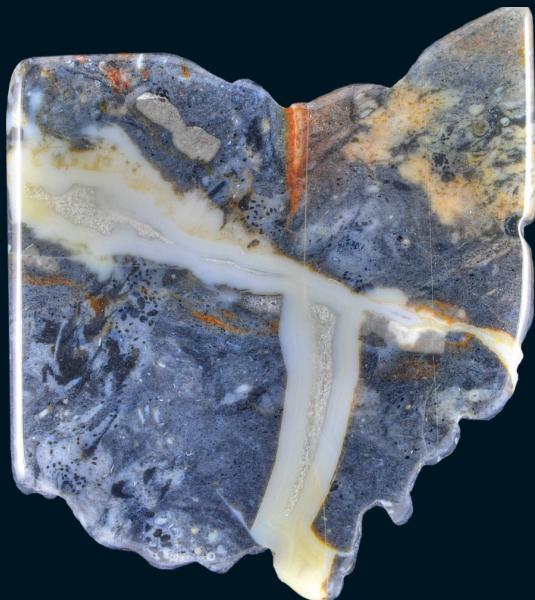


FLINT

Ohio's Official Gemstone



by Garry L. Getz

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Throughout Ohio's early history, humans relied on tools created from a large variety of stone materials. They preferred stone that could be easily fashioned into tools in a timely manner by flaking. The most common stone used in prehistoric time was flint. An important resource for making tools and weapons, flint was valued because it broke sharply in *conchoidal fractures*. Flint is a strong, durable stone that can be easily reshaped; thus it was the preferred material for tool-making.

Ohio has a variety of stone materials that can be easily chipped or flaked, including chert, chalcedony, jasper, and agate, all of which are finely crystalline, siliceous materials that are often referred to under the generic name of *flint*. What most people call flint is technically chert. However, true flint is found only in very specific places around the world (for example, Cretaceous chalks of England). Flint, a variety of quartz, is composed of silicon dioxide (SiO_2) or silica. Essentially, flint is a more pure form of chert, both having similar physical properties. For example, chert and flint both occur as nodules and in layers or beds.

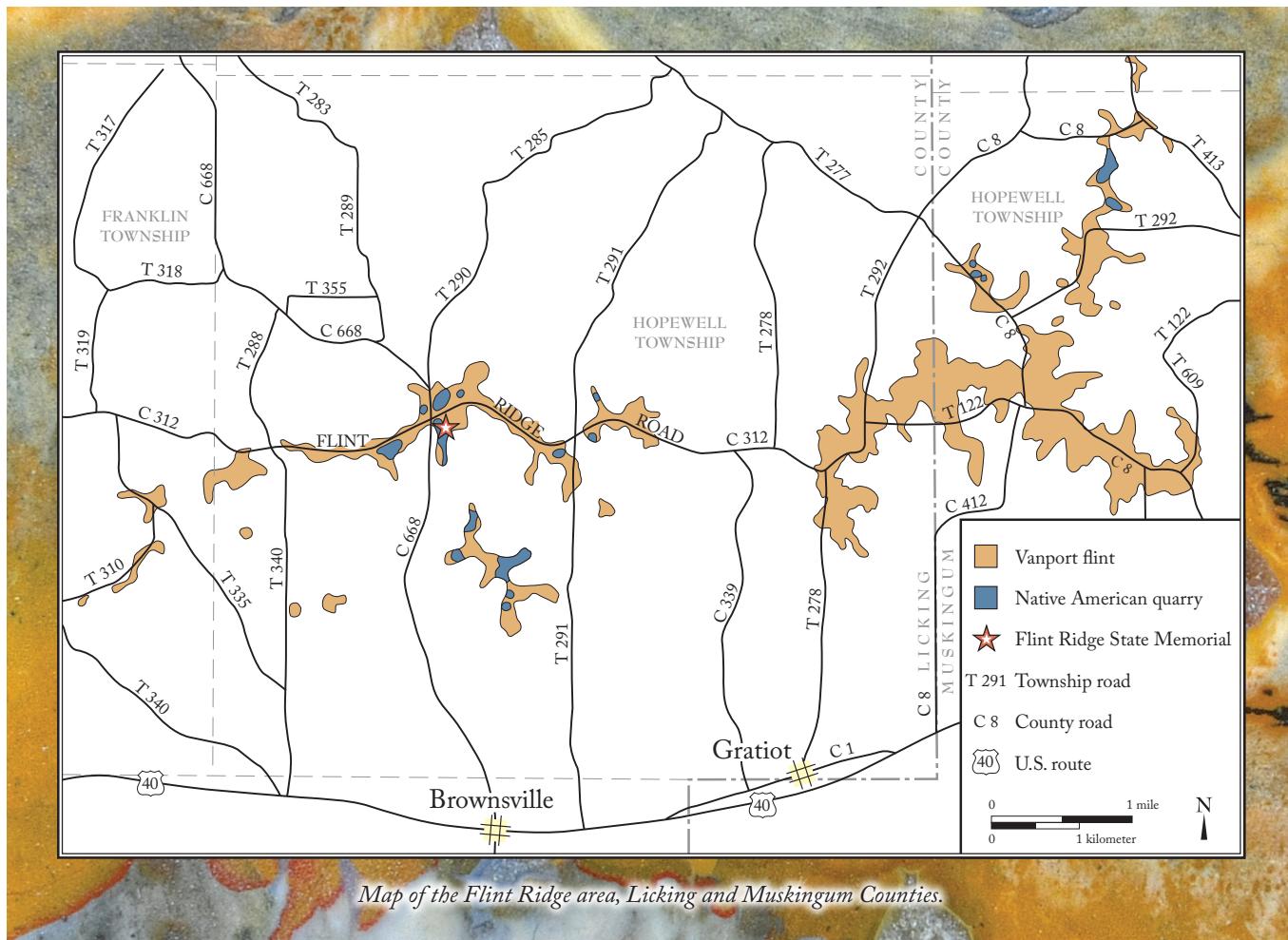
Ohio is fortunate to have sources of some of the most highly prized flint in the world, sought after by collectors, lapidary artists, and artists.



Occurrence of Flint in Ohio

Sources of flint range from layers found in bedded limestone to materials that were carried by glaciers and tumbled about, taking the form of rounded cobbles. In Ohio, flint occurs in a wide range of strata extending from the early Silurian-age Brassfield Formation (about 440 million years ago [m.y.a.]) to the late Pennsylvanian-age Cambridge Limestone in the lower half of the Conemaugh Group (about 307–299 m.y.a.). These rocks were deposited in shallow, tropical seas that covered the area that is now Ohio during the Paleozoic Era. Most flint deposits are associated with marine limestone. There is no definitive answer as to the source of the vast quantities of silica necessary to form flint deposits in Ohio. Although final answers

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have not been determined, the consensus today is that most nodular chert forms by the replacement of limestone by silica and that bedded chert forms by either the complete replacement of carbonate-rich beds or the alteration of siliceous ooze, which in part derived from spicules that formed the skeletal support for sponges that lived in the seas.

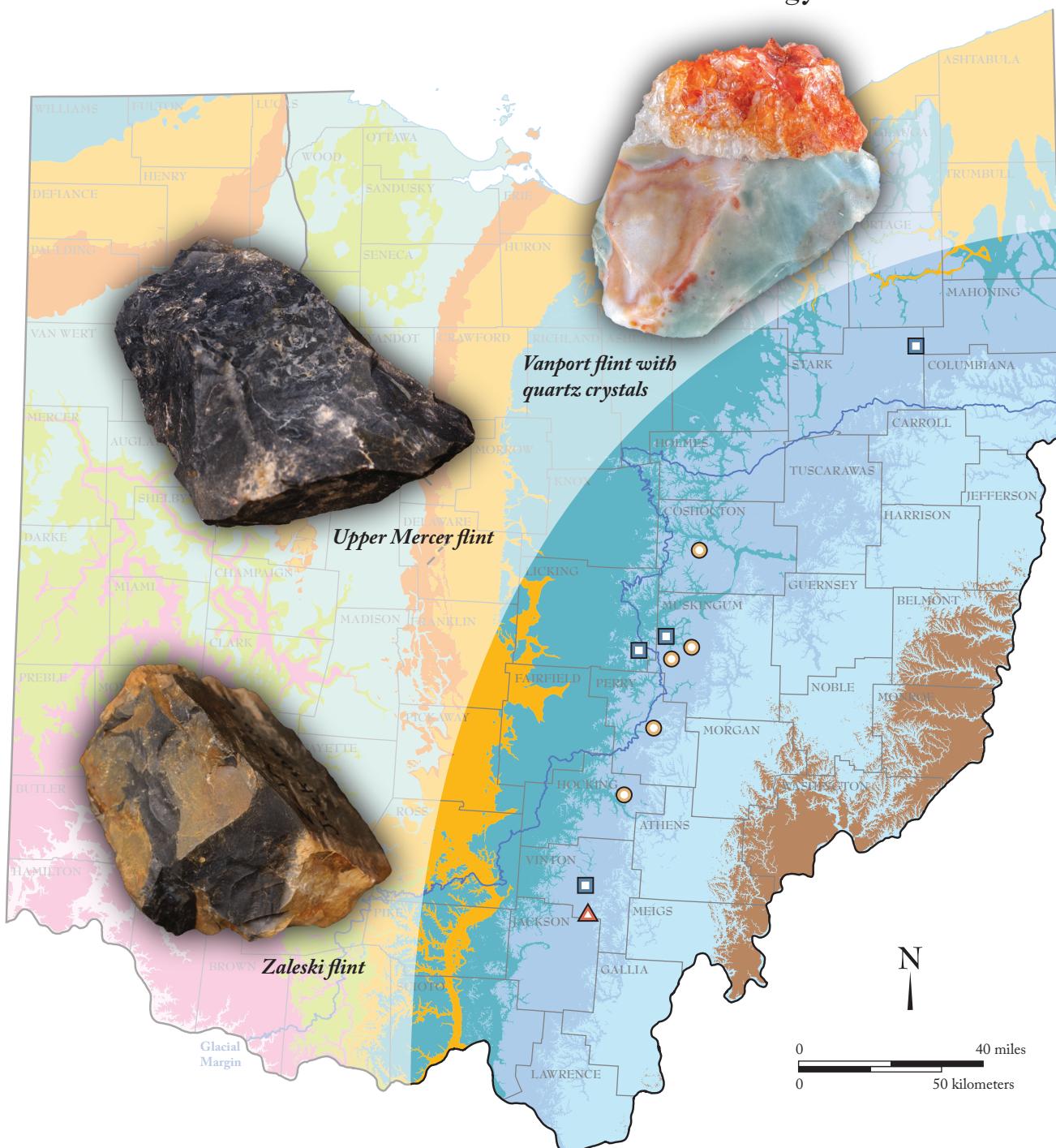
The most famous deposit of Ohio flint, the Pennsylvanian-age Vanport flint, is found in an area of eastern Licking and western Muskingum Counties known as Flint Ridge. Flint Ridge flint has been quarried for over 12,000 years and covers a ridge-top area of about six square miles. One of the most impressive and areally extensive concentrations of ancient quarries is located at Flint Ridge and within Flint Ridge State Memorial (see map above). Here the flint deposit ranges in thickness from one foot to twelve feet and is believed to be discontinuous in areas.

Flint Ridge flint is noted for its array of colors and widespread use by Native Americans. The flint of the Vanport member varies greatly in color and quality at different portions of the deposit. Much of it is a typical chalcedony—a dense, fibrous, microcrystalline variety

of quartz—usually blue or grayish blue and translucent. Portions of the deposit are banded or ribbon jasper—a characteristically red chert—with alternating strips of light and dark gray. In the central part of the ridge the deposit has weathered to various tints of blue, red, brown, yellow, and white. The rarer colors are green, bright yellow, red, blue, and purple and swirled, streaked, and mottled combinations of these. The color variegation in Flint Ridge flint is typically caused by chemical impurities. The most important staining or coloring agents are iron, manganese, and carbonaceous materials. Surface weathering and subsurface oxidation by the action of circulating waters are additional factors that may affect color.

The exceptional characteristics of Flint Ridge flint distinguished it from other cherts found in the Ohio River Valley and explain why it was so important to prehistoric Native Americans. The high quality of this flint may have been what attracted the earliest hunting and gathering groups to quarry it for making large spear points, but its bright and varied colors may have been more important to later Woodland peoples. The Adena (*circa* 800 B.C.E.–100 C.E.)

Flint Locations and Bedrock Geology



○ Upper Mercer flint

■ Vanport flint

△ Zaleski flint

■ Permian-Pennsylvanian

■ Pennsylvanian

■ Mississippian

■ Devonian

■ Silurian

■ Ordovician

＼ Fault

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and Hopewell (*circa* 1–400 c.e.) peoples quarried this flint for both utilitarian and ceremonial objects and traded this flint with other contemporary groups throughout the region.

Ohio's Native Americans also quarried flint from deposits other than Flint Ridge, most notably the Zaleski flint in Vinton and Jackson Counties and the Upper Mercer flint in Coshocton, Hocking, and Perry Counties. Like Flint Ridge, these units are Pennsylvanian in age.

Role of Flint in Ohio History

Ohio's first human inhabitants, or Paleo-Indians, migrated from the west and slowly inhabited the land as the last of the glaciers receded about 15,000 years ago. The migration took place over thousands of years as forays after game ranged further and further afield and led gradually to permanent habitation of new territories. Survival of early humans was predicated on four basic requirements: water for drinking, cooking, and transportation; wood for fires, tools, and shelter; wild game for food and clothing; and flint for a variety of stone tools, weapons, and other implements.

Throughout the development of prehistoric civilizations, flint was the most utilized rock type. It was fashioned by early hunters into spear points, knives, hide scrapers, drills, and a variety of other implements for daily and ceremonial use. Survival in prehistoric Ohio was directly linked to the effectiveness of stone tools of early humans.

Recent research by The Ohio State University and Ohio History Connection archaeologists suggests that some Native Americans came to Flint Ridge to replace their worn out and broken points and artifacts, not to produce large quantities of stone tools for trade. The Native Americans recycled their chipped or broken stone tools by resharpening and using them again. When bodies of reworked points became too narrow to function as weapons, they were further flaked down into drills. Native Americans who discovered artifacts from previous times reworked these tools and weapons too. In each of the prehistoric time periods, Native Americans made new tools to meet changing needs, improve existing versions, and become even more skilled in working stone. During long spans of time there were gradual, distinct changes in the way Native Americans lived. These changes were often reflected in the kinds of tools and weapons they used and how the objects were made.



Native Americans used flint drills such as this to drill holes in wood and bone. Actual size.

OHIO HISTORY CONNECTION PHOTO



Originally a projectile point, this scraper tool was fashioned after the original tip broke. Actual size.

OHIO HISTORY CONNECTION PHOTO



This Thebes type projectile point was resharpened and probably was used as a knife. Actual size.

OHIO HISTORY CONNECTION PHOTO



St. Charles type projectile point made from Flint Ridge flint. Actual size.

OHIO HISTORY CONNECTION PHOTO

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Example of an early flintlock rifle mechanism. Ohio flints were not of high enough quality for flintlock production.



This millstone, which has been used as a headstone in a Knox County cemetery, was made from Vanport flint. Note the furrowed, polygonal pieces fitted together and secured with a metal strap. Diameter approximately 3.5 feet.

JOE HANNIBAL PHOTO

Flint was also important to Ohio's European settlers, who used impure, porous deposits of flint for buhrstones to grind grain in their water mills and for grindstones to sharpen tools. Some buhrstones measured 4–7 feet in diameter and 1–1.5 feet in thickness and regularly sold for several hundred dollars per pair. Smaller, hand-powered grinding wheels were also made for home use. The town of McArthur, in Vinton County, was noted for such a product. Here the industry began about 1807, relying on the Vanport flint, and continued vigorously for over 35 years. Another active field for buhrstones during the early period of development was Flint Ridge, where Vanport flint was utilized also in this way. Quarrying of flint buhrstones in Ohio continued until approximately 1840. Flint also was used for fire starting and in flintlock rifles of the pioneers, though Ohio flints typically were not of high enough quality for flintlock production. Other uses included glazing for ceramics and to enamel glassware manufactured in the Zanesville area.

The Use of Flint Today

Over the last several decades there has been a renewed interest in flint materials, not just in Ohio but across the United States. Because of its color, hardness, and ability to take a high polish, Flint Ridge flint is one of the most coveted materials among mineral collectors and lapidarists, who produce unique, often beautiful jewelry items from this rock. Thus in 1965 the Ohio General Assembly named flint Ohio's official gemstone.

An additional modern day use for flint is flintknapping. *Flintknapping* is a highly descriptive term, referring to both the raw material (flint) and the manufacturing process of *knapping*, which means "breaking with sharp blows." The breaking process also is commonly known as *flaking*. Flintknapping can be traced further back in time than any other technology. The process is accomplished with a multitude of techniques and tools. The basic approach involves reducing the volume of a stone by removing flakes. Flintknapping is one of two technological innovations that greatly affected the course of human development; the other is controlled use of fire.

As a hobby, flintknapping quickly has grown over the past few decades, and a growing appreciation for finely crafted, flintknapped art pieces has developed. Today many knappers are making their points out of the highest quality stone available. However, no material is more highly treasured than the very best Flint Ridge material.

Early on, Native Americans found—possibly by mistakenly placing it near their campfires—that heating flint had the potential to change its color and made it easier to flake. Today this process is known as *heat treating* and is practiced by modern knappers. Heat treating is the thermal alteration of the material and gives it a very smooth, waxy

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Polished flint jewelry can be quite beautiful.

texture when chipped. Colors often change too, becoming brighter as impurities such as iron are oxidized. What happens during heat treatment is not entirely clear. Some suggest that silica crystals or fibers fuse on a microscopic scale, making the material more homogeneous, while others argue that microscopic cracks are formed that weaken the materials and make it fracture more readily and evenly.

It would be hard to imagine early human existence, not just in Ohio but worldwide, without the discovery of the knappable material we call *flint*. Flint materials directly



Examples of modern heat-treated arrowheads knapped from Flint Ridge flint.

affected the development of early human civilizations and their survival because of its wide range of uses. Because flint can be easily shaped and reshaped, early peoples had resources to create stone tools, which enabled them to adapt to new and ever-changing environments.

About the Author

Garry Getz was born and raised in Springfield, Ohio, and attended Wright State University where he earned a B.S. degree in geology. He has worked in geology-related fields since 1975, including mining and mine consultation for various aggregate companies, aggregate testing, and oil field and vibroseis exploration. He is also an avid mineral and fossil collector and regularly volunteers at local mineral and gem shows as an identification specialist. Garry lives in Springfield, Ohio, with his wife Linda.

Further Reading

Carlson, E.H., 2015, *Minerals of Ohio* (2nd ed.): Ohio Department of Natural Resources, Division of Geological Survey Bulletin 69, 304 p.

Converse, R.N., 1963 (1973), *Ohio Flint Types*: The Archaeological Society of Ohio Special Publication, 76 p.

DeLong, R.M., 1972, *Bedrock Geology of the Flint Ridge Area, Licking and Muskingum Counties, Ohio*: Ohio Department of Natural Resources, Division of Geological Survey Report of Investigations 84, color map with text, scale 1 inch equals 2,000 feet.

DeRegnaucourt, Tony, and Georgiady, Jeff, 1998, *Prehistoric Chert Types of the Midwest*: Arcanum, Ohio, Upper Miami Valley Archaeological Research Museum, 240 p.

Holmes, W.H., 1919, *Handbook of Aboriginal American Antiques—Part I, Introductory, The Lithic Industries*: Washington, D.C., Smithsonian Institution, Bureau of American Ethnology Bulletin 60, 380 p.

Lepper, B.T., 2004, *Ohio Archaeology—An Illustrated Chronicle of Ohio's Ancient American Indian Cultures*: Wilmington, Ohio, Orange Frazer Press, 304 p.

Mills, W.C., 1972, *Flint Ridge*: Ohio Archaeological and Historical Quarterly, v. 30, p. 90–161.

Stout, W.E., 1918, *Geology of Muskingum County*: Ohio Geological Survey, Fourth Series, Bulletin 21, 351 p.

Stout, W.E., and Schoenlaub, R.A., 1945, *The Occurrence of Flint in Ohio*: Ohio Department of Natural Resources, Division of Geological Survey Bulletin 46, 110 p.

Yerkes, R.W., 1995, *Investigations at the Flint Ridge State Memorial, Ohio, 1987–1988: Hopewell Archeology*, v. 1, no. 1, last accessed July 28, 2023, at npshistory.com/publications/hocu/newsletter/v1n1.pdf.

Video

Flint Ridge—Ohio's Original Art and Industry: Effigy Digital Productions, 2008, directed by Alan Gutchess, DVD, 90 min.

Websites

ohiodnr.gov/flint

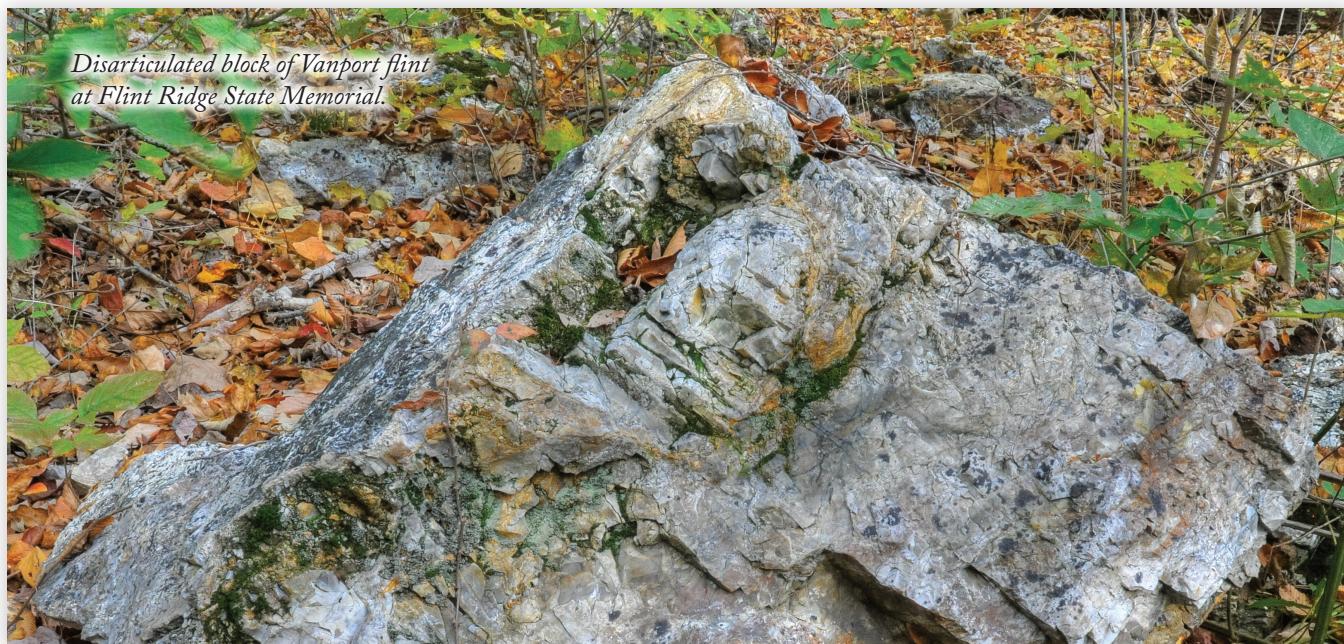
Ohio Geological Survey, *Ohio's State Gemstone*: Ohio Department of Natural Resources, last accessed July 28, 2023.

ohiohistorycentral.org/w/Flint_Ridge

Ohio History Central, *Flint Ridge*: Ohio History Connection, last accessed July 28, 2023.

opl.in.org/point

Ohio Public Library Information Network, 1997 (2008), *What's the Point?—Identifying Flint Artifacts*: Ohio Public Library Information Network and Ohio History Connection, last accessed July 28, 2023.



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Flint Ridge State Memorial



Flint Ridge State Memorial, established in 1933 by the Ohio Historical Society (now the Ohio History Connection), rests on a 525-acre portion of Flint Ridge. Numerous trails through the memorial site lead visitors past hundreds of quarries dug by Native Americans to obtain flint. A museum, constructed in 1968 around a restored prehistoric quarry, includes displays on the geology and uses of flint. Flint Ridge State Memorial is located at 15300 Flint Ridge Rd., Glenford, Ohio 43739 (39°59'20.05"N, 82°15'44.81"W).

For further details, including a location map, hours of operation, and admission information, visit the Ohio History Connection website at ohiohistory.org.

COVER: STATE OF OHIO CARVED BY CRAIG ZIMMER

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