

## Geological and Paleontological Results of Karnes County Field Trip

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**Tessman Ranch:** The material found in the plowed fields consisted of about 20% yellow agatized fossil wood. This material in general was too agatized for identification (that is, the cell structure was destroyed by layered or random-pattern silica mineralization). The only structures consistently identifiable were the capillary vessels in palm wood (referred to as "straw"). Of the remaining 80%, about a half was grading toward pure silica and thus could not be used for wood ID. The exception to this was the weathered exterior, which in many cases showed cell structure as a weathering pattern. This was useful, but only for species with which I was already familiar; they could not be used for ID of unknowns. The remaining specimens were sorted by species and documented.

The ranch is situated in the uppermost portion of the Manning Formation, Jackson Group, upper Eocene epoch (approximately 40 million years before present [mybp]). The climate was still tropical to subtropical at that time, so we would expect only tropical flora to be present. This in fact was the case, as most specimens showed either weak or no growth rings (indicating a nonseasonal environment). Over half of the specimens were a genus called *Rhamnacinium* in an old reference. This name is the generic type-name for an extinct genus from the *Rhamnus* family (Buckthorn). This family is originally from Eurasia but is now widespread due to introductions by man. Common Buckthorn forms hedges and is present in Texas. The wood structure strongly resembles Maple; however there is no genetic relation.

The list of primary plant families are as follows:

1. *Rhamnacinium* (over half of all specimens)
2. *Alangium* (possibly two different species)
3. Unknown flora, wood structure resembles Fig
4. Legume (Pea family, possibly 3 different species)
5. Palm

*Alangium* is a single-genus, tropical to subtropical family residing today in Asia and Africa. It is documented in the Eocene of Oregon and is a common constituent of Eocene flora in Texas. Its wood anatomy somewhat resembles Walnut, but there is no relationship between the two families.

Legume is a large family comprised of *Acacia*, *Mimosa*, *Locust*, *Mesquite*, and *Tamarind*, among many others. It is well documented in the fossil record worldwide. The problem is that without further observation of thin sections, it is almost impossible to distinguish some Legume genera (such as *Acacia*) from Laurel (*Cinnamon*, *Avocado*, *Bay Laurel*, *Sassafras*, among others), which is another family well-represented in the fossil record. For the time being, I will continue referring to these specimens as Legume unless I can demonstrate otherwise.

**Bordovsky Ranch:** All of the specimens found at this ranch were highly silicified. About a third were too silicified for identification, meaning that the rock was turning to

an amorphous chalcedony without internal structure. Great for polishing, but bad for identification. Of the remaining 2/3, only about half were suitable for detailed identification, meaning that all the cellular components were preserved. These were sorted and logged.

An interesting subgroup of specimens from this locality is a type of wood that has been totally fractured and the fractures filled with agate (banded chalcedony). This wood gives the appearance of being dessicated (as in mudcracks) or exploded (by a tensional environment). These broken segments are polygonal and sometimes resemble the rhombohedral outlines of a cycad. However, closer observation of cut sections (figure next page) reveals all varieties of polygonal shapes. Microscopic observations shows the polygons to consist of fragments of a severely silicified hardwood.



The Bordovsky Ranch is on a hillock composed of the upper Miocene Oakville Formation (approx. 15-25 mybp). The climate had cooled by this time, but some remnant tropical species may still have been present. Wood is known to occur in this formation; however many (but not all) of the specimens were rounded and very weathered, perhaps by stream erosion. This poses the possibility that the woods are not from this formation originally but were transported already fossilized from upstream during deposition of the Oakville Formation. It is almost impossible to ascertain with certainty where the specimens come from, unless we can age date via the species composition.

With that introduction, lets look at the primary flora families found in this location:

1. Legume (at least two different species)
2. Alangium
3. Juniper

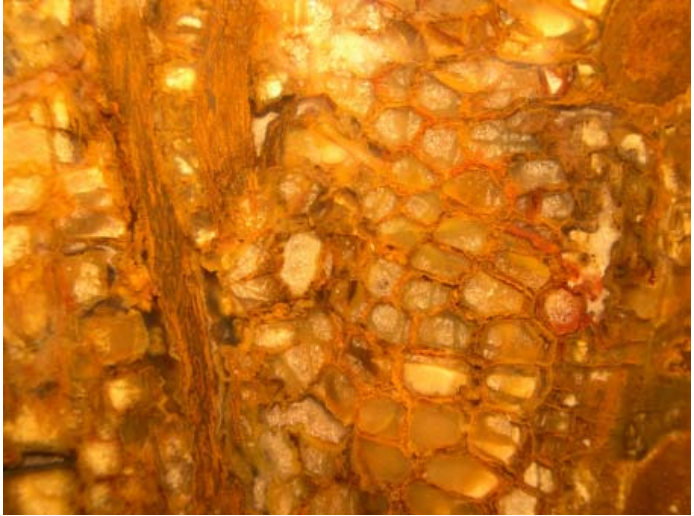
Minor constituents are as follows:

4. Sequoia
5. Walnut (Engel-hardioxylon)
6. Unknown flora, wood structure resembles Fig

Unfortunately, all of these genera are found in earlier Eocene formations. To determine if they are still present in the Miocene, other Miocene localities in Texas would need to be sampled. My intuition would be that we may have significant contamination of this formation from earlier formations. The good news is that a large piece of Live Oak was found at one of the sites, which is definitely a temperate species that isn't seen in Texas until the Oligocene (25-35 mybp).

**Wheat Ranch:**

**Specimens** found at this ranch were all severely silicified and rounded, indicating the same possibilities as stated above. Only about half could be used for identification. They were not very remarkable or colorful.



The ranch is probably located in both the Caddell Fm. and Wellborn Fm., both of which are in the lowermost Jackson Group of the upper Eocene epoch (approx. 40-45 mybp). They are sandwiched between the middle Eocene Yegua Fm. and the Upper Eocene Manning Fm., both of which are prolific wood producers. From the geologic quad maps, I deduced that the wood was produced from the Caddell Fm. and the pecten/oyster shell casts were produced from the Wellborn Fm.

The primary constituents of this fossil flora are:

1. Legume (2 different species)
2. Alangium
3. Juniper

Minor constituents are:

4. Rhamnacinium
5. Sequoia

plus several other very minor constituents.

What immediately strikes me is the similarity between this flora assemblage and the one at the Bordovsky Ranch, whose sediments are 20 million years younger