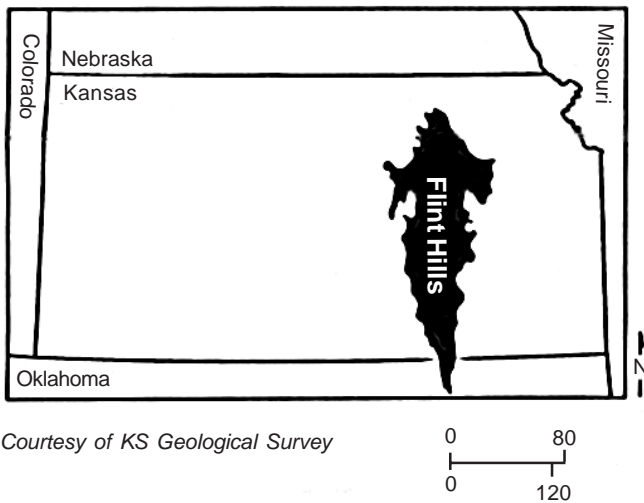




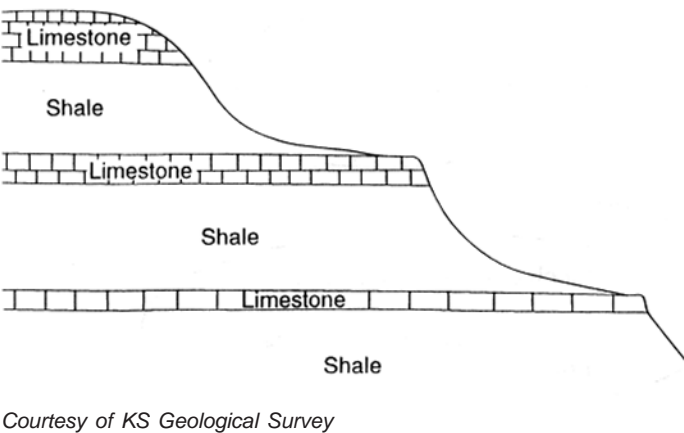
Flint Hills



Few places in this country demonstrate the connection between landscape and people better than the tallgrass prairie in the Flint Hills. The Flint Hills and the surrounding area are shaped by the rocks that lie directly beneath the vegetation and soil—the same rocks which made cultivation difficult and led to the use of native prairie grasses for ranching. This rocky terrain is closely tied to today’s ranching culture. The Flint Hills region is characterized by thin soils, limestone outcrops, vegetation-covered shale intervals between the limestones, deeply incised valleys, and dissected topography. The Flint Hills cross east central Kansas from the north near the Nebraska border and extend into Oklahoma to the south. Many of the limestones contain nodules and layers of flint (also called chert)—a hard, dense rock that resists erosion. As the limestones erode, angular fragments of flint accumulate at the surface, giving the Flint Hills their name.

The thin, rocky soils and steep slopes of the Flint Hills have precluded cultivation, effectively preserving the native grasslands. Historically, only deep ravines and the flood plains of streams were forested. Most cultivation is limited to river and stream bottoms, such as along Fox Creek, just east of the ranch headquarters area; there, the bedrock is covered by a layer of river-deposited sediments that have developed thick soils that are especially valuable for cultivation.

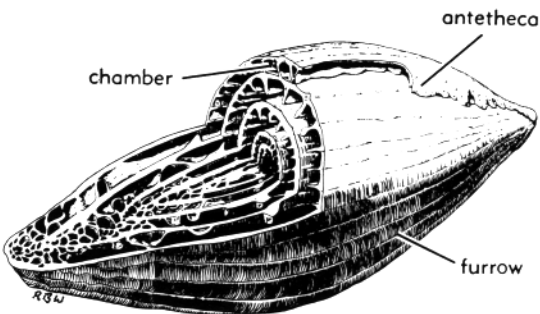
Layers of Ocean Floor



Limestone ranges in color from nearly white to brown. It is hard, and more resistant to erosion than the softer shales, which are usually gray or tan. The alternating beds of limestone and shale produce hillsides with a terraced appearance. Many of the limestone layers create notable benches on the hillsides; the shales form the steep slopes between the benches. The hills themselves are created by a process called differential erosion. Tougher, more resistant limestones and flint cap the tops of hills, while the land between them has been worn away and slowly removed.

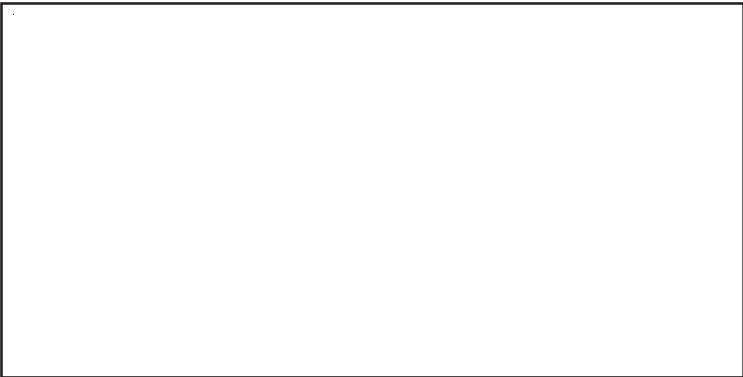
The rocks of this area—alternating beds of limestone and shale—were deposited during the Permian Period of geologic history, about 280 million years ago. At that time, the climate here was hot, and the surface was covered by ocean water most of the time. The limestones represent periods when the region’s surface was covered by shallow, tropical oceans which teemed with life; shales represent times when mud was deposited on the ocean floor. Each of these sedimentary rock layers has been named after towns, creeks, or other nearby landmarks; the names are based on the locations where each rock layer was first found and described by geologists.

Abundant Fossils



A closer look at the rock reveals many fossils. Most of these marine fossils are invertebrates—animals without backbones—such as corals, clams, snails, bryozoans (colonies of animals resembling sea fans), sea urchins, crinoids (a stalked animal that is distantly related to the starfish and sea urchin), and clam-like animals called brachiopods. All of these organisms at one time lived in a shallow, warm, tropical ocean. Particularly abundant in some limestones are fusulinids—fossils shaped like wheat grains; these were one-celled animals that floated in the water. When they died, their skeletons drifted to the bottom of the ocean and were preserved in the lime mud of the ocean floor. These lime muds eventually became limestone. Fusulinids can be seen in many of the limestone blocks used for building on the preserve.

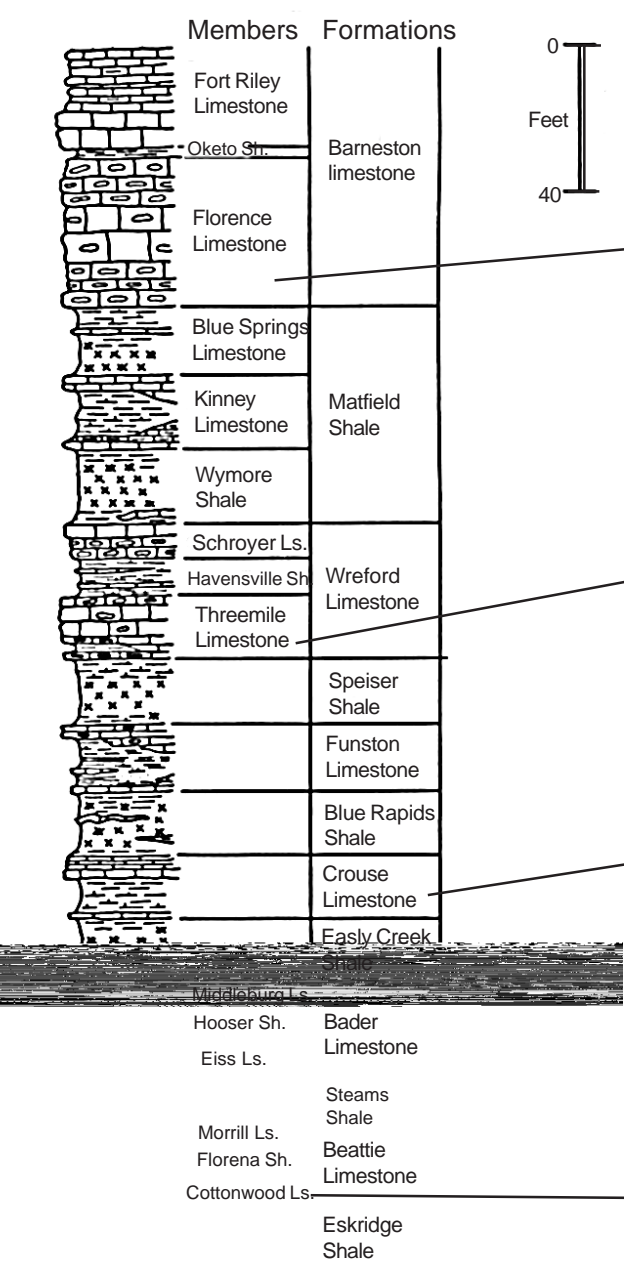
Building With Limestone



Wood was scarce when the prairie was settled primarily by Anglo-American emigrants in the mid-1800s, so the abundant limestone became important for constructing buildings, bridges, and fences. The Cottonwood Limestone, a rock layer that occurs on the preserve near the base of the hills in the Fox Creek Valley, is a common building stone in Kansas. The Cottonwood is thick, nearly white in color, even-textured, durable, and contains numerous fusulinids. Blocks of stone three or more feet thick, and several feet in length and width, can be taken from a single ledge. The ranch house, portions of the schoolhouse and barn, and many other structures on the preserve were built with Cottonwood limestone. Numerous buildings in the state, including the Chase County Courthouse in Cottonwood Falls, and most of the State Capitol building in Topeka, were constructed with Cottonwood limestone.

Classification of Rocks at the Tallgrass Prairie National Preserve

Permian Period



Florence Limestone is found at top of the highest hills on the northern end of the Tallgrass Prairie National Preserve. A large amount of flint occurs at this level.

Threemile Limestone forms a prominent bench on the hillsides and caps the tops of the hills on the south end of the Preserve.

The massive, tri-level barn is built mainly out of **Crouse Limestone**.

Cottonwood Limestone is the primary building material used in the construction of the preserve's three-story mansion.

For additional reading:

- [Kansas Geology: An Introduction to Landscapes, Rocks, Minerals, and Fossils](#) Edited by Rex Buchanan, University Press of Kansas, 1984.
- [Ancient Life Found in Kansas Rocks: An Introduction to Common Kansas Fossils](#) by Roger B. Williams, Kansas Geological Survey, Educational Series I, 1975.
- [Konza Prairie: A Tallgrass Natural History](#) by O.J. Reichman, University Press of Kansas, 1991.

This publication was developed through cooperation with the **Kansas Geological Survey**.