OHIO GEOLOGY

GeoFacts No. 7

OHIO DEPARTMENT OF NATURAL RESOURCES • DIVISION OF GEOLOGICAL SURVEY

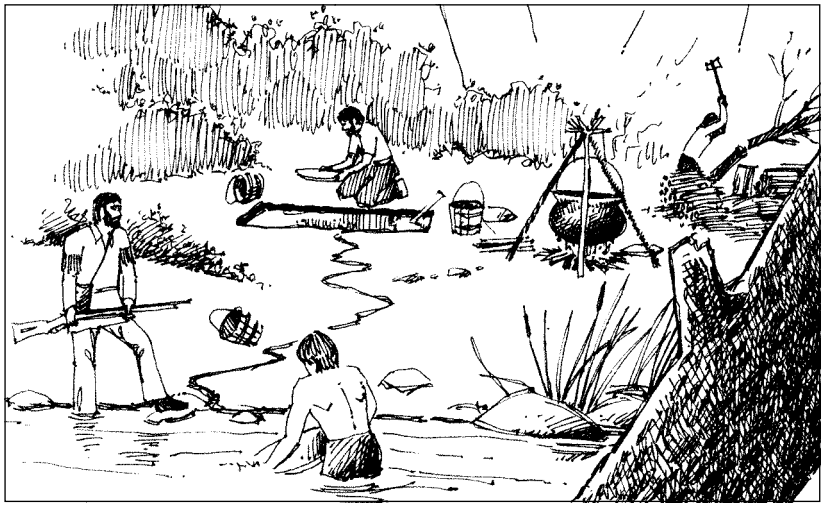
THE SCIOTO SALINE—OHIO'S EARLY SALT INDUSTRY

Today, salt is a commodity that is so abundant and inexpensive that most people give little thought to it. Indeed, the Division of Geological Survey estimates that the Silurian rock salt beneath eastern Ohio could supply the entire nation for 32,000 years. But on the Ohio frontier in the late 1700's and early 1800's, salt was a precious commodity that had to be brought by packhorse across the Appalachian Mountains and commanded a price of $4 to $6 dollars per bushel.

It is no wonder that natural salt-water springs, known as licks or salines, were of intense interest and importance to the pioneers. One of these licks, known as the Scioto Saline or Scioto Salt Licks, along Salt Lick Creek (also known as Little Salt Creek) in Jackson County, figured prominently in the development of Ohio. This lick is an area where naturally occurring salt water, known as brine, flows at the surface as a salt-water spring. It has existed at least since the Pleistocene Ice Age because numerous bones of extinct animals were found at the site. Salt had been obtained at the saline for at least 8,000 years, as indicated from archaeological excavations by W. C. Mills at Boone Rocks in 1905.

At the time of its exploitation, the Scioto Saline was the most important mineral industry in the state. Not only was it the reason for the founding of Jackson at this location, but the availability of salt led to early establishment of a prosperous agricultural and livestock industry in the lower Scioto River drainage area.

European traders and explorers may have known of the existence of the Scioto Saline as early as 1740 because there was a French trading post at the mouth of the Scioto River at that time. Christopher Gist, surveyor and explorer for the Ohio Company of Virginia, made mention of it in his journal compiled during the winter of 1750-51. He noted "The Indians and Traders make salt for their Horses of this Water, by boiling it; it has at first a blueish Colour, and somewhat bitter Taste, but upon being dissolved in fair Water and boiled a second Time, it becomes tolerable pure salt." The Scioto Saline is marked on the well-known Lewis Evans map of the Middle British Colonies issued in 1755.



Depiction of early salt making along Little Salt Creek at the Scioto Saline using methods employed by Native Americans and early pioneers. Illustration by James Glover.

The Ohio country was opened to settlement following the Battle of Fallen Timbers in 1794 and signing of the Greenville Treaty the next year. Joseph Conklin of Mason County, Kentucky, is credited with establishing the first ongoing salt operation by a European settler at the saline. There was no enforced regulation of the salt lands between 1795 and 1803, and "squatter's rights" prevailed.

On April 13, 1803, soon after Ohio became a state, the new legislature passed "An act regulating the public salt works." The provisions of the Enabling Act of 1802, which was passed to create the State of Ohio, forbade the State to sell the salt lands, which consisted of a full 6-mile-square township. The state legislation provided for an agent to lease lots to be used for cultivation as well as to collect fees for manufacturing salt. Each lessee had to have a minimum of 30 salt kettles, but could not exceed 120 kettles, and had to pay 12 cents per gallon capacity in the first year of operation. In 1804 this charge was dropped to 4 cents, in 1805 to 2 cents, and by 1810, to 5 mills.

The earliest method of obtaining salt at the Scioto Saline, employed by Native Americans and the earliest pioneer operations, was to dig shallow pits into the Sharon sandstone during low water when the rock was exposed in the stream bed. These pits would slowly fill with weak brine, which was dipped out and boiled over fires. The initial attempt to increase salt production was to deepen these rock pits from a foot or two to 6 to 8 feet. The pioneer salt boilers soon discovered that brine would accumulate in deeper pits, up to 30 feet deep, that could be dug into the unconsolidated sediments that filled part of the valley of Salt Lick Creek. These pits or wells were cased at the surface with a hollow black gum log in order to prevent an inflow of surface water.

Soon after government control and regulation of the licks began, the salt boilers set up crude furnaces to increase efficiency and production. These furnaces consisted of a 4-foot-deep trench over which were set two rows of 12- to 15-gallon kettles. Wood was used as a fuel and heat passed beneath the kettles, bringing them to a boil. These furnaces operated 24 hours a day and required constant attention. Wood had to be cut and fed to the fires and brine had to be replenished in the kettles. Charlotte E. Bothwell, who came to McArthur in 1814, noted in her diary, "Our salt we got at Jackson; gave $2 for fifty pounds of mean, wet, dirty salt as could not find a market now at any price."

Dr. Samuel P. Hildreth, Marietta physician, First Assistant Geologist for the Ohio Geological Survey in 1837, and chronicler of pioneer activities in Ohio, summarized the early salt operations at the Scioto Saline in the First Annual Report of the Geological Survey. He noted that the greatest quantity of salt from this site was produced between 1808 and 1810, when 20 furnaces were generating 50 to 70 bushels each per week. Salt sold at this time for $2.50 per bushel or 5 cents per pound. After 1810, salt production at the Scioto Saline declined rapidly owing to the discovery of more concentrated brines along the Kanawha River in what is now West Virginia. Approximately 600 gallons of brine had to be evaporated in order to produce a bushel of salt at the Jackson site. The State of Ohio appropriated funds to drill deep wells at the Scioto Saline in order to procure more concentrated brine. The last of these wells was drilled to a depth of 450 feet in 1815 under the proviso that 50 pounds of salt must be produced from 250 gallons of brine. Hildreth noted that a stronger brine was discovered but it was in small quantities.

Hildreth reported that the salt works extended for 4 miles along the valley of Salt Lick Creek. The principal activities, however, were concentrated in the valley in the city of Jackson, between what are now Broadway Street and Harding Avenue. During the heyday of the salt operations, a row of salt boilers' cabins in this area was known as "Poplar Row" because they were constructed from poplar trees that grew nearby.

The second site that gained notoriety was Boone Rocks, a 57-foot-high cliff of Sharon sandstone in the northwest part of the city of Jackson, adjacent to the present-day municipal sewage-treatment

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plant. The bed of Salt Lick Creek ran close to the base of this cliff; however, channelization projects in the 1880's and 1930's straightened the stream and cut off this meander. There is speculation that salt pits in the sandstone are present beneath debris in the former bed of the stream.

Boone Rocks derives its name from an unsubstantiated story about the famous pioneer, Daniel Boone. Supposedly, Boone was brought to the saline in 1778 as a captive of the Shawnee (Shawanese) but escaped by leaping from the cliff to the branches of a tree growing at its base.

GEOLOGY OF THE SALT LICKS

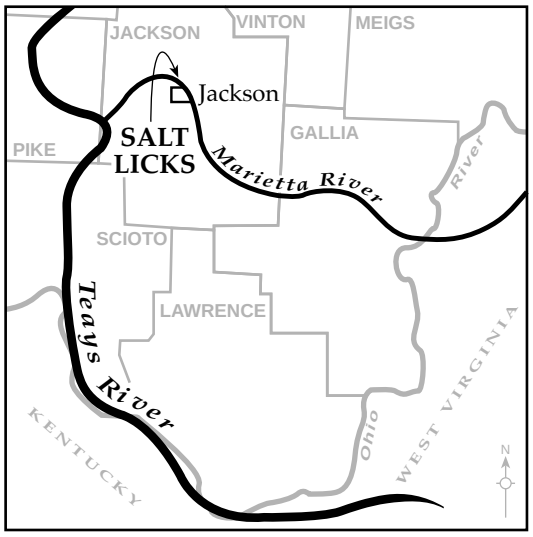
Early Survey geologists Caleb (sometimes listed as Charles) Briggs, Jr., and Samuel P. Hildreth were the first observers and interpreters of the geology of the Scioto Saline. Since their reconnaissance in 1837 there has been very little geological inquiry into the geology of the salt licks, probably because the licks were of little economic interest after their demise about 1815. Later geological focus in the area was on coal, sandstone, iron ore, and other mineral commodities.

It was recognizable to everyone that the brine was flowing from the Sharon sandstone, a nearly pure quartzose sandstone and conglomerate of Early Pennsylvanian age. Briggs noted that many of the productive salt wells at Jackson were in unconsolidated sediments that filled a basinlike depression in the Sharon. He referred to these as "mud wells." The deeper test wells at the saline that encountered more concentrated brines of less quantity were in rocks of Mississippian age. This information suggests that the brine may have been derived from deeper units and flowed from the Sharon. The regional hydrologic flow pattern is recharge and downflow in the western part of the state and upflow and discharge in the eastern part of the state. Consequently, salt springs, at which connate water (brine) is discharged, appear to be confined to eastern Ohio.

But why does brine flow to the surface in large amounts only at the Scioto Saline and not at the numerous other outcrops of Sharon sandstone in Jackson County? This question suggests that some unique set of geological conditions is present at the Jackson County salt licks. Hildreth may have been close to the answer when he noted "The seams and vertical cracks in the more compact beds would always afford avenues for the transmission of the brine from the lower to the higher strata." The unique geological factor at the Scioto Saline may be structural in origin.

In areas where faults, folds, and other structural features are not immediately obvious in surface exposures, one of the first procedures is to examine the drainage pattern of the area for clues to cryptic geologic structure. Streams seek the path of least resistance and commonly follow zones of weakness created by fractures. The most obvious drainage feature in the vicinity of Jackson is the long-abandoned valley of the Marietta River, a major tributary of the preglacial Teays River. The Marietta River had its headwaters in eastern Ohio in Monroe County, flowed southwestward across Ohio and West Virginia, then westward across Gallia and Jackson Counties. The Marietta River joined the main Teays River in westernmost Jackson County. This drainage system was destroyed early in the Pleistocene when a glacier dammed the Teays, causing large preglacial lakes to form in the valleys in unglaciated Ohio. The lakes eventually spilled over low divides and created a new drainage system in which the present-day Ohio River was the trunk stream.

The old Marietta River valley is very obvious on topographic maps, where it stands out as a comparatively broad, flat valley, portions of which are occupied by small, underfit streams, such as



Jackson County and vicinity in southern Ohio showing the preglacial north-flowing Teays River and a westward-flowing tributary, the Marietta River. Note the arcuate bend in the Marietta River just upstream from its junction with the Teays. The Scioto salt licks are in this arcuate valley, which is even more arcuate than is depicted on this map, which is derived from a map in Stout, Ver Steeg, and Lamb (1943).

Salt Lick Creek. The most unusual aspect of the Marietta valley is that it makes a large arc in the western half of Jackson County. The city of Jackson is on the northeast part of this arc. Modern drainage in the area seems to define a domelike structure, as streams appear to flow away from this feature in all directions. This fact did not escape the notice of Charles Whittlesey, topographer for the first Geological Survey of Ohio. He noted in the First Annual Report, "From the southern part of Jackson county, streams descend in every direction. The south fork of Salt creek northwardly, the Little Scioto and Pine creek, to the south and west, and Symmes' creek eastwardly." The old Marietta River valley defines the eastern, northern, and western boundaries of the "dome."

Have fractures extended upward from basement rocks into overlying Paleozoic rocks and acted as conduits for brine to flow to the surface at the Scioto Saline? This question cannot be answered with present information. However, in the last decade we have begun to discover that complexities in Precambrian basement rocks have had subtle, but nonetheless profound, influences on the surface geology in many areas of the state.

FURTHER READING

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• This GeoFacts compiled by Michael C. Hansen • March 1995 •

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