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MINERAL RESOURCE SURVEY
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The information contained in this circular was gathered by a unit of the WPA Mineral Resources Survey of Texas, a project sponsored by The University of Texas, Bureau of Economic Geology. The purpose of this survey is to assemble information concerning mineral products and to gather other geologic data and make it available to the public. With this information in the hands of the public, it is reasonable to suppose that industries of value to the State may be developed. The following report is based on work done in Lee County by Work Project No. 3182, from January 27, 1936, to May 4, 1936.

REPORT ON THE GEOLOGY OF LEE COUNTY, TEXAS*

by G. D. Harris, Supervisor

GEOLOGY

The pre-Quaternary rocks exposed at the surface in Lee County belong to the Tertiary system of the Cenozoic era. The strata are divided into groups, formations, and members as follows:

- Jackson group
  - Fayette formation
    - Manning beds
    - Wellborn sandstone
    - Caddell sands and clays
- Claiborne group
  - Yegua formation (upper Claiborne)
  - Crockett formation
    - Tabor member
    - Two Mile member
    - Wheelock member
    - Stone City member
  - Sparta formation
  - Weches formation
  - Queen City formation
  - Reklaw formation
  - Carrizo formation
- Wilcox group
  - Sabinetown formation
  - Rockdale formation
  - Seguin formation
- Midway group
  - Wills Point formation
    - Kerens member

These formations and their members are briefly described in The University of Texas Bulletin 3232.

Wills Point Formation

Stratigraphy.—The Wills Point formation outcrops in an area approximately 1 mile square, in the extreme northwest corner of Lee County. Only the uppermost strata of the formation are present, belonging to the Kerens member.

The Kerens member consists of dark gray, sandy and silty clay. On soil survey maps the soil derived from the Kerens member is called Crockett fine sandy loam. It consists of grayish-brown, noncalcareous, sandy loam from 6 to 10 inches thick. There are no good exposures of the Kerens member in Lee County and no sections of it were measured.

Paleontology.—Large fossils do not occur in the Kerens member of the Wills Point formation. Three microfossils which occur in this member are:[1]

Ammobaculites midwayensis Plummer, n.sp.
Ammobaculites expansus Plummer, n.sp.
Lenticulina midwayensis (Plummer)

*Assistance in the preparation of these materials was furnished by the personnel of Works Progress Administration Official Project No. 65-66-5026 and Work Projects Administration Official Project No. 665-66-3-233.

[1]Plummer, F. B., Cenozoic Systems, *in* Geology of Texas, Vol. I, Univ. Texas Bull. 3232, 1932 (1933).

Seguin Formation

Stratigraphy.—The Seguin formation outcrops in the extreme northwestern corner of Lee County, extending from a point on the Bastrop-Lee County line, approximately 2 miles southeast of the corner where Lee, Williamson, and Bastrop counties converge, across the corner of Lee County and entering Williamson County. The width of the outcrop is a little less than 1 mile.

The Seguin formation is underlain by the Kerens member of the Wills Point formation. There is no sharp line of division between the two layers, but the thinly laminated sands containing carbonaceous matter that belong to the Seguin are distinguishable from the underlying silty loams and clays of the Wills Point. The contact between the Seguin and the Kerens member is thought to be conformable. Overlying the Seguin are the sands and red clayey sands of the Rockdale formation. No sections of the Seguin formation were measured in Lee County.

Paleontology.—The Seguin formation has been subdivided into two members which are:[2]

Caldwell Knob oyster bed
Solomon Creek clays and sands

The Caldwell oyster bed is exposed at the type locality at Caldwell Knob located 10 miles north of Bastrop and about 2 miles south of Colorado River in Bastrop County. The oyster is *Ostrea multilirata* Conrad var. *duvali* Gardner. In Lee County the bed is either covered with overlapping sands from the overlying Rockdale, or it was removed by pre-Rockdale erosion. The thickness of the formation is between 50 and 65 feet.

Rockdale Formation

Stratigraphy.—The Rockdale formation is exposed on the surface in the northwestern portion of the county. The outcrop extends from a point 4.5 miles north of Tanglewood, where the railroad leaves Lee County to go into Milam County, and continues in a westward direction across the county, with the full width of the outcrop exposed at the Lee-Bastrop County line. It is underlain by the Seguin formation and the Carrizo sand overlies it with an unconformable contact. The greatest width of outcrop is 10 miles.

Regional geology.—The Rockdale forms a steeply rolling and undulated surface, with drainage line frequent in occurrence. Where the land is not in cultivation it is wooded. It weathers to a red and tan colored sandy loam and makes good farm land.

The Rockdale is unfossiliferous and lignites are found near the top of the section. Sand and sandy clays make up the greater portion of the section, with some almost pure sand layers. The thickness of the formation varies, but it has been measured in adjoining Bastrop County. In the J. J. Ott No. 1 well, ¾ mile sw of String Prairie, Bastrop County, the formation has a thickness of 1065 feet.[3] The width of the outcrop in the western portion of Lee County is almost 10 miles. With the regional dip of 100 feet, the thickness would be about 1000 feet.

Paleontology.—The Rockdale is nonmarine in origin. There are numerous petrified trees and stumps occurring with the lignites in the upper portion of the formation. These trees are replaced with silica. They may be seen around the coal dumps at Hicks, north of Tanglewood and at the foot of the Yegua Knobs, on the Lee-Bastrop County line.

Section of Rockdale formation, Wilcox group, in the washes in the vicinity of the improved spring, at the north foot of the second Yegua Knob, and approximately 1 mile airline south of the Knobs School House, Lee-Bastrop County line.

	feet	inches
Washed sand, large grained, pure silica, rounded to sub-rounded, grains up to 5 mm	4	
Rockdale formation:		
Clay, gray and sticky, mottled with limonite stains	3	
Sand, white, fine grained, very little clay and limonite stains, cross bedded	3	
Sand, light tan when fresh, fine grained, weathers white, more clay than sand above, petrified wood in portion near base	2	
Lignite, black, soft, lenticular		4 to 6
Clay, gray, sticky, bentonitic	3	
Total section	15	6

At this locality the Rockdale formation is directly overlain by the Carrizo sandstone, which forms the capping of the Knobs. The marine phase of the upper Wilcox, the Sabinetown, is not present in the section but is very likely overlapped by the Carrizo sandstone.

Sabinetown Formation

The Sabinetown formation does not outcrop in Lee County. It is thought that either the formation was not deposited in Lee, Bastrop, and Caldwell counties, or that it was eroded before the deposition of the Carrizo sand.

There is, however, a yellowish-gray, sticky clay, with a few iron oxide concretions that is exposed one-half mile west of the Knobs community which might be a local lagoonal deposition of the Sabinetown. This clay lentil has no large fossils. It cannot be traced to either the east or west and is approximately 12 feet in thickness. It is overlain by tan and buff-colored sands, which occur below the uppermost seam of lignite.

Carrizo Sand

Stratigraphy.—The Carrizo sand outcrops on the surface in Lee County from the northeastern corner, where the Tanglewood fault leaves the county, in a southwestern direction to the Lee-Bastrop County line. The width of the outcrop in the northeastern corner is about 1 mile, due to the faulting. In the southwestern portion of the county it is at least 5 miles in width. It overlies the Rockdale formation and is overlain by the Reklaw clays.

There is over 200 feet of the Carrizo exposed at Yegua Knobs, in the Lee-Bastrop County line, about 5 miles northeast of McDade. The lower portion of the Carrizo consists of tan and white sands, medium grained, with one or two layers of

[2]Plummer, Idem, p. 576.

[3]Plummer, Idem, p. 585.

bluish-colored sand or siltstone. The upper portion of the formation consists of massive sandstone, iron stained, with a conglomeratic ironstone capping the section. The conglomeratic layer usually occurs on the dip slope of the outcrop, forming a secondary scarp back of the frontal scarp formed by the coarse-grained sand.

Paleontology.—The Carrizo being nonmarine in origin contains no shells. The plants that occur in the formation are related to those found in the other formations belonging to the Claiborne group.

Regional geology.—The relief of the formation on the surface is moderate with the surface covered with loose buff and light gray sand. Blackjack, post oak, pinoak, sandy-land hickory, and poison ivy grow well in the sandy soil. A few cedars and pines usually distinguish it from the Queen City sand, along with the difference in grain size.

Section of the Carrizo exposed along the banks of Allen's Creek and in the road cut, on the Tanglewood-Hicks road, 3.2 miles north of Tanglewood, Lee County.

	feet	inches
Ironstone conglomerate, hard, massive, red brown	1	6
Sand, red to brown, medium grained to coarse grained	4	
Total section	5	6

Section of the Carrizo sand exposed on the north side of the Lexington-Tanglewood road, west of the railroad crossing and approximately 2 miles south of Tanglewood, Lee County.

Carrizo sand:

Conglomerate, ironstone, hard and resistant to weathering, red to reddish brown	1	6
Sand, red and clayey, half-inch layers of gray clay	3	6
Sand, red and yellowish red, medium grained, half-inch to one-inch layers of gray clay	3	
Sand, light gray, medium grained	3	
Total section	11	

Reklaw Formation

Stratigraphy.—The Reklaw formation outcrops in Lee County from a point in the Richard Russell Survey, where the Lee-Burleson-Milam county lines converge, across the northern and northwestern portion of the county to the John Tom Survey, on the Lee-Bastrop County line, where it is faulted out. The width of the outcrop varies from 0.2 to 0.5 of a mile. The thickness of the Reklaw is less than 50 feet as exposed.

Regional geology.—The surface of the Reklaw is a gentle, mature, rolling prairie land. It is not heavily forested, compared to the underlying Carrizo and the overlying Queen City. Mesquite and post oak are common on land that is not under cultivation.

Paleontology.—The Reklaw formation is not fossiliferous to the extent that the Weches and the Crockett are. It does contain, however, a thin, concretionary, yellow-brown limestone which carries casts and moulds of gastropods, pelecypods, and other shell fragments.

A good exposure of the Reklaw was measured on the John Tom Survey, Joiner tract, which adjoins the R. M. Bealy 200-acre tract. The formation is exposed in a dry branch and is 6 miles by road north of Paige, on the Lee-Bastrop County line. The section is given below.

Limestone, yellow, concretionary; casts and moulds of shells	2
Clay, red and gray, sandy, evenly bedded, with half-inch layers of limonitic sandstone	8
Clay, gray, sandy, grading into gray sand at the base	4
Total section	14

The Reklaw may be seen along Allen's Creek, northeast of the Tanglewood-Hicks road, extending to the Lee-Burleson County line.

Section of Reklaw (?) exposed at the crossroads where the Blue-Darden Springs road meets the northwest road from Fedor to Lexington, (see Bastrop quadrangle) Lee County, Texas.

Sand, white to tan, windblown	2	
Ironstone, hard, resistant, dark brown	1	
Sandstone, massive, red-brown, with frosted sand grains	2	
Sandstone, red-brown, cross-bedded, platy, with streaks of white sandstone	3	
Clay, red-brown, sandy, numbers of 1mm-square mica flakes exposed on freshly broken surface, one-fourth-inch limonitic sandstone layers	4	
Alternating 1-inch red-brown limonitic-stained sandstone and red-brown calcareous shales	5	
Sandstone, white, thin bedded; numerous mica flakes		3
Sandstone, soft, light brown to red	2	
Sand, brown to light red, soft, mottled	2	
Total section	21	3

Queen City Sand

Stratigraphy.—The Queen City sand is exposed on the surface in Lee County in an outcrop that varies from 1 to 3 miles in width. It extends entirely across the county. The outcrop in the vicinity of Lexington and Tanglewood is broken by numerous faults, which have allowed well preserved sections of the Weches clay to be present up dip from the Weches outcrop. The Queen City enters the county 1 mile north of the Russellville community, on the East Yegua Creek. The outcrop is exposed south of Brushy Creek valley and westward through the northern part of the Thomas Morrow Survey, the southeastern portion of the Patrick Curneal Survey, the Alexander S. Mitchell, Nicholas C. Grunk, Arron C. Dodd, and finally the John Tom Survey, where the outcrop enters Bastrop County.

Paleontology.—The Queen City sand is considered nonmarine in origin. The fossils found in the type section in Cass County consist entirely of plant leaves and stems. At a point 3.1 miles north of Lexington on the Tanglewood road there is an exposure of yellow limestone and underlying marine clays and sands. Some workers have called this material fossiliferous Queen City, but in this writer's opinion it is the basal portion of the Weches clay.

Regional geology.—The outcrop of the Queen City makes a mature and gently rolling terrain. The relief is more pronounced than the underlying Reklaw and resembles some portions of the Rockdale and the fine sand layers of the Carrizo sand outcrop.

The Queen City sand as exposed in Lee County consists of fine to medium-grained buff and gray sands, with some few thin limonitic sand layers. Post oak, blackjack, and hickory cover most of the outcrop. The land is used mostly for grazing, with very little acreage under cultivation.

Section of Queen City sand in an abandoned sand pit on the north city limits of the town of Lexington, where the Taylor road crosses the railroad, Lee County.

	feet	inches
Top soil		6
Clay, red, sandy, with gravel	1	
Conglomerate, with limonitic concretions and sandstone		3
Sands, medium to fine grained, cross-bedded, limonite stained, noticeable heavy mineral content seen with hand lens	6	
Total section	7	9

Section of Queen City sand exposed 2.2 miles north-northwest of Lexington on the Taylor road, Lee County.

Sandstone, brown, iron stained, weathers into large platy layers	1	
Sand, brown, medium grained		6
Sandstone, brown to red, fairly resistant	1	
Sand, brown, medium grained, limonite and iron oxide stains		6
Covered with talus	6	
Sandstone, red to brown, medium grained	4	
Sandstone, red and brown, half-inch layers, glauconitic, contained light green clay layers	2	
Clay, gray, sandy	1	6
Limonite-stained sand		3
Clay, red, sandy, grading into clayey sand	6	
Sand, yellow stained, iron concretions	4	
Clay, greenish, yellow iron stains and spots, stiff	5	
Sand, red to yellow, contains some clay	6	
Total section	37	9

Section exposed in the road cut and dry branch beside the road, one-half mile northeast of the Russellville community, Lee County.

Soil, red brown, clayey, with some sandy clay	3	
Weches clay:		
Clay, sandy, red brown, weathers to red brown soil	4	
Queen City sand:		
Sand, white, fine grained, one-fourth-inch streaks of limonite, numerous mica flakes	6	
Sand, brown to tan, massive, loosely cemented	5	
Sand, light tan, grades into white, medium grained	3	
Total section	21	

Section of the Queen City sand exposed along the road that goes from the Russellville community (Lee County) to the Gus community (Burleson County), approximately one-half mile from the First Yegua Creek.

Soil, sand, yellow to brown, medium grained	3	
Queen City sand:		
Sandstone, soft, red-brown, thin bedded, medium grained	1	
Sandstone, red-brown, 3- to 6-inch layers that are more resistant, remainder of layer soft and easily eroded	3	
Sandstone, predominantly white in color, 1-inch brown layers, lenticular in character		6
Sandstone, red-brown, massively bedded	1	
Sandstone, white and brown layers alternating, 1-inch in thickness	1	
Sandstone, hard, massive, red to brownish tan, a few limonite concretions	3	
Sandstone, tan, mediumly hard, 1-inch white sandstone layers, medium grained to fine grained	1	10
Sandstone, red-brown to brown, hard and resistant	1	
Sandstone, white to tan, alternating 2-inch beds	1	8
Sand, red to tan, some gray, numerous iron stains	1	6
Total section	18	10

Weches Clay

Stratigraphy.—The Weches clay outcrops in the north-central and extreme western portions of Lee County. The Weches overlies the Queen City sand unconformably and is overlain with a conformable contact by the Sparta sand. The Weches consists of glauconitic clays, which weather into red clayey soil, and red-brown, glauconitic, fossiliferous limestones. A broad belt of Weches extends from the East Yegua Creek, just southeast of the Russellville community, through Lexington and west of the

town for 1 mile. The width of the outcrop is from 1 to 2 miles. West of Lexington the Weches is not well exposed until in the Fedor community, where the clays are darker and form almost black soil. From Fedor to the Bastrop County line the outcrop is rather continuous but is nowhere more than a mile wide.

Paleontology.—The Weches is very fossiliferous. The greater portion of the clays are glauconitic and contain limestone layers. There is a persistent yellow limestone carrying glauconite found near the base of the exposed section and another near the top. Numerous red, concretionary limestone layers are abundantly fossiliferous and are found throughout the median portion of the section.

Regional geology.—Rolling, open prairies are characteristic of the Weches outcrop. The land is under cultivation and the belt makes a striking contrast with the post oak forests of the Queen City and Sparta.

Section of Weches clay exposed along the Fedor-Paige road at the cemetery, in the Fedor community, Lee County.

	feet	inches
Top soil consisting of brown to black loam	2	
Weches clay:		
Limestone, heavy, massive, bedded, weathers into field boulders, fossiliferous	1	
Clay, yellow, sandy	2	
Limestone, brown, weathers yellow, concretionary, manganese oxide dendrites, nodular, semi-crystalline, nonfossiliferous		4
Sand, yellow, with one-eighth-inch masses of gray clay	2	
Clay, yellow, sandy	2	
Sand, brown, calcareous, glauconitic; replaced glauconite consists of iron oxide		6
Limestone, brown, concretionary		2
Clay, brown, sandy		3
Sand, brown, fine grained, glauconitic, fossiliferous		3
Limestone, concretionary, fossiliferous; has secondary capping of lime and phosphate-flattened concretions.		3
Clay, yellow and sandy		6
Sandstone, calcareous, some glauconite, casts and moulds of fossils		6
Clay, yellow, soft, glauconitic, casts and moulds of shells	4	
Sandstone, brown, soft, medium grained, glauconite replaced with iron oxide, plant impressions		4
Clay, red to brown, glauconitic	3	
Total section	19	

Section of the Weches exposed along the Lexington-Fedor road, 1mile from the railroad tracks at Lexington, Lee County.

Weches clay:		
Clay, red, calcareous, glauconitic	4	
Limestone, yellow, glauconitic, casts and moulds of fossils	1	
Clay, yellow, glauconitic	1	6
Limestone, yellow, glauconitic, nodular, some fossil casts observed	1	
Clay, yellow, glauconitic, with bentonitic clay balls, weathers to red soil	2	6
Clay, yellow, evenly mixed with white, sticky, bentonitic clay and greensand	2	
Total section	12	

Section of Weches formation exposed in small creek 0.5 mile east of State highway No. 44 and 1.7 miles south of the town of Lexington, Lee County.

Sand, white, with one-half-inch iron-stained layers	4	
Sand, brown, calcareous, slightly glauconitic	4	
Bentonite, blue to white, thin limonite stains	2	
Marl, yellow, glauconitic	1	
Limestone, yellow, concretionary, glauconitic	1	
Marl, yellow, glauconitic	1	
Total section	13	

The above section of the Weches formation is the upper portion and, as exposed in the creek bank, consists of an inlier of the formation, with outliers of the Sparta sand on the hills to the east and the west.

The limestone is very glauconitic and may be distinguished from the Crockett limestones because of this feature. Fossils are scarce.

Section of the Weches clay exposed along the road on the east side of the First Yegua Creek, 1.4 miles northeast of the Russellville community, Burleson County.

Soil, red to brown, clayey	3	
Weches clay:		
Clay, brown, sandy, slightly glauconitic	3	
Sandstone, glauconitic, iron stained, weathers red-brown		4
Clay, yellow to brown		6
Limestone, red to brownish tan, contains numerous *Ostrea* sp., *Turritella* sp.	1	
Clay, yellow, with yellow and white phosphate and lime nodules		6
Limestone, red-brown, concretionary, fossils		6
Clay, yellow, a few fossils poorly preserved		6
Limestone, red-brown, fossils, many casts and moulds	1	
Limestone, glauconitic, shell breccia consisting of casts and moulds		6

	feet	inches
Clay, brown to reddish brown, glauconitic	3	
Limestone, yellow, glauconitic, fossiliferous	1	
Clay, yellow, glauconitic, white lime and phosphate nodules	2	
Clay, gray, light colored, sandy, iron oxide stains, evenly bedded	6	
Queen City sand:		
Sandstone, light brown, massive, no glauconite, half-inch platy, more resistant layers, sand lightly cemented	5	
Sand, loose, no cement, medium grained, over 90 percent silica, iron stained to bright brown color	5	
Total section	28	10

Section exposed one-fourth mile downstream from the road crossing Pinoak Creek, on the Perry Property, Lee County.

Sparta sand:		
Sand, tan to yellowish brown, with 1-inch white sand layers	10	
Weches clay:		
Clay, red to brown, sandy, glauconitic, few fossils preserved	4	
Limestone, red-brown, sandy, glauconitic, fossil casts		6
Clay, yellow to brown, glauconitic, fossiliferous	3	
Limestone, red-brown, concretionary, fossil casts		6
Clay, yellow, glauconitic, fossils in abundance	1	6
Limestone, red, concretionary, fossils		6
Clay, yellow, glauconitic, few fossils	3	
Limestone, red-brown, hard and resistant along the outcrop, few fossils		6
Clay, shaly, yellow, glauconitic, fossils and white phosphate nodules	3	
Limestone, yellow, glauconitic, fossils	1	
Shale, gray, sandy, slightly glauconitic	5	
Shale, sandy, gray and resistant to weathering		6
Total section	37	6

Section of the Weches clay and the Sparta sand, on east bank of creek 1½ miles south-southwest of Lexington, Lee County. Creek locally known as Shaw Branch. (Section discovered by Coleman Renick.)

Sparta sand:		
Sand, yellow, fine grained	1	
Ironstone, hard, brownish red		3
Sand, yellow and gray, 3- to 6-inch layers with some limonite stains	4	
Weches clay:		
Ironstone layer, red to brown, lenticular in occurrence; contains white sand concretions that contain Ledas, Dentalinas, and gastropods		6
Clay, gray to brown, calcareous	1	
Clay, weathers to light tan, red-brown when fresh	2	
Ironstone concretion layer, fossil casts		3
Clay, brown, calcareous		6
Ironstone concretion layer, fossil casts and moulds		3
Clay, brown to tan, calcareous, fossils	1	
Ironstone concretion layer, red-brown, 3 inches thick and 6 inches to 1 foot in diameter, fossiliferous		5
Clay, brown, calcareous, fossiliferous	1	
Ironstone concretion layer, red to red-brown, fossiliferous	1	
Clay, yellowish gray, fossiliferous	1	
Ironstone concretion layer, irregular, 1 foot in diameter, few fossil casts and moulds		6
Clay, yellow, calcareous, fossiliferous	1	
Clay, greenish gray to greenish black, glauconitic, extremely fossiliferous	2	
Total section	17	8

Sparta sand

Stratigraphy.—The Sparta sand outcrops on the surface in Lee County in a belt that varies from 2 to 7 miles in width. It enters the county from the northeast, south of the Weches outcrop along the East Yegua Creek and extends westward in a widening belt until it reaches the S.A. & A.P. Railroad north of Lincoln, where it is over 6 miles in width. From there it runs in a southwesterly direction, passing 1 mile south of Fedor and continuing to the Bastrop County line.

The Sparta consists of fine- to medium-grained tan and white sands, with one or two glauconitic sand layers and numerous limonitic ironstone layers 1 inch in thickness. The sand is locally cross-bedded and contains lignitic clay lentils that are very irregular in occurrence.

Paleontology.—The nonmarine character of the Sparta formation as a whole makes its correlation from place to place rather difficult. The lignitic clay layers contain a few leaf imprints. The glauconitic layers do not contain any large fossils and the microfauna is meager.

Regional geology.—The Sparta forms a belt of moderate relief and is characterized by the post oak timber. The soils are sandy and grade in color from a light red to tan and in depth from 8 to 16 inches. In the region east of the Middle Yegua Creek and north of the Lincoln-old Dime Box road the Sparta has more relief than usual. This is due to the forming of a protective cap of ferruginous conglomerate consolidated and impregnated with hematite and limonite.

Section exposed along the banks of Pinoak Creek, south of the bridge crossing the creek, on the Perry land, Lee County.

	feet	inches
Sparta sand:		
Sand, windblown, yellow, fairly tightly packed	10	
Sand, yellowish white, medium grained	5	
Sand, light gray, clayey	1	
Sand, tan, fine to medium grained	1	
Sand, light gray, clayey	1	
Sand, massive, yellow, no bedding, medium grained	4	
Shale, medium-grained sand disseminated through the layer, fissile in places due to case hardening	3	
Total section	25	

Section of Sparta sand exposed in the bed of Pinoak Creek, where it contacts the eastern boundary of the Perry property, and almost below the bridge across the creek, Lee County. (Sparta sand is faulted down against the Weches clay.)

Top soil sandy, light tan	2	
Sand, white with some iron stained half-inch layers	3	
Sand, white, fine grained	1	
Limonitic sandstone layer		1
Sand, gray to white, clayey in places		6
Sand, white, limonite stains, medium grained	3	
Sandstone, limonitic, thin bedded		2
Clay, gray, limonite stains and thin beds of limonite	3	
Sand, fine grained, tan to brown		6
Total section	13	3

Section of the Sparta sand and the Stone City member of the Crockett exposed along State highway No. 44, 22 miles north of Lincoln, Lee County.

Stone City member:		
Limestone, yellow, hard, concretionary, caps the north-facing scarp made by the resistant clays of the basal Crockett	1	
Clay, yellow and gray, sticky, limonite stains	4	
Clay, yellow, weathers to black soil on surface	4	
Sand, yellow, some glauconite noticed, medium grained, very little clay	2	
Red clay, brick-red, unusually fine bedding	4	
Clay, red and sandy, getting more sandy toward the base	6	
Sparta sand:		
Covered with blown sand	2	
Sand, pale yellow, with one-eighth-inch limonite sandstone layers occurring every 3 or 4 inches	6	
Sand, yellow and iron stained, massively bedded with almost pure pale yellow sand at base of the layer, exposed in small drainage branch	3	
Total section	32	

Crockett Formation

The Crockett as exposed in Lee County may be divided into the same members which Stenzel has used successfully in field work in Leon, Madison, and Brazos counties.[4] These members are, in descending order:

Tabor member (capped by Bryan sand)
Two Mile member
Wheelock member
Stone City member

Stratigraphy.—The outcrop of the Crockett throughout Lee County is from 4 to 7 miles in width and contains the best portion of the cultivated land in the county. The formation enters the county along East Yegua Creek in a belt extending from the Lincoln-Caldwell road on the north to 1 mile south of Dime Box. It extends in a southwesterly direction taking in the region around Lincoln, old Dime Box, Loebau, and Manheim. Elm Creek occurs as a strike stream along the outcrop of the Two Mile member. The lower course of the Middle Yegua Creek cuts across the Crockett outcrop midway between Lincoln and old Dime Box.

Paleontology.—The Crockett formation is considered fossiliferous as a whole. There are lignitic sandy members being found in the upper portion of the section that do not carry any fauna. The Wheelock and Two Mile members with their yellow limestones and gray and yellow clays, carry an abundant fauna. Columnar sections of the Crockett as exposed are given.

Regional geology.—The Crockett outcrop is characterized by brown to black soil, with the Wheelock member having greenish-black clayey soil. The surface is covered with mesquite and post oak. The streams cut rather broad valleys, and exposures of the different members along the banks are not very good.

Distinguishing characteristics of the members.—The members of the Crockett may be recognized by their fossils, lithology, and vegetation. The Stone City member consists of red clays, very sticky, with a glauconite layer near the top. The member forms a northward-facing slope beneath the strike ridge of the Wheelock member. The Stone City is wooded with post oak and black jack where not in cultivation.

[4] Stenzel, H. B., MS.

The Wheelock member forms a broad prairie, with mesquite and post oak covering the uncultivated land; black, clayey soil, and persistent yellow limestones characterize the member. The Old Spanish Trail, "Camino Real," follows the Wheelock member entirely across Burleson and Lee counties.

The Two Mile member is exposed in Elm Creek valley for the length of the stream. East of where Middle Yegua and Elm creeks join, the Two Mile extends to the East Yegua Creek in an outcrop that is just north of Dime Box. Brown to reddish-brown soil and post oaks, live oaks, and pear trees are characteristic of the vegetation found on the outcrop. The fossils are generally smaller than those of the Wheelock member and occur in thin sandy layers or in ironstone concretions.

The Tabor member exposed just south of the Two Mile outcrop makes a gently rolling topography culminating in the resistant capping of the Bryan sand. The soil is tan to brown, sandy, and well drained. The Bryan sand belt may be traced by its red color, sandy red soil, and the cedars that grow on the outcrop due to the calcium carbonate cement.

Section of Crockett formation, Stone City and Wheelock members, exposed in the road ditches 4 miles east of Gloyna school, along the Lincoln-Dime Box road and 1.8 miles west of old Dime Box, Lee County.

	feet	inches
Wheelock member:		
Clay, yellow, fatty and sticky, limonite stains	5	
Limestone, septarian, yellow	1	
Clay, yellow, limonite stains	1	
Stone City member (?):		
Sandstone, poorly cemented, reddish brown, concretionary	1	
Sand, light brown, evenly bedded	3	
Sand, white, with limonite stains, clayey in spots	4	
Clays, evenly bedded, light tan to chocolate colored, lignitic and sandy in texture	6	
Total section	21	

The Lincoln-Dime Box road runs along the strike of the Crockett formation the entire distance from State highway No. 44 to the First Yegua Creek and the Burleson County line. At this locality it seems that the Stone City member has had a change from red clays to red-brown sand and sandstone. It is possible that the change is due to local deltaic producing conditions.

Section of Crockett formation, Wheelock member exposed 100 yards upstream from the bridge on the West Yegua Creek, where the Lincoln-Dime Box road crosses the creek, 0.3 mile east of Lincoln, Lee County.

Pleistocene:		
Red and gray sandy loam	3	
Gravel in clay, cross-bedded, locally cemented to form a gravel conglomerate	1	
Crockett formation, Wheelock member:		
Sand, gray, cross-bedded, limonite stains and streaks, medium grained	2	6
Sand, gray, clayey	1	
Clay, gray, sandy, lignitic	4	
Total section	11	6

Section along State highway No. 20 at Friendship School, 7.1 miles north of Giddings, Lee County. Elevation 534 feet.

Stone City member, Crockett formation:		
Clay, yellow and brown, sandy, weathers to a rich brown soil on the surface	8	
Clay, yellow, sandy, weathers to a yellowish-brown soil on the surface	4	
Limestone, rotten, yellow, nodular, no fossils noted	1	
Clay, yellow, sandy	6	
Total section	19	

Section exposed 0.2 mile upstream from where State highway No. 44 (Giddings-Lexington road) crosses West Yegua Creek, Lee County. Upper Wheelock exposed on the south bank of the creek.

Top soil and gravel	1	
Clay, yellow, fossiliferous, weathers yellow to grayish yellow	6	
Limestone, yellow, concretionary, fossiliferous		6
Limestone, red, sandy, irregular in occurrence		2
Shell layer, very fossiliferous, some large forms but smaller forms predominating		3
Clay, yellow, sticky, evenly bedded, limonite stained, fossiliferous	6	
Clay, blue to black when fresh, weathers a dirty gray, small gypsum crystals, some sand	1	
Total section	13	11

Section in the Two Mile member of the Crockett formation, 0.2 mile south-southeast of the bridge at Orell's Crossing on Elm Creek, Giddings-Manheim road, in ditch to north of road, Lee County.

Top soil, brown, clayey, with some sand	2	1/8
Sand, gray, medium to fine grained, loosely packed		7
Clay, gray, disseminated gypsum crystals and limonite streaks		2
Sand, light tan, small gypsum crystals disseminated through the mass, limonite stains		3
Clay, dark gray, bentonitic and sticky		1
Sand, light gray, fine grained, no limonite stains		2
Clay, light gray, one-eighth-inch limonite streaks, sticky and bentonitic, disseminated gypsum crystals		2
Clay, light gray, with fine sand, limonite streaks		6

	feet	inches
Clay, chocolate-brown, small gypsum crystals, slightly sandy		2
Sand, light gray, fine grained		2
Clay, chocolate-colored, sticky and bentonitic, limonite streaks		2
Sand, fine grained, gray to light gray, faint limonite streaks and stains		2
Sand, clayey, chocolate color, lignitic, limonite streaks		6
Sand, light tan, very minute gypsum crystals, half-inch chocolate-colored bentonite clay layers, limonitic sand streaks	1	3
Clay, chocolate, sandy, limonite stains		3
Sand, light tan, limonitic streaks and stains, fine grained		2
Clay, chocolate, highly limonite stained, one-sixteenth-inch of limonite sand		3
Clay, chocolate, bentonitic, with some light gray sand		6
Sand, light gray, fine grained		2
Clay, chocolate, thin limonite streaks, bentonitic and sticky		6
Sand, light tan, fine grained, with limonite layer at top and bottom		3
Clay, chocolate, lignitic, with some fine sand	1	1
Limonite streak		1/8
Sand, light tan, fine grained, few limonite stains		9
Limonite streak		1/8
Clay, chocolate, bentonitic, evenly bedded, one-eighth-inch limonite streaks near top, none near base	1	7
Clay, dark chocolate color, lignitic		1
Clay, light chocolate color, sticky, limonite streaks in lower half		8
Gypsum, white to colorless		1/4
Clay, light chocolate color, sticky		2
Sand, light tan, limonite stains		3
Clay, light chocolate color, some fine sand, limonite stains		2
Gypsum, white to colorless		1/4
Clay, dove-gray, bentonitic, sticky		8
Sandstone, brown to red, platy, limonite stained, weathers yellow		4
Clay, dove-gray, sticky, limonite streaks and stains	1	
Sand, dove-gray to light tan, fine grained	1	
Clay, dove-gray, limonite stained, sticky	3	
Total section	19	2-7/8

Section of the Two Mile member of the Crockett formation exposed 200 yards upstream from Orell's Crossing on Elm Creek, Giddings-Manheim road, Lee County.

This section occurs immediately below the preceding section that occurs 0.2 mile south-southeast of the bridge.

Concretions, ironstone, soft, red-brown		3
Clay, dove-gray to yellow, sticky, evenly bedded	4	6
Sand, brown, limonite stained, fossiliferous		2
Concretions, ironstone, soft, red-brown, 3 to 6 inches in diameter		1
Clay, sandy, tan to brown, fossiliferous		3
Clay, gray, yellow, sticky, weathers gray and white	1	
Sand, brown, limonite stains, fossiliferous		4
(The next four layers were determined by a test hole.)		
Clay, yellow, sticky, gray spots		3
Clay, gray, sticky, evenly bedded	3	
Clay, gray and yellow, limonite stains	1	
Total section	11	10

Section of the Crockett formation, Two Mile member, seen approximately 1¼ miles downstream from the new cement bridge over Elm Creek, on State highway No. 44, Lee County.

Top soil	3	
Sandstone, brown, yellowish brown, occurs in one-fourth-inch layers, platy		6
Shales, gray to yellow, chocolate-colored near the base, lignitic, fatty	4	
Shales, blue near the bottom and chocolate to purple near the top, sandy	6	
Sandstone, light brown, poorly cemented, fine grained, highly fossiliferous		2
Concretions, red to brownish-red ironstone, slightly fossiliferous		3
Shales, gray to yellowish gray, limonite stains, fatty and lignitic in places		18
Concretions, ironstone, reddish brown, few fossils		3
Shale, light gray, sandy, fossils scarce		4
Sandstone, light brown, poorly cemented, fine grained, highly fossiliferous		2
Shale, gray to brown, sandy, fossiliferous		9
Sandstone, light brown, poorly cemented, fine grained, highly fossiliferous, underlain by a 2-inch layer of iron concretions averaging 4 inches in diameter		6
Shale, dove-gray, fatty	2	
Total section	19	3

Section of the Two Mile member of the Crockett formation exposed on the headwaters of Elm Creek, reached by taking secondary road that leads west from the Giddings-Manheim road, south of Elm Creek, following the road for 1¾ miles and turning to the north. The Two Mile is exposed in all three of the Elm Creek tributaries crossed by the road. Lee County.

	feet	inches
Top soil, gray to brown loam	1	
Two Mile member:		
Clays, gray, weather yellow, sticky when fresh	4	
Ironstone concretion layer, red and red-brown, 6 inches to 1 foot in diameter		6
Clay, dove-gray, weathers yellow and grayish-yellow	2	6
Ironstone concretions, red-brown		6
Sandstone, fossil casts and moulds		3
Clay, brown and sticky, calcareous	3	
Limestone, massive, hard, yellow, very few fossil casts and moulds		6
Limestone, soft, rotten, poorly bedded, fossil casts		3
Clay, yellow, sticky when fresh, few fossils	1	1
Limestone, yellowish brown, weathers brown, resistant and hard, slightly glauconitic, casts and moulds of fossils		6
Clay, yellow, fossils, upper portion contains concretionary yellow limestone, with iron oxide concretions in 2-inch layers	2	
Total section	15	9

Section of Two Mile member, Crockett formation, seen under the bridge crossing Yegua Creek, 0.3 mile north of the town of Leobau, Lee County.

Alluvium and windblown red sandy clay, some gravels	5	
Clay, purple to chocolate-colored, sandy	6	
Sandstone, brown, weathers gray, calcareous		6
Sand, white to pale yellow, limonite stains		6
Clay, chocolate, lignitic	3	
Clay, blue, sandy, occurs in half-inch to one-inch layers	3	
Total section	18	

Section of the upper portion of the Two Mile member of the Crockett formation exposed on the south bank of Elm Creek, approximately 2 miles upstream from the crossing of the old Lincoln-Giddings road, Lee County.

Windblown soil and alluvium consisting of red clay with gravel and sand	6	
Clay, chocolate to dun-colored, greasy, bentonitic, lignitic, with leaf impressions, gypsum layers and veins, and limonite stains	6	
Sandy shale, light gray near base and tan at top, thin limonite layers and gypsum crystals	4	
Clay, more resistant than strata above, blue-black when fresh, dull gray when weathered, lignitic	3	
Total section	19	

Section of basal portion of the Tabor member, Crockett formation, exposed along State highway No. 44, at a point 1.5 miles north of where the old Giddings-Dime Box road crosses the S.A. & A.P. Railroad and enters the new road, Lee County.

Tabor member:		
Sandstone, platy, calcareous, limonite stains		3
Clay, green, weathers to yellowish green, gypsum crystals	12	
Sand, limonite stains, medium grained, evenly bedded	1	
Sand, limonite stains, fine grained, yellow when fresh	2	
Sand, fine grained, gray in color	1	
Two Mile member:		
Clays, yellow and grayish green, fatty and lignitic	15	
Total section	31	3

Section of Two Mile and Tabor members, Crockett formation, in the road ditches and in the railroad cut 1 mile north of Dime Box where the road crosses the railroad over an iron viaduct, Lee County.

Tabor member:		
Top soil, red and sandy	2	
Sandstone, brown to red, rotten on surface		3
Sand, medium grained, 1-inch gray bentonite clay streaks	5	
Sandstone, limonitic, fine grained		3
Sand, light gray to white, limonite stains and streaks in the bedding planes	2	
Sand, pale yellow, fine grained, massive, little bedding seen in exposure	6	
Clay, gray to yellow, iron stained	6	
Two Mile member:		
Clay, chocolate colored, bentonitic	6	
Clay, red, with gray streaks, sandy	5	
Clay, gray to blue, sticky, some iron stains	5	
Total section	34	6

Section of the Bryan sand member, Crockett formation, exposed in the road cut, 2.7 miles west of Serbin, on the Smithville road, near the Lee-Bastrop County line.

	feet	inches
Clay, red and yellow, very sticky	6	
Sandstone, heavy and massively bedded, brown	2	
Sandstone, brown, iron stained, concretionary, locally cross-bedded, well developed joints	2	
Total section	10	

Section of the Bryan sand member, Crockett formation, exposed along the dirt road 1.5 miles from Serbin on the Grassyville road, Lee County.

Sandstone, heavy, red-brown, with ironstone concretions; dip 5° southeast	2
Sandstone, platy, iron stained, alternating with brown and red-brown sand	12
Total section	14

Section of the Tabor member, Crockett formation, exposed along the secondary dirt road running east from B.M. 475 on the Giddings-Grassyville road, Lee County.

Sandstone, brown, massive, resistant to weathering, medium grained, Bryan sand member	3
Clay, red, sticky	2
Clay, red and yellow, with decidedly granular appearance when weathered and dry	6
Clay, streaked, reddish brown, and sandy	35
Clay, yellow and sandy, weathers gray; occurs in the road cut at the B.M. 475	4
Total section	50

Section of Tabor member of the Crockett formation exposed along State highway No. 44, 0.5 mile north of the point where the old road enters the new one, which is at the railroad crossing, approximately 5 miles north of Giddings on the Dime Box road, Lee County.

Top soil, red sandy loam	1	
Clay, red, sticky	1	
Sandstone, platy, brown to red, medium grained, stained with iron oxide, contains some lime	1	6
Clay, red, sticky	1	6
Sandstone, platy, thin layers up to half-inch thick, red-brown, fine grained	1	
Clay, red	1	
Clay, gray and yellow, limonite stains, sticky	7	
Total section	14	

Section of Crockett formation, Tabor member, exposed along the road and in the ditches 2 miles east by south of Dime Box on the road that goes to High Prairie School, Lee County.

Top soil, red clay and gravel	3
Clay, red and sandy	3
Sand, yellow, glauconitic, medium grained	3
Sandstone, massive, red-brown	3
Clay, red and sandy	1
Sandstone, brown, calcareous and slightly glauconitic	1
Clay, red and sticky	5
Sand, yellow, medium grained, cross bedded with limonite streaks	6
Total section	25

Yegua Formation

Stratigraphy.—The Yegua formation outcrops on the surface in Lee County in a band that varies from 3 to 5 miles in width extending from the East Yegua Creek westward through Giddings and to the Fayette and Bastrop county lines. The formation ranges from 350 to 400 feet in thickness. It is lying conformably upon the Bryan sand of the Tabor member of the Crockett formation and is overlain disconformably by the Caddell sands and clays of the Fayette formation.

Paleontology.—The Yegua formation is almost entirely nonmarine in origin as found on the surface in the central and south-central portions of Texas. Lignites, shales with lignitic material, petrified wood, and palm stumps are found the length of the outcrop. Microfossils are found in some of the thin marine clay lentils, which thicken and become dominantly marine down dip.

Bentonitic clay beds and sandy bentonitic clays occur in the median and upper portions of the Yegua but are very lenticular in character. The contact of the Yegua and the overlying Caddell is drawn in the eastern part of the county where the bentonitic and sandy clays of the Yegua contact a lignite bed, overlain by a dull-colored quartzitic sandstone, of the Caddell. In the western and southern parts of the county the contact is placed where the clays of the Yegua contact a red, sandy, glauconitic layer, which is also overlain by a hard resistant white sandstone of Caddell age.

Regional geology.—The Yegua formation occupies a gently rolling belt of more or less sandy, tan-colored soil with numerous large post oak trees along the outcrop. Mesquite is present from place to place, as are prickly pear cactus and a few cedar trees. Streams cut deep gulches in the surface and vertical walls and banks of 20 feet are not uncommon along intermittent streams.

Section of the Yegua sand exposed 4.1 miles southwest of Northrup and northwest of the railroad, in a small creek which later drains into Pinoak Creek, Lee County.

	feet	inches
Sand, clayey, with some gravel from stream terrace	2	
Marl, gray, weathers to grayish white, limonite stains and thin layers	9	
Clay, gray to chocolate, high content of gypsum, weathers a light gray color	3	
Total section	14	

Section of the Yegua sand exposed 2.5 miles southwest of Northrup and northwest of the railroad in small creek which later drains into Pinoak Creek, Lee County.

Top soil, consisting of gray, sandy loam	3	
Gravel and sand, terrace deposits	4	
Yegua sand:		
Clay, sandy, gray to light tan, limonite streaks	3	6
Lignite, poorly bedded, soft, easily eroded		6
Clay, gray and sandy, little iron oxide stain	3	
Total section	14	

Section of Yegua formation exposed in a creek on the W. E. Williams 145-acre tract, J. W. Lightfoot Survey, 369 acres, approximately 1 mile by road east of the town of Giddings, Lee County.

Top soil and gravel	2 to 6
Sand, yellow, limonite stains, clayey in places	6
Sandstone, brown, iron stained, platy when weathered, lenticular	3
Sand, yellow, medium grained, evenly bedded	3
Clay, sandy, light tan	3
Clay, gray, bentonitic, limonite stains and streaks	8
Sand, gray, clayey, few limonite stains, medium grained, evenly bedded	4
Total section	29 to 35

Section of Yegua formation along the road in the ditches 6 miles from Giddings on the High Prairie School road, Lee County.

Top soil, red and sandy	3
Sandstone, brownish-red, made up of concretions	2
Sand, brownish to brownish white, pipestem concretions and limonite layers and streaks, lignitic	3
Clay, bentonitic, chocolate-colored, lignitic	1
Sand, white, lignitic	3
Total section	12

Section along the road in the ditches 1.5 miles east of highway No. 20, 1.6 miles southeast of Giddings, Lee County.

Yegua formation:	
Clay, gray and white, sandy, even bedded	25
Sand, grayish white and clayey, medium grained	5
Sandstone, white, hard, weathers into 1-foot square blocks, iron stained along the joints	1
Clay, white, with limonite stains, sandy in places	1
Clayey sand, grayish white, slightly benonitic in layers from 1 to 4 inches in thickness	8
Total section	40

Section in the Yegua formation along the banks of the north fork of Rabb's Creek, 2.4 miles southwest of Giddings, Lee County.

Surface soil, both washed and windblown, light gray	4
Yegua formation:	
Sand, yellow to white, with thin clay layers, small flat limonite concretions	5
Sand, white to gray, medium to fine grained	2
Clay, chocolate, even bedded	2
Total section	13

Section in the Yegua formation, seen along the banks of a wash draining into Rabb's Creek, on the property of John Schautschick, 2.7 miles southwest of Giddings, on the Serbin road, Lee County.

Windblown sandy soil	3
Yegua formation:	
Clay, sandy, yellow, with 3-inch layer of limonite	5
Clay, sandy, light brown, limonite stains	6
Total section	14

Section of Yegua formation in railroad cut, below overpass of State highway No. 44, at the north city limits of Giddings, Lee County.

Top soil with some gravel	5	
Clay, bentonitic, grayish yellow to white, with sand	3	
Sand, clayey and white color	3	
Sandstone, limonitic, platy		½
Clay, white, bentonitic and sandy, numerous limonite stains	6	
Sand, white to pale yellow, limonite stains	5	
Total section	24	½

Fayette Formation

The Fayette formation as exposed in Lee County occupies the southeastern one-third of the county. The outcrop is from 4 to 6 miles in width. In the eastern portion of the county it occupies all the space between Yegua Creek and Cedar Creek, along the Washington County line. In the southwestern portion it extends from Giddings and Northrup to the Fayette County line. The Fayette has three recognizable members in Lee County which are:

Manning beds
Wellborn sandstone
Caddell clays and sands

A brief description of the members is given in the following paragraphs.

Caddell Clays and Sands

Stratigraphy.—The Caddell occupies a belt varying from 2 to 3½ miles in width and extends across Lee County from the Irwin bridge on the East Yegua Creek to the Fayette County line.

The Caddell as found in Lee County has the following sequence in sedimentation, in descending order:

Sand, white, cross-bedded, medium to coarse grained
Clays, brown to chocolate-colored
Marl, gray to white, sandy and locally very clayey
Marl and sandy marl, light gray to gray
Sandstone, white to tan, locally quartzitic, 4 to 10 feet thick
Glauconitic sand layer

These beds with some local variations may be traced entirely across the county.

Regional geology.—The region occupied by the Caddell is characterized by a rather featureless topography, with streams cutting moderate channels and a scarcity of good exposures. The upper beds are usually best exposed just below the Wellborn sandstone scarp.

The Caddell is determined in well sections down dip from the outcrop by its characteristic foraminifera.

Section along State highway No. 21, from 0.8 mile south of Giddings, on the La Grange road, to 2.2 miles south of Giddings, Lee County.

	feet	inches
Jackson group, Caddell member:		
Clays, sandy, light gray to white, pipestem and flat limonitic concretions, cross-bedded sands locally	30	
Sandstone, white to gray, pipestem concretions of limonite	4	
Sand, light gray to white, clayey in spots, with flat limonite concretions	4	
Sandstone, consists of dark, reddish-brown ironstone concretions	2	
Clay, sandy and red, slightly glauconitic	3	
Glauconite, sandy, cross-bedded and medium grained, small bentonitic clay balls are enclosed	4	
Yegua formation:		
Clay, reddish and gray, mottled	3	
Clay, gray to white, evenly bedded, sandy, with yellowish streaks	6	
Total section	53	

Section of Caddell member in pasture north of the High Prairie-Giddings road at a point 1.3 miles west of High Prairie School, on the Ellen McBride property, Lee County.

Top soil, sandy and windblown	3	
Sandstone, red, limonite concretions in the form of pipestems making up the sandstone mass	1	
Sand, yellowish white, slightly cross-bedded	15	
Bentonitic, greenish gray, sandy	6	
Sand, lignitic, tan, medium grained	2	
Limonite, light yellow, replacing sand		½
Clay, bentonitic, brown to gray; has conchoidal fracture	4	
Total section	31	½

Section of the Jackson exposed along the road cuts and on the north-facing escarpment 3.2 miles east of the Giddings-La Grange road on the dirt road that leads to Green's Creek, Lee County.

Wellborn sandstone member:		
Sandstone, white, medium grained, well cemented, with fucoid-like casts and moulds, massive	2	
Sand, unconsolidated, white and gray		3
Quartzitic sandstone, light tan	1	
Sand, unconsolidated, white and gray, cross-bedded		3
Quartzitic sandstone, light tan	2	
Sand, unconsolidated, with limonite stains	1	
Quartzitic sandstone, tan-colored		6
Sand, unconsolidated, cross-bedded, white		3
Quartzitic sandstone, tan and gray	3	
Talus covered	10	
Caddell member:		
Sand, medium grained, cross-bedded, white and with numerous dark heavy minerals	8	
Clay, yellow, limonitic locally, streaks of limonite, very sticky, exposed in road cut	6	
Total section	55	

The sandstone and the quartzite layers have a 5° dip to the southeast. There is also a well defined joint system, which runs NNE-SSW.

The sandstone and the quartzite both are rock that can be quarried. The top of the ridge to the north of the road as found in the above section is the site of a now abandoned quarry.

Wellborn Sandstone

Stratigraphy.—The Wellborn sandstone occupies a narrow belt in the southern portion of Lee County that extends from the junction of Cedar Creek and the East Yegua Creek at the Burleson County line to the vicinity of Green's Creek Lutheran Church on the Fayette County line. The width of outcrop in most cases is less than 1 mile, but in the vicinity of Globe Hill Negro school and church the outcrop swings to the north for another mile. The Wellborn is well exposed on the south side of Nail's Creek, which runs along the strike of the sandstone for 7 miles.

Paleontology.—The Wellborn contains numerous impressions of leaves, stems, and locally a goodly quantity of petrified wood. The upper sandstone contains the best preserved leaves and stems. Both the upper and lower beds of the sandstone are generally quartzitic, which form prominent escarpments.

Regional geology.—The Wellborn outcrop is distinguished by the deep sand on the back slope and the great number of large post oak trees. The beds are overlain by the Manning ash beds with the contact drawn at the base of a thin but persistent bed of lignite which usually occurs immediately above the uppermost resistant sandstone layer. Beneath the lower sandstone member of the Wellborn is found the medium to coarse-grained, cross-bedded sands of the upper Caddell.

Section of Wellborn sandstone along the road and ditches in the fields along the road from Nail's Creek to the east to Post Oak Negro school, Lee County.

	feet	inches
Top soil, tan to brown windblown sand	2	
Sandstone, white to tan, limonite streaks	1	6
Sandstone, quartzitic, with white and tan streaks	1	
Sand, loose, white to light gray	3	
Sand, white, medium grained, case hardened on surface	2	
Sand, white and yellow, unconsolidated	1	
Sandstone, bentonitic, white to gray		6
Bentonitic clay, yellow to green, weathers white	3	
Clay, brown, bentonitic, leaf impressions	6	
Sand and bentonitic clay, alternating layers 1 inch thick	10	
Clay, bentonitic, gray, hard, weathers white	6	
Sand, with some clay, rather resistant to weathering	6	
Bentonite, gray, with conchoidal fracture, sand forced between the bentonite	3	
Sandstone, white, weathers yellow to brown	1	6
Total section	44	

Section of the Fayette exposed along the road cut, on the property of Richard Mayfield, 7 miles by road north-northeast of Ledbetter, Lee County.

Wellborn sandstone member, Fayette formation:		
Sand, white, medium grained, weathered from quartzite	2	
Quartzite, brown and tan, weathers dark brown to black, lichen covered	6	
Sand, yellow, cross-bedded	4	
Clay, light chocolate to gray	1	
Sand, yellow, cross-bedded	1	
Clay, limonite stained, sandy	1	
Sand, pale green, bentonitic, slightly iron stained	2	
Sand, pale gray to pale yellow, half-inch thick limonite layers	5	
Sand, iron stained, case hardened, limonite concretions	7	
Clay, yellow to brown, bentonitic, black soil when weathered	6	
Covered with talus	2	
Shales, sandy, light tan to white when weathered on outcrop, light brown and chocolate-colored when fresh; thin and evenly bedded	10	
Sandstone, light gray to white, medium grained, exposed at foot of the scarp in the valley of Nail's Creek	3	
Total section	50	

Section of Jackson group in the creeks and road ditches along a secondary road approximately 3.4 miles north of State highway No. 20 at a point 5.3 miles east of Giddings, on the Ledbetter road, Lee County.

Windblown sand and high terrace gravel with red clay	3	
Manning member:		
Sand, bentonitic, white and case hardened, no limonite	3	
Sand, clayey, one-eighth-inch limonite layers, limonite stains, sand is gray when fresh	5	
Bentonite clay, gray and sticky	3	
Bentonite, limonite stained, weathers white to yellow, gray when fresh	2	6
Sandstone, bentonite layers, gray when fresh	1	
Clay, sandy, platy, brown when fresh, more resistant than clay just below	2	

	feet	inches
Clay, bentonitic, light brown, limonite stains	3	
Sandstone, leaf impressions, white with limonite stains		6
Sandstone, leaf impressions, white, some shaly layers	3	
Sandstone, white, evenly bedded, 1-inch layers	3	
Sand, white, evenly bedded, white, 1-inch layers	1	
Sandstone, white, evenly bedded, leaf impressions		6
Sand, white, evenly bedded, limonite stains		3
Sandstone, white, evenly bedded, platy, with leaf impressions, 1-inch layers		1
Sand, white, medium grained, cross-bedded		6
Sandstone, clayey, leaf impressions		4
Sand, white, medium grained, cross-bedded		6
Covered with talus	3	
Sand, white, clayey, limonite stains, leaf impressions	3	
Clay, tan, sandy, few leaf impressions, half-inch pipestem concretions	4	
Sandstone, white, thin bedded, limonite stains, fucoidal masses	2	
Clay, brown, limonite stains, leaf impressions	2	
Lignite, brown and full of plant remains	1	
Wellborn sandstone member:		
Sandstone, brown to white, locally quartzitic, forms scarp facing the northwest	3	
Clays and alternating sand beds, white	5	
Clays, bentonitic, sandy, gray and brown	20	
Covered with talus	5	
Clay, bentonitic, gray to yellow, iron oxide stains	2	
Sandstone, medium grained, lenticular, tan		6
Sand, gray to green, slightly bentonitic	3	
Sandstone, gray, massive, slightly quartzitic, medium to fine grained	2	
Total section	87	8

Manning Beds

Stratigraphy.—The outcrop of the Manning beds occupies the area south of the Wellborn sandstone outcrop in the extreme eastern part of Lee County. The outcrop is from 1 to 1½ miles in width, with the upper portions of the Manning not exposed due to the presence of Cedar Creek and its rather wide valley along the Washington County line. The thickness of the Manning as exposed is less than 100 feet.

The Manning consists of brown to tan, sticky, lignitic, bentonitic clays and sands, with lentils of white volcanic ash that has been redeposited by stream and wave action.

Paleontology.—Plant leaves and stems are the only remains of life found in the Manning beds. Thin lignites are found locally. In the vicinity of Ledbetter and 1 mile south of the town there occurs a 6-foot bed of lignite.

Regional geology.—The Manning occupies a flat to gently rolling topographical area. The drainage is good and the soil sandy, thin and poor. Post oaks, hickory, ash, and cedars are the most common trees found on the outcrop.

Section of Manning member of the Jackson group exposed in the ditches and washes on the Knight Alford property, 2.2 miles east of Post Oak Negro school, Lee County.

Volcanic ash, white, cross-bedded, slightly altered with secondary action of silica and ground water	6	
Ash, grayish-white, extremely cross-bedded, a few one-sixteenth-inch streaks of limonite	2	
Clay, gray to brown, bentonitic	3	
Sand, brown, limonite stains, lignitic	10	
Total section	21	

Section of Manning beds, Jackson group, exposed in a wash 0.5 mile from the house on the farm of Mr. A. H. Becker, approximately 1 mile from Green's Creek Lutheran Church, Lee County.

Sand, white and cross-bedded, medium grained	8	
Sand, ironstone replacing most of the layer, thin-bedded		2
Clay, brown, bentonitic, with lignite masses	1	
Clay, brown, bentonitic, without lignite masses	2	
Clay, white, ashy in texture	1	
Bentonitic clay, sandy and gray to brown	5	
Total section	17	2

Section of Manning beds, Jackson group, exposed along the bank of Cedar Creek, on W. F. Mueller property, along the Lee-Washington County line, Lee County.

Clay, gray to tan, iron oxide stains, bentonitic	2	
Sandstone, tan, some brownish, weathers white, leaf impressions	1	
Shale, brown, fissile, lignitic, with plant remains	2	
Shale, light tan to white, sandy, leaf and stem impressions	1	
Sand, gray to tan, clayey locally, case hardened on the surface	4	
Total section	10	

The section is typical of the Manning beds as found below the Groveton or "quarry sandstone," which is exposed on the south side of Cedar Creek, some one-half to 1 mile from the creek itself.

As exposed in Lee County, the upper portion of the Manning beds contains more plant remains than the lower portion, the lower portion consisting mainly of brown to tan lignitic clays and white, lenticular ash deposits.

Section of the Jackson exposed along Green's Creek and Little Green's Creek, southeast of the Lutheran church, along the Lee-Fayette County line, 5.5 miles south of State highway No. 20 on the Good Hope School and the Green's Creek road, Lee County.

	feet	inches
Manning beds:		
Sand, white, cross-bedded, limonite streaks, locally case hardened, contacting the underlying chocolate clays with steep dipping unconformity; contains petrified logs	40	
Clay, chocolate, even bedded, very little sand, with bentonitic clay lentils from 1 to 6 inches thick, which contain leaf impressions, lignite spots and petrified logs near the top	12	
Sand, clayey, blue and fine grained, lenticular in deposition	2	
Wellborn sandstone member:		
Quartzite, and sandstone with streaks of quartzite, brown and gray, lichen covered, exposed in the bed of Green's Creek	3	
Sandstone, brown and tan, hard, resistant to weathering, with 2- to 6-inch sand layers	4	
Sand, white and clayey, even-bedded, with small amounts of limonite	6	
Total section	62	

Mineral Products

Clays.—The only clay pit in Lee County that is operating is on the property of J. E. Droemer located 1.3 miles southwest of Giddings, on the Serbin road. The pit is located along the Yegua sand outcrop and the clay in the pit is gray and sandy, with numerous limonitic concretions.

Mr. Droemer built his kiln in 1931. The press used is operated by a gasoline motor. The kiln has a capacity of 38,000 bricks, and two kilns are run each year, which takes care of the local demand. The bricks produced in the plant are an excellent grade of No. 2 red brick.

Clay is found on the Mitschke property, which may be reached by going 3½ miles south of Giddings on the Northrup road and then 1½ miles off the road, to the southeast. There is 1½ acres of light tan clay, bentonitic, sticky, and evenly bedded. The clay is from 8 to 14 feet in thickness and covered by 1 to 2 feet of soil and gravel.

Small lentils of bentonitic clay occur entirely across the county in the Fayette formation, Manning beds. The clay is tan and gray, sticky, swells and disintegrates in water.

Peat.—Peat occurs in at least two localities in Lee County. Seven miles west of Lexington, on the Enders property, along Spring Branch, to the north of the road, there occurs a deposit of some extent and thickness. The area in which it occurs is pasture land and the Carrizo sand is exposed in the road cuts. The peat is dark brown to black, spongy, and is known to be at least 6 feet thick in some places. The area covered is over 2 acres.

There is another deposit of peat on the Alf Perry property, south of the junction of Brushy Creek with East Yegua Creek. The area covered is approximately 300 acres; in some portions the peat is of a better grade than others. The area is fenced so that cattle may not be caught in the bog. The thickness of the peat was not determined with a 10 foot test hole. For additional information on peat see Bureau of Economic Geology Mineral Resource Circular No. 16, Peat Deposits in Texas, by F. B. Plummer.

Lignite and brown coal.—Lignite occurs in the county in both the Yegua formation and in the Manning beds of the Fayette formation. It is of poor grade and the seams are irregular in purity and thickness. The average thickness of the lignite in the Yegua is 6 inches, and it occurs near the top of the formation. It is well exposed in the road cut 1 mile west of Irwin bridge at the edge of the East Yegua Creek bottom.

The lignite found in the Manning beds is likewise irregular in its occurrence. In the vicinity of Michael's Hill on the Johnson league, 4 miles east of Post Oak Negro School, lignite occurs immediately above the uppermost hard layer of the Wellborn sandstone. It is covered by the light-colored lignitic, sandy clays of the basal Manning beds.

Higher in the section, 1 mile south of Ledbetter, lignite was mined on the W. F. Sanders property from 1905 to 1908. The shafts were 93 feet in depth and tunnels ran out from the shafts. Timbering was necessary, since there is no stiff clay for roofing. A Mr. Calloway operated the mines and shipped the lignite by railroad.

On the Will Rowell property, across State highway No. 20 from the old lignite mines, a 6 foot seam of lignite was penetrated in a water well at the depth of 90 feet.

Brown coal in Lee County occurs in the Rockdale formation and can be traced entirely across the county. Mining operations have been limited to two mines at Hicks, on the S.A. & A.P. Railroad, 4 miles north of Tanglewood. Here the coal averaged from 2 to 4 feet in thickness, with fine-grained sand and platy, thin-bedded sandstone above and below the coal.

Two shafts were put down below 50 feet and the dumps may be seen along the road and railroad today. The mines had to be timbered, due to the sand above and below the coal. They were last worked in 1917.

Brown coal is exposed at the foot of the Yegua Knobs near the improved spring, where it is associated with the upper sands of the Rockdale formation. Petrified wood is abundant in the outcrop.

Building Stone

There are four types of building stone found in Lee County. Only one of these types has been used on a large scale for commercial purposes.

Quartzite.—There occurs in the southern part of the county, in the Fayette formation, a brown quartzite of variable thickness. It is found associated with sandstones and unconsolidated sands, but there are numerous exposures of the quartzite

of more than 3 feet in thickness. Abandoned quarries are to be seen on the Fritz Sump place, the Wolfe place, and the Stork place, between Good Hope School and Green's Creek Lutheran Church. The rock from these quarries was used in the construction of the Galveston sea wall soon after 1900. There is another quarry located 3.2 miles east of highway No. 44 (Giddings-La Grange road) along a secondary road that leads to Green's Creek community. The quarry is 0.5 mile north of this secondary road. The rock from all of these quarries has been used for building foundations, chimneys, and outhouses.

Conglomerate.—Conglomerate is found in the vicinity of Lincoln and 1 mile north of the village, in the bottoms of West Yegua Creek. The rock is from 1 to 2 feet in thickness and consists of quartz and limestone pebbles and gravels cemented with sand and calcium carbonate. It is being used locally for rubble rock and road wash prevention. Some buildings in the Lincoln community have the rock as foundations. The approaches to the new bridges on highway No. 44 from Giddings to Lexington are filled in with this conglomerate. The rock is of late Pliocene or early Pleistocene age.

Limestones.—The Stone City and the Little Brazos limestones occur through the middle part of the county. The limestones are hard, yellow, and sometimes concretionary, 1 to 2 feet in thickness, and are well exposed along the strike of the Stone City and the Wheelock members of the Crockett formation. They may be seen from the First Yegua Creek, on the Lee-Burleson County line, along the Dime Box-Lincoln road and along the Lincoln-Fedor road. These limestones have been used for building foundations and bridge approaches in the northern and central portions of the county.

Sandstone.—The Bryan sandstone, occurring at the top of the Crockett formation, is hard, brown, sometimes concretionary, and from 1 to 3 feet thick. It is persistent along the outcrop across the county. There are good exposures on the Serbin-Grassyville and Grassyville-Giddings road. It is used mainly for road work and foundations.

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