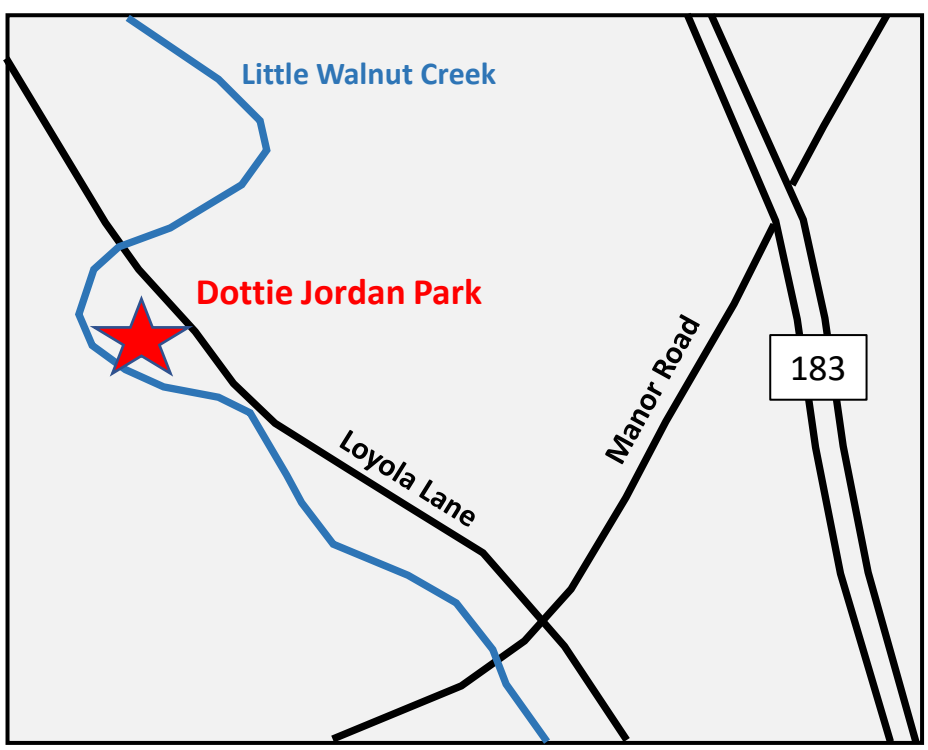
Austin Chalk Do It Yourself Field Trip –Dottie Jordan Neighborhood Park

Austin Chalk Overview

The Austin Chalk is a white to gray limestone that can be seen from Dallas to west of San Antonio (https://en.wikipedia.org/wiki/Austin_Chalk https://mrdata.usgs.gov/geology/state/sgmcunit.php?unit=TXKau%3B0) as part of the Balcones Fault Zone (https://www.beg.utexas.edu/geowonders/centtex). It was deposited from about 90 to about 85 million years ago during the Cretaceous period. Below the surface, it extends across large areas of eastern Texas and Louisiana where it forms an important oil and gas reservoir in places (https://austinchalkoilgas.com/). The Austin Chalk is a formation that includes two main types of rock: chalk and marl. Chalk is a limestone composed of microscopic plankton fossils, so it formed in an ocean environment. Chalk is dominated by the calcium carbonate mineral calcite. Marl is a mixture of calcite, clay, and silt. Clay and silt are grains of quartz and other silica-based minerals. The chalk formed directly from living organisms in the ocean and the marl formed where clay and silt from the land was mixed into the chalk by rivers and storms.

Dottie Jordan Neighborhood Park

Dottie Jordan Park is in northeast Austin near the intersection of highways 183 and 290. At the southeast end of the parking lot, you can find a short trail that leads down into Little Walnut Creek. Unless the water is high, the creek has flat rock surfaces that make for easy walking. Once you get down to the creek, turn left (south). The hike is 0.4 miles round trip. After walking about 0.1 miles, you'll notice that the rock ledge on the east bank disappears, so you'll want to cross over to the west side. There is a large concrete walkway at that point which might help you get across.



Interesting Things To See

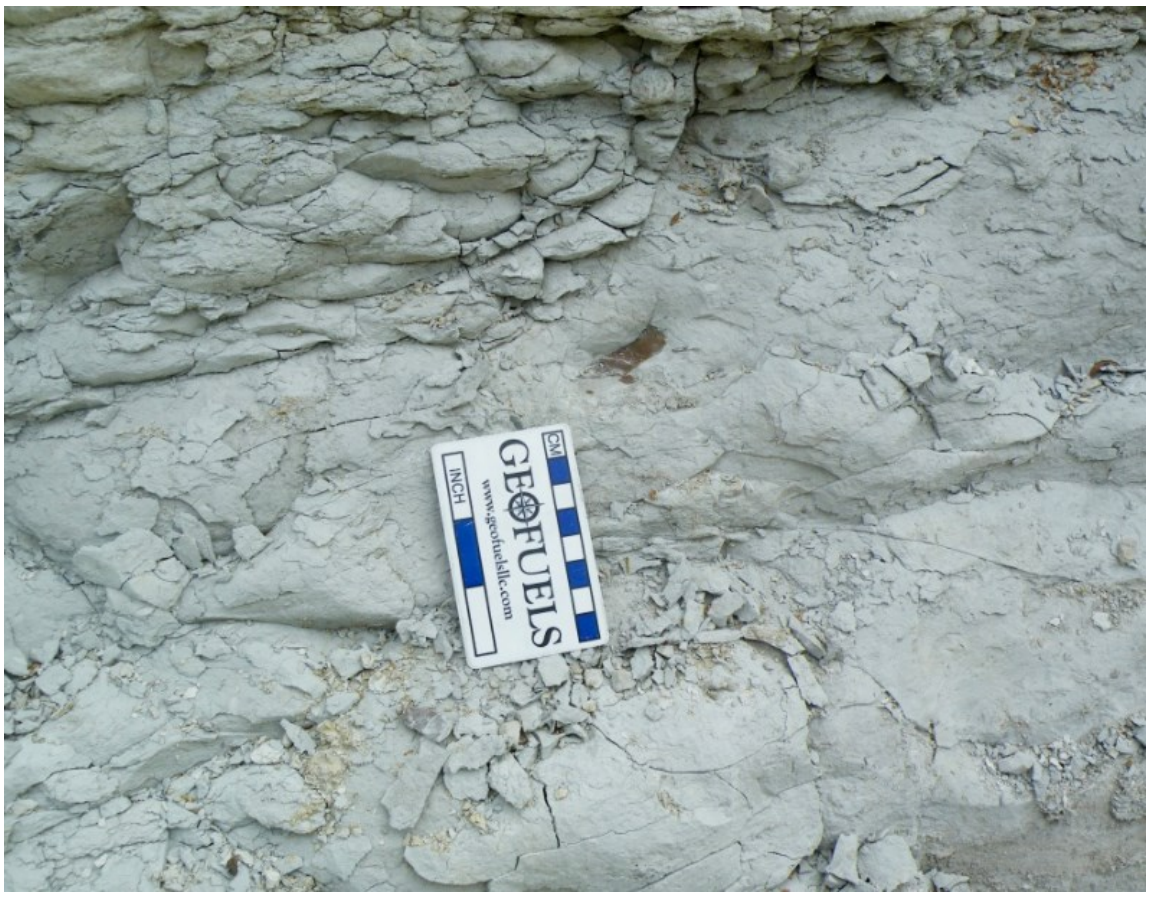
The hike allows you to see how uniform the Austin Chalk is here. We don't see the variability of bedding that can be seen at Gracywoods Park.

This photo is from the end of the hike. The first thing to notice is the gray, soft layer at the top of the outcrop on the right. This is not Austin Chalk. It is a rock composed of clay with some clay mixed in (a "calcareous claystone"). This is the Sprinkle Formation. The white ledge below the uppermost clay is a layer with more calcite so it is a marl. Below that we see another layer of claystone with patchy white splotches of marl. The surface between the white rocks of the creek bed and this lower claystone is the top of the Austin Chalk. Notice how the Austin Chalk is harder than the Sprinkle. This is because the clay makes for a softer rock that erodes more easily.

Take notice of the internal structure of the upper most bed of the Austin Chalk. It has numerous irregular surfaces that separate the chalk into small bodies that geologists call nodular bedding. Nodular bedding results when thin beds with more clay are deposited between layers of pure chalk and animals dig burrows into the soft layers, before they turn to rock, mixing the chalk and clay together. Geologists call this mixing by animals "bioturbation". Photos below show details of the burrows and of nodular bedding.

Another thing to observe here is the surface at the base of the uppermost bed of Austin Chalk that looks like a horizontal crack that extends from the right of the photo almost but not quite to the left edge. This is a thin layer of marl that represents a time of low wave or storm energy. Often, you can find evidence that features such as burrows are truncated below these surfaces suggesting that they formed by erosion during high-energy events like storms. Storms create large waves that can erode the sea floor. Geologists might call these surfaces scours.

Notice how the outcrop changes and then ends along the left edge of the photo. The building stones at the far left were put there to hold up the wall of the creek valley because there is no Austin Chalk there, only soft claystone. The chalk is gone because there is a fault. The growth of the fault crushed a lot of the chalk, so it doesn't have the same bedding as the rest of the outcrop.



This photo is a close-up of the nodular bedding described above.

The long patches of darker-gray material in this photo are burrows created by animals such as shrimp or worms while the chalk was still soft. The darker color is due to a higher clay content within the burrows. Often burrows are open to the seafloor surface and clay can fill them in during times of low energy. These rocks might be telling us this story: First a bed of nearly pure chalk was formed when high-energy waves or currents swept all the clay away. When the weather changed and the energy dropped, animals moved into the chalk to build tunnels that allow them to feed on the plankton in the seawater. Because the energy level was lower, clay was not swept away, and it accumulated in the burrows.

These photos show oyster fossils seen along the trail. Paleontologists give fossils genus and species names just as biologists do with plants and animals living today. This genus of this oyster is ***Exogyra*** and the species is probably ***ponderosa*** so geologists would call this ***Exogyra ponderosa.***