

## Ozark Plateau: Rocks and Minerals

As its name suggests, this corner of southeastern Kansas is part of the Ozarks of Missouri, Oklahoma, and Arkansas. Bounded by the Spring River on the west, the Ozark Plateau covers about 55 square miles and includes the towns of Baxter Springs and Galena. This region contains the oldest surface rocks in the state, limestones that formed about 345 million years ago during the later part of the Mississippian Period.

These rocks show that during the Late Mississippian, the land was alternately above and below sea level. When the sea advanced, limestones (and occasionally shales) were deposited. When the sea retreated, erosion set in.

The Mississippian limestones contain chert (or flint). Because chert is much harder and more resistant to weathering than limestone, erosion of the softer limestone has left a thick blanket of chert gravel on hilltops and ridges.

The thin and rocky soil of the region, combined with steep slopes, makes most of the region unsuitable for farming. Cropland is restricted to the valley floors of Shoal Creek and Spring River. Many of the hillsides are covered with hardwood forests, predominantly oaks and hickories, along with other trees, shrubs, and vines. Some of the vegetation, such as sassafras trees and mistletoe, is not found anywhere else in the state.

The Ozark Plateau averages more than 40 inches of precipitation a year, making it one of the wettest places in the state. Water also affects the landscape of the region. Percolating through the joints and fractures of the Mississippian limestones, water creates caverns and feeds seeps and springs, which in turn drain into clear streams that flow over gravel-beds in steep-walled valleys. These stream valleys produce the region's topographic relief.



Water flows over Mississippian limestones in Cherokee County.

The region's highest point (with an elevation of 1,040 ft) is located just a few miles east of one of the lowest points, along the Spring River (elevation 770 ft).

### Common Rocks and Minerals

*Galena.*—Galena is lead sulfide (PbS), the principal mineral of lead ore. It occurs as metallic to lead-gray, cube-shaped crystals that break into cubic, right-angled fragments. Some galena crystals are very large. Galena is



Galena from Cherokee County.

heavy, has a metallic luster on fresh surfaces, has a gray-black streak, and is so soft that it will mark on paper. Galena was once mined in the Tri-State mining district (see below), once one of the most important lead- and zinc-producing areas in the world. Although the mines are now closed, galena can still be found at old mine dump sites.

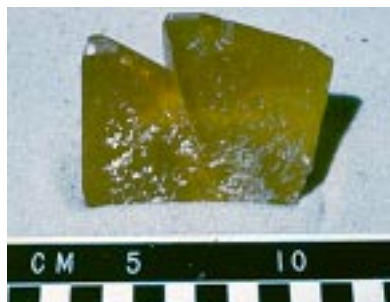
*Limestone.*—Common throughout Kansas, limestone is a sedimentary rock composed mostly of calcite (calcium carbonate,  $\text{CaCO}_3$ ). It is formed in marine environments by organic means or by chemical deposition. Many animals and plants take calcium carbonate out of the water and secrete it to form shells or skeletons. As these organisms die, they drop to the bottom of the ocean, lake, or river. Over time, the organic parts decay and the calcium carbonate accumulates to form limestone. Chemically deposited limestones are formed when calcium carbonate dissolved in water falls out of solution and settles to the bottom.

The limestones that crop out in the Ozark Plateau contain chert and were deposited during the Mississippian Period. The best places to see these cherty limestones are roadcuts or steep cliffs along stream valleys. Economically, these Mississippian limestones were very important because they contained valuable lead and zinc ores.

**Chert.**—Chert (or flint) is common in many Kansas limestones as nodules or continuous beds. It is opaque and ranges in color from white to gray or brown to black. It breaks with a shell-like (conchoidal) fracture, and the edges of the broken pieces are sharp. Chert is a sedimentary rock composed of microscopic crystals of quartz (silica, SiO<sub>2</sub>). Humans have used chert for thousands of years to make tools and weapons. In Cherokee County, chert fragments are commonly found in the dumps at abandoned lead and zinc mines.

**Calcite.**—Calcite (calcium carbonate, CaCO<sub>3</sub>) is the primary constituent of limestone and is therefore one of the most common minerals in Kansas.

Generally it is white or colorless, but it may be tinted gray, red, green, or blue. It can be scratched with a knife but not with a fingernail. Among the finest calcite crystals in Kansas are those from the lead and zinc mines of Cherokee County. Most of these are pale yellow and some are very large.



*Calcite from Cherokee County.*

## Lead and Zinc Mining

Although the lead and zinc mines are all closed down, mining of these ores played a big part in the history of southeastern Kansas, beginning with the discovery of blackjack (a dark variety of sphalerite) on the Cook Forty in Galena in 1870. The Tri-State mining district, which includes southwestern Missouri, southeastern Kansas, and northeastern Oklahoma, was one of the major lead and zinc mining areas in the world. For one hundred years (1850-1950), the district produced 50 percent of the zinc and 10 percent of the lead in the United States.

During the life of the district more than 4,000 mines produced 23 million tons of zinc concentrates and four million tons of lead concentrates. The Kansas part of the Tri-State district produced more than 2.9 million tons of zinc, with an estimated value of \$436 million, and 650 thousand tons of lead worth nearly \$91 million.

After World War II, production in the Tri-State mining district gradually declined until 1970 when the last active mine, located two miles west of Baxter Springs, Kansas, shut down due to environmental and economic problems.

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*This fact sheet was compiled by Kansas Geological Survey staff (April 1999). More information is available on the World Wide Web: <http://www.kgs.ku.edu/Extension/>*

## Places to Visit

**Schermerhorn Park.**—Probably the best place to see the Mississippian limestones of the Ozark Plateau is Schermerhorn Park, located about one mile south of Galena on the east side of Kansas Highway 26. Located within the park is Schermerhorn Cave, which provides a unique habitat for several species of salamander. [The cave entrance is locked and not accessible to the public.]

**Galena Mining and Historical Museum.**—Check out the mineral and fossil specimens at this museum, located in the old train depot, 319 W. 7th, Galena, KS 66739 (316) 783-2192.

**Baxter Springs Historical Museum.**—Located on historic U.S. Highway 66 (now called U.S. 69 Alternate), Baxter Springs is the oldest cowtown in Kansas. The Historical Museum at Eighth and East Avenues contains a variety of historical exhibits including a full-scale replica of a lead and zinc mine. The museum is open on weekends year round and at various times during the week (316) 856-2385.

**Spring River Wildlife Area.**—This wildlife refuge is situated along the western edge of the Ozark Plateau, three miles east and a quarter mile north of U.S. Highway 69. This 424-acre area includes Ozark hardwood forest, native prairie, savannah, restored native grasses, and croplands. The Spring River runs for almost one mile along the eastern edge of the wildlife area. Most of the wildlife found here are typical of southeastern Kansas, but some are rare. For more information, contact the Kansas Department of Wildlife and Parks, 507 E. 560th Ave., Pittsburg, KS 66762 (316) 231-3173.

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