BOURBON FURNACE

This old stack is one of Kentucky's most interesting relics and I congratulate the citizens of Bath county and all other Kentuckians on the marking of it. It is a monument to the men of foresight and business acumen who built it under the very eyes of ambushed Indians in order to meet some of the urgent needs of the infant commonwealth. It is a monument to industry and the development of Kentucky resources; it has played its important part in the domestic life of the state as well as in the War of 1812. It should be set apart as a park and kept in order and preserved at all hazards.

Looking back over the century and a half that has passed, we are reminded that our Kentucky was the only uninhabited land lying adjacent to the thirteen original colonies. No other land in history was so quickly settled. Whole communities and churches came. Forts were built for protection and families gathered about their hearthstones. Leaving good homes back East and unable to transport the necessities of life they set to work to substitute the things at hand for comforts they had left behind.

Salt and iron were two commodities that were apparently lacking in the "Wilderness." The pioneers found abundant salt water at the salt springs, but boiling down 900 gallons of salt water to make a bushel of salt required salt kettles and bringing ten gallon salt kettles from the settlements was a well-nigh impossible task. Here on this spot iron was found and the necessary cast kettles were cast in 1792 just as Kentucky became a state.

The farmers needed plows, tools, lanterns. The housewives needed betty-lamps, candle-sticks and snuffers, cranes for their open fireplaces, supplied with pots, pothooks, trivet ovens, and kettles and long handled waffle irons. The cobblers

needed tools for their benches; apothecaries needed finely adjusted scales, mortars and pestles; barbers needed razors, hunters needed knives. At this furnace these articles were produced and the Iron Works Road was laid out to transport them to such distributing centers as Frankfort and Lexington. From this furnace came the tools and utensils used on Kentucky farms and in Kentucky homes for more than a quarter of a century.

After danger of Indian hostilities has passed, prosperous settlers converted their log cabin homes into slave quarters and built their mansion houses which made Kentucky famous. This necessitated iron nails instead of the early wooden pins cut by hand, and nails were literally worth their weight in gold. They also required iron latches, locks, hinges and bolts - instead of the latch-string and wooden bar; as well as ornamental Franklin stoves and other niceties of life, all of which were cast in this furnace.

Work horses had to be shod, so did oxen whose tiny little feet seemed far too small to carry their bulky bodies. In addition to them, the English sporting blood of the pioneer Kentuckians, which manifested itself in horseracing up dry creek-beds necessitated the finest plates for dainty thoroughbred hoofs. So while the blacksmith and wheelwright wrought at the forge, the farrier stood beside the anvil operating the huge "leather lungs" as he called the bellows, while making shoes for man's four-footed friends, and the white-smith made his guns.

When candle-light dimmed the vision, iron craftsmen wrought the adjustable frames for spectacles and eye glasses cost one hundred dollars a pair in the settlements. Other skilled craftsmen contrived the tailor's "goose" and "shears" which he took with him when he visited a home, slept in the third best feather bed and made the winter clothing for the household.

A mill-site was invariably noted by the prospector and mill machinery had to be added to the output of the furnace. To the mills came settlers for miles around

to grind their corn, and this use provided many roads so that many mill sites ultimately resulted in the location of Kentucky towns.

On this spot John Cockey Owings and his son, Colonel Thomas Dye Owings, not only built the stack, but a fort to protect the builders from the Indians, and also a blacksmith shop, a grist mill and a store. They, indeed, were men of vision providing domestic necessities for the pioneer Kentuckians. When the War of 1812 came on, they converted this plant into a munitions factory, supplying cannon, canister and grapeshot to Andrew Jackson at New Orleans, to defeat Sir Edward Packenham.

I have a cannon ball about the size of an apple given me years ago, and I have seen useful and artistic articles produced at this furnace. They should be collected as far as possible and preserved in a museum beside this stack as tangible proof of Kentucky's inititative, progress and patriotism, and as an illustration of the skilled craftsmanship of our forebearers."

(FIVE MINUTE TALK GIVEN BY MRS. W. T. LAFFERTY AT OWENSVILLE, KENTUCKY, ON THE OCCASION OF THE UNVEILING OF THE MARKER ERECTED ON THE STACK OF THE BOURBON FURNACE BY THE MOSES SHARP CHAPTER OF THE DAUGHTERS OF THE AMERICAN REVOLUTION)

From Newcomen Society,
by Quincy Bent Vice Pres.
Bethlehem Steel Co,25 Bdy .N.YC.
1939

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From Bent address.

Further note. The first steel rails ever made in tis country on a commercial order were rolled at Johnstown in 1867. They were made of steel produced in the Bessemer plant at Bethlehem, Pa.

In that same yr, 1867, the Pennsylvania Steel Co. bought the first consignment of pig iron ever sold on a laboratory annalysis, and in 1870 A.S. McCreath, later of Harrisburg was regularly employed in the Steelton Plant as a full-time chemist. Credit this if used.)

Russell. 1/ 31 '41

73x9

From Newcomen Society,
by Quincy Bent Vice Pres.
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1939

Cut. "The Bessemer Converter"

Quote,

" A number of revolutionary events occured in the early '80s. Encouraged by the prospects of a metal that had almost universal application,not only in steel rails but also in plates, bars and structural material, the horizon began to broaden. Metallurgy was taught in Universities and trained young minds began to attack the problems, - to dare to do things that had never been done before- not to be discouraged by one failure- the eternal bounce of in youth.

Quincy Bent.

His address was on the progree in steel. He says the first steel rails were imported from England by the Penn. R.R. in 1866, loo. tons as a test. Cost $150. pr. T. The rails weighed 40/60 lbs. pr. yard, and in length anything over 20 ft. was acceptable. The process of making steel was largely an English development."Alexander L. Holley was brought to Baldwins in 1866 from England to construct and operate the steel plant. A condition precedent to the employment was that he should be provided with a house for his family, built exactly from the plans of his English home. This house still stands today and with additions and alterations is occupied by the present Gen. Mgr. of the Steelton Plant. Incidentally, it happens to have been the birthplace of your humble servant".

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Russell. 1/ 31 '41

8 Continued -

F. B. R.

The yankee spirit of Enterprise began to react to the necessity of the times + in 1866 the Baltimore began the building of a steel plant at Steelton Pa., bringing a man of experience from England where the steel business had really developed. Steel is made from Pig Iron + demand for it gave impetus to Expansion in Furnace building to supply demands of the steel Mills

In 1867 the first steel rails were rolled in this Country + the demand for Iron was growing as more + more miles of Rail Roads were built. Estill County furnaces found a ready market in 1871 + got as high as $40. per Ton f.o.b. Louisville for their output. A reaction set in soon to disturb the whole Industrial movement in the Country. Steel rails were offered at $20.00 per Ton + pig Iron was declining on the market in the Fall of 1873. The furnace in Estill Co. went out of blast as a business there was soon revival in business conditions six yrs. later and Estill Co. was started in a small + economical way in 1879 on a market affording $45.00 per Ton f.o.b. Louisville. The Iron was hauled by wagon 24 miles to avoid the transfer of river transportation heretofore

Ecl 9

by Mrs Welch
1941

The Red River Iron Region.

By Mrs Welch 1941

Western Asia, the birthplace of the human race, began at such an early date to smelt iron that its history is lost in obscurity. Iron was used as early as three thousand years ago in Europe and at a much earlier date in Asia Minor. Iron was used at an early date by the Egyptians, and by them introduced into Arabia, and it was used at this same time by their contemporaries the Chaldeans, Babylonians and Assyrians. The Book of Job contains references to iron, referring even to "bars of iron". When Moses led the Children of Israel out of Egypt, iron was frequently mentioned in the story of their wanderings. A thousand years before Christ, when David made preparations for the building of the temple he prepared iron in abundance; when Soloman came to build the temple he sent for men cunning in the work of iron. The knowledge of iron entered China at some unknown date. It was a common knowledge to all the people of the then known world five hundred years prior to the birth of Christ. In England the strong and energetic race, known as Celts, had by the time they became known as Britains learned to mine and manufacture iron, -the most useful metal known to man. Such were the people met by Caesar when he invaded Britain, fifty five years B.C. In Anglo-Saxon times the Iron-smith was treated as an officer of the highest rank. William the Conqueror was much indebted to the smith for his conquest of England; his soldiers being better armed than those of the Britains.

The oldest specimines of iron are in the British Museum; one of which was taken from the pyramid of Gizeh and is thought to be about 4000 years old.

North Carolina was the first state in this country to give the Europeans the knowledge that iron ore existed in the New World. When Ralph Lane commanded an expedition to North Carolina in 1585, his men explored the country along the Roanoke and Elizabeth Rivers where they discovered iron ore but no effort had been made to use it when they quarreled with

the Indians in 1636 and returned to England. Neill's History of the London Company says that on April 10, 1608 the Company's ship from Jamestown loaded with iron ore, sassafras, cedar posts and walnut boards. In 1619 the Virginia Company sent to Virginia a number of persons who were skilled in the manufacture of iron, "to set up three iron works" in the colony. They were not successful and Massachusetts has the distinction of operating the first successful iron works in America, in 1645. Other Eastern States made iron about the same time, and the industry was very active in the state of New Jersey prior to the Revolution. As early as 1692 there were iron works in Pennsylvania, but the business wasn small and local and did not amount to much until 1716, but after this time it grew rapidly and Pennsylvania soon became known as the most advanced in the manufacture of iron of all the American colonies. Many furnaces and forges in Maryland and in the valley of Virginia were in operation prior to the Revolution.

Kentucky was separated from Virginia in 1786 but was not admitted to the States of the Union until six years after its orginization as a territory. Up to 1775 land in the section of what later became Kentucky had been surveyed for veterans of the French and Indian Wars and the grants from 1782 to 1792 were for military services in the French and Indian Wars. After that the grants were Revolutionary Virginia Grants.

was "God of Virginia" and greatly interested in Kentucky lands warrants could be obtained for a mere pittance; land warrents called "Treasury Warrents" had been issued to the extent of many millions of acres. Virginia took her paper money which had been issued during the Revolutionary war in payment for lands in Kentucky. The speculators using soldier's script were the principal benefactors and it is believed that the State of Kentucky was covered three times over by differnet emtries which involved the people in tedious and expensive law suits for many years.

The most venturesome of all nations is the heritage of the American people, and certainly no state in the Union was more fortunate in her occupancy than the State of Kentucky. Not all of her early settlers came as homesteaders; for her vast unknown resources and timbered lands appealed to business men who saw a future in the manufacture of iron. The Kentuckians had an excellent training in the making of iron, coming as they did from Pennsylvania, Maryland and Virginia. By far the greatest majority of these people were the first, second and even the third generations of the so called Scotch-Irish who had landed at Philadelphia and eventually they came to Maryland and the Valley of Virginia and on into Kentucky in the great western move of population after the Revolution. This self-reliant contingent of people had carried Virginia's frontier to the Ohio River within the life time of the immigrant ancestor, and they were impatient to conquer still another wilderness and start a normal way of life. There was no other necessity than iron quite so necessary, with the exception of salt, to the early settler , and knowing how difficult it would be to bring iron over the mountains or down the treacherous Ohio River on account of its burdensome weight it would not be hard to believe that some of the first settlers had made iron in a crude way for their own personal use, but there had been no attempt to smelt iron in a commercial way until 1791. In October of 1782 Jacob Meyers, from Baltimore, Maryland patented 5,434 acres of land on Slate Creek in Bourboun County Kentucky. In 1790 Jacob Meyers (above) the boomer, the contractor and builder of the Bourboun Furnace had selected the furnace site on Slate Creek, a branch of the Licking River, about two miles southwest of what is now Owingsville, Kentucky, and in 1791 this furnace was in operation, in Bourboun County in the territory of Kentucky, but the following year when Clark County was organized this furnace property was made part of ~~the~~ Clark County but it did not remain long in Clark county for when Montgomery county was organized in 1796 it became a part of thar county and when Bath county was carved out of Montgomery county January 15, 1811 it became then and has remained ever

since a part of Bath county. In 1791 a partnership had been formed between John Cockey Owings, Christopher Greenup, Walter Beall, Willis Green and Jacob Meyers.

The pioneers had complained because the rock bottomed creek beds damaged the feet of their horses and oxen and because they needed plows, tools, weapons, fireplace supplies and many other things to which they had been accustomed for many generations. This newly organized company furnace, the interest and purpose of which was to provide the settlers with all the articles made of iron so badly needed in their infant commonwealth, was not only the first furnace west of the Alleghenies but was the first of the industries to cross the Alleghenies. It was said by Mrs. Lafferty on the occassion of the unveiling of the marker on the stack of the Bourbon or Slate Furnace by the Moses Sharp Chapter of the American Revolution that a list of its owners and operators would read like a list of "Who's Who in the Kentucky Industry". The capital to operated this furnace came largely through John Cockey Owings of Baltimore, Maryland who was elected president of the firm, and who was the only member of the firm who never lived in the State of Kentucky. He was a wealthy man, a son of Joshua and Mary Cockey Owings of Baltimore, Maryland, and he had large land holdings in Kentucky, part of which were used by the iron works as a source of raw material. His interests in Kentucky were managed by his son Thomas Dye Owings. John Cockey Owings died at his home in Baltimore, Maryland, February 3, 1810.

Christopher Greenup was born in Virginia about 1750 where he later served in the Revolutionary war. On March 4, 1783 he was sworn in as an attorney at law for the district of Kentucky and on March 4,1785 he was appointed the clerk of that court. From 1792 to 1797 he was a member of Congress, and after that he was a clerk of the senate of Kentucky. From 1804 to 1808 he was governor of the State of Kentucky. Afterwards he was elected to the

legislature of Franklin county. In 1812 he acted as a justice of the peace for the same county. He served for many years as a director in the old bank of Kentucky. He died April 27, 1818.

Colonel George Nicholas was born about 1743 in Williamsburg, Virginia where his father Robert Carter Nicholas was a distingusihed lawyer, a member of the house of burgesses, a member of the colonial council and treasurer of the colonly of Virginia. George Nicholas was a captain in the war of the Revolution in the Virginia state line, and after the war, practiced law in Albermarle County, Virginia and was elected to the legislature from that county. In 1788 he moved to what was then Mercer county in the territory of Kentucky. He was a member of the convention which framed the first constitution of Kentucky. He was a great statesman and a great lawyer. While he was interested in the Bourboun furnace he made that vacinity his home for several years; afterwards moving to Lexington where he practiced law. In 1799 a law department was added to Transylvania University and Colonel Nicholas was made the first professor, but he died shortly thereafter. In 1799 Colonel Nicholas had married Mary Smith, of Baltimore, Maryland. His youngest daughter married Judge Richard Hawes of Bourboun county, Kentucky.

John Buchanan was the author of the Kentucky Resolutions of 1798/ He was a United States senator in 1801 and Attorney General of the United States in 1805.

Walter Beall was a well known surveyor. He was an elector of the senate from Nelson county in 1792, under the first Constitution. May 1783 he had been a clerk in Lincoln, county.

One of the first christian marriages ever solomanized on Kentucky soil was between Willis Green and Sarah Reed, near Danville, Kentucky. Willis Green was born and reared in the Shenandoah Valley of Virginia. He came to Kentucky as a surveyor, to locate land warrents for various persons. He represented the county of Kentucky in the Virginia Legislature. He was clerk of court for a long term of years.

These men, the owners of the Bourboun furnace were of Scotch and English descent with one exception a german artisan. These men of education and refinement had come together to create an enterprise which was the first of what was to develope into a big and important business in the state of Kentucky.

Required at all times to run the furnace when it was in operation were two founders, two keepers, two gutterman, two or more fillers, a potter, an ore roaster and several laborers. The furnace was built of large blocks of limestone found in the locality and the interior was lined with fine grained fire resisting stone. Between the two walls a space was left to be filled with clay to protect the outside wall from the intense heat. The furnace consisted chiefly of hearth, stack and bellows , and castings were done directly from the smelting furnace but later a forge was built where pigs, from the rock ores, were reheated and hammered into wrought iron. To start the furnace the men first filled the inside of the stack with charcoal which was lighted from the top. After the charcoal had burned for several days and the fire had burned down the furnace was again refilled with charcoal. As the furnace business grew the first step was to build a wagon road so that merchandize might be hauled by teams of horses or oxen. Prior to this time the market had been entirely a local one for there was no means of transportation to carry it to other settlements. The Ohio River was navagatable but accessable only to those who lived near it, and the highways were mere trails up old creek beds which joined hollow to hollow and served in lieu of roads. Slate forge was built in connection with this furnace about 1798, a few miles below the furnace on the same side of the stream where until 1818 they converted pig iron into bar iron by forging. Paris in 1790 was a community of 838 people, Winchester in 1810 had a population of 538 and Lexington in 1810 had a population of 4,386.

The pioneers found many salt springs and it took 900 gallons of salt water to make a bushel of salt. So many ten gallon kettles were maes at the

furnace that it was often referred to as "salts".

Since the ore was on the surface or just below the surface no technical knowledge of mining was necessary and the men with picks and crow-bars would dig the ore out of the earth then shovel it on to a wagon or sled and use a team of horses or oxen to take the ore to the furnace. This ore was found mixed with rock, clay and earth but it was only the masses heavy with iron that would justify smelting.

details not correct

The charring of the wood for charcoal-making was a very familiar process. After the trees were felled, trimmed and bundled into cords they were stacked in conical shaped looking wigwams in a dry circular pit by stqnding each bundle on end so as to leave the innermost circle open to form a chimney. Damp earth or leaves were packed around and over the outside of the giant wigwam and holes were drilled in the sides to draw air. The inside was then filled with dried leaves and bits of dried sticks and lighted from the top. No flame was ever allowed to develope and men watched day and night always ready with wet leaves or clay to patch over any place where there was the possibility Of a flame. It generally took wix or seven days, or sometimes less, depending on the ability of the men, to char one of these. When the charcoal was completed and cold it was hauled to the stone charcoal house near the furnace. It was near the furnace where a thriving community very quickly came into existence and where the iron master and his workers lived. The mangger was a very important man and his "mansion house" was built at the expense of the firm. The other company-owned buildings were the furnace, forge, blacksmith shop, store, inn,

The charcoal house was of necessity built of stone like that in the furnace itself. The only company owned buildings not in the furnace settlement proper were the charcoal burners huts which were in the woods near their work. The men worked hard and were a big influence in laying a commonwealth west of the Alleghenies. All the materialsnecessary to the manufacture of iron were

The processing of coal is described by Russell in a Medeb following this article

Not at all correct

found in abundance in this destrict; outcropping ironore, extensive .ests to provide material for fuel, beds of ~~ira~~ limestone and the streams and creeks to furnish the necessary water power. A few highly skilled german iron men came from Pennsylvania. Labor was supplied by the early pioneers themselves, although a part of the work was performed by negro slaves. The Slate creek furnished the water power necessary to drive the ,machinery as well as the bellows which furnished the blast for furnace and forge. A blacksmith in those days was a very important man in any community. He did not limit himself to repair work and shoeing horses and oxen but made tools and many other useful impliments and was really in a small way a manufacturer.

The Kentuckians looked on the Indians as blood-thirsty savages and the Indians thought of the Kentuckians as ~~a~~ land thirsty, restless white men. It was found necessary to guard the workers at the furnace, the charcoal burners, the woodsmen, the men hauling ore as they went back and forth from furnace to forest . Collins says that there was a blockhouse, in 1786, on the old Slate ore bank where Jacob Meyers afterwards built the furnace. On February 26, 1791 it was ordered that the iron works post be immediately occupied by the guards, for the defense of the district and there are other instances on the government records where militiamen were ordered out to the iron works to quell the Indian disorders. The furnace people had so often to retreat into this block house in time of Indian troubles that the ore of this furnace became known as "block house ore".

written by Mrs West a granddaughter of Mrs Day-ally, Mt Sterling
I have not checked the dates.
Much of minor details such as workers
& houses are from hearsay & not
accurate. Some of her relatives once
had an interest in Collaz furnace.

73x9

Notes of Frank B. Russell

ESTILL COUNTY

Estill County was formed from parts of Clark and Montgomery County in 1808 being the 50th county created in Kentucky in the 15th year of her statehood. Parts of its original territory has been taken since to help form Breathitt in 1839, Owsley in 1843, Powell in 1852 and 1889 Jackson in 1858 and Lee in 1870.

Estill County lies East of central Kentucky on both sides of the Kentucky River which drains its entire water shed. Red River is the boundry line for some ten miles on the northwest from its confluence with the Kentucky River constituting its boundry on Clark County.

Lying in the foot hills of the Cumberland Mountains most of the surface is hilly with fertile valleys, especially along the Kentucky River where some of the best river bottom farms are found, but the hills have been the real source of wealth, rich in iron and crude oil as well as timber. The timber was the first to be taken and floated down the river to mills at Ford and Frankfort and some to local saw mills.

IRON, Forge and Rolling Mill

The far sighted business men who came into Kentucky from Pennsylvania and the coastal states took land some years before the state was admitted to the Union in 1792. They were aware of the valuable resources the hills possessed in timber and minerals. They knew the needs of the people for building material, timber, nails, iron for shop work in wagon building, farm impliments as well as pots, kettles, and many other essentials needful in converting a wilderness into a liveable country. The lack of roads prevented goods being hauled in from settlements East of the mountain range. To meet these needs three or four of the large land holders proceeded to build a small charcoal blast

furnace on Red River in the northwest corner of Estill County. At this point the river makes a bend of some five miles around and one mile across the heel of the horse shoe. The plan was to use water power to operate the machinery in the proposed grist mill, saw mill, blast furnace and rolling mill. A dam was built eight feet high of logs and rock and a mill race dug some twelve feet wide and ten feet deep from the pool across the neck, with two control gates spaced five hundred feet apart in the race. This gave them a pool in the river some four miles in reach and a fall of some six or seven feet from head to mouth of the mill race. This was ample to drive a bucket wheel twelve feet by six with sufficent energy, say fifty horse power, to serve their purpose. The furnace for smelting was discontinued and torn down about 1831. There is no known history of its dimentions, but on doubt it was some eighteen feet high of sand stone and lined with fire clay with a capacity of one ton per day.

The greatest demand was for kettles to be used for making salt, sugar from cane, and sugar maple. These they molded and traded to settlers as well as two to ten gallon sizes for cooking and wash day use. The ore had to be hauled from the hill tops East of the plant four hundred to five hundred feet elevation above there location, as ore is not found below the lime formation. There river location was imperative ~~and an expense~~ since the water power was the guiding factor in locating the site. Lime was another necessary item to be hauled since some five hundred pounds of good white lime was needed with each three tons of ore and two hundred bushels of charcoal as fuel to make one ton of iron. Blast was pumped in about two feet from the bottom of the hearth at about six to eight pounds pressure from a blast cylender much as a black-smith uses ~~from~~ his hand ~~operated~~ bellows. As the fuel was consumed

more charcoal is fed in from the top, called the man-head, with a charge of ore and lime. After some twelve hours of continuous operation the iron is ready to be drawn and cast into molds or shapes formed in sand from patterns, or into ingots or oblongs. These are suitable for going through rolls for bars or plates from which nails can be cut of four different sizes, six, eight, ten and twenty pennies. They were put up in pine boxes, one-hundred pounds each and stored in large ware houses, one hundred and fifty by fifty feet and twenty-five feet high, made from oak dimentions and weather boarded. The ware houses or "Iron Houses" as they were called, held the finished products pending sale. The plant, including the dam, mill race, furnace, gristmill and saw mill were built in 1804 or 1805. Collins History of Kentucky says it was supposed to have been built about 1810, but in looking over the acts of the 1805 Legislation we discovered an act forbiding the building of stone fish traps in Red River between the iron works on the river and the mouth. The furnace and forge plant was ten miles from the confluence with the Kentucky River so much of the iron products were shopped in small barges, built on the spot, to settlements below Frankford and maybe to Louisville. A market was found in these small settlements, especially for nails and wagon material. Some of the products were hauled by ox and mule team over poor roads to Lexington, Harrodsburg and other settlements in the Blue Grass section. Many houses built within fifty to one-hundred miles of the plant, prior to 1860, and still in use, used nails manufactured at this plant which operated as late as 1865.

The town of Clay City was built in 1890 on the farm surronding the forge and iron works. There is still to be seen on its original location the solid iron anvil, weighing about two tons, on which the power

driven triphammer shaped the iron after the rolling and malleable processing. The old mill race is well over-grown with vegatation and the banks are lined with sweet gum and sycomore, as large as thirty-six to forty inches in diameter. As late as 1874 quite a few boxes of cut nails remained in the "Iron House" and in useable condition. The large ten room house, built for the manager of the plant, still stands, and is now owned and lately occupied by Frank Newell, who as a small boy lived at Fitchburg. The plant was owned in 1828 to 1830 by Jackson Wheller & Co. and others interested in the business were Peter Mason, Thomas D. Owens and John C. Mason. The business was run as a partnership, but was refered to as the Forge and often as the Red River Iron Works. Later incorporated by the Owens, Eastern capitalists, who under the management of Frank Fitch took over the Iron Works on Red River, The Estill Furnace and some twenty-five Hundred acres of land attached to the two properties.

IRON INDUSTRY

Estill Counties resourses were early in development. Four plants for the manfacture of iron being the counties contribution to the needs of the state and the furnishing of work for men and their teams.

The Forge and Rolling mill, for reducing hemalite ore to pig iron, was built about 1805, then in Clark County, later Estill County, now Powell County. Estill Furnace was built in 1830 on the mountain, ten miles from Irvine, by the then owners of Forge and Rolling Mill on Red River. Cottage Furnace was built in 1854 by Mason and Wheeler who operated it some four or five years and then sold in 1862 to Pierce Winter and Vaughn (Vaughn of Hardwick Creek). The firm operated less than two years and in 1871 it passed to a firm organizes by John O. Miller. The names of Baum, Gardner and Roberts appearing as part owners.

From them it passed to D. B. McKinney & Bro. This property was never connected with the holdings of the Red River or Kentucky River Iron Manufacturing Co. These two furnaces were built on the Kentucky River slope of the dividing ridge between the Red and Kentucky River water sheds. This ridge is now the designated dividing line between Estill and Powell Counties.

Fitchburg's two furnaces, twin stacks, were built in 1869 by the Red River Iron Mfg. Co. with a combined capacity of about twenty-five tons per day. Both furnaces went into blast in 1870 and not being a financial success for the owners wound up their activity in 1873. The principal stockholders disposed of part of the property in 1889 and in 1903 the balance in the three and four mile circle surrounding Estill Furnace and the Forge. Later it was all sold off in parcels to local people.

The last blast was made at Estill in 1888 and the iron shipped from Clay City on the Kentucky Union R. R., lately built from Hedges' Station (C.& O. R. R.). Later crude oil was discovered on parts of the property, in the four mile circle and some 250 wells were drilled with success and profit for the owners, county and state.

RED RIVER IRON MANUFACTURING CO.

A charter by act of the Legislation in 1865 and by act passed in 1872 and approved by Gov. Leslie, was amended granting further and extended rights to build a railroad from Richmond to Irvine, thence to Scots Landing (mouth of Millers Creek), thence to Beattyville and granting the county of Estill right to subscribe for stock in the enterprise to the extent of $150.000 subject to the approval of the voters of Estill County. This election having been ordered by the Estill County Court on Feb. 20, 1872. For various reasons the plan to build the railroad

was not carried out. It was about twenty years later that a railroad was built from Richmond to Beattyville by another cooperation which is now owned and operated by the L & N Railroad. This company improved and extended the railroad to the fields in Letcher County. They abandoned the line from Irvine to Richmond and built a line from Irvine to Winchester, thus shortening the distance to Cincinnati some twenty miles. This development in transportation came long after the iron production in Estill County had ceased.

Estill Furnace, heretofore refered to, was built by Jackson, Mason and Wheeler in 1829 and 1830 and made its first blast the later part of 1830. It was operated intermittently for several years, then Mason and Wheeler disposed of their interests. It was then operated for sixteen to eighteen years by the firm of Laywell Jackson & Co. at which time Jackson became the sole owner of all the iron interests in Estill Furnace and the forge property on Red River, together with all the land owned by the builders within a four mile circle of Estill Furnace and continuing in a circle radiating three miles from the center of the County Road Bridge across the mill race of the forge on Red River. Also some 18000 acres in the four mile circle and six or seven thousand acres in the three mile circle. All this acreage had been set aside for furnace use earlier. The three and four mile circle each within the Thomas Franklin patent of some one hundred and ten thousand acres under an early grant by Virginia and signed by Gov. Patrick Henry. Parts of the acreage inside the area of each circle had been sold off to settlers before the iron business was started; hence the lesser acreage owned by the furnace company was then the content of the two circles.

The large acreage so set aside was for timber to make charcoal and the hill tops above the lime strata contained the red hematite ore

which yields about 33% iron. These ore vains ran from thirty to forty inches thick and usually near the surface.

Estill Furnace had a capacity of seven tons per day of twenty-four hours, to produce some twenty-one tons of ore and fourteen hundred bushels of charcoal (seven loads of two hundred bushels each) and about ~~fifteen hundred~~ pounds of good white lime stone necessary to flux the furnace and run off the foreign matter, slag or dross, called cinder by the furnace workers. This stock was dumped into the trundlehead of the furnace stack, in charges of twenty bushels of charcoal to four hundred to six hundred pounds of ore along with fifty pounds of lime. These charges of stock are put in as the furnace will take it.

The two old fashioned cylender boilers set on top of the stack with front ends over the trundlehead and extending back there length of some twenty-five feet to a smoke stack forty feet high. This smoke stack created a draft to pull the gases from the trundelhead back through the fire box which generated steam for the eighty horsepower engine. The purpose of the engine was to create blast to intensity the furnace heat. The blast was forced into the furnace by a blast cylender setting upright with the pistion connected with a overhead walking beam to which the engine was connected at the opposite end. This forced the blast through a large receiver, five by eighteen feet, through a six inch pipe into the furnace about five or four feet from the bottom of the furnace hearth. This blast went into the furnace with a pressure of some five to seven pounds, as would be shown on a steam guage. The hearth of the furnace is of sand stone and forms a basin circular in shape three feet in diamiter and three feet deep from the opening where the slag or cinder escapes as the smolten iron rises in the basin. The cinder being of the lesser gravity floats on top of the iron and runs off to the cin-

-der

beds is hardened and carried off to the dumps, much of it being used for making roads within a mile or less of the furnace. When the basin is filled it will contain about three and a half tons of iron. The engine is then shut down stopping the blast and the furnace keeper taps the outlet at the bottom of the hearth and lets the smolten iron run down a trench, made of sand, to the pig beds where it is formed into bars in size, say two inches by four by thirty inches and weighing about one hundred pounds. These bars are called "pigs". This operation is termed "casting" and occurs every twelve hours.

The active operation of the furnace is in control of a foundryman who must know the technique of successful operation of a furnace to get the capacity output of one ton and hold down the fuel consumption to the minimum. The furnace must, to get the best results, be kept at a consistent temperature neither too hot or too cold. If she becomes too hot and the iron will be white looking when broken, and brittle not tough and durable and will grade up to as high as number six where number one and two is wanted. The principal demand for pig iron in the seventies was for making car wheels and steel rails to met the demand of railroad expansion through out the country. In fact the manfacture of rolling steel rails was just coming into its own in the United States. This information comes from Mr. Quincy Bent of the Bethleham Steel Co., that the first rails used in this country were imported from England for trial in railroad tracks of the Penn. R.R in 1862. One hundred tons were brought over at a cost of $150.00 per ton. The rails weighed from forty to sixty pounds per yard compared with our standards today of one hundred to a hundred and fifty pounds.

1940 by Clayton Tilch, Mt Sterling

THE IRON INDUSTRY IN KENTUCKY

Previous to 1791 there had been no attempt to smelt iron on a commercial basis in Kentucky. Consequently, any machine part which was needed on the rapidly growing frontier or, more generally, west of the Alleghenies, had to be carried over the mountains or, possibly, boated down the Ohio River. The crank to the first saw-mill west of the Alleghenies, which weighed one hundred eighty pounds, had to be brought on mule back many miles from one of the eastern states. Thus may be seen the necessity for development of some means of manufacture of iron products in the rapidly growing western district.

This need was first met by Jacob Meyers, who was a German immigrant. He moved from Baltimore, Maryland, about 1790 and began the construction of an iron furnace on Slate Creek in Bath County. This furnace was first called Bourbon Furnace and later changed to Slate Furnace. It is the only furnace west of the mountains that has a history that can be traced back into the eighteenth century. For this reason, and that it was a pioneer attempt and one executed under great difficulty, it is given much weight in descriptions of the early industry. Beside this, it was situated in an ore region of relatively great importance.

At this period, great encouragement was given by the Government of the Colonies to anyone attempting to develop the iron resources of the west. It is well that the government did give the builders of this furnace aid because it was carried out under great danger of attack from the Indians. For this reason there was built a strong blockhouse of logs close by the ore bank and furnace site, into which the workmen could retreat if attack from the Indians was imminent. The ores of this particular vicinity consequently were often called "the blockhouse ores". There are on the government records instances recorded when the militiamen were ordered out to Bath County to quell Indian disturbances which impeded the development of the iron smelting enterprise there.

The first blast in this Furnace was made in the year 1792 and the furnace continued in operation intermittently until 1839, when, due to

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exhaustion of timber for charcoal, as well as for other reasons, the furnace ceased operation. The furnace is still standing.

In connection with this enterprise, there was built in 1798 Slate Forge, a few miles below the furnace on the same stream. The purpose of this forge was to convert pig iron to bar iron by forging. This forge continued in operation intermittently until 1818. Also, the Maria Forge was built on Licking River close to the mouth of Slate Creek in 1810 and continued in operation until about 1840.

This furnace was of heavy stone construction, looking from the outside much like a truncated pyramid. Its blast machinery was operated by water power of Slate Creek, which was often insufficient to keep the furnace operating continuously. The furnace produced about three tons of iron per day while running. Though the iron from this furnace and its nearby forges was widely used and well known, it had a bad reputation in that it had poor strength and was very hard. This was due in part to the high phosphorous content of the ore used.

In spite of the poor qualities of this iron, it had a wide market. Most of it was shipped down the Licking River to Cincinnati and Louisville, after being hauled overland for seven miles. Also, the Iron Works Road, which passes close to Lexington, was built in connection with this industry. In fact, its later owners, who will be mentioned in a subsequent paragraph, maintained a store of iron at Lexington and advertised their products for sale. Many of the early heating stoves, cooking utensils, flat irons, etc., were cast at this furnace. In 1810 the owners of this furnace had contracts with the United States Government for furnishing cannon balls, chain shot, grape shot, etc., to the Navy. From this furnace also came many of the cannon balls, chain shot and grape shot used by General Jackson in the Battle of New Orleans.

The original owner of the furnace, Jacob Meyers, soon after beginning operations, took into partnership several gentlemen, all of whom were either prominent men in the history of this country or very outstanding men

otherwise. There was Christopher Greenup, a Virginia soldier who was elected to Congress in 1792 and was Governor of Kentucky, 1804-1808. Also, Greenup County was named for this man. George Nicholas was a great lawyer and statesman. He was a member of the Constitutional Convention of Kentucky and author of said document and served as the first Attorney General of the State of Kentucky. John Breckinridge was author of the Kentucky Resolutions of 1798 and U. S. Senator in 1801. He was also appointed Attorney General of the United States in 1805. Walter Beall and Willis Green were surveyors who later held various offices in Kentucky. John Cocking Owings, whose name is most mentioned in the early history of the furnace and who later became its sole owner, was a large landowner in Maryland.

After 1800 the iron industry in Kentucky made steady progress. Soon there were five furnaces in this district, later called the Red River Iron District. There was one in Estill County, one in Wayne, one in Bath and two in Montgomery. There were also four forges; one in Estill, one in Wayne, one in Montgomery and one in Bath County. In the same year, or shortly afterward, there were four nail factories in Lexington, which had a combined annual production of seventy tons, or about fourteen hundred kegs.

In 1815 Richard Deering, a farmer of Greenup County, smelted in a cupola the first iron ore used in the Hanging Rock District of Kentucky. Being successful, he took into partnership David and John Trimble and built in 1817 or 1818 one of the first furnaces in the district. This furnace was called Argillite from the black slate cliffs in which it was cut. This furnace was operated only a few years and the production was small.

Soon after 1818 Pactolus was built on the Little Sandy River above Argillite in Carter County. There was also a forge in connection with this furnace, but both were soon abandoned.

There was the Steam Furnace built in 1817 in Greenup County. Its blast machinery was operated with steam. It was abandoned in 1860.

In 1826 the first iron furnace in Boyd County was built about two and one-half miles southwest of Ashland by A. Paull, George Poague and others. It was called Bellefonte.

There were at least thirteen charcoal furnaces built in Carter, Greenup and Boyd counties between 1817 and 1834 and eighteen other charcoal furnaces subsequent to 1834.

In 1830 there were twelve forges in Greenup, Estill, Edmonson and Crittenden Counties. With the exception of Red River Forge, Estill County, these were all abandoned before 1850. There were two forges built below Eddyville in 1840.

In addition to the Hanging Rock Region, furnaces were built before 1860 in Bath, Russell, Bullitt, Nelson, Muhlenberg, Lyon, Crittenden, Trigg, Calloway and Livingston Counties. Besides the Bourbon, or Slate, Furnace, before mentioned, there were built the Caney and Clear Creek furnaces in Bath County.

There was great activity in the iron industry between the years 1825 and 1860, but this business lapsed after the Civil War. Kentucky was seventh in the list of iron-producing states in 1870 and eleventh in 1880. In 1890 the state was fourteenth in the production of pig and rolled iron.

In 1880 there were twenty-two furnaces, eighteen being charcoal and four bituminous coal, which had been built in the latter part of the nineteenth century in the Hanging Rock Region. In the same year there were eight rolling mills. Two of these were in Covington, two in Newport, two in Louisville, one in Ashland and one in Lyon County. The first of these was built at Covington in 1829.

The Red River Iron Region was the first region in Kentucky to be entered by the iron industry. Its name is derived from the fact that much of this area is drained by Red River. This region was finally construed to include the region between the Kentucky and Licking Rivers. The name "Red River Iron" became quite famous and was extended to the iron made in furnaces other than those in the Red River Valley, which used Red River ores. The counties in this region in which the iron industry was carried on were Estill, Powell, Lee, Menifee, Bath and Montgomery. There were no furnaces outside these bounds until the Hanging Rock Region was reached.

The iron smelted, especially in the furnaces on the dividing ridge between the Kentucky and Red River drainage basins, was of high quality and used chiefly for the manufacture of railroad car wheels. The limestone mingled with the ore furnished an adequate flux. The ore has uniform composition and the phosphorous, a very undesirable element in iron, is not excessive. The ores are similar to the lower limestone ores of Greenup and Carter Counties. Also, the ore, being porous, is permeable to the reducing gases of the furnace. This ore is still present on the dividing ridge of the Kentucky and Red Rivers.

In general, the iron manufactured in this region was cold blast charcoal iron, very suitable for car wheels. The methods of manufacture were on the whole, very similar.

The Slate Furnace, which has been mentioned in a previous paragraph while not exactly within the Red River Iron Region, has been included in this region because of its early existence and the lack of any other region to which it could be assigned. The blast machinery was driven by water power from Slate Creek. The process by which iron was smelted here was very wasteful, requiring three tons of ore per ton of iron smelted out. The capacity of this furnace was about three tons of iron per day, while running, which was not continuous because of the intermittent flow of water. The iron had a poor reputation for strength, but was hard.

The Red River Furnace, the second oldest in the state, built in 1808, was situated in a large bend of Red River above the mouth of Hardwick's Creek, close to the present site of Clay City. There is little present indication of the existence of the furnace. There was a forge which had been built two years previous to this at the same location. There was also a rolling mill operated in connection with this until 1860. This furnace was also operated by water power and the ore was floated down the river to the dam. The men who first built this furnace built with black shale, which contained bituminous matter. After a short period of operation, the furnace burned to such an extent that it had to be dismantled and rebuilt of a more solid material which did not support combustion.

There was built in Menifee County in 1879 Beaver Furnace, situated on Beaver Creek in Menifee County. There were two forges in connection with this furnace, used in the manufacture of bar iron. One was situated on Beaver Creek below the furnace and the other on Licking River below the mouth of Beaver Creek. The product of these two forges was generally floated down the Licking River and Ohio River to Cincinnati. These establishments were in operation until 1830.

Most of the furnaces in this region were of heavy stone construction resembling truncated pyramids. They were generally built of sandstone and in cases where fire brick were not available, the sandstone was used as a refractory or inner lining.

The Red River Furnace of the Red River Iron Manufacturing Company represents the first attempt at improved furnace construction in the region. It is otherwise called the Fitchburg Furnace in honor of Frank Fitch, the General Superintendent of the company, and Fred Fitch, its secretary. Its masonry is still standing in good order, except for part of it which has been blasted. It is of fine construction and a very handsome and imposing structure. Its base is rectangular, forty by sixty feet, and its height is approximately fifty feet. It has two large stacks about twenty feet in diameter at the bosh, one being named Chandler and the other Blackstone. Using waste heat from the furnace were eight large boilers. Also utilizing the hot gases from the furnace was a roasting oven which roasted the ore, removing some of its undesirable elements, such as sulphur, phosphorus, etc. The construction of this furnace alone cost one hundred thousand dollars, and its cost complete with machinery amounted to one hundred sixty thousand dollars.

The iron produced in this furnace was of the highest quality and its use for car wheels was spread far and wide. One stack of this furnace made as much as four hundred eighty tons of iron in one month. In one week one hundred twenty-eight and one half tons of iron was produced in one stack of this furnace, but this was an exceptionally good run. The average production was about forty-five percent when using roasted ore. Much of the iron produced at this furnace was floated down the Kentucky River on barges, after

an overland haul of six miles from the furnace, on Millers Creek.

From a metallurgical standpoint, this furnace yielded all that its owners could expect, but financially it was a failure. The furnace, which was built in 1868, continued in operation until 1874, at which time it became highly unprofitable to operate. This was due to the diminishing timber supply and the high cost of transportation of the iron to market. At this time the cost of transportation of a ton of iron to Louisville or Cincinnati was seven to ten dollars per ton. However, iron could be produced more cheaply here than at many other places at the time. Another reason for the financial failure was the lavishness with which the owners of the company spent money on homes for themselves and the workmen, and on outbuildings at the furnace. Also, the furnace was of too expensive and permanent construction for the location. After the timber began to grow scarce it was unprofitable to try to haul in coal and change to that type of fuel. If the furnace had originally been located nearer to possible trnasportation lines, the furnace could have been operated much more profitably and for a longer time.

Nothing stands today except the mass stone-work of the furnace that would tell one of a past industry. All the fine houses built by these Eastern investors have been destroyed and none of the buildings that were in the town of Fitchburg, except the lodge hall, a store and the servant house of Mr. Frank Fitch, the Superintendent, remain standing. The town of Fitchburg could once boast of a small opera-house, a hotel and a bank. Gay and boisterous was life in this town and much drinking and fighting went on at times when many of the Irish workmen gathered together.

A second important iron district in Kentucky is the Western Kentucky or Cumberland River Region. The main counties embraced in this district are Trigg, Lyon, Caldwell, Muhlenberg and Edmonson. At one time a canal connecting the Kentucky and Cumberland Rivers, and the improvement of the Kentucky River, were proposed in order to bring ores from both the Red River and Cumberland Regions together for smelting. The deposits lie between the Cumberland and Tennessee Rivers.

The Cumberland Region has many advantages which made it a good location for the erection of iron furnaces. It is about one hundred seventy-five miles from Louisville and accessible to rail lines. The ore is of good quality and especially suited to the manufacture of boiler plate. Also the essentials of cheap iron were contained in this region. There were good coking coal, cheaply mined and handled, good abundant iron ores close to coal or easily shipped, pure limestone, cheap labor, abundant water supply and low freight to market. Iron was produced at a price of from $12.50 to $14.50 per ton, which compared favorably with other regions of the United States at that time.

Some of the furnaces in this region were Trigg, Centre, Monmouth and Fulton. There was a rolling mill close to Eddyville which was quite extensive. The boiler plate made here became quite famous and was used in many of the steamboats that plied the western rivers.

One of the most noteworthy developments in the history of the iron industry had as its scene of development in this Western Kentucky iron region. At Eddyville, in Lyon County, in 1852, William Kelley discovered the so-called Bessemer Process two years in advance of Sir Henry Bessemer. Kelley, a native of Pittsburgh, and his brother purchased the Eddyville Iron Works. It is believed that at Suance Furnace Kelley did his work which gave him claim to his fame. He produced the first of the new type of steel in 1852. In 1856 he went to Washington, D. C., to find that Bessemer had been granted a patent only a few days before. He was granted a patent, however, on account of his effort and the fact that he had been known to have done work before Bessemer. However, due to his failure to press the matter of obtaining a patent, the name of the process and much of the credit went to Bessemer. On account of the dispute over the claims of the two inventors of the process, its use was held up in the United States until 1864.

The third main iron region of Kentucky is the Hanging Rock Region. It takes its name from a peculiar shape of rock exposure on the Ohio River, near which is a village of the same name. Some of the early furnaces were

located at this place and ore was landed here. The name was later applied to all iron produced in adjacent counties of Ohio and Kentucky. It embraces the whole or parts of Scioto, Lawrence, Gallia, Jackson, Vinton and Hocking Counties in Ohio, and Greenup, Boyd and Carter Counties in Kentucky. The iron produced in this region was very good, especially for foundry purposes, and it could also be mixed with scrap. The majority of the furnaces in this area were charcoal furnaces, but later several stone coal furnaces were built.

Argillite and Pactolus, built in 1822, were the first furnaces in the region. Argillite, Pactolus, Hopewell, Enterprise and Globe furnaces were built adjacent to water power, which was used to drive the blast machinery. However, this was not sufficient, due to the intermittent nature of the streams. The smaller furnaces produced about two or three tons of iron per day and the larger ones produced ten to sixteen tons per day. Most of them were built resembling a truncated pyramid and situated close to the base of a hill.

All of these furnaces are constructed on the same pattern except Hunnewell and Iron Hills. Hunnewell was built on the same design, but much larger. Iron Hills Furnace was more modern, being built with an iron shell stack, set on four iron pillars. It had a fire brick hearth and lining. The top was closed, with bell and hopper charging apparatus. It was started in the winter of 1873-74, but was compelled to cease operation in the spring, after making only nine hundred sixty-two tons of iron.

Later, stone coal was used in the area, due to the diminishing supply of timber. This section of the country was blessed with a good supply of this coal. Coal was used by the Star, Willard, Bellefonte and Ashland furnaces. Hunnewell Furnace also used stone coal for a very short time, but its machinery was not adapted to the use of stone coal. The first attempt to use stone coal was at Martinsville, Ohio, in 1866. Then the Bellefonte Furnace at Ironton, Ohio, in 1867, Ashland Furnace at Ashland in 1869, and Norton Iron Works at Ashland in 1873 used this type of coal.

The Norton and the Ashland furnaces were the most complete furnaces at that time. The Ashland Furnace had an iron shell stack sixty feet high,

resting on four masonry pillars. This furnace produced only mill iron. Its output was thirty-seven to forty tons daily. Beside the native ore used, much Iron Mountain ore from Missouri was used. Also mill cinder was used in this furnace. The furnace used number seven coal alone, after starting the blast with charcoal.

Ashland Furnace was very successfully managed. On June 20, 1874 a blast was finished which had lasted three years and four months, during which it made forty thousand five hundred twenty-seven tons of iron. It required an average of two and seventy-four hundredths tons of coal per ton of iron, which was far better than other furnaces of that day.

The Norton Works comprised three separate establishments; a blast furnace, a rolling mill and a nail mill. The furnace was constructed in 1873 but did not begin operation until 1874. It was the most extensive at that time. It had an iron shell resting on iron pillars. There were five hot blast ovens and twelve boilers, which furnished steam for both the mills and the furnace. In the rolling mill were sixteen puddling and two reheating furnaces, which were used in making plate for nail machines. There were eighty nail machines producing four thousand kegs per week.

The iron industry in Kentucky today is confined chiefly to Newport and Ashland. About the first establishment in the vicinity of Newport was built in 1845 by the Licking Iron Works Company and, under the name of Licking Coal and Iron Company, was in operation as late as 1911. The largest rolling mill now in Kentucky is the Newport Rolling Mill Company, organized in 1890. In 1925 it produced an average of eleven thousand finished sheets of steel and iron every month, and its annual output was about $32,000,000.

The Ashland Furnace, built in 1869, is the present Number One American Rolling Mill Company Blast Furnace. In 1888 was constructed the present Number Two Blast Furnace. Both are in operation and producing about four hundred tons of iron per day. In 1916 the Ashland Iron and Mining Company, now the American Rolling Mill Company property, started an extensive construction program which has developed six open hearth furnaces, a thirty-six inch

bloom mill, bar mills, jobbing mills, sheet mills and finish units necessary for the manufacture of high grade sheet steels for automobiles. Also the Ashland Steel Company manufactures Bessemer Steel with two Bessemer Converters and has a bloom mill and a rod mill.

The working of iron ores in Kentucky has ceased, due to the opening of much richer deposits in Pennsylvania, Minnesota, Alabama and Tennessee. When these deposits become so depleted as to be difficult to mine economically, Kentucky may again become important, but this is not likely to occur for many years. Kentucky, however, has played a great part in the iron industry of this country, being the scene of many pioneer operations in iron smelting and working.