

**BUREAU OF ECONOMIC GEOLOGY**

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# **A Revision of Taylor Nomenclature, Upper Cretaceous, Central Texas**

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Introduction

Since the days of R. T. Hill (1901) two Upper Cretaceous lithic units have been used as formations but have remained unnamed. These two units have usually been called the "Lower Taylor Marl" and the "Upper Taylor Marl." If Taylor is used as a group, both of these formations belong in the Taylor Group. If one uses Hill's division system of

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classification, the "Upper Taylor Marl" belongs to the Taylor Division but the "Lower Taylor Marl" belongs to the Austin Division, since it is a claystone lithosome interfingering with the type Austin Chalk and is genetically part of the Austin.

Schuchert (1943, p. 900) may have been aware of some of the problems and some of the confusion rising out of this nomenclatural muddle when he applied the term "unnamed formation" to the unit generally termed "Lower Taylor Marl." The "Lower Taylor" and the "Upper Taylor" are separated by the Pecan Gap Formation (Stephenson, 1918) so that the lithic sequence is claystone, chalk (or marly limestone), and claystone. In more detailed maps of the greater area of Austin, Texas, now in preparation, the Pecan Gap is omitted by faulting in some areas, leaving the two claystone formations in fault contact. To eliminate confusion, it is imperative that the two unnamed claystone units be named. Table 1 shows the old and the proposed usage.

Table 1. Comparison of older nomenclature with the proposed nomenclature of Taylor strata in Central Texas.

| <u>Older Nomenclature</u> | <u>Proposed Nomenclature</u> |
|---------------------------|------------------------------|
| Upper Taylor Marl         | Bergstrom Formation          |
| Pecan Gap Formation       | Pecan Gap Formation          |
| Lower Taylor Marl         | Sprinkle Formation           |

#### Sprinkle Formation

The name Sprinkle Formation is here proposed for the formation formerly referred to as the "Lower Taylor Marl," or the "unnamed formation" of Schuchert (1943). Sprinkle is an extant but non-operating station on the Missouri-Kansas-Texas Railroad north of the northern city limits of Austin, Travis County, Texas.

The Sprinkle Formation is a greenish-gray to brownish-gray, unctuous, montmorillonitic claystone, slightly calcareous in the lower 20 or 30 feet. It is gradational with the underlying Big House Chalk (Young and Marks, 1952; Durham, 1956; Murray, 1961; Young, 1963) (fig. 1 and table 2). The Sprinkle ranges up to 340 feet thick in Travis County and thickens to the northeast (the East Texas Embayment) and to the southwest (Gulf Coast Basin). To the south and southwest it thins, pinching out near San Antonio by the overlapping Pecan Gap-Anacacho transition. Many of the wells in Travis County penetrated sections of Sprinkle less than 300 feet thick. The Sprinkle is faulted in some of these wells. Others were drilled on or adjacent to igneous intrusions. The igneous rocks in Travis and Caldwell counties were emplaced during Dessau, Burditt, Big House (Murray, 1961), and Sprinkle deposition (table 2); these formations are thin over most of the igneous bodies.

No complete section of Sprinkle Formation is exposed in Travis County. The gradational basal boundary of the Sprinkle Formation with the Big House Chalk (Murray, 1961, nomen nudum) is well exposed just below the bridge on the old Austin-Manor highway on Little Walnut Creek (Bureau of Economic Geology locality 226-T-4) (fig. 1). It was described by Feray and Plummer (1949, pl. 17, pp. 62-64) and by Stephenson (1937, p. 135).

Table 2. Comparative classifications of Taylor strata.

| Group     | Formation | Division |
|-----------|-----------|----------|
| "Navarro" | Corsicana | Navarro  |
| "Taylor"  | Bergstrom | Taylor   |
|           | Pecan Gap |          |
|           | Sprinkle  | Austin   |
| "Austin"  | Big House |          |
|           | Burditt   |          |
|           | Dessau    |          |
|           | Jonah     |          |

The best exposures of the Sprinkle Formation are along Little Walnut Creek about half a mile west of the above locality. Here, just south of the intersection of Loyola Lane and Tulsa Drive in the River Bend subdivision of Austin the Sprinkle is faulted into a small graben. This locality is herein designated the type locality of the Sprinkle Formation.

Other good but incomplete sections of Sprinkle Formation are exposed along Walnut Creek between the type locality and Sprinkle. Periodically new and good exposures are developed in new road cuts, but one must collect them immediately before they are obscured by the landscaping program of the Texas Highway Department.

The top of the Sprinkle Formation was exposed in the road cut on the new Austin-Manor highway (U. S. Highway 290) on Walnut Hill, Travis County, Texas (Bureau of Economic Geology locality 226-T-29). These outcrops have since been landscaped, but they were described by Feray and Plummer (1949, pl. 16, pp. 61-62), who also described a part of a section of the upper part of the Sprinkle Formation (Bureau of Economic Geology localities 226-T-40 and 226-T-50). The boundary of the Sprinkle with the Pecan Gap was also described by Young (1953, stop 7, pp. 54-58). This boundary is lithically sharp (fig. 2), is burrowed, and the burrows extend

into the underlying claystone for up to 2 or 3 feet. The burrows are 1 to 2 inches across and filled with the overlying chalky marl of the Pecan Gap Formation. This boundary is interpreted to be the disconformity described by Ellisor and Teagle (1934) at the base of the Pecan Gap Chalk--Wolfe City Sandstone.

The Sprinkle Formation is a clay lithosome of the Austin Chalk, and it thickens basinward both by the increasing thickness of each bed and also through lateral replacement by the Big House Chalk, the Burditt Marl, and the Dessau Limestone (table 2) in the deeper parts of the basins (Young and Marks, 1952; Durham, 1956; Young, 1963, in press). It is thus separated from the Taylor Division by a disconformity and is part of the Austin Division of Hill (1901) in the sense of Hill (1894), Lozo and Stricklin (1956), Lozo (1959), and Young (in press).

The most characteristic fossil of the Sprinkle Formation is Exogyra ponderosa s. l. The type, described by Römer (1852), is the so-called "chalk variety" of Adkins (1933). The variety of the Sprinkle Formation is that to which Exogyra ponderosa has been applied by Stephenson (1914, pl. 13, figs. 5-7 & pl. 14). Exogyra erraticostata Stephenson first appears in the Big House Chalk and recurs in the Pecan Gap Formation; it is not found in the intervening Sprinkle Formation except in the very basal, still very calcareous part. Diploschiza cretacea (Conrad) first appears in the base of the Sprinkle Formation along with Anomia argentaria Morton and Alectryonia sp. cfr. falcata (Morton). One specimen of Delawarella sabinalensis Young is from the base of the Sprinkle Formation on Little Walnut Creek (Young, 1963). Check lists of the Foraminifera of the Sprinkle (= Lower Taylor) and lower and upper members of the Pecan Gap Formation have been published by Plummer (1949) and by Cushman (1946, pp. 9-13).

#### Bergstrom Formation

Overlying the Pecan Gap Formation is the claystone unit usually referred to as the "Upper Taylor Marl." It is here proposed to name this unit the Bergstrom Formation. The best exposures of this formation are now in road cuts along Farm Road 973, east of Moore and Berry's Crossing (mistakenly shortened to Moore's Crossing on the Texas Highway Department's Travis County highway map and the U. S. Geological Survey Montopolis Quadrangle, topographic) of Onion Creek, just east of Bergstrom Field, Travis County. This area is herein designated the type locality of the Bergstrom Formation. Although the entire formation is not exposed in the type locality, about 65 feet are now well exposed in the hillside road cuts about 1/4 mile east of the intersection of Farm Road 973 and Ferguson Road; probably they will be grown over by vegetation within a few years.

The Bergstrom Formation is a greenish-gray to brownish-gray, unctuous, montmorillonitic claystone (table 2), more calcareous toward the base, where it is transitional with the underlying Pecan Gap Formation. The transition zone from Pecan Gap to Bergstrom ranges through a thickness of from 20 feet at some localities to 50 feet or more at other localities. Between Austin and Manor, Travis County, Texas, on the northeast side of the Pecan Gap cuesta,

the gradual transition between the two formations can be observed in small gullies draining the dip slope of the cuesta. Most of the formation is covered by soil and vegetation and cannot be observed. The thickness of the Bergstrom Formation is about 400 feet.

The upper boundary of the Bergstrom Formation (= upper boundary of the Taylor) was placed by Helen Jeanne Plummer (personal communication, 1949) at a burrowed horizon just below a 6-inch thick calcareous siltstone bed containing a few phosphate pebbles. In 1949 this boundary was well exposed near the bottom of a draw half a mile southwest of Noack, Williamson County, Texas; the writer measured the section (fig. 3) at that time. It is difficult to call any planar surface at this section a disconformity, although the burrowed surface could be a disconformity if it is regionally significant. At Fulcher's Bluff on the San Gabriel River (Bureau of Economic Geology locality 165-T-12), Milam County, the first specimens of Exogyra costata (Say) occur in a layer with phosphatic pebbles just below a nodular calcareous siltstone that may correlate with the siltstone at Noack.

About 3/4 mile south-southwest of the type locality of the Bergstrom Formation, where the Elroy-Colton road crosses the North Fork of Dry Creek, the basal Navarro formation (Corsicana at this locality) is glauconitic above its boundary with the Bergstrom Formation.

Since Stephenson (1941) and Darton et al. (1937) did not map the lower two formations (Neylandville and Nacatoch) of the Navarro Division to the south of the San Gabriel River, it is generally assumed that the upper formation of the Taylor (Bergstrom Formation) and the Corsicana Formation are disconformable at the Travis County outcrop. However, Adkins (1933, p. 499) pointed to the questionable age of various sandstone bodies along the outcrop at the top of the Bergstrom Formation (top of Taylor) along the northeast flank of the San Marcos Platform in Caldwell County. Earlier Hill (1901) had included the concretion horizons near Kimbro, Rice's Crossing, and at Sandahl's Farm near the New Sweden Church, Travis County, as part of his Navarro Division. Since Stephenson (1941), these beds have been included in the Taylor by most workers. Helen Jeanne Plummer included them in the Taylor when she established formation boundaries in 1949 (Helen Jeanne Plummer is also quoted on this particular point by Adkins, 1933, pp. 498-499). There is, in the writer's opinion, still considerable doubt as to the exact relationship of the upper beds of the Bergstrom Formation (= Hill's, 1901, concretionary beds) to the lower beds and formations of the Navarro Division.

The variety of Exogyra ponderosa described by Stephenson (1914, pl. 13, figs. 5-7 and pl. 14) is the most characteristic megafossil of the Bergstrom Formation. Bostrychoceras secoense Young has been recovered from the formation in Williamson County, and, of course, the concretion horizons at Kimbro, Rice's Crossing, and near New Sweden have yielded Pachydiscus sp. cfr. gollevillensis (d'Orbigny), Menuites stephensoni Young, Manambolites ricensis Young, Placentoceras meeki Böhm, P. intercalare Meek, several species of Nostoceras, Solenoceras, Scaphites, Baculites, and other molluscs.

Exogyra costata (Say) and a small bivalve, Crenella serica Conrad, first appear at the base of the Corsicana Formation and are not known from the underlying Bergstrom Formation.

A check list of Foraminifera of the Bergstrom Formation (= Upper Taylor) appears in Cushman (1946, pp. 9-13).

## References

- Adkins, W. S. (1933) The Mesozoic systems in Texas, in Sellards, E. H., Adkins, W. S., and Plummer, F. B., The geology of Texas, Vol. I, Stratigraphy: Univ. Texas Bull. 3232 (Aug. 22, 1932), pp. 238-519, figs. 13-27.
- Cushman, J. A. (1946) Upper Cretaceous Foraminifera of the Gulf Coastal region of the United States and adjacent areas: U. S. Geol. Survey Prof. Paper 206, 241 pp., 66 pls.
- Darton, N. H., et al. (1937) Geologic map of Texas: U. S. Geol. Survey Map, 4 sheets, scale 1:500,000.
- Durham, C. O., Jr. (1956) The Austin-Taylor relationship in Central Texas (abst.): Resúmenes de los Trabajos Presentados, XX Congreso Geológico Internacional, Mexico, p. 330.
- Ellisor, A. C., and Teagle, John (1934) Correlation of Pecan Gap chalk in Texas: Bull. Amer. Assoc. Petrol. Geol., vol. 18, pp. 1506-1536, il.
- Feray, D. E., and Plummer, H. J. (1949) Road cuts in new highway 20, Walnut Hill area, Travis County, Texas. Bureau of Economic Geology localities 226-T-50, -40, -29, & -28 and old Austin-Manor road crossing, Little Walnut Creek, Travis County, Texas. Bureau of Economic Geology locality 226-T-4. In Cretaceous of Austin, Texas area: Guidebook, 17th ann. field trip, Shreveport Geol. Soc., pp. 61-64, pls. 15-17.
- Hill, R. T. (1894) Geology of parts of Texas, Indian Territory, and Arkansas adjacent to Red River: Bull. Geol. Soc. Amer., vol. 5, pp. 297-338, pls. 12, 13.
- \_\_\_\_\_ (1901) Geography and geology of the Black and Grand Prairies, Texas: U. S. Geol. Survey 21st Ann. Rept., pt. 7, 666 pp., 80 figs., 71 pls.
- Lozo, F. E. (1959) Stratigraphic relations of the Edwards Limestone and associated formations in north-central Texas, in Symposium on Edwards Limestone in Central Texas: Univ. Texas Pub. 5905, pp. 1-19, figs. 1-10.
- \_\_\_\_\_ and Stricklin, F. L., Jr. (1956) Stratigraphic notes on the outcrop basal Cretaceous, Central Texas: Gulf Coast Assoc. Geol. Socs., Trans., vol. 6, pp. 67-78, 8 figs.
- Murray, Grover (1961) Geology of the Atlantic and Gulf Coastal Province of North America: Harper and Bros., New York, 692 pp., il.
- Plummer, H. J. (1949) Lower Taylor clay and Pecan Gap chalk, in Cretaceous of Austin, Texas area: Guidebook, 17th ann. field trip, Shreveport Geol. Soc., pp. 99-100 and table facing p. 101.

Römer, Ferdinand [Roemer] (1852) Die Kreidebildungen von Texas, und ihre organischen Einschlüsse: Bonn, Adolph Marcus, 100 pp., 10 pls.

Schuchert, Charles (1943) Stratigraphy of the Eastern and Central United States: John Wiley and Sons, New York, 1013 pp., 78 charts, 123 figs., 3 pls.

Stephenson, L. W. (1914) Cretaceous deposits of the eastern Gulf region and species of Exogyra from the eastern Gulf region and the Carolinas: U. S. Geol. Survey Prof. Paper 81, 77 pp., 2 figs., 21 pls., 9 tables.

\_\_\_\_\_ (1918) A contribution to the geology of northeastern Texas and southern Oklahoma: U. S. Geol. Survey Prof. Paper 120, pp. 129-163, maps.

\_\_\_\_\_ (1937) Stratigraphic relations of the Austin, Taylor, and equivalent formations in Texas: U. S. Geol. Survey Prof. Paper 186-G, pp. 133-140, fig. 7, pl. 44.

\_\_\_\_\_ (1941) The larger invertebrate fossils of the Navarro group of Texas: Univ. Texas Pub. 4101, 641 pp., 13 figs., 95 pls., 6 tables.

Young, Keith (1953) in Stenzel, H. B., AAPG Field Trip #5 to Austin: Guidebook, Field Trip Routes, Oil Fields, Geology, AAPG, SEPM, SEG joint ann. meeting, pp. 54-60, 3 figs. [Through no fault of Stenzel, Keith Young and John A. Wilson were editorially omitted as co-authors of this paper.]

\_\_\_\_\_ (1963) Upper Cretaceous ammonites from the Gulf Coast of the United States: Univ. Texas Pub. 6304, vii + 373 pp., 34 figs., 82 pls., 13 tables.

\_\_\_\_\_ (in press) The Comanche Series, Central Texas: Permian Basin Section, Soc. Econ. Paleontologists and Mineralogists, special pub.

\_\_\_\_\_ and Marks, Edward (1952) Zonation of Upper Cretaceous Austin Chalk and Burditt Marl, Williamson County, Texas: Bull. Amer. Assoc. Petrol. Geol., vol. 36, pp. 477-488, 1 pl., 2 figs.

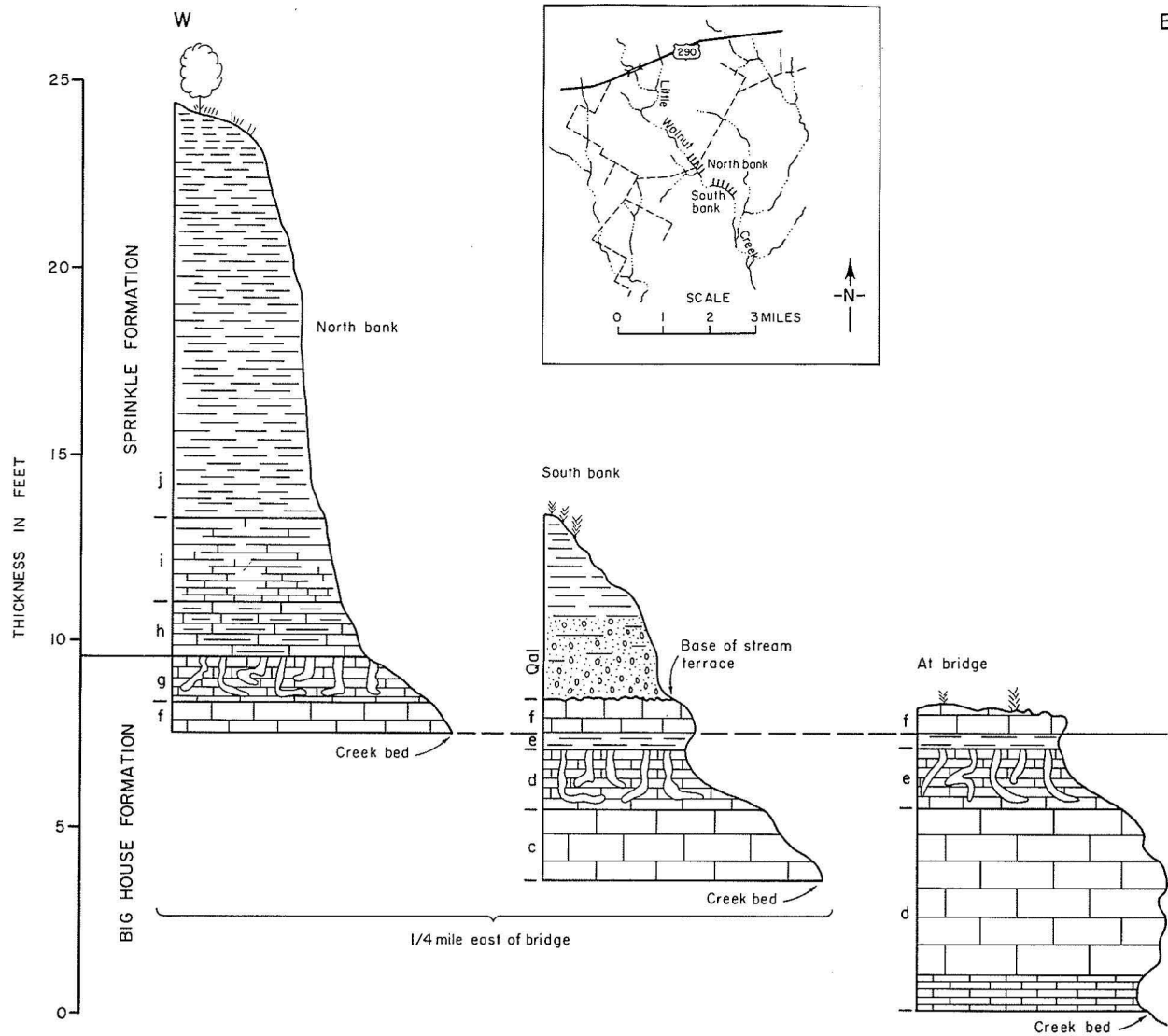


FIG. 1. Sprinkle--Big House boundary, old Manor Road crossing of Little Walnut Creek, Travis County, Texas. Bureau of Economic Geology locality 226-T-4. Just east of type locality of Sprinkle Formation.

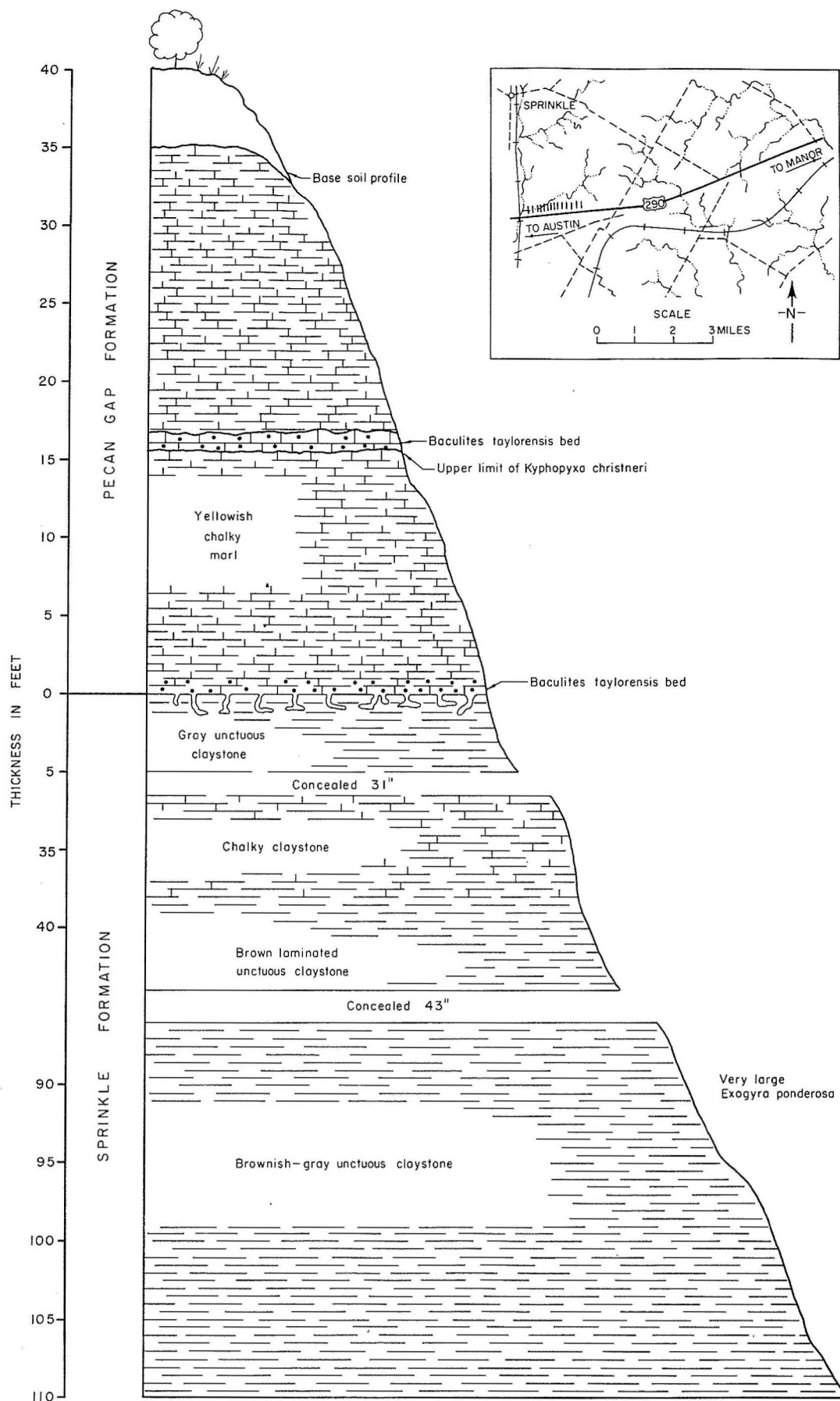


FIG. 2. Sprinkle--Pecan Gap boundary east of Austin at Walnut Hill, Travis County, Texas.

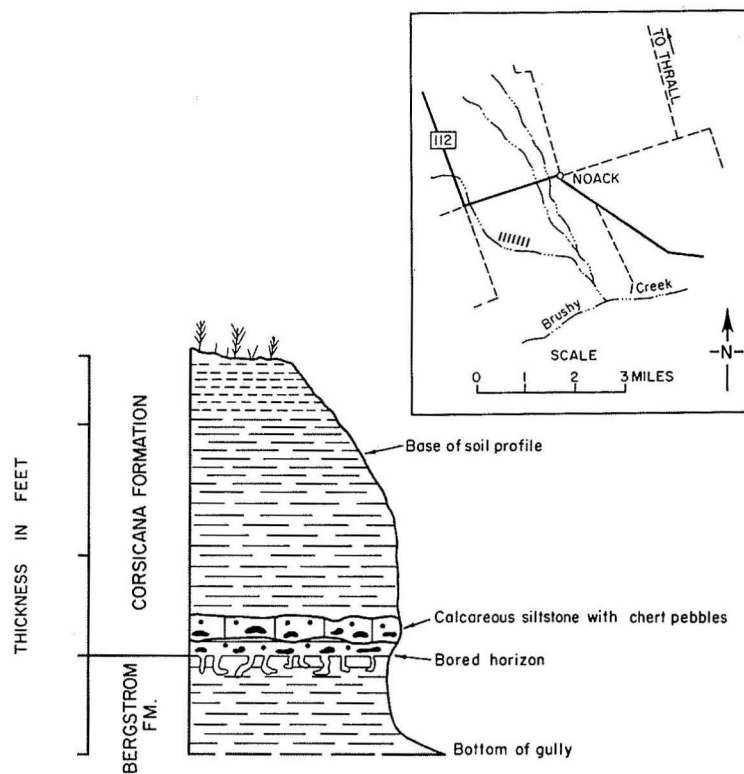


FIG. 3. Bergstrom-Corsicana boundary 7/8 mile west of Noack, Williamson County, Texas.