THE ROCKFINDER
Michiana Gem & Mineral Society
Tom Noe, Editor
05 Napoleon
South Bend, IN 46617

MICHIANA GEM & MINERAL SOCIETY, INC.

AFMS

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THE ROCKFINDER

FEBRUARY, 2003

MICHIANA GEM & MINERAL SOCIETY

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The purpose of the Michiana Gem & Mineral Society is to promote the study and enjoyment of the earth sciences and the lapidary arts, and to share lapidary knowledge and techniques.

General meetings are held the fourth Sunday of each month, 2:00 PM, EST, at Our Redeemer Lutheran Church, 805 S. 29th St., South Bend, IN. Regular exceptions include May (third Sunday), July (no meeting), August (club picnic) and the November/December meeting and Christmas party. Board meetings are held before the general meetings. The annual club show is Labor Day weekend.

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The Michiana Gem & Mineral Society, a not-for-profit organization, is affiliated with the Midwest Federation of Mineralogical Societies and with the American Federation of Mineralogical Societies.

The Rockfinder is published monthly except July and August. Editor, Tom Noe, 305 Napoleon Blvd., South Bend, IN 46617 (ph. 289-2028). Co-editor, Herb Luckert, 221 Marquette Ave., South Bend, IN 46617 (ph. 282-1354). Reporters, Bob Heinek, Herb Luckert, club members.

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_______Individual $10.00 per year
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Please indicate areas of special interest.

General Geology____ Beads ____
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THE ROCKFINDER

Newsletter of the Michiana Gem & Mineral Society

Volume 43, Number 2 **February, 2003**

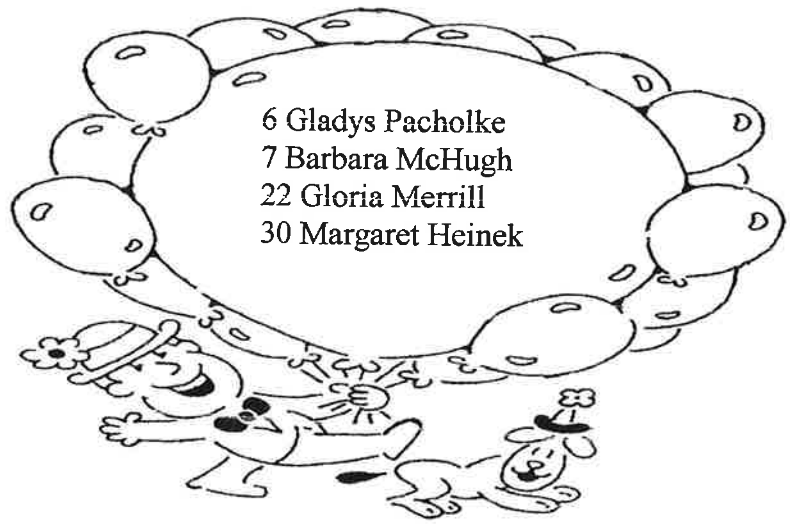
Meeting: Sunday, February 23, 2003
Doors open at 1:30 p.m.
Meeting starts at 2:00 p.m.

Place: Our Redeemer Lutheran Church
805 S. 29th Street (19th & Wall)
South Bend, IN

Program: Sculptor Victor Riley will demonstrate his work in stone carving, describing his tools and his creative process.

Refreshments: Sue Ellen Brown
Marty Perry

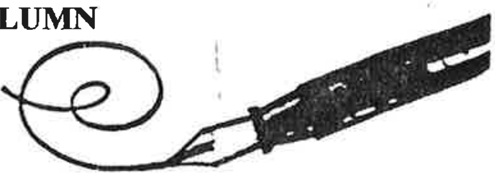
March Birthdays



UP AND COMING

Mar. 7-9: Eastern Indiana Society show, Wayne County Fairgrounds, Richmond, IN.
Mar. 14-16: Michigan Gem & Mineral Society show, Masonic Lodge, Michigan Center, MI.
Mar. 15-16: Stark County club show, Canton Memorial Civic Center, Canton, OH.
Mar. 22: Metro Rock Swap (Dearborn), Democratic Club, Taylor, MI.
Mar. 22-33: Badger Lapidary Society show, Monroe High School, Monroe, MI.
Mar. 22-23: Geodon Show, Dupage County Fairgrounds, Wheaton, IL.
Mar. 28-30: Mid-America Paleontology Society (MAPS) National Fossil Exposition, Western Illinois University, Macomb, IL (midamericapaleo.tripod.com).
Mar. 29-30: Blossomland Gem & Mineral Society show, Berrien County Sportsman's Club, 2985 Linco Rd., (north of) Berrien Springs, MI.
There will be no April show at Century Center this year.
Apr. 5-6: Columbus Club and Licking County Club joint show, Veterans Memorial, Columbus, OH.
Apr. 11-13: Mt. Clemens Lapidary Society show, Community Center (Groesbeck Rd.), Mt. Clemens, MI.
May 30-June 1: Midwest Mineralogical & Lapidary Society show (Dearborn club), Allen Park Civic Arena, Allen Park, MI.
June 28-29: MGAGS Rockhound Seminar, Washtenaw Community College, Ann Arbor, MI.

DIANE'S COLUMN



Cold winter weather did not deter 28 members from attending our January meeting. Sorry to say, Bob and Margaret Heinek were unable to attend due to a mishap involving Bob's glasses and lake-effect snow.

We had an interesting brainstorming session. Two groups were formed to write down ideas, and many great ideas were presented. From these ideas I think that we will be able to focus on a few at a time. We will try to get committees together soon to plan for the rest of the year. Please try to find one of the committees to serve on. This is your club and your input is important.

I just received gold-panning pans from my sister in California. I did get a chance to pan for gold a few years ago with my brother-in-law. We went to a stream in the mountains near Route 66. Finding some small flecks gave me a touch of gold fever. I'm gearing up for our fall trip to southern Indiana. I am anxious to get the chance to learn more about panning for gold. If you have not signed up for the trip or need details, contact Kathy Miller.

Condolences go to member Bonnie Smith on the passing of her husband, James.

Remember, if you have news of members or former members, let me know so we can share the information.

Diane Gram
574-272-6885

MINUTES OF THE JANUARY MEETING

The January meeting of the Michiana Gem & Mineral Society was called to order at 2:00 p.m. by President Diane Gram, with 28 members present. The minutes of the December meeting were read by Secretary M. Jeanne Finske. They were approved without amendment. Since Treasurer Bob Heinek was not present, there was no treasurer's report.

Diane reported on places and times for upcoming gem and mineral shows in the Midwest.

Under old business, Kathy Miller gave information on the status of plans for the September field trip to Brown County. There remain three cabins available for club reservations. Information can be found in the January *Rockfinder*. Members must make their own reservations. The list for providing refreshments for upcoming meetings was circulated for volunteers to sign.

Under new business, there was a discussion about providing door prizes for the meetings. After several plans were submitted, it was decided that all members make donations of rock-related items to Vice-President Don Church. At each meeting there will be a prize for every 10 members present, and one for each junior member present. Members were asked to volunteer to serve as greeters at meetings by signing a list provided. Information concerning the need for dues increases will be in future issues of the *Rockfinder*. Bill Nelson brought an article from the January 21 issue of the *Chicago Tribune* regarding the legality of fossil collection.

The rest of the meeting was taken up by a 10-minute brainstorming session about ideas for future meetings and club activities. Results include

1. Swap meeting for members
2. "Do-it-yourself" projects
3. Local geology field trips
4. Door prizes for the MGM fall show--need to get a supply
5. Polishing Petoskey stones for the fall show
6. Suggestions for guest speakers
7. Special activities for juniors at meetings
8. Lessons on how to do things, e.g., rock tumbling
9. Free advertising in *Michiana Peddler*
10. Invite teachers to club meetings
11. Be resource persons about rocks and minerals for 4H, Girl and Boy Scouts, etc.
12. Plan workshops.

A good rockhound web site: bobsrockshop.com.

The meeting adjourned at 3:20. Refreshments were provided by Bob and Kathy Miller and Todd and Lynn Miller. The program was provided by Don Church, who demonstrated equipment purchased at garage sales for cutting, grinding and polishing rocks.

--M. Jeanne Finske, Secretary

HE PERMIAN EXTINCTION
By Sam Shapiro

Charles Darwin rejected Georges Cuvier's idea that earth's history was shaped by a series of catastrophes and extinctions and the creation of new species. While sailing around the world on the *Beagle* (1832-1836), he had read Charles Lyell's *Principles of Geology*, and accepted the principle of gradual change and uniformitarianism. He had studied the slow rise of the Andes, and the building up of coral reefs and atolls over thousands of years. In *The Origin of Species* (1859), he wrote that "The old notion of all inhabitants of the earth having been swept away by catastrophes at successive periods is generally given up."

Darwin was partly mistaken. Many geological structures, such as the Grand Canyon and drifting continents, do take millions of years for their formation, but paleontologists today are convinced that there have been six major catastrophes that happened rather quickly, in geological terms, and extinguished much of life on land and in the seas. The greatest of these was the Permian extinction, about 245 million years ago. It brought an end to the Paleozoic ("old life") era and inaugurated the Mesozoic ("middle life") era, the Triassic period and the age of dinosaurs. Peter Ward, a paleontologist from the University of Washington, has been studying the Permian in the Karoo Desert of South Africa since 1992. He writes about the sudden disappearance of synapsids, amphibians and turtles, and the way the green and olive strata turn to red and purple as the Karoo became hot and dry. "We have no fossils whatever. . . . In these beds we find nothing. . . . Even the small creatures have died out. . . . This place is dead" (*Evolution*, p. 148). In the geologically short span of 165,000 years, 90% of all species, including our old friends the 325-million-year-old trilobites, went extinct.

How did it happen? One suggestion is that gigantic volcanic eruptions in what is now Siberia spewed out a total of three million cubic kilometers of lava, enough to cover the entire planet's surface to a depth of 20 meters. In addition to the lava, which wrecked the ecosystem that made life possible, huge clouds of sulfates (SO^4) blocked sunlight and chilled the earth. A drizzle of acid rain (H^2SO^4) poisoned the ground, and CO^2 gas killed marine life. "Things were getting bad in many ways," says Ward. "This may have been a mass extinction brought about by many things going to hell in a handbasket very quickly."

The next major extinction, at the Cretaceous/Tertiary boundary, 65 million years ago, was apparently caused by a meteorite that crashed into the Yucatan Peninsula at Chicxulub. It wiped out the dinosaurs, and gave mammals (and thus us) a chance to repopulate the earth. Now we are in the midst of a seventh mass extinction, this one caused by the ecologically disastrous habits of six billion human beings.

LARGEST TRILOBITE EVER FOUND

Canadian paleontologists working in northern Manitoba have discovered the world's largest recorded complete trilobite fossil.

The 445-million-year-old fossil is over 70 cm. (approx 27.3 inches or over two feet) in length, 70% longer than was the previous record-holder.

Trilobites, an extinct group of sea-dwelling arthropods (joint-legged animals) distantly related to crabs, scorpions and insects, are among the most familiar fossils of the Paleozoic Era (about 545 to 250 million years ago.)

The fossil remains are eagerly sought by amateur and professional paleontologists. Most trilobites were between 3 and 10 cm. long.

The project is led by Dr. Graham Young (Manitoba Museum of Man and Nature) and Bob Elias (University of Manitoba). The trilobites are being studied by Dave Rudkin (Royal Ontario Museum).

"As a museum, we are primarily an educational facility and this trilobite provides us with an excellent opportunity to educate our visitors about a fossil animal group other than the dinosaurs. We have found a very unusual specimen that illustrates some of the diversity and weirdness of ancient life," said Young.

GemiNews (Oct., 2000)

THE TREACHEROUS MINERAL

By Bill Cordua

Mineral names are often given to commemorate a famous scientist or locality. Sphalerite (ZnS) however, has a name based on the Greek word for "treacherous." Blende, a German synonym for sphalerite, means "blind" or "deceiving." What is it about this common mineral (which forms very attractive collector specimens) that led its namers to be so negative about it?

The name comes from the tendency of people to misidentify it. It was often mistaken for galena, which was mined for its lead and, sometimes, silver content. Sphalerite yielded neither at the smelter, and, until the nineteenth century, there were few if any uses for the zinc that was present. So, to the old-time miners, the mistaken identity was a costly error. Things changed for sphalerite in the 1850s with the advent of galvanizing. In Wisconsin, many deposits worked for lead suddenly became zinc mines as well, with hundreds of thousands of tons of metal produced. This was also true for deposits elsewhere, notably in the Tristate district and other Midwestern deposits, now prized for the beautiful sphalerite crystals found during mining.

So this is a bum rap for poor sphalerite. It is actually a relatively easy mineral to identify, and has a number of very distinctive properties that can be tested with little equipment. Yet, true to form, I find many of my mineralogy students misidentifying it with depressing regularity.

First, when well crystallized, its form is distinctive. Sphalerite forms complex crystals that have a generally tetrahedral habit, although many modifying forms commonly occur. A tetrahedron has four faces, each one an equilateral triangle. Even with the complex modifications frequently present on sphalerite crystals, the generally triangular outline is usually visible. Few minerals have this crystal habit. The color of sphalerite is extremely variable, and this is probably part of the identification problem. Though usually some shade of brown to nearly black, red, yellow, green, blue and clear sphalerite is known. The colors represent the effects of chemical impurities, generally iron. The percentage of iron controls how dark the brownish hue is. Chemically pure sphalerite is clear (a variety called cleiophane). Translucent red sphalerite is sometimes called rubyjack.

The streak plate helps to even out the color problems. Sphalerite will generally give a pale yellow streak.

The hardness of 3-4 on the Mohs scale, distinguishes sphalerite from quartz or feldspar. You can scratch sphalerite with a steel nail, but not with a copper penny.

Sphalerite breaks readily along a number of regular cleavage planes. Ideally, there are six preferred directions of break (the so-called dodecahedral cleavage). While it is not usually possible to count all six directions on any particular specimen, an observer will clearly see this is a mineral with at least four cleavages. Few minerals have more than three.

A chemical test is also helpful. When powdered and moistened with weak HCl (muriatic or brick-cleaning acid), sphalerite emits a potent rotten egg odor of sulfur compounds. Kids generally love to do this test.

So sphalerite gives many clues to its identity, yet is still viewed as "treacherous." Many minerals which are mistaken for sphalerite, such as calcite, fluorite, siderite or goethite, will never emit sulfurous fumes. Among the sulfur-bearing minerals, few have the color, luster, streak and cleavage of sphalerite. Galena, for which it is most frequently mistaken, is always metallic; always some shade of gray, breaks along three sets of cleavages as cubes, and never crystallizes as tetrahedrons. Who could honestly mistake it for sphalerite? Poor sphalerite. Sometimes life ain't fair.

Last fall, I took my mineralogy students to visit the core labs of the proposed Crandon copper-zinc mine in Wisconsin. While viewing a length of core, I pointed out to my students what I thought was an interesting zone of coarse siderite in one of the cores. The mine-site geologist looked at me and said, "Oh, no, that's one of our main ore minerals up here—it's sphalerite." Boy, was my face red. The treacherous mineral had struck again!

U. of Wisconsin -
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THOMSONITE

By Lorraine Weaver

Thomsonite, a zeolite mineral found in volcanic rocks as seam or gas cavity fillings, is named after a Scots chemist, Dr. T. Thomson, who analyzed it.

Pure thomsonite is dead white in color. The colorful banding in most thomsonites is caused by infiltrations of foreign minerals during growth. Iron, copper and other elements are responsible for the pink, red, green, black, purple, brown and yellow colors.

Thomsonites have been found in Nova Scotia, Colorado, Oregon, Michigan, New Jersey, Minnesota, Czechoslovakia and Germany. Ontario thomsonites have reddish and brownish tints, and are found on the beaches of Michipicotin Island in northeastern Lake Superior. Michigan thomsonites are found on the beaches of Isle Royale and in areas of the Upper Peninsula.

The Minnesota thomsonites are found along Thomsonite Beach in Cook County, about 5.5 miles along the shoreline of Lake Superior between Grand Marais and Lutsen. An authority estimates the locality to be only 65 feet across the outcrop.

The basaltic rocks containing the thomsonites in the Grand Marais area are among the oldest on this continent, ranging from 1.1 to 1.4 billion years in age. In thomsonite formations, liquid magma within the earth rose to the surface. As this occurred, the surrounding pressure decreased. As a result, any gases in the magma expanded. Voids were formed by these gases as the rock solidified. Later, water containing dissolved minerals percolated through the rocks, depositing minerals in the voids.

The most color is found just below the opaque dark green skin. Dark green and black colors are next to the skin, while the pinks, yellows and other colors are more into the interior of the spheres. Many eyes appear in the radiated masses.

The thomsonites of Grand Marais are distinctive. No others like them are found anywhere in the world. The best specimens are found in the gravels of Lake Superior, where the constant wave action has weathered them out of the basalt. The thomsonites are free of the green skin or basalt matrix, as they are partially polished because of the constant tumbling by the waves.

Most nodules measure one-eighth to five-eighths inches. Specimens over an inch are highly prized. They have many eyes and are highly chatoyant. Those imbedded in basalt are hard to remove without fracturing. There is a way to do it, but much care and practice is needed. These thomsonites are covered with an opaque green skin.

November seems to be the best time to collect from the lake because the gravels are close to shore and Lake Superior is calmer. The best specimens are found by scuba divers.

Thomsonite was mined during the Middle Ages in Scotland, and was used as a good luck stone. Queen Victoria commissioned the Chippewa Indians to mine Grand Marais thomsonites because the nodules were becoming scarce in Scotland.

Thomsonites have been found in Alaskan Eskimo burial sites over 2,000 years old. The Russians made jewelry using thomsonites in the eighth century.

Thomsonites are found along the beaches of the Keweenaw Peninsula and on Thomsonite Hill not far from Eagle Harbor.

Rockhound News (Nov., 2000)

DID YOU KNOW?

Utah's Arches National Park has the greatest known concentration of natural stone arches in the world. By 1992, nearly 2,000 arches were discovered within the park's 73,379 acres. The more well known of the arches range from 34 to 128 feet in height, and from 32 to 71 feet in width. The arches formed when alternating frosts and thawing caused the porous sandstone to flake and crumble, eventually cutting through the rock fins. Rockfalls and weathering enlarged the holes. Arches National Park is located in high desert, with elevation ranging from 4,085 to 5,653 feet above sea level. The climate is one of very hot summers, cold winters and very little rainfall.

Excepted from an article in *The Californian,* no date given, via *The Glacial Drifter* (July/August 1996)

THE VALUE OF "DIRT"
by Paul Hlava

There are of course many kinds of dirt, especially if the word is enclosed in quotes. There is the dirt that my wife pots plants in, and similar stuff out in the yard where I plant the tomatoes. That's not what I want to talk about. How about the kind that I leave on my truck to protect the paint from our harsh desert sun? No. Well then, there is the whispered kind where you can learn about major changes at the office well before they take effect. That's not it, nor is the dirt that can surround delicate crystals in vugs which protect the goodies during removal. The kinds I will discuss are the ones found inside crystals and, especially, gems.

People have often come up to me and asked what magic wands do I use to tell if a particular gem is real or fake. The best answers I can give are that, 1, I try to deal only with reliable sources and, 2, I take a close look at the "dirt" in the stone. Why the dirt? Because the dirt, inside, can often tell you if that particular gemstone is natural or man-made. Natural diamonds have a particular set of dirty things in them, while sapphires have a slightly different set. Their man-made equivalents have sets of dirt that are different yet. Let's take a look at some of the kinds of dirt that help to identify the origin of a stone.

The dirt in a gemstone can be inclusions of fluids, matrix rock or other minerals ("real" dirt), zoning and similar imperfections, or fractures. Gems and other minerals are not formed in a vacuum; they are usually surrounded by other solid and/or fluid materials. These foreign substances are usually incorporated into the body of the crystal as it grows. The goal of most gem buyers is to find stones that have the least amount of this trash as possible. Only the absolute finest stones are perfectly clear; most have small bits of material that, often, indicate the origin of a stone. Carbon "petals" around clear inclusions are diagnostic of natural diamonds. Bits of black asphalt are common in sapphires and rubies. Metal particles are often found in synthetic diamond, and white, undigested alumina powder is often captured in synthetic ruby and sapphire. Natural stones suffer the slings and arrows of geologic processes and retain scars in the form of cracks, pits and fractures (veils and feathers) which are essentially nonexistent in synthetic material and would be very difficult to manufacture.

In the controlled environment of the gem synthesis laboratory, the stones produced are extremely homogeneous. In nature, stones grow in a medium which may vary in composition with time and the result is the presence of zoning. In the case of colored stones, this zoning can be exhibited as bands of widely different hue or intensity. Often, these zones are very fine, needing a hand lens to be seen, but absolutely sharp and straight with perfect angles where adjacent crystal faces meet. I have a sapphire that shows such a corner with a perfect 120^0 angle exposing the hexagonal symmetry of the mineral.

It should be obvious by now that the magic wand of gem identification is study by an experienced individual. It should also be obvious that, IF ONE WANTED TO, he could create fakes that could fool many experts. As perfection is approached, it becomes more difficult to spot the fakes. The owner of a large and prestigious company which produces a large proportion of the fine synthetic rubies on the market, and who is an expert at spotting the same, has said that he can correctly identify only about 90% of his material. Because of the quality of synthetic gems continuing to improve, statements like that one send cold shivers down many geological spines. This just goes to show that a little dirt can be a very valuable thing, indeed.

News Nuggets (June, 1988)

OHIO GEOLOGY

GEOFACTS No. 7

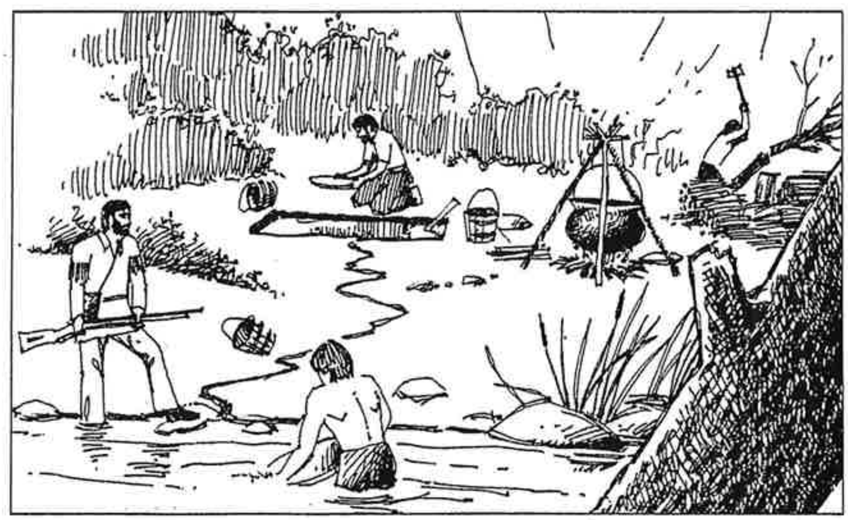
OHIO DEPARTMENT OF NATURAL RESOURCES • DIVISION OF GEOLOGICAL SURVEY

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.



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.

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.

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

continued

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

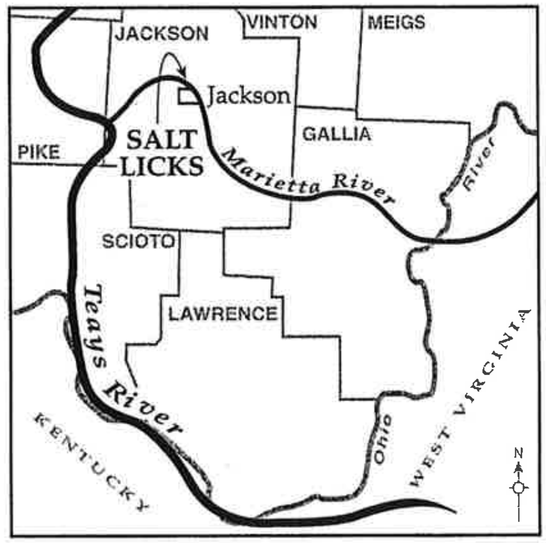
Early Survey geologists Caleb (sometimes listed as Charles) Briggs, Jr., and Samuel P. Hildreth were the first observers and interpreters of the geology of the Scioto Saline. Since their reconnaissance in 1837 there has been very little geological inquiry into the geology of the salt licks, probably 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.

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