

**THE IRON INDUSTRY IN DICKSON COUNTY,
TENNESSEE**



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THE IRON INDUSTRY IN DICKSON
COUNTY, TENNESSEE

An Abstract
Presented to
the Graduate Council of
Austin Peay State University

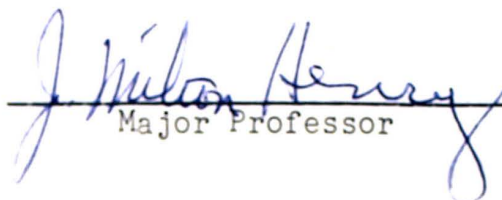
In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Buena Coleman Daniel

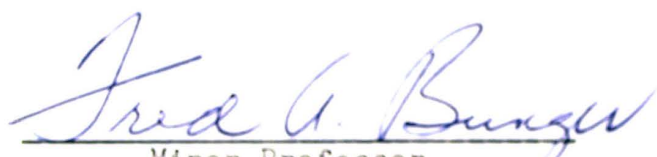
July 1970


To the Graduate Council:

I am submitting herewith a Thesis written by Buena Coleman Daniel entitled "The Iron Industry in Dickson County, Tennessee." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in History.


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recommend its acceptance:


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ABSTRACT

The iron industry in Dickson County, now extinct, has left its mark on the historical development of the county, state, and nation. It has produced iron in war and in peace for more than a century and a half. The story of this industry, of its fantastic growth, and the men whose courage and ingenuity gave it life, comprise a historical epic which deserves more than cursory attention.

The man responsible for the beginning of the iron industry in Dickson County was General James Robertson. While exploring the area which is now Dickson County in 1790 he discovered what was later believed to be an inexhaustible supply of iron ore. Here he constructed Cumberland Furnace, one of America's early responses to the exigent demand for iron so desperately needed on the advancing frontier. From this crude beginning sprang an industry which rivaled the greatest in Tennessee. Possessing all of the natural resources requisite to the manufacture of pig iron, Dickson County was on its way to becoming one of the major iron producing centers in the South.

Once the iron industry was established, it shaped and ultimately dominated the economy of the area. It also exerted a marked influence on the social and cultural life. By 1830 it was attracting experienced ironworkers from

Europe as well as from the iron producing states of the North and East, who were able to supply both capital and valuable experience. The immigrant workers brought with them a culture of their own which in time was to merge with the local culture, forming a society which was probably superior to either.

Among the Dickson County ironmasters who achieved national stature were Montgomery Bell, Richard Napier, and Anthony Vanleer. These men struggled against the forces of nature, laboring diligently to develop the vast potential of the wilderness into successful ironworks. They succeeded remarkably, reaping vast fortunes. Of these the most important was Montgomery Bell. He was the first to utilize Tennessee's streams for water power, and he developed ingenious methods of operation which set off a revolution in the iron industry all over the South.

This study is an attempt to depict events in the formative years of the republic and to show how they were affected socially, economically, and culturally by the iron industry. It is also an attempt to make the young people of Dickson County more keenly aware of the rich heritage which is bequeathed them by those courageous frontiersmen who played so vital a role in the shaping of American civilization.

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Chapter 1

INTRODUCTION

It has been stated that iron is the world's great civilizer. In Dickson County this has been particularly true. For approximately a century and a half "the great civilizer" exerted a telling influence both economically and socially in the county and the general area.

The discovery of iron ore in what was to become Dickson County occurred in the early 1790's when the area was a dense forest from which the Indian war cry could still be heard. This discovery brought the first settlers into the wilderness. Having been severely handicapped by the scarcity of iron ore, they were eager to participate in the development of the new discovery. The demand for iron products on the frontier was tremendous and the iron furnaces prospered, attracting laborers from other states and even from foreign countries.

The writer has been aware for years of the need for an authenticated account of the iron industry in Dickson County. She has on several occasions attempted to do research in this area only to find that the recorded history of the industry is fragmentary and must be supplemented by interviews with persons who were themselves well

acquainted with the manufacture of iron in this locality or whose forebears had handed down verbal accounts of actual events and their specific dates. These dates were often remembered because they happened to be concomitant with significant events in their own family history. For example, one would say, "I've heard my father say many a time that his father was born the day Carroll Furnace ran its first cast of pig iron."

It is felt that while persons are still living who can supply bona fide information from their own knowledge, or who have received trustworthy information from their own parents and grandparents, a comprehensive documentary should be written and authenticated. It is also felt that unless such a documentary is undertaken in this generation, a very interesting and very pertinent segment of the history of Dickson County will be lost.

In preparation for the thesis the writer has endeavored to gather as much information as possible, fitting it in with what is already known, to provide as complete a history as is possible of the iron industry in Dickson County. Most of the research was done in the State Library and Archives in Nashville. Additional research was done in the Joint University Library on the Vanderbilt University campus, the library at Austin Peay State University, and the Dickson County Public Library, Dickson, Tennessee.

Much of the material used in dealing with the study has been from primary sources, which form the raw material of history and give it greater authenticity; letters, manuscripts, personal papers, church records, Dickson County deed books, records of legislative proceedings, microfilms of newspapers were used, and interviews were conducted with members of the older generation who had been actively engaged in the iron industry when it was in operation in Dickson County.

A number of secondary source materials were helpful although much of the material was difficult to obtain and was scattered in a number of out-of-print books. Many of the books used in the study had limited information relevant to the iron industry in the county. Most of the important facts were secured from periodicals and bulletins from the Tennessee Department of Geology.

This research has led the writer to many areas of the county, visiting the old furnace sites and the homes of great ironmasters. It has introduced her to many helpful individuals who were interested in the history of the iron industry in Dickson County.

Chapter 2

HISTORICAL MILESTONES

The iron industry in Dickson County never produced more than a small portion of the nation's iron, but its prominence was more than local and its historical influence was nothing less than monumental. It has left its mark permanently on the development of the county, state and nation, producing iron in war and in peace for more than one hundred and fifty years.

Between 1790 and 1795, General James Robertson established Cumberland Furnace in what is now Dickson County.¹ The first iron furnace in Middle Tennessee and the second in the state, Cumberland Furnace was the first blast furnace to be established outside the original thirteen states.² It is believed to have operated longer than any furnace in the history of the United States.³ This particular furnace played an especially important

¹James M. Stafford and J. B. Killebrew, The Elements of the Geology of Tennessee (Nashville: Ambrose Printing Co., 1909), p. 174.

²Robert Corlew, A History of Dickson County, Tennessee (Nashville: Benson Co., 1956), p. 15.

³The Nashville Banner, November 28, 1937, p. 5, col. 1.

role in the life of the frontiersman, who could not possibly survive without agricultural implements, a gun, cooking utensils, horse-shoes and horse-shoe nails, and other items made of iron. Not only did iron provide the early settlers with the essentials of life, it also provided many with employment. Soon after the Cumberland Furnace began operating, Robertson offered work to a large number of people. This was the major cause of the great migration of the early 1790's into the area that was to become Dickson County.⁴

During the period 1820-1850 the iron industry made steady progress; furnaces and forges increased tremendously in capacity as well as in numbers, attaining a very high degree of prosperity. By 1850 there were seven blast furnaces in Dickson County.⁵ In 1820 iron manufacturing was expanded by Montgomery Bell, members of the Napier family, Anthony Van Leer and others. The great boom in the industry began about 1830 when men who had learned the iron business in New Jersey, Pennsylvania, and in various European countries were attracted to Tennessee by the thriving new industry. Not only did the area receive the benefit of their knowledge and experience, but many of them had capital with which to expand the industry and carry out

⁴Corlew, p. 15.

⁵J. P. Lesley, The Iron Manufacturer's Guide to the Furnaces, Forges and Rolling Mills in the United States (New York: John Wiley, 1859), pp. 135-36.

new ideas. The iron business flourished in Dickson County during the boom period, with the county making significant contributions toward elevating Tennessee to the status of leading iron producing state in the South up to 1850.⁶

But undoubtedly the most distinguished milestone in the history of the Dickson County iron industry was achieved in the year 1850 when pig iron produced at the Laurel Furnace, located in what is now Montgomery Bell State Park, took first prize at the World's Exposition in London, England.⁷ When one considers the quality of the competition which England herself must have offered in this field, being the largest iron producing country in the world at the time, one is obliged to conclude that the iron produced in Dickson County was of a distinctly superior quality.

An outstanding historian perhaps stated the obvious when he wrote that not all victories in a war were achieved on the battlefield, that some were won in the industrial areas far behind the lines, and of all the industries which contributed to the war effort, the iron industry unquestionably deserved to be ranked first.⁸ This statement would seem to be especially applicable to Dickson County, for

⁶A. P. Foster, "History of Tennessee Industry," Tennessee Industry, I (February, 1931), 12.

⁷The Nashville Banner, July 5, 1936, p. 5. col. 1.

⁸Allan Nevins and Abram Hewitt, With Some Account of Peter Cooper (New York: Harper and Brothers, 1935), p. 192.

although the iron industry was small here compared with that of other areas, its contribution to our nation in time of crisis was nationally recognized. It is a common legend in Dickson County that the Cumberland Furnace supplied iron for munitions in every war our nation fought during its existence. This would include every war in the history of our country except the American Revolution.

Before the War of 1812 Montgomery Bell negotiated a contract with the United States government to furnish cannon balls and other materials for the Armed Forces. It has been stated that Bell made a small fortune from this contract.⁹ When Andrew Jackson was making preparations for his campaign in New Orleans, Bell installed machinery at the Cumberland Furnace, which he now owned, to cast cannon balls. According to legend, substantially all the cannon balls used by Jackson in the Battle of New Orleans were molded at Cumberland Furnace. There is no reason to doubt the story, since Bell is known to have had at his command the facilities to produce and deliver such shipments. The ammunition was hauled by wagon to the Cumberland River where it was put on keel boats and shipped down the river to the Ohio, and on to the Mississippi River and to New Orleans.¹⁰

⁹Nannie Seawell Boyd Collection, Montgomery Bell Papers (Manuscript Section, Tennessee State Library and Archives, Nashville), Box 1.

¹⁰Goodspeed Publishing Company, History of Tennessee (Nashville: Goodspeed Publishing Co., 1886), p. 921.

The decade of the 1860's was a calamitous period for the people of Dickson County. It was also a period of bitter feelings throughout the iron producing areas of both North and South; for although practically all the iron-masters were from the North, they were the most rabid of secessionists.¹¹ In 1861 the Civil War broke out, unleashing all the fury of its conflicting social and economic interests, raining death, horror, and destruction on the area.

During the early years of the war the iron industry in the county boomed briefly, filling demands for war materials needed by the Confederacy, but the occupation by Union forces brought it sudden disruption. Many furnaces had closed without a struggle at the outbreak of the conflict. After the fall of Fort Donelson February 15, 1862, General Grant initiated a campaign of terrorism in an effort to frighten the people into returning their allegiance to the United States government.¹² During this period many ironworks were burned and the machinery destroyed, but Cumberland Furnace was left intact. Many historians believe that it escaped destruction because the Federal high

¹¹The Nashville Banner, November 28, 1937, p. 5, col. 4.

¹²Federal Writers Project of Work Projects Administration for the State of Tennessee, Tennessee: A Guide to the State (New York: Viking Press, 1939), p. 455.

command realized there was a possibility that it would need its facilities before the war was over.¹³

After the close of the Civil War, recovery was slow in the iron business. Many ironworks had been damaged or destroyed, and there was a lack of capital as well as a scarcity of labor that made it impossible for furnaces in the area to resume operation. In 1873 there were only two active furnaces--Cumberland Furnace and Piney Furnace--in Dickson County.¹⁴ Because these works had suffered no extensive damage during the Federal occupation, they were physically able to begin limited production of iron a few years after the close of the war.

Cumberland Furnace continued to operate at intervals during the two World Wars. In the First World War it supplied some iron for war materials and continued to operate until the Great Depression of the 1930's forced its shutdown. It resumed operation in 1941 when the Second World War caused once more a great demand for iron, but the high cost of production made the enterprise unsuccessful.¹⁵

When the silent colossus which had been Cumberland Furnace was dismantled in 1943 and its massive iron ovens

¹³The Nashville Banner, November 15, 1934, p. 1, col. 2.

¹⁴W. L. Cook, "Furnaces and Forges," Tennessee Historical Magazine, IX (October, 1925), 192.

¹⁵Stewart County Times, November 4, 1943, p. 1, col. 4.

hauled away to be converted into munitions by modern furnaces, the implication was inescapable: the historic old furnace had made the "supreme sacrifice." It had quite literally given its life for its country.

Chapter 3

IRONMASTERS, FURNACES, AND FORGES

General James Robertson, the first ironmaster in Dickson County, discovered rich deposits of iron while surveying land in the area. General Robertson and Governor William Blount had been co-adventurers in land deals soon after the Revolutionary War. Governor Blount purchased land claims from the soldiers who had fought in the war, and Robertson surveyed and located the claims, receiving one-fourth of the land for his services.¹ By the early 1790's James Robertson had explored and surveyed the area and had detected rich iron ore in sufficient quantity to justify the location of an iron furnace. In some places the ore could be found on the surface and in other locations the banks could be excavated with minimum effort.²

Historians do not agree on the exact date that Robertson established the first ironworks in what is now Dickson County. Some writers give the date between 1790 and 1795, and others give a later date. J. P. Lesley, who compiled a list of all furnaces and ironworks for the

¹James E. Matthews, General James Robertson, Father of Tennessee (Nashville: Parthenon Press, 1934), p. 493.

²Corlew, p. 15.

American Iron Association in 1859, states that the furnace was built in 1790, but the year 1793 has been stated by many historians and is widely accepted as the date of the establishment of this furnace.³ It is known that in 1793 the State of North Carolina granted General Robertson 640 acres of land in what is now Dickson County.⁴ But all authorities agree that Robertson's furnace made the first iron west of the Allegheny Mountains and was the first furnace in Middle Tennessee.

The following letter was written to General Robertson from Governor Blount on October 3, 1795.

If you have any Bank of Iron Ore I advise you not to sell it unless you can sell it to People of Capital enough to erect Works immediately & I presume none such can yet appear at Cumberland. It will take \$10,000.00 at least to get a Furnace & Forge at Work in this Country & much more on such an exposed Frontier as yours. I really mean to raise a Company to erect Iron Works myself upon Cumberland as soon as the State of the Country renders the Thing practicable with every prospect of Success.⁵

The above letter gives evidence that the furnace was erected after 1795, and implies the desire of Blount to join

³Goodspeed, p. 921.

⁴North Carolina Land Grant No. 1590.

⁵Robertson's Letters (Manuscript Section, Tennessee State Library and Archives, Nashville); "Correspondence of General James Robertson," American Historical Magazine, IV (1899), 75.

Robertson in promoting the erection of an iron industry at Cumberland.⁶

General Robertson's furnace was erected on Iron Fork of Barton's Creek, about eight miles north of the present town of Charlotte, and was called, for awhile, the Cumberland Iron Works.⁷ It later became known as Cumberland Furnace. The original furnace was located near a big spring that supplied the water needed for operation of the iron-works. The ore was dug from the surrounding hills; limestone was secured from a bluff about fifty yards away, and the forests supplied the wood for charcoal. It was a small, crude contrivance that could scarcely turn out a ton of pig iron a day, but it was the beginning from which grew the better furnaces of later years.⁸

So wide was the range of Robertson's interests, so varied his talents that he was never able to settle down to the dull, plodding work necessary to develop the Cumberland Furnace to its full capacity. Besides being Brigadier General of the Western Territory, Head of Indian Affairs, and a prominent surveyor, he was also the leader in all departments, both civil and military, of the pioneer

⁶Samuel Williams, "Early Iron Works in the Tennessee Country," Tennessee Historical Quarterly, VI (1947), 44.

⁷Corlew, p. 15.

⁸Newspaper clipping in the Dickson County Scrapbook (State Library and Archives, Nashville, August 23, 1936).

government of the Western Territory which had been established in 1790.⁹ His great love of adventure seemed to take precedence over the iron business, which he operated intermittently for over a period of approximately ten years.

Another prominent ironmaster was Richard C. Napier, Robertson's son-in-law, who operated the furnace after his marriage to Charlotte Robertson in 1789.¹⁰ Richard Claiborne Napier and other members of the Napier family had settled in Dickson County about 1790, and had established ironworks in the area. Before coming to Tennessee the Napiers had been engaged in the production of iron in North Carolina.¹¹ Richard later operated Laurel Furnace and Turnbull Forge. His most enduring contribution to the locality was the beautiful two story brick structure of Williamsburg design which he erected about four miles from Cumberland Furnace. One of the first brick houses in what was to be Middle Tennessee, it is still standing and in a splendid state of preservation. The structure, surrounded by ancient trees, is located near the spot where old Carroll Furnace stood. The family burial ground nearby, where many of the Napiers lie buried, gives the place a heightened sense of history. Although the interior of the house has been remodeled, the

⁹Matthews, p. 498.

¹⁰Matthews, p. 550.

¹¹Dawson Phelps and John Willett, "Iron Works on the Natchez Trace," Tennessee Historical Quarterly, XII (December, 1953), 314.

basic design remains unaltered. Rich in both history and legend, it is pointed to with pride by the people of the locality, and it is a worthy monument to the pioneer ironmaster.

The most outstanding ironmaster, not only in Dickson County, but in the entire state of Tennessee, was Montgomery Bell. He came from Chester County, Pennsylvania, near Valley Forge. In 1789 he went to Lexington, Kentucky, to live with his sister who on the death of her husband had been left alone with a family of children to rear among strangers. Bell established a profitable hat business in Lexington by which he supported and educated his sister's children. When he felt that his sister was financially secure he decided to move southward.¹² He was attracted to the Cumberland country because he recognized the unlimited possibilities which the potential water power and the rich deposits of ore combined had to offer. Bell purchased Cumberland Furnace from Robertson in 1804. The deed of James Robertson to Montgomery Bell executed June 18, 1804, stated that Bell paid sixteen thousand dollars for an ironworks tract containing six hundred forty acres, lying on Barton's Creek, in Dickson County, Tennessee.¹³ With the

¹²Nannie Seawell Boyd Collection, Montgomery Bell Papers.

¹³Dickson County Deed Records, Book C, Charlotte, Tennessee, p. 304.

transaction Bell began the long career as a leader in the iron industry in Tennessee.

Cumberland Furnace prospered under Bell's ownership and in a short time he had greatly increased the production of iron at the furnace. Four years after his purchase Bell placed an advertisement in the Nashville Impartial Review and Cumberland Repository, dated April 7, 1808, for five thousand cords of wood for which he would pay fifty cents per cord. This advertisement was indicative of his vastly increased operations.¹⁴ Although Bell treated the enterprise as a stepchild, because he had become more interested in industries that utilized iron than the ones that produced it, Cumberland Furnace under his proprietorship became one of the leading ironworks in the West.¹⁵

Some writers designate Montgomery Bell as the first industrialist of Tennessee because he was the first to utilize its streams for power. Soon after he arrived at Cumberland he began to expand his industries by erecting furnaces on Barton's Creek, Jones' Creek, Turnbull Creek, and on Piney and Cumberland Rivers. The following furnaces and forges in addition to Cumberland Furnace were soon in operation and most of them were owned by Bell: Carroll

¹⁴Stanley Folmsbee, Robert Corlew, and Enoch Mitchell, History of Tennessee, I (New York: Lewis Historical Co., 1960), 478.

¹⁵The Nashville Banner, November 28, 1937, p. 5, col. 3.

Furnace, the Steam Forge near Betsytown on the Cumberland, Upper Forge on Jones' Creek, Piney Forge on Piney River, and Worley Furnace. He also had interests in ironworks in Montgomery, Hickman, Stewart, Davidson, and other Middle Tennessee counties.¹⁶

Soon after Bell purchased Cumberland Furnace he formed a plan for a great water power development at the Narrows of Harpeth in Dickson County which later became Cheatham County. He decided to dig a tunnel at one of the bends in the Harpeth River where it flows along at the bottom of a bluff. The tunnel was dug through solid limestone rock for a distance of one hundred yards to the other side of the bluff. The tunnel was dug by Bell's slaves who completed the project within one year digging by hand and using some blasting powder. When it was completed, Bell had deflected part of the waters of the Harpeth through the tunnel, causing a water fall of about twelve feet on the opposite side of the bluff. It is not known just when the construction was completed, but it was probably about 1820.¹⁷

At the Narrows of Harpeth Bell constructed one of his largest industrial projects, a water-power forge. He used the water power to turn large water wheels which

¹⁶Corlew, pp. 23-24.

¹⁷Nannie Seawell Boyd Collection, Montgomery Bell Papers.

operated the powerful hammers. This was accomplished in the following manner: The water was conducted about twenty feet, from the fall to the top of twin water wheels, by the use of wooden troughs. The weight of the water caused the wheels to revolve on their axles. The axles were made of large poplar logs near the ends of which were driven two protruding pins of white oak, called lever trips. As the axles revolved, these trips pressed down and released a long lever on the end from which hung a huge hammer. The heated iron was held with tongs on top of a long anvil; it received two hammer blows with every revolution of the two water wheels, each of which operated a hammer. Bell called his Narrows project Patterson's Forge, this being his mother's maiden name.¹⁸ In 1829 Bell petitioned the Legislature of Tennessee offering the state the opportunity to purchase the Narrows of Harpeth, but he got no action on his petition.¹⁹

By 1820 Bell had sold Cumberland Furnace to Anthony Wayne Van Leer and Bernard Van Leer for fifty thousand dollars. The transaction also included four thousand eight hundred acres of land.²⁰ The business was thereafter

¹⁸Statement by Albert Ganier, personal interview, May, 1968.

¹⁹Petition to the General Assembly of Tennessee (Search Section, Tennessee State Library and Archives, Nashville, September 30, 1829).

²⁰Dickson County Deed Records, Book D, Charlotte, Tennessee, p. 140.

operated under the name of Anthony W. Van Leer and Company.²¹ Anthony Wayne Van Leer was born at the Reading Furnace mansion in Chester County, Pennsylvania, April 6, 1783.²² He was the fourth and youngest son of Captain Samuel Van Leer and Hannah Wayne Van Leer who was a sister to General Anthony Wayne. Captain Samuel Van Leer, Anthony Wayne's father, was the grandson of William Branson who had erected the first iron furnace in America. Anthony Van Leer was sent by his brothers to Dickson County to invest the Van Leer money in Cumberland Furnace. At that time his family owned twenty or more furnaces and forges in Pennsylvania.²³ Anthony Van Leer became one of the most successful ironmasters in the country. The little town of Vanleer, Tennessee which was named for him is all that remains to remind Dickson countians of his phenomenal success. The name Van Leer was shortened to Vanleer in the iron industry. It was Von Leer in Germany and Switzerland and Von Lohr in Prussia.²⁴

Van Leer made many improvements in the operation of the ironworks. He converted the furnace from water power to steam power, and in the early 1830's he had the original

²¹Corlew, p. 60.

²²A letter from Mrs. Blake Ragsdale Van Leer to Mrs. Buena Daniel, June 7, 1970.

²³A letter from Mrs. Blake Ragsdale Van Leer.

²⁴Genealogy of the Van Leer Family by Mrs. Blake Ragsdale Van Leer, no date given.

furnace dismantled and moved to a new site west of the original furnace.²⁵ He continued to operate the industry until the 1850's when Hugh Kirkman, his son-in-law, assumed control of the booming enterprise. In 1859 Cumberland Furnace was listed as a charcoal hot and cold blast furnace owned by Anthony Vanleer and operated by Hugh Kirkman, capacity about twelve tons of pig iron a day.²⁶ Kirkman operated the industry until the occupation of the county by the Federal forces during the Civil War. Van Leer acquired a vast domain and at the time of his death owned twenty thousand acres of ore and timber land surrounding Cumberland Furnace.²⁷ His granddaughter, Florence Kirkman, inherited his vast estate.

After the Civil War Cumberland Furnace again began operation under the management of Captain James Pierre Drouillard, a Union soldier, who had married Florence Kirkman in September, 1864. Captain Drouillard graduated from West Point, July 1, 1857, and later fought in the Civil War. He was discharged from the army in February, 1865,²⁸ and within a few years after the war had organized the J. P. Drouillard Iron Company at Cumberland Furnace. The

²⁵The Nashville Banner, November 28, 1937, p. 5, col. 3.

²⁶Lesley, p. 135.

²⁷Cook, p. 190.

²⁸A letter from Mrs. Blake Ragsdale Van Leer.

furnace operated successfully under the management of R. B. Stone, a Confederate veteran, until 1889 when it was sold to the Southern Iron Company of Nashville.²⁹

E. H. Stone, the son of R. B. Stone, who had been associated with the furnace during the Drouillard tenancy, was one of the organizers of the new company.

Four years after the Southern Iron Company acquired the industry the antiquated equipment was replaced by a modern furnace designed to operate on coke fuel. The new furnace never had a chance to justify itself. Concomitant with its completion in 1893, was the beginning of the financial panic of the Cleveland administration.³⁰ After a few years of unsuccessful operation the company dissolved.

The last of the ironmasters in Dickson County was Joseph Warner of Nashville. He was the son of James C. Warner, a pioneer in iron production in Middle Tennessee. Joseph Warner was first associated with the iron industry in Hickman County at a furnace that had been constructed by his father. He purchased Cumberland Furnace in 1900 and operated it periodically until 1938 under the name Warner Iron Company. He was a progressive industrialist whose

²⁹Cook, p. 190.

³⁰The Nashville Banner, November 28, 1937, p. 5, col. 8.

many advances in the iron industry contributed greatly to the economic welfare of Dickson County.³¹

Although the ironmasters described here are the most important ones, there are others who are worthy of being remembered. They are George and Henry Napier, Robert Baxter, W. R. Hicks, and the Hillman brothers, Daniel, George, and James, who came from New Jersey. James Hillman died at Cumberland Furnace within a year after he arrived and is buried not far from the site of the old furnace.³² Daniel Hillman became a foreman of the furnace, and having learned the iron business there went on to become a major industrialist, operating ironworks in Tennessee, Kentucky, and other southern states, and amassing an immense fortune.

The iron industry in Dickson County saw many ironmasters come and go, but the one who exerted the greatest influence on the industry was Montgomery Bell. A shrewd, ambitious, talented, self-made businessman who had no misgivings whatever about investing his money in ironworks, he negotiated large contracts with equanimity, dealing with the government as well as individuals until he acquired a vast fortune.³³

³¹The Nashville Tennessean, November 27, 1939, p. 1, col. 2.

³²The Nashville Banner, November 28, 1937, p. 5, col. 4.

³³Corlew, p. 24.

Montgomery Bell invented the process of making malleable iron from ordinary pig iron which came to be known as the "Bessemer Process." This process which was claimed by Henry Bessemer and William Kelly was used by Bell before either but was not patented.³⁴ Bell was also a pioneer in the establishing of forges that converted pig iron into finished products. He made a great contribution to the iron industry in Dickson County and became the greatest industrialist of his time.³⁵

Bell's impact on the area is borne out by the public institutions bearing his name; among them are Montgomery Bell State Park, approximately five thousand acres of beautiful forest preserves and lakes located in Dickson County, and Montgomery Bell Academy, a very highly rated prep school in Nashville. In his will he bequeathed twenty thousand dollars for an academy "for the education of children not less than ten or more than fourteen years old who are not able to support and educate themselves and whose parents are not able to do so."³⁶

Montgomery Bell died April 1, 1855 at the age of 86, at his home near Valley Forge Ironworks four miles

³⁴Boyd Collection, Montgomery Bell Papers.

³⁵W. B. Leech letters to Mrs. Nannie Seawell Boyd (Manuscript Section, Tennessee State Library and Archives, Nashville, November 20, 1928).

³⁶Boyd Collection, Montgomery Bell's Will, July, 1852.

south of Charlotte on Jones' Creek. He was very attached to this forge because the surrounding valley reminded him of his childhood home in Pennsylvania. It was at Valley Forge Ironworks that he felt his greatest accomplishment had been made.³⁷ He requested that he be allowed to die at Valley Forge, but that he be laid to rest in the valley across the river from his forge at the Narrows of Harpeth. Both requests were granted. The fence around his grave plot at the Narrows is graced appropriately with a piece of his own handiwork, a wrought iron gate supposedly from one of his forges.³⁸

Persons desiring more definitive information of furnaces and forges in Dickson County will be interested in the list compiled by J. P. Lesley for the American Iron Association in 1859.

Cumberland Steam Cold-blast Charcoal Furnace, owned by Anthony W. Vanleer, managed by Hugh Kirkman, Charlotte, Dickson County Tennessee, and situated on Iron Fork of Barton's Creek eight miles north by west of Charlotte, was built about 1790, was nine and one half feet across the bosh by twenty-nine feet high, and made in 1857 1,831 tons of foundry metal out of limonite ore.

Carroll Steam Cold-blast Charcoal Furnace, owned by William C. Napier, managed by William Thomas, Clarksville,

³⁷W. B. Leech to Mrs. Boyd, November 8, 1926.

³⁸Boyd Collection, Montgomery Bell Papers.

Dickson County Tennessee, and situated on a branch of Barton's Creek three miles northwest of Charlotte, was rebuilt in 1853. It was eight feet across the bosh by thirty feet high and made in forty-two weeks of 1857 984 tons of iron out of limonite ore.

Bellview, formerly Mammoth, Steam Cold-blast Charcoal Furnace, built about 1825 by Montgomery Bell, on Jones' Creek, three miles south of Charlotte, had an eleven feet bosh by forty-five feet high, ran until after 1834 and was then abandoned for want of charcoal and ore.

Worley Steam Cold-blast Charcoal Furnace, owned by James L. Bell, managed by J. M. Skelton, Clarksville, Dickson County Tennessee, and situated ten miles south of west of Charlotte, was built in 1844, rebuilt in 1854, was eight and one half feet across the bosh by thirty-six and one half feet high and made in forty weeks of 1857 about 1,200 tons of iron out of limonite ore from banks three hundred yards distant.

Piney Steam Cold-blast Charcoal Furnace, owned by William H. Crutcher of Nashville, and situated nine miles south of Charlotte in Dickson County Tennessee, was built in 1832, was nine feet across the bosh by thirty-five feet high and made in 1854 1,731 tons of iron out of limonite ore.

Laurel Steam Cold-blast Charcoal Furnace, owned by William H. Crutcher, and situated eight miles southeast of Charlotte in Dickson County Tennessee, was built in 1815,

rebuilt in 1854 and was nine feet across the bosh by twenty-eight feet high, and made in forty weeks of 1855 657 tons of iron out of limonite ore. The furnace was abandoned and a camp-meeting pulpit erected in the run out arch.

Jackson Water Cold-blast Charcoal Furnace, owned by the Jackson Furnace Company, Charlotte, Dickson County Tennessee, stood twelve miles east of Worley Furnace, and fourteen southeast of Charlotte, was built in 1833, was ten feet across the bosh by forty-seven feet high, and made in 1854 fifty tons of iron. It had ceased to operate by 1857.

Henry Clay Forge, one mile back from the left bank of the Cumberland River, twenty miles south of Clarksville, and owned and managed by Theodore Hicks Baxter, Barton's Creek, Dickson County Tennessee, was built about 1837, had one forge and seven knobling fires with one hammer driven by steam, and made in five months of 1856 600 tons of blooms from pig metal.

Patterson Forge was situated at a remarkable bend in the Harpeth River (a branch of the Cumberland from the southwest), where, after seven miles of current, it returns to within two hundred feet of its bed. This point is by road twelve miles from the mouth of the Harpeth in the Cumberland, but twenty-three miles by water. It was owned by James L. Bell and managed by A. W. Turner, Chestnut Grove, Cheatham County Tennessee, had one forge and eight knobling fires with three hammers driven by water, and made

Cincinnati blooms out of Worley Furnace pig metal. When this forge was built it was in Dickson County.

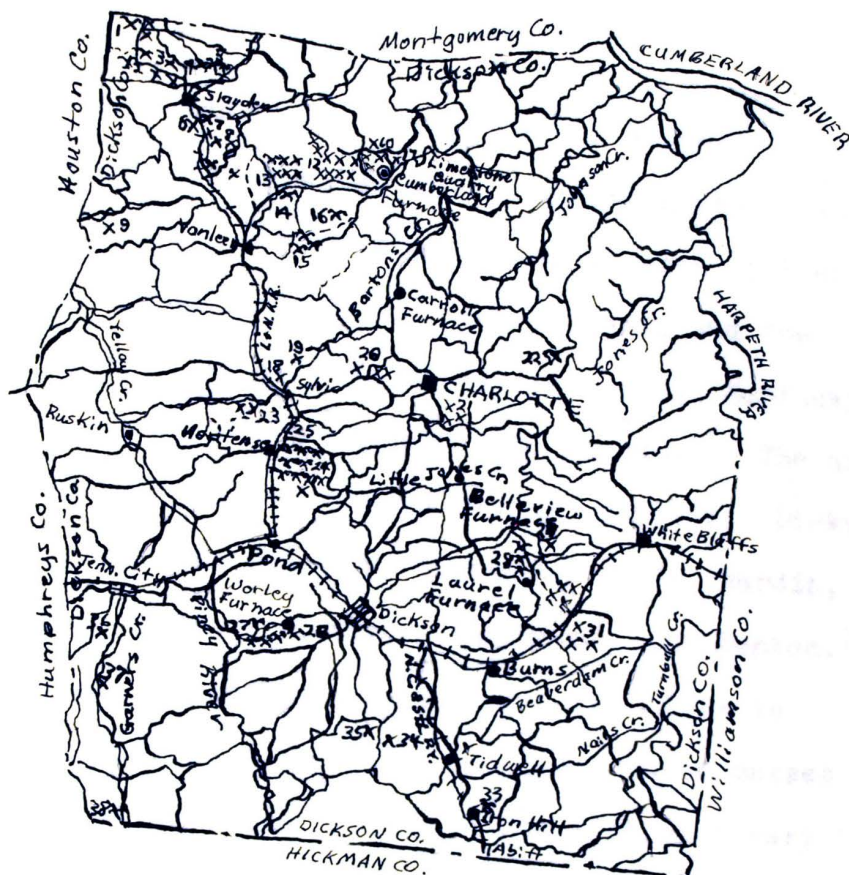
Turnbull Forge, on Turnbull Creek eighteen miles east of Worley and six miles east of Jackson Furnace, twenty-five miles west of Nashville, was built in 1815 by Richard, and rebuilt in 1847 by Elias Napier, stopped in 1855 to never run again. It was owned by William C. Napier Charlotte, Dickson County Tennessee, had one forge and four knobling fires with two hammers driven by water, and made in 1855 210 tons of blooms out of Cumberland Furnace pig metal.

White Bluff Forge, on Turnbull Creek, five miles above the last, two miles east of Jackson Furnace, fourteen miles south of Charlotte, and twenty-nine miles south of Nashville, was owned by Kurr & Hutchison, and managed by John Hall, Charlotte, Dickson County Tennessee, was built in 1828, had one forge and six knobling fires with two hammers driven by water, and made in 1855 173 tons of blooms and bars out of Piney Furnace pig metal. It is now abandoned.

Valley Forge was owned by Montgomery Bell and situated four miles south of Charlotte, Tennessee, on Jones' Creek. It was built in 1829.³⁹

Figure 2 is a map of the blast furnaces and mines in Dickson County.

³⁹Lesley, pp. 135-216.



- Blast furnaces, active or recently operated
- Blast furnaces, abandoned or former sites
- X Brown iron ore mines
- X Brown iron ore deposits

Figure 2. Blast Furnaces and Mines in Dickson County⁴⁰

⁴⁰Ernest Burchard, The Brown Ores of the Western Highland Rim, Tennessee (Nashville: Tennessee Division of Geology, 1934), p. 65.

Chapter 4

GEOLOGY OF IRON ORE

Dickson County is located in the Western Iron Belt which is an area fifty miles wide, running north to south through the state. The belt comprises an area of 5,400 square miles lying between the Central Basin and the Tennessee River. It extends northward through Kentucky to the Ohio River, and southward into Alabama.¹ The area includes all or parts of the following counties: Dickson, Montgomery, Houston, Stewart, Lawrence, Wayne, Hardin, Lewis, Perry, Decatur, Hickman, Humphreys, and Benton.²

The ore in Dickson County does not occur in stratified beds, but rather in irregular shaped masses of loose particles near the surface. The particles vary from shot-size to boulders ten to fifteen feet in diameter.³ These ore banks were usually found to occupy a high position, being located on the borders or near the crusts and spurs of the plateau-ridges; they tended to adapt to the upper hill slopes, lying in a horizontal position. Other

¹Stafford and Killebrew, The Elements of the Geology of Tennessee, p. 179.

²Goodspeed, p. 35.

³Burchard, p. 24.

deposits occurred toward the level of valleys, but these low-lying deposits were found to be inferior, having a substantial thickness of chert between the ore and underlying rocks.⁴ The existence of good ore was often indicated by the presence of a fine gravel or "shot ore" scattered over the surface and embedded in the subsoil. Ledges of chert-gravel cemented by brown iron oxide were found on the hillsides, but these masses were no richer in content than the low-lying deposits. The iron ore found in the area was usually covered with soil, clay, gravel, sand, and other foreign matter which had to be removed before mining began.⁵

The Dickson County ore was principally limonite, an oxide of iron, consisting of hard, black to brown or reddish brown ore, which is referred to in this study as limonite or brown iron ore. The term limonite is derived from a Greek word, signifying meadows, because this ore was first found in marshy areas.⁶ The leading varieties of limonite are the compact, which is a hard stone material, often fibrous with a smooth surface; the "honey-comb" ore consisting of hard limonite formed in webs with interstices

⁴J. B. Killebrew and J. M. Stafford, Introduction to the Resources of Tennessee (Nashville: Eastman and Howell, 1874), p. 236.

⁵Burchard, p. 25.

⁶Killebrew and Stafford, Introduction to the Resources of Tennessee, p. 223.

between; the pot ore which occurred with decomposing chert, with some of this type frequently enclosing crystals of selenite; and "yellow ochre" which was mixed with clay and often very impure.⁷ The first three types are common forms and were prevalent in the area.

The minerals mined and processed in the manufacture of iron consist of various iron oxides, iron hydroxides, iron carbonates, and iron sulfides. Iron is the fourth most common element in the earth's crust. Approximately 5 percent of the rocks on the outer crust of the earth consists of iron.⁸

Limonite which Dickson County yielded in largest quantities consists of a mixture of hydrous iron oxides in which the iron is present in the ferric form as the sesquioxide (Fe_2O_3).⁹ It contains approximately sixty pounds of iron to the hundred pounds when in a pure state. Limonite cannot possibly contain more than 60 percent of pure iron. The following analyses show the content of metallic iron from samples of iron ore from six mines in Dickson County.¹⁰

⁷James M. Stafford, The Geology of Tennessee (Nashville: S. C. Mercer, 1869), p. 437.

⁸Charles M. Riley, Our Mineral Resources (New York: John Wiley and Sons, 1965), p. 56.

⁹Burchard, p. 26.

¹⁰Burchard, pp. 75-87.

Limonite in considerable quantities still lies hidden under oak-topped hills at several points in the county.

Table 1. Analysis in Percentage of Brown Iron Ore in Dickson County Mines

Locality	Iron	Insoluble	Phosphorus	Manganese
Cumberland Furnace				
Bell Mine	33.82	40.58	0.22	0.37
Stokes Mine	48.91	18.44	0.18	0.35
Hortense Mine	52.69	10.36	0.31	0.18
Montgomery Bell Mines				
Mine 1	51.10	3.84	0.30	0.78
Mine 2	46.96	20.44	0.44	1.32
Iron Hill Mine	51.28	11.96	0.22	0.25

The problem of the formation of iron ores is discussed extensively in geologic literature. The conditions of formation of brown ore are not clear and the authorities differ in their interpretations. Several modes of origin have been theorized by many writers. One theory is that limonite is of secondary origin, resulting from the mutation of other ores, or minerals, containing iron, through exposure to moisture, air and carbonic or organic

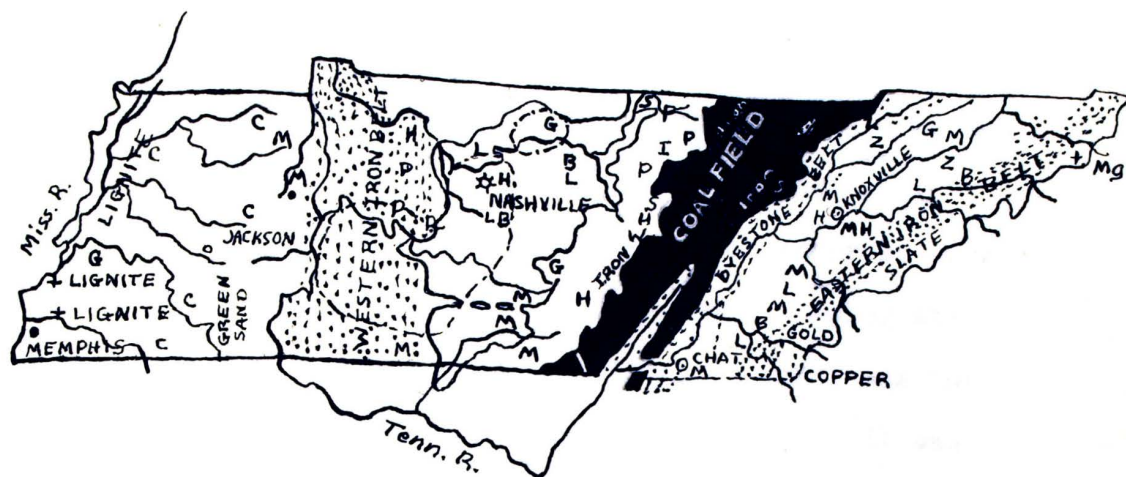
acids.¹¹ The ores were deposited from iron-rich ground waters which percolated downward to the less clayey residuum of the Mississippian limestones, where chemical and physical conditions were favorable for precipitation. Experts suggest that the primary source of the ores was glauconite-bearing Upper Cretaceous deposits which are believed once to have covered the Western Highland Rim area.¹²

Figure 3 is a mineral map of Tennessee. The map also shows the location of the Western Iron Belt.

Marble
Manganese
Magnetite
Petroleum
Salt
Shale
Lime

¹¹Edward S. Dana, A Textbook of Mineralogy (4th ed.; New York: John Wiley and Sons, 1964), p. 505.

¹²Lawrence L. Larson, Mineral Resources Summary of the Cumberland Furnace Quadrangle, Tennessee (Nashville: Tennessee Division of Geology, 1966), p. 4.



- | | |
|--------------------------|---------------|
| B. Barite | M. Marble |
| C. Potter's Clay | m. Manganese |
| G. Millstone | Mg. Magnetite |
| H. Hydraulic Limestone | P. Petroleum |
| I. Iron | S. Salt |
| L. Lead | W. Whetstone |
| - - - Phosphate Deposits | Z. Zinc |

Figure 3. Mineral Map of Tennessee¹³

¹³Burchard, p. 166.

Chapter 5

THE IRON MAKING PROCESS

An abundant supply of high grade ore was only one of the natural essentials for the establishment of a successful ironworks. Many other natural resources were requisite for the manufacture of pig iron. Geologists agreed that the northern part of Dickson County was the scene of an inexhaustible supply of iron ore.¹ It was obvious that the county had also the combination of limestone, water power, and timber for charcoal which were the other essentials for the iron industry. During the early nineteenth century it would have been difficult to conceive an area having greater potentiality for the manufacture of iron. Possessing all the natural resources it appeared that Dickson County was destined to become a major iron producing center.

The principal substance in the manufacturing process was iron ore; therefore, the furnace was usually located near the ore banks. The mining operations were relatively facile because of the shallow deposits.² Before the Civil

¹The Nashville Tennessean, July 14, 1940, p. 8, col. 6.

²Phelps and Willett, p. 318.

War ore was dug by slave labor with a pick and shovel, or it was moved by horses pulling a plough or "slip" scraper.³ The greatest disadvantage in mining was due to the fact that the ore was embedded in red clay that had to be extracted. In the early days this was accomplished by placing the iron ore on a kiln and drying it over a wood fire, which caused the clay to separate from the stones, but this method was slow and was soon abandoned in favor of washing.⁴ Later mining was done by blasting, and the ore was loaded by hand onto mule tramcars which carried it to the grizzly. The dawning of the twentieth century saw the advent of the steam shovel that brought an even greater advance in the excavation process. The mules were replaced by a dinky engine which greatly facilitated the hauling of the raw material to the grizzly and on to the washer.⁵

All ore going into the blast furnace had to be as free from foreign matter as possible. This was accomplished by the washer. The washer was a large perforated iron cylinder where water was sprayed on the mass of iron as the cylinder revolved. The water washed away the clay through the perforations, and the ore was retained in the

³Albert Ganier, Brief History of Montgomery Bell Park (Nashville: Tennessee State Parks, 1968), p. 3. (Mimeographed.)

⁴Statement by James A. Rector, personal interview, June 9, 1970.

⁵Burchard, p. 72.

drum which sent it into the bin.⁶ Figure 4 shows a washer flow sheet.

The fuel used in the furnaces until about 1893 was charcoal. A vast amount of timber was required to furnish the ironworks with the essential fuel. About five hundred acres were used annually by each furnace that produced as much as twelve tons of iron daily.⁷ Oak and hickory were the most desirable woods for charcoal although any type except chestnut was used when the demand for charcoal became increasingly heavy. The soft woods lost considerable density during the charring process and resulted in charcoal of poor quality.⁸ The amount of charcoal produced by the different types of wood varied; white pine yielded only 455 pounds of charcoal per cord, weighing fifteen pounds per bushel; hickory yielded 1,172 pounds per cord and weighed thirty-two and eighty-nine hundredths pounds per bushel.⁹ As the need for charcoal increased, entire sections of land were stripped to produce the fuel needed by the furnaces.

⁶The Nashville Banner, November 28, 1937, p. 5, col. 8.

⁷Killebrew and Stafford, p. 242.

⁸Statement by James A. Rector, personal interview, June 9, 1970.

⁹Harriet Simpson Arnow, Flowering of the Cumberland (New York: Macmillan Company, 1963), pp. 296-97.

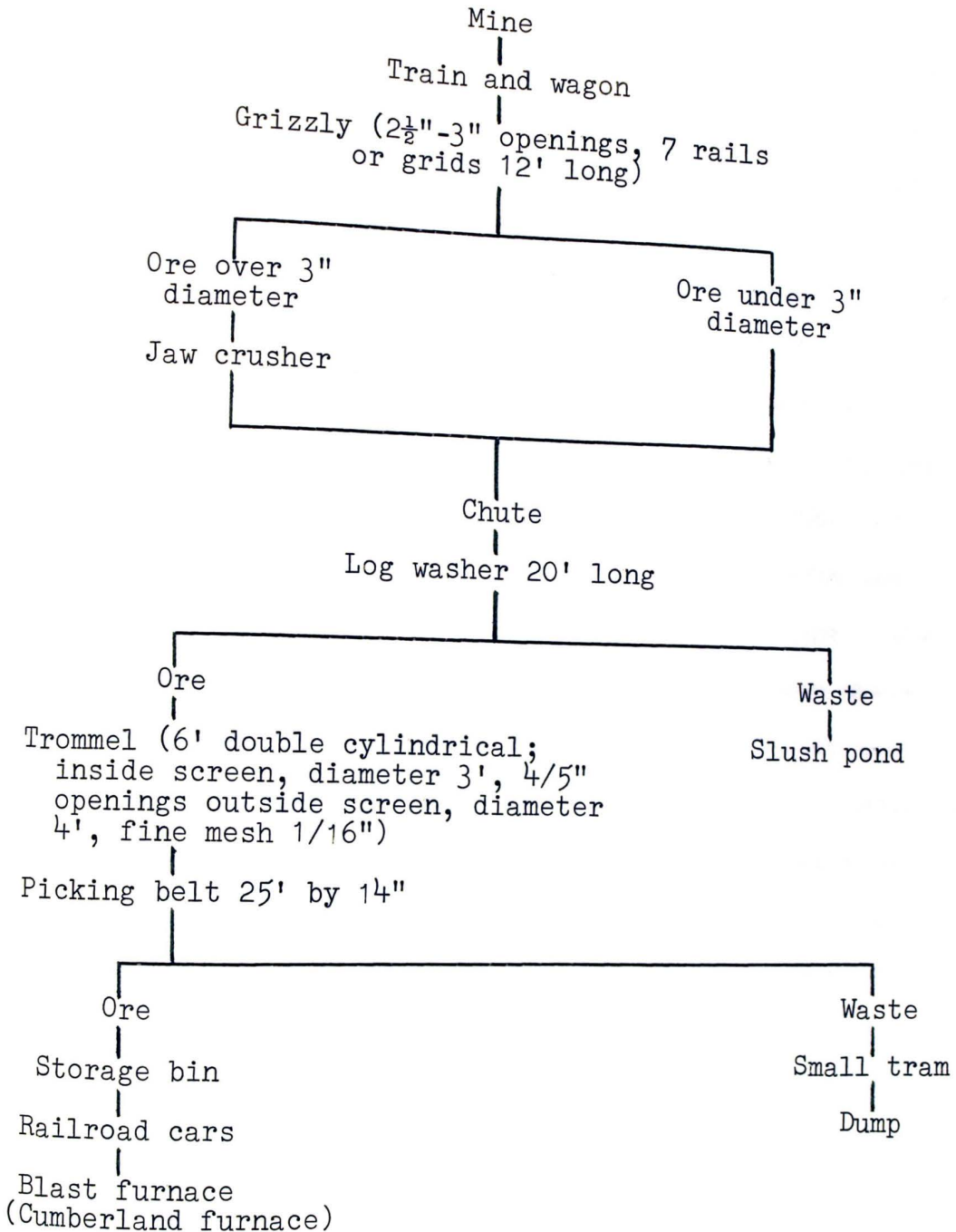


Figure 4. Flow Sheet of Stokes Mine Washer Operated by Warner Iron Company, Dickson County, 1923

The process of making charcoal was time-consuming, tedious work. Six men working three months could produce only sixteen thousand bushels of charcoal which would make approximately eighty to one hundred tons of iron.¹⁰ First the wood was cut in cords four feet wide, four feet high, and eight feet in length. The cutting and stacking were only the preliminary step in the production of charcoal. The hearth, a circle thirty feet in diameter, had to be cleared to make a pit.¹¹ The spot selected had to be dry and sheltered from the winds. In the middle of the pit three or four sapling poles about five inches thick and twelve feet high were tied together and set upright. The poles, spaced about a foot apart, formed a chimney where charcoal, kindling and other inflammable substances were placed to start the fire when the process began.¹² Several pits were charred at one time with each containing about fifty cords of wood, stacked on ends three lengths high. The top stack of wood was slanted roof-fashion, making the pit twelve feet high.¹³ The mound was then covered with about eight inches of wet leaves which formed a protective covering to prevent the dirt falling into the pit. Clay

¹⁰Arnow, p. 296.

¹¹Hattie Hall Burnam, An 18th Century Skill, p. 1. (Mimeographed.)

¹²Statement by James A. Rector, personal interview, June 9, 1970.

¹³Burnam, p. 1.

was then used to cover the entire surface. To fire the pit a shovel of burning coals was put into the chimney to ignite the inflammable materials in the bottom. The pit was recovered and two holes about six inches across were made on each side of the mound at the bottom to allow the gas and smoke to escape.¹⁴

After the pit was fired a twenty-four hour watch was imperative until the charring was completed. It was necessary to check the covering of the pit regularly because the proper covering was a crucial part of the operation. A strong wind could destroy the entire contents of the pit by fire if the cover was too thin; too thick a cover could cause an explosion because of trapped gases. Within four or five days the fire would have spread throughout the pit, then it was ready to be tightly covered, since at that stage the charring needed little air. A fifty cord pit required about eight days to char.¹⁵ An experienced worker was required to remove the charcoal after the charring was completed. An opening was made at the base of the pit and the charcoal was removed with a long-handled shovel. Water was poured on the charcoal as soon as it was removed from

¹⁴Burnam, p. 1.

¹⁵Statement by James A. Rector, personal interview, June 9, 1970.

the pit. It was loaded on wagons usually pulled by four mules and taken to the furnace.¹⁶

The third and equally vital raw material needed for the manufacture of iron was limestone which was used as flux, because of its affinity to combine with sand and clay forming a molten slag. The county had an abundance of limestone what was quarried near the furnace sites, including both Warsaw and St. Louis varieties; however, Warsaw limestone was the most available and most widely accepted limestone for general purposes, including its use for flux. It varied in color from a yellowish-gray to an olive-gray, and had a maximum thickness of one hundred to twenty feet.¹⁷ The limestone was quarried, crushed, and hauled to the furnace.

The manufacture of iron was an extremely involved process, and so was the construction of a furnace to accomplish it. Details of James Robertson's furnace are lacking, but it was very primitive and probably conformed to the general pattern of the furnaces constructed during the same period. All the furnaces in Dickson County before the Civil War were known as hillside furnaces. These were open-top furnaces built against a steep hillside so that the wagons loaded with ore, limestone, and charcoal could

¹⁶Burnam, p. 2.

¹⁷John M. Calvin and Donald S. Fullerton, Mineral Resources Summary of the Charlotte Quadrangle, Tennessee (Nashville: Tennessee Division of Geology, 1965), p. 4.

be unloaded directly into the furnace, thus solving the problem of elevation to the top of the stacks.¹⁸

All blast furnaces, including the early ones, consisted of three parts: the shaft which was the upper portion where the diameter was gradually narrowed from eight feet at the bosh to four feet at the top. The bosh, or the middle part, was an inverted truncated cone which flared outward at the top. This checked the velocity of the rising gases and made it possible for them to reduce the ore properly. It rested on the third part, the hearth or crucible.¹⁹

The hearth was narrow and high and was the smallest section of the furnace. It required a very strong foundation because it was the gathering point of the molten metal and slag. After excavating the ground until a base was reached which was solid enough to hold the heavy weight, large stones were laid. The rule for building stone furnaces was to make the base equal the height. Then the outer walls were constructed of huge building stones and lined with firebricks with a space of several feet between the stone and brick walls. The intervening space was filled with dry sand to prevent the stones from cracking

¹⁸The Nashville Tennessean, July 29, 1934, p. 8, col. 2.

¹⁹Richard Moldenke, The Principles of Iron Founding (New York: McGraw-Hill, 1917), p. 71.

under the intense heat. These early furnaces were in the form of a truncated cone, twenty to forty feet high.²⁰

Starting a charcoal blast furnace required dexterity and constant attention. To put the furnace "in blast" it was partly filled with charcoal which was ignited at the top and allowed to burn to the bottom of the bosh. This process took approximately twelve hours.²¹ The workmen would then refill the stack from the top using the following formula: eight hundred pounds of iron ore, eighty pounds of limestone, and twenty bushels of charcoal.²² The combination of these substances was called a "charge" and was put into the furnace in the above stated proportions three times an hour.²³ Each charge would make from three hundred fifty to four hundred pounds of pig iron depending upon the purity of the ore. Its purity was determined by the amounts of phosphorus and siliceous matter present in it. When the ore contained large amounts of such matter, more limestone was needed and the amount of the finished product was reduced accordingly.²⁴

²⁰The Nashville Tennessean, July 29, 1934, p. 8, col. 3.

²¹Phelps and Willett, p. 319.

²²Stafford and Killebrew, The Elements of the Geology of Tennessee, p. 182.

²³Phelps and Willett, p. 319.

²⁴Stafford and Killebrew, p. 182.

After the first charge was added to the furnace the "blowing in" process began. The primitive furnaces were blown through one tuyere, a short pipe, from a wooden tub by a plunger operated by hand. Later, bellows activated by a water wheel were used to send blasts of air into the bosh to keep the coals burning. Since the air was not heated, this was called a cold-blast furnace. The temperature after the blowing-in process often ran as high as 3,500 degrees Fahrenheit.²⁵ Once the furnace was put "in blast" it ran continually for several months or until a new lining in the furnace was needed which was usually from six to nine months.²⁶

The permutation process that took place in the furnace under the intense heat was as follows: As the ore melted, the limestone was converted into lime which united with the clay, sand, and other impurities in the ore, forming a molten impure glass. This, being lighter than the melted iron, floated on top and was driven off as slag. The white-hot charcoal took the oxygen from the ore and freed the iron, which settling on the bottom, was drawn off through the iron notch at the bottom.²⁷ In the early furnaces a brick that blocked the runout arch was knocked

²⁵Stafford and Killebrew, p. 182.

²⁶Statement by Alvin Hand, personal interview, November 20, 1969.

²⁷Stafford and Killebrew, p. 183.

out to let the molten metal escape. A cinder notch three feet above the iron notch carried the slag to a container that was lined with brick called a "hot pot." This container was emptied about every half hour and the operation was called "flushing."²⁸ The iron notch was opened about every six hours to allow the molten iron to run off into small molds made in the sand. These molds were shaped like sows with litters of suckling pigs--hence the name pig iron.²⁹ Each pig bed held about two tons of iron. After the iron was cooled with water it was broken into pieces about eighteen inches long and was then ready to be transported to market. Table 2 shows the amount of pig iron produced in 1854.³⁰

The early furnace operators in Dickson County transported the pig iron with ox teams and later with six-mule teams to Betsytown on the Cumberland River. It was then loaded on flatboats and shipped down the river to market.³¹ By 1893 the pig iron was shipped by railroad after the construction of the Clarksville Mineral Branch

²⁸Phelps and Willett, p. 320.

²⁹Moldenke, p. 4.

³⁰James Stafford, The Geology of Tennessee, p. 465.

³¹The Nashville Banner, November 28, 1937, p. 5, col. 3.

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by the Louisville and Nashville Railroad. At Vanleer a branch was extended to serve the blast furnace there.³²

Table 2. Production of Dickson County Furnaces in 1854

Furnace	Owners	Pig metal and castings produced: tons
Worley	Jas. L. Bell	950
Jackson	Estate of M. Bell	50
Piney	Napier and Holt	1,731
Laurel	William C. Napier	257
Cumberland	Anthony Vanleer	1,926
Carroll	Robert Baxter	1,050

The substitution of coke for charcoal in 1893 initiated a major revolution in the manufacturing process.³³ At Cumberland Furnace the revolution was given further impetus by the construction of a large, modern furnace which resulted in a tremendous increase in the production of pig iron during the early part of the twentieth century. The new furnace greatly expedited the iron making process. The raw materials were deposited into the furnace from tramcars run on an elevated trestle. Since the use of coke

³²Roger Harris, "Gone But Not Forgotten," L and N Magazine, February, 1966, p. 16.

³³The Nashville Banner, November 28, 1937, p. 5, col. 8.

necessitated a more powerful blast than could be obtained from water-driven bellows, a blowing engine was employed. This mechanism was connected to the furnace by six three-inch pipes called tuyeres through which the heat, generated by three stoves at the side of the furnace, was driven. The gases were taken from the top of the furnace to the heating stoves to preheat the blast to a high temperature.³⁴ Table 3 shows a balance sheet of materials necessary to the production of one ton of pig iron.³⁵

Table 3. A Balance Sheet of Materials Concerned in the Production of One Ton of Pig Iron

Furnace charge	Tons	Products	Tons
Iron Ore	2.0	Pig iron	1.0
Coke	0.8	Slag	0.7
Limestone	0.4	Gas	5.4
Air	4.0	Dust	0.1
	—		—
	7.2		7.2

The cold-blast charcoal furnace produced eight to ten tons of pig iron in twenty-four hours; the new coke

³⁴Statement by James A. Rector, personal interview, June 9, 1970.

³⁵W. H. Dennis, A Hundred Years of Metallurgy (Chicago: Aldine Company, 1963), p. 89.

furnace produced from one hundred to one hundred ten tons in twenty-four hours.³⁶

The number of laborers required to operate an ironworks was prodigious. The work force included the general manager who was experienced in the iron industry. It was necessary that he be knowledgeable concerning furnace and forge operation, charcoal production, and ore properties. He also needed the ability to handle the other workers. Each furnace also employed two founders who worked alternate twelve hour shifts. They worked at the base of the stack checking the air pressure, regulating the "charge" of the furnace, supervising the removal of the molten metal and the necessary repairs on the furnace. The top fillers' duties were to check the proper proportions of ore, flux, and fuel that went into the furnace. This charging process required a minimum of about five men on each shift. A keeper tapped off the iron or removed the slag. A gutterman and four or five workers prepared the pig beds to receive the molten metal. The molders completed the work force at the ironworks. They prepared the molds used to cast hollowware and other cast-iron items.³⁷

Negro slaves had formed a large segment of the labor force before the Civil War. The blast furnaces needed

³⁶Statement by Alvin Hand, personal interview, November 20, 1969.

³⁷Statement by Alvin Hand, personal interview, November 20, 1969.

both skilled and unskilled workers including miners, founders, teamsters, colliers, charcoal workers, blacksmiths, carpenters, general laborers as well as farmhands to work the company farms. Their primary job was to accumulate the raw materials needed to put the furnace into blast, which required considerable manpower. The ironmasters owned about one fourth of the slaves in the county, but also hired many from other slave owners to supplement their labor force.³⁸ These slaves were usually hired during the fall and winter months after the farming season was over. If they were hired for a year, the standard price paid ranged from one hundred fifty dollars to two hundred dollars a year including maintenance.³⁹ A contract protected the ironmaster and the slave owner. If the slave ran away or died during the year the ironmaster paid only for the time that he worked. The slave owner collected damages if the employer injured or caused the death of a slave.

Some of the slaves were efficient and trustworthy, but the majority were careless and destructive. One slave who was especially noteworthy for his efficiency and trustworthiness was James Worley, a mulatto slave owned by Montgomery Bell. Worley was a bright, shrewd businessman who had come with Bell from Kentucky to Dickson County in

³⁸Corlew, p. 37.

³⁹Cook, p. 191.

1800. He was implicitly trusted by his master and transacted many business deals for him in New Orleans, Cincinnati, and other river ports. Worley Furnace located near Dickson was named for James Worley, Bell's first-owned and highly prized slave.⁴⁰

After the Civil War slave labor which had proven such a boom to the ironmaster had be abandoned in favor of salaried workers. This spread the income over a larger segment of the people, thus strengthening the middle class and bringing about a healthier social and economic climate.

⁴⁰W. B. Leech Letters, Montgomery Bell Papers, no date given.

Chapter 6

CONTRIBUTIONS OF THE IRON INDUSTRY

The expansion of the county's economy was greatly facilitated by the development of the iron industry. It was the first industry established in the county and for over a century and a half contributed immensely to the economic growth of the area. Once established it shaped and ultimately dominated the local economy. The manufacture of iron attracted both skilled and unskilled laborers and brought the urgently needed capital into the region, influencing to a considerable degree the lives of the local people.

Even on the frontier the iron industry soon lost its primitive characteristics and achieved a notable degree of stability. By 1799 the first iron furnace established by James Robertson brought about a drastic reduction in the price of iron on the frontier, but it continued to be expensive.¹ In 1801 James Winchester, a merchant in Cairo, Illinois, wrote the following letter to General Robertson:

The Mockboy called me on last Sunday and expressed a desire to make a contract for a quantity of pork and beef to be delivered at Cairo next fall. I told him I was not prepared to give an answer, but that

¹Arnow, p. 295.

I would think of it and write the result to you. We will deliver in the December month at Cairo 10,000 lbs. of pork at \$3.00 per hundred, and receive salt in payment at \$2.50 per bushel, provided the salt be delivered in the month of August or September next. We would receive at the same time about a ton of large castings, say pots and kettles from ten to twenty gallons, a few of the smallest kind of hand ware, such as skillets, etc. Bar iron we would receive at 12 cents per lb., if good, and give produce in exchange at market price. If you accept of these in August or September next with salt, iron and castings, we will send you in return country linen for what we are indebted to you. The castings we will expect a little lower than the last we had of you. You then sent us an over proportion of small ovens. There is more than a ton of them yet on hands at this time.²

Winchester and his partner had a large business and purchased goods throughout the country, but it was advantageous to them to buy their iron at the nearest ironworks. Money was scarce during this period and buying was an exchange of products rather than selling for cash.³

During the early nineteenth century the iron industry experienced a period of great prosperity. At that time the area showed promise of becoming a major iron producing center. Many ironmasters in the county during this era operated iron stores in Nashville, selling not only pig iron, but kettles, stoves, and similar utensils that they had produced. The iron produced at the Turnbull

²Robertson's Letters, July 1, 1801.

³Albert Holt, "The Economic and Social Beginnings of Tennessee," Tennessee Historical Magazine, IX (April, 1924), 37.

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Ironworks was unsurpassed in quality, and vast amounts were available at the iron store on Union Street in Nashville.⁴

An account of the ironworks in Dickson County was written by Captain Mockbee, the son of John Mockbee. This account which was written in 1915 gives an overall picture of the economic situation of the iron industry in the county before the Civil War.

My earliest recollection goes back into the forties. I became familiar in my youth and early manhood with the iron business in consequence of a close kinship with several iron men. You will doubtless be surprised when you consider the number of these enterprises and the vast capital required to build and successfully operate them. There were thousands of men employed at the iron works, most of them slaves, but many white men were also given employment at remunerative wages, especially skilled workmen in the forges, and as founders and moulders. Moulders made pots, skillets, ovens, and andirons. The workers in the forges wrought the pig metal into shape called "Blooms" which were sent to the rolling mills.

The management of the works had to use system in the employment of their labor. As early after Christmas as possible they would start out on horse back visiting all the slave owners for miles around in order to secure labor to carry on the work for the next year.

The price paid for slave labor ranged from One Fifty, to Two Hundred Dollars a year, dependent upon experience and training. Good teamsters brought even better price.

The slaves thus employed were given, in addition to what was paid to their masters, two or three suits of clothes, one hat, three pairs of shoes and one blanket, and the teamsters were given an overcoat, and paid extra for any work done on Sunday, or beyond their usual time. If any failed to take up all his clothing allowance, its value was paid to him in money.

A weekly ration was allowed each slave of seven pounds of bacon, a peck of meal, and a quantity of molasses. They would often barter part of their

⁴Corlew, p. 61.

ration to shiftless white folks in the vicinity of the works obtaining in return melons, eggs, or indeed any other thing that suited their fancy.

In addition to clothing and feed the employer contracted to, and did supply medical aid and medicine throughout the period of the contract. A physician was employed by the year to care for the health of the men.

However, all the slaves were not hired. Many hundreds were owned by the proprietors of the works, and these fared just as well as the hired ones, receiving the same allowance of clothing and feed, and being paid alike for extra work and overtime.

My first recollection of an Iron works is when at the age of five years my mother, then a widow, lived at Randolph Furnace on Lick Creek in Stewart County. My father, John H. B. Mockbee, was an experienced furnace man and had operated this furnace, but before his death he quit the iron business and engaged in steam boating on the Cumberland River. My Uncle, Thomas Dye Mockbee, built and operated for some years La Grange Furnace on Leatherwood Creek in Stewart County. My Uncle on my mother's side, Robert Baxter, owned and operated several in Montgomery and Dickson Counties. Some time in the early fifties my cousin, Robert Baxter, Jr., bought Carroll Furnace from Wm. H. Napier, and upon his taking charge of it I went there to live with him, remaining until I was fifteen years old. While there I attended Tracy Academy, the school kept by Professor Larkins, a splendid man and fine teacher. It was in his school and under his tutorage that I obtained all the training in books that I ever received. After leaving there I was employed about the furnaces in that section until I enlisted as a soldier in the Confederate Army, where I served until the end, and then located in the State of South Carolina. I married there in 1866. Thirty years passed after my marriage before I returned to the section of my native State where I spent the days of my childhood and youth. But my acquaintance with and relationship to men engaged in the iron business made me familiar with the business and location of the many iron industries that operated there before the war.

The Furnaces and Forges have fallen into decay. Heavier, thicker growth of brush and briar mark the spot where mansions and buildings stood. The Furnace stacks built from hewn limestones, stand lonely

monuments of their builders, reminding one of the miniature pyramids that defy the ravages of time.⁵

Thousands of men were employed by the iron industry during its existence in the county. The furnace operators paid wages that were comparable to those paid by ironmasters in other sections of Tennessee. Table 4 shows the wages paid the workers at Laurel Furnace in 1842.⁶

Table 4. Wages Paid at Laurel Furnace in 1842

Work	Number of days	Wages
Hauling bar iron	1	\$3.00
Hauling coke	1	3.00
Standing guard	1	.50
Water carrier	1	.50
Furnace work	1	1.00
Skilled furnace work	1	3.00
Hauling wood		.40 cord
Cutting cordwood		.50 cord
Driving a team	114½	41.00

The Warner Iron Company at Cumberland Furnace paid the following wages to workers between 1900 and 1938: Men

⁵Cook, pp. 191-92.

⁶Laurel Furnace Ledger (Home of Miss Ruth Eleazer, Dickson, Tennessee, 1842-1843), pp. 22-95.

hauling and unloading raw materials were paid one dollar a day; workers in the mines received one dollar a day; the founders' wages were three dollars a day, and the average wage for top fillers and other furnace operators was two dollars. Many farmers in the community availed themselves of the opportunity to supplement their incomes during the long winter months by cutting cordwood for charcoal at fifty cents a cord.⁷

The iron furnaces in Dickson County were not always paying enterprises. Although a large number of ironmasters reaped vast fortunes in the area, the industry went through periodic recessions. Many ironworks struggled to survive the Panic of 1857, but revived and prospered during the 1860's. Common charcoal pig iron on the southern markets in April, 1861 advanced from twenty-eight or thirty dollars per ton, depending on the quality, to forty dollars per ton in the fall of 1861.⁸ But the Civil War closed the furnaces, damaging or destroying many with only Cumberland Furnace operating successfully after the war. The iron industry at Cumberland Furnace in 1880 produced twenty-four hundred tons of pig iron valued at seventy thousand dollars.⁹ The estimated cost to produce a ton of pig iron

⁷Statement by James A. Rector, personal interview, June 9, 1970.

⁸Charles Dew, Ironmaker to the Confederacy (New Haven: Yale University Press, 1966), p. 129.

⁹Burchard, p. 223.

in Middle Tennessee in 1880 was eleven dollars and fifty cents, the gross profit being well over 100 percent.¹⁰ One can readily see how this sort of prosperity must have bolstered the local economy.

Each iron company was a little principality with all property, equipment, and buildings owned by the company. The iron company furnished houses for the workers. These houses were erected in rows near the furnace and at convenient places on the company farms. The better houses rented for five dollars a month and the others for three dollars.¹¹ A hotel was also built at the furnace site to accommodate workers and visitors. The hotel at Cumberland Furnace was a large two story building containing twenty-four rooms. It burned in September, 1964.

One of the most important and interesting places at a furnace site was the company store or commissary. It was a profitable adjunct to the ironmaster's enterprise because of the enormous profits made on the goods sold to the employees. It was a typical country store, providing hardware, drugs, groceries, household goods, and other essential items needed by the community. The store served as a postoffice and a ready market for the company farm

¹⁰Newspaper clipping in the Dickson County Scrap-book (State Library and Archives, Nashville, August 23, 1936).

¹¹Statement by James A. Rector, personal interview, June 9, 1970.

products as well as for the local farmers. Table 5 gives the prices of some products sold at Laurel Furnace Commissary in 1842.¹²

Table 5. Price List of Products at Laurel Furnace Commissary, 1842

Product	Amount	Price
Eggs	1 doz.	\$.06
Lard	1 lb.	.08
Coffee	1 lb.	.25
Bacon	1 lb.	.08
Salt	1 lb.	.03
Meal	1 bu.	.50
Corn	1 bu.	.50
Potatoes	1 bu.	.37½
Sugar	2 lbs.	.12½
Tobacco	1 twist	.25
Apron	1	.25
Shoes	1 pr.	2.50
Shoes (small)	1 pr.	1.00
Vest	1	2.00
Shirt	1	2.00
Frock coat	1	4.50
Cambric	1 yd.	.25
Calico	1 yd.	.30

¹²Ledger of Laurel Furnace, pp. 122-180.

Mrs. Jane Suarrat was the seamstress in the commissary at Laurel Furnace. She made a ladies garment for thirty-seven and a half cents and jeans for fifty cents.¹³

The laborers received their wages in the form of credit on the company books. Accounts were kept on every transaction, the number of days worked and the total amount of purchases were recorded. When J. P. Drouillard operated Cumberland Furnace, he settled his accounts and paid the workers once a year, at Christmas.¹⁴ During Warner's ownership of the furnace the workers also received credit on the company books, but the accounts were settled at the end of each month. If the worker had not spent all of his wages at the commissary he was paid the remainder in script. Script could be spent at full value at the commissary, or at a 10 percent discount at other stores in the county.¹⁵

The commissary was the social center of the community. It not only supplied the essentials for the furnace employees, but it also served as a gathering place to gossip, learn the news, play checkers, or a place to seek entertainment.

The manufacture of iron in Dickson County did much to raise the standard of living for the people in the area.

¹³Laurel Furnace Ledger, p. 135.

¹⁴Statement by Alvin Hand, personal interview, June 9, 1970.

¹⁵Statement by Alvin Hand, personal interview, June 9, 1970.

Cumberland Furnace and other furnace towns became booming centers during the years that the ironworks were functioning. People from other iron producing regions of the United States moved into the county to work at the ironworks. There were in 1870 over one hundred Pennsylvania natives working at Cumberland Furnace.¹⁶ Young men who had learned the iron business in Alsace-Lorraine, Germany and the British Isles came to Cumberland Furnace and gave the area the benefit of what they had learned in Europe concerning the industry. Among these immigrants was Mr. John Schmitz who came to America with his family from Alsace-Lorraine after the Franco-Prussian War. He first went to Ohio to work in the iron industry there, and later moved to DeKalb County, Tennessee, where he worked at the Brownsport Furnace. After it closed he moved to Cumberland Furnace and remained there until his death.¹⁷ Many citizens living in the northern part of Dickson County are descendants of the immigrant workers who came into the area when the iron industry was at its peak.

Captain and Mrs. J. P. Drouillard who owned Cumberland Furnace shortly after the Civil War made many social and cultural contributions to the community. Mrs. Drouillard who had inherited Cumberland Furnace from

¹⁶Corlew, p. 114.

¹⁷Statement by Miss Eleanora Miller, personal interview, June 25, 1970.

her grandfather, Anthony Vanleer, donated the land and had Saint James Episcopal Church constructed. She was also responsible for the first school built in the community. The school was constructed near the church with a lodge hall on the second floor. Mrs. Drouillard employed in 1879 the Reverend Charles J. Hendley, a native of Saint Thomas, Canada. He was the first Episcopal rector to serve the church; he was also the first school teacher and the first member of the Masonic Lodge to come to Cumberland Furnace.¹⁸ Services are still held regularly in the church which contains the original chandelier, side bracket lamps and two lovely French vases that were contributed by its founder. A beautiful oil painting by Reverend Hendley hangs in the church. It depicts a cross covered with garlands of flowers said to have come from Mrs. Drouillard's garden.

The Drouillards built a lovely Victorian mansion on a hill overlooking Cumberland Furnace. Mrs. Drouillard entertained lavishly visitors from Nashville, New Orleans, and other large cities. Her guests came by boat to Betsytown on the Cumberland River where they were met by a buggy or coach and driven to her beautiful home. After the railroad was constructed in 1893 the Drouillards' guests arrived by rail.¹⁹ Today the house stands empty

¹⁸Statement by Miss Eleanora Miller, personal interview, June 25, 1970.

¹⁹Statement by Miss Eleanora Miller, personal interview, June 25, 1970.

as a monument of the days when Cumberland Furnace was a prosperous, booming, industrial center.

An unpremeditated social contribution of the iron industry is a little rock country church located four miles from Charlotte. It is located near the site of the old Bellview Furnace and is now called Rock Church. The building is made of limestone rock hand hewn by slave labor. The blocks are approximately twenty-four by twenty inches making the walls massive. The building is all that remains of what was known as Valley Forge or Upper Forge, an iron foundry owned and operated by Montgomery Bell. The building which was used as a powder magazine also provided storage for ingots of cast iron. With the decline of the iron industry this historic building has served as a meeting place for a congregation of the Church of Christ. It has the distinction of being the first Church of Christ organized in Dickson County.²⁰ Beside the church but across the drive is an old mount block made of limestone carved "1826."

²⁰Rock Church Records (Mrs. M. E. Duke, Dickson, Tennessee), pp. 1-2.

Chapter 7

TERMINATION OF THE IRON INDUSTRY

For a century and a half Dickson County showed promise of becoming a leading iron producing area. During this period there were at various times as many as seven furnaces and five forges operating simultaneously with success in the county. Before the Civil War the people in the area had dreams that Nashville and Clarksville would become leading iron manufacturing centers, rivaling Birmingham, Alabama and Pittsburgh, Pennsylvania. Dickson County did its utmost to make this dream a reality, but wars, recessions, and depressions forced the small furnaces to close, leaving only Cumberland Furnace to carry on the tradition. The county still seemed assured of a brilliant future as an iron manufacturing center in 1880 when Cumberland Furnace developed new and better iron producing techniques.¹ The turn of the century saw the industry at Cumberland Furnace still flourishing, and the First World War gave it new impetus, but the Great Depression in the

¹Burchard, p. 223.

1930's forced the furnace to close. It was obvious by 1938 that the iron industry in Dickson County was doomed.²

There were various reasons for the failure of the iron industry in Dickson County where there still existed an abundant supply of iron ore. The major reasons were the result of economic conditions. First, was the diminishing supply of forests which furnished the charcoal for the industry. After the furnaces converted to coke, which had to be shipped in from the Appalachian region, the cost of production increased, vastly cutting the profits. Other adverse conditions were: inordinately high freight rates on both raw materials and finished products, increased cost of labor, competition from larger manufacturers of pig iron, the depletion of high grade ore in the county, and a diminishing market for foundry grades of ore as well as ore of high silicon content.³

The iron ore in Dickson County is low in metallic iron content; in order to compete with the larger industries a high grade ore had to be brought in and mixed with the indigenous ore. The Warner Iron Company first purchased ore from Hickman County mines, but later it became necessary to use Michigan ore. The cost of transporting raw material from so great a distance greatly added to the cost of

²Stewart County Times, November 4, 1943, p. 1, col. 3.

³Burchard, p. 222.

manufacturing. Birmingham, Alabama in the 1930's could produce iron ten dollars per ton cheaper than Cumberland Furnace.⁴

The railroad spur track to the furnace was abandoned in 1936, and shipping had to be done by truck which was too costly for long distances.⁵ It became impossible for Cumberland Furnace to compete with the large furnaces at Birmingham and Pittsburgh.

At the outbreak of the Second World War a valiant effort was made by Cumberland Iron Company to get Cumberland Furnace into operation, but the cost of production was prohibitive. After a few months it closed never to open again.

In other sections of the county three of the old hillside furnaces of pre Civil War vintage still stand, ghostly monuments to an illustrious past, long gone. But the real monument to the iron industry in Dickson County exists in the minds of people. It is the twinkle in the eye of the old timer when he talks of the legendary operation which brought his own little world into the mainstream of national affairs. It is the pride of his voice when he tells of the dynamic role which his own county had in the shaping of American civilization. It is the

⁴Statement by Edward Hutton, personal interview, June 10, 1970.

⁵Roger Harris, "Gone But Not Forgotten," L and N Magazine, February, 1966, p. 17.

sharpened sensitivity to history which the people of the locality have acquired as a result of being in close daily contact with the substance of which history and legend are made--the bloodstains on the floor of the old brick house where it is said that the Napier family was surprised by Indians; a cannon ball saved by a furnace worker from the lot cast by Montgomery Bell for Andrew Jackson at the Battle of New Orleans; and the ubiquitous story claimed by every furnace in the area of a runaway slave who looking down from the stack, saw his master and jumped into the furnace.

But there is another group for whom the memory of the industry transcends both history and legend; it is the group whose childhood memories include the thrill of being permitted to sit up late at night and witness the most marvelous spectacle, redder than a hundred sunsets, more glowing than the aurora borealis--the casting, under an open sky, of a sea of molten red hot iron.

If one visits Cumberland Furnace today he sees atop the highest hill the old Drouillard mansion standing empty and inaccessible, its great windows staring blindly on what was once the most important industrial center in Middle Tennessee. The trestle of the railroad over which ore was brought to the furnace now sags amid the wild growth. The most poignant reminder of all, is the old furnace's crumbling foundation surrounded by toppled fire-brick stacks which form a dramatic sort of Stonehenge. This view is a ghostly reminder of the illustrious past

when Dickson County was a prominent iron manufacturing center.

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