

Road Log

Fredericksburg, Texas to ERSNA and then onward to Burnet

Please note, this document is intended as a general introduction to some geological features and not as a definitive scientific work. Not for redistribution.

Starting on US 290 in Fredericksburg. Distances are in miles. Since this was originally written for a field trip I was actually going on, it's written in the first person (i.e. we, us, etc.) and I haven't taken the time to rewrite it to remove all that.

0.0 Turn on to Ranch Road 965 (aka Park Road 965). From here to Cross Mountain the road is on the Lower Cretaceous Hensel Sandstone.

1.2 Cross Mountain on the west side of the road. The slope of the hill is Lower Cretaceous Glen Rose Limestone and the top of the hill is capped by the Lower Cretaceous Fort Terrett Formation (Edwards Group limestone).

With a couple of notable exceptions (discussed below) the first part of the trip (14.95 miles) between Fredericksburg and Enchanted Rock alternates between two primary units, Cretaceous limestones (mostly white, yellow or tan) and Cretaceous Hensel Sandstone (reddish to gray). The sandstone started out as sediments from rivers and tidal flats, the limestone is marine (transgressive sequence). The limestone tends to top the hills, whereas the eroded stream valleys are floored by the poorly cemented Hensel Sandstone (with or without Quaternary Alluvium). The contrast between these two units is important for the historical development of this area. The Hensel Sandstone breaks down into a relatively decent soil which can be used for a growing things like peach trees. The limestones tend to break down into soils better suited for raising goats and other livestock.

1.6 Road cut in the basal nodular member of the Cretaceous Fort Terrett Formation.

1.65 More road cut, well-bedded limestone and dolomite of the Fort Terrett Formation. (Work up your own Tort Ferret joke for any lawyers out there.)

2.75 Straight ahead, big reddish hill is Bear Mountain. Note the quarry on the side facing us.

2.85 Going down section going down the hill, pass from Fort Terrett to Glen Rose to Hensel Sandstone.

3.6 On right, entrance to the Bear Mountain Granite Quarry (operated by Cold Spring Granite Company), an active quarry producing Radiant Red granite (for the building stone trade) and Mountain Red granite (for the monument stone trade). It's the same stuff, just with a different name.

3.8 On the right, older abandoned granite quarry located on the west side of Bear Mountain (one of 4). On the left side of the road is a hill of Cretaceous limestone.

4.05 Roadside picnic area. **Stop** for overview of the geology of Bear Mountain.

Stop 1. Picnic area north of Bear Mountain

Bear Mountain Granite Quarry is on a hill between Enchanted Rock and Fredericksburg, ~3.6 miles north of U.S. 290 on Ranch Road 965. Bear Mountain is about 575 m in elevation (1,885') the picnic area is at 536 m (1,760').

Bear Mountain is in its third performance as a topographic high point. In the Cambrian, this erosion-resistant granite stuck up far enough that most of the Cambrian rocks were deposited around, but not over it (Ordovician limestones did cover it). After a tectonic disturbance in the late Paleozoic, erosion removed all the Ordovician and Cambrian rocks from this spot and left a hill of Precambrian granite as an island in an encroaching Cretaceous sea. The Cretaceous limestones eventually covered the island. Then the Balcones Fault Zone lifted up the Hill Country, and erosion once again removed the softer rocks from around what became known as Bear Mountain.

The presence of a granite to quarry closer to Fredericksburg than Enchanted Rock probably kept Enchanted Rock from being turned into conveniently sized blocks. [Note: In the late 1930's University of Texas Bureau of Economic Geology scientist Virgil Barnes evaluated the suitability of Enchanted Rock as a source of building stone. "An excellent building and monumental stone" said Virgil. What did you expect? We are not the Bureau of Scenic Geology.]

4.3 Cross Palo Alto Creek, Hensel Sandstone outcrops along the banks.

6.0 Cretaceous Fort Terrett limestone outcrop.

7.5 Caliche pit on right within the Kirschberg Evaporite horizon of the Edwards limestone (lots of gypsum elsewhere, but no salt?). The next 1.2 miles are in the Segovia Formation of the Edwards Group. Somewhere in that interval we pass over a major watershed boundary. Palo Alto Creek (behind us) flows into the Pedernales River. Creeks ahead of us flow into Sandy Creek and then into Lake LBJ. Not quite the Continental Divide, but an important watershed boundary nonetheless.

10.6 On right, outcrop of red Cambrian Hickory Sandstone (Riley Formation) overlain by 50 feet of Cretaceous Hensel Sand (~380 million year gap between the two units), with Fort Terrett limestones capping the hill. Cretaceous rocks were deposited directly on the Cambrian in this area. This bit of Cambrian exposure is at the northern end of a pre-Cretaceous paleo-ridge.

11.1 Intersection with Keese Road. Gypsum mine is down road to left several miles.

11.8 Traveling along east side of Polander and Crabapple Creeks. Much of the creek bed is in the Hensel Sandstone, with scattered inliers of Hickory Sandstone.

12.6 Crossing Crabapple Creek into the community of Crabapple. Really.

~14.2 To the north, first view of Enchanted Rock. Slow down for this, it's worth it. Enchanted Rock is the tallest of the string of granite domes visible from here.

We have just descended the edge of a limestone escarpment that marks the boundary between the Edwards Plateau and a lower-lying topographic basin formed on pre-Cretaceous rocks.

14.95 Leave Cretaceous rocks, start driving over Precambrian igneous and metamorphic rocks. Note a change in both topography and vegetation.

16.7 Entrance to Enchanted Rock State Natural Area.

Stop 2. Enchanted Rock State Natural Area

0.0 Leaving ERSNA. Reset odometer at entrance. Turn left on Ranch Road 965 to return by different route.

Several road cuts of Precambrian Packsaddle Schist, some cut by pegmatites, are present over the next mile or two.

2.1 This particular road cut is probably the one which has some very narrow bands of serpentinite (a rare, silica-poor, iron and magnesium-rich, typically green to black, metamorphic rock).

3.7 Fine-grained Precambrian granite exposed in the bottom of a small creek. Hills to the left are fine-grained pink granite as well.

4.1 Fine-grained granite is exposed in the bottom of the creek. (Crabapple Creek, again). On the flat stretch past the creek, if you are NOT driving, turn around for a nice view back at Enchanted Rock.

6.7 Mountain on left at 9:00 is Bowie Mountain, an intrusion of fine-grained granite. Around this spot we cross from Packsaddle Schist onto coarse-grained granite of the Legion Creek Pluton. The granite is very similar to that seen at ERSNA, but is several million years older.

8.55 Intersection of Park Road 965 with Highway 16. Turn north (left) toward the town of Llano. Note panoramic view of the Riley Mountains to the east. Riley Mountains are a down-dropped fault block of erosion resistant Paleozoic sedimentary rocks.

9.25 Sandy Creek. Note the large amount of, well, sand, in the creek. A sand and gravel pit is operating on the left side. We are leaving the Legion Creek Granite and moving into a narrow band of the Packsaddle Schist.

If I didn't get to talk about it at ER, streams on granite and metamorphic rocks differ greatly from streams on limestones. Limestone streams have a smaller width to depth ratio, and have less sediment in them. Much of the water in sandy creeks such as this one actually flows through the sediment on the bottom rather than on the surface. Limestone streams have less sorted sediment and tend to be more sinuous.

11.4 By this point we are driving through the Precambrian Valley Spring Gneiss. Note the change in topography. This is the first time we have been driving through the Valley Spring Gneiss on this trip.

12.8 "Town" of Oxford. Cemetery population outstrips living population.

13.8 Crest of hill and road cut. This is atypical Cambrian Hickory Sandstone, lighter in color and more color banded than most of the unit. The rocks are part of a graben (down-faulted block) and many small faults cut the road cut. A type of small fault known as a deformation band is particularly common at this spot.

North of this narrow band of sedimentary rocks, we are again driving through the Packsaddle Schist.

This hill seems to be another watershed boundary. North of the hill, creeks flow into the Llano River before getting to the Colorado River, south of it creeks drain into Sandy Creek and then into the Colorado River.

20.4 Fine-grained granite exposed in creek bed (Oatman Creek).

21.5 SCHOOL ZONE AHEAD. Slow down.

22.4 Intersection of Highways 16 and 71. Anyone returning to south or southwest Austin should go back on 71.

22.6 Another SCHOOL ZONE.

23.4 Bridge over Llano River. Dam to the west. Some very interesting outcrops of medium-grained granite and folded Packsaddle Schist are exposed just downstream of the dam, which is accessible through a city park.

24.0 Reset odometer. Turn right on SR 29. We will take this road all the way through Burnet, to intersection with 183.

3.9 Fine-grained pink granite along left side of the road.

11.0 We are driving alongside or through coarse-grained granite of the Lone Grove Pluton. Unlike the Enchanted Rock Batholith, there are no granite domes in this area. Although it is not completely understood, the differing topography is probably due to differences in the fracturing, leading to differences in the weathering.

18.6 Bridge over Colorado River (Inks Lake). Buchanan Dam is up river to the right.

21.2 Several hills of pink Valley Spring Gneiss to the left of the road.

29.6 Intersection of SR 29 and SR 281 in town of Burnet. We are driving over some small areas of Ordovician Ellenburger Limestone in town (no visible outcrop), but once we leave Burnet, nothing but Cretaceous limestones all the way back to Austin.

End of Road Log.

This road log steals heavily from:

Geomorphology, Quaternary Stratigraphy, and Paleoecology of Central Texas, Friends of the Pleistocene South Central Cell, 7th annual meeting guidebook, 1989.

Groundwater, Granite and Gypsum - Economic Geology of the Fredericksburg Area, Central Texas, Austin Geological Society Guidebook no.15, 1993.

Garrison, J. R., Jr., Göbel, V.W., and Hutchinson, R.M. (1986) Origin of the Precambrian granites and associated metamorphic rocks of the Llano Uplift, Texas: Field Trip No. 13. Geological Society of America Annual Meeting Guidebook Series, 142 p.

Economic Geology of the Central Mineral Region of Texas, Southwestern Association of Student Geological Societies Spring 1974 Field Trip

Despite that, the grammatical errors and so-called jokes are solely the responsibility of Robert M. Reed, Ph.D. This road log has obviously never crossed the path of Bureau editing and lets hope it never does. The Director of the Bureau has NOT authorized the publication of this document, and could you blame him?