later, Cleveland’s M.A. Hanna & Company purchased the United Iron & Steel Company’s Cherry Valley furnace stack, mines, and coking works at Leetonia and the Fannie furnace works at West Middlesex. By the end of the 1920s, the Cleveland consortium dismantled the Leetonia site for scrap.

Two years after the disastrous failure of the Leetonia Steel Company, the McKeefrey family regained ownership of their former blast furnace site at Leetonia and formed the McKeefrey Iron Company in 1915. During the next fifteen years, the McKeefreys continued to produce Bessemer, basic, malleable Bessemer, foundry, and forge pig iron intermittently with varying success selling their products as an independent firm on the open market. As a result, during the late 1920s the McKeefrey family started to redirect its primary business concerns to mining coal along the Ohio River near Moundsville in northern West Virginia. The McKeefrey family dismantled the McKeefrey furnace complex at Leetonia and sold the blast furnace site for scrap at approximately the same time the Hanna Company dismantled the Cherry Valley site. By March 1931, the \textit{Youngstown Vindicator} described the “McKeefrey Iron Co.’s old blast furnace at Leetonia [as] only a tangled mass of scrap metal, broken bricks, and old lumber.”\textsuperscript{14}

By the late 1920s, iron manufacturing at Leetonia ceased forever while the former properties of independent iron manufacturers throughout the Mahoning and Shenango Valleys became integral parts of profitable fully integrated steel companies. Examining


\textsuperscript{14} “Today is Monday, March 27, the 86th day of 2006. There are 279 days left in the year...On March 27, 1931,” The Youngstown Vindicator (March 27, 2006) http://www4.vindy.com/content/opinion/oped/301554001610070.php.
the successes and failures of several independent iron manufacturers in eastern Ohio and western Pennsylvania during the half century before the onset of corporate consolidations allows for a more accurate understanding of the heterogeneous characteristics of late nineteenth century American iron manufacturing. The widespread adoption of Bessemer process steel manufacturing did not immediately displace iron manufacturers during the 1880s. Continued access to high quality raw materials, which allowed for the manufacturing of specialized iron products in the wake of Bessemer steel, allowed independent iron manufacturers to exploit profitable niche markets for independent iron manufacturers who chose not to transition to steel production during the late nineteenth century. Despite eventually being absorbed during the great merger wave or failing in an attempt to transition to steel manufacturing, the history of independent iron manufacturers in eastern Ohio and western Pennsylvania illustrates the diverse characteristics of late nineteenth century American iron manufacturing. This dissertation, therefore, presents new perspectives into American Business history and encourages historians to redirect their understanding of the iron and steel industry during the “Age of Steel.”
Image 10-1 Remains of McKeefrey Iron Co.’s Blast Furnace Complex, Leetonia, 2005\textsuperscript{15}

\textsuperscript{15} Photos by Paul Di Rocco and Samuel Di Rocco, II.
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Oral Histories


Appendix A

Glossary of Terms

acid Bessemer process steel -- the method of making steel from molten pig iron by blowing atmospheric air through low phosphorus irons.

acid steel -- the process of making steel with low-phosphorus irons in a siliceous lined furnace.

after blow -- last stage in the Bessemer process of making steel when the blast is continued after the carbon is removed in order to remove any remaining phosphorus.

American Scotch pig iron -- see chapter 6.

annealing furnace -- a furnace that heats iron or steel to a requisite temperature in order to remove stresses within the material and or to soften the material for further working.

Anthracite coal -- the purest and highest grade of coal (see Chapter 2).

bank -- a coal mine.

bar bank -- a flat area on a rolling mill floor where bars are placed to cool after the final rolling pass.

bar mill -- any type of rolling mill designed primarily to roll iron or steel bars.

bar rod / round -- rolled iron or steel about 3/16” to ½” in diameter (rod) and 5/8” to 3” - 4” in diameter (bar). The term bar is sometimes applied to sections which are not round in cross section.

basic Bessemer process steel -- the method of making steel from molten pig iron by blowing air through high phosphorus irons.

basic pig iron -- pig iron made in a blast furnace specifically for the basic open-hearth steel making process. This iron is high in phosphorus (from 2 to 2.5%), low in sulphur (0.08%), and low in silicon (0.80%).

bastard iron -- a cheap and poor substitute for wrought iron, made from a mix of wrought iron and mild steel scrap.

beehive coke oven -- coal charged in an all brick domed roof chamber resembling a beehive where no by-product gases are captured or secured.

bell and hopper -- devices located at the top of a blast furnace stack that prevent gases from escaping (i.e. a closed top furnace stack).

belly -- the swelling in the side of a Bessemer converter where molten metal collects before being tapped.

Bessemer converter(s) -- a pear shaped refractory lined vessel where the Bessemer process of making steel takes place.

Bessemer grade iron -- pig iron specifically made for use in a Bessemer converter for steel manufacturing.
Bessemer process -- the process of making steel from molten pig iron by blowing air through the iron, whereupon oxygen oxidizes the carbon, silicon, and manganese within the iron.

billet -- rolled or forged semi-finished pieces of iron or steel of any size up to and including 5" x 5". Any size above this is considered semi-finished bloom iron or steel.

billet shear -- a shear for cutting billets.

billy roller -- a light roller carried on brackets from a hand sheet mill housing immediately below the pass line level and used as a guide for a piece of iron or steel being rolled and as a rest for a roller’s tongs.

blackband -- a dark colored carbonaceous shale iron ore containing coal and iron carbonate

blast furnace -- a refractory lined stack that uses the countercurrent flow of air upward and iron ore, fuel (coke), and flux (limestone) downward to smelt iron; producing iron and slag.

blast pipe -- a) a pipe from the blower to the hot blast stoves and from the stoves to the bustle pipe. b) a pipe from the blower on the cupola to the wind box.

blister steel -- steel made from carburizing (introducing carbon) wrought iron by prolonged heating in a sealed container, which renders blisters on the exterior of the steel due to the release of gases.

bloom -- a semi-finished piece of rolled iron or steel between the ingot stage and the finished product.

bloomary (bloomery) -- a small charcoal fired hearth for producing wrought iron directly from iron ore.

blooming -- the first operation in producing a long forging under a press where an ingot is drawn down to a long square bar or bloom and then rounded off.
blow in -- the process of putting a blast furnace into operation. Once the furnace stack reaches its burden it is then “in blast.”

blowing engine -- machine that compresses air into hot stoves before being blasted into the furnace.

blow out -- the process of taking a blast furnace out of operation after its firebreak lining is worn out and needs replaced. Blowing out a blast furnace is routine.

blow pipe -- the pipe that conveys a hot blast from a blast furnace tuyeres stock to the tuyeres.

bosh -- the widest section of a blast furnace immediately above the crucible (hearth) where the chemical reactions of smelting iron occurs.

breakout -- the accidental release of molten metal or slag from a blast furnace.

burden -- the requisite proportion of iron ore, coke, and limestone needed for a complete charge of a blast furnace.

bustle pipe -- encircles a blast furnace, receives the hot blast from the blowing engine, and distributes the hot blast to the tuyeres.

by-product coke oven -- coke oven design that captures gases expelled during the coking process in order to be used again.

carbonize -- to convert coal to coke by driving off gases and other impurities.

cast / casting -- a) the releasing of molten iron from a blast furnace by tapping (opening) the taphole b) to pour molten iron or steel into a mould.

cast house -- a building located in the front of a blast furnace stack covering the area where molten iron flows into sand casts. Once the iron flows into these casts the iron appears similar to sows and pigs (pig iron).
cast iron -- iron containing between approximately 1.8 to 4.5% carbon content, with varying amounts of silicon, manganese, sulphur, and phosphorus.

channel iron -- iron rolled into a channel shape cross section.

charge -- the combined total of iron ore, coke, and flux placed into a furnace to make iron.

cinder -- another term for slag from a blast furnace.

closed top furnace -- see bell and hopper.

coal bed / coal seam -- an extended deposit of coal.

coal measure(s) -- any strata associated with a coal bed(s).

coal outcrop -- coal near the surface that is poor in quality.

coal vein -- a bed or seam of coal.

coke -- porous cohesive carbon produced by burning off the impurities within bituminous coal.

collery -- two or more mines operated by the same company.

Cowper stove -- a cylindrical iron shell lined regenerative stove used to increase the blast temperature of a blast furnace (see chapter 9).

crucible -- the lowest part of a blast furnace between the hearth and the bosh.

crucible steel -- steel made from melting pieces of blister steel within a coke fueled furnace whereupon carbon molecules could spread throughout the molten metal more evenly.
Danks’s puddling furnace -- a rotating mechanized refractory lined drum that puddles iron; thereby removing the skilled puddler.

direct process -- the process of making iron or steel directly from ore rather than from pig iron (indirect).

double two high mill -- a hand rolling mill that consists of two pairs of rolls in each stand, one above and slightly behind the other. A pass through one pair of rolls is then returned through the other pair.

downcomer -- a pipe leading down from the top of a blast furnace that brings gas down to the ground or to a gas cleaning plant where it burns as a fuel.

drift mine -- a level free coal mine opened into the side of a hill.

driving -- the rate of operating a blast furnace (see chapter 5).

dry-burning coal -- a non-coking coal.

drying out -- after relining a blast furnace, it needs to be dried out slowly in order to minimize damage when the stack is put back into blast (blown in).

ductility -- the property that allows a metal to deform without fracturing.

elasticity -- that property of a metal that allows it to be deformed and returned to its original shape and size.

fancy iron -- correctly applied to rolled iron sections with patterns or markings on its surface for making fancy ironwork, but also used more broadly to describe horseshoe iron (see chapter 7).

flue -- a refractory lined passageway between a blast furnace and nearby chimney stacks.
flux -- a critically important material (often limestone) used in a blast furnace that combines with impurities in the charge and is discharged (tapped) as a liquid slag.

forge iron -- pig iron made specifically for an iron forge for decarburizing into wrought iron.

foundry iron -- pig iron made specifically for remelting in a foundry.

goose neck -- the bent pipe connecting the bustle pipe to the tuyeres of a blast furnace.

grey iron -- a type of cast iron where all or most of the carbon is present.

guide mill -- a rolling mill designed for small rounds, bars, or sections where a final pass has a box guide that completely surrounds the piece of iron to guide the piece while at the same time keeping the piece from twisting.

hearth -- technically the bottom of a blast furnace lining but often interchangeable with the term crucible.

hematite iron ore -- a high grade of iron ore that exists in various forms such as kidney, red, brown, or wood hematite.

hot blast -- pig iron made in a blast furnace through the use of heated air blasts.

hot blast stove -- a refractory lined structure used to provide heated air for a blast furnace (see Cowper stove and Whitwell stove, Chapters 5 and 9).

ingot -- iron or steel in a mold ready to be rolled or forged.

iron -- chemical symbol Fe, atomic weight 55.85, with a melting point at 1535° C / 2795° F.

iron ore -- any of the many oxides or carbonates of iron that occur naturally and are for smelting iron.
kidney ore -- a hematite iron named for its shape.

larry -- a rail mounted rail car with a discharge window on its bottom to pour coal into the top of coke ovens.

limestone -- a calcium carbonate that is used as a fluxing agent in a blast furnace.

long wall system -- the process of removing coal from a mine without leaving any pillars.

lump coal -- screened coal.

mine face -- the location in a mine where coal is extracted from and or the end of a coal mine.

mouth -- the entrance or opening of a drift, shaft, or slope mine.

muck bar -- the product of the first rolling with rough and ragged edges. This iron was cut up, piled, and then reheated and or rerolled at least one more time.

number one iron -- traditionally rated as a grey foundry iron, with the higher number indicating a higher carbon content in the pig iron, such as No. 4 was a forge iron.

nut coal -- small coal that passes through screen bars while it is extracted from mine cars destined for railroad or lorry cars.

open-hearth furnace (Siemens-Martin furnace) / open-hearth process -- the process of making steel by melting through a direct flame a mixture of pig iron, iron and scrap iron...on a hearth...accessible through furnace doors for inspection, sampling, and testing (see chapter 5).

pig iron -- iron that binds with silicon and carbon during the charging of a blast furnace (see cast house for name).
roll bite -- the parts of a pair of rolls in direct contact with the piece of iron or steel that is being rolled.

roller -- any cylindrical rotating component of a rolling mill used to guide or transfer metal and does not alter the character or shape of the iron.

rolling mill -- any one of several locations for shaping iron or steel through a myriad of applications.

salamander -- a mass of metal located below a blast furnace’s hearth when it is blown out. Also called a bear or a horse.

shaft -- a hole sunk in the ground for the extraction of coal.

slack -- small unprofitable refuse coal.

slag notch -- the opening in a blast furnace a short distance above the taphole that is tapped to release the slag after each blast.

stand -- a pair of rolling mill housings that include rolls, housing screws, chocks, and driving pinions. Two or more stands could be connected to for a train (i.e. a train of rolls).

taphole (iron notch) -- the hole at the bottom of a blast furnace hearth through which the molten iron flows into a cast house. During charges, both the slag hole and the taphole are plugged with clay or some other refractory material.

three-high mill -- a rolling mill where there are three rolls in each stand, vertically mounted one above the other.

tipple -- a platform where mine cars filled dump coal into chutes.

train of rolls -- two or more stands of rolls coupled together.
tram-road -- a set of rails constructed from the mouth of a coal mine to a tipple, storage building, or other location (Refer to Chapter 4).

tuyere -- the end of a blast pipe that conveys the hot blast to the furnace or hearth.

tuyere stock -- a refractory lined pipe between the blowpipe and the gooseneck of the blast furnace.

Whitwell stove -- a regenerative hot blast stove used for blast furnaces (see chapter 5).

working face -- see mine face.

wrought iron -- a commercially pure form of iron that has threads of slag that can be forged, rolled, drawn, or fire welded, but not cast.
Appendix B

Chronology of Iron Manufacturers at Leetonia, Ohio

Section 12, Salem Township
1866-1873   Leetonia Iron & Coal Company
1873-1879   Cherry Valley Iron & Coal Company
1879-1899   Cherry Valley Iron Works
1900-1906-07  Cherry Valley Iron Company
1906-07-1920  United Iron & Steel Company
1920-1930   M.A. Hanna & Company

Section 11, Salem Township
1867-1888   Grafton Iron Company (Graff, Bennett, & Co.)
1888-1890   McKeefrey & Hofius’s Seneca Furnaces
1890-1892   McKeefrey & Company
1892-1913   Salem Iron Company
1913        Leetonia Steel Company
1915-1930   McKeefrey Iron Company
Appendix C

**Graff, Bennett, & Company’s**
**Rolling Mills, Blast Furnaces, Forges, and Steel Works**

<table>
<thead>
<tr>
<th>Name</th>
<th>Built / Acquired</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinton Rolling Mill</td>
<td>1845 / 1853</td>
<td>Pittsburgh</td>
</tr>
<tr>
<td>Clinton Furnace</td>
<td>1859</td>
<td>Pittsburgh</td>
</tr>
<tr>
<td>Millvale Mill</td>
<td>1863</td>
<td>Pittsburgh</td>
</tr>
<tr>
<td>Paulding Furnace</td>
<td>1865</td>
<td>Cecil, Ohio</td>
</tr>
<tr>
<td>Grafton Furnace</td>
<td>1866</td>
<td>Leetonia, Ohio</td>
</tr>
<tr>
<td>Paulding Forge</td>
<td>1867</td>
<td>Cecil, Ohio</td>
</tr>
<tr>
<td>Isabella Furnace</td>
<td>1872</td>
<td>Borough of Etna, Pennsylvania</td>
</tr>
<tr>
<td>Ft. Pitt Iron &amp; Steel Works</td>
<td>1882</td>
<td>Pittsburgh</td>
</tr>
<tr>
<td>Open-Hearth Steel Mill</td>
<td>1886</td>
<td>Millvale Mill, Pittsburgh</td>
</tr>
</tbody>
</table>
Appendix D

King, Gilbert, & Warner’s
Blast Furnaces, Rolling Mills, and Steel Works

Selling Agents:

Jefferson Iron Works   Steubenville    Jefferson County    1882
Cherry Valley Iron Works  Leetonia       Columbiana County   1884-1892
Baird Iron Company      Gore           Hocking County     1884-1888
Standard Nail & Iron Company  Middleport  Meigs County     1886-1888

Lessees & Eventual Operators:

Franklin Furnace(s)   Columbus    Franklin County  1884-1899
Wellston Furnace      Wellston     Jackson County    1886-1889
Glasgow Furnace (formerly Moxahala)  Moxahala  Perry County  1887-1897
Steelton Furnace      Columbus    Franklin County  1897-1899

Owners-Operators of Steel Works:

Middleport Steel & Nail Works   Middleport  Meigs County  1887-1894
The King, Gilbert, & Warner Co.  Columbus    Franklin County  1894-1899