

Road Log: Town of Burnet

Vanishing Taxes River Cruise

Please note, this document is intended for a general audience as a limited informal introduction to some geological features along the route. It should be considered a beta version. Distances are in miles, numbers in brackets indicate mileage on return trip.

This road log begins in the town of Burnet, just on the edge of the Llano Uplift. The route passes into the core of the Llano Uplift (Precambrian igneous and metamorphic rocks), and then turns more northerly and passes back out into the margin of the Llano Uplift (Paleozoic sedimentary rocks). See the stratigraphic column at the end to sort out the stacking order of the rocks.

The area is covered by the Llano Sheet of the Geological Atlas of Texas (still in print, available from UT-Bureau of Economic Geology). However, the complex geology of the area can make it difficult in some areas hard to pinpoint exactly what unit you happen to be driving over. The map pattern of rocks in this area is complex due to several factors. Three different major erosion surfaces of different ages are involved:

- The modern topography (the current erosion surface) is fairly hilly, particularly toward the end of our route.
- The Precambrian/Cambrian erosion surface had more than 200 meters of relief.
- The erosion surface the Cretaceous rocks were deposited on had some had some topography as well.

An even more serious complication is a series of NE-trending, late Paleozoic normal faults that tilt the Paleozoic rocks and vertically ruffle the rocks. From Burnet to the Canyon of Eagles Resort, we pass over about 15 map-scale faults, mostly within Paleozoic rocks. Offsets on most of these map-scale faults appear to be in tens of meters, but numerous unmapped faults with smaller

0.0 (18.9) Intersection of SR 29 and SR 281 in town of Burnet. We are driving over some small areas of Ordovician Ellenburger Limestone in the center town (no outcrop that I could see but it's on the map). Up to this point (via 183 and 29 about 44 miles from the BEG) you have been driving over nothing older than the Cretaceous since you left Austin. Since this is the first occurrence of Paleozoic rock on 29 going west, there should be a sign saying "Now Entering Llano Uplift".

0.1 (18.8) Hamilton Creek, pretending it is a river. (Tributary of the Colorado River)

0.65 (18.25) Cuts on the left (south) are Cretaceous limestone (probably Glen Rose). As we went uphill we crossed the unconformity and are briefly back in Cretaceous rocks.

3.3 (15.6) Turn right (north) onto FM 2341. Sign says that it is 14 miles to Vanishing Texas River Cruise (I measured 15.6 miles). Stay on FM 2341 all the way to the park. Turn is on in Paleozoic rocks again.

~3.8 (15.1) Low road cut of brown Cambrian Hickory Sandstone (Riley Fm.). Hills to the east are Cretaceous Limestone, an outlier of the Edwards Plateau.

~4.4 (14.5) Rare outcrops of pink rocks in the field for the next mile or so are Precambrian Valley Spring Gneiss.

6.7 (12.2) Pass Burnet Co. 113. On the left (west) between this road and the creek is a road cut of reddish quartzite from the Precambrian Packsaddle Formation.

6.8 (12.1) Crossing Clear Creek which drains in to Inks Lake.

7.1 (11.8) Low road cut on left is deformed Precambrian pink granite of the Midway Sill. The exact age of the Midway Sill is not known, although it is believed to be >1.093 Ga.

7.5 (11.4) Road cut and outcrops on the right are also deformed granite of the Midway Sill.

7.7 (11.2) Pass Burnet Co. 114 (aka Graphite Mine Road) on west side. If you wanted to go the Graphite Mine you'd turn here. Don't turn.

8.0 (10.9) Road cut on west side is more deformed granite of the Midway Sill. The Midway Sill is one of the few deformed granites in the Llano Uplift.

8.1 (10.8) Road cut primarily on the west (left) side is in the contact zone of the Midway Sill. Deeply weathered subunits of the Valley Spring Gneiss, with deformed pegmatites related to the Midway Sill.

8.3 (10.6) Very small outcrop of pink gneiss on the west side is the last visible Precambrian rock while driving North.

8.6 to 9.0 (9.9 to 10.3) On the left, a series of road cuts of the Cambrian Hickory Sandstone (Riley Fm.). These fluvial sandstones are from the basal part of the Hickory. This is known because of the type of sandstone present, and because if you look in the bottom of the ditch on the right side of the road, you would find a very small outcrop of Precambrian Valley Spring Gneiss. The sandstone was deposited directly onto the eroded surface of the gneiss. The two rock units are ~700 million years apart in age.

9.1 (9.8) Somewhere close to this bridge, a major NE-trending normal fault drops down the rocks on the NW-side. This fault puts the transitional zone between the Hickory and the Cap Mountain Limestone against the lower part of the Hickory, so we miss the bright red middle part of the Hickory.

9.1 to 9.2 (9.7 to 9.8) Climbing up the hill, dark tan to yellowish-brown, calcite-cemented well-layered sandstones are present in road cuts on both sides. These are also Cambrian sandstones from the Riley Fm, but are marine in origin (probably tidal). However, these particular layers are somewhat controversial as some geologists place them at base of the Cap Mountain Limestone Member and other geologists place them at the top of the Hickory Sandstone Member. ††

9.3 (9.6) Top of the hill is definitely in the buff-colored, darker weathering, Cap Mountain Limestone. At 55 mph it's hard to see the bedding parallel stylolites which are common to this unit, but they are there. The flat plateau you are driving across is floored by this resistant limestone unit.

9.6 (9.3) The hill on the left is known as Spider Mountain This may have something to do with an aerial view of the hill, which has a number of leg-like ridges radiating out from it. This hill is mostly made up of the Morgan Creek Limestone of the Cambrian Wilberns Formation (with Point Peak Shale at the top).

10.2 (8.7) Green Lion Mountain Sandstone of the Cambrian Riley Fm. The white pods within the green are calcitic and phosphatic shell hash.

10.3 (8.6) South Fork of Morgan Creek. Lake Buchanan may be visible on the left.

10.7 to 10.9 (8 to 8.2) Heading around turn, the green rock in the road cut is glauconitic marine sandstone of the Lion Mountain Member of the Cambrian Riley Fm. This is the same rock exposed at the Hoover Point Overlook on FM 1431 outside of Kingsland. There is probably some Cambrian Morgan Creek Limestone (Wilberns Fm.) at the very top of the road cut.

At this point, my personal experience with the rocks becomes somewhat less comprehensive but the road cuts become more numerous. I have got notes on some, but not all, geologic features, and some hints for high-speed drive by geology.

If the rocks are dark brown or reddish brown: probably Cambrian Hickory Sandstone

If the rocks are dark tan to yellow-brown and well-layered: probably Cambrian sandstones, transitional between the Hickory and Cap Mountain.

If the rocks are tan to dark tan and have wavy beds: probably the Cap Mountain Limestone.

If the rocks are dark green (with or without reddish altered zones): the glauconitic Lion Mountain Sandstone.

These are the most common rocks types visible for the rest of the trip.

11.5 (7.4) Another green Lion Mountain Sandstone road cut.

12.3 (6.6) Burnet Co. 140.

12.4 to 12.5 (6.4 to 6.5) Large road cut, in the Riley Fm. At the southern end the rocks are light-colored well-layered calcite-cemented sandstones from the transition zone. Then there is a normal fault visible on the east side, which brings dark-red, hematite-rich Hickory Sandstone in contact with the lighter-colored sandstone.

13.7 to 13.9 (5 to 5.2) Long road cut on the right side, lake directly on the left, very small pull-off area. This tan to yellowish tan, well-layered rock is the calcite-cemented sandstone transitional between the Hickory and the Cap Mountain. The road is running close to E-W here and the rock is cut by a number of small faults that trend nearly parallel to the face of road cut. At the western end of the road cut, there are areas where the face of the road cut is made up largely of a reddish-stained fault surface. This E-W trend of faults is not the typical direction seen in this area. Some well-developed burrowing is present on the undersides of the thin sandstone beds.

14.0 (4.9) Burnet Co. Park. Actually, a parklette. Boat Ramp with a superiority complex.

15.0 (3.9) Passing Burnet Co. 128 (aka Silver Creek Rd.)

15.7 (3.2) Big road cut in Hickory Sandstone.

16.0 (2.9) Crossing an arm of Lake Buchanan.

16.6 (2.3) Old quarry on the east side of the road. Based on the geologic maps, white rock is probably Cambrian San Saba Dolomite (Wilberns Fm.), but it may be from the calcitic rather than the dolomitic facies of the unit.

17.5 (1.4) Road cuts probably of Cap Mountain Limestone

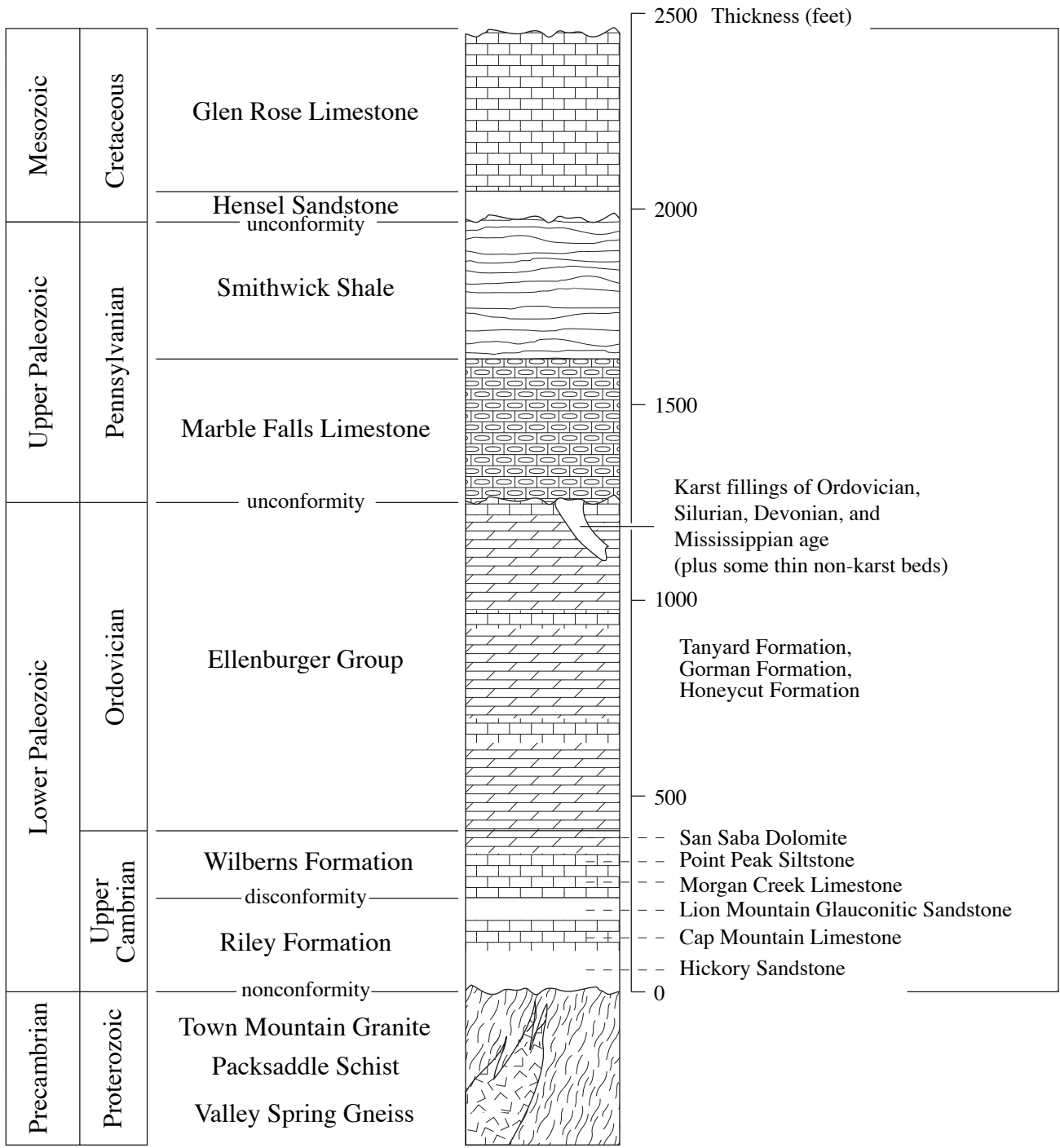
18.2 (0.7) Pass through the big Hickory Sandstone gate. Follow signs to VTRC. According to the geologic map, most of the drive is in the Cambrian Cap Mountain Limestone or the calcite-cemented sandstone at its base.

18.9 (0.0) Parking lot and park store. The rock scattered around the lot and in the low outcrop slightly into the woods on the far end of the lot is Hickory Sandstone. These are hematite-cemented marine beds from near the top of the Hickory.

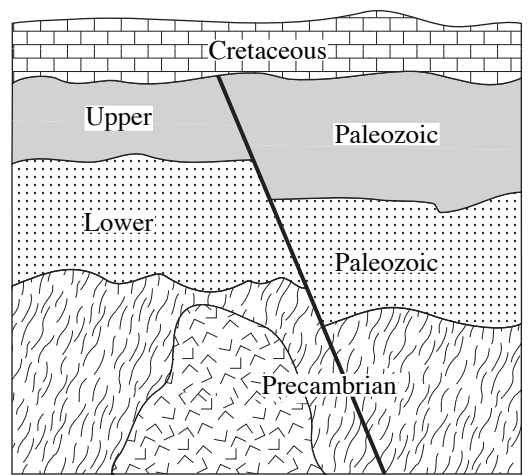
End of Road Log.

† Arguably one could say that the Cretaceous sandstones made up of material shed off the older uplifted rocks are also part of the LU, but I prefer to be more strict in my definition.

†† These calcite cemented sandstones are controversial. The late Virgil Barnes (BEG geologist extraordinaire) included them in the Cap Mountain Limestone member. This decision was based on the weathering characteristics of these rocks which weather like the more resistant limestone units rather than the weaker hematitic units just below in the Hickory. This difference leads to a break in topography and vegetation which makes the contact easily visible on aerial photographs (and hence easy to map). Some stratigraphers, more interested in lithologies than mapping (i.e. McBride and others, BEG RI) place the calcite-cemented sandstones in the Hickory Sandstone Member. In his thesis, S.J. Krause (1996) puts a 3rd order sequence boundary at the base of the calcite-cemented sandstones and hence puts the unit boundary there as well.



Stratigraphic Column,
Eastern Llano Uplift,
Central Texas



Schematic cross section

L. Long