AN ECONOMIC HISTORY OF THE JACKSON COUNTY IRON INDUSTRY

A Thesis Presented for the
Degree of Master of Arts

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Approved by:

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INTRODUCTION

"The cyclops here their heavy hammers deal;  
Loud strokes, and hissings of tormented steel  
Are heard around; the boiling waters roar;  
And smoky flames thro' fuming tunnels soar".  
--Vergil.

In early Biblical times, according to the fourth chapter of Genesis, "Tubal Cain", born in the seventh generation of Adam, was an "Instructor of every artificer in brass and iron". The slow development of iron making among the early Greeks, Hebrews, and other early peoples is well known to the economic historian. There is much evidence to prove that the Assyrians, Chaldeans and Babylonians were acquainted with its manufacture.

Prof. J. Russell Smith, in "The Story of Iron and Steel", states;

The primitive methods of the ancient world finally focused themselves so far as the Mediterranean basin and European countries are concerned, upon the so-called Catalan forge, first devised and used in Cataline, Spain. This differs but little from the ordinary blacksmith's forge, which has the air blast furnished by a bellows, or if possible by a waterfall, through the device known as the "Trompe". This consists in letting the water fall through a pipe and carrying with it bubbles of air, which escaped at the bottom of the pipe with an air-tight receptacle. There the accumulated air has a pressure derived in being carried downward in the falling water. The Germans by a series of slow improvements evolved the first form of blast furnace. This was called by the Germans the "Stuckofen", being built to a height of ten to sixteen feet, and having an output of from one-hundred to one-hundred fifty tons a year in its best form.

Many variations and improvements followed the German improvements, before the making of iron was introduced into
the United States, which occurred in Massachusetts in 1645. Then by degrees, tediously but surely, its manufacture spread throughout the colonies, chiefly because of necessity.

When Washington became President, iron was made to some extent in practically every state of the newly formed union. Proof that the use of iron was known before the white man's coming is shown by the following quotation from the "History of Iron in all Ages", by James M. Swank:

Prof. Putnam, of Harvard University, the Archaeologist, found in the ancient mounds of Ohio masses of meteoritic iron and various implements and ornaments made by hammering the pieces of meteoritic iron. This native iron the ancient people used the same as they did native silver or native gold, simply as a malleable metal. It was only after contact with Europeans that the Indians obtained iron in different forms, and in due time learned to heat and shape it as a blacksmith would do.

In the Smithsonian Institution at Washington, may be seen a replica of the early iron mine, showing an American Indian woman carrying a basket of the precious iron ore from a tunnel, which extended straightways into the earth.

Although backed by the experience of their forerunners, the iron makers of Ohio, needed unlimited courage, strength of will, and perseverance to "carry on". The development of the Southeastern Ohio Iron Region at the beginning of the 19th century, gives to the section an unusual romantic story for the economic historian. This region, which developed from such a small beginning, later rivalled with such regions as Toledo, Spain, and the famous iron region of Asia Minor.

The Hanging Rock Iron Region furnished crude iron for
use in making ordnance in England during the Crimean War, and it was highly praised by their chemists. During the Civil War, the Hanging Rock iron was again in great demand, and the region furnished the materials for building the famous "Monitor", the iron clad ship which won fame in the historic duel with the "Merrimac". One of the Hanging Rock furnaces furnished the pig iron which was used in moulding the famous "Swamp Angel" cannon used in the defense of Charleston Harbor. The Hanging Rock iron was so much in demand during the Civil War, that oftimes the iron was started on its journey to the railroad in wagons, before being allowed to cool, and many wagon beds were burned. On the industrial side the iron became equally famous for its casting qualities; it being much in demand in Cincinnati, St. Louis, Pittsburgh, and other foundry and steel centers.

Iron as we know it now is a basic material, the prices being used as an economic barometer, especially during a period of depression, through such as we are now passing. The dependence of manufacturing upon iron and steel is taken for granted. 'If a country be lacking in iron, and its close ally, coal, it is indeed in poor straits to become a commercial or industrial nation, unless transportation is so well developed that the necessary materials may be secured easily, or at small cost.

The counties which comprise the Hanging Rock Iron Region of Ohio, seem to have been blessed with a plenteous supply of not only iron ore and coal, but the necessary limestone is also found in great abundance.
The purpose of this thesis is to give a glimpse of the history of this most interesting and historical region. For this purpose Jackson County has been chosen from among the group involved, to serve as a representative area for study. The development of the iron industry in this region, beginning with the establishment of the first furnace in 1811 will be closely studied. The effect of the iron industry upon the entire region will be given cognizance, including the growth of markets and commercial centers. Concentrating the study, the development of each furnace in Jackson County will be noted, from the beginning of the industry in that county in 1836, and continuing up to the present time; hence the story of the struggle between the three major fuels, coal, charcoal and coke.

The author is indebted to the following persons for furnishing valuable information and help, that this story may be complete: Mr. H. H. Maynard, Prof. of Marketing, Ohio State Univ. who suggested this theme, and has carefully followed the preparation of it; Mr. Ray B. Westerfield, Prof. of Political Economy, Yale University; Mr. Wilbur E. Stout, State Geologist, Columbus, Ohio; Mr. Robert Jenkins, County Auditor for Jackson County; Mr. Joseph J. Jones, last manager of Jefferson Furnace, Oak Hill, Ohio; Mr. Andrew J. Dutiel, last manager of Madison Furnace, Jackson, Ohio; Mrs. Eliza Bundy Wells, daughter of Hon. H. S. Bundy, and wife of Harvey Wells, builder of the city of Wellston;
Mr. C. B. Galbraith, Secy. Ohio Arch. and Hist. Society, Columbus, Ohio; Mr. John E. Jones, present owner and President of the Globe Iron Company, of Jackson, Ohio; Mr. John S. Sylvester, Editor of the "Wellston Telegram", Wellston, Ohio; and Mr. S. J. Newell, of the "Jackson Herald".

Information and help have been drawn from so many sources that to acknowledge them all would require too much space, In addition to the above, thanks are due to the older residents in Jackson County, who worked in the iron industry, many of whom generously gave much valuable data and information.

Vernon B. Keeler

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Chapter I.

The Hanging Rock Iron Region

The name which is used to designate this most interesting and once most important iron making region in the United States, is obtained from a cliff, located on the brink of the Ohio River. This location was made famous by the old Hanging Rock Forge, which was so well described by Dr. Hildreth, in his notes of 1836, and is worthy of reproduction here:

Four miles above the mouth of the Little Sandy on the Ohio side or right bank of the Ohio River, and in the midst of the iron region, is a celebrated cliff of sandstone, called the "Hanging Rock"; the upper portion of the cliff, which is nearly four hundred feet high, projects over the mural face of the rock like a cornice of a house. The Ohio flows close to its base, while beneath and under its projecting walls, is erected a forge, for the refining of iron the blast of this immense bellows, and the thundering noise of its immense hammer, weighing more than a ton, echoing and reverberating under the walls of the cliff, affords no unapt emblem of the laborers of Cyclops, under the caverns of Mt. Etna. An abundance of iron ore is found in the vicinity, and a few miles back in the hills a furnace called the "Aetna", furnishes the pigs for the anvils of these modern Cyclops. Bar iron of an excellent quality is manufactured at this most interesting spot. (I)
four counties of Jackson, Lawrence, Scioto, and Vinton, with minor plants in Hocking and Gallia County in Ohio; and Greenup, Boyd, Carter and Lawrence County in Kentucky, embracing in all, about two thousand square miles. Considering the whole of the above mentioned region, a famous historian has written that; "It is doubtful if any similar section of the middle west can furnish so much picturesque detail of human experience and enterprise". (2)

The Hanging Rock Region is bounded on the east by the Ohio river, and on the west by the Scioto river and its tributaries. The region had a seemingly inexhaustible supply of iron ore, a splendid grade of limestone to be used for flux, and plenty of timberland to be used in making charcoal. The existence of men who were willing to take long chances upon industrial ventures, made possible the growth of this region, which was practically an unknown wilderness previous to 1800.

The following quotation will show the abundance of ores in the Hanging Rock Region at the beginning of the nineteenth century:

The limestone ores, as calcareous and argilaceous carbonates, and hydro-peroxides, or limonites, are very abundant and have been mined for years in the Hanging Rock Region of Ohio and Kentucky. They were the base of the charcoal industry of this famous region. The limestone ores derive their name from being associated with a thick and extensive deposit, of grey limestone. The iron made from this ore has always held a front rank in market; the cold blast iron, being particularly prized for the manufacture of ordnance, car wheels, and other castings. For 2. "A Standard History of the Hanging Rock Iron Region". Preface. E. B. Willard. Gen'l. Supervising Editor, assisted by Board of Dir. in various districts. Pub. in 2 vols. Lewis Pub. Co. 1916.
requiring tough iron. The counties constituting the Hanging Rock Iron Region, on both sides of the Ohio river along the horizon of the grey limestone ore, had been worked over in every hill, and the ore stripped to a depth of eight to twelve feet, forming a line of many miles of terrace work. (3)

The making of charcoal was an expensive procedure, in spite of the fact that timber land was plentiful. The numerous charcoal pits scattered about over these Southern Ohio counties, still form a fitting memorial to this industry of by-gone days. After the charcoal was manufactured at the kiln, mule teams or oxen were used to transport it to the furnace grounds. A twohundred bushel load of charcoal was usually drawn by five yoke of oxen, or by four mule teams. In many instances the coal had to be hauled a great distance to the furnace bank. It was generally figured that five cords of wood should coal one load of charcoal, which was two hundred bushels. This charcoal was used as fuel in all the old furnaces of the Hanging Rock Region, and hence the charcoal industry was at one time the leading branch of the iron making venture.

Perhaps the greatest factor in the transportation field during the first part of the nineteenth century, was the historic and beautiful "La Belle Riviere" (Ohio or Beautiful River"), so named by the French following its discovery by La Salle in 1669, this nation having exercised control of it until 1763.

A model of one of the Ohio river flatboats which plied 3. "Historical Collections of Ohio". Vol. I. P. III. Edited by Howe. Col's. O.
the waters in these early days may at the present times be seen in the United States National Museum at Washington, D. C. The keel boat used prior to the steamboat, was used for the transporation of flour and other products from Cincinnati to northern points. The old-fashioned flat-bottom boat descended the Ohio and Mississippi rivers, with cargoes of iron, and other materials, as soon as production was begun in the inland Ohio towns, thus being opened a veritable road of commerce between north and south, east and west.

The first Ohio River steamboat was built in Pittsburg in 1810-1811. It was 138 feet long, and of 300 ton burden. The following description of this boat is of particular interest:

The "New Orleans" left Pittsburg in October, 1811, and created a veritable sensation all along the river—panic and consternation—in some places which advance information had not reached. "A novel sight, wrote one contemporary journalist, 'and as pleasing as novel to see a huge boat working her way without the appearance of sail, or pole or any manual labor about her—moving within the secrets of her own mechanism, and propelled by power undiscoverable". (4)

The continued growth of this magnificent avenue of traffic is a matter of history, and shows us the immense value and importance of water traffic, especially during the days of the pioneer, when every effort was made to use the available resources at hand.

In order to reach this line of traffic, it was necessary to use the familiar pack horse, and still later the 4. "The Ohio River in History".—Harry Pence. Pub. by Ohio Valley Improvement Ass'n. Cincinnati, Ohio.1929. Page 17.
ox cart, which used roads, little better than paths through the dense vegetation of the region. The roads, in many instances, followed the creek beds where the water was shallow, and furnished a suitable foundation for travel.

Nothing which could be called roads existed in the territory west of Pittsburg at the beginning of the nineteenth century. Pittsburg was the assembling point for many a traders boat or pack train closely following the settlements in the Hanging Rock Region at the beginning of the century. The pioneer families were of the usual adventuresome, poor but hardy group, familiar in all frontiers in early days. There were only a few persons of wealth among them, but such as they were, they formed a nucleus around which might be built an industrial enterprise.

Because of necessity, the familiar country cross-roads store soon came into existence, these serving as markets, places of social enjoyment, postoffice and general utility centers; the stores carrying only articles of necessity, such as hats, caps, flour or corn meal, women's clothing, articles of dress for young and old, implements of labor for the charcoal and iron workers, and general supplies for the sturdy pioneer.

The blacksmith shop was generally considered a necessity adjunct to the general store in most of the small hamlets, and it occupied quite a place in the community life. The settlers, in need of iron implements depended upon the distant regions of Pennsylvania, or other iron
regions, to supply their wants. Little did they realize that underneath the soil in these Ohio counties, lay untold wealth in the untouched ores, and in the abundant allied products.

Iron was sorely needed for the manufacture of the need-
ed implements of labor, and for pots, pans and kitchen uten-
sils, used in the home. The blacksmith shops at Portsmouth, Hanging Rock, Chillicothe, Piketon (having a name as early as 1814) and Jackson (officially organized in 1816) all did a rushing business. Bar iron was often brought over the Appalachian mountains, by means of pack horses, the iron being bent over the horses back, so as to allow different art-
icles of merchandise to be tied to both ends of the bar.

The cities of Pittsburg, Cincinnati, and New Orleans were the pioneer's chief buying centers, beginning with the nineteenth century. Slowly it dawned upon the settlers that they must secure some commodity, which could be easi-
ly exchanged for their necessities, if they would main-
tain their trade. The following quotation sheds interesting light upon the first iron venture in southern Ohio, at the beginning of the century:

Previous to the first smelting of iron in the Hanging Rock Region, Brush Creek Furnace in Adams County, the first erected in the State of Ohio, was in blast in 1824. It was built by Ellison, James and Col. Paul. This was also the first furnace in the United States, run by steam, the engine which operated it, was built by the Pittsburg Steam Engine Co. who sent James Rogers to install it. (5)

Thus we had the beginning of the venture which was des-
tined to make its impression upon the entire section, where such an abundance of raw materials remained untouched. Cheap labor was found in the incoming pioneer, who was willing to cut the wood at twenty-five cents a cord, with other labor receiving a proportionate compensation. Little capital was necessary in the construction of the first furnaces, as they were of the crudest types.

The second venture in the iron industry was undertaken some seven years later, across the Ohio river in our neighboring state of Kentucky. In the year 1815, there lived a gentleman by the name of Richard Deering; "quite above the average of his class, and day, for enterprise and investigation, and he was also considerable of a mechanic". (6) Mr. Deering engaged in saltboiling as a vocation, and accidentally discovered the iron ore located on his lands. Having made iron in his native state of Pennsylvania, he decided to make some of this ore into pigs. Meeting with success in his small cupola, he engaged about half a dozen moulders to run the material into hollow ware.

The success of that crude attempt induced Mr. Deering in 1818, to form a partnership with David and John Trimble for the erection of "Argillite" furnace, the first iron plant to be established in the Hanging Rock Region. It was located in Greenup County, Ky., six miles southwest of Greenupsburgh, upon the left bank of the Little Sandy River. The stack twenty-five feet high, six feet bosh, was cut solid in a cliff of black slate, hence the name "Argillite", with only two sides for arches. A dam thrown diagonally across the river with a massive undershot water wheel, furnished power for the blast. The iron produced was made into hollow ware on week days, and run into pigs on Sundays.

The blast cylinder and water wheel was made by John Deering, whom his brother had engaged for that purpose. The original capacity of the "Argillite" was one ton daily, it being classified as a cold blast furnace. (7)

The task of finding a market for the surplus iron was not a difficult one, as it was easily loaded on rafts, and floated to Cincinnati, Portsmouth, and other river cities. The iron being disposed of, the lumber was sold, and the men took the first steamer back home.

After Mr. Rogers completed his work for the Pittsburg Steam Engine Company at the Brush Creek furnace, he became very much interested in the possibilities of the surrounding region. As a result of this interest the first iron furnace north of the Ohio river in the Hanging Rock Region was established in 1826. Mr. Rogers had as partners in this enterprise; Valentine Fear, Mr. Sparks, and Mr. Means, the latter becoming prominently identified with many furnaces during a later time. The new furnace was named the "Union", and it was very similar in construction to the Brush Creek furnace, turning out about the same amount of iron, from three to four tons a day.

Mr. Henry Howe, who visited this region in 1834, wrote the following concerning "Union" furnace:

Union Furnace was the first iron furnace north of the Ohio, in the Hanging Rock District, built in 1826. In 1837, a son by the same name, John Means, leased it, at first making three to four tons a day, and increased the output soon to thirty tons a week, considered unusual.

Mr. Means stated as follows: 'When I leased Union Furnace in 1837, corn sold for 12 ½ cents a bushel, and wheat for from twenty-four to twenty-six cents. Wages for compe-
tent laborers were only $10.00 a month. I made a trip to New Orleans and saw wheat sold there for a quarter of a dol-
lar a bushel; and corn on the cob, at the same price per bu-
shel. We saw no gold, and little silver coined, except in small pieces, our circulation was chiefly bills of state banks, and those were continually breaking. (8)

"Union" was located only four miles from the Hanging Rock Forge, and thus served as a splendid feeder for its im-
mense hammer. Closely following the success of "Union", furnaces began to spring up throughout the Hanging Rock Iron Region, and it was soon on its way to fame. One of these furnaces which was established in 1833, "Hecla", is shown below.

The furnace which made the iron for the famous "Swamp Angel" cannon used at Charleston Harbor.

The following figures give one somewhat of an idea as to the materials used at one of these early furnaces during a blast;

Clinton Furnace, located in the Hanging Rock Region, used the following materials in a blast of 204 days in 1836. Charcoal 307,876 bu...Stone Coal 30,277 bu...Limestone 260 tons...Iron ore 2,546 tons...Pigs Made 896 tons.

Average quantity per day. 4 ton, 7 cwt. 3 qrs. 10 Lbs.  
Average stock being. 1509 bu. bit. coal. 148 bu. Charcoal  
Iron Ore. 12 ton, 9 cwt. 2 qrs. 12 lbs. Limestone. 1 ton,  
7 cwt. 1 qr. 22 lbs. (9)  

The charcoal iron produced at these furnaces had many  
and varied uses. Superior ores were needed, the purer the  
raw materials, the more valuable the finished product.  
Strength and uniformity is required in making the best iron,  
and these qualities were secured through the use of char-  
coal fuel, and the exercise of care in choosing the better  
grades of ore. The chief use of the charcoal iron was for  
foundry purposes, where it was moulded into all types of  
castings, in the various Ohio river cities. The greatest  
handicap of the pioneers was a lack of working capital,  
outside of the transportation problem, which presented it-  
selv at every turn. As the laborers were paid only $10.00 a  
month, and the other wages and prices in line, it is not  
to be expected that any considerable savings would be pos-

sible.  

A progressive movement which proved a blessing for the  
industry for a time was the building of the Ohio Canal in  
1831-32, at a cost of $5,000,000. This canal extended from  
Cleveland to Portsmouth, a distance of 307 miles, and opened  
up a new line of trade for the entire region. This canal  
was of great aid in bringing machinery and equipment from  
the Great Lakes Region, and helped to overcome the handi-
cap of lack of transportation. However the later results  

Survey Report of 1869, given by Prof. J. S. Newberry, Files  
State Geologist.
did not bear out the wishes and hopes of its promoters, as shown by the following quotation:

In Jan. 1838, navigation was closed, and twice in the spring of 1839 the canal was closed for repairs, goods being brought to Brush Creek and wagoned to Portsmouth. To give an idea of the canal as a revenue producer, it may be said that the tools of 1837 amounted to $433,699, and $382,135 for 1838, expenses for the latter year in repairs being $214,581. In July 1855, the newspapers announced that the canal was in a deplorable donition, though in March, 1858, there were tri-weekly packet lines from Portsmouth to Columbus. By 1860 railroad competition had taken its effect, and the canal tolls had materially decreased, as witness the following figures; for the quarter ending Feb. 15, 1860, $7,150; and for quarter ending May 15, $10,568. (10)

Relying chiefly upon the new markets made available by the Ohio Canal, several new industries were begun in Portsmouth, the nucleus of the Hanging Rock Region. Perhaps the greatest and most important of these industries was the Portsmouth Iron and Steel Company, founded in 1831, it being the first plant of its kind west of Wheeling, W. Va. The President of this company was John P. Terry, who owned several charcoal furnaces, and thus made direct use of the pig iron produced. Their products were bar iron, sheet-iron nails, and like materials. At a later time they manufactured all kinds of steel, spikes, "T" rails, specializing in iron boiler plates and boiler rivets. By the year 1885, their annual product was valued at about $700,000 at per year, thus being a factor of great importance to the nearby furnaces.

In 1837 a new era dawned upon the iron business in the

Hanging Rock Iron Region, and of the country, caused by the introduction of the hot-blast. Three or four furnace men met at Vesuvius and there agreed that they would test the principle, that they would employ a man to put up a hot-blast at Vesuvius, and if it proved satisfactory, Hurd, Gould, and Co. were to pay all expenses; if a failure the expense was to be divided among all the parties to the experiment. The result was so successful as to mark a great step in the progress of the industry. William Firmstone was the man selected to install the hot-blast, the first it is believed in the United States. (II)

Thus we note that during the short term of a quarter of a century, the iron industry of southeastern Ohio was becoming well established; it being stated by a good authority that one Thomas W. Means, who kindled the first fire at the "Union" furnace, lived to see over fifty furnaces in operation throughout the entire region.

To determine the relative importance of the Hanging Rock Region with other regions of the United States, the following figures are of particular interest:

The first record of the amount of iron made, according to the U. S. Ass'n of Charcoal Iron Workers, in its journal for 1880-81, is in 1810, when there were in existence in this country 153 charcoal furnaces, 135 bloomeries, 330 forges, and 34 rolling and slitting mills, producing 53,908 gross tons of pig iron, and 36,385 tons of blooms, billets, and bars. In 1840 the number had been increased to 304 furnaces, producing 286,903 gross tons of cast iron, and 795 forges, bloomeries and rolling mills.

The Geological Survey of 1869 stated that 38 furnaces were in operation in the entire Hanging Rock Region. These furnaces produced about 90,000 tons of charcoal iron, and in addition there were five bituminous coal furnaces which produced 16,000 tons, making a grand total of 106,000 tons. Thus it is to be noted that the region was gradually assum-
ing a leadership in the iron industry, which it was to de-
velop for many years to come.
Chapter II
Beginning of the Charcoal Epoch in Jackson County

"Ay me, what perils do environ,
The man that meddles with cold iron".

Jackson County is an upland county, lying at the head of the waters. The loftiest hills are in Washington and Jackson Townships, with a few points in Liberty Township reaching 1,000 feet. The county is bounded on the north by Vinton, on the east by parts of Vinton and Gallia Counties, on the south by Gallia and Scioto, and on the west by portions of Scioto, Pike and Ross Counties. There are numerous hills and dales, formed by the waters of the melting glaciers, which occurred many centuries ago. Two means of water transportation were seemingly available for industrial development, when the idea was first projected. The Scioto River was some distance to the west, and Raccoon Creek was on the east. As we shall see, however, both of these routes proved to be impracticable.

The existence of the salt licks in Jackson County accounts for its early settlement, the pioneers coming from many distant places to secure this needed ingredient. It is known that licensed fur traders began to visit the salt licks about 1720, and that they found evidence of habitation at that time. "An edition of a map by Lewis Evans, the Welsh Geographer, published in 1755, including Virginia, and the Ohio Valley, had the Scioto Salt Licks marked on it". (I2)

Transportation facilities were indeed lacking at this early date, but the need for salt caused many emigrants to...
settle at the springs, to aid in carrying on the industry. Money was scarce, and was not often seen among the settlers. It is stated that the warehouses (such as they were) at the springs were often a type of museum, because of the various articles brought in exchange for salt. Any article ranging from a pocket knife to a saddle was acceptable as barter, and even firewater was brought in exchange for salt. Perhaps the best medium of exchange was the pelt or hide, which was in great demand. A historian of the region stated that; "Even some tax collectors and postmasters were known to take peltries, and exchange them for money required by the government". (I3)

There were two or three well known trails or roads leading into Jackson, at the beginning of the nineteenth century. One of these trails extended from Portsmouth on the Ohio River, another from Chillicothe via Jackson to Gallipolis. Relative to the early road legislation, we have the following interesting note:

The Ohio Legislature appropriated the sum of $800.00 on Feb. 18, 1804; for the purpose of opening and making a road to Gallipolis, in the county of Gallia, to Chillicothe. (I4)

The above mentioned road was the first road established in the territory now including Jackson County. The county was organized in March, 1816, its area being about 410 sq. mi. At this time the salt boilers naturally held sway in every political, social and industrial venture.

Statistics show that the population of the county in 1820 was 3,942, and in 1830 had risen to 5,941. The year 1823 saw the first venture of the traders in extending their operations beyond the county boundaries. During that year they mined more coal than was needed in their salt furnaces, and hauled the surplus to the blacksmiths of Pike and Scioto Counties. Thus began a development of commercial relationships with the adjoining counties.

As a result of better salt brine being found on the Kanawha River in W.Va. in 1826, the salt works were abandoned, the school lands were sold, and a general revival begun. The school lands were appraised at from twelve to eighty-seven cents an acre, the average amount being about fifty cents. Little did the appraisers realize that underneath the seemingless worthless timber land lay untold wealth in iron ore, coal and limestone, all intertwined in their usefulness. The land in Hamilton Township, which was to be honored by having the first iron furnace established within its boundaries, was valued at only twenty-five cents an acre.

The ore deposits in the southern end of the county were known to the Lawrence and Scioto County furnace men, but the problem of bringing the finished product a distance of twenty miles made quite a handicap. The yield of from 325 to 350 acres of timber land, that is about 13,000 cords of wood were required for the operation of a furnace. The prospect of cheap land, in the vicinity of rich ore deposits, caused Mr. Jacob Hurd, Mr. Rogers, Jacob Ricker, et al., to incorporate a company in 1836,
for the purpose of erecting the first furnace in Jackson County. All of these gentlemen had been engaged in the iron business in Lawrence and Scioto Counties. "This was the commencement of the iron industry in the county, and the engine used to blow the bellows, was the first steam engine that was ever operated in the county". (I5)

The furnace was incorporated under the name of Rogers, Hurd & Company, the incorporation being under special act of legislature. A photograph of the furnace is reproduced below.

"Jackson Furnace as it appeared about 1850"

The first manager was the well known J. M. G. Smith; Mr. Hurd was

clerk, and Mr. J. H. Ricker was storekeeper. The latter position was one of great importance, as it was at the company store that all business of the community was transacted. The furnace employees were all paid in scrip, and this was taken to the store in exchange for various commodities. Very often huge profits were exacted, one storekeeper stating that 75 to 100% was expected as a fair return.

Although the hot-blast had been proven successful, Jackson Furnace used a cold-blast, the product being used in foundries which desired the highest quality charcoal iron. The crude method of manufacturing employed in the beginning is responsible for the low output, about three or four tons a day. It was of high quality, and was much in demand. The pigs were hauled to Portsmouth, the nucleus of the region, where it was loaded on boats and taken to Cincinnati, provided that it was not needed for the mills in Portsmouth. It is regrettable that the financial crash came so suddenly at the time when Jackson furnace was just getting a start. The following quotation will show the conditions which soon became general:

Property shrank to such low value, that many people were in doubt as to whether they possessed anything except their lives and their families. The wildcat banks rapidly climbed the golden stairs, and their assets went crumbling. The necessities were cheap, and those who suffered most in those days were of the class called "wealthy", excepting perhaps the managers of the wildcat banks spoken of above. The farmer and mechanic of the west had little to complain of. Their wants were few and supplies cheap. The collapse which began about 1837, lasted over the land as late as 1842. (I7)

"There was a six foot bed of ore found along the ridge above Jackson Furnace which yielded 10,000 tons to the acre." (I6).

I6. Hist. of Scioto Valley, Opus Cit. Page 496
In spite of the advantages of plentiful supplies, etc., the furnace was sold in 1840 to the firm of Ellison, Tewksberry & Co. This group had operated other furnaces previous to their new venture, and began with high hopes of success, which hopes were well borne out.

During the year 1837, one of the most scholarly gentlemen, who ever lived in Jackson County, took up his abode in Jackson, and soon began to exercise a tremendous influence. Of this individual Mr. Howe writes as follows:

William Williams Mather, LL.D., a descendent of the family of Cotton and Increase Mather, in August, 1836, resigned from the army to take part in the Geological Survey of N.Y., and in 1837 came to Ohio to superintend the first Geol. Survey of Ohio. After the suspension of the Ohio Survey, he purchased a tract of several hundred acres including the Pigeon Roost, north of the Court House, in Jackson County, on which he built a house, and became a citizen of Ohio. (18)

Prof. Mather, assisted by Caleb Briggs in the survey, noted the abundance of materials for the manufacture of iron in Ohio, and the former decided to take advantage of the fact. Although Mather's efforts were somewhat unsuccessful, it had its effect in drawing attention to the region. One of Mather's enterprises is well described in the following paragraph:

William Williams Mather associated himself with a number of capitalists and organized the Ohio Iron Manufacturing Co., to manufacture iron, glass, pottery, and fire brick, make salt and saw marble. The company was incorporated on March 6, 1845, with a capital of $300,000. It was authorized to build a furnace in Athens, Gallia, Lawrence and Scioto Counties. This brilliant scheme never materialized, although Mather and a company built the Oak Ridge Furnace in Lawrence County, but it called the attention of capitalists to the resources here. Mather was more of a student than a business man, and succeeded better as Professor at Marietta and Ohio University. (19)

Had Professor Mather and his New England friends been able to convince the capitalists of the possibilities of the county, the development would have been more rapid. When Mather examined the coal in 1837, he pronounced it to be of the highest quality, and it was used to fire the boilers at Jackson Furnace.

As to the quality of the iron being produced in these first Hanging Rock furnaces, Mr. Howe stated in his notes of 1846 that: "It stood very high for casting, and was equal to Scotch Pig for foundry purposes". (20) Mr. Howe further stated that the iron was excellent for bar iron; the principal markets being Pittsburg and Cincinnati. At this date (1846) the four counties of Jackson, Lawrence, Scioto, and Greenup, Ky. made about 37,500 tons annually, which at $30.00 a ton, the current market price, amounted to $1,123,500. "There were twenty-one furnaces in the Hanging Rock Iron Region. Each of the furnaces employed on an average of 70 yoke of oxen, 100 hands, sustained 500 persons, consumed 560 bushels of flour, 1000 bushels of corn meal, 10,000 bushels of corn, 50,000 lb. of bacon, 20,000 lbs. of beef, 1,500 bushels of potatoes, besides other provisions, and tea, sugar and coffee in proportion". (21)

The coming of winter found hundreds of wood-choppers emigrating from their mountain homes in Kentucky and W. Va. to the furnace regions of the county. The constant moving about, and the association of the Jackson Countians with the inhabitants of the river cities, brought about new modes of living, and improved means of manufacture. Soon the one room cabins gave way to more spacious dwellings.

to more modern dwellings. During the year 1847 the town of Jackson was incorporated, and the community at large began to take on new life.

The migrations of persons from Lawrence and Scioto County into Jackson County served a good purpose, when a new furnace was projected in 1848. This second venture in the County was promoted by John Campbell (22), the well known furnace man of Lawrence County. Many of the residents of Keystone and the neighboring villages, had served apprenticeships under Campbell, and thus provided experienced labor for the project. This new furnace, the "Keystone" was to be located on Raccoon Creek, and it was planned to make use of the creek for transportation.

The attention of the community was drawn upon the lack of suitable transportation facilities, by the promotion of the second furnace. A corporation was organized for the purpose of making the creek navigable for travel. "The Raccoon Navigation Company consisted of James Riggs, Nicholas Thevenin, Alexander Williams, James Lewis, Charles Giles, Joseph S. Coombs, A. Bentley, and Moses R. Matthews. It was incorporated Feb. 4, 1848, with a capital stock of $100,000. The commissioners of Gallia, Jackson, and Athens Counties were authorized to subscribe to the said stock, any amount not to exceed $20,000 each. The survey completed, the work was begun, but the possibility of a railroad killed the enterprise." (23)

22. Howe stated; "To no other individual is so much due for developing the resources of "Hanging Rock Region". - Hist. of Ohio. 23. Hist. of Jackson County. Opus Cit. Page 167.
In a like manner experiments were made on the western boundaries of the county, to determine the practicability of using the Scioto River for traffic. During the winter of 1847-48 several steamers began to carry on trade along the river going from Portsmouth toaverly, the last steamer attempting to make it a paying business was launched in Oct., 1860, and it continued to make trips until 1861. This steamer was called the "Piketon Belle". The navigation on the Scioto never reached a point beyond the experimental stage.

Undaunted by failures to navigate the Scioto and Raccoon, Campbell went ahead with the "Keystone" project. The furnace was erected by John McConnell and Company, and the stack was thirty-four feet high, being built in the side of a sandstone cliff. (24) The furnace was somewhat more productive than the

Photo from Wilbur Stout, ca. 1850

Keystone Furnace about 1850
24. See appendix for complete statistics on this furnace.
first furnace to be built in the county, and produced from eight to ten tons of hot-blast iron a day. The iron was loaded on rafts, which were built of heavy logs; the whole outfit was then floated down the creek during the spring freshets to the Ohio River, and thence to Cincinnati. The method proved quite hazardous, due to the mill dams, where several men were drowned, in attempting to get the rafts over the incline. This plan of shipment was soon abandoned, and the iron was hauled to the Ohio river, although it was about twenty-five miles away.

Shortly after the furnace began, quantities of flint was found in the ore, and many of the stockholders sold out. Their fear proved groundless, as "Keystone" became one of the most successful furnaces in the county. It passed into the hands of Green, Benner and Company in 1853, and they operated it for many years, it being one of the last to close down.

"Keystone" like many other furnaces of the region in early days never ran a day on Sundays. This custom of closing on Sundays was begun by Robert Hamilton at Pine Grove Furnace on Dec. 20, 1844, and furnished a valuable precedent for others. (25) In Europe it was common for the furnaces to be rested on Sunday's, one famous manager stating that; "We do not claim to make as much iron in six days as we could in seven, but in the long run, a year, Sabbath keeping furnaces make more than those which do not rest." (26)

During the year 1851, a third furnace was projected in the county, the "Buckeye", which was located only a few miles

notth of "Keystone". As noted in the photograph below, it differed but little from the other furnaces in the county. The stack was 37 feet high, and it produced from 10 to 12 tons a day. It was built in the side of a cliff, the opening being plainly visible, in the center of the photograph shown at the left. The company purchased 4,500 acres of land about the furnace, and employed the firm of Newkirk, Daniels & Co. to erect the plant, a hot blast stack.

Buckeye Furnace Stack as it is today.

Relative to the merits of hot-blast vs. cold-blast iron, as produced by the various furnaces in 1850, the following quotation is of particular value:

Most ores, when smelted with cold-blast, will make an iron which will have a more uniform and lasting chill than when smelted with hot-blast. Some ores are affected more injuriously than others. Semâ, when smelted with hot-blast, make an iron not better than the average of anthracite iron. We know of no red or brown hematite ores, which will not make a better iron when smelted with cold-blast. (27)

The following query also brings out the fact that charcoal iron was considered more valuable for castings than other irons, different factors being equal. The Lobdell Car-Wheel Co. of Wilmington, Del. was asked what advantages charcoal pig iron 27. Jour. U.S. Ass'n. Charcoal Iron Workers. 1882-1883. Report of Lobdell Car-Wheel Co. Wilmington, Del.
possessed over other fuels for chilled castings, with the following result:

All of our wheels are made of a mixture of different kinds of charcoal iron. We suppose that a reasonable good wheel could be made of a mixture of other fuels, but a better one could be made of charcoal iron. Wheels made of iron smelted with charcoal will have a more uniform and lasting chill than if the ore is smelted with anthracite coal or coke. We know of no wheel that is equal to a good chilled cast-iron wheel, made with proper care and of the proper material, if safety and economy are considered. (27)

Following the establishment of the Hocking and Scioto Railroad in 1852-53, several new markets were created for iron, and the industry received a great impetus. "Keystone" hauled no more iron to the Ohio River, but brought its iron to the railroad at Keystone Station, and to Jackson, where it was shipped to its destination. The larger amount of the hauling was done in the summer, when the roads were in a more passable condition. The greatest iron market for the three furnaces in the county was at Pittsburg, although Wheeling, Cincinnati, and Marietta received large shipments.

The town of Jackson itself used a small amount of the iron produced by the furnaces, in its two foundries. The Jackson Foundries and Machine Shop was founded in 1847, at a cost of about $10,000. It made hot-blast car-wheels, and all kinds of castings, especially desirable for furnace equipment. It employed about a half dozen men in the beginning. Three years later the "Old Jackson Foundry" was established. This establishment manufactured about the same type of article, with one exception; they introduced the cast iron stove in the community. Pickrel and Company built the latter named foundry at a cost of about $11,000.
When the news of the Scioto and Hocking Valley Railroad was spread during the early fifties, the furnaces at once began to stack their iron along the right-of-way, that they might take advantage of the first opportunity. Buckeye Furnace had large stacks of iron piled up at Jackson, and thus was one of the railroad's first customers. Another result of the coming of the railroad was the establishment of the first bank in the city of Jackson. People realized that with new outlets, commerce would develop, and new industrial and economic changes would be inevitable. The following notice appeared in the Jackson Standard, in August, 1851:

Bennett and Company have established a bank in Jackson, and are prepared to loan money on short time, in large or small sums, upon approved security, and also purchase good negotiable paper and county orders on favorable terms. Office for the present over the Auditor's office. Bank open from 10.00-12.00 M.

Chapter III
Dawn of the Railroad

Prior to 1827 all the railroads built were composed of wooden rails, and constructed only for the purpose of carrying heavy materials very short distances. In 1827 the Baltimore and Ohio Railroad was chartered by the Maryland legislature, and this was the first Railroad opened for carrying passengers. It was opened for travel from Baltimore to Ellicott's Mills, a distance of thirteen miles, on May 24, 1830, and completed to Washington City on August 25, 1834.

By the year 1837, when the first furnace was operated in Jackson County, there were only 1,497 miles of railroad in the United States, with a total of only 4,021 by 1850. When the railroad fever reached the "Buckeye" state about 1850, Jackson County was an anxious prospect for the "Iron Horse". Accordingly, in 1851, promoters were brought to the southern Ohio counties, to secure subsidies, etc, with the expectation of building a railroad. The County Commissioners purchased stock readily, which later proved to be worth only about twenty-five cents a bushel at a paper mill.

The first Jackson County railroad project was the "Iron Railroad". A charter was issued by special act of legislature, March 17, 1849, and the capital stock was fixed at $500,000. Lawrence County was particularly interested in this line, as it would bring the iron and coal from the northern part of her boundaries to the Ohio River. It was proposed to build a line from the present site of Ironton, in Lawrence County, north through Jackson County, and connect it with the Marietta and Cincinnati project in Vinton.

County. The necessary capital could not be secured, and the matter was dropped for the time being.

Two years later, in March 1851, the County Commissioners of Jackson County subscribed $100,000 to the "Scioto and Hocking Valley Railroad. An agreement was reached whereby a release was to be given upon their contract with the "Iron Railroad", that the county might not lose thereby. The Scioto and Hocking line crossed the Jackson County boundary line in May 1853, and thus became the first railroad of this section. The line opened up a new line of trade to the north via Columbus, and other northern points, and later became a great rival with the Ohio River route.

It was at first intended that the "Scioto and Hocking" would be extended to Newark, Ohio, but the Marietta and Cincinnati R. R. began a law suit, which caused much delay. The road was stopped at Jackson, but after a time it was completed to Hamden, where it made connections with the M. & C. R. R., and the Newark and was abandoned. The right of way for these early roads was secured mostly by easement, and was one-hundred feet wide. The Scioto and Hocking Valley road later became the property of the Baltimore and Ohio.

Immense limestone deposits at Eifort made available by R. R.
Immediately upon receipt of the news of a railroad, preparations for improvements in marketing facilities and better production was begun. The old settlement called Portland, in the southern part of the county literally moved west, the old public square was abandoned, and the buildings were erected several hundred feet to the west to be near the railroad. The new settlement, Oak Hill, was composed of many Welsh, who came to the country between the years 1810-20. The city of Jackson benefited more than any other part of the county. Churches and schools were built, more than one hundred different types of buildings were erected between April 1, 1853, and November 1, 1855. (29)

During the year 1853 the Scioto Furnace Company, also known as Robinson, Gildden & Co. established the house of Peter Powell & Co. at Oak Hill. Its purpose was to sell goods, and buy iron ore for Scioto Furnace, which was located in Lawrence County. (30) In addition to the Scioto Furnace agents, other furnaces gradually established agencies for securing ore and charcoal, and it is regrettable that so much material was taken from the county to be manufactured elsewhere.

30. "The Scioto Fce. Co. bought one acre of land from James Kennedy a quarter of a mile west of Cackley's Switch for one hundred and a quarter of a mile west twenty dollars. It was on top of a hill, and the dirt was plowed and stripped down, the ore on the entire acre was taken out. It yielded a little over 4,000 tons of good ore. This is a fair average for that region, and shows that the lands are cheap at $2,000 an acre"—Davis Mackley. Article in Jackson Standard. about 1860.
The impetus given to business by the first railroad soon led to the establishment of another. The Marietta and Cincinnati Railroad was extended to Byers in the northwestern part of the county on June 4, 1854. Coach lines were then established between Byers and Jackson, in addition to the existing lines running between Jackson, Chillicothe and Gallipolis. This stage line between the latter cities left Gallipolis on Tuesdays, Thursdays, and Saturdays, at 4 A. M., and arrived at Jackson at 12:15 P.M., and reached Chillicothe at 8.00 p.M. the total distance between Gallipolis and Chillicothe being about sixty-five miles.

The three furnaces which were in operation when the railroad was completed in 1853-54, were Keystone, Buckeye, and Jackson. These furnaces rapidly made plans to expand their business, and felt much more confident as to the future of the industry. The firm of Green, Benner & Co. assumed the management of Keystone Furnace, in 1853, and greatly expanded the holdings. Jackson Furnace, under the control of Ellison, Tewksberry & Co. was now enabled to load their iron at a nearby point. As has already been stated Buckeye furnace had large stacks of iron at Jackson, awaiting the coming of the first train. This iron was soon on its way to Columbus, Cincinnati, and Chicago. The cold-blast iron was selling at thirty-forty dollars a ton, and greatly in demand.

When the Scioto and Hocking Valley road was completed
to Hamden in 1855, giving a direct route to Cincinnati, six furnace projects were begun. The Iron Valley (later the Cornelia, and still later the Lincoln) was built in 1854, by Thompson, Laslie & Co. at a cost of $115,000. The company purchased 5,000 acres of land in the immediate vicinity. The "Lincoln" furnace was constructed somewhat differently from the others, in that a part of the stack was hewn from the solid stone of the cliff of which it was a part, and the blast was sent thru a tunnel driven through the rock in the same manner. An interview with an old resident of the vicinity, Mr. Sent Thorn, developed that he remembered of having seen the ox teams dragging the heavy loads of iron over the hill, following the creek valley for a short distance, to the loading place at Hamden Junction, about six miles away. Mr. Thorn stated that the roads were practically impassable during the winter, and that most of the hauling was done in the spring and summer. About the time of the Civil War, a branch line of the railroad was constructed to a point within a few miles of the furnace, and this aided materially in its growth.

"Latrobe" furnace was built in 1854, a few miles to the southeast of Berlin. The capital stock of Latrobe was $60,000, and the company was composed of William McGhee, H. S.
Bundy, H. F. Austin, and R. C. Hoffman of Jackson County, and V. B. Horton of Pomeroy. (32) Block and kidney ore were both found in abundance on the company's land, the latter being extensively used. Limestone was also available, as well as coal for use in firing the boilers.

"Madison" furnace also erected in 1854, was in the center of vast ore deposits. Portsmouth capital was largely instrumental in building this furnace, backed by Mr. John Campbell, veteran furnaceman. Madison's product was largely disposed of at Portsmouth during her first few years of operation. The first shipment of iron was in July 1854, from the siding at Cross Roads, about three miles from the furnace. (33)

It is regrettable that the same conditions did not exist at the time of the completion of this group of furnaces, as existed the year before. (1854) Iron which sold for $50.00 in 1853, sold for $35.00 in 1854. All business except farming began to lag, and practically all the furnaces which had been erected were unable to run, due to lack of funds. The persons who had swarmed to the county with the prospects of the railroad and the iron industry, now began to go elsewhere, and this continued for several years. (34)

The largest of the group of six furnaces erected in 1854 was the "Monroe", organized under the name of the Union Iron Co. The same group also owned the Madison furnace, and the Washington furnace, which was however across the county line in Lawrence County. Col. Wm. M. Bolles, a nephew of Prof. William Mather, the first State Geologist, was in active control of "Monroe" furnace. It made an average of eighteen tons a day, as contrasted with twelve and fourteen tons, the capacity of its competitors. (35) Cambria furnace was built at a site, which is now called Blackford, by a group of Welshmen. It was incorporated by David H. Lewis & Co. Many of the Welsh settlers traded

Birds-eye view showing "Jefferson" furnace and surroundings.  
35. See appendix for sizes various furnaces.
their homes, land and belongings for a share of stock. Practically all of the timberland was secured by this method. Thomas M. Jones was one of the first managers of "Cambria", and he proved to be quite successful. (36)

The most successful, as well as the best known furnace established at the beginning of the railroad era in 1853-54, was the "Jefferson" furnace. It was erected by a company of Welshmen, who had become dissatisfied with their connections at "Madison" furnace. (37) The barren, bleak and heavily wooded hills of that part of the country hid a wealth of rich limestone ore that was almost self-fluxing.

The following quotation is very descriptive of the foundation of Jefferson Furnace:

A joint-stock company was organized in Jan. 1854, under the leadership of Thomas T. Jones, David Edwards, et al, all Welsh, the capital being $50,000, and divided into shares of $500.00 each. Many of these stockholders traded land to the company in exchange for stock, some giving as much as 160 acres at $12.00 an acre, reserving the land where their buildings stood, and the right to cultivate what had already been cleared. Some of the less fortunate persons offered to allow their accumulated wages to be applied as part payment for stock. Although the company had a large amount of paid-in capital, it was necessary to go into debt considerably to build their plant. The firm had in the beginning 2,000 acres of timber land, valued at $24,000, and cash for the value of $26,000 fully paid. A peculiar statement in their constitution provided that none but persons of Welsh birth could hold stock, and that the furnace should be always shut down on Sundays, as was common among other early industrial enterprises. (38)

36. The iron from this furnace was hauled over the hills to "Gallia Landing", the first railroad stations being termed "Landings", taken from the language of the river men.
37. Interview with Andrew J. Dutiel, Last Madison Fee. M'ngr. 1931.
Relative to "Jefferson's" beginning, Mr. Jones the last manager of the furnace states that; "The first cast was on Oct. 15, 1854, and in the following winter they made 300 tons of iron, which turned out to be of superior quality, for car wheels and machinery. It produced about four or five tons a day in the beginning, although in a short time, it was casting about 10 tons a day. (39)

In a short time "Jefferson" iron became known as a standard of excellence throughout the Hanging Rock Region. It was sold under the trade name, "Anchor". The iron from this furnace was loaded at Oak Hill, three miles away. It was hauled to the station by large cumbersome wagons, drawn by three ox teams. The haulers worked in two shifts of twelve hours each, beginning at sun-up. Some residents of the Jefferson neighborhood have stated that many mules and oxen were killed in pulling these heavy loads of materials up and down the seemingly impassable roads. The photograph below gives a splendid impression of the manner in which the hauling was done.

39. Interview with Joseph J. Jones. Last Jefferson Manager. 1931
The business depression which began about 1856, was a great handicap to industrial growth. So far as can be determined, none of the furnaces were making profits during the years 1856-1860. (40)

Several of the furnaces were out of blast for long periods of time, due to lack of capital, and surplus stocks, caused by the general depression. Jefferson furnace suffered along with the others, "a part of the company holding about one-third of the whole stock contracted the "Go West" fever and sold out their interests to the remaining members for $900.00 a share, thus nearly doubling their money in two years' time". This threw the officers into additional debt, and they advertised the furnace for sale about 1860, but no offer came, and necessity forced them to make the best of things.

Undismayed by general business conditions, another charcoal furnace "Limestone" was constructed in 1855. Splendid workmanship was displayed in its erection as is shown in the photograph below. Limestone differed but little from the "Madison", and was located only a few miles north of the latter named furnace. Although situated in the center of a rich bed of ore, the lack of capital soon made it evident that it would

40. Scioto Valley History. Opus Cit. Page 669. This text further states; The policy of Jefferson was to get all additional timber land possible, and save their own for later use. They sometimes bought the land, then sold it after they cut the timber off". —
not be a success. The year following its construction, (1856) it was sold to another firm. In 1858 it passed into the hands of a receiver, and by 1860, was out of blast entirely. The owners were constantly handicapped by lack of capital. (41)

The following items of interest concerning "Limestone" furnace were given by an old resident of the neighborhood;

John Williams was the foundryman, or the man that "Blowed the furnace". The ore was secured chiefly on the Williams farm, only a few miles away. They hauled loads of iron to the siding, and returned with loads of ore. The iron was first hauled to Crossroads Landing, and later tointon Switch, as in the latter case direct contact was secured with the Columbus route. As many as sixteen teams were engaged in hauling during the summers, and they were paid about $15.00 per month. Labor received 75 cents a day. The charcoal was secured largely on the company's land, and the wood-choppers were paid from 30 to 50 cents a cord for cutting the necessary wood supply. (42)

During the year 1854, one year before the construction of the last charcoal furnace to be erected in Jackson County, the following article appeared in the "Jackson Standard".

We understand that on or about the 20th. inst. there will be experiments made to bring into use the Jackson coal for iron making. The Washington Furnace has made preparations to test the matter in full and decided satisfaction. Much depends upon the success of this important matter. If it is possible that our coal can be used in the manufacture of iron, Jackson County can build all the railroads in the State. Her wealth can be surpassed by California. We look with an anxious eye to the success of this great and important experiment. (43)

Unfortunately no statement can be found relative to the actual result of the above experiment, but it was

42. Interview with Pat Varley. Wellston, Ohio. March, 1931.
seemingly regarded as a success. Coal had been mined in the county since 1823, and it was used to a great extent throughout the entire region for firing the furnace boilers. It was argued that if raw coal could be used in the Mahoning Valley furnaces of Ohio, and also in the Shenage Valley furnaces of Ohio, and also in the Shenago Valley of Pennsylvania, it was reasonably expected to be successful here. At least the following article appeared in the "Jackson Standard" in 1855, which added to the enthusiasm;

Mr. Joseph Crowther has succeeded in Coking or rather charring Jackson Coal, which is in every sense of the word calculated for furnace use. Our furnace men say that it will answer the same purpose as charcoal, for making iron.

The news of the coal possibilities brought on another slight boom, and several projects resulted therefrom. The year 1855 brought the first telegraph line to the country which proved to be a great aid to communication. The first daily line of stages was started from Jackson to Byers Station, on the Cin. & Marietta R. R. in July 1855, thus giving a daily line to Cincinnati. An attempt was also made to bring another railroad into the county, as noted in the following paragraph;

This new railroad was to be known as the "Hillsboro, Jackson and Pomeroy". An organization was effected, and work begun in 1856, with a number of Jackson men taking the initiative. Considerable grading was done, but the promoters had not considered the fact that they might be infringing upon the rights of another road. The Marietts and Cincinnati railroad, which claimed that the road would injure their business, secured an injunction, and thus ended the project. Some of the local contractors, including Bannister Brown, Abraham French, J. M Martin and C. M. Martin lost all they put into it. The stockholders like-
wise lose heavily. The old road bed west of Jackson was later made use of in the building of the Detroit, Toledo and Ironton road. (44)

They year 1856, found another furnace in the process of construction in the town of Jackson. "Salt Lick" furnace was built by Peter Powell, Alexander Gratton, and R. C. Hoffman. "It was built in a vicinity where both timber for charcoal, and iron ore were several miles away. They owned little land, depending upon buying the materials and hauling it in wagons." (45). This visionary project could have but one future, and such was the result. The charcoal was too expensive to be hauled to its grounds, and the long hauling costs were prohibitive. This failure had some good results however, because following its failure; David Todd and Allan Hallowell of Youngstown, experienced stone-coal workers in the Mahoning Valley were secured to experiment here. Unfortunately too much sulphur existed in the stone-coal which they secured from the hills, to make it successful in the reduction of ore. Hence the first stone-coal furnace in Jackson was a disaster failure. The furnace was allowed to decay, very little work being done after 1860, and it was dismantled in 1867.

The first furnace constructed especially for the use of stone coal as a fuel was also built in 1856, and was known as the "Young America". It was located at Petrea, three miles N. W. of Jackson. The company consisted of L. A.

44. Interview with Mr. S. C. Crossland. Partner in Martins store. Founded '44.
Atkinson, J. W. Laird, J. H. C. Miller, N. T. Cavett, Geo. B. Walterhouse, Miles W. Vance et al, Mr. T. M. Jones aiding in its construction. These gentlemen were more experienced in law and politics than in iron making, and the venture was a complete failure. It never operated over half the time, and when a receiver was appointed in 1860, the plant was razed to the ground. Thus came the untimely death of Jackson's second stone-coal fuel furnace. The machinery was sold to the Orange Furnace Company of Jackson. Many Jackson citizens lost thousands of dollars in this ill-advised scheme.

A copy of the scrip in common use among the furnaces, in addition to its use by Young America Furnace appeared in the Wellston Telegram, on Feb 27, 1930; which stated that it was printed on thin India paper, so that a hundred could be slipped into an ordinary billfold. The production is given below:

Young America Furnace Company. No. 1778. June 15, 1858
The holder, having surrendered his certificate, has credit to the company's store for the sum of One Dollar, payable in merchandise on demand.

By order of the directors,
J. S. Miller, Secy.
Storekeeper will only issue checks in his charge department for financial convenience, never for circulation as money.
There was a feeling of discouragement, due to the fact that the stone-coal fuel was seemingly unfit for use. A mere accident resulted in the discovery of a new vein of coal in the town of Jackson, which in every way seemed suited to furnace use. In 1859, James L. Rice sunk a well near his flour mill, and upon finding a vein of coal, used some of it in his stoves. Upon further investigation the shaft showed a four feet vein of superior coal. The secret of the Jackson Shaft Coal, lies in the fact that when borings are made, an abundance of salt water is found, instead of the usual fresh water. Sulphur will not mix with salt water, and hence the coal is practically free from sulphur, which makes it ideal for use in the reduction of iron. The discovery of this splendid coal vein was of immense value to Jackson County, and meant the continued growth of the iron industry.

In closing this chapter it may be noted that seven charcoal furnaces, erected during the railroad era existed for all due to the influence of the railroad. Although the stone-coal furnaces were closed down, there was plenty of usable fuel 75 feet beneath their own properties.

Although the railroad was purchased for a high price, its influence was felt in every town, hamlet, and village in the section. It led to immense changes in the industrial, social and educational life. The population of Jackson doubled during the decade, and a spirit of optimism prevailed in 1860, in spite of the prevailing bus-
iness depression. Many of the furnaces were shut down, but all looked forward with high hopes.
Chapter IV

Effects of the Civil War and Introduction of Bituminous Coal

Due to the business depression which began about 1857, great quantities of iron was stacked by the furnaces, and this remained on their hands in 1860. Credit had been extended to the furnaces, although several were forced, by lack of capital to cease operations. Scrip and negotiable instruments became more common in the payment of labor, and none of the furnaces paid dividends during the years 1857-1860.

Mr. John Means, veteran furnace man, and owner of several Lawrence County furnaces, gave the following information relative to conditions during the years immediately preceding the war:

From 1854-1861 I kept my furnaces going, but sold very little iron, only enough to keep me in ready money. I had an accumulated stock of 16,000 tons. Charcoal iron was selling at between $10.00 and $14.00 a ton. In 1862 it advanced to $40.00 a ton, which I thought a fine lift, but in 1864, it netted me $50.00 a ton. For eight years before the war, nearly all the furnace owners were in debt, but creditors did not distress them, for they were afraid of iron, the only asset they could get, so they carried their customers the best they could, hoping all around for better times. We Are Alright Now, And So Is the Country, If The Fools Will Quit Tariff Meddling. (46)

Prior to the breaking out of the Civil War, the U. S. Government had made a test of different irons, with reference to its suitability for making ordnance. It was found that the coldblast iron made in the Hanging Rock Region

was equalled only by; "Results obtained from the two furnaces, respectively, at Toledo, Spain, and in Asia Minor". (47) As a result the Fort Pitt Works at Pittsburg, began to make heavy demands upon all the Hanging Rock furnaces, in many instances using every ton of their output. The hot iron was hauled to the railroad, without a chance to cool, in some instances the wagon beds were burned.

Before long the accumulated stocks were disposed of, and the scarcity of labor was quite a problem for the furnace owners. Many of the furnaces, including Keystone, and Diamond, raised troops of their own, put foremen in charge of them, and sent them off to the war.

Perhaps the most outstanding manufacturer of iron for the government during the war period was Jefferson furnace. The Government offered several times to take the entire output, but the managers would not allow their old customers to be neglected, and hence the agreement was not consummated. "Jefferson" furnace had thousands of tons of iron stacked on its property in 1860-1861, which was worth only $14.00 a ton. Then came the big opportunity, and they made good use of it. The price soared to $40.00, $60.00 then $90.00 a ton. The iron from this furnace, which was sold under the trade name of "Anchor", became a standard of value. "The big guns at Harper Ferry were made from Jefferson Furnace iron, one of them weighed sixty tons, and used 47. Geol. Report of 1884. Files of State Geologist. Columbus, Ohio.
eighty tons of crude iron in its construction. (48) The furnace paid first dividends in 1861, and then commenced one of the most prosperous eras in furnace history, for "Old Jefferson. The dividends paid by "Jefferson" from 1861-1881 are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Dividends</th>
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<tbody>
<tr>
<td>1861</td>
<td>10%</td>
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<tr>
<td>1862</td>
<td>20</td>
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<td>1879</td>
<td>30</td>
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<tr>
<td>1880</td>
<td>200</td>
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"Jefferson" furnace, which supplied iron for construction of the famous "Merrimac"

48. Article in Jackson Herald, Feb. 17, 1900. This article (con't on following page)
Another furnace in the county which profited greatly by war orders was the "Lincoln", which was leased by the Iron Valley Furnace Company to the firm of Radcliff and McGhee, in 1861. McGhee bought out the interest of Radcliff in 1863, and continued a successful career. "Latrobe" furnace likewise made great profits during the war, and turned out some of the best iron ever produced in the county. "Latrobe" was purchased by Hon. H. S. Bundy during the war, and the plant was arranged in such a manner that either hot or cold-blast iron could be produced. Bundy and H. F. Austin also purchased "Buckeye" furnace in 1862, for the sum of $50,000. In 1864, the firm was sold for Terry, Austin and Company, who ran it until 1867 when the "Buckeye Furnace Company" was assumed to take control. The frequent changes at Buckeye furnace is illustrative of the way in which frequent reorganizations took place in the management of practically every furnace. Many were the individuals who lost heavily on these reorganization devices, and but few of the furnaces in Jackson County escaped the inevitable receivership proceedings, at some stage in its career.

Monroe and Cambria furnaces were unprepared to profit greatly during the war, the former was in the hands of a receiver, who sold off large quantities of the land. Cam.

Further states that. "The iron-clad Merrimac" was constructed from Jefferson furnace iron". Recorder records. Jackson County Court House Jackson, Ohio.
Furnace was badly in need of repairs; it made some iron during the war, but largely due to lack of foresight, was placed in the hands of a receiver in 1864. "Jackson" furnace, the first to be established in the county, was becoming obsolete, and no attempt was made to bring it up to date. Due to the impetus of war orders, progress was made for the time being, and the furnace was then again neglected. "Madison" furnace, which was managed by Portsmouth interests made rapid progress both during the war, and after its consummation. Their policy of constant replacement of obsolete machinery, conservation of timberland, and the purchase of coal land stood the furnace in good stead for many years to come.

The high price of iron during the war caused another slight boom in the industry, one immediate effect of which was the building of a stone-coal furnace within the corporate limits of Jackson. The "Orange" furnace had been planned as early as 1853, but various obstacles prevented its construction. When a coal shaft was sunk on the southeast corner of Locust and Pearl Streets, it was found to yield a high quality coal, practically free from sulphur. This greatly encouraged the promoters, and construction was immediately begun. The company was composed of Lewis Davis, Alanson Robbins, Peter Pickerel, and D. D. Dungan, and was incorporated as the Orange Furnace Company. Augustus and James Watson of Cincinnati were
also instrumental in the erection of the furnace. These later named gentlemen were not particularly interested in the business, except as an investment, and when they purchased a controlling interest, the end seemed near. "Orange" ran a part of the time for a few years, and went into the hands of a receiver.

The first cast at Orange furnace was on Sunday, May 21, 1865. (50) The furnace was located directly over an immense vein, but this factor alone could not make up for poor management, and inexperience. During the second receivership, under Van Dyke, a large amount of coal was mined and shipped out of the city. A new coal-burning locomotive was placed on the Portsmouth branch of the Marietta and Cincinnati Railroad about 1865, and thus developed a new use for the shining carbon. In 1867, the Orange Furnace boilers blew up, and scattered parts all about the town. Some repairs were made, and a small amount of iron made until the panic of 1873 gave it a death-dealing blow. The furnace was torn down, and the land was sold by the Cincinnati bankers, for use as town lots.

The fourth stone-coal furnace to be put in operation in the county, in spite of the failure of three others was the "Star" erected in 1864. The Star Furnace Company was composed of John M. Jones, Ezekiel T. Jones, (Who had superintended the erection of "Orange") Alanson Robbins, David Dungan, James Chestnut, B. Kahn, and Isaac Brown.

The capital stock was $60,000. "Star" had the first iron stack ever erected in the county. It was also one of the most modern furnaces of its time. The machinery was purchased from the Oak Ridge Furnace Co. of Lawrence County. "Star" made about 12-15 tons of iron per day in the beginning, but quickly increased its production. The coal seam underneath its property in the N. E. section of Jackson was practically free from sulphur. The firm had splendid management, the markets were well studied, and the furnace from the start had a successful career. Thus the beginning of this furnace really marked the successful approach of the bituminous coal era for Jackson County.

It was now realized by prominent furnace men that the struggle between charcoal vs. stone-coal iron would become more intense as the years rolled on. Considering the whole of the United States, the following quotation is of particular interest, although the same situation did not exist in the Hanging Rock Iron Region of Ohio;

From 1840 there had been what is usually termed a decadence of the charcoal iron industry; it is however more of an overshadowing. Many of the furnaces, forges, and bloomeries which were in operation in 1840 are permanently abandoned. Some of these works were forced to cease op-
erations by reason of the denudation of forest lands, and their conversion into arable tracts; while others, owing to their location being distant from a suitable ore supply or from railroad facilities, have been unable to compete in the market with more favorably situated furnaces. (51)

In spite of the above mentioned conditions, which existed in the country at large, the Jackson County furnaces fared rather well, until about 1880, when a sudden downward trend developed. The problem of self-preservation was an ever present one however, in the face of the large production of the new stone-coal furnaces. Hon. H. S. Bundy, who had purchased two furnaces in the country, made several noticeable improvements. The tonnage capacity at "Keystone" was increased from 10 tons to 24 tons a day between the years 1870 and 1880, and about 100 men were employed at various tasks. (52) Bundy also initiated a new program of experimentation at "Latrobe" furnace. Heretofore all the furnaces followed somewhat of a re-forestation plan, but H. S. Bundy converted the land to farming tracts, and rented it out to various people. It is doubtful whether this plan was of any value to the business.

Jackson Furnace changed hands a number of times previous to its last run in 1874. Stone-coal was used as an experiment in her stack, but the brick lined side was not fitted for its use. There were about 7,000 acres of coal

52. Interview with Mrs. Eliza Bundy Wells, Daughter of H. S. Bundy. Mrs. Wells states that her father erected a large grain mill on Raccoon Creek, in conjunction with the furnace in 1879, this mill using the famous turbine water wheel.
in the township in which it was located, but the peculiar construction of the stack thus prevented its use. "Jackson" was thus in operation for thirty seven years. Mr. Moses Morgan was one of the last managers. One historian has stated that; "had the vein of ore held out, in quantity and quality, as it had first promised, it would have furnished food for Jackson furnace for 300 years, it yielding 10,000 tons to the acre". (53)

"Buckeye" furnace, on the other hand made a great deal of progress during the years 1870-1882, under the management of Lot. Davis. The following information relative to this furnace was given by the state Geologist in his report of 1869;

Dr. Williams was the financial manager of Buckeye furnace in 1869, who kindly furnished us ores for analysis some being very superior ores. One gives 61.52% of metallic iron, the other two giving respectively 55.58% and 50.83%. The cinder of No. 2 contains nearly 7% of metallic iron. No furnace can afford to make much of such cinder. From the appearance of the cinder heaps in Southern Ohio some furnaces have made far too much of it.

A change in ownership was noted in the "Cambria" furnace, closely following the war. In 1866, John and Isaac Peters, who were among the first owners, sold their entire interest for $129,000 to Portsmouth interests. As has already been noted, "Limestone" furnace fared badly following the war. Madison Furnace was in the hands of E. D. Ricker & Co. in 1865, controlled by Peters, Clare & co.

53. Scioto Valley History. Opus Cit. Page 496
in 1869, controlled by Clare, Duduit & Co. in 1871. (54)

During the year 1868, another stone-coal furnace was begun in the town of Jackson. Fulton furnace, as it was called has become one of the most successful furnaces of the county, and is still in operation under the name of "Globe".

The land had been purchased and work begun on the shaft in 1865, by Capt. Lewis Davis, immediately after severing his connection with the Orange furnace. More land was purchased, partners were taken in, the shaft and furnace was completed, but the coal proved to be impure and the shaft was not worked. (55)

The resultant hard times of the business depression coming as it did about a year after "Fulton's" construction crippled it for a time. Mr. Elias Crandall and L. T. Murfin were among the first managers of the furnace. It was capitalized at $80,000. Samuel McCormick was elected President J. E. Feree, Secy, and Thomas T. Jones, Manager. (Mr. Jones had been active at old Jefferson Furnace, and was the grandfather of the Present Pres. of the firm, Mr. John E. Jones). After a few years, there was an opportunity to secure a splendid coal supply by a consolidation with another firm in the city, and this led to the consolidation of Fulton furnace with the Globe Furnace in 1870.

It is interesting to note at this late date, the contrast between the best furnaces of other regions. While the Jackson County furnaces had a production of from 10-

54. Auditors Records, Court House, Jackson, O. This record further states Madison owns about 1,000 acres of land @ $9,621; plant and fixtures at $11,575, in 1875.
20 tons a day in 1870, there were big stone-coal and coke furnaces being built in Columbus, Cleveland, and Youngstown, which produced from 35-35 tons a day. The height of the stacks in these latter named cities was from 80 to 65 feet, while only two or three furnaces in Jackson County were over 50 feet. (56)

The state Geologist in 1870 stated that "Even our best furnaces are still behind the age in their productiveness and economy. They come far short of what is accomplished elsewhere. The old charcoal furnaces were thought to do well, if they made from 30-40 tons a week, while in England some of the furnaces are making 600 tons a week, while our best situated ones are making 300 tons a week". (57)

The United States had the advantage of a higher tariff; several thousand miles less of transportation for the raw material, in which Jackson County shared bountifully. By 1870, a few of the furnaces were making use of foreign ores, and were making improvements in their equipment, but it was not a general trend. The Geological Survey of 1869 stated that the supply of ore in the entire Hanging Rock Region was scarcely diminished; "Though many were quitting because of a scarcity of timber". (58). This report

56. W. B. Potter in Geol. Report for Ohio. In 1870, he further states that Scotch Furnaces were built to a height of 95 feet in 1865, and in 1869 to a height of 100 feet, with a capacity of 33,00 cu. ft.
57. Geol. Survey of 1869-1870, files of States Geologist. Col's. O.
58. Ibid.
urged the adoption of a system of forest preservation, although it admitted that this might not be possible where the land was so valuable for agricultural purposes. This report further stated that numerous rolling mills were being established at Portsmouth, Ironton, Pomeroy, Columbus, Zanesville, and Newark, which would be of great value to the industry as a whole. (59)

59. This report further stated that, "Portsmouth is the chief commercial city of the Hanging Rock Region. Ironton, 30 miles up the river in Lawrence County, has a population of 7,000 and is one of the most enterprising and most important manufacturing points in Southern Ohio, as well as being the shipping and distributing center for the most important part of the Hanging Rock Region. It is the largest town on the Ohio River above Cincinnati, which has navigation uninterrupted by the fluctuations of the height of the water".
Chapter V

Steady decline of Charcoal Iron Making
And Building of the City of Wellston

During the first few years of the 70's, great progress was made in the development of the furnaces already in operation, as well as the construction of other plants. Coal mining received a great impetus, due to the establishment of new markets, and the furnaces used thousands of tons of the new fuel.

In 1871, which year may be taken as a fair year by which to compare modern iron interests, the production of pig iron in the world was approximately 13,315,000 tons. Great Britain led with a production of 6,500,000 tons and the United States ranked second with a production of 1,912,000 tons. Ohio ranked second in the States being exceeded only by Pa. The entire production of Ohio was 426,626 tons. Jackson County ranked fourth in the state, with a production of 34,416 tons, being preceded by Mahoning, Trumbull, and Lawrence Counties. Jackson County Ranked First in coal production. (60)

Speaking of the Hanging Rock Region as a whole, Prof. Newberry, the State Geologist, said in his report of 1869 that; "Deposits of iron ore can be found in nearly all sections of the valley, especially in the coal measures. One vein of coal is the floor of an iron ore seam. They occupy different horizons of the same territory. One vein yields 33% pure iron, another 55%, and a third 60%. These seams extend for miles, creeping out in opposite slopes of the same hills".

Between the years 1870-73, the value of different ores as delivered at the furnace was, per ton, on the average, for the limestone ores, $3.85; for the kidney ores, $3.50; and for the block ores, $3.25. The Missouri ores, always high, although now being used in the furnaces of

the Hanging Rock Region, is used especially at Ironton, as a mixture with other ores. With these native ores, they usually work better than when smelted alone, the native ores producing a red short iron, and the Missouri and Lake Superior ores a cold short iron, a proper mixture is said to produce a neutral iron, or one having neither of these objectionable features. In 1870 the Lake Superior ore cost about $11.00 a ton at Logan, Ohio, and the Missouri ores $12.00 at Ironton. (61)

In the year 1872, another stone-coal furnace, "Globe" was built in the western part of Jackson. It was incorporated under the name of Watts, Hoop and Company, and the owners were; J. M. Watts, Peter Hoop, Jr., C. S. Dickason, and T. P. Sutherland. (62) The Globe Company had a stone mine in connection with its plant, the shaft having been sunk in 1865. This mine contained valuable coal deposits, Andrew Roy, State Mining Inspector, giving the following report of it in 1880; "The coal falls below three feet on the hills, and swells to four feet in the swamp of the mine. Globe makes hot-blast iron, her production is about 15 tons a day". In spite of the advantages enjoyed, "Globe" was unsuccessful, and consolidated with the "Fulton" furnace in 1873. From that date, the coal was hauled by teams of mules from Globe furnace to old Fulton furnace, which was now under the name of the Globe Iron Company. The old Globe furnace completely burned in 1876, thus its life was short, but its namesake is in operation today. The new Globe furnace was also one of the first furnaces in the Hanging Rock Region to dispense with the expensive}

61. Ibid. Also states; Charcoal delivered at the furnace in 1870-71, cost about 5½ cts. a bu. av. Consumption for ton of iron was 155 bu. or allowing 20 lbs. per. bu., 31 cwt. (2,268) of iron with hot-blast, and 215 bu. or 43 cwt. per ton. (2,268) of iron cold-blast.
roasting process, and made iron from the raw native ore.

During the year of 1873, the same year of the re-organization of Globe furnace, another stone-coal furnace was projected in the N.E. section of the town of Jackson. (63) "Triumph" was the name selected for the new plant, but its failure belied its title. The inferiority of the coal seam, caused its abandonment, and the machinery, which had been purchased, was sold to the newly organized "Huron Furnace Company".

The era of prosperity reigning for a few years during the early 70's was in danger however, and the furnaces were not prepared for a rainy day. Paying huge dividends, when they had them, reserve funds were practically unknown, even the best managed firms spending liberally. As a result practically all the charcoal furnaces were shut down during the Panic of 1873, Keystone, Latrobe, and Jefferson being about the only ones which kept going, although they sold little if any iron during these years. A man living in Wellson operated the two former named furnaces, and when he was asked time after time, why he operated them, he stated that; "The country cannot always do without iron, and the poor men must not starve, even though iron cannot be sold". (64)

One of the most interesting stories, illustrating the economic fallacies of the time, grew out of an annual meeting of the directors of old Jefferson furnace. The financial statement of 1873 showed that the furnace was operating at a

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64. The gentleman named was Hon. H. S. Bundy. From excerpts of a letter written by F. M. Massie to Wellston Telegram. Feb. 26, 1931.
great loss, though the commissary store had a slight profit. The directors proposed that they shut down the furnace, and continue the operation of the store, ignoring the fact that the prosperity of the store was directly dependent upon the success of the furnace.

In spite of the difficulties presented by the depression of 1873, there were fortunately some far-seeing economists and business men who were not blinded by the conditions at hand. Thus the year 1873 became one of the milestones in the history of the county. Perhaps the most noticeable progress was due to the efforts of the promoter of Wellston, Harvey Wells. (65)

Harvey Wells landed in Jackson in 1872, with a new idea for the iron industry. He stated that it was a bad economic policy for the entire community to be dependent upon the welfare of one single industry. As no one from outside the group of owners were allowed profits, the men were entirely dependent upon the stability of downfall of the enterprise. If the furnace failed, the whole community failed, and the population of three or four hundred, dwindled to practically zero, within a few weeks time. Wells suggested to the furnace men of Jackson, that their plants be made mere adjuncts of the town, and that the town be made self-supporting without their help, should conditions so warrant. The following paragraph gives a

65. *Harvey Wells, son of Agrippa Wells, was born at Wilkesville, in Vinton County, May 29, 1846. First learned carpenters trade. Became a messenger in Union Army at 16. Was placed in Harness Dep't, and soon became Foreman of the Dep't. Discharged Oct. 1865, age of 19. Started to school, soon quit, and worked as manager of H.S. Bundy's store at Latrobe furnace. Soon became dissatisfied again and attend- (65. Cont'd. next page)*
summary of the results:

When he wanted to build additions to Jackson, and make it the county metropolis, which would draw all the furnaces, and other enterprises within its limits, the business men of Jackson, who had never given any thought to real estate values refused him all financial aid. But he had traveled extensively, and he concluded to use his talents in creating value by town building, and this determination gave birth to a new town, which was called Wellston.(66)

Mr. Wells began to buy hundreds of acres of land in the vicinity of Milton Postoffice, using only his nerve and audacity, as he had little other capital at the time. He secured several thousand acres of land, and organized the "Consolidated Wellston Coal and Iron Company". He then issued $500,000 in first mortgage bonds, which he put up as collateral for a loan of $300,000 from the Farmer's Loan and Trust Company of New York. The Jackson Standard carried the following item on May 1, 1873; "A coal shaft has been sunk in Milton Township, near the farm of H.S. Bundy. It is located between the brick schoolhouse, and the railroad. On last Thursday, April 24, coal was reached at the depth of 71 feet. We saw specimens of the coal. It is of the best quality of shaft coal. There will be a new furnace commenced at once". A photograph of this first furnace, the "Milton" appears below. Several carloads of the coal was brought to Jackson, and tested in the

65. (cont'd) ed school at Ohio Wesleyan and also at Ohio Univ. When 21, with aid of Mr. Stearns of Latrobe Fee, compiled a treatise, "Rapid Calculations". Succeeded in selling 60,000 copies through Central States. Everywhere known as "Lightning Calculator". Selling tour developed personality, and gave him some needed cash for investment".
Orange Furnace in July, 1873, and satisfactory results obtained. The Milton Iron and Coal Co. organized on Monday, July 28, 1873. The capital stock was $100,000. (67) Mr. Wells was not an incorporator of the first furnace which was erected, but he was responsible for its promotion. (68)

The Jackson Standard gave the following information in its issue of Nov. 13, 1873, following an interview with Harvey Wells:

Mr. Wells informs us that he has closed his contract with Mr. H. S. Bundy for his home farm. Mr. Bundy reserves his home and fifty acres around it, and a right of way to the railroad. Mr. Wells gets the balance, 1,000 acres for which he pays $100 an acre, or $100,000 for the entire tract. It is the intention of Wells to erect several furnaces, and lay out a large town in the spring. (69)

The feeling among the business men of Jackson can be well imagined when they read the above paragraph. True to his promise, Wells had the town surveyed in Jan. and Feb., in the year 1874, and the plat covered 271 acres. The name was changed

68. Incorporators of Milton Coke were Alanson Robbins, A. Austin, H.G. Lasley, H.S. Willard, J.E. Ferree, J. W. Morley, and L. W. French. Robbins was Pres; Ferree was Sec'y; Willard was Manager, and French, Storekeeper.
69. Mr. Bundy seemingly used his funds to an advantage, as he and his son-in-law, Benj. Stearns purchased 720 shares of Keystone Furnace stock in 1873 for $72,000, including 6,500 acres of land; according to court house records at Jackson, O.
from Milton, to Wellston, in honor of its promoter, and a mush-room city developed. "A large portion of the thousand acres now owned by the Wellston Company, was bought by Mr. Bundy, only a few years ago for $30.00 to $35.00 an acre. He sold it to Wells for $100.00 an acre, who sold it a few months later for $150.00 an acre, and thus cleared $50,000 in the deal." (70)

Closely following the successful construction of Milton Furnace, came the realization that transportation was still inadequate to meet the demands of a growing community. An outlet was needed to the manufacturing centers of the Middle States, which would cut the cost of the round-about journey by water, or via Columbus, Ohio. A group of interested citizens in Jackson organized the Jackson and Pigeon Railroad, with a capital stock of $100,000. Their intention was to build a railroad from Jackson to Byer, but the capital could not be secured, and the charter was cancelled.

Wells next secured the cooperation of citizens from Washington C.H., Zenia, Springfield, Jackson, and Pomeroy for the purpose of promoting a railroad. A meeting was held in Greenfield, on Dec. 15, 1874, and the new road planned. The Jackson Standard carried the information in its issue of Dec. 15, 1874, that books for subscriptions to the "Springfield, Jackson, and Pomeroy Railroad" would be opened at both the First National and Iron Banks at Jackson, Ohio on Jan. 23, 1875, and in ten other designated towns. The charter was granted by the legislature on Dec. 17, 1874. Jackson County subscribed 70. Article in Jackson Standard. Feb. 1884.
$70,000. The first rail was laid and spiked on Thursday, Dec. 7, 1876, near Chillicothe Bridge, in the town of Jackson. The road however was not completed until 1877, due to financial difficulties. The original plan of connecting the road with the Springfield road was abandoned, and the Jackson end was connected with the Scioto and Hocking Valley at Waverly, Ohio. (71) This railroad not only shortened the distance to Cincinnati by about twenty-five miles, but made less of a delay at Hamden Junction, for the cars of iron via Marietta and Cincinnati Railroad. To prove their interest in the value of the road, the Jackson County furnace owners subscribed $25,000 of the capital of the road.

In the meantime, Wells and his business associates of Wellston were advertising far and wide the coal and iron possibilities in Jackson County. His next project was the construction of a twin furnace in Wellston, costing $100,000, the first of its kind in the county. A number of capitalists from Washington C. H. aided in its capitalization, as well as some New York City financiers. (72) The splendid photograph below, which was taken many years after its construction shows in detail its splendid construction. The Jackson Standard carried the

71. When the road was completed from Jackson to Waverly, the road got into debt, and was unable to complete the construction on to Springfield. Suit was brought, judgment rendered, and the sheriff closed it out, to Samuel Thomas of Columbus, O. in Oct. 1879. The effort to render it failed, and a new incorporation followed, "The Springfield Southern". It extended the road from Springfield to Roakwood, in Lawrence County, thus being of great value to Jackson. The road adopted a standard gauge in 1880.
72. Interview with Mrs. Elize Bundy Wells, Wellston, O. March. 1931.
Wellston Twin Furnace, constructed in 1874. Basis of Wellstons' Industrial Growth

following interesting description in 1874;

These furnaces are among the best constructed in the county, and will be ready to blast in about six weeks. They are fifty-two feet in height, and have a diameter of eleven feet. The engine is a double one, made in Chillicothe, and has six boilers 60 feet in length each, and forty inches in diameter. There are four cylinders, each 18 inches and four feet. Four blowing cylinders, four by four feet. They have about 12,000 tons of ore on the bank, most of it is now roasted. It is mostly from the surrounding hills, but part of it has been brought by railroad from other points. The Wellston Company is shipping a great deal of coal. They have a splendid prospect, and a most valuable property, and I think good management. Mr. Grove appears to be a very capable businessman, and popular among people. I made a careful count of all the houses in Wellston, together with Austin's Addition, and also Milton Fce........ and found 103 houses in all. (73)

Had Well's dream of a concentration of coal, limestone, iron and gas industries for the city of Jackson been realized, Jackson county would now have one large metropolis, instead of several small competing towns. The town of Wellston was 73. Article in Jackson Standard. Dec. 4, 1874.
well planned, and the streets were 75 to 100 feet wide.

The city of Jackson however, was not standing still, associated with the meteoritic rise of Wellston. Jackson made good use of the advertising which had been given the entire county, and began to make use of the increased supply of capital available. Mr. E.T. Jones, moved to Jackson from Indiana in 1873, and superintended the building of the seventh furnace to be constructed within the corporate limits of the town of Jackson. The Tropic Furnace Co. elected Mr. Jones as the first President, and D.D. Morgan as Sec'y. (74) "Tropic" was not as large as the other furnaces in the town, but it used stone-coal very successfully, and made good iron. A coal shaft was sunk alongside the furnace, and this furnished an abundant coal supply. "Tropic" furnace lay idle from 1875 until 1879, and then was again put in operation, and was operated until the spring of 1883, when it stopped for needed repairs.

During the year 1874, a third foundry was established in Jackson, the property of Benoni Gray. This foundry was erected south of "Globe" furnace. An addition to the Jamestown Foundry in the N.E. part of the town, enabled it to cast furnace tops which weighed 3,8000 lbs. each. A new planing mill was established during the same year. (1874) "There were sixty odd business firms in Jackson, in addition to the six furnaces in operation in 1874, including a woolen factory, flour mill,

74. Other members of this firm were; Miles Jones, T.M. Jones, and H.L. Chapman, the latter being elected President in 1875.
foundries, etc. (75) By extensive improvements, "Globe" furnace increased her productiveness, and was equal if not superior to the Wellston furnaces.

During the years 1874-75, a cold-blast furnace, the "Ophir", was erected about 3 1/2 miles N.W. of Jackson. It was constructed by the Ophir Iron Company. (76) Ophir soon changed to a hot-blast, but it was soon realized that the transportation problem would soon spell its doom. In 1875 the Jackson Atlas stated that: "The Ophir Iron Company held 320 acres of land in Section 6, Typ. 7, Range 18. They are manufacturers of cold-blast pig iron, used for car-wheels". (77) A year later the company gave up in despair, due to the lack of ore supplies, and the distance from sources of supplies. The machinery was purchased by the ever vigilant Harvey Wells, who believed that he could find a use for it.

The following quotation from Prof. Briggs Report of 1875, throws some light upon the manner in which the Jackson County Iron and Coal deposits were considered at that time;

"The counties of Jackson, Lawrence, and Scioto are able to supply 400,000 tons of superior iron annually for 2,700 years, and furthermore, this belt of coal is equivalent to fifty miles in length, five miles in width and nine feet thick, and will yield 9,000,000 tons per square mile." (78)

75. Interview with Lamar Sternberger, Jackson A. P. Representative.
76. Persons composing this firm were: W. T. Washam; Jno. Mitchell; Chas. James; Mark Sternberger; H. S. Bundy; Rob't. Hoop; Geo. Hoop; and Wm. S. Baker; Rob't. Hoop was Pres. and Wm. Baker was Secy.
77. Atlas further stated that furnace castings, Hoops Patent Wing Hot-Blast, etc., were made by Jackson foundries.
78. Report of Prof. Briggs, Chief Geol. of Ohio, 1875.
The last furnace to be put in operation within the town limits of Jackson was the "Huron", located in the S.W. part of the town. A shaft was sunk in 1875 to a depth of over 70 feet, and suitable coal was found in abundance. The original capital of Huron Furnace was $113,500, and ten acres of land, in addition to 200 acres of coal land was purchased. (79)

Lot Davies, who had formerly been connected with Jefferson Fece., was elected Pres., with Miles Jones as Sec'y. Miles Jones superintended its construction, and assumed the position as manager. About a year later William Vaughn was chosen to manage the plant, and John L. Davies was elected Sec'y. After it went into blast in the spring of 1875, it ran a year, lay idle for about three years, and started again in Nov. 1879. Huron shipped a great deal of coal, as well as iron. (80)

Just as the southern part of the county assumed the lead in the beginning of the industry, the northern and central part of the county now assumed this position. The city of Wellston progressed rapidly, the population increasing from practically zero in 1873 to 650 in Dec. 1875, when they petitioned the county commissioners for its incorporation. "The petition was amended Feb. 8, 1876, and passed on favorably. The incorporation followed on May 9, 1876." (81)

The Wellston furnaces, promoted by Wells and others, lay idle from 1876-1879. (82) In the early 30's H.S. Bundy became the President, and a great deal of coal was shipped, in addition to the pig iron. The coal shaft produced about 10 car loads a

79. Notes of D.W. Williams, Veteran Jackson County Author.
80. Mr. Williams states that many Huron Stockholders were only day laborers, who took one share each.
81. Auditors Record, Jackson, Ohio.
82. Andrew Roy, State Mining Inspector of Ohio, in an article
day, in addition to the coal used by the furnace. Milton Furnace turned out about 5,000 tons of iron during the year 1878, in spite of the money panic. (83) From 75-150 men were employed at each of the Wellston furnaces, when they were in operation. "The men were paid partly in scrip, and the remainder in cash. Furnace scrip passed from one person to another as acceptable currency. The furnace stores did a flourishing business." (84)

The last furnace erected during the period of expansion, was the "Eliza", built in 1878, and located about a mile east of Wellston. It was owned by Harvey Wells, and he used the machinery which he had purchased of the Ophir Iron Company, at Jackson for its construction.

The charcoal furnaces, in the face of this overwhelming competition of the stone-coal stacks, were in bad straits. The Union Iron Company, which controlled the Monroe Furnace, held 6,000 acres of land in 1875, but it sold this land gradually to secure funds for operation. Cambria furnace was in the hands of J. W. Servis, Trustee, in 1875. The expense involved in the charcoal process was too great for the plants to bear in the face of this new competition. Cambria made its last cast in Jan. 1876. (85)

82. (Cont'd) for Jackson Journal in 1884, gave following statistics for production in Jackson County, during year 1876.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Bloomfield.</td>
<td>4700</td>
<td>3000</td>
<td>12,000</td>
</tr>
<tr>
<td>Jackson Corp.</td>
<td>3,000</td>
<td>400,000</td>
<td></td>
</tr>
<tr>
<td>Franklin.</td>
<td>1,475</td>
<td>7,315</td>
<td></td>
</tr>
<tr>
<td>Jefferson.</td>
<td>10,137</td>
<td>III,561</td>
<td></td>
</tr>
<tr>
<td>Lick.</td>
<td>2,081</td>
<td>208,900</td>
<td></td>
</tr>
<tr>
<td>Madison.</td>
<td>2,780</td>
<td>30,500</td>
<td></td>
</tr>
<tr>
<td>Milton.</td>
<td>15,420</td>
<td>7,500</td>
<td>864,124</td>
</tr>
<tr>
<td>Totals.</td>
<td>26,280</td>
<td>26,977</td>
<td>1,634,400</td>
</tr>
</tbody>
</table>

83. Pat Varley, veteran resident at Wellston stated that no street lights were needed in there in early days, as illumination of gases burning at top of stacks furnished plenty of light.

84. Article in Wellston Telegram Jan. 22, 1929.
85. Interview with Andrew Dutiel, Last Madison Foe, Manager.
Lincoln Furnace, another charcoal survivor, was run by the sons of William McGhee after 1876, and fared badly. A branch line of the M & C.R.R. was completed to within three miles of the property about 1878, only to be disbanded, when the realization came, that the furnace would soon be a thing of the past. Timber was growing scarcer, year by year, large stocks of unsold merchandise was on hand, and the future appeared doubtful.

There was organized in the United States in 1879 an organization: "For the purpose of mutual interchange of practical and scientific knowledge and experience in this branch of metallurgy, and to take the proper measures for advancing and protecting the interests of the Charcoal Iron Industry, in all its branches". However the aid came too late for most of the furnaces. The price of iron during 1880 was from $55.00 to $65.00 a ton, but after the unsold stock was disposed of, the future appeared more and more doubtful, the reasons for which will appear in more detail in the following chapter.

86. Interview with Sent Thorn, Lifelong Resident of Cornelia neighborhood.
Chapter VI

Stone-Coal and Coke end the Charcoal Iron Regime

As was noted in the latter part of the preceding chapter, the charcoal furnaces were rapidly becoming obsolete, in the way of out-of-date equipment, low productiveness, etc. As has been well stated by a well-known furnace Superintendent: "The manufacturer who, in the swift march of progress and in the pursuit of an industry, the foundation of which is ever changing with altering raw materials, does not constantly take stock of his equipment and rejuvenate it to suit the times, will soon find himself outclassed by his competitors". (85) This situation existed in many Jackson County furnaces a decade previous to the beginning of the twentieth century. H. S. Bundy, of Wellston, who owned three of these charcoal furnaces, one of which "Latrobe", was estimated to be worth several hundred thousand dollars, lost heavily when the trend started down. Bundy, as optimistic as the others, failed to see in the horizon the decay of the charcoal regime, and its wasteful and expensive methods. (86)

One of the greatest problems which was faced by the charcoal iron workers was the destruction of the wood supply. The Journal of the Charcoal Iron Workers Ass'n for 1880 stated:

In referring to our lumber supply, the "Leffel Mechanical News", says, "There is no mistaking the fact that our timber is going. Occasionedally within the past ten years a note of

86. Interview with Mrs. Eliza Bundy Wells, Wellston, O. 1931.
warning has been sounded by some alarmed statistician, who has looked into the figures, and perceived the sure result to which they were tending; but the country has not taken the matter seriously to heart. Enjoying a large abundance in the present with no check upon our expenditures; we have put off the inspection of our national account until at last, in the matter of the timber supply, we are but one step from bankruptcy. (87)

The Charcoal Iron Workers Association which had been organized in 1879,(88) made valiant efforts to keep the charcoal iron industry on its feet, but failed. The following query was addressed to the editor of the Association Journal in 1880; What do you think of the prospects of the iron business?, and this query was answered in the following well detailed manner;

First; We know that machine shops, car shops, foundries and mills are very busy, many of them with orders far ahead.
Second; We know that as a rule these large consumers have comparatively small stocks of iron on hand.
Third; We know that it is difficult to place orders for immediate delivery at any of these works. One order for 5,000 car-wheels, another for iron pipes, others for locomotives or machine tools, have lately to our knowledge, failed of finding manufacturers to take them for prompt delivery.
Fourth; We know that we imported over $600,000 tons of foreign pig iron last year, more than was needed by our market, and that 25,000 to 50,000 tons of pig iron and large quantities of manufactured steel and iron are coming in monthly at the present.
Fifth; We know that there are immense stocks of pig iron, probably over a million tons held in England, ready to be shipped here as soon as our prices are sufficiently high to encourage it, and that France is closing her doors to British iron by tariff.
Sixth; We know that charcoal iron, although used for special purposes, sympathizes with the fluxations of other irons, and that manufactured irons all lead of pig iron.
Seventh; We know that the entire country is prosperous, money abundant, and labor receiving fair compensation.
Eighth; We know that the unusually severe winter seriously interfered with mining ore, hauling wood for charcoal, etc., thereby reducing the amount of charcoal iron made in furnaces and forges from 40 to 50,000 tons.
Ninth; We know that good grades of charcoal pig iron or

88. Ibid. Pagel.
89. Ibid. Page 185.
blooms always command a ready sale.

There are few charcoal iron works where one or more of these suggestions cannot be advantageously applied. If we reduce the cost of production, profits will be larger when prices are high, and when the duller times come again, and they surely will, they will rest less heavily upon us.(89)

The State of Ohio, in the year 1879, produced 43,445 net tons of iron, the greatest previous production was 100,498 net tons in the year 1873, when Ohio ranked second among the states.(90) The Hanging Rock Region alone produced 81,338 net tons in 1880, and 73,870 tons in 1881.(90) The lowest price for Hanging Rock iron in Cincinnati was in Feb. 1879, when it was $25.00 a ton, the highest price was in Feb. 1880, when it rose rapidly to $63.00 a ton. (Car-wheel iron) (91)

The following statistics relative to the struggle going on between charcoal, anthracite and bituminous coal factions throughout the United States, sheds some light upon the conditions during the year 1881:

<table>
<thead>
<tr>
<th></th>
<th>Jan. 1. 1881</th>
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<tbody>
<tr>
<td>Charcoal Faces.</td>
<td>In blast. 160 Out of blast. 112</td>
</tr>
<tr>
<td>Anthracite.</td>
<td>In blast. 162 Out of blast. 76</td>
</tr>
<tr>
<td>Bituminous.</td>
<td>In blast. 151 Out of blast. 68</td>
</tr>
<tr>
<td>Total.</td>
<td>473</td>
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</table>

In the State of Ohio, there were 34 charcoal furnaces, 26 of which were in blast, and 8 inactive, during the year 1880.(93) Of these 26 active furnaces in the state at that date, seven were in Jackson County. These furnace produced from 12 to 15 tons of iron a day, and held from 5,000 to as high as 20,000. Report of American Iron and Steel Ass'n. May 20, 1880.

95.Ohio Reports on Industry in 1880, states that capital invested in iron and steel in state is $25,141,294.
20,000 acres of land. The need of this large supply of timber land is recognized when it is stated that, "The cold-blast furnaces consume from 200-250 bushels of charcoal in making a ton of iron, and the hot-blast furnace uses about 150 bushels. The wood yields from 30-33 bu. of coal per cord". (94)

A former manager of "Jefferson" furnace, the most famous furnace of Jackson County, in the charcoal field, gave the following information relative to the situation in 1880;

I commenced working at Jefferson Furnace in 1880. Day laborers at that time were paid 90 cents a day. Jefferson never made anything but charcoal iron. It made about 12 tons a day, and had two casts a day. We always run from six to seven months a year, as we needed the other months to chop wood for the charcoal, etc., preparatory to another run. The charcoal was secured in different adjoining tracts of land, perhaps 2/3 being on other people's land, especially following 1900, as timber became more scarce. We used about 10 loads of charcoal a day, and used six mules teams for hauling it. We had a number of ox teams for hauling ore and supplies. We did not use analyses of materials, until along toward the close of the 19th century, as it was necessary prior to that time. We measured the charcoal by means of buggies, which held about 33 bushels; ore was weighed, and we used about 800 lbs. at a cast, and about 50 lbs. of lime. (96)

The Charcoal Iron Workers Association constantly emphasized the fact that; "There will always be a demand for pure metal, such as is manufactured by the Charcoal Furnace, even though other irons may supplant it in part". (97) The demand continued slightly, but it was not great enough to offset the increased costs of production. The discovery of the huge Lake Superior ore deposits helped to concentrate the industry around

96.Interview with Mr. Joseph J. Jones. Last "Jefferson" Manager. Oak Hill, 0.
97.Charcoal Iron Workers Jour. Vol. 2. No. 4. Page 197. This Article stated that; Ohio made less charcoal iron in 1882 than in 1881, and has fallen back from 3rd to sixth place.
the northern lakes, and the Mahoning Valley gained, while the
Hanging Rock Region lost. Perhaps with the care of forests
in the United States, such as was shown by England and Germany,
the industry would have progressed. Another factor which was
considered in the Hanging Rock Region, was the transportation
of charcoal from other sections. This procedure was followed
successfully in different parts of the country. The Charcoal
Iron Workers Journal for 1880 carried the following item relative
to the possibility of transporting the charcoal by rail; "The
transportation by rail, of the charcoal is less to be dreaded
than most of us imagine. The full weight of charcoal can be
hauled as cheaply as the full car of grain. We know of in-
stances where charcoal is regularly hauled from 50 to 100
miles with profit. (98)

The effects of the tariff adopted about 1880 further
handicapped the furnace owners, and hastened the downfall of
the charcoal iron industry, as the following extracts from
and address given at a New York Convention in 1880 will show;

Excuse me gentlemen, if I am slightly personal in this
matter. Two years ago, just before the advance in pig iron,
a party of us thought we saw a profit in the manufacture.
We purchased a blast furnace site and went to work. The
country around us was very sparsely settled, with only a house
here and there, and with little means of communication. The
industry was just large enough to give us a little profit,
and we started with a population of 200 in the village. We
have since spent $40,000 for freight. We have bought mer-
chandise to the extent of $100,000 and all of this has been
paid for, and all of this has been the result of the protec-
tive tariff, without which we would not have dared to have made an attempt. (Applause) We have furnished an industry where there was none before. We have furnished labor, where before there was no employment. We have paid wages at the rate of from $1.25 to $3.00 a day. We have furnished a market for the

lumber of the neighborhood. We have cleared over two square miles of timber, and we have enabled our people to pay for all that they bought and made a profit for ourselves. I think that covers the ground. (Applause) (99)

Coupled with the decline of the charcoal iron industry in Jackson County were two notable changes. One was the increasing interest in stone-coal and coke furnaces; the other was the emphasis upon the mining of coal by the furnaces. The Wellston Telegram, in Jan. 1881 carried the statement that; "1000 buggies of coal was hoisted at Milton Furnace Shaft in five days last week. The Milton and Wellston mine are running forty turns each. The price per ton is 80 cts." (100) In this same issue of the "Telegram" appeared this article; "Buckeye Furnace (charcoal furnace) had made arrangements to ship sixty carloads of iron from Berlin where it was stacked, but rain and mud prevented. Lot Davies, the Sup't spent a part of the week there".

Concerning the competing furnaces of Jackson and Wellston the Wellston Telegram had the following to say in its issue of March 26, 1881;

Milton Furnace, reported as doing badly, is still making an average of 18 to 20 tons of iron a day, and made a total of 125 tons last week. It is the only furnace in the county having Whitwell Ovens. Wellston Furnace blew out Wednesday after the best and most successful blast it ever had. The furnace will start again as soon as it gets a sufficiently large stock of ore. Huron Furnace of Jackson, cast 13 tons on a 12 hour hold last Monday, not using scrap iron or superior ore. Can any other furnace come up to this?

99, Ibid. Page 119
100, Representatives of the U.S. Ass'n of Charcoal Iron Workers visited Jackson County in 1881, and stated that they found the Wellston Furnaces to be 55 feet high, having a bosh of 13 ft. Diam. It is blown by five 4 in. tuyers, into a crucible which is 5 ft. 6 in. in diam. Blast is heated to from 600-700 degrees. Furnace is iron-cased on columns, and produces 18 tons a day.
During the year 1881, a new foundry was established in the town of Jackson, which aided in creating a demand for more charcoal iron, but of course nothing short of a miracle could now save the industry. The Mitchell Foundry and Machine Shop was built on the corner of Main and Locust Streets, at a cost of $15,000, including grounds. They made heavy castings for furnaces, and architectural iron work. (101)

In the spring of the year 1882, a branch of the newly reorganized Ohio Southern Railroad, was built along Horse Creek to Wellston, and about the same time; "A branch of the great S. H. & D. line entered the county near Ross County line, ran on the Baltimore and Ohio line to Byer, and followed Pigeon Creek through Coalton to Wellston, and south to the headwaters of Symmes Creek near the Gallia County line, and thence to Ironton. Before these two roads were completed the coal shipments of Jackson County did not exceed 10,000 tons a year, but in 1880 the shipments amounted to nearly 300,000 tons, and continued to increase rapidly". (102)

In 1882, Monroe Furnace, the largest charcoal stack in the county, closed down, never to run again. Expenses were rising, and charcoal was hard to get. Thus ended a twenty-eight year run. The following note of warning was sounded by Prof. Edward Orton, in his report of the Geol. Survey for 1883;

102. Hanging Rock Iron Region. E. B. Willard. Opus Cit. Vol. 1. Page 521. Text further states that; Ten years later the tonnage rose to 1,304,772, and Jackson County was largest producer in Ohio.
By a system of care and strict economy in the use of wood, and the employment of the best and most approved methods of manufacture, the duration of the charcoal iron industry can be lengthened, though the final fate of it is certain. It may be safely stated that at present 8/9 of the available timber land of Southern Ohio's iron region has been cleared. Many of the furnaces are compelled to obtain their fuel from such a distance, that its transportation becomes a very serious item in the cost of the iron.

In 1883, the "Huron" furnace, a stone-coal plant of Jackson was closed down. It was erected in 1875, and had a short run. It was operated for a short time in the 80's, by the Globe Iron Co., but the stack was soon torn down. The closing down of Huron furnace left the town of Jackson with only three furnaces in operation; the Star, Tropic, and Globe, all stone-coal projects. The following item of interest concerning the Tropic furnace, appeared in the Jackson Journal, in Sept. 1884; "A new coal shaft has been sunk at Tropic, 93 feet deep, and the coal is of the same quality and thickness as that of Star Mine. A switch has been built to the shaft, connecting by railroad the furnace and the mine. Raw coal is used in the Tropic Furnace for reducing the ore, four tons of coal being required on an average for every ton of iron made. The mine produces coal for the use of the furnace only, the daily production of the mine being about 70 tons". The furnaces at Jackson, employed about 50 men each, and hence were a source of profit to the town at large.

"Star" furnace of Jackson had one of the best coal veins in the state of Ohio, and was adjudged by the State Mining Inspector, to have the most up-to-date equipment of any which he had visited in the Hanging Rock Region. Star furnace made about 7,000 tons of metal a year, during the early 80's, this
amount being about twice the average production of the charcoal furnaces. Tropic and Star furnaces both began to use coke in their plants about 1860, and thus reduced their costs considerably. "Star" furnace shipped its iron to all parts of the country, as far east as New York, and as far west as Los Angeles. It paid dividends of 150% during the early 80's.

It seems that transportation still presented somewhat of a difficulty as early as 1884, as witnessed the following quotation taken from the Jackson Journal, in an issue of Aug. 1884:

The Narrow Gauge R.R. and the Trust Co. are still making faces at one another, one because cars are too cheap, the other because they are not cheap enough, the effect of it being very plainly felt in the dull times, that are weighing down every business and industry in the place. The condition of the T.C. & St.L. Railroad, at the Riverton end of the road is most deplorable; trains are seldom seen, and in consequence the freight facilities are almost as bad as before the construction of the road, the furnace company's being compelled to ship its iron via. C. & H.V.R.R.

On Sept. 17, 1884, the following item appeared in the Jackson Journal; "Wellston, Milton, and Eliza Furnaces are being repaired preparatory for starting at an early day. The miners at Eliza probably average four days a week, hence easy calculations can be made as to their wages at about 70 cts. a ton". A month later the Wellston furnaces were all running full blast, the owners were very much encouraged over the elections, and felt that the "Tariff did protect."

The following prices furnished by the office of Rogers, Brown & Co., of Cincinnati, Ohio, which purchased large quantities of iron from the Jackson County furnaces, were given in the Jackson Journal on June 30, 1884;
Foundry.
Strong Coke. No. 2. $17-$17.50 Sou. Car-wheel. $24.50-$26
Soft Stone Coal. 1. $18.50-$18.75 Lake. Sup. Car-wheel. $24.50-$23
Soft Stone Coal. 2. $17.00-$17.75 Lake Sup. Malleable. $24.50-$25

"General aspect of market is little, if any changed. Some furnaces, under pressure of accumulated stocks, are willing to shade prices. Unsettled feeling in Wall St. still acts as a restraint upon buyers, yet the promise of a a harvest rivalling that great one of 1882, and sound condition of all legitimate interests throughout the country, makes a feeling that the extreme depression cannot last long. We quote above prices for cash F. O. B. Cincinnati, Ohio."

The Jackson Journal in December 1884, stated that; The business depression still continues. Factories are shutting down, furnaces are blowing out, thousands of workmen are being thrown out of employment, and a general stagnation prevails. The Iron Trade Review of 1884, further emphasized the effects of the depression thus;

In 39 establishments, wages have been reduced an average of 12 1/2 per cent, affecting about 20,000 men, and that 27 establishments have closed down entirely, throwing out of work 12,275 men.

Only a few of the charcoal furnaces were enabled to survive the depression of 1884-85. During the year 1885, the following five furnaces shut down, never to run again; Keystone, built in 1848; Buckeye, built in 1851; Latrobe, built in 1854; Lincoln, built in 1854; and Eliza, constructed in 1878; all but the last named being charcoal plants.

H.S. Bundy, of Wellston realized that profits in the charcoal iron business would grow less as the years rolled on, and in 1885 he sold both Latrobe and Keystone furnaces to a group of eastern capitalists. The consideration was $375,000, and in-
cluded 10,000 acres of rich coal and ore lands. (103)

Jefferson furnace, the old guard, fared somewhat better as noted in the Oak Hill News, of Feb. 25, 1885, which stated that; "About two weeks ago, after having been in blast for nine months, Jefferson Furnace blew out, and has been shut down for the present time, the entire blast has been a successful one, having manufactured during the blast 2,200 tons of excellent cold-blast iron, and having consumed in the process 5,300 tons of ore, and 460,000 bushels of charcoal. There are nearly one hundred men employed at the furnace, the majority of whom will now turn their attention towards replenishing stock, preparatory to another blast". Evidently the same conditions did not exist all over the county, as the Jackson Journal in its issue of Feb. 25, 1885, stated that in the southern part of the county; "Times are hard, labor scarce, and very poorly remunerated. Only 25 cents a cord for chopping, and from 80 cts. to $1.25 a ton for ore digging".

Scrip began to be used more plentifully, by all the furnaces in the county, in spite of the Jones Scrip Law, which went into effect in April 1885, the following article being of particular interest;

Every mine in the valley still goes on, issuing orders, and every store in town deals out scrip with a lavish hand. The only thing there seems to be for people to do, is to make the best of things, and hope for something better. Price of mining coal has dropped from 70 to 55 cts. a ton.

Andrew Roy, State Mining Inspector, in 1885, gave the following figures relative to the coal, ore and limestone veins in IO3. Recorders records, Jackson Court House, Jackson, Ohio
Jackson County; "According to a rough estimate from the best data obtainable, there are about 25,000,000 tons of shaft coal in the county; 175,000,000 tons of Coalton or Wellston coal; 578,520,000 tons of limestone coal, and 50,000,000 tons of Waterloo coal. This estimate does not include any intermediate seams, which are not even mined. Of the available amount of limestone ores, 50,000,000 tons would be a moderate estimate. No calculations can be made of the other beds. The amount of available limestone for furnace flux is practically inexhaustible".

Mr. Roy further gives a summary of the iron industry as follows:

The county in 1882 ranked third in the state in the production of pig iron, producing an aggregate of 63,960 tons of both hot and cold-blast iron. The county was surpassed by Mahoning County, which produced 121,964 tons, and by Lawrence County, which produced 122,177 tons. The number of men engaged in mining ore in the county is returned as 240, and in mining coal as 195. Milton Ty. returns 60 barrels of lime manufactured.

The 22 furnaces erected to date, in the county, have cost from $75,000 to $100,000 each. So that approximately $2,000,000 has been expended in the erection of furnaces in the county.

The manufacture of iron has brought a fortune to many a man, but the capital required is so great, that unless a large amount can be kept on reserve, the future success of a furnace is apt to be governed by the fluctuations in the money and iron markets, so that quite a few furnaces have failed, taking with them many a man to financial ruin. (I04)

The town of Wellston established a new enterprise in 1885, known as the "Wellston Steel and Nail Co. It was at that time the only concern of its kind in the country. Mr. Wells was desirous of making this concern a type of co-operative affair between employer and employee, but through lack of understanding, it never attained much prominence. Transportation was improved somewhat in the county, during the late 80's, and there I04. Article in Jackson Journal, Feb. 1885.
was a mileage of about 150 miles of railroad tracks by 1887. This included the Ohio Southern, the I.B.& W., and the Toledo, Cin. & St. Louis, the latter being a narrow gauge road.

Many of the furnaces began to give stock in exchange for labor and supplies, and still others issued long term notes, while awaiting a revival of industry. A copy of one of these old promissory notes is reproduced below;

Jackson, Ohio, August 1, 1888.
After 10 years, The Jackson County Furnace Co.; promises to pay Bearer at its offices, Jackson, Ohio, Ten Cents, for value received, without interest.

George Peters, Pres.
(Attested) J. A. Peters.

This note will be redeemed by the Storekeeper at Jackson Furnace, in merchandise at current cash prices, at option of the holder hereof. (IO5)

One of the discoveries which made it harder for the charcoal furnaces to operate, was the fact that stone-coal and coke made iron could replace charcoal iron in practically every type of casting. In addition to this, coke iron could be secured at about one-half the price of charcoal iron. Many of the charcoal plants, forced by necessity, placed their stock on the market, and took whatever was offered. It is stated that in Chicago, during the late 80's, 400,000 tons or about 2/3 of the total stock of charcoal iron was forced on the market, which brought ridiculously low prices. This resulted in further misery for the already doomed charcoal furnaces.

Perhaps many of the Jackson County furnace men were thinking back to the days when iron sold for $60.00 a ton. In the path of progress of any industry, new methods and increased IO5. Original owned by William James, Coalton, Ohio.
efficiency should lead to lower prices. The economy in handling material, the labor saving devices are always a factor to reduce costs.

The following editorial appeared in the Journal of the U.S. Ass'n of Charcoal Iron Workers in 1889: "We can state that the present outlook for the American iron and steel trade, is in many ways encouraging, but the prospect is not without some elements of danger". A further comment read as follows:

The iron and steel business is at its healthiest tone, when the manufacturers, who are well located, and who manage well, earn a fair profit on the capital employed, and when materials command moderate prices. We trust that a 'boom' tendency will not extend to this country, for the evil reaction of a 'boom', will more than counter-balance any benefits resulting therefrom. Many of the failures of iron and steel producers and managers are directly traceable to the influence of 'booms' or the reactions which follow them. (106)

If the above lesson could have been imprinted upon the minds of the Jackson County furnace owners, the life of the industry would have been healthier for many years. By the year 1890, all but seven furnaces had closed down, and only two of these were charcoal plants. The railroads, always iron's greatest customer, using about 1/2 of the total output, during the period of railroad expansion, began to turn more to coke and stone made iron.

Mr. Andrew Dutiel, former manager of the Madison Furnace, one of the two remaining charcoal furnaces in 1890, stated that:

I came to Madison Furnace in 1895 as manager, and run the furnace until 1898; the last few years we used charcoal and some coke. The coke came from Ky. We used some Lake Superior ore. I was appointed receiver in 1898, and in 1899, leased the plant to the Welliston Iron and Steel Company. That company.

operated it until it closed down. To illustrate some of the wasteful methods of early days; 'I bought one acre of land at Clay about $395, which I used as a 'Landing'. We dug around in the mud, and secured nearly $600.00 worth of pig iron.' About 40% of our output went to Pittsburgh, other important markets were Dunkirk, N.Y., Cincinnati, and all important steel centers. In 1894, our iron sold for $12.00 a ton. We never secured above $18.00 a ton. In 1897, the materials used for a charge of 25 days were as follows:

- **Stock.** $11.15 a ton.
- 30,900 bu. charcoal @4 1/2 cts Bu.
- Labor. $1.80 a ton.
- Total. $13.13.00
- Total. $12.95 a ton.
- 453 tons of ore @ 1.35. $638.00
- 90 tons of lime, @ 0.60. $54.00
- 25 da's labor. $356.00

Jefferson Furnace the other remaining plant in the county, showed the following dividends from 1880-1897:

<table>
<thead>
<tr>
<th>Year</th>
<th>Dividend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1881</td>
<td>100%</td>
</tr>
<tr>
<td>1882</td>
<td>100</td>
</tr>
<tr>
<td>1883</td>
<td>70</td>
</tr>
<tr>
<td>1884</td>
<td>60</td>
</tr>
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<td>1885</td>
<td>50</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Dividend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1886</td>
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<tr>
<td>1887</td>
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<td>1888</td>
<td>20</td>
</tr>
<tr>
<td>1889</td>
<td>25</td>
</tr>
</tbody>
</table>

The tables show that in the forty-three years of its operation, the furnace paid in dividends the enormous sum of $957,500, or 1915%, on its capital stock of $500,000, an annual average of over 44%. (I08)

Thus we find that of the fourteen furnaces in operation in 1880, only six remained in 1900, the last stone-coal plant to cease during the period, being the "Tropic", in 1896. Of the six remaining stacks, two "Star" and "Globe", both stone coal plants, were located in Jackson, the other stone-coal plants, "Milton" and "Wellston", were located in Wellston. The two charcoal plants, Madison, and Jefferson were both near Oak Hill.

Thus we note that the struggle between stone-coal and charcoal became more intense as the years passed by, and the next chapter will bring out the details of their losing fight.

I07. Interview with Andrew Dutiel, Madison Fce. Manager.
I08. Article in Jackson Herald, Feb. 17, 1900.
Chapter VII
Twentieth Century Development

The unusually high prices of iron during the years 1899-1900, were destined to experience the usual downfall, and to be followed by a frenzy of price cutting, liquidation, and industrial war. As some historian has stated, "The pity of the human race, lies in the fact that it has learned so little from its own experience". In the boom of 1899, nails jumped from $29.00 to $71.00 a ton, an increase of 145%. (109)

An editorial which appeared in the Journal of the Ass'n of Charcoal Iron Workers in 1889 stated that,

We occasionally meet with producers of pig-iron who hope for a return of the time when fifty dollars will be paid for a ton of pig iron, but we sincerely hope that such a day will not come to the iron industry of the United States, for it would indicate a step backward, and be far from progress.

No pig iron is worth $50.00 a ton, although some alloys of other metals with iron cause in pig molds may command that price, for the intrinsic value of pig iron has (with the exception of certain seasons of commercial disturbances) a constant downward tendency, and we look for a continuation of this decline, which is really a true indication of progress. The methods employed, and the appliances introduced at our coal mines, iron ore mines, limestone quarries, and blast furnaces are all in the direction of securing economy of material and saving of labor. (110)

In spite of the different experiences by some of the furnaces in the county, Globe Furnace of Jackson was undismayed, and in 1902, began the construction of a new plant, built alongside the new one. A picture of these two stacks is given on the following page. Only three competi-

tors remained in the stone-coal field for Globe furnace following 1900. One of these was in Jackson, the "Star", which had made numerous improvements also, and which was steadily gaining new business. "Star" furnace experienced many difficulties in the way of fires, etc. previous to 1900, but under the supervision of the Brown family, moved steadily on. The other two competitors of Globe Furnace, were located in Wellston; the Milton and Wellston furnaces. Thus this small group now held sway in the entire county.

In the charcoal field, only two furnaces remained in the county, at the beginning of the twentieth century. "Madison" furnace was run by the Wellston Furnace Company, until it closed down in 1902. It cleared $10,000 the year it closed, but mounting expenses, and lack of modern equipment hastened its death. After the closing down of "Madison", the furnace at "Jefferson" held a monopoly on charcoal iron in the county. In 1896, a hot blast had been substituted for the renowned cold-blast, and although well equipped, it was not in blast during the years 1896-1902,
when it again went into blast. Mr. Jones, the last manager of "Jefferson" furnace stated that:

We did not find it necessary to analyze the iron to any extent, until 1902, when exact analyses were wanted by the foundries. The Globe Iron Company, of Jackson was engaged to make our analyses for us. Rogers, Brown, and Co, of Cincinnati, acted as our selling agents. They paid us $34.00 a ton when I first began. I stated that charcoal iron could not be made for that price, with our improved plant, and in the face of increasing costs, and the next year secured a contract for 1,000 tons, (if we could make it) for $34.00 a ton. I wanted $35.00. (111)

During the upward trend which occurred from 1902-1906 much building was done in Jackson, and also in Wellston. A foundry was brought to Jackson from Marietta, a foundation was laid for a new pipe and foundry plant. The Detroit, Toledo, and Ironton car shops were located in Jackson. A woolen mill, and a glass factory were built. On August 6, 1906, Moses Morgan, John F. Morgan, David D. Davis, John J. Thomas, and Henry H. Hossman secured the incorporation of the twenty-third, and the last furnace to be constructed in Jackson County. "Jisco", as it was called went into blast on Oct, 6, 1908,(112) and has run steadily ever since. It was built on Givens Run, about a mile west of Jackson, near the mine on the Hunsinger farm, and thus was near a splendid vein of coal. Built for the purpose of manufacturing the Jackson County "Silvery" iron, for which "Star" and "Globe" furnace were becoming famous, it soon began to receive a share of the business.

III. Interview with Joseph J. Jones, Last "Jefferson" Fce. Manager.
About the same time as the extensive building projects were made in progress in Jackson and in Wellston, the electric railway craze was thrust upon the residents of the county. The second interurban line to be established in the United States was already in operation, between the town of Jackson, Wellston and Hamden. Next, a proposition to extend this line was initiated, as described in the following paragraph:

Col. E. A. Boone addressed the residents of Wellston, at a public meeting Friday night, regarding the construction of an electric railway from Wellston to Pomeroy. For instance, the expenses of the survey, he asked $4,000 as Wellston's contribution, to be paid when the first 25 miles is built; it is to be the first step in a line from Cincinnati to Pittsburg. (113)

Perhaps fortunately for the would-be investors, the panic of 1907 caused the abandonment of this scheme. It was the plan of the promoters to build a great metropolis at Wellston, to rival the city of Pittsburg. The exhaustion of many coal mines followed the panic of 1907, due to improved methods of mining, and unsystematic plans of working the mines. Some of the mines were suspended, and others were liquidated. This factor was the cause of a lull in the county's progress. The town of Wellston reached its peak in 1910, when the population reached 8,000. From then on, it gradually receded, until it occupied a place second to the town of Jackson. Thus it rose and fell, quickly and noisily. Coal, coupled with iron was its chief main-stay, and when the two industries de-

clined. It became dependent largely upon Lake Ores, following the twentieth century, and this added to the expense of furnace operations.

The outbreak of the War in 1914, gave a fresh start to the iron industry, and fortunately prolonged the life of it for a number of years, at least in Jackson County. Iron was shipped from the furnaces of the county, to every part of the U.S. The Bethlehem Steel Corp, the United States Steel Corporation, and all the open hearth furnaces throughout the country were anxious customers. "A shipment of 'Silvery' iron was sent to Los Angeles, Cal, via the Panama Canal" (114) Many foundries did not care to make a small quantities of the ferro-silicon iron, which made a splendid mixture with other ferrous products, in the manufacture of Certain castings.

"Globe" furnace, under the supervision of Jnol E. Jones, (a grandson of mana of "Old Jefferson" furnace) was re-built during the years 1912-1913, and was well equipped to turn out large quantities of high silicon iron. The Wellston furnaces also profited by the increased demand for iron.

114. Interview with Homer Davis, former Bookkeeper at Star Furnace, Mr. Davis further states that; "Star" being unable to get needed equipment during the war, was given a special concession by the Gov't, which allowed them to get it at a reasonable price."
The Wellston furnaces also profited greatly by the increased demand for iron. The picture below shows the thousands of tons of iron stacked at the Wellston furnace preparatory to shipment. The "Jisco" furnace at Jackson installed steel bins and a skip hoist in 1914, which added to its efficiency materially.

Immense Stacks of Iron at Jackson County's only Twin Foe.

Even the added impetus brought on by the war, could not long protract the life of the one remaining charcoal furnace in the county. "Jefferson" furnace made its last cast in 1936. It thus ended sixty-two years of faithful service. John E. Jones, whose grandfather, and other relatives were connected with this furnace has written the following reminiscences concerning the furnace,

Many years have passed since the hum of operative activity of the old furnace, and we are always overwhelmed with a sentiment (pardon us) when we drive through and along the old landmarks, as we do often in the summer and fall seasons of these new years. We can imagine the soft
purring of the old blowing engines, the creaking of the wheels of coal wagons, (schooner type) blocked for going down the winding hill roads, and the song of the wood chopper with the ring of his ax in the "coal-lands", while over all hovered the hazy smoke of the smouldering pits, and in the air the every prevailing scent or odour of burning charcoal. It is a deserted village now, and only shadows of a real historic past are felt. The furnace is gone, but the quaint little Horeb Church and its silent graveyard stand a memorial sentinel. (115)

Mr. Joseph J. Jones, the last manager of "Jefferson" states;

We found it impossible to operate at a profit in the face of mounting competition. We closed down in 1916. We sold a part of the metal in the stack to a junk dealer for $2,000. Unfortunately the place was torn down practically, when the metal was removed. I sometimes regret the sale of the old stack. A gentleman has approached me within the last few years, with the suggestion that the furnace be repaired, and run again. But of course this is only a dream, as little of the old stack remains, even though such a plant might be successful. There is good fireclay on the land, and we are holding the land, with the hope that a spure track will be built there sometime in the future. (116)

With the "Jefferson" furnace career ended, four furnaces, all stone-coal stacks remained in operation in the county. During the next decade, the Wellston furnaces changed hands several times, and were in operation only a part of the time. The furnaces at this time employed from 75-100 men, and turned out over 100 tons a day, when they used Lake Ores, in contrast to the 12 tons a day production of the charcoal furnace, shown on the preceding page. The competition of the Mahoning Valley, and other northern regions, was beginning to make quite an impression however, and the furnaces were further weakened during

the depression of 1921. The furnaces were badly in need of repairs by 1923, and it was not felt that further operation would be profitable. The following article appeared in the "Wellston Telegram" on July 11, 1923:

Fires at Milton Furnace were banked Saturday for an indefinite period. The reasons given were a shortage of coke, and and indifferent iron market. According to the owners the shutdown will be only temporary.

The latter made promise, as stated above was never fulfilled. A short time later the "Wellston" furnace, the remaining furnace at Wellston, decided that it would not be profitable to continue. Thus Wells' idea of a metropolitan city failed. An item of particular interest was carried in the "Wellston Telegram", on July 10, 1930, relative to the progress of the city:

Wellston has 3,797 acres, the largest city in Ohio for the number of people it contains. It includes all of sections 31, 6 and 7 and portions of six other sections taken from Milton and Washington Tys., when the township of Wellston was created to coincide with the city boundaries.

Thirty years ago, when the population of Wellston reached the highest peak, slightly more than 8,000 people, almost half the acreage in the city was owned by one man, Francis E. Hinckley, a Chicago capitalist and promoter, who loomed large in the early history of this city. At that time he held title to 1,689 acres. He later owned Milton Furnace, put in the Electric Plant, owned other furnaces, all of which he got to further his ambition to make Wellston "The Pittsburg Of The West".

The population of Wellston has now receded to a little over 5,000. The decline of the iron and coal business gave it a deadening blow. There is plenty of coal in the hills about the town, but it is of inferior grade, and cannot compete successfully with the W. Va. and Pennsylvan-
ia mines. The mounds of Earth, piled high throughout the surrounding hills of the community, bear the high trace of "The Robber Industry." The silent reminders of the dawn, the peak and fall of the coal industry, has a mate in the shining slag heaps, littered with copper-tinted fragments of iron ore.

An article which appeared in the Portsmouth Times, in Feb. 1931, stated that;

Wallston has been rich and broke several times. The furnaces which once belched forth smoke, employed hundreds of men, and poured wealth into the purses of the owners, are now silent and abandoned altogether. Coal is being mined for local use only. Iron ore in the hills is of too poor quality to dig out for furnace use. The principal industries of Wallston now include; Morrow Manufacturing Co. which manufactures mining machinery; The Wallston Manufacturing Co. which makes rotary display stands; and a few other minor plants. The town is the Southern Ohio headquarters for the Ohio Fuel Gas Co. which supplies this section. It is also a small terminal for the B & O R.R., and for the C. & C. R. R.

One of the greatest customers of the furnaces was the railroad, and one of the greatest customers of the railroad were the furnaces. The furnaces used innumerable cars for transportation, and the railroads used about 50% of the iron produced by the industry, either directly, or indirectly, during the early days. The Wallston Telegram carried the following article on Mar. 26, 1931;

Once we heard the late H. S. Willard, himself a great producer of freight, say in a public address, that one blast furnace or coal mine is worth more than a whole township of farms to a railroad, because they yield a larger freight revenue. This is evident in the movement of freight THRU Wallston. One hundred and ninety five cars of iron ore is coming through Wallston over the B. & O.
Railroad consigned to the blast furnaces at Jackson and Portsmouth, freight in six months time. (117)

On March 26, 1931, the Wellston Telegram carried the news that: "The last passenger train on the Wellston run of the C. & O. Railroad, will be taken off next Sunday morning in accordance with a recent order of the State Utilities Commision". It was known that the service was maintained at a loss, and this removal of trains led other roads to follow suit. Competition of business, and of private automobiles was given as the reason for the losses. The popularity which the railroad enjoyed thirty years ago is gone, at least for passenger service, Just as "Old Man River ", and yet the carriage by the "Suicide Ships", the change goes on. When the D. T. & I. branch from Jackson to Cornelia was abandoned during 1930, it cut off $120,000 for taxation. The largest taxpayer in Jackson County is the B. & O. R. R., Its valuation is fixed at $1, 760,330. Of this $526,609, is for the main line, $587,710 for the old abandoned C. H. & D. line, and $548,170 for the Portsmouth Division.(118)

As for the city of Jackson, two trunk lines enter the city at the present time, the B. & O., and the D. T. ' I car shops are very important to the city's welfare. The pipe and foundry Co, is still on a paying basis, after having operated some thirty years. Unfortunately the Auger Bit Plant, which at one time employed about 100

117. Issue of June. 5, 1930.
persons, was moved to Rockford, Ill, in 1930. The two furnaces which are still in operation today in the town are the "Globe", and the "Jisco", both capable of turning out from 200-300 tons of iron a day.

The following comment was given by E. B. Willard, in summarizing the development of the iron industry in Jackson County;

The history of the iron industry in this county is like that of gold mining in the west. The greater part of the money is invested in the business was lost, and many partnerships, and individuals were involved in the bankruptcies of some of the earlier furnaces, including the early Jackson banking institutions. The industry is now on a firm foundation, and is now Jackson's mainstay after more than sixty years of fluxuations. (130)

In speaking of the old charcoal furnaces, the "Wellston Telegram" said that;

These old charcoal furnaces are now abandoned, and nothing remains of them except the flat benches used for storing the ore and charcoal, and the lower flat which was the casting floor. (See photo at right) In some instances the ruined stacks are still visible. Yet in their time they produced considerable iron, 28 furnaces making 90,000 tons during the year 1869, through out Hanging Rock Region. One first class furnace would now turn out the same amount in 90 days. One may usually identify the remains of the old furnaces, by the broken glass-like slag used for highway ballast, the reddish remains of ore piles, sometimes by a few log houses still standing, and frequently by the familiar benched flats where the furnace stood. (119)

During the year 1899, Globe furnace again rebuilt
119 "Wellston Telegram". Thurs. Feb 5. 1931
their plant, and hence was splendidly equipped. During 1930, Jisco furnace, the other remaining furnace in the county installed a gas cleaner at a cost of several thousand dollars. Not to outdone, the Globe furnace then installed three Cottrell Precipitators, as furnished by the Research Corporation of New York City. These precipitators, as furnished by the Research Corporation of New York City, having been installed for the purpose of cleaning the gas consumed, have more than paid for themselves.

Jackson County iron is still sold throughout the United States. The chief reason for its popularity, is due to its special nature. The iron produced is high silicon iron, generally known as Jackson County Ferro-Silicon, or "Silvery" iron. This iron, especially the higher silicones, has become famous in the open-hearth steel business, which is practically free from sulphur. Bessemer ferro-silicon is also produced at times, and during the war, some "Spiegel" iron, due to the fact that the magnet which was used to carry the iron bars from the casting floor, would not carry this type of iron; as a result, the furnace men had to follow the method used by their predecessors at the old charcoal furnaces, and take it out via wheelbarrow. A photo below shows the method of procedure.
Each of the two furnaces employs from 100-125 men at the present time, including the men who work in the mines, connected with each furnace. One of the furnaces owns its own ore mine on Lake Superior. The coke used, in addition to the stone-coal is brought from West Virginia. All of the slag is purchased by the Standard Slag Company for use on the highways.

John E. Jones, present President of the Globe Iron Co, states that:

The old methods of iron making read more like a romance, than the story of an industry. The trade at present calls for high silicon iron. Formly only charcoal iron was used for making car wheels. Metallurgical science has made available methods, whereby manganese iron is now used for the same purpose. Where formerly our furnace made 15-20 tons of iron a day, we are now equipped to make 500 tons of low silicon iron a day if the occasion demands. Our regular production is from 250-275 tons of 8-10% iron per day. As for the future prospects in the iron business, I believe that conditions will warrant slow progress for the next year of two, i.e. neglecting the usual spurts, or seasonal variations. Our great advantages in the county are: 1. Our coal supply, which is relatively free from sulphur, the ore of all iron makers, and 2. The fact that our iron is of such a specific nature. Many steel mills which operate blast furnaces do not care to make small amounts of the ferro-silicon iron. The raw bituminous coal which we are able to use, facilitates putting silicon into the high-silicon iron which is demanded. (121)

At the present time, due to the general depression, both furnaces in Jackson are closed down, but the time is being used to advantage, in making needed repairs. The iron and steel industry, as a whole is at the lowest ebb since 1921. The future of the iron industry can be predicted with only a degree of accuracy. It has weathered many storms. Three years after the big construction of 1921. Interview with John E. Jones. Pres. Globe Iron Co. Jackson, O.
period of 1854, came the depression of 1857, which lasted twelve months, the depression in 1859, which lasted eight months; the depression in 1873, which followed the reconstruction after the Civil War, and lasted about thirty months; the depression of 1884, which lasted about twenty-two months, and which gave the death-eating blow to the charcoal iron industry; the depression of 1893, which lasted about twenty-five months; and thus led to the boom period of the late 90's. The year 1903, saw another change in the depression lasting about twenty-five months; in 1907 the depression lasted about a year; in 1914 it lasted about eight months; in 1921, it lasted about fourteen months. Each period has seen better times, and greater progress.

When the iron and steel business recovers, Jackson County with her two large furnaces, which uses both stone-coal and coke, will get her share of the business.

Iron in the past has been made from a half dozen different kinds of ore, and from three or four types of fuel. Fifty years ago, ore which contained sulphur and phosphorous was unusable, but with the growth of metallurgical science, it is becoming more and more valuable. There are thousands of tons of ore of varying quality in Jackson County at the present time; it is not used to any great extent, because of the cheapness of other ores, etc. There is plenty of coal in the county which is not used for the same reason. Supposing however, that such discoveries occur in the iron industry, as have occurred in the
aluminum industry, whereby aluminum is made from practically any type of earth, and the price lowered from $25.00 a pound to 25 cents. Then Jackson County may again come into her own, and bear out the dreams of her far-seeing promoters many years ago. Two poems which well describe the work of "Old Globe", during the past, and in the present, are given below, along with a photograph of the furnace, as it appears today:

"Globe" furnace today, with a possible production of five-hundred tons per day

"Old Glâpe"

Under the bludgeonings of snow and sleet and sharp adversity, from low estate
Seemingly permanent coal
Shall, soon or late
Go down to iron.
Lo, when the fiery flames of the furnace have lain
the melting mass,
Under smokestacks high;
Hot iron shall ply
down row in row,

"Modern Old Globe"

Have you heard of that furnace "Old Globe."
That was built in such a modern way
It has to run all night and day
To make the iron to be shipped far away?
The steam and the engines, the hoist and the pump;
Certainly keep that old place on the jump.
The stock that it takes is surely a fright, And the
Rivers are slow, rivers are fast iron that it makes is
But rivers run down to the sea; certainly a sight.
All good coal goes down to the Old
Globe Blast
Ho! watch the fiery furnace, They used to mold their
And do it with good grace; pigs in the sand, But
Cover the iron with sand, now they have a new
at Old Globe Blast scheme, the best in the
You very best workers, with giftedto a very large kettle,
hand. And tipped by a motor so
You of stalwart soul Watch the strong and so still. And
molten mass little conveyors then
cover the metal
Cover it carefully,
Soon, men from the mine come past Water falling on them as
gulp down Main Street, to Old Globe go up the hill.
Blast.—Katherine Martin.
So in a few hours they do the work of a day
To get the iron ready to be shipped far away.—
Oscar Nail, Globe Em-
ployee.
# APPENDIX A

The figures below show the number and names of all furnaces in operation each ten year period, from the time the industry was begun in Jackson County in 1836-37, up to 1931. I835-I845. Estab. Closed. I865-75. (Cont'd) Closed.

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<td>Star. I866</td>
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<td>I851</td>
<td>Tropic. I874</td>
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<td>I854</td>
<td>Ophir. I874</td>
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<td>I865-75</td>
<td>Charcoal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jackson</td>
<td>I836</td>
<td>I874</td>
</tr>
<tr>
<td></td>
<td>Keystone</td>
<td>I848</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Buckeye</td>
<td>I851</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jefferson</td>
<td>I854</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monroe</td>
<td>I854</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cambria</td>
<td>I854</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Latrobe</td>
<td>I854</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Iron Valley</td>
<td>I854</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Madison</td>
<td>I855</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stone coal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diamond</td>
<td>I856</td>
<td>I867</td>
</tr>
</tbody>
</table>

Jefferson Furnace closed in 1916, and all but Globe and Jisco closed in 1923.
Below are given the dimensions of the early furnaces, for the purposes of comparison:

<table>
<thead>
<tr>
<th></th>
<th>Cambria</th>
<th>Monroe</th>
<th>Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height of stack.</td>
<td>38'</td>
<td>40'</td>
<td>40'</td>
</tr>
<tr>
<td>Diam. top of boshes.</td>
<td>10' 6''</td>
<td>11' 6''</td>
<td>11'</td>
</tr>
<tr>
<td>Diam. of Tunnel head.</td>
<td>2' 6''</td>
<td>2' 8''</td>
<td>5'</td>
</tr>
<tr>
<td>Batter at top of boshes</td>
<td>9'</td>
<td>9'</td>
<td>3 1/4 per ft.</td>
</tr>
<tr>
<td>Height of hearth.</td>
<td>6'</td>
<td>6' 9''</td>
<td>6'</td>
</tr>
<tr>
<td>Diam. of Hearth at top.</td>
<td>3' 8''</td>
<td>5'</td>
<td>5'</td>
</tr>
<tr>
<td>Diam. Bottom of hearth.</td>
<td>2' 8''</td>
<td>4' 2''</td>
<td>5'</td>
</tr>
</tbody>
</table>

Cambria has one twyer 4 1/2 in. in diam. entering hearth from the bottom. Uses Hoops Patent Wing Hot-Blast. Pressure of blast is 4 lbs. per sq. in.
Ore roasted. Proportions half-charge—1,100 lbs.
  Limestone. 80 lbs.
  Charcoal. 33 bu.

Uses 56 half-charges in 24 hours. One ton of iron requires 2.4 tons of raw ore. Makes 2/3 foundry and 1/3 mill iron. Daily production is 12 1/3 tons. Total in 1870 2,300 tons.

Monroe Furnace uses three twyers of 3 in. diam. the twyers entering hearth 27 inches above the bottom. Uses 2 sets Davis' hot-blast, the pressure of the blast is 3 1/2 lbs. The proportions of the half charges are:
  Limestone. 75 lbs.
  Ore roasted 1,250 lbs.
  Charcoal. 33 bu.

It uses 75-80 half-charges in 24 hours. Uses 2 3/5 tons of raw ore for one ton of iron, or 2 1/8 tons of roasted ore for one ton of iron. The average production per day is 16 tons. Uses 2/3 limestone ore, and one-third block ore, all from the Co. land.

Star furnace has three twyers, entering hearth at bottom, 2 ft. 11 inches. Diam. of the twyers is 4 inches. Force of blast is 5 lbs. per sq. in. Quantity of air per minute 3,600 cu. ft. Temp of the blast is 700°.

Above information taken from the Geological report of 1869-70, through courtesy of Wilbur Stout, State Geologist of Ohio.