Use caution and common sense when stopping along any highway in Arkansas!

Travel to Oppelo and take a right on Highway 154 to Petit Jean State Park.

Geologic formations present within the park.

Petit Jean Mountain is underlain by shales and sandstones in the Atoka Formation and the Hartshorne Sandstone. The Atoka Formation is divided into upper, middle and lower members based on regionally mappable shale or sandstone intervals. Only the upper member is exposed in the park. In some areas fossiliferous beds containing mostly gastropods and bivalves are present. The upper member of the Atoka Formation can be seen when beginning the climb to the top of the mountain from either direction on Highway 154. The best exposures are found along the highway on the east side of the mountain beneath Stouts Point. At this location dark gray to black shales are interbedded with thin layers of tan to gray sandstone. Thicker sandstones appear along the road at the top of the mountain. These sandstones are part of a different rock formation called the Hartshorne Sandstone.

Figure 1. The Atoka Formation along Highway 154.

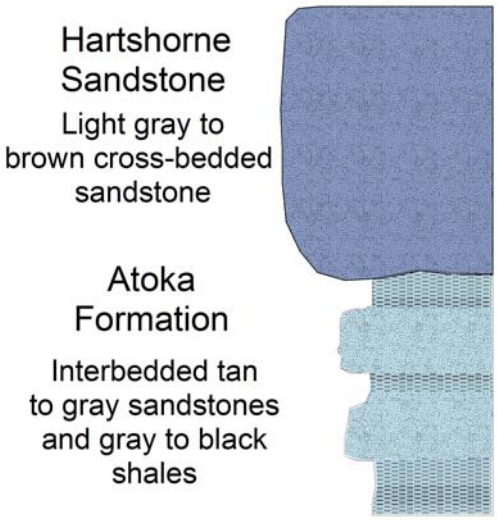

Figure. 2. Columnar section showing sequence of rock formations within the park.

The Hartshorne Sandstone caps Petit Jean Mountain and forms the near vertical ledges and bluffs around the top of the mountain. This rock formation also contains most of the geologic curiosities including Rock House Cave and Bear Cave. The sandstone is brown to light gray, forms thick beds, and is usually cross-bedded. Scenic exposures of this sandstone are found behind Mather Lodge and many of the cabins. This formation is easily viewed at any of the overlooks for Cedar Falls and the canyon formed by Cedar Creek.

Figure 3. Hartshorne Sandstone capping Petit Jean Mountain.

STOP 1A – Cedar Falls Overlook

Directions: Turn right off of Highway 154 into the parking area for Cedar Falls Overlook when heading east/southeast toward Mather Lodge.

This is a very short walk to a magnificent view of the canyon cut by Cedar Creek and Cedar Creek Falls. Walk underneath the stairway and around to the left to see great liesegang banding sometimes called box-work and "carpet rock"**.**

Figure 4. View of Cedar Falls from overlook.

Carpet Rocks

Box-shaped and triangular patterns are abundant in the sandstones on top of Petit Jean Mountain. These patterns form when iron present in the rock is oxidized. Iron exists as the minerals siderite, magnetite, hematite and some clay minerals that are present in the Hartshorne Sandstone. At some point in geologic history water filled the pore spaces of the rock formation and came into contact with minerals made up of iron. This caused the

iron to go into solution. If the rock becomes exposed to air then oxygen is added to the solution and causes the iron to oxidize and precipitate out along exposed joints in the rock formation. Sometimes color bands result from the different oxidation states of iron. These bands are also referred to as Liesegang banding or box work by the scientific community. Often the joints form interesting triangles referred to as "carpet rock" by the park community.

Figure 5. "Carpet rocks" along Cedar Creek Trail.

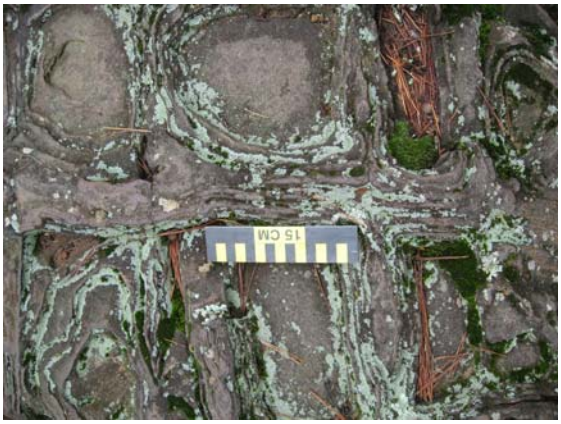

Figure 6. Box work near Cedar Falls overlook.

STOP 1B – Turtle Rocks area near Mather Lodge

Directions: Veer right off of Highway 154 onto lane toward Mather Lodge. Stop near first rock outcropping on right side of road.

Turtle Rocks

Some of the most unique features seen around the park are those called "turtle rocks". Mounded polygonal structures resembling a turtle shell were carved in thick sandstones of the Hartshorne Sandstone. These features are unique to this sandstone but not to the mountain itself. More turtle rocks can be found throughout the Arkansas River Valley where the Hartshorne Sandstone is exposed. Turtle rocks also exist on Pleasant View Mountain and London Mountain near Russellville and Cove Mountain south of Petit Jean State Park.

The exact processes that create "turtle rocks" are poorly understood. One explanation involves spheroidal weathering. This process occurs when water percolating through cracks and between individual grains in the rock loosens and separates layers of the rock. The weathering acts more rapidly on the corners and edges of the rock producing a rounded shape. Another theory concerns the amount of calcite present in the matrix of the rock holding the grains together along with the size of the grains that allow for this

type of weathering. Either way the weathering of the rocks is strongly influenced by the polygonal joint pattern seen in all “turtle rocks”.

Figure 7. Turtle rocks near Mather Lodge

Figure 8. Turtle rocks near Rock House Cave

Other areas of interest

If time allows we may walk down to Rock House Cave. Start at the Rock House Cave Trail and walk down to a excellent exposure of “turtle rocks”. This is a good area to examine the joints around each “turtle back”. Follow the trail off of the outcrop and down to the rock shelter. See what Cedar Creek carved out long ago!

Figure 9. Rock House Cave