WINTER 1986

Ohio Geology Newsletter

Division of Geological Survey

THE HANGING ROCK IRON REGION OF OHIO

by Horace R. Collins
Division Chief & State Geologist

The charcoal blast furnaces of southern Ohio played a major role in making Ohio into an industrial state. This region produced charcoal iron from 1818 to 1916, and during the Civil War was one of the leading iron producers in the nation. Much of the iron used in the armament of that period was produced in the furnaces of the Hanging Rock Iron Region. The *Swamp Angel*, a famous Civil War cannon used in the seige of Charleston Harbor, was cast at Hecla Furnace (Lawrence County). The iron used to sheathe the famous Union ironclad *Monitor* is reported to have been cast just west of Oak Hill at Jefferson Furnace (Jackson County).

In 1862 a number of men from the Ironton area drafted a memorial to Congress in which they pointed out the various advantages of the Ironton area as an iron-producing region. The document was entitled "Memorial to Congress for the Establishment of a National Foundry and a Gun-Boat Yard at Ironton, Ohio." This request pointed out that the cold-blast charcoal pig iron made in Lawrence County was widely sought after and that the plates covering the gunboats engaged in the storming of Forts Henry and Donelson were made of this iron. This early day plea for a federal ordnance program was supported by numerous testimonial letters. One was written by "John Christopher, professional mineralogical chemist and machinist, who, during the Crimean War, was in the employ of the British government both in Yorkshire and South Wales." While so employed he performed many experiments on the irons of England, Northern Europe, and the United States to determine their value in the making of ordnance. Christopher indicated that he had made a great number of experiments on various American irons and had found the Hanging Rock iron to be superior. He also found that southern Ohio iron was much better than the best English irons. Hanging Rock iron acquired such an excellent reputation that the British government bought large amounts for the manufacture of military hardware during the Crimean War (1854-1856).

During the Civil War, the demand for Hanging Rock iron became so great that many iron masters would start the pigs of iron off to war still hot. The wisdom of this haste was not always apparent to the

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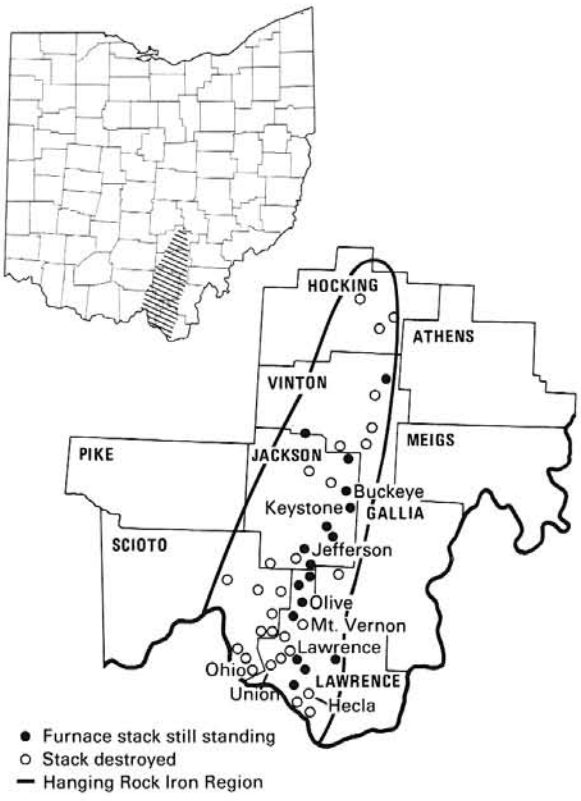
View of Buckeye Furnace, located in eastern Jackson County. This furnace, built in 1851, produced approximately 12 tons of pig iron per day until its final blast during 1894-1895. The furnace and its buildings were reconstructed in 1976 by the Ohio Historical Society and the site is now a State Memorial open to the public.



Charcoal-iron furnaces of the Hanging Rock Iron Region of Ohio.

ODNR
OHIO DEPARTMENT OF NATURAL RESOURCES

Richard F. Celeste, Governor • Joseph J. Sommer, Director

Chief's corner by Horace R. Collins

The article on the Hanging Rock Iron Region which leads off this issue is taken from a leaflet prepared several years ago by myself and a now-deceased colleague. The circumstances leading to making a survey and publishing on the status of the old charcoal furnaces were caused, in part, by the destruction of an old furnace stack that was in excellent condition. Piqued by this act of barbarism against a historic relic, we felt some effort should be made to preserve at least some of these structures.

The act of conducting the actual survey soon turned into a labor of love as many warm and beautiful Saturdays and Sundays were spent in the field tracking down the furnace sites. These excursions also provided an excellent opportunity to enjoy the flora, fauna, and geology. Local residents seemed anxious to share their knowledge of the region and their conversations were full of the rough-hewn flavor of the old iron men of the district. Standing before the old stacks, the homes, the stores, and the graveyards lent a somber, almost reverential, feeling for how these early Ohioans lived and how they created iron from the natural resources of the hills of the region. These feelings and insights fueled even further the interest in seeing something preserved of the region. Although we cannot take credit for directly saving any of the old stacks, our efforts were rewarded by a heightened interest at both the local and state level. Ultimately, Buckeye Furnace was restored and opened to the public as an Ohio Historical Society facility. A few—too few—additional stacks are on publicly owned lands and are thus relatively protected from the rude hand of man but not, unfortunately, from the ravages of nature. Jaunts and walks in the Hanging Rock district, particularly at Buckeye Furnace, are strongly recommended for those who wish to capture something of the essence of this bygone era.

BEREA ATLAS

The Appalachian Geological Society has released Special Publication No. 1, *Lithologic and environmental atlas of Berea Sandstone (Mississippian) in the Appalachian Basin,* by P. E. Potter, J. H. DeReamer, D. S. Jackson, and J. B. Maynard. This 159-page publication describes16 outcrops and 22 cores of the Berea in an area stretching from northeast Ohio and northwest Pennsylvania through Kentucky, West Virginia, and Virginia with particular emphasis on Ohio. Research was sponsored by the Gas Research Institute. The publication is profusely illustrated by photographs, maps, and diagrams and will be of particular interest to petroleum geologists, stratigraphers, and sedimentologists. Special Publication No. 1 is available for $20.00 to members or $25.00 to nonmembers from Appalachian Geological Society, P.O. Box 2605, Charleston, West Virginia 25329.

OHIO GEOLOGY

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News items, notices of meetings, etc. should be addressed to the attention of the editor. Change of address and new subscriptions should be addressed to the attention of the secretary.

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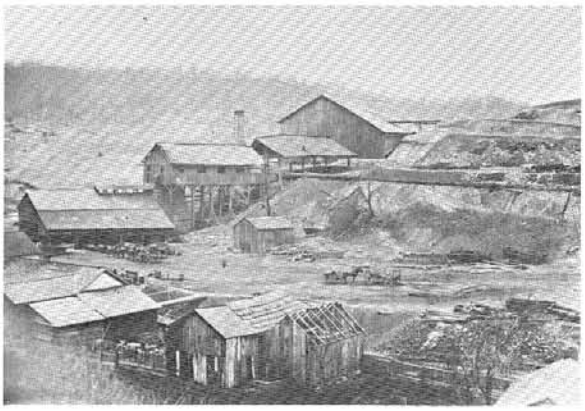
teamsters, as these hot pigs would sometimes burn their wagons on the way to market. In addition to contributing iron to the war effort, the Keystone Furnace community in Jackson County raised a company of troops which served as Company E, 27th Regiment, Ohio Volunteer Infantry. Not all of the iron produced in this region went into ordnance, however. It also was noted for its extreme rust- and corrosion-resistant character and its suitability for the manufacture of cast-iron wheels.

The Hanging Rock Iron Region is a 25- to 30-mile-wide belt which extends from Logan in Hocking County, Ohio, to Mt. Savage in Carter County, Kentucky. The name "Hanging Rock" is taken from a high sandstone bluff a few miles down the Ohio River from Ironton. There is still a small village by that name, but curiously enough there was never a charcoal iron furnace there. The first one to be built in the Ohio portion of the Hanging Rock region was Union Furnace, which was built in 1826 in Lawrence County several miles north of the village of Hanging Rock. Construction of charcoal furnaces continued until shortly after the Civil War, and by the end of the era a total of 46 furnaces had been built on the Ohio side of the river. Lawrence County could claim 16, Jackson 11, Scioto nine, Vinton six, Hocking three, and Gallia one. There were also about 24 furnaces built on the Kentucky side of the Ohio River.



Overview of Hecla Furnace, Lawrence County, circa 1865-1877, showing the variety of buildings for support activities of the furnace. Photo courtesy of the Ohio Historical Society.

Lawrence Furnace, Lawrence County, circa 1865-1877. Each iron furnace in the Hanging Rock region was the center of a community of both furnace workers and those engaged in support activities. The furnace store was the hub of community activities and accepted script issued to furnace workers. Photo courtesy of the Ohio Historical Society.

The Hanging Rock region did not become an iron-producing region strictly by chance. First, and perhaps foremost, the area was adequately endowed with all the raw materials necessary to the manufacture of charcoal iron. Numerous deposits of native ore and limestone and hundreds of square miles of virgin timber were available to the early iron masters. There was also an abundance of sandstone with which to build and line the massive furnace stacks.

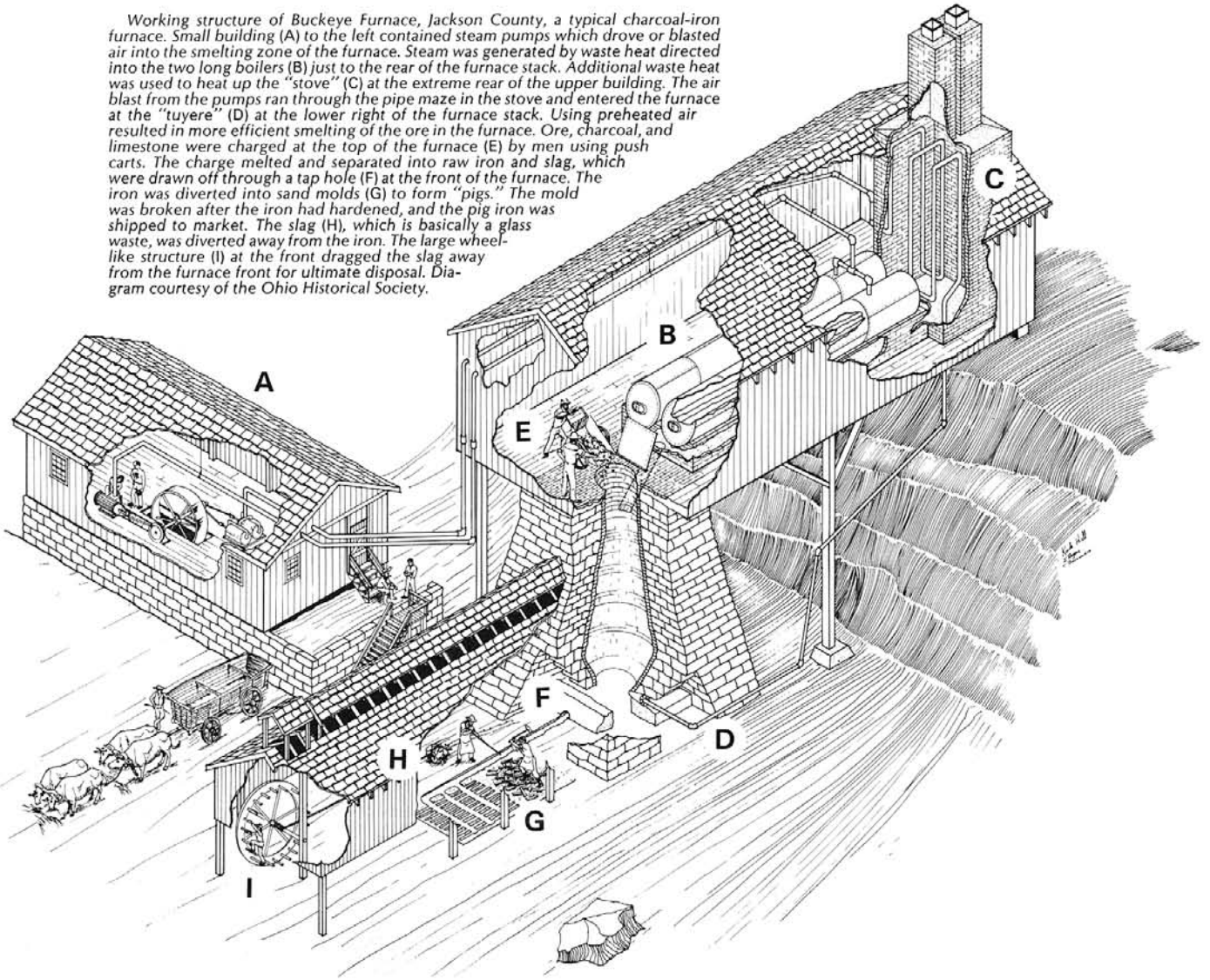
In the vicinity of each furnace a community of several hundred people would arise where all trades needed for tending and operating the furnace could be found. There were laborers, teamsters, ore diggers, blacksmiths, carpenters, charcoal burners, storekeepers, bookkeepers, and the furnace manager or owner. The towns themselves were complete with a general store, church, school, graveyard, and place of employment—the furnace. Wages were low and life was primitive. Good laborers would make $10 to $20 a month and generally were paid in goods or in script redeemable at the company store. Whiskey was commonly part of a business deal and many furnace ledgers show such entries as "John Smith contracts to make one hundred rods of road for $25 and two gallons of whiskey." The workers generally lived in dirt-floored log cabins, although the manager may have had a more elaborate home of brick or stone. Many of these old houses and log cabins and some company stores have survived and are still in use. Visitors to this region can sometimes stop for refreshments at stores that were serving iron workers over 100 years ago. The current proprietors can often supply interesting vignettes about the furnace community that was formerly served by their store.

Manager's house, Mt. Vernon Furnace, Lawrence County, circa 1865-1877. The furnace manager, an important person in the community, commonly lived in the largest house in the area. Some of these structures continue in use as fine homes. Photo courtesy of the Ohio Historical Society.

The furnace and buildings were constructed of materials obtained on or near the site and were almost always built on two levels. A storage yard was built on the upper level and the furnace on the lower. The furnace was constructed so that the top of the stack was at the same elevation as the storage yard above. On this upper level were numerous sheds for the housing of charcoal, which had to be kept dry, and other supplies for the furnace. Iron ore and limestone were normally piled in great heaps in the open. A shed, which also served as a bridge, connected the storage yard with the top of the furnace. The charge of ore, limestone, and charcoal was trundled across this bridge and dumped into the top of the furnace. The equipment for generating the hot-air blast also was normally located on the upper level. On the lower level, in addition to the stone stack itself, was the casting house where the molten iron was cast into pigs. Other buildings such as the scale house and carpenter's and blacksmith's shops were scattered about the property.

The furnace itself consisted of an inner lining and outer wall. The outer wall of the stack was constructed of massive hand-hewn sandstone blocks, or in some cases was carved directly from solid sandstone. These stacks were normally between 35 and 40 feet high. The inner portion where the iron was smelted was lined with fine-grained refractory sandstone or fire brick. The purpose of the outer wall was to support and to some extent insulate the inner lining. The space between the two major parts of the furnace was filled with sandstone rubble and sand. Ruins of the old furnaces are generally in such a condition that it is difficult for anyone not familiar with their design to distinguish the various parts. These stone stacks represent only a very small portion of the original operation. There were many wooden buildings attached to and surrounding the furnace. These wooden structures are now gone, and the moss-shrouded stone ruins provide few clues to the character of the original works.

The principles involved in the manufacture of iron have not changed from the period of the charcoal furnaces to the blast furnaces of today. The charge of a blast furnace then as now was fairly simple in character. Iron ore, limestone, and fuel are the essential constituents. The basic method is to fill a furnace with these ingredients and blow or blast air (hence the name blast furnace) up through the ore and fuel mixture. In the old charcoal stacks the air was fed through large inverted V-shaped openings in the sides of the stack. The air supplies oxygen to the burning fuel which in turn melts the ore and limestone. The impurities float to the top of the molten iron and form a glassy waste product called slag. This slag litters the ground in the vicinity of the old furnace sites and is a clue to the former tenants. The iron, being heavier than the slag, collects in the bottom of the furnace and is periodically drawn off. The slag and iron were withdrawn separately from a large inverted V-shaped opening in the front of the stack. The opening for tapping off the iron and slag is generally much larger than the side openings for the introduction of air. In the Hanging Rock region the molten iron was normally run into prepared sand beds and cast into ingots called pigs. The pig iron was then sold to the manu-

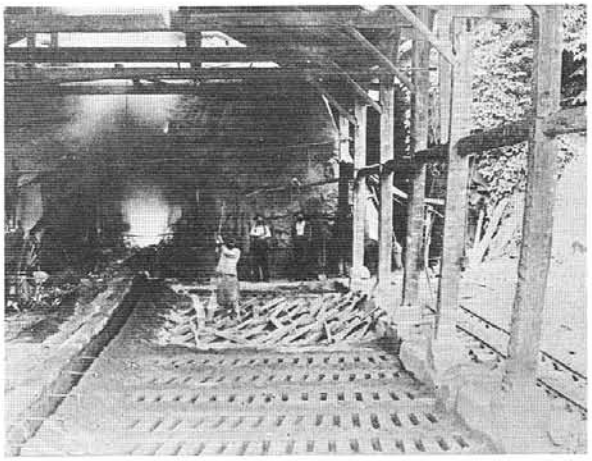


Working structure of Buckeye Furnace, Jackson County, a typical charcoal-iron furnace. Small building (A) to the left contained steam pumps which drove or blasted air into the smelting zone of the furnace. Steam was generated by waste heat directed into the two long boilers (B) just to the rear of the furnace stack. Additional waste heat was used to heat up the "stove" (C) at the extreme rear of the upper building. The air blast from the pumps ran through the pipe maze in the stove and entered the furnace at the "tuyere" (D) at the lower right of the furnace stack. Using preheated air resulted in more efficient smelting of the ore in the furnace. Ore, charcoal, and limestone were charged at the top of the furnace (E) by men using push carts. The charge melted and separated into raw iron and slag, which were drawn off through a tap hole (F) at the front of the furnace. The iron was diverted into sand molds (G) to form "pigs." The mold was broken after the iron had hardened, and the pig iron was shipped to market. The slag (H), which is basically a glass waste, was diverted away from the iron. The large wheel-like structure (I) at the front dragged the slag away from the furnace front for ultimate disposal. Diagram courtesy of the Ohio Historical Society.

facturers of trade items. Some furnaces on occasion would cast the iron directly into such salable items as pots, skillets, stoves, and iron beams or bars, and it was not uncommon for a fabrication plant such as a nail factory to be located at or very near the furnace.

The tremendous quantities of raw materials that were needed to produce iron were a major problem to operators. From 5,000 to 10,000 acres of land were required to support the operation of a single furnace. To make 1 ton of pig iron required from 150 to 200 bushels of charcoal, 5,000 pounds of ore, and about 300 pounds of limestone. The average furnace would produce from 8 to 12 tons of iron per day for the duration of the blast. The period of blast generally did not exceed nine months, thus the yearly production would average about 2,000 to 3,000 tons per furnace. Early predictions for the future of the charcoal-iron industry were glowing; but as with most forecasts, they indicate that long-range economic predictions have little value. In the face of increasing charcoal demands and decreasing forest areas, one prophet of the day said, "cold-blast iron from this region will probably never be excelled in quality, and will find sufficient demand for all that can be supplied, even at a large advance from its present cost." An 1838 report proudly claims, "Jackson, Lawrence, and Scioto counties are capable of producing 400,000 tons of iron annually for 2,700 years." As late as 1884 it was predicted that there was ore enough in the Hanging Rock region to "yield a supply sufficient for the existing furnaces of the region at their present rate of consumption for the next eight hundred and fifty years." It is rather ironic that the last furnace in the region went out of blast only 32 years after this prediction was made. Amanda Furnace, completed in the 1960's at Ashland, Kentucky, is one of the larger blast furnaces in the United States and can produce 3,340 tons of pig iron per day, which is about equal to a year's production of the best charcoal furnaces. The Amanda can produce twice as much iron in a year as was reported in 1878 for all the furnaces in Ohio.

Low-grade native iron ores, ranging from 4 to 18 inches in thickness, were used in these early furnaces. The tenor of the ore normally ran only 25 to 40 percent iron. Ores bearing such colorful names as Guinea Fowl, Hallelujah, and Sour Apple were stripped from beneath shallow cover along the nearby hillsides by men using only shovels, picks, wheelbarrows, and perhaps a horse-drawn scraper. When the ore became too deep (generally 10 to 12 feet) to be mined economically, the ore diggers would merely move to the next

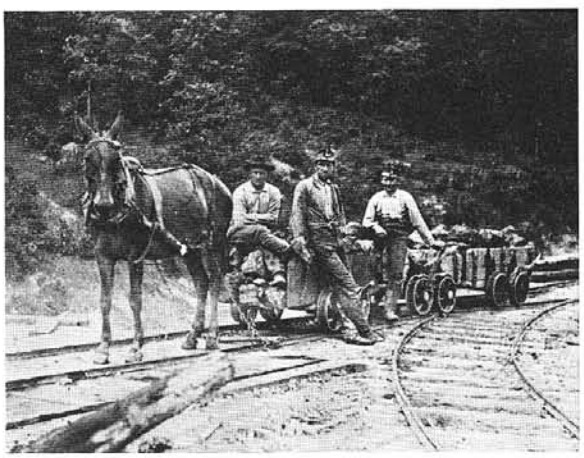


Casting pigs, Olive Furnace, Lawrence County, circa 1865-1877. Molten iron flowed from the furnace hearth through the channel at left center into the molds for the pigs, which can be seen as rectangular slots in the foreground. Photo courtesy of the Ohio Historical Society.

hill. Profitable mining permitted the removal of 1 foot of dirt for 1 inch of ore. Charcoal-furnace buffs can see remnants of these ore diggings snaking for miles along the hillsides in the furnace regions.

Charcoal was made in the forest by burning specially constructed piles of wood called meilers. These piles resembled small haystacks in shape, and were covered with damp leaves and earth to exclude oxygen and insure charring rather than burning. It normally took about three weeks to build, burn, and draw a meiler of charcoal. The meiler would contain about 40 cords of wood, equal to about 1 acre of virgin timber, and would make about 1,600 bushels of charcoal worth 8¢ a bushel. From 300 to 350 acres of timber were required each year to supply the fuel consumed by just one of these stone giants. During the period the furnaces were active, the majority of the forests in this district were cut over several times. The charcoal made from the second- and third-growth wood was said to have been superior to that made from virgin timber.

Ore and charcoal were transported from the forest and hills by teams of oxen pulling large open-topped Conestoga-type wagons. About 50 yoke of oxen were needed by each furnace to move iron to the market and supplies to and from the operation.



Miners with carloads of the Big Red Block ore destined for Ohio Furnace, Scioto County, 1882. Photo courtesy of the Ohio Historical Society.

Charcoal-iron manufacture started to decline soon after the Civil War. Many factors contributed to the decline. One of the most important causes for the demise of charcoal iron was the dwindling of the forests needed to supply the charcoal. Demand for iron was increasing at a time when forests were rapidly being depleted and the cost of charcoal was going up. The richer Lake Superior iron ores were coming on the market at prices which made it impractical to work the thin Hanging Rock ores. More efficient coal and coke furnaces were being built which could economically turn out more iron than the old charcoal-burning stacks. One by one the old stacks were taken out of blast, never to resume operation. Most of the furnaces had ceased operation by 1900. The whistle signalling the last cast of charcoal iron in the Hanging Rock region was sounded at Jefferson Furnace in Jackson County in December 1916. Thus, with this last cast on a cold wintry day, the end came to the once-mighty charcoal-iron industry in Ohio.

Editor's note: The text of this article is reprinted with revisions from Collins and Webb (1966) by permission of the Ohio Historical Society. We thank the Ohio Historical Society for their assistance with illustrations.

FURTHER READING

Collins, H. R., and Webb, D. K., Jr., 1966, The Hanging Rock Iron Region of Ohio: Ohio Historical Society, one sheet with text and map.

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Willard, E. B., 1916, A standard history of the Hanging Rock iron region of Ohio: Chicago, Lewis Publishing Co., 2 v.; v. 1, p. 3-641; v. 2, p. 645-1356.

1986 OHIO GEOLOGY SLIDE CONTEST

A favorite geology slide could be a winner in the Survey's Ohio Geology Slide Contest. This year marks the fifth time for this annual contest, which in past years has received more than 100 high-quality entries. Winners will receive award plaques at the 1986 Ohio State Fair.

Any 35-mm color slide that portrays some aspect of the geology or mineral resources of Ohio is eligible and individuals may submit a total of two slides. Popular topics in previous contests include scenic outcrops, mineral-industry operations, and mineral and fossil specimens. Slides are judged on the basis of geologic significance, artistic composition, and technical quality.

For a list of rules and an official entry blank, write: Ohio Geology Slide Contest, Ohio Department of Natural Resources, Division of Geological Survey, Fountain Square, Building B, Columbus, Ohio 43224. Entries must be postmarked by May 31, 1986.

UPCOMING EVENTS

April 19-20, 1986 Gem, Mineral, and Jewelry Show, Cincinnati Convention Center, Cincinnati, Ohio. Sponsored by the Cincinnati Mineral Society.

April 23-26, 1986 North-Central Section, Geological Society of America, annual meeting, Kent State University, Kent, Ohio. Donald E. Guy, Jr. and Jonathan A. Fuller, geologists with the Survey's Lake Erie Section, will conduct a field trip, titled "Geomorphology of the Lake Erie shore in northeast Ohio," on April 26th.

April 25-27, 1986 Ohio Academy of Science annual meeting, University of Toledo, Toledo, Ohio. More than 30 geology papers and a geology field trip are scheduled.

April 26-27, 1986 "Wonderful World of Gems," Veterans Memorial, 300 West Broad St., Columbus, Ohio. Sponsored by Columbus Rock and Mineral Society, Licking County Rock and Mineral Society, Rockwell International Mineral Society, and the Rolling Stones.

ASHTABULA COUNTY SAND AND GRAVEL RESOURCES

The Survey recently published Report of Investigations No. 128, *Sand and gravel resources of Ashtabula County, Ohio,* by Michelle L. Risser. This map, at a scale of 1:62,500, depicts the distribution of sand and gravel deposits in the county by mode of origin (kame, outwash, delta, beach ridge/dune, beach flat) and resource category (measured, indicated, inferred). In addition, the publication contains an explanatory text, strip logs of water wells and measured sections, and tables listing resource tonnages by township, pebble counts, and sieve analyses.

This report will be of interest to those involved in exploration for deposits of sand and gravel and to local planning agencies. Delineation of the distribution of sand and gravel deposits will enable planners to insure that adequate resources of sand and gravel will be available in order to meet long-range needs. Report of Investigations No. 128 is available from the Survey for $10.72, which includes tax and mailing.

GLACIAL GEOLOGY OF COLUMBIANA COUNTY

The Survey recently published Report of Investigations No. 129, *Glacial geology of Columbiana County, Ohio,* by George W. White and Stanley M. Totten. This detailed color map, at a scale of 1:62,500, depicts the distribution of glacial features (end moraine, ground moraine, kame) and till units in the county. The map is accompanied by a 25-page report that details the glacial geology of Columbiana County.

This report will be of particular value to county and local agencies and residents because it provides a firm data base for planning decisions that involve surface materials. Siting of solid-waste disposal facilities, for example, will be easier because this report provides information necessary to protect ground-water supplies. Report of Investigations No. 129 is available from the Survey for $15.44, which includes tax and mailing.

SURVEY RECEIVES DEVONIAN SHALE GRANT

The Survey recently received a $700,000 research contract from the Gas Research Institute of Chicago to fund a three-year study of Devonian shales in portions of southeastern Ohio. The objective of the study is to develop a computerized data base for Devonian shale wells and to analyze structural and stratigraphic relationships of oil and gas production from these wells.

The study will concentrate on Lawrence, Meigs, Monroe, Noble, and Washington Counties. Cross sections and structure, isopach, and production maps will be prepared for these areas. John D. Gray, Head of the Subsurface Geology Section, will manage the project and Mark T. Baranoski and Ronald A. Riley, both of the Subsurface Geology Section, will serve as project geologists.

REPORT ON DEEP CORE IN NORTHWESTERN OHIO AVAILABLE

The Division's core-drilling rig recently completed the deepest continuous core yet to be drilled in Ohio. The hole, located in Seneca County, in northwestern Ohio, began in the Silurian Greenfield Formation and bottomed in Precambrian gabbro. Total depth of the hole was 2,870 feet, a depth which set a record for a Mobile B-61 rig using BCQ ($2^{3}/_{16}$-inch O.D.) drill rods. Gamma ray, neutron, acoustic porosity, and 3-arm caliper logs were run for the entire hole, thus providing important comparisons between these geophysical logs and the rock core.

The core was drilled on the most intense magnetic and gravity anomaly in the state and may provide significant information on the origin of this unique circular structure. The 50 feet of gabbro core from the bottom of the hole is being petrographically analyzed and radiometrically dated by the University of Kansas Center for Research, Inc., under a cooperative agreement with the Division of Geological Survey.

A preliminary report on this core, which includes both a lithologic log and the gamma ray-neutron logs, has been published as Division of Geological Survey Information Circular No. 51, *Report on a continuously cored hole drilled into the Precambrian in Seneca County, northwestern Ohio.* This report, by Survey geologists Lawrence H. Wickstrom, George Botoman, and David A. Stith, is available from the Survey for $2.86, which includes tax and mailing.

RESEARCH IN OHIO GEOLOGY, 1985

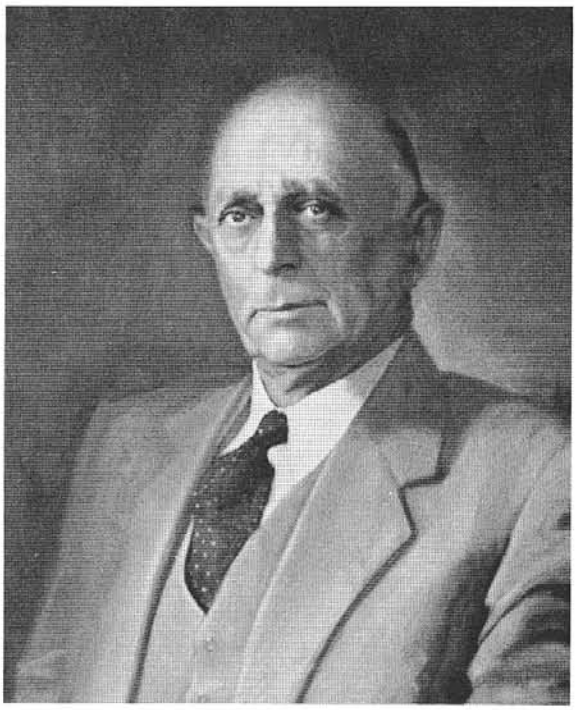
Every two years the Division of Geological Survey canvasses university, government, and other researchers in order to compile a list of recent research projects dealing with the geology of Ohio. Anyone who has initiated, completed, or published research on Ohio geology in 1984 or 1985 is asked to complete a questionnaire for each project. Questionnaires were sent out in early March. If you have research to report but have not received a form, please contact Merrianne Hackathorn at the Survey (telephone 614-265-6590). Those researchers submitting forms receive free copies of the compilation. Please note this request is for current or recent research on Ohio geology only.

THE SEARCH NOW AVAILABLE ON VIDEOTAPE

The Survey's award-winning film, *The Search, the Geological Survey of Ohio,* is now available for purchase on videotape cassettes. This 28½-minute film traces the beginnings of the Survey in 1837 through the Newberry and Orton Surveys to the modern organization. *The Search* emphasizes the development of the state's mineral industries and their past and present importance to Ohio and the geological history of the state. This popular film is the only one available that is entirely dedicated to the geology of Ohio.

Beta- and VHS-format cassettes are available for $27.00 each and U-matic (¾-inch)-format cassettes are available for $39.00 each. The price includes tax and mailing and each cassette is enclosed in a heavy-duty plastic case. Please order from the Survey and include the desired format. *The Search* is also still available for loan to groups at no charge in a 16-mm-film format.

WILBER STOUT PORTRAIT



An oil portrait of Wilber Stout, sixth State Geologist of Ohio (1928-1946), now graces Orton Hall Library at the Ohio State University, owing to the efforts of Dr. Charles H. Summerson and many financial contributors. The Stout portrait joins those of his predecessors, W. W. Mather, J. S. Newberry, Edward Orton, Sr., Edward Orton, Jr., and J. S. Bownocker, on the walls of Orton Library.

Stout, whose association with the Survey spanned 34 years, from 1912 to 1946, was one of the most prolific and broad-ranging geologists to have ever worked in Ohio. He authored or coauthored 58 publications on the geology of the state, many of which were extensive Survey bulletins on the geology of a county or the geology of a mineral industry.

SURVEY STAFF NOTES

René Fernandez

Lisa Van Doren

René L. Fernandez is a geologist in the Regional Geology Section and is one of the Survey's county glacial mappers. He recently completed mapping the glacial geology of Seneca County and is currently working in Wyandot County.

René, a Canton native, taught earth science for nine years at GlenOak High School in Canton after completing a B.S. degree at Miami University. He came to the Survey in 1984 after completing an M.S. degree in geology at the University of Akron. René lives in Worthington with his wife and two daughters and enjoys woodworking as a hobby.

Lisa Van Doren is a cartographer in the Technical Publications Section. She is a native of Wooster and came to the Survey in 1984 after receiving a B.A. degree in geography from Wittenberg University. Lisa has devoted much of her efforts at the Survey to compositing county base maps for the mapping program and particularly enjoys the satisfaction of seeing a cartographic project emerge in its final, printed form. Lisa lives in Columbus and enjoys participation in outdoor sports as a hobby.

OHIO MINERAL-INDUSTRIES WORKSHOP FOR SCIENCE TEACHERS

The Division of Geological Survey and the University of Akron will cosponsor a workshop for science teachers, with emphasis on Ohio's mineral industries, on August 4-9, 1986. This workshop, which is designed primarily for earth science teachers, will be based at the Survey's offices at Fountain Square, Columbus, and will include field trips to mineral-industry operations. One field trip will include an overnight stay at Burr Oak Lodge, Burr Oak State Park (Morgan County). Field-trip aspects of the workshop have been made possible by grants from the Ohio Aggregates Association, Ohio Coal and Energy Association, Ohio Manufacturers' Association, Ohio Mining and Reclamation Association, and the Ohio Oil and Gas Association.

There will be no charge for field trips, meals, study materials, or lodging at Burr Oak; however, participants must enroll for two semester hours of academic credit through the University of Akron and are responsible for travel costs to attend the workshop. For additional information on the workshop, contact Dr. Jim L. Jackson, University of Akron, Oak Hill Center, 3505 Oak Hill Road, Peninsula, Ohio 44264. Telephone: 216-657-2815.

COMPUTER ORIENTED GEOLOGICAL SOCIETY

The wide availability of personal computers has created considerable interest among geologists eager to use this equipment to solve geologic problems and maintain and manipulate large files of data. Recently, the Computer Oriented Geological Society (COGS) was formed to act as a source for and a clearinghouse of information on the use of computers in geology.

COGS publishes an informative monthly newsletter that features news on computer-oriented developments in geology, new software, and employment opportunities. Also available is a periodically updated catalog of geologically oriented software that lists both public domain and commercially available programs that are of interest to geologists. For membership information, contact: COGS, P.O. Box 1317, Denver, Colorado 80201.

An Ohio chapter of COGS has been formed and Survey geologist Lawrence H. Wickstrom was elected president. This chapter, which currently has 80 members, holds monthly meetings alternating between sites in Columbus and Wooster and publishes a newsletter. Dues are $5.00 per year. It is not necessary to join the national chapter in order to join the Ohio chapter of COGS. For more information on the Ohio chapter contact Lawrence H. Wickstrom, in care of the Survey (telephone: 614-265-6598), or Dwayne Wilson, Eastern Well Surveys, P.O. Box 58, Wooster, Ohio 44691 (telephone: 216-264-6560).

QUARTERLY MINERAL SALES, JULY—AUGUST—SEPTEMBER 1985

Compiled by Sherry L. Weisgarber

Commodity	Tonnage sold this quarter[1] (tons)	Number of mines reporting sales[1]	Value of tonnage sold[1] (dollars)
Coal	8,276,830	278	260,174,132
Limestone/dolomite[2]	11,592,232	101[3]	43,892,585
Sand and gravel[2]	10,646,686	215	33,154,818
Salt[2]	764,396	5[4]	6,003,405
Sandstone/conglomerate[2]	595,952	22[3]	7,115,686
Clay[2]	328,148	26[3]	1,440,665
Shale[2]	410,910	19[3]	402,465
Gypsum[2]	72,090	1	684,855
Peat[2]	8,432	4	38,533

[1]These figures are preliminary and subject to change.
[2]*Tonnage sold* and *Value of tonnage sold* include material used for captive purposes. *Number of mines reporting sales* includes mines producing material for captive use only.
[3]Includes some mines which are producing multiple commodities.
[4]Includes solution mining.

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