GEORGIA
STATE DIVISION OF CONSERVATION

DEPARTMENT OF MINES, MINING AND GEOLOGY
GARLAND PEYTON, Director

THE GEOLOGICAL SURVEY
Bulletin Number 74

LOGS OF SELECTED WELLS IN THE COASTAL PLAINS OF GEORGIA

by

Esther R. and Paul L. Applin

ATLANTA
1964

LETTER OF TRANSMITTAL

Department of Mines, Mining and Geology

May 4, 1964

His Excellency, Carl E. Sanders
Governor of Georgia and
Commissioner Ex-Officio
State Division of Conservation
Atlanta, Georgia

Dear Governor Sanders:

I have the honor to submit herewith Georgia Geological Survey Bulletin No. 74, "Logs of Selected Wells in the Coastal Plain of Georgia" by Esther R. and Paul L. Applin, formerly Geologists of the United States Geological Survey.

This report contains valuable data upon the geology and water-bearing formations beneath the Coastal Plain of Georgia. These studies of cuttings and cores of 31 selected wells will be of much use in supplying ground-water information needed by cities, industries, well drillers, mine plants and farmers. The geologic information will be used by geologists who are engaged in the search for oil and gas in Georgia.

I believe that the publication of this report is another of the valuable contributions to the search for water and oil that we have been privileged to make.

Very respectfully yours,

Garland Peyton

Garland Peyton
Director

LOGS OF SELECTED WELLS IN THE COASTAL PLAIN OF GEORGIA

By Esther R. Applin

Introduction

This report contains lithologic and paleontologic descriptions of cuttings and cores from 31 selected wells in the Coastal Plain of Georgia. These descriptive logs are based on microscopic studies made periodically from 1937 to 1962. Prior to my employment with the U.S. Geological Survey, the studies were on a commercial basis, but thereafter they were part of the regional investigations of the U.S. Geological Survey relating to stratigraphy and structure of Mesozoic rocks in the subsurface of the southeastern Gulf and Atlantic Coastal Plain. The logs of 21 oil tests deal chiefly with Cretaceous and older sedimentary rocks, and only incidentally with overlying Tertiary rocks; the other logs describe the Eocene and younger rocks penetrated in relatively shallow water wells. Microscopic study of the samples of the Cretaceous rocks provided a part of the basic data for reports by Paul L. Applin and Esther R. Applin that have been published by the U.S. Geological Survey. After retirement from the Federal Survey, I was requested by the Director of the Georgia Geological Survey to prepare logs of significent wells for publication. The original descriptions of the cuttings and cores from the wells were, in many instances, abbreviated notes, and the work of putting them into readable form fell to my husband, Paul L. Applin.

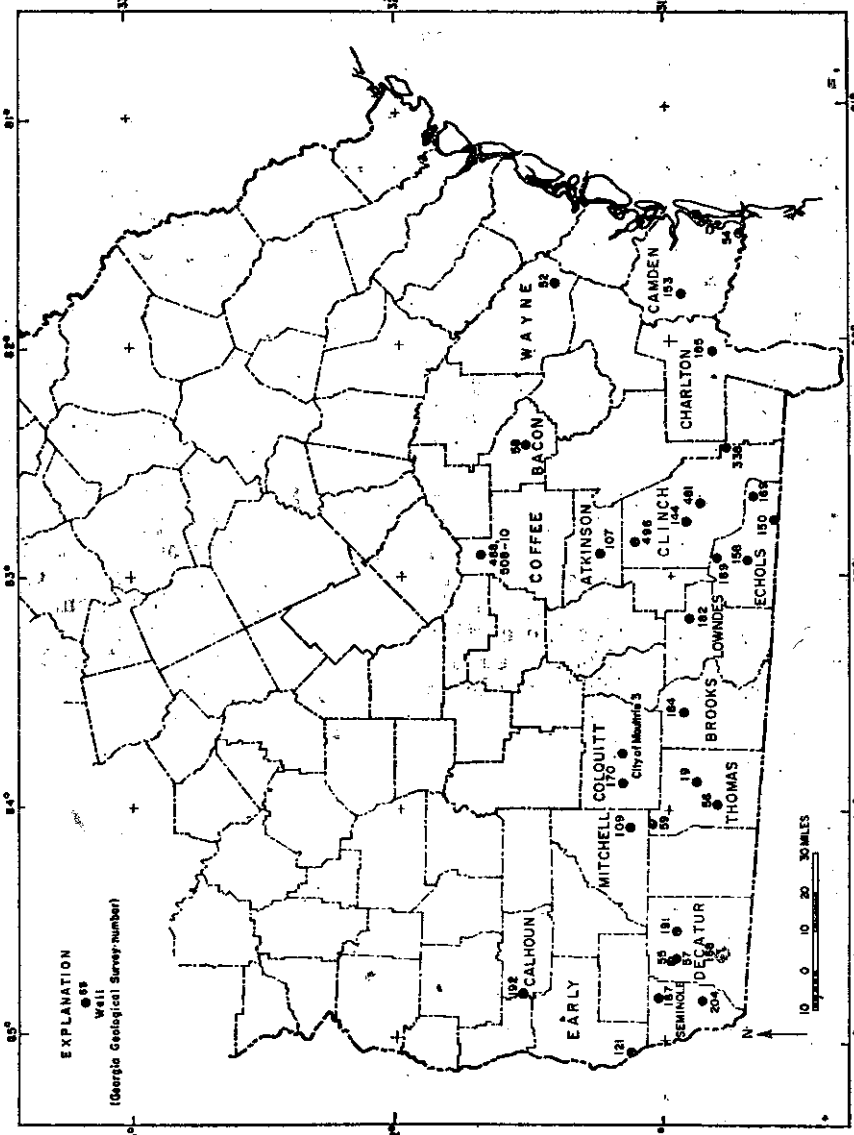

FIGURE 1. *Well log locations of South Georgia described in this Bulletin.*

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ATKINSON COUNTY

Operator: Sun Oil Company
Landowner: Doster-Ladson Well 1

GGS. No. 107
Elevation: 222 ft. (derrick floor)

Location: Land District 7, Land Lot 71 1650 ft. north and 660 ft. east of southwest corner of Land Lot 71.

Total depth: 4296 ft.
Completed: Jan. 30, 1945

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Miocene undifferentiated	90 (1st sample)	180
Oligocene		170
upper, Suwannee Limestone	270	120
middle and lower, Vicksburg Group	390	50
Eocene		1340
upper, Ocala Limestone, upper member	440	130
lower member	570	210
middle, upper middle, Tallahassee Limestone(?)	780	90
upper middle (?) or lower middle (?)	870	90
lower middle, Lake City Limestone	960	500
lower, beds of Wilcox age	1460	320
Paleocene		24
Clayton Limestone	1780	24
Cretaceous		
Gulf		2066
Beds of Navarro age	1804	643
Beds of Taylor age	2447	351
Beds of Austin age	2798	337
Atkinson Formation, upper member	3135	588
lower member	3723	147
Comanche undifferentiated	3870	350
Pre-Cretaceous		
Igneous rocks	4220	to total depth 76

Lithologic and paleontologic description of cores and cuttings. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0- 90	No samples

Tertiary

Miocene Series undifferentiated

90- 100	Sandstone, quartz; composed of moderately fine to coarse, rounded grains; contains nodules of white sandy clay.
100- 270	Samples of the Miocene rocks were not studied in detail, but consist, mainly, of sandstones and sandy limestones containing phosphatic material.

Oligocene Series

Upper Oligocene. Suwannee Limestone.

270- 280	Chalk, white, non-sandy.
280- 290	Limestone, white, moderately hard, porous; composed mainly, of masses of poorly preserved molds of microfossils, including specimens of *Coskinolina floridana*.
290- 300	Limestone, like sample at 280-290 ft., but more dense; specimens of *Coskinolina floridana* common.
300- 310	Like sample at 290-300 ft; contains specimens of *Quinqueloculina leonensis*.
310- 380	Limestone, white, chalky, calcitic, microfossiliferous, irregularly porous; contains many specimens of *Coskinolina floridana* and other species of Foraminifera common in the Suwannee limestone.
380- 390	Limestone, cream; composed of rolled, usually well-rounded molds of microfossils and fragments of fossiliferous limestone; *Coskinolina floridana* common.

Middle and Lower Oligocene. Vicksburg Group.

390- 400	Limestone, cream and white, hard, nodular, irregularly porous; contains abundant traces of poorly preserved microfossils and fragments of molds of macrofossils. Many calcitized fragments of echinoids are present. Sample contains numerous fragments of white chert.
400-410	Like sample at 390-400 feet. Sample contains molds of *Operculinoides*, sp.
410- 420	Like sample at 400-410 ft., but fossil material is better preserved. Species of Foraminifera identified are: worn specimens *Operculinoides* sp., *Lepidocyclina mantelli*, and *Gypsina globula*. Specimens of *Coskinolina floridana* are present, but are possibly not indigenous.
420- 430	Like sample at 410-420 ft; contains poorly preserved specimens of other species of *Lepidocyclina* common to the Vicksburg of this area.
430- 440	No sample

Depth (feet)	Description
	Eocene Series
	Upper Eocene. Ocala Limestone. Upper Member.
440- 470	Lithology and fauna of three 10-foot samples are, in general, like sample at 420-430 ft. but show the introduction of fragments of a more chalky, highly fossiliferous limestone, and worn specimens of *Operculinoides floridana* and *Asterocyclina georgiana;* at 460-470 ft. specimens of *Pseudophragmina citrensis* are present.
470- 570	Coquina, light-cream; composed of worn and fragmentary molds of microfossils, mainly *Operculinoides ocalanus*, several varieties of *Lepidocyclina ocalana, Asterocyclina georgiana,* and other Ocala species. Highest occurrence of *Heterostegina ocalana* is in the sample at 510-520 ft.
	Upper Eocene. Ocala Limestone. Lower Member.
570- 580	Lithology and fauna are, in general, like the samples at 470-570 ft., but this sample contains specimens of *Amphistegina pinarensis cosdeni,* marking the top of the lower member of the Ocala Limestone.
580- 600	Limestone, cream, dolomitic, cryptocrystalline. No identifiable indigenous fossils were observed, although traces of fossil molds occur in the limestone; the sample contains fossils that are evidently caving from higher levels.
600- 660	Samples in this interval are, in general, about 50 percent cream, porous, pitted, cryptocrystalline to very finely granular limestone, and 50 percent fine to moderately coarse grained quartz sand which may be caving.
660- 670	Limestone, white and light-cream, unfossiliferous, in part chalky and in part dolomitic; about 25 percent of the sample is composed of fine to coarse, rounded grains of quartz sand.
670- 720	Samples in this interval are like the sample at 660-670 ft., but contain seemingly indigenous specimens of *Lepidocyclina* sp., and chalky specimens of *Amphistegina pinarensis cosdeni.*
722- 729	Core 1. Recovery 3 ft. Limestone, white to cream, porous, irregularly chalky, and finely dolomitic; contains many sections of small miliolids and traces of impressions of other microfossils.
720- 780	Samples in this interval are composed of limestone like the core at 722-729 ft. and contain specimens of *Amphistegina pinarensis cosdeni* and poorly preserved specimens of *Lepidocyclina* sp.
	Middle Eocene. Upper Middle Eocene.
	Tallahassee Limestone (?) equivalent.
780- 810	Samples in this interval are composed of limestone like the samples at 720-780 ft. and contain, in addition, fragments of white,

Depth (feet)	Description
	gray-spotted chalky limestone composed mainly of masses of chalky molds of Foraminifera and fragments of molds of macrofossils. Fragments and poorly preserved molds of at least two species of *Lepidocyclina*, worn molds of specimens of *Operculinoides*, sp., and specimens of *Amphistegina pinarensis cosdeni* are present in the gray-spotted limestone.
810- 820	Limestone, white, gray-spotted fossiliferous, like samples at 780-810 ft., but the fossil material consists of worn and rolled molds. Fossils present are sections of small miliolids, specimens of *Lepidocyclina* cf. *L. pustulosa*, *Operculinoides* sp., *Valvulina* sp., and a few specimens of *Amphistegina pinarensis cosdeni*.
820- 830	Limestone, white, gray-spotted, porous, in part chalky and in part dolomitic; composed of a mass of worn and fragmental fossil material, in which the fossils are mostly too poorly preserved for identification. However, the fauna seems to be similar to that in the sample at 810-820 ft.
830- 840	Limestone, like the sample at 820-830 ft., but more indurated and the fossil material is less well preserved.
840- 850	Limestone, gray-spotted, chalky and dolomitic; contains bryozoan fragments and vague traces of other fossils.
843- 858	Core 2. Recovery 2 ft. Limestone, white, gray-spotted, porous; composed of a mass of molds of small miliolids and fragments of other microfossils.
850- 870	Two 10-foot samples composed of material like the core at 843-858 ft.
	Middle Eocene. Upper Middle(?) or Lower Middle(?) Eocene.
870- 880	Limestone, chalky, 50 percent of sample; similar to samples at 850-870 ft., but only slightly gray-spotted. Fine to coarse rounded grains of clear quartz sand compose 50 percent of sample.
880- 890	Limestone, cream, in part dolomitic, highly fossiliferous; contains specimens of *Fabianina cubensis*, *Operculinoides*, sp., and several species of *Lepidocyclina;* about 25 percent of sample is sand like that in sample at 870-880 ft.
890- 900	Limestone, white and buff, highly dolomitic, somewhat chalky, 50 percent of sample. The dolomite is finely granular. Sand is 50 percent of the sample.
900- 910	Limestone, like sample at 890-900 ft., is about 75 percent of sample; sand is 25 percent of sample.
910- 930	Limestone, buff, finely granular, dolomitic; contains scattered chalky areas and selenite. Fossils present are chalky molds and fragments of *Lepidocyclina* sp., *Operculinoides* sp., and algal nodules.

Depth (feet)	Description
930- 960	Dolomite, light-buff, finely granular; contains small chalky areas, specimens of two species of *Lepidocyclina*, and irregular-shaped chalky nodules that are probably of algal origin.
	Middle Eocene. Lower Middle Eocene.
	Lake City Limestone.
960-1000	Samples in this interval are similar to those at 930-960 ft., but are somewhat glauconitic and contain large inclusions of selenite. Sample at 970-980 ft. contains specimens of *Discocyclina (Asterocyclina) monticellensis* and numerous fragments of several species of bryozoa.
1000-1060	Limestone, chalky, somewhat dolomitic; gypsum is common; glauconite is rare. Samples contain specimens of *Discocyclina (Asterocyclina) monticellensis, Lepidocyclina* sp., and numerous fragments of bryozoa. Sample at 1020-1030 ft. contains specimens of *Amphistegina lopeztrigoi* var.
1060-1100	Limestone, buff, irregularly chalky, finely dolomitic, somewhat glauconitic; contains abundant fragments of bryozoa, two species of echinoids, numerous specimens of several species of *Lepidocyclina* including numerous specimens of *L. (Polylepidina) antillea*, and a few fragments of *Discocyclina* sp.
1100-1140	Limestone, white, finely fragmental, slightly glauconitic, fossiliferous; contains abundant fragments of bryozoa, many specimens of *Discocyclina (Asterocyclina) monticellensis* and *Operculinoides* sp., and poorly preserved molds of smaller Foraminifera. Samples also contains fragments of buff, granular crystalline dolomite (which may be caving), and fragments of light-gray chert.
1140-1160	Like the samples at 1100-1140 ft., but *Operculinoides* sp. is the dominant foraminiferal species, and most of the remaining fossil material is very finely fragmental; specimens of *Discocyclina* sp. are also present.
1160-1180	Limestone, white, chalky, slightly glauconitic, containing very finely fragmented fossil material. Specimens of *Operculinoides* sp., *Cibicides* sp., and a few other species of smaller Foraminifera are present.
1180-1240	Samples in this interval are lithologically and faunally similar to the samples at 1160-1180 ft. The samples contain cavings from higher levels and about 25 percent fine to coarse-grained clear quartz sand that may also be caving.
1240-1250	Limestone, light-cream, chalky, slightly dolomitic, finely fragmented. Fossil material consists of a few specimens of small Foraminifera, *Discocyclina* sp., *Operculinoides (?)* sp., and other fossils obviously caving from higher levels. Sample contains about 25 percent fine to coarse-grained quartz sand.

Depth (feet)	Description
1250-1290	Samples in this interval are similar to the sample at 1240-1250 ft., and samples from 1270-1290 ft. contain numerous fragments of light-gray chert.
1290-1300	Dolomite, buff, slightly chalky, finely granular, porous; many fragments of brownish-gray chert; a few fossils that probably are not indigenous.
1300-1350	Dolomite, like sample at 1290-1300 ft., but somewhat gray-spotted and slightly porous.
1350-1360	Limestone, soft, chalky; contains a little fine-grained sand, many fragments of *Lepidocyclina (?)* sp., some fragments of *Camerina* sp., and many specimens of *Lepidocyclina (Polylepidina) antillea.*
1360-1390	Limestone, chalky and dolomitic, somewhat glauconitic, slightly sandy (fine-grained sand). Brownish-gray chert is present but may be caving. Fauna is like sample at 1350-1360 ft.
1390-1430	Limestone, chalky, fossiliferous, and many fragments of grayish-brown finely granular, crystalline dolomite. The samples contain fragments of brownish-gray chert-like the samples at 1360-1390 ft.
1430-1460	Limestone, soft, chalky, finely fragmental, and fragments of dolomitic limestone like the samples at 1360-1390 ft; abundant specimens of *Lepidocyclina (Polylepidina) antillea.*
	Lower Eocene. Beds of Wilcox age.
1460-1500	Samples in this interval are not satisfactory for precise description; they are seemingly like the samples at 1430-1460 ft., but are highly glauconitic.
1500-1510	Core 3. Recovery ½ ft. Clay, light brownish to greenish-gray, chalky, glauconitic; contains numerous specimens of *Asterigerina* sp. that seem to be indigenous.
1510-1520	Limestone, white, chalky, microfossiliferous. Sample is lithologically and faunally like samples from higher levels, and may not be representative of the rocks penetrated at this depth.
1520-1530	Limestone, moderately, hard, chalky, fossiliferous, glauconitic; contains many bryozoan fragments, and fragments of a number of species of *Lepidocyclina* that are probably caving, because they are similar to some observed at higher levels. Many fragments of pink-stained, glauconitic limestone. The sample is probably from the Salt Mountain Limestone, the top of which is at 1483 ft. on the electric log of the well.
1530-1540	Limestone, pink-stained, hard, somewhat glauconitic; contains many fragments of bryozoa.
1540-1550	Limestone, white, slightly pink-stained, hard, somewhat glauconitic; lithologically and faunally like the sample at 1530-1540 ft.

Depth (feet)	Description
1550-1560	Limestone, like the sample at 1540-1550 ft., but this sample contains fragments of a coarsely sandy limestone and a few fragments of *Pseudophragmina (?)*.
1560-1610	Limestone, white, dense, somewhat glauconitic; contains scattered coarse grains of sand and a few poorly preserved specimens of *Discocyclina?* sp. The samples at 1590-1610 ft. contain worn and broken fragments of *Ostrea* sp., and unconsolidated coarse-grained quartz sand.
1610-1620	Limestone, soft, chalky, and a little coarse-grained sand.
1620-?	Limestone, cream, dense, showing many sections of fragmental fossil material.
1640-1650	Limestone, cream, gray-spotted, hard, dense, showing abundant sections of fragmental fossil material.
1650-1680	Sandstone, white, very fine and even-grained, somewhat glauconitic, micaceous, irregularly chalky; contains traces of fossil fragments.
1680-1750	Sandstone, very fine grained, glauconitic, micaceous, calcareous; contains many fragments of fossil bivalves and some bryozoan fragments.
1750-1770	Sand, unconsolidated, very fine and even-grained, that seemingly, was deposited in a matrix of soft gray calcareous clay.
1770-1780	Sample unwashed but seems to be like the samples at 1750-1770; contains cavings from higher levels.
	Paleocene(?) Series
	Clayton Limestone(?)
1780-1790	Limestone, white, hard, dense, glauconitic; contains poorly preserved fragments of fossils, including bryozoa. Paleontologic data are lacking on which to base the Paleocene age of the limestone. On the basis of electric log characteristics, the top of the limestone is at 1777 ft.
1790-1800	Sandstone, very fine and even-grained, somewhat micaceous, slightly glauconitic, calcareous; contains fragments of macrofossils. Sample also contains fragments of limestone like that in sample at 1780-1790 ft.
1800-1810	Limestone, cream, hard, irregularly sandy; contains many fragments of poorly preserved macrofossils and traces of specimens of Foraminifera.
	Cretaceous
	Gulf Series
	Beds of Navarro age
1810-1820	Sample seems to be mainly cavings but contains specimens of species of Foraminifera that are characteristic of the beds of

Depth (feet)	Description
	Navarro age. The top of the beds of Navarro age is placed at 1804 ft. on the basis of electric log characteristics.
1820-1830	Limestone and calcareous sandstone like samples at 1780-1810 ft.
1830-1850	Clay, brownish-gray, finely sandy, somewhat carbonaceous and micaceous.
1850-1870	Sandstone, grayish-brown, very fine grained, argillacrous, micaceous, somewhat carbonaceous, and fragments of dark brownish-gray soft flaky clay. Sample at 1860-1870 ft. contains specimens of *Robulus navarroensis*.
1870-1890	Clay, gray, soft, flaky, micaceous, and argillaceous sandstone. Chalky fragments of fossils at 1880-1890 ft.
1890-2010	Clay, gray, soft, micaceous, somewhat carbonaceous, and dark brownish-gray, very fine grained, argillaceous, micaceous, carbonaceous sandstone. A few chalky fragments in the clay seem to be remnants of fossil shells. Sample contains small nodular fragments of gray limestone.
2010-2020	Core 4. Recovery 10 ft. Top 5 ft. sandstone, gray, very fine and even-grained, argillaceous, micaceous; contains specimens of *Robulus navarroensis*, *Globotruncana cretacea*, and a few other specimens of species characteristic of the Navarro. Bottom 5 ft. clay, gray, micaceous; contains much fine-grained sand.
2020-2030	Sandstone, gray, very fine grained, argillaceous, micaceous, and fragments of light-gray, moderately hard, very fine grained, calcareous, micaceous sandstone. Specimens of *Robulus navarroensis* are fairly common in the sample.
2030-2040	Sandstone, light-gray, soft, very fine and even grained, chalky.
2040-2050	Sandstone, dark-gray, soft, fine-grained, argillaceous, micaceous.
2045-2055	Core 5. Recovery 10 ft. Top 5 ft. Sandstone, light-gray, soft, very fine grained, micaceous, calcareous. Bottom 5 ft. No change.
2050-2060	Sandstone, gray, soft, very fine grained, argillaceous, micaceous; contains a few specimens of foraminiferal species indicative of the Navarro age of the beds.
2060-2100	Sandstone, like the sample at 2050-2060 ft. Some of the samples in this interval show fragments of white, moderately hard, very fine grained, calcareous sandstone that seems to occur as lenses in the gray, soft argillaceous sandstone.
2100-2110	Core 6. Recovery 10 ft. Top 5 ft. clay, gray, soft, sandy (fine-grained sand), micaceous. Bottom 5 ft. sandstone, gray, moderately soft, very fine grained, micaceous, calcareous, finely carbonaceous.
2100-2150	Clay and sandstone as described in core at 2100-2110 ft. The samples contain specimens of *Robulus navarroensis*, and a

Depth (feet)	Description
	few other foraminiferal species characteristic of the beds of Navarro age.
2150-2160	Core 7. Recovery 10 ft. Top and bottom. Clay, gray, moderately hard, highly sandy (very fine grained sand), micaceous; contains small fragments of carbonaceous material.
2150-2200	Sandstone, gray, soft, very fine grained, argillaceous, micaceous, somewhat finely carbonaceous; contains specimens of *Globigerina cretacea* and a few other species of Foraminifera characteristic of beds of Late Cretaceous age.
2200-2210	Core 8. Recovery 5 ft. No sample.
2200-2300	Samples in this interval were unwashed but seem to consist of gray, highly sandy, micaceous clay; fossils, if present, were not visible.
2310-2317	Core 9. Recovery 7 ft. Clay, gray, sandy (fine-grained sand), micaceous; contains small fragments of carbonaceous material.
2317-2327	Core 10. Recovery 0.
2327-2337	Core 11. Recovery 10 ft. Top, sandstone, gray, moderately soft, very fine grained, argillaceous, micaceous. Middle and bottom. Like the top part of the core.
2337-2347	Core 12. Recovery 10 ft. Like core 11, at 2327-2337 ft.
2347-2357	Core 13. Recovery 10 ft. Top 3 ft. like core 12 at 2337-2347 ft. A few fragments of *Robulus* sp. in the core. Middle 4 ft. and bottom 3 ft. No change.
2357-2367	Core 14. Recovery 6 ft. Top 2 ft. and bottom 4 ft. Like core 13 at 2347-2357 ft.
2367-2377	Core 15. Recovery 10 ft. Top. Clay, gray, moderately hard, sandy (fine-grained sand), micaceous, somewhat carbonaceous. Bottom. Clay, like top part of core, containing inclusions of light-gray, calcareous, somewhat glauconitic sandstone.
2377-2387	Core 16. Recovery 0.
2387-2397	Core 17. Recovery 0.
2397-2407	Core 18. Recovery 3 ft. Clay, gray, sandy (fine-grained sand), micaceous. Specimens of Ostracodes and Foraminifera are fairly common in the sample, but no diagnostic species were seen.
2400-2410	Clay, gray, highly sandy, micaceous. Specimens of Foraminifera identified are: *Globotruncana arca, Globotruncana fornicata, Dorothia bulletta, Robulus* spp. *Anomalina pinguis, Clavulinoides trilaterus, Bulimina aspera, Pseudotextularia elegans.* The sample contains many ostracodes. The fauna is Navarro in character.

Depth (feet)	Description
2407-2417	Core 19. Recovery 4 ft. Clay, gray, very highly sandy (very fine grained sand), micaceous, calcareous, somewhat finely carbonaceous.
2410-2420	Clay, gray, sandy, micaceous; contains numerous specimens of Foraminifera and ostracodes. The fauna is Navarro in character.
2417-2427	Core 20. Recovery 3 ft. Like core 19, at 2407-2417 ft.
2420-2430	Like sample at 2410-2420 ft.
2427-2437	Core 21. Recovery 0.
2430-2440	Like sample at 2410-2420 ft.
2437-2447	Core 22. Recovery ½ ft. No sample.
2440-2450	Like sample at 2410-2420 ft.
	Beds of Taylor age.
2447-2457	Core 23. Recovery 10 ft. Marl, light-gray, finely micaceous. Foraminiferal fauna includes specimens of *Planulina dumblei, Bolivina cretosa, Planulina spissocostata, Bolivinoides decorata, Dorothia grabella.*
2450-2460	Clay, light-gray, soft, sandy, micaceous, calcareous. Foraminiferal fauna is like core 23 at 2447-2457 ft. and contains, in addition, many specimens of *Clavulinoides* n. sp.
2457-2467	Core 24. Recovery 0.
2460-2470	Like sample at 2450-2460 ft. Specimens of *Dorothia* cf. *D. stephensoni* are added to the fauna.
2467-2477	Core 25. Recovery 4 ft. Clay, light-gray, highly sandy (very fine grained sand), micaceous, glauconitic (fine grains), calcareous.
2470-2480	Clay, gray, soft, highly sandy (very fine grained sand), micaceous, calcareous. Fauna like that described in preceding samples from beds of Taylor age.
2477-2487	Core 26. Recovery 0.
2480-2490	Like sample at 2470-2480 ft. Fragments of *Inoceramus* present.
2487-2497	Core 27. Recovery 1 ft. Clay, moderately hard, highly sandy (extremely fine grained sand), micaceous, calcareous.
2490-2500	Lithology and fauna like that described in preceding samples from beds of Taylor age, with the addition to the fauna of many specimens of *Stensiöina americana* and *Planulina dumblei.*
2497-2507	Core 28. Recovery 10 ft. Top. Like core 27 at 2787-2797 ft; *Inoceramus* fragments abundant. Bottom. No change.

Depth (feet)	Description
2500-2510	Like sample at 2490-2500 ft; contains a few *Inoceramus* fragments.
2507-2517	Core 29. Recovery 10 ft. Top. Clay, gray, highly sandy (extremely fine grained sand), micaceous, calcareous, contains small shreds of carbonaceous material. Bottom. No change.
2510-2520	Like sample at 2500-2510 ft.
2517-2527	Core 30. Recovery 10 ft. Sandstone, gray, very fine grained, argillaceous, micaceous, calcareous.
2520-2530	Lithology and fauna like that described in preceding cutting samples from beds of Taylor age; some fragments of *Inoceramus* present.
2527-2537	Core 31. Recovery 10 ft. Clay, gray, highly sandy (extremely fine grained sand), micaceous, calcareous.
2530-2540	Sandstone, gray, argillaceous, micaceous, calcareous. Microfauna is the same as in the preceding 100 feet of samples.
2537-2547	Core 32. Recovery 5 ft. Top. Clay, gray, highly sandy (very fine grained sand), micaceous, calcareous. Bottom, no change.
2540-2550	Clay, gray, highly sandy (fine-grained sand) micaceous. Specimens of Foraminifera are much less common than in preceding samples of beds of Taylor age.
2547-2557	Core 33. Recovery 10 ft. Like core 32 at 2537-2547 ft.
2550-2560	Like cutting sample at 2540-2550 ft.
2557-2567	Core 34. Recovery ½ ft. Clay, light-gray, sandy (fine-grained sand), micaceous, calcerous.
2560-2570	Clay, light-gray, sandy (very fine grained sand), micaceous, calcareous. Sample contains a few nondiagnostic species of Foraminifera.
2567-2577	Core 35. Recovery 0.
2570-2580	Like cutting sample at 2560-2570 ft.
2577-2582	Core 36. Recovery 4 ft. Clay, gray, highly sandy (fine-grained sand), micaceous, calcareous, and soft, argillaceous, very fine grained, micaceous sandstone.
2580-2590	Clay, gray, sandy, micaceous, somewhat fossiliferous.
2582-2588	Core 37. Recovery 6 ft. Like core 36 at 2577-2582 ft.
2588-2598	Core 38. Recovery 5 ft.

Depth (feet)	Description
	Top, clay, gray, highly sandy (very fine grained sand), micaceous, calcareous. Bottom. No change.
2590-2600	Clay, gray, sandy (very fine-grained sand), micaceous, calcareous. Sample contains a few specimens of Foraminifera like those at higher levels in the beds of Taylor age.
2598-2608	Core 29. Recovery 3 ft. Top. Clay, gray, sandy (very fine-grained sand), micaceous, calcareous. Bottom. No change.
2600-2610	Shale, gray, soft, flaky, micaceous; some fragments of gray sandy, micaceous clay, and light-gray, very fine grained calcareous sandstone.
2608-2618	Core 40. Recovery 4½ ft. Like core 39 at 2598-2608 ft. and somewhat carbonaceous.
2610-2620	Like cutting sample at 2600-2610 ft; contains few specimens of Foraminifera.
2618-2628	Core 41. Recovery 6 ft. Top. Clay, gray, highly sandy (fine-grained sand), micaceous. Bottom, Shale, gray, thinly-laminated, calcareous.
2620-2630	Clay, gray, sandy, micaceous, and some fragments of gray, soft, flaky, micaceous shale.
2628-2638	Core 42. Recovery 10 ft. Top 8 ft. clay, gray, sandy (extremely fine-grained sand), calcareous; gray micaceous clay; and thin lenses of gray micaceous shale. The core fragment studied contains traces of macrofossils. Bottom 2 ft. Shale, brownish-gray, micaceous, containing irregular inclusions of white, chalky, glauconitic, micaceous sandstone.
2630-2640	Cuttings of materials like the bottom of core 42 at 2628-2638 ft.
2638-2648	Core 43. Recovery 7 ft. Shale, dark brownish-gray, micaceous, somewhat carbonaceous, containing irregular streaks of light-gray, argillaceous, micaceous, slightly glauconitic, calcareous sandstone.
2640-2650	Clay, gray, soft, sandy (fine-grained sand), micaceous; contains very few specimens of Foraminifera, and no diagnostic species.
2648-2658	Core 44. Recovery 7 ft. Clay, dark, brownish-gray, sandy (very fine grained sand), micaceous, somewhat carbonaceous.
2650-2660	Like core 44 at 2648-2658 ft; contains a few nondiagnostic specimens of Foraminifera.
2658-2668	Core 45. Recovery 9 ft. Clay, gray, highly sandy (fine-grained sand), highly micaceous, containing small shreds of carbonaceous material.
2660-2670	Like core 45 at 2658-2668 ft.; contains few specimens of Foraminifera.

Depth (feet)	Description
2668-2678	Core 46. Recovery 6 ft. Top. Like core 45 at 2658-2668 ft. Bottom. Clay, gray, irregularly sandy (fine-grained sand), micaceous.
2670-2680	Like core 46 at 2668-2678 ft.
2678-2688	Core 47. Recovery 2 ft. Clay, dark-gray, shaly, irregularly sandy (fine-grained sand), micaceous.
2680-2690	Like core 47 at 2678-2688 ft.
2688-2698	Core 48. Recovery 5 ft. Like core 47 at 2678-2688 ft.
2690-2700	Like Core 48 at 2688-2698 ft.
2698-2708	Core 49. Recovery 6 ft. Clay, gray, irregularly sandy (very fine grained sand), micaceous.
2700-2710	Like core 49 at 2698-2708 ft.
2708-2716	Core 50. Recovery 3 ft. Like core 49 at 2698-2708 ft.
2710-2720	Like core 50 at 2708-2716 ft.
2716-2728	Core 51. Recovery 7 ft. Clay, dark brownish-gray, shaly, irregularly sandy (very fine grained sand), micaceous.
2720-2730	Like core 51 at 2716-2728 ft.
2728-2738	Core 52. Recovery 3 ft. Clay, dark brownish-gray, micaceous.
2730-2740	No cutting sample.
2738-2748	Core 53. Recovery 6 ft. Top. Like core 52 at 2728-2738 ft. but irregularly sandy (fine-grained sand). Bottom. Clay, like top part, but containing irregular inclusions of light-gray, argillaceous, micaceous, calcareous, very fine grained sandstone.
2740-2750	Like core 53 at 2738-2748 ft.
2748-2758	Core 54. Recovery 5 ft. Like core 53 at 2738-2748 ft.
2750-2760	Like core 54 at 2748-2758 ft.
2758-2768	Core 55. Recovery 5 ft. Clay, dark brownish-gray, irregularly sandy (fine-grained sand), micaceous.
2760-2770	No cutting sample.
2768-2778	Core 56. Recovery ½ ft. Clay, like core 55 at 2758-2768 ft., containing irregular areas of light-gray, micaceous, highly sandy (fine-grained sand) clay.
2770-2780	Like core 56 at 2768-2778 ft.

Depth (feet)	Description
2778-2788	Core 57. Recovery 5 ft. Shale, dark brownish-gray, occurring in thin lenses; and dark-gray, micaceous, sandy (fine-grained sand) clay.
2780-2790	Like core 57 at 2778-2788 ft.
2788-2798	Core 58. Recovery 7 ft. No sample.
2790-2800	Clay, brownish-gray, containing small flakes of mica; very fine and even-grained, micaceous, calcareous, somewhat glauconitic sandstone. The sample contains a few moderately large nodules of dark-green glauconite. Specimens of Foraminifera are present, but not abundant, and species are not diagnostic; *Globotruncana fornicata* common; *Globorotalites conicus* present.
2798-2803	Core 59. Recovery 2 ft. Top foot. Shale, brownish-gray, flaky, containing small flakes of mica and a few nodules of dark-green glauconite. Specimens of non-diagnostic species of Foraminifera are present.
	Beds of Austin ? age.
	Bottom foot. Shale, brownish-gray, flaky, micaceous, containing irregular streaks and inclusions of fine-grained, chalky, highly glauconitic sand. Chalky character of sand due to small fragments of microfossiliferous material and *Inoceramus* prisms.
2800-2810	Shale, brownish-gray, flaky, micaceous, and very fine grained, micaceous sandstone containing some small grains of glauconite.
2803-2813	Core 60. Recovery 10 ft. 3d and 4th feet, Marl, light-gray, chalky; micaceous, containing many small black phosphatic nodules, some fragments of fish scales, and abundant *Inoceramus* prisms. The chalky character of the material is due to abundance of comminuted microfossil shells. Specimens of Foraminifera present are: *Eouvigerina aculeata, Globorotalites conicus, Planulina texana, Globotruncana* spp. (common), *Clavulinoides* n. sp. 9th and 10th feet. Clay, light-gray, chalky, sandy, micaceous, highly glauconitic.
2813-2823	Core 61. Recovery 2 ft. 2nd foot. Clay shale, brownish-gray, soft, flaky, micaceous, highly glauconitic; light-speckled appearance is due to abundance of small chalky microfossils, *Inoceramus* prisms, and broken and crushed small fragments of chalky fossil debris. Fauna is like that in core 60 at 2803-2813 feet, and the specimens are usually poorly preserved.
2823-2833	Core 62. Recovery 2 ft. Marl, light-gray, sandy (very fine-grained sand), chalky, micaceous, highly glauconitic, highly microfossiliferous. The fossil material is usually composed of finely comminuted debris; *Inoceramus* prisms abundant; *Robulus rotulata* common; *Cibicides harperi* present.

Depth (feet)	Description
2833-2843	Core 63. Recovery 1 ft. Like core 62 at 2823-2833 ft.
2843-2853	Core 64. Recovery 10 ft. No change.
2853-2863	Core 65. Recovery 10 ft. 1st to 7th foot like cores 62 (2823-2833 ft.), 63 (2833-2843 ft.), 64 (2843-2853 ft.). Beds of Austin age (definite) Gober Tongue(?) equivalent 8th, 9th and 10th feet. Marl, buff, sandy (very fine grained sand), somewhat micaceous, chalky. Contains a large amount of finely comminuted, poorly preserved, microfossil debris, and abundant *Inoceramus* prisms and fragments. Many specimens of Foraminifera present, including *Heterostomella austiniana*, *Planulina austiniana*, and *Loxostoma clavatum*.
2863-2873	Core 66. Recovery 5 ft. 1st foot. Marl, gray, light-spotted, dense, slightly micaceous. Speckled appearance is due to abundant microfossiliferous material and finely fragmented chalky fossil debris. Specimens of Foraminifera are usually very small. *Globigerina*, *Gümbelina*, several species of *Globotruncana*, and a small *Anomalina* sp. strongly predominate; numerous specimens of *Globorotalites umbilicatus* are present. 2nd and 3rd feet. Similar to 1st foot, but slightly glauconitic. 4th and 5th feet. Marl, buff, light-spotted, slightly micaceous, highly microfossiliferous.
2873-2883	Core 67. Recovery 5 ft. Like core 66 at 2863-2873 ft.
2883-2893	Core 68. Recovery 6 ft. No change in lithology. *Inoceramus* prisms very abundant. Some specimens of *Ventilabrella austiniana* and *Nonionella austiniana* present, but fauna otherwise unchanged.
2893-2903	Core 69. Recovery 4 ft. Marl, buff, slightly micaceous, containing abundant specimens of Foraminifera; fauna unchanged.
2903-2913	Core 70. Recovery 10 ft. 1st, 2nd and 3rd feet. Marl, buff, moderately hard, chalky, highly microfossiliferous. Fauna like core 69 at 2893-2903 ft. 6th, 7th and 8th feet. Marl, light-buff, chalky, glauconitic, highly microfossiliferous. 9th and 10th feet. Chalk, cream, slightly micaceous, highly glauconitic, highly microfossiliferous; pyrite inclusions common; fauna unchanged.
2910-2920	Cuttings contain specimens of *Kyphopyxa*, which may have come from higher levels.
2913-2923	Core 71. Recovery 5 ft. Marl, buff, light-speckled, micaceous, highly microfossiliferous. Dominant species of Foraminifera are: *Globigerina cretacea*,

Depth (feet)	Description
	Gümbelina spp., and a small *Anomalina* sp. characteristic of the beds of Austin age. Also present are specimens of *Globotruncana austiniana, Globorotalites umbilicatus,* and *Planulina texana; Globigerina* and *Planulina* are the dominant forms.
2923-2933	Core 72. Recovery 8 ft. Marl, grayish-tan, somewhat micaceous, highly microfossiliferous. Fauna like core 71 at 2913-2923 ft.
2933-2943	Core 73. Recovery 2 ft. Like core 72 at 2923-2933 ft.
2943-2953	Core 74. Recovery 8 ft. Marl, tan-gray, micaceous, slightly carbonaceous, highly microfossiliferous. Fauna unchanged.
2953-2963	Core 75. Recovery 0.
2963-2968	Core 75. Recovery 5 ft. Shale, brownish-gray, flaky, highly micaceous, somewhat glauconitic. Contains fragments of fish scales, green and brown mica, and a few small arenaceous species of Foraminifera. Other species of Foraminifera are like those in core 71 at 2913-2923 ft.
2968-2976	Core 77. Recovery 5 ft. Marl, brownish-gray, micaceous, highly fossiliferous; contains abundant fragments and prisms of *Inoceramus.* The foraminiferal fauna is more representative than in core 76, and is Austin in character.
2976-2986	Core 78. Recovery 4 ft. Shale, brownish-gray, micaceous, microfossiliferous.
2980-2990	Cuttings contains specimens of *Frondicularia undulosa.*
2986-2996	Core 79. Recovery 3 ft. Like core 78 at 2976-2986 ft.
2996-3005	Core 80. Recovery 8 ft. Top 4 feet. Shale, brownish-gray, highly glauconite, calcareous, microfossiliferous. *Inoceramus* fragments are abundant. Foraminiferal fauna is composed, largely, of specimens of *Gümbelina reussi, Globigerina cretacea, Globtruncana canaliculata,* and many specimens of *Globorotalites umbilicatus* and *Planulina* sp. (small forms). Bottom 4 ft. shale, brownish-gray, micaceous, calcareous, highly microfossiliferous.
3005-3015	Core 81. Recovery 5 ft. Like core 80 at 2996-3005 ft.
3015-3025	Core 82. Recovery 6 ft. No change.
3025-3035	Core 83. Recovery 5 ft. Top 3 ft. Shale, brownish-gray, somewhat micaceous, calcareous, very highly microfossiliferous, containing comminuted fossil debris, specimens of small Foraminifera and very abundant *Inoceramus* prisms and fragments. Microfauna consists, mainly,

Depth (feet)	Description
	of *Globigerina cretacea, Gümbelina reussi, Gümbelina moremani* (specimens rare in preceding samples, common in this sample), a small *Anomalina* sp., a few specimens of *Globotruncana,* a large, flat form of *Globigerina(?)* cretacea (common), and a few specimens of *Globorotalites umbilicatus.* Bottom 2 feet. No samples.
3035-3045	Core 84. Recovery 10 ft. Top 9 feet. Like core 83 at 3025-3035 ft; contains abundant fragments of *Inoceramus* and other bivalves. Specimens of *Globotruncana* are more common than in core 83. Bottom 1 foot. Shale, light-gray, hard, dense, calcareous. *Inoceramus* fragments are relatively scarce, but material is too well-indurated for fauna to wash from sample. Specimens identified are same as in core 83.
3045-3055	Core 85. Recovery 10 ft. Top 5(?) feet. Shale, brownish-gray, calcareous, very highly fossiliferous, giving shale a somewhat speckled appearance. No marked change in microfauna. 2nd 4 feet. Marl, gray, somewhat micaceous, light-speckled owing to abundance of *Inoceramus* fragments and comminuted fossil debris. No marked change in microfauna. Bottom (?) 1 foot. Shale, light-gray, hard, dense, calcareous, microfossiliferous.
3055-3065	Core 86. Recovery 8 ft. Top 2 feet. Material like bottom of core 85 at 3045-3055 ft. and lenses of smooth, dark-gray, flaky shale containing many irregular-shaped, gray, phosphatic nodules. Bottom 6 feet. Shale, greenish-gray, flaky, micaceous, containing crushed fragments of fossil (?) material and some fragments of fish scales. Microfauna consists of several species of *Gümbelina, Globigerina cretacea* (small variety), specimens of *Globorotalites umbilicatus,* a few specimens of *Globotruncana cretacea,* and specimens of *Planulina eaglefordensis.*
3065-3075	Core 87. Recovery 10 ft. Shale, gray, flaky, calcareous, similar to core 86; contains small fragments of fish scales and an irregular-shaped area in which large amounts of crushed chalky material seem to be composed of small, broken fragments of fossils. Third 2 feet. Shale, dark-gray, flaky, slightly micaceous, calcareous. The speckled appearance of the shale is due to many rather evenly distributed small chalky specimens of Foraminifera and fragments of *Inoceramus.* An *Anomalina* sp. and two species of *Gümbelina* are the dominant specimens of Foraminifera, and specimens of *Eouvigerina* cf. *E. austiniana* are also present.

Depth (feet)	Description
3075-3085	Core 88. Recovery 5 ft. Like core 87 at 3065-3075 ft.
3085-3095	Core 89. Recovery 7 ft. No change.
3090-3100	Fragments of *Citharina texana* var. were first observed in this sample of cuttings, but the highest occurrence in the well may have been above this depth.
3095-3105	Core 90. Recovery 10 ft. Top 5 feet. Shale, gray, flaky, microfossiliferous, like that described for the third 2 feet of core 87 at 3065-3075 ft. Core 90 contains fragments of *Inoceramus* and other macrofossils. Foraminiferal fauna is like core 87, but specimens of *Globigerina cretacea* var. are much more common, and some specimens of *Globotruncana* are present. Bottom 5 ft. Like the top 5 ft. but specimens of Foraminifera are less abundant and some specimens of *Citharina texana* var. are present.
3105-3115	Core 91. Recovery 10 ft. Like core 90 at 3095-3105 ft. Fragments of *Inoceramus* and other macrofossils are present; microfauna is like core 90.
3115-3125	Core 92. Recovery 10 ft. Like core 91 at 3105-3115 ft. with the addition of tubular inclusions of pyrite. *Inoceramus* fragments are common. Microfauna is like core 91 but specimens are somewhat less abundant; specimens of *Citharina texana* var. are common.
3125-3135	Core 93. Recovery 7 ft. Like core 92 at 3115-3125 ft. Specimens of *Dorothia alexanderi* are present.
	Atkinson Formation. Upper Member.
3135-3145	Core 94. Recovery 10 ft. Top of deeper-water marine facies of upper member of Atkinson Formation. Top 9½ feet. Clay, dark brownish-gray, flaky, highly sandy and micaceous, somewhat carbonaceous and pyritic; contains many fragments of *Ostrea* sp. The sand grains are fine, even, and angular. Bottom ½ foot. Sandstone, soft, somewhat argillaceous, glauconitic, micaceous; the grains are fine, even angular, clear quartz.
3145-3155	Core 95. Recovery 10 ft. Top 5 feet. Sandstone like bottom of core 94 at 3135-3145 ft., containing some thin lenses of brownish-gray, flaky, micaceous, carbonaceous, somewhat glauconitic clay. Fragments of *Ostrea* sp. are common. Bottom 5 feet. Like top 5 feet, but only slightly glauconitic.

Depth (feet)	Description
3155-3165	Core 96. Recovery 9 ft. Top 7 feet. Clay, light-gray, highly sandy (fine-grained sand), highly-micaceous, glauconitic, calcareous. Bottom 2 feet. Clay, greenish-gray, irregularly sandy (very fine grained sand), micaceous, glauconitic, carbonaceous, calcareous. The clay contains numerous reddish-brown, small, irregular-shaped nodules of siderite, and some fragments of fish scales. A few specimens of *Globigerina cretacea* in the washed sample may not be indigenous.
3165-3175	Core 97. Recovery 9 ft. Clay, greenish-gray, soft, somewhat sandy (fine-grained sand), highly micaceous, (biotite and muscovite), calcareous, slightly carbonaceous. The clay contains some small, grayish-brown, irregular-shaped nodules of siderite.
3175-3185	Core 98. Recovery 10 ft. Clay, greenish-gray, flaky, micaceous, calcareous, containing irregular, highly sandy (fine-grained sand), glauconitic areas. The clay contains small gray and light-brown, irregular-shaped nodules of siderite.
3185-3195	Core 99. Recovery 1 ft. Shale, olive-gray, flaky, somewhat micaceous, slightly carbonaceous, calcareous.
3195-3205	Core 100. Recovery 10 ft. Shale, like core 99 at 3185-3195 ft. but irregularly sandy (fine-grained sand), and more highly micaceous. The shale contains some fragments of fish bones, fish scales, and nodules of siderite. The fauna is composed of a few *Inoceramus* prisms and specimens of *Planulina caglefordensis*, *Gümbelina* sp., *Valvulineria infrequens* var., *Globigerina cretacea*, and *Hastigerinella moremani* Cushman.
3205-3215	Core 101. Recovery 7 ft. Like core 100 at 3195-3205 ft.
3215-3225	Core 102. Recovery 10 ft. Clay, olive-gray, sandy (very fine grained sand), micaceous; contains fragments of fossil bivalves, fish bones and teeth, phosphatic nodules, a little glauconite and a few specimens of Foraminifera like core 100 at 3195-3205 ft.
3225-3235	Core 103. Recovery 7 ft. Shale, greenish-gray, flaky, somewhat micaceous, containing irregular areas and thin lenses which are highly sandy (fine-grained sand) and somewhat glauconitic. The fauna is composed of small scattered fragments of fish bones and scales, and a few specimens of Foraminifera like core 100 at 3195-3205 ft.
3235-3245	Core 104. Recovery 10 ft. Top 7 feet. Marl, gray, thinly laminated, slightly micaceous, containing irregular areas of very fine grained sand. Middle 5 feet. Like the top 7 feet. Contains abundant specimens

Depth (feet)	Description
	of Foraminifera; *Planulina eaglefordensis, Gümbelina moremani, Globigerina cretacea* var., and a very few specimens of *Globotruncana* cf. *G. arca, Ammobaculites* sp. and *Gaudryina* cf. *G. foeda.*
	Bottom 3 feet. Marl, greenish-gray; contains a species of *Massilina* characteristic of the Eagle Ford shale in Texas.
3245-3255	Core 105. Recovery 10 ft.
	Top 5 feet. Marl, gray, thinly laminated, micaceous; contains fish scales and specimens of Foraminifera.
	Bottom 5 feet. Marl, gray, flaky, slightly micaceous; contains fish scales and many specimens of Foraminifera.
3255-3261	Core 106. Recovery 5 ft.
	Top 3 feet. Shale, greenish-gray, irregularly sandy (moderately coarse grained sand), somewhat glauconitic.
	Bottom 2 feet. Shale, gray, smooth, thinly laminated, containing fragments of macrofossils, and irregular light-gray silty and micaceous areas.
3261-3266	Core 107. Recovery 2 ft.
	Top of shallow-water marine facies of upper member of Atkinson Formation. The electric log shows the top of 3253 ft.
	Top 1 foot. Sandstone, light-gray, hard, moderately coarse grained, clear quartz and a few peach-colored grains. Contains fragments of *Ostrea* sp., and some scattered nodules of glauconite.
	Bottom 1 foot. Shale, gray, smooth, moderately soft, argillaceous, moderately fine grained sandstone, containing fragments of carbonaceous material.
3266-3271	Core 108. Recovery 5 feet.
	Top 1 foot. Sandstone, greenish-gray, moderately hard, argillaceous, micaceous, slightly glauconitic and sandy clay. Sand is very fine to moderately fine grained. Core contains fragments of macrofossils.
	Second 1 foot. Clay, gray, highly micaceous, sandy (very fine grained sand), containing areas of smooth, blue-gray, marly shale. A few shell fragments present in the core.
	Bottom 3 feet. Clay, shaly, greenish-gray, highly micaceous, sandy (fine-grained sand), carbonaceous.
	Core contains many fragments of fossil bivalves.
3271-3276	Core 109. Recovery 4 ft.
	Top. Like bottom 3 feet of core 108 at 3266-3271 ft. but more coarsely sandy. The sand is gray, argillaceous, highly micaceous.
	Bottom. Sandstone, light-gray, moderately soft, argillaceous, moderately fine grained, micaceous; contains a few fragments of fossil bivalves and numerous fragments of carbonaceous material.

Depth (feet)	Description
3276-3286	Core 110. Recovery 5 ft.
	Top. Shale, greenish-gray, thinly flaky, highly micaceous, slightly carbonaceous.
	Bottom. Like the top part but more highly carbonaceous, and containing shell fragments.
3286-3293	Core 111. Recovery 2 feet.
	Top 1 foot. Sandstone, light-gray, hard, dense, moderately fine grained; contains numerous fragments of *Gryphea* sp., and small nodules of black (phosphatic?) material.
	Bottom 1 foot. Alternating thin lenses of gray shale and very fine to moderately fine grained, glauconitic, micaceous, argillaceous sandstone. Core contains fragments of fossil bivalves.
3293-3298	Code 112. Recovery 2 ft.
	Sandstone, white, soft, micaceous, argillaceous, very fine to moderately fine grained.
3298-3308	Core 113. Recovery ½ ft.
	Sandstone, light-gray, hard, dense, fine to moderately fine grained; contains many fragments of fossil bivalves, fragments of carbonaceous material, and phosphatic nodules.
3308-3318	Core 114. Recovery 6 ft.
	Top 4 feet. Sandstone, light-gray, soft, argillaceous, fine grained, highly micaceous, somewhat carbonaceous, slightly glauconitic.
	Bottom 2 feet. Shale, greenish-gray, thinly flaky, somewhat micaceous, irregularly interbedded with moderately fine grained argillaceous sandstone. The shale contains lenses of light-gray, slightly carbonaceous siltstone in which siderite pellets are present.
3318-3328	Core 115. Recovery 8 ft.
	Top 4 feet. Shale, greenish-gray, micaceous, intergrading with light-gray, highly micaceous siltstone. The core contains fragments of carbonaceous material, phosphatic material, and a few traces of macrofossils.
	2nd 2 feet. Sandstone, light-gray, moderately hard, moderately fine grained, argillaceous, highly glauconitic and micaceous.
	Bottom 2 feet. Like the 2nd 2 feet but sandstone is somewhat coarser grained.
3328-3338	Core 116. Recovery 5 ft.
	Top 4 ft. Sandstone, light-gray, moderately soft, moderately fine grained, highly glauconitic and micaceous.
	Bottom 1 foot. Sandstone, light-gray, moderately soft, silty to moderately coarse grained, cross-bedded, micaceous, somewhat carbonaceous.
3338-3347	Core 117. Recovery 5 ft.
	Top 1 foot. Sandstone, light-gray, moderately hard, fine to moderately fine grained, argillaceous, glauconitic, somewhat

Depth (feet)	Description
	micaceous; contains fragments of fossil bivalves and many fragments of phosphatic material. Bottom 4 feet. Sandstone, moderately soft, fine to moderately fine grained, glauconitic, argillaceous, somewhat micaceous; contains many inclusions of carbonaceous material.
3347-3357	Core 118. Recovery 5 ft. Sandstone, light-gray, soft, silty to moderately fine grained, glauconitic.
3357-3367	Core 119. Recovery 10 ft. Top 1 foot. Sandstone, light greenish-gray, like core 118 at 3347-3357 feet; contains many fragments of phosphatic material. 2nd 1 foot. Sandstone, light-gray, loosely consolidated, very fine to moderately coarse grained, glauconitic, micaceous. Bottom 8 feet. Sandstone, loosely consolidated, silty to fine to coarse grained, glauconitic, micaceous.
3367-3377	Core 120. Recovery 5 ft. Top 1 foot. Sandstone, loosely consolidated, fine to coarse-grained, micaceous. Bottom 4 feet. Sandstone, light-gray, silty to fine to moderately fine grained, highly micaceous, slightly glauconitic.
3377-3387	Core 121. Recovery 6 ft. Top 1 foot. Sandstone, light-gray, moderately soft, fine to moderately coarse grained, somewhat carbonaceous. 2nd 1 foot. Sandstone, soft, silty to fine to coarse-grained, somewhat micaceous, carbonaceous; contains nodules of light-brown to yellowish, soft limonite. Bottom 4 feet. Siltstone, light-gray, moderately soft, micaceous.
3387-3397	Core 122. Recovery 8 ft. Like bottom 4 feet of core 121 at 3377-3387 ft.
3397-3407	Core 123. Recovery 4 ft. Sandstone, light-gray, moderately soft, coarse-grained, argillaceous, micaceous.
3407-3413	Core 124. Recovery ½ ft. Sandstone, light-gray, fine-grained, micaceous.
3413-3423	Core 125. Recovery 4 ft. Top 1 foot. Sandstone, light-gray, hard, dense, conglomeratic (fine to coarse-grained sand). Contains irregular-shaped inclusions of light greenish-gray and dark-gray clay; black, carbonaceous, highly pyritic clay; a few nodules of limonite; and a trace of glauconite. Bottom 3 feet. Sandstone, light-gray, moderately soft, moderately fine grained, argillaceous.
3423-3433	Core 126. Recovery 4 ft. Sandstone, light-gray, soft, poorly sorted, moderately fine to moderately coarse grained, argillaceous, containing highly micaceous, glauconitic, and lignitic lenses.

Depth (feet)	Description
3433-3440	Core 127. Recovery 7 ft. Sandstone, light-gray, silty to fine-grained, highly micaceous.
3440-3450	Core 128. Recovery 7 ft. Top 5 feet. Like core 127 at 3433-3440 ft. and contains glauconitic streaks and fragments of carbonaceous material. Bottom 2 feet. Clay, greenish-gray, silty, somewhat micaceous.
3450-3460	Core 129. Recovery 3 ft. Top 2 feet. Sandstone, light-gray, soft, fine-grained, silty micaceous. Bottom 1 foot. Sandstone, white, moderately hard, moderately fine grained, micaceous.
3460-3470	Core 130. Recovery 2 ft. Clay, gray and greenish-gray, moderately hard, containing irregular streaks of highly sandy (coarse-grained sand), somewhat micaceous carbonaceous clay.
3470-3480	Core 131. Recovery 9 ft. Sandstone, light-gray, soft, silty, micaceous, slightly glauconitic. The sand is, mainly, very fine grained, but a few coarse grains are present.
3480-3490	Core 132. Recovery 10 ft. Sandstone, light-gray, soft, silty, high micaceous, glauconitic, slightly carbonaceous.
3490-3498	Core 133. Recovery 2 ft. Siltstone, light-gray, soft, highly micaceous, somewhat glauconitic, somewhat carbonaceous.
3498-3508	Core 134. Recovery 3 ft. Top 1 foot. Sandstone, light-gray, hard dense, moderately coarse grained, very highly micaceous, glauconitic, and pyritic. Middle 1 foot. Sandstone, greenish-gray, soft, silty, fine-grained, very highly micaceous and glauconitic, containing inclusions of carbonaceous material. Bottom 1 foot. Sandstone, white, soft, fine-grained, silty micaceous.
3508-3518	Core 135. Recovery 4 ft. Top 2 feet. Shale, greenish-gray, unctuous, flaky. Bottom 2 feet. Sandstone, white, moderately hard, fine-grained, silty, micaceous.
3518-3538	Core 136. Recovery 9 ft. Top 5 feet. Sandstone, moderately hard, dense, fine to moderately, fine grained, argillaceous, micaceous, containing many small scattered fragments of soft yellowish-brown limonite(?). Middle 1 foot. Clay, light greenish-gray, moderately hard, silty, micaceous. Bottom 3 feet. Sandstone, greenish-gray, moderately hard, poorly sorted, fine to moderately coarse grained, argillaceous, micaceous, containing inclusions of limonite(?).

Depth (feet)	Description
3538-3558	Core 138. Recovery 5 ft. Top 1 foot. Siltstone, greenish-gray, dense, finely micaceous, containing many fragments of carbonized plant remains. Bottom 4 feet. Sandstone, light greenish-gray, soft, moderately fine to coarse grained, silty, argillaceous.
3558-3578	Core 138. Recovery 0.
3578-3598	Core 139. Recovery 5 ft. Top 2 feet. Sandstone, light-gray, moderately hard, dense, moderately coarse-grained, slightly pyritic. The sand grains are clear quartz. Middle, 1 foot. Siltstone, white, soft, micaceous. Bottom 2 feet. Sandstone, light-gray, moderately hard, moderately coarse to coarse-grained, somewhat pyritic, containing worn fragments of a bivalve *Ostrea* (?) sp.
3598-3618	Core 140. Recovery 3 ft. Top 1 foot. Sandstone, gray, hard, dense, coarse-grained, quartzitic, containing many irregular-shaped inclusions of greenish-gray clay, glauconite and carbonaceous plant fragments. 2nd 1 foot. Clay, light greenish-gray, micaceous, highly sandy (fine-grained sand). 3d 4 inches. Sandstone, white, moderately hard, dense, modrately fine-grained, glauconitic. 4th, 5 inches. Sandstone, greenish-gray, moderately coarse grained, argillaceous, micaceous, containing inclusions of thinly laminated green shale that seem to have been secondarily deposited in the sandstone. 5th 3 inches. Sandstone, light-gray, moderately hard, moderately fine to coarse-grained, mainly clear quartz but containing peach-colored grains.
3618-3638	Core 141. Recovery 4 ft. Top 1 foot. Sandstone, light-gray, hard, dense, moderately fine grained, micaceous, clear quartz, containing a few pinkish grains, dark-green nodules of glauconite, and highly pyritic areas. 2nd 1 foot. Like top 1 foot. 3d 1 foot. Sandstone, light-gray, hard, fine-grained, micaceous, glauconitic. 4th 1 foot. Clay, greenish-gray, slightly sandy, micaceous and somewhat carbonaceous.
3638-3658	Core 142. Recovery 3 ft. Top 1 foot. Sandstone, moderately hard, moderately coarse grained, micaceous, glauconitic, containing fragments of carbonaceous material, a few phosphatic nodules and greenish-gray inclusions (probably secondary).

Depth (feet)	Description
	Middle 1 foot. Silt, gray, somewhat carbonaceous, containing irregular areas that are sandy, micaceous and slightly glauconitic.
	Bottom 1 foot. Sandstone, light-gray, hard, dense, moderately coarse-grained, micaceous, glauconitic.
3658-3678	Core 143. Recovery 8 ft.
	Top 1 foot. Sandstone, hard, moderately coarse-grained, calcareous, glauconitic, composed mainly of clear quartz grains and few pink or peach-colored grains.
	2nd 1 foot. Shale, greenish-gray, thinly flaky, silty to sandy, containing a few small carbonaceous fragments.
	3d 2 feet. Sandstone, light-gray, hard, moderately coarse grained, micaceous, glauconitic, containing numerous inclusions of carbonized plant fragments.
	4th 2 feet. Clay, greenish-gray, silty, micaceous, containing lenses of dark-greenish-gray thinly laminated shale.
	5th 2 feet. Sandstone, light-gray, hard, dense, moderately fine grained, micaceous, glauconitic.
3678-3698	Core 144. Recovery 8 ft.
	Top 3 feet. Shale, greenish-gray, flaky, micaceous, containing communinuted carbonaceous fragments.
	2nd 1 foot. Conglomerate, composed of dense, moderately fine grained, glauconitic sandstone containing secondary nodular inclusions of green and dark brownish-gray clay, limonite nodules, many worn and broken shell fragments, and fragments of carbonaceous material. Another part of the core is soft, coarse-grained, micaceous sandstone.
	3d 3 feet. Siltstone, light-gray, glauconitic, micaceous, and lenses of dark greenish-gray, unctuous shale.
	4th 1 foot. Sandstone, light-gray, hard, dense, conglomeratic, glauconitic; contains worn shell-fragments, fragments of pyritized lignite, and nodular fragments of greenish-gray clay and of limonite. Another part of the core is dense, glauconitic, micaceous sandstone containing abundant small scattered fragments of limonite.
3698-3718	Core 145. Recovery 7 ft.
	Top 3 feet. Sandstone, light-gray, dense, very highly micaceous (muscovite and biotite), glauconitic.
	Bottom 4 feet. Shale, greenish-gray to dark green, smooth-textured, slightly micaceous and carbonaceous, non-calcareous. The bottom foot is irregularly highly sandy (fine-grained sand) and micaceous.
3700-3720	Clay, brownish-gray, micaceous and fragments of light-gray and brownish-gray sandstone; shell fragments present.

Depth (feet)	Description
	Atkinson Formation. Lower Member.
3720-3730	Shale, greenish-gray, and many fragments of white, moderately fine grained glauconitic, micaceous sandstone; numerous shell fragments and a few carbonaceous fragments. Top of the lower member of the Atkinson Formation (marine facies) is at 3723 ft. on the electric log of the well.
3730-3750	Like sample at 3720-3730 ft.
3750-3760	Like sample at 3730-3750 ft; fragments of lignite are common, and a few, probably indigenous specimens of ostracodes are present.
3760-3770	Shale, gray and greenish-gray, and many fragments of irregularly sandy, somewhat glauconitic, highly macrofossiliferous limestone, which also contain specimens of ostracodes like those in sample at 3750-3760 ft. The sample contains fragments of sandstone and fragments of lignite.
3770-3790	No change.
3790-3800	Shale, olive-gray, flaky, and fragments of fossiliferous limestone.
3800-3810	Like sample at 3790-3800 ft; fragments of fossil bivalves; limestone fragments more abundant.
3810-3820	Shale, olive-gray, fragments of *Ostrea(?)* sp., and several types of sandstone. Sample contains specimens of *Ammobaculites agrestis* and *Ammotium braunsteini.*
3820-3830	Shale, greenish-gray, flaky, somewhat micaceous.
3830-3840	Shale, gray, containing shell fragments.
3840-3850	Shale, greenish-gray, flaky, 50 percent; and 50 percent moderately coarse grained quartz sandstone containing grains of pink feldspar.
3850-3860	Like sample at 3840-3850 ft., but sandstone is less than 50 percent.
3860-3870	Shale, greenish-gray, flaky, a little sandstone, and numerous fragments of white bentonite.
	Comanche Series. Undifferentiated
3870-3880	Shale, flaky, and coarse-grained sandstone like sample at 3860-3870 ft. Sample also contains fragments of sandy (fine-grained sand) bentonite, first observed in sample at 3860-3870 ft., numerous fragments of brownish and purplish-red micaceous clay; siderite pellets (possibly caving from higher levels); fragments of pink-stained, nodular limestone.
3880-3890	Shale, gray and greenish-gray, flaky, and many fragments of brick-red, purplish-red, red and gray mottled, and mustard and gray mottled, micaceous, sandy shale; light greenish-brown siderite nodules; pink-stained limestone nodules; a little coarse-grained, unconsolidated sand.
3890-3900	Like sample at 3880-3890 ft., but no limestone nodules.

Depth (feet)	Description
3900-3910	Sand, unconsolidated, coarse-grained, quartz, and scattered grains of feldspar, about 75 percent; gray, thinly flaky shale, and red and multicolored shale about 25 percent of sample.
3910-3920	Sand, coarse-grained, and shale like sample at 3900-3910 ft., sample contains many grains of pink and yellow feldspar, and a few grains of greenish-yellow quartz(?).
3920-3930	Like sample at 3910-3920 ft., but shale fragments are more abundant.
3930-3940	No change.
3940-3950	Like sample at 3930-3940 ft., but fragments of red shale, red and mustard mottled shale, and purple shale are very abundant.
3950-3960	Sand, unconsolidated, pinkish-gray, coarse-grained, quartz, and many red-stained grains. Sample contains fragments of red, purple and mottled shale.
3960-4060	No change.
4060-4070	Mudstone, gray, red, purple, and mottled; unconsolidated sand like that described in sample at 3950-3960 ft. Grains of feldspar are common, and fragments of shale are abundant.
4070-4080	Clay, red, and fine to very coarse grained quartz sand; a little feldspar.
4080-4090	Sand, fine to very coarse grained; a little red feldspar.
4090-4095	Sand, like sample at 4080-4090 ft; a little red shale; abundant cavings of gray shale.
4095-4100	Clay shale, bright red, 50 percent of sample; cavings of gray shale 50 percent.
4097-4102	Core 146. Recovery 0.
4100-4110	Clay, gray, one-third of sample; clay shale, one-third of sample; sand, one-third of sample.
4110-4120	Clay shale, red 75 percent; sand 25 percent.
4120-4130	Sand, fine to very coarse grained, subangular, red-stained quartz; staining probably from red clay matrix. Yellow grains of quartz, and grains of feldspar are present.
4130-4140	Sand, like sample at 4120-4130 ft.
4140-4150	Sand, yellow-tinted grains, and bright yellow clay that is probably the matrix in which the sand occurs; a few varicolored pebbles of igneous (?) rocks; rounded pebbles of red and yellow feldspar; rounded pebbles of yellow quartz.
4150-4160	Sand, moderately coarse grained, quartz; grains of feldspar and a little red clay.
4160-4170	Sand, fine to very coarse grained, quartz; a little feldspar; a few pebbles of igneous (?) rocks; a few small fragments of red clay.
4164-4167	Core 147. Recovery 3 ft. Top. Clay, brownish-red, silty, micaceous.

Depth (feet)	Description
	Bottom. Like top sample, and irregularly streaked with light bluish-gray, silty to sandy (fine-grained sand), argillaceous clay.
4170-4180	Clay, red, 75 percent; sand, like sample at 4160-4170 25 percent.
4180-4190	No change.
4190-4200	Sand, 50 percent; clay 50 percent. Sand is in part, like sample at 4160-4170 ft., and in part, fragments of fine-grained, even-grained, soft sandstone containing grains of red feldspar, and hard yellow clay.
4200-4210	Sandstone, fine to very coarse grained, composed of yellow and red-stained grains, and a few grains of feldspar; also medium-grained sandstone having small amount of matrix.
4210-4220	Sand, yellow and white, mostly coarse-grained, quartz and a little feldspar.
	Pre-Cretaceous
4220-4280	Igneous rock.
4279-4282½	Core 148. Recovery 3 ft. Igneous rock.
4280-4296 T.D.	No samples.

BACON COUNTY

Operator: City of Alma Well 1
Location: City of Alma, Ga.

GGS. No. 58
Elevation: 195 ft. (approx.)
Total depth: 626 ft.
Completed: May 20, 1938

Summary of Stratigraphy

		Depth (feet)	Thickness (feet)
	Tertiary		
Pliocene to Recent		Surface	50
No samples		50	14
Miocene undifferentiated		64	386
Oligocene			
upper,	Suwannee Limestone	450	50
Eocene			
upper,	Ocala Limestone, upper member	500	to total depth 126

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
	Pliocene Series to Recent Series
0- 10	Sand, quartz, dark, reddish-brown, coarse-grained argillaceous.
10- 40	Clay, red, sandy. Washed residue, large; composed of fine-grained, angular, clear quartz sand, red-stained by the clay matrix.
40- 50	Sand, quartz, clear, coarse-grained, subangular, etched.
50- 64	No samples.
	Miocene Series undifferentiated
64- 118	Clay, greenish-gray, sandy. Washed residue, large; composed of fine-grained, angular, clear quartz sand, and several fragments of carbonaceous material.
118	Clay, greenish-gray, sandy. Washed residue, large; composed of moderately coarse grained, subangular, moderately even grained, clear quartz sand, and a few fragments of the clay matrix.
118- 140	Chalk, white, sandy, soft. Washed residue, large; composed, chiefly, of nodules of hard sandy chalk, some of which contain worn fragments of macroscopic fossils (*Ostrea* (?) sp.); about 10 percent of washed residue is clear, uneven-grained, quartz sand.
140- 150	Clay, greenish-tan, sandy. Washed residue, moderately small; composed of fragments of clay and about 50 percent clear, angular, uneven-grained quartz sand.
150- 160	Clay, light-tan, sandy. Washed residue, small; composed of clear quartz sand, a few nodules of hard limestone as in sample at 118-140 ft., and a few fragments of greenish-gray carbonaceous clay.
160- 170	Clay, tan, sandy. Washed residue, moderately large; composed of very uneven grained, clear quartz sand, and about 10 percent fragments of hard clay.
170- 180	Clay, tan, somewhat sandy. Washed residue, small; composed of fragments of hard clay, and about 50 percent very uneven grained clear quartz sand.
180- 190	Clay, greenish-tan, sandy. Washed residue, moderately large; composed of nodular fragments of hard calcareous clay, and about 50 percent very uneven grained clear quartz sand.
190- 200	Clay, light-brown, sandy. Washed residue, moderately large; composed of very uneven grained, angular, clear quartz sand.
200- 210	Sand, quartz, clear, angular, uneven-grained, and about 25 percent light-brown chert; a few fragments of white chalky limestone.
210- 220	Sand, quartz, clear, uneven-grained; a few fragments of white chalky limestone, as in the sample at 200-210 ft., and a few fragments of grayish-green, sandy clay shale.
220- 230	Limestone, cream, soft, chalky, irregularly sandy, and about 25 percent uneven-grained quartz sand; a small amount of light-brown chert.
230- 240	Limestone, white, chalky, sandy, and greenish-gray, shaly, sandy clay. Washed residue, moderately large; composed of fragments

Depth (feet)	Description
	of hard limestone, and nodular fragments of calcareous clay; about 25 percent of the washed residue is uneven-grained, clear quartz sand.
240- 260	Clay, greenish-tan. Washed residue, small; composed of small fragments of clay, and about 50 percent very uneven grained clear quartz sand; a few small, black, phosphatic pebbles.
260- 270	Chalk, soft, sandy. Washed residue, moderately large; composed of about 75 percent nodular fragments of hard sandy chalk containing inclusions of shells (ostracodes?); about 25 percent fine, angular, clear quartz sand, and a few small, black, phosphatic pebbles.
270- 280	Like sample at 260-270 feet, but nodular fragments of limestone constitute about 25 percent of the washed residue, and sand constitutes about 75 percent.
280- 290	Sand, fine, uneven-grained, and a few nodules of hard sandy chalk.
290- 300	Clay, tan, sandy (fine-grained sand). Washed residue, very small; composed of fine-grained, angular, clear quartz sand, and a few resistant fragments of light greenish-gray unctuous clay.
300- 310	Clay, greenish-tan, sandy. Washed residue, small; composed of fine-grained, angular, clear (white) quartz sand.
310- 320	Clay, greenish-gray, sandy (fine-grained sand). Washed residue, small; composed of fine-grained sand, and about 10 percent small, tough fragments of clay.
320- 340	Bit sample. Clay, gray, sandy. Washed residue, small; composed of moderately coarse grained, clear quartz sand, and a few fragments of light-green clay.
340- 350	Clay, greenish-gray, somewhat sandy. Washed residue, very small; composed of sand like sample at 320-340 ft., and about 10 percent fragments of hard clay.
350- 360	Clay, greenish-gray, sandy. Washed residue is small, and similar to the sample at 340-350 ft.
360- 370	Clay, sandy, and chalk. Washed residue, large; composed of fragments of hard sandy, chalky limestone, and about 25 percent uneven-grained, clear quartz sand. Some fragments of limestone show traces of embedded worn and broken fossil shells.
370- 380	Like sample at 360-370 ft.; sand composes about 75 percent of the sample.
380- 400	Limestone, white, nodular, is about 50 percent of the sample, and coarse, uneven-grained quartz sand is about 50 percent. The limestone shows traces of worn and fragmented fossil shells.
400- 410	Limestone, light-gray and light-tan, hard, nodular, sandy, containing traces of fragmented and very much worn fossil shells. About 25 percent of the sample is composed of clear, angular, fine-grained quartz sand.
410- 430	Limestone, white, sandy, nodular, containing a few small, black, phosphatic pebbles, and many worn fragments of fossil shells, among which are *Barnea* sp., *Ostrea* sp., large echinoid spines, and crab claws. About 50 percent of the sample is composed of fine-grained, angular, clear quartz sand, and many small, black, phosphatic pebbles.

Depth (feet)	Description
430- 450	Like sample at 410-430 ft., but showing an increase in sand content.
	Oligocene Series
	Upper Oligocene Suwannee Limestone.
450- 460	Limestone, white, hard, nodular. Some fragments of the limestone are porous and oolitic, and many fragments contain worn and broken fossil shells. Megafossils are, chiely, *Ostrea* sp., *Pecten* sp., and Echinoids. Microfossils are, chiefly, molds of a small, sharply conical form of *Coskinolina cookei*, poorly-preserved specimens of *Archais* sp. and *Rotalia* cf. *R. mexicana*, and a few specimens of *Gypsina* sp., *Elphidium* cf. *E. chapmani*, *Eponides* sp., and *Quinqueloculina* spp.
460- 470	Limestone, white, hard, fossiliferous, containing many specimens of: *Coskinolina cookei* (typical form) *Valvulammina* sp. (Cushman and McGlamery) *Quinqueloculina* cf. *Q. lustra* *Quinqueloculina* cf. *Q. glabrata* *Textularia* cf. *T. subhauerrii* *Valvulina* sp. (Cushman and McGlamery) Echinoid fragments
470- 490	No change.
490- 500	Similar to samples at 450-470 ft., but the fossil material is less well preserved.
	Eocene Series
	Upper Eocene. Ocala Limestone. Upper Member.
500- 510	Limestone, cream, hard, highly fossiliferous. The dominant macrofossils are fragments of Bryozoa, *Ostrea* sp., and *Pecten* sp. Microfossils are, chiefly, specimens of *Operculina* cf. *O. floridensis*, *Lepidocyclina ocalana*, *Asterocyclina georgiana*, *Sphaerogypsina globula*.
510- 520	No sample.
520- 530	Limestone, cream, coquinoid, composed, mainly, of calcitised bryozoan fragments, many specimens of *Operculina* sp., and a few specimens of *Lepidocyclina* sp.
530- 540	Limestone, white, hard, coquinoid, composed of fragments of Bryozoa, *Ostrea* sp., *Pecten* sp., and many specimens of species of Foraminifera as in sample at 500-510 ft.
540- 550	Like sample at 530-540 ft., containing many specimens of Foraminifera. The most abundant species are: *Lepidocyclina ocalana* *Operculina floridensis* *Heterostegina ocalana* *Asterocyclina georgiana* *Cibicides lobatulus* var. *Sphaerogypsina globula* *Eponides budensis*

Depth (feet)	Description
	Eponides jacksonensis *Eponides* n. sp. *Guttulina irregularis* *Siphonina jacksonensis* *Nonion advenum* var.
550- 560	Like sample at 530-540 ft. The most abundant species are: *Operculina floridensis, Asterocyclina georgiana,* and *Heterostegina ocalana. Robulus limbosus* var. is fairly common, and other species are as listed in sample at 540-550 ft.
560- 570	Like sample at 550-560 ft.
570- 580	Like sample at 550-560 ft. Specimens of *Lepidocyclina* cf. *L. cookei* are common.
580- 590	No sample.
590- 600	Like sample at 570-580 ft.
600- 626 T.D.	Like sample at 570-580 ft.

BROOKS COUNTY

Operator: D. E. Hughes
Landowner: E. M. Rogers, Sr., Well 1 B

Location: Land District 12, Land Lot 454
2830 ft. south and 1570 ft. west of northeast corner of Land Lot 454.

GGS. No. 184
Elevation: 136 ft. (derrick floor)
Total depth: 3850 ft.
Completed: Apr. 12, 1949

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Paleocene		
in beds containing Tamesí fauna; 1st sample at 2200 ft.	?	?
Cretaceous		
Gulf		
Beds of Navarro(?) age or Taylor (?) age	2230	100
Beds of Taylor age (definite)	2330	220
Beds of Austin age	2550	540
Atkinson Formation, upper member	3090	300
do lower member	3390	230
Comanche undifferentiated	3620	230
	to total depth	

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-2200	Samples not studied.
	Tertiary
	In Paleocene Series
2200-2210	Shale, gray, marly, and fine to medium-grained sand, 50 percent of sample; specimens of species of Foraminifera indicative of the beds of Paleocene age containing the Tamesí fauna, 50 percent of sample.
2210-2220	Sample not studied.
2220-2230	Like sample at 2200-2210 ft. and some large nodules of glauconite.
	Cretaceous
	Gulf Series
	Beds of Navarro (?) age or Beds of Taylor (?) age.
2230-2240	Like sample at 2200-2210 ft., but contains a few specimens of *Globotruncana* sp. marking the top of the Cretaceous.
2240-2250	Shale, gray, marly, and a few fragments of glauconite about 50 percent of sample; fine to moderately coarse grained sand (possibly caving) about 50 percent of sample. Specimens of *Globotruncana* sp. and other Cretaceous Foraminifera present.
2250-2330	Samples not studied.
	Beds of Taylor age (definite)
2330-2340	Shale, gray, marly. Fauna consists of many specimens of Foraminifera including the typical Taylor species *Bolivinoides decorata* and *Bolivina incrassata.*
2340-2350	Marl, like sample at 2330-2340 ft., a little light-gray chalky marl, and specimens of *Stensiöina americana* and *Globorotalites conicus.*
2350-2550	Samples not described, but are composed, mainly, of medium-grained sand and gray, soft, chalky marl and shade.
	Beds of Austin age (electric log correlation)
2550-2560	Shale, gray, several types, a little chalky marl, and a few fragments of white, hard unfossiliferous (?) chalk, about 50 percent of sample. Sand is about 50 percent of sample. The foraminiferal fauna contains specimens of typical Taylor species.
2560-2570	Marl, a little white hard chalk, fragments of *Inoceramus*, and the usual cavings of sand.
2570-2610	Samples not studied.
2610-2620	Similar, in general, to sample at 2560-2570 ft., but contains many *Inoceramus* fragments and a few chips of gray marly shale irregularly streaked with soft white chalk.
2620-2640	Samples not studied.

Depth (feet)	Description
2640-2650	Sand, 50 percent; several types of gray shale and a few fragments of chalk 50 percent. Material being drilled is possibly a soft white chalk containing many *Inoceramus* fragments and a non-diagnostic microfauna.
2650-2660	Like sample at 2640-2650 ft., and a few specimens of *Planulina austiniana.*
2660-2670	Sample not studied.
2670-2680	Like sample at 2640-2650 ft., and a few specimens of *Kyphopyxa christneri* and *Pseudogaudryinella capitosa* var. (early Taylor or late Austin age).
2680-2740	Samples not studied.
2740-2750	Sample is mainly sand (caving?), fragments of gray shale, and foraminiferal specimens from various higher levels. A few fragments and nodules of white chalk probably indicate the material being drilled at this depth. Many nodules of pyrite are present, and also a few specimens of Foraminifera and Ostracoda that are indicative of the early Taylor or late Austin age of the beds; *Inoceramus* fragments are fairly common.
2750-2760	Sample not studied.
2760-2770	Mainly cavings of sand, gray marl, and specimens of Foraminifera.
2770-2800	Samples are about 75 percent medium-grained, angular sand and 25 percent *Inoceramus* fragments and specimens of Foraminifera.
2800-2810	Shale, gray, marly, a little sand, a few *Inoceramus* fragments, and a few specimens of Foraminifera that are not narrowly restricted. Also observed were a few specimens of *Cythere simplicate* that is common in the beds of late Austin age although present in the beds of early Taylor age.
2810-2870	Like the sample at 2800-2810 ft.
2870-2880	Shale, gray, showing the typical speckled appearance of the lower part of the beds of Austin age.
2880-2910	Like the sample at 2870-2880 ft.
2910-2920	Shale, gray, marly, a little sand, and a few highly speckled fragments of shale. Specimens of Foraminifera are mainly *Globigerina* sp. and *Gümbelina* sp.; specimens of *Globorotalia umbilicata* (common in the lower part of the beds of Austin age in southern Georgia) are common. Fragments of *Ostrea* sp. are also present.
2920-3011	Samples not studied.
3011-3021	Core 2. Recovery 10 ft. Top. Sandstone, light-gray, soft, fine-grained, even-grained, argillaceous, micaceous slightly glauconitic. Middle. Sandstone, gray, fine-grained, argillaceous, micaceous, glauconitic, calcareous; fragments of *Ostrea* sp. present. Bottom. Like middle part of core.

Depth (feet)	Description
	A sample of cuttings from this depth shows gray, hard, sandy nodules and many fragments of *Ostrea* sp., suggesting a beach or near-shore depositional environment.
3021-3040	Samples not studied.
3040-3050	Sand and sandstone, like sample at 3011-3021 ft.; many fragments of white, hard, highly sandy (fine-grained sand), somewhat glauconitic chalk; many fragments of *Ostrea* sp., microfauna nondiagnostic.
3050-3090	Samples not studied.
	Atkinson Formation. Upper Member.
3090-3100	Shale, sandy and many fragments of *Ostrea* sp.; fragments of white, fine to medium-grained, calcareous sandstone, containing fragments of *Ostrea* sp., phosphatic bone fragments, and a trace of glauconite.
3100-3110	Shale, grayish-green, flaky; abundant fragments of sandstone, like sample at 3090-3100 ft., containing glauconitic and phosphatic material, and many fragments of shells.
3110-3120	Sample not studied.
3120-3130	Sandstone, shell fragments, and cavings from higher levels; a little grayish-green flaky shale.
3130-3380	Samples in this interval are composed of fragments of sandstone like the samples below 3090 ft.; cavings of shale from higher levels; fragments of grayish-green shale; fragments of shells of macrofossils; and a few nondiagnostic specimens of Foraminifera that are probably caving. The white-speckled appearance of some fragments of the grayish-green shale is due to the high content of comminuted tests of microfossils. A few fragments of lignite are usually present in the samples. The quantity of sandstone fragments decreases progressively with depth, and the samples in the lower part of the interval are composed mainly, of grayish-green shale, fine-grained sand and a few cavings from higher levels.
3380-3390	Shale, green, sandy (fine-grained sand), and a mixture of material caving from higher levels. Fragments of light greenish-gray, very finely granular limestone containing broken shells of macrofossils are probably from the strata penetrated near this depth. Fragments of the green shale contain a few specimens of *Planulina eaglefordensis*.
	Atkinson Formation. Lower Member.
3390-3400	Like the sample at 3380-3390 ft.; a few fragments of green, flaky, waxy, highly micaceous shale, and a little greenish-gray fossiliferous limestone.
3400-3410	Shale, grayish-green, and sand; a little green, micaceous shale.

Depth (feet)	Description
3410-3430	Samples not studied.
3430-3440	Shale, grayish-green.
3440-3460	Samples not studied.
3460-3470	Shale, grayish-green, containing a few specimens of *Ammotium braunsteini* (an arenaceous species characteristic of the lower member of the Atkinson Formation).
3470-3480	Shale, grayish-green, containing specimens of *Ammobaculoides plummerae*.
3480-3490	Shale, some fragments of which are microfossiliferous; a few fragments of cream pyritic limestone containing broken shells of macrofossils.
3490-3500	Shale, dark greenish-gray, containing a few dwarf specimens of Foraminifera, and a few specimens of arenaceous species characteristic of the lower member of the Atkinson Formation.
3500-3543	No change.
3543-3556	Core 3. Recovery 10 ft. Top. Sandstone, light-gray, soft, medium-grained, highly glauconitic, somewhat micaceous. Middle. Like the top sample, but slightly finer grained. Bottom. Sandstone, soft, medium to coarse-grained, loosely cemented.
3556-3560	No sample.
3560-3570	Shale, greenish-gray, and a little sandstone and unconsolidated sand.
3570-3620	No change.
	Comanche Series undifferentiated
3620-3630	Shale, like the sample at 3560-3570 ft., and a little unconsolidated sand containing a few coarse grains; also, dull grayish-brown, waxy, somewhat carbonaceous and sandy (fine-grained sand) shale containing nodules of siderite.
3630-3640	Like the sample at 3620-3630, but without the coarse grains of sand and showing an increase in the grayish-brown shale.
3640-3660	No change.
3660-3670	Sand, unconsolidated, coarse to very coarse, quartz, containing a few pink-tinted and yellow-tinted grains, a little feldspar, and a little colorless mica.
3670-3750	No change.
3750-3760	Sand, like the sample at 3660-3670 ft., and a few fragments of dark-red, waxy, finely micaceous shale.
3760-3850 T.D.	Sand, mainly coarse-grained quartz, containing some feldspar. At 3840-3845 ft. the samples show a few fragments of purplish-red, silty shale.

CALHOUN COUNTY

Operator: Sowega Minerals Exploration Co., Inc.
Landowner: J. W. West Well #1
Location: Land District 4, Land Lot 328; 200 ft. north of south line and 200 ft. east of west line of Land Lot 328.

GGS. No 192
Elevation: 345 ft.
Total depth: 5265 ft.
Completed: Jan. 13, 1950

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Samples not studied		
Cretaceous		
Gulf		
Beds of Navarro age	560[1]	410
Beds of Taylor age	970	450
Beds of Austin age	1420	680
Atkinson Formation, upper member	2100	550
do lower member	2650	270
Comanche undifferentiated	2920	930?
Triassic (?)		
Upper Triassic (?) Newark (?) Group		
clastic rocks	3850?	1340?
diabase	5190	75
	to total depth	

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0- 770	Samples not studied by E. R. Applin.
	Cretaceous
	Gulf Series
	Beds of Navarro age
560- 600	"Sand: fine to coarse-grained, angular grains. May represent basal Clayton Formation."[1]

[1]Herrick, S. M., 1961, Ga. Geol. Survey Bull. 70, p. 57.

Depth (feet)	Description
600- 770	"Marl: gray, silty, micaceous, glauconitic, fossiliferous (macroshells, ostracodes, and Foraminifera); xxx, *Anomalina pseudopapillosa* at 680-690."[2] This fossil is classified by E. R. Applin as Navarro age.
770- 780	Description of samples by E. R. Applin begins at this depth. Sand, fine to coarse-grained, quartz; fragments of white limestone and a little glauconite, probably caving from higher levels; fragments of light-gray, sandy, (fine-grained sand), chalky clay, probably the material being drilled at this depth. Specimens of *Anomalina pseudopapillosa* present.
780- 790	Like sample at 770-780 ft., and a few specimens of *Globigerina cretacea.*
790- 800	Sand, fine-grained, angular grains; a little coarse-grained sand; a little glauconite; and fragments of white limestone, probably all caving from higher levels. Many fragments of light-gray, highly sandy (fine-grained sand), calcareous, somewhat micaceous clay, that is probably the material being drilled at this depth. Sample contains a few small fragments of *Inoceramus* and other fossil bivalves; specimens of several species of ostracodes; and specimens of species of Foraminifera that are typical of the upper part of the beds of Navarro age: *Anomalina pseudopapillosa* (fairly common), *Globotruncana cretacea* (small specimens), *Robulus navarroensis,* and *Gaudryinella pseudoserrata.*
800- 810	Sample not studied.
820- 860	Like sample at 790-800 ft.; a few phosphatic nodules at 820-830 ft.
860- 870	Clay, gray, highly sandy (fine-grained sand), micaceous, like sample at 790-800 ft. Sample contains a trace of glauconite, a few phosphatic nodules, and a few nodules of pyrite. Specimens of Foraminifera are like those in sample at 790-800 ft., and in addition, many specimens of *Anomalina pinguis,* a few specimens of *Cibicides harperi* and several other rotalid forms; *Globotruncana cretacea* is slightly more common.
870- 900	No change.
900- 920	Like sample at 860-870 ft., but fine to coarse-grained sand is abundant. No change in fauna.
920- 940	Clay, light-gray, highly sandy, calcareous, micaceous, glauconitic, or argillaceous sandstone. Sample contains a few phosphatic nodules, a few fragments of *Inoceramus* and shells of other fossil bivalves; microfauna is unchanged.
940- 970	Like sample at 920-940 ft.; glauconite is about 10 to 20 percent of the samples.

[2]Herrick, S. M., 1961, Ga. Geol. Survey, Bull. 70, p. 57.

Depth (feet)	Description
	Beds of Taylor Age
970- 980	Sand, fine to coarse-grained quartz; glauconite is about 10 percent of the sample. Sample contains sandy marl and a microfauna similar to that in the beds of Navarro age with the addition of specimens of *Anomalina sholtzensis*.
980-1010	No change.
1010-1020	Marl, gray, sandy, highly glauconitic. Nodules of dark-green glauconite are about 50 percent of the sample; sand is composed of fine to coarse, angular grains of quartz, with medium grains strongly dominant. Sample contains many specimens of *Planulina dumblei, Anomalina sholtzensis, Bolivina incrassata, Gyroidina globosa,* and other species of Foraminifera.
1020-1070	Marl, gray, sandy, like sample at 1010-1020 ft., and much fine to coarse-grained sand washing from the marl; phosphatic nodules, and nodules of pyrite are also present; about 50 percent of the sample is composed of dark-green, irregularly rounded nodules of glauconite. The sample contains fragments of *Inoceramus* and shells of other fossil bivalves. The foraminiferal fauna is like that in the sample at 1010-1020 ft., and several species of *Globotruncana* are common.
1070-1080	Like the samples at 1020-1070 ft., but glauconite is about 25 percent of the sample.
1080-1100	Sand, gray, argillaceous, glauconitic. Glauconite is about 50 percent of the sample, and the sand is mainly clear, angular, medium grains of quartz. Phosphatic nodules, nodules of pyrite, and fragments of *Inoceramus* and other macrofossil shells are present. The foraminiferal fauna is like the sample at 1020-1070 feet.
1100-1200	Sand, fine to very coarse, quartz; coarse grains common; glauconite is about 10 to 25 percent of the samples. Samples contain fragments of sandy clay, pyrite nodules, shell fragments, and specimens of Foraminifera like those in the samples of the beds of Taylor age already described.
1200-1210	Sand, mainly medium to coarse-grained, that seems to wash from a gray, soft marly clay matrix. The sample contains about 25 percent glauconite, a few phosphatic nodules, nodules of pyrite, fragments of *Inoceramus* and other shells. Specimens of Foraminifera include species that are characteristic of the lower part of the beds of the Taylor age: *Pseudogaudryinella capitosa, Kyphopyxa christneri, Planulina dumblei, Globorotalites conicus,* and many specimens of several species of *Globotruncana* and *Globigerina*.
1210-1330	No change.
1330-1340	Like the sample at 1200-1210 ft., but the marly clay is darker brownish-gray.
1340-1420	No change.

Depth (feet)	Description
	Beds of Austin age
1420-1480	Shale, brownish-clay, calcareous.
1480-1510	Like the samples at 1420-1480 ft., and in addition, lenses of very fine-grained sandstone. The microfauna contains a few specimens of *Pseudoclavulina moorevillensis*, and many specimens of *Pseudogaudryinella capitosa* var. *serrulata*.
1510-1570	Like the samples at 1480-1510 ft. The material being drilled seems to be brownish-gray, soft clay shale and interbedded lenses of very fine grained sandstone. This fine-grained sandstone is about 75 percent of the samples. Medium-grained sand and glauconite in the samples is possibly caving. Shale is progressively more dominant with depth. The microfauna is like that in the sample 1480-1510 ft.
1570-1600	Like the samples at 1510-1570 ft., and in addition, a few fragments of *Citharina texana*.
1600-1630	Shale, gray, soft, flaky, micaceous; a little fine-grained, argillaceous, calcareous sandstone, and a few phosphatic nodules. Medium-grained sand and glauconite is possibly caving. No marked change in fauna; a few fragments of *Ostrea* sp., *Inoceramus*, and *Citharina texana*.
1630-1840	Like the sample at 1600-1630 ft., and many specimens of *Valvulineria infrequens*, many small *Gümbelinae*, a few specimens of *Planulina austiniana* and *Citharina texana*. The samples contain a few specimens of arenaceous Foraminifera that may be caving from higher levels.
1840-1870	Shale, gray, micaceous; about 10 percent fine-grained sand, and 5 percent glauconite; a few nodules of pyrite and phosphatic nodules. The sample seems to contain less sand than those immediately above. The fauna is composed of specimens of Foraminifera like those at 1630-1840 ft., and fragments of *Ostrea* sp. and *Inoceramus*.
1870-1900	Shale, gray, a little fine-grained sand, and a few fragments of fine-grained, chalky, micaceous sandstone. No marked change in fauna.
1900-1930	No samples.
1930-1960	Like the samples at 1870-1900 ft., fragments of *Ostrea* sp. and *Inoceramus* are somewhat more abundant.
1960-1990	Like the samples at 1870-1900 ft., but the soft gray shale and fine-grained sand are each about 50 percent of the sample; a little glauconite present. No change in shell fragments and microfauna.
1990-2100	Like the samples at 1960-1990 ft., with the addition of a few fragments of light-gray, very finely granular limestone. Specimens of *Valvulineria infrequens* are fairly common in the microfauna.

Depth (feet)	Description
	Atkinson Formation. Upper Member.
2100-2140	Lithology and fauna like the samples at 1990-2100 ft., with the addition of many fragments of white, fine to medium-grained, glauconitic, micaceous, somewhat phosphatic sandstone.
2140-2170	Like the sample at 2100-2140 ft., and also fragments of light greenish-gray flaky shale, a little carbonaceous material, a few coarse grains of sand, and a few large phosphatic nodules. The samples contain fragments of heavy-shelled *Ostrea*-like bivalves, specimens of *Planulina eaglefordensis*, an Eagle Ford type of *Valvulineria*, a small arenaceous form, and other specimens of Foraminifera that are caving from higher levels.
2170-2200	This sample seems to mark a change from the deeper-water marine facies of the upper Atkinson above, to the shallow-water marine facies, below.
	Sand, fine to coarse-grained, quartz, in which coarse grains are common, and a few pink grains are present. The sample contains a few fragments of lignite, phosphatic nodules, nodules of pyrite, shell fragments, and a few siderite spherules.
2200-2300	Sand, coarse-grained, quartz, containing a few pink grains, a few large phosphatic nodules, and a few pyritized fragments of carbonaceous material.
2300-2330	Like the samples at 2200-2300 ft.; also a fragment of yellow, unctuous, sandy clay and a few siderite spherules.
2330-2360	Sand, moderately coarse-grained, clear, quartz; no colored shale or siderite.
2360-2390	Sand like the sample at 2330-2360 ft., and a few fragments of red and grayish-green mottled micaceous shale.
2390-2420	Sand like the sample at 2330-2360 ft.; no shale.
2420-2450	Sand and a few fragments of red and grayish-green mottled shale.
2450-2635	No change.
2635-2650	Sand, medium to coarse-grained, and a few siderite spherules.
	Atkinson Formation. Lower Member
2650-2690	Sand, like sample at 2635-2650 ft., a few fragments of *Ostrea* sp., a little dark-gray, flaky shale, and a little grayish-green shale.
2690-2720	Like the sample at 2650-2690 ft., but showing an increase in the fragments of dark-gray flaky shale. A few small specimens of arenaceous species of Foraminifera are questionably indigenous.
2720-2750	Lithology and microfauna like the sample at 2690-2720 ft., although fragments of soft, gray, marly shale and specimens of Foraminifera from the beds of Austin age occur as cavings in this sample.
2750-2780	Sand, fine to coarse-grained, fragments of dark-gray and greenish-gray shale, and cavings from higher levels.

Depth (feet)	Description
2791	Core? Sand fine to very coarse-grained, fragments of carbonaceous material, a few nodules of pyrite and many fragments of dark-gray flaky shale. The microfauna contains specimens of *Ammobaculites bergquisti* and *A. agrestis*, that are typical of the lower member of the Atkinson Formation.
2780-2810	Sand, fine to coarse-grained, many nodules of pyrite, fragments of pyritized carbonaceous material, a few phosphatic nodules, and fragments of heavy-shelled *Ostrea*-like bivalves.
2810-2840	Sand, fine to very coarse-grained, with coarse grains common; many nodules of pyrite; a little pyritized lignite; a few shell fragments; fragments of several types of clay and shale similar to those observed in samples at higher levels, including fragments of red and green mottled shale. The shale fragments are probably caving.
2840-2920	No change.
	Comanche Series undifferentiated
2920-2960	Sand, like sample at 2810-2840 ft., but containing many yellow-tinted grains, a little feldspar, and a few fragments of mustard-colored waxy clay, or ochre mudstone, that is slightly gray and red mottled.
2960-2990	Mainly coarse-grained quartz sand and a little feldspar.
2990-3020	Like the sample at 2960-2990 ft., and many yellow and red coated and tinted grains, and a little amber and white feldspar.
3020-3200	No change.
3200-3260	Sand, like sample at 2960-2990 ft., but medium to moderately coarse grains dominant.
3260-3290	Sand, like the sample at 3200-3260 ft., and a few fragments of purplish-red and gray mottled finely micaceous shale.
3290-3320	Sand like the sample at 3200-3260 ft. This sample contains no shale.
3320-3380	Sand, fine to coarse-grained, containing a few yellow and a few pink-tinted grains, and many grains of feldspar.
3380-3410	Sand, like the sample at 3320-3380 ft.; also fragments of bright red shale, and dull-red and greenish-gray mottled, highly micaceous shale.
3410-3440	Sand, like the sample at 3320-3380 ft., and a little red shale.
3440-3500	Like the sample at 3320-3380 ft., and a few fragments of dark purplish-red, micaceous shale.
3500-3530	Sand, like the sample at 3320-3380 ft.; and a few fragments of red and dull-green mottled shale.
3530-3560	Sand, and a few fragments of dull-red and yellowish-green mottled micaceous shale. The ratio of sand to shale is less than in the immediately preceding samples, and some red shale is probably being drilled.

Depth (feet)	Description
3560-3620	Sand, but no red shale.
3620-3800	Sand, and a little dull-red and yellowish-green shale.
3800-3830	Sand, a little red and mottled shale, and many cavings of clay from the beds of the Gulf Series.
3830-3850	Like the sample at 3800-3830 ft., and a few large pebble-sized nodules of quartz and of feldspar.
	Triassic (?)
	Upper Triassic (?) Series
	Newark (?) Group
3850-3890	Sand, fine to very coarse-grained, many small pebbles of quartz and feldspar, and a few pebbles of basalt; a few fragments of red shale.
3890-3920	Like the sample at 3850-3890 ft., pebbles are less abundant.
3920-3950	Sand, fine to very coarse-grained, a few pebbles, and a few fragments of dull-red and green mottled shale.
3950-4010	No change.
4010-4040	Sand, fine to coarse-grained, and cavings.
4040-4070	Mainly cavings, and a little fine to very coarse grained sand.
4070-4100	Sand, fine to coarse-grained, quartz; a little feldspar and a few pebbles.
4100-4130	Mainly cavings, and some fine to coarse-grained sand.
4130-4160	Like the sample at 4100-4130 ft., and a few fragments of red and mottled shale.
4160-4220	Sand, fine to coarse-grained, a few fragments of dull-red and greenish-yellow mottled shale, and abundant cavings from the beds of the Gulf Series.
4220-4310	Sand, white, fine to coarse-grained, quartz; coarse grains common; a very few yellow and pink grains; a little feldspar.
4310-4370	Sand, fine to coarse-grained, quartz, but coarse grains are less common than in the samples at 4220-4310 ft. Sample contains a few pebbles, a few fragments of sandy limonite, and many cavings.
4370-4400	Sand, fine to coarse-grained, quartz, and a few pebbles.
4400-4430	Sand, like the sample at 4370-4400 ft., and cavings; each about 50 percent of sample.
4430-4460	Sand, fine to very coarse-grained; a few pebbles and a few fragments of sandy limonite. The sample is small, and before washing, was probably mainly cavings of sandy clay from the beds of the Gulf Series.
4460-4490	No sample.
4490-4580	Sand, fine to very coarse-grained; a few quartz pebbles and a few of sandy limonite; many cavings.

Depth (feet)	Description
4580-4610	Like the samples at 4490-4580 ft., and a little red mottled shale.
4610-4640	Sand, white, fine to coarse-grained, quartz; a few pebbles.
4640-4850	Like the sample at 4610-4640 ft.; a few fragments of red shale.
4850-4880	Sand, moderately coarse grained, quartz.
4880-5040	Sand, fine to moderately coarse grained, quartz; medium grains common.
5040-5050	Sand, fine to very coarse grained; about 75 percent of sample is cavings from higher levels.
5050-5060	Sand, medium-grained, quartz.
5060-5090	Sand, fine to coarse-grained quartz; abundant cavings.
5090-5100	Sand, fine to coarse-grained; a little feldspar.
5100-5170	Mainly cavings from beds of the Gulf Series; a little fine to very coarse grained sand.
5170-5180	Sand, fine to very coarse grained; a little feldspar; a few pink-stained nodules of sandy limestone.
5180-5190	Cavings from the beds of the Gulf Series and a little fine to coarse-grained sand.
5190-5200	Sand, fine to coarse-grained; abundant cavings from beds of the Gulf Series; many fragments of diabase, in part altered or weathered(?).
5200-5260	Diabase. The ratio of diabase to other materials in the cuttings increases progressively with depth.
5263-5265	T.D. Core. Diabase.

CAMDEN COUNTY

Landowner: Kraft Corporation
Location: St. Mary's Ga.
(drilled by Layne-Atlantic Co.)

GGS. No. 54
Elevation: 13 ft.
Total depth: 1060
Completed: ?

Fifty-one samples of cuttings were examined but not described in detail.[1]

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Pliocene or Pleistocene	0	70
Miocene		
lower and middle, Hawthorn Formation	70	420
No samples	490	70

[1]The depth to the top of each stratigraphic unit is based on paleontologic and lithologic data obtained from the microscopic study of the samples.

	Depth (feet)	Thickness (feet)
Eocene		
in upper, Ocala Limestone, upper member	560	300
lower member	860	170
upper middle, Avon Park Limestone	1030 to total depth	30

CAMDEN COUNTY

Operator: The California Company
Landowner: J. A. Buie, Well 1

Location: 4 miles west and 2 miles north of Tarboro, Ga.
Latitude 31° 03′ 01″ North
Longitude 81° 52′ 48″ West

GGS. No. 153
Elevation: 65 ft. (derrick floor)
Total depth: 4955 ft.
Completed: Mar. 26, 1948

Lithologic and paleontologic description of side-wall cores.

Depth (feet)	Description
1550	Chalk, white, slightly gray-spotted, porous, highly micro-fossiliferous; fossils are fragmented and calcitized. Fauna contains specimens of *Camerina* sp. and numerous specimens of *Asterigerina texana.*
	Age: early middle Eocene(?)
2700	Dolomite, white, nodular, coarsely crystalline, unfossiliferous.
	Age: not determined.
2965	Chalk, white, dolomitic, and grayish-green clay shale; no determinable fossils.
	Age: not determined.
3065	Dolomite, white, somewhat chalky, unfossiliferous, and fragments of nodules of bluish-green glauconite.
	Age: not determined.
3430	Marl, gray, containing fragments of *Inoceramus* and specimens of *Marginulina inconstantia, Pseudogaudryinella capitosa, Planulina dumblei.*
	Age: beds of early(?) Taylor age.
3700	Marl, gray, and a few green and brown nodules; contains fragments of *Inoceramus* and specimens of *Planulina austiniana.*
	Age: beds of Austin age.
3830	Shale, gray, flaky, marly. Fauna contains specimens of *Globotruncana* (an undescribed Austin form), *Citharina texana, Globigerina* sp., *Gümbelina* sp., *Gaudryina* sp. (an early Austin form), and ostracodes.
	Age: beds of early Austin age.

Depth (feet)	Description
3840	Marl, brownish-gray, light-speckled, and unidentified green nodules. Age: beds of Austin age.
3905	Marl, gray, containing fragments of specimens of a thin-shelled species of *Inoceramus*, crushed specimens of *Globigerina* sp. and *Citharina texana* (common), and specimens of *Gaudryina austiniana* and *Planulina austiniana*. Age: beds of Austin age.
3948	Marl, dark gray, light-speckled, containing specimens of *Gümbelina* sp. and *Globigerina* sp. Age: beds of Austin age.
4015	Marl, gray, hard, containing specimens of *Globigerina* sp., and a few specimens of *Gümbelina* sp. and *Globotruncana* sp. Age: not determined.
4075	Like side-wall core at 4015 ft.
4125	Marl, gray, containing a few fragments of fish bones and specimens of *Globigerina* sp., *Planulina eaglefordensis* (common), and *Valvulineria infrequens*. Age: upper member of Atkinson Formation.
4290	Shale, grayish-green, flaky, micaceous, containing many irregular-shaped siderite nodules. The fauna is composed of a few fish scales and fragments of fish bones, a few shell fragments and specimens of *Planulina eaglefordensis* which may have caved. Age: upper member of Atkinson Formation(?)
4385	Shale, dark-gray, hard micaceous. Age: lower member of Atkinson Formation(?).
4392	Shale, green, somewhat sandy in irregular areas, micaceous; contains a few moderately coarse grains and many green grains. Age: lower member of Atkinson Formation(?).
4555	Sand, moderately coarse, many green grains and a little pink feldspar. Age: Comanche(?).
4690	Igneous rock(?) Age: not determined.

CHARLTON COUNTY*

Owner Operator: State of Georgia, State Prison Camp (Folkston) Well 1

GGS. No. 185
Elevation: 75 ft.

*Publication of this data is authorized by the Sun Oil Company, for whom the report was prepared on a commercial basis.

Location: About 1 mi. south of Folkston, Ga., and 3 mi. north of bend in St. Marys River at Twp. 4N., Rge. 23E., Nassau County, Fla.

Total depth: 554 ft.
Completed: January 1941.

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
In **Miocene** undifferentiated	90 (1st sample)	326
Oligocene absent		
No samples	416	14
Eocene		
upper, Ocala Limestone, upper member	430 to total depth	124

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0- 90	No samples.
	Tertiary
	In Miocene Series, undifferentiated
90- 100	Limestone, gray, sandy, nodular, porous; a few nodules contain fragments of macrofossils.
115- 125	Clay, light-tan, highly sandy, containing many black phosphatic nodules, and a few worn fragments of a fossil bivalve.
118- 128	Clay, gray, waxy, slightly carbonaceous, irregularly sandy, containing small fragments of fragile chalky shells, and a few poorly-preserved, chalky molds of specimens of Foraminifera; *Rotalia beccarii* common.
128- 138	No samples.
138- 149	Clay, greenish-gray, highly sandy. The sand is clear quartz and very uneven grained. The clay contains many large, black, phosphatic nodules, and many worn and fragmented shells of fossil bivalves.
149- 158	No samples.
158- 168	Like sample at 138-149 ft., but shell fragments are rare.
168- 182	Like sample at 158-168 ft.
184- 194	Like sample at 168-182 ft., but the sand is finer grained.
194- 215	No change.

Depth (feet)	Description
215- 225	No samples.
225- 248	Sand, quartz, clear, uneven-grained (very fine to coarse), containing many black to brownish-black phosphatic nodules.
248- 258	Sand, quartz, clear, coarse-grained, containing many moderately large, black, phosphatic nodules.
258- 267	Clay, light-brown, gritty, highly sandy, phosphatic, containing a few calcareous nodules, and a few shell fragments that are possibly caving from higher levels.
267- 277	Clay, greenish-gray, phosphatic, highly sandy (very uneven grained clear quartz sand), containing a few calcareous nodules.
278- 286	Clay, grayish-tan, somewhat phosphatic, highly sandy (moderately fine, moderately even grained, clear quartz sand).
286- 307	Clay, tan, somewhat calcareous, somewhat phosphatic, highly sandy (very uneven grained sand).
307- 317	Sand, quartz, clear, moderately fine grained, moderately even grained (a few coarse grains), containing a few phosphatic nodules.
317- 327	No samples.
327- 357	Like sample at 307-317 ft.
357- 367	Like sample at 307-317 ft.; sand is chiefly coarse-grained.
367- 386	No change.
386- 396	Like the preceding samples, but sand is chiefly fine-grained.
396- 406	Clay, brown, gritty, calcareous, somewhat phosphatic, highly sandy; and black, carbonaceous clay. Nodules of the brown calcerous clay contain a few small fossil bivalves (Miocene forms).
406- 416	Sand, quartz, clear, tan, argillaceous, slightly calcareous, fine-grained, moderately even grained, containing a few phosphatic nodules.
416- 430	No samples.
	Eocene Series
	Upper Eocene. Ocala Limestone. Upper Member.
430- 445	Sand, quartz, clear, angular, moderately fine grained, moderately even grained, and about 10 percent small fragments of chalky limestone. A fragment of *Operculina* sp., and a bryozoan fragment occur in the limestone.
445- 517	No samples.
517- 526	Limestone, white chalky, containing many fragments of *Operculina floridensis*, many bryozoan fragments, and a few specimens of smaller Foraminifera common in the Ocala Limestone.
526- 540	Limestone, chalky, fossiliferous, like sample at 517-526 ft., and about 50 percent fine-grained clear quartz sand that is probably caving from higher levels. The sample contains specimens of a species of Bryozoa characteristic of the Ocala Limestone, and the microfauna is like that in the preceding sample.

Depth (feet)	Description
542- 547	Limestone and a little sand like sample at 526-540 ft.
547- 554	T.D. No change.

CLINCH COUNTY

Operator: Sun Oil Company
Landowner: W. J. Barlow well 1

Location: Land District 12, Land Lot 373, 1478 ft. north and 1754 ft. east of southwest corner of Land Lot 373.

GGS. No. 144
Elevation: 177 ft. (derrick floor)
Total depth: 3848 ft.
Completed: March 5, 1947

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Eocene		
In middle, undifferentiated at 2100 ft.	?	?
lower, clastic beds of Wilcox(?) age	2260	60
Salt Mountain Limestone	2320	100
Paleocene, beds containing Tamesí fauna	2420	435
Cretaceous		
Gulf		
Beds of Taylor age	2855	200
Beds of Austin age	3055	305
Atkinson Formation, upper member	3360	248
lower member	3608	181
Comanche undifferentiated	3789	45
Ordovician[1]		
Lower Ordovician(?) quartzitic sandstone	3834 to total depth	14

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

[1]Bridge, Josiah, and Berdan, J. M., 1951, U.S. Geological Survey open file report, p. 5, 6, and map.

Depth (feet)	Description
0-2100	Samples not studied.
	Eocene Series
	In middle Eocene, undifferentiated
2100-2120	Limestone, white, irregularly sandy (fine-grained sand); glauconitic, and a few fragments of light-tan chert. Sample contains a few small specimens of nondiagnostic species of Foraminifera.
2120-2130	Like sample at 2100-2120 ft., and in addition, many fragments of light grayish-cream, highly glauconitic, sandy (fine-grained sand) limestone.
2130-2140	Like the sample at 2120-2130 ft., but few fragments of dark glauconitic limestone.
2140-2150	Limestone, white, somewhat glauconitic, and fragments of light grayish-tan chert. A few specimens of several species of Foraminifera, including a specimen of *Asterigerina* sp.
2150-2160	Limestone and chert like the samples at 2100-2150 ft., but some fragments of limestone are highly glauconitic.
2160-2170	Like sample at 2150-2160 ft., and many fragments of white, chalky, dense, cherty limestone; chert abundant.
2170-2180	Limestone, glauconitic, many fragments of chert, and a little white ash.
2180-2200	Limestone and chert, like sample at 2170-2180 ft.
2200-2210	Limestone, slightly glauconitic, fragmental, porous, composed of a mass of small fragments of chert-cemented calcite that are probably derived from molds of altered fossil material.
2210-2220	Limestone, like the sample at 2200-2210 ft., containing many inclusions of calcite; many moderately large irregular-shaped nodules of calcite, and a little chert.
2220-2230	Limestone, light-cream, fragmental, slightly glauconitic; much light-tan chert.
2230-2240	Like the sample at 2220-2230 ft., but some fragments of limestone are highly glauconitic.
2240-2260	Limestone, fragmental, and a little chert, like the sample at 2230-2240 ft. A section of *Discocyclina* sp. in the sample at 2240-2250 ft.
	Lower Eocene. Clastic beds of Wilcox(?) age.
2260-2280	Shale, light-green, micaceous; a few fragments of limestone and a little chert like that described in the samples of the middle Eocene beds.
2280-2300	Like the samples at 2260-2280 ft., and many specimens of small Foraminifera; *Globigerina* sp., *Orbulina* sp., and *Discorbis* sp. are common.
2300-2310	Shale, like the samples at 2260-2300 ft., and many fragments of light greenish-gray, highly glauconitic, irregularly sandy, porous limestone, streaked with thin veins of chalcedony. Limestone

Depth (feet)	Description
	contains sections and small specimens of *Asterocyclina* sp. and a few bryozoan fragments.
2310-2320	Shale, light-green, highly glauconitic, irregularly sandy, containing phosphatic nodules and nodules of glauconitic limestone. A few nodules contain fragments of *Discocyclina* sp.
	Lower Eocene. Salt Mountain Limestone.
2320-2340	Limestone, white, fragmental, somewhat glauconitic, that seems to be composed of worn, chalky, calcitic molds and fragments of fossils. A few specimens of *Discocyclina weaveri* are present, and *Asterigerina* sp. is common.
2340-2350	Like sample at 2320-2340 ft., and many fragments of light grayish-brown, micaceous, fossiliferous chert.
2350-2380	Limestone, fragmental, somewhat glauconitic, composed of tests and altered fragments of macrofossils and microfossils; among the latter is *Discocyclina weaveri.*
2380-2390	Limestone, finely fragmental, somewhat sandy and glauconitic.
2390-2420	Like the sample at 2380-2390 ft., but the sand content of the limestone is between 50 and 75 percent; fine-grained, evenly distributed glauconite is about 25 percent. The sample at 2410-2420 ft. contains a little fine-grained, calcareous, glauconitic sandstone.
	Paleocene Series
	Beds containing Tamesí fauna
2420-2440	Clay, soft, which, when washed, leaves a moderately large residue of fine-grained, angular clear quartz sand and a few fragments of calcareous sandstone like sample at 2410-2420 ft. Sample contains a few phosphatic nodules. Fairly common specimens of Foraminifera are: *Darbyella?* sp., *Lenticulina degolyeri, Nodosaria latejugata,* and *Globigerina* sp.
2440-2460	Like sample at 2420-2440, and a few specimens of other small Foraminifera.
2460-2480	Clay, sandy; washed residue composed of sand and a few phosphatic nodules like sample at 2420-2440 ft., fragments of calcerous, glauconitic sandstone, and specimens of small Foraminifera.
2480-2490	Like samples at 2460-2480 ft. Microfauna contains specimens of *Nodosaria latejugata, Lenticulina degolyeri,* and *Darbyella?* sp. like sample at 2420-2440 ft.; many specimens of *Globigerina triloculinoides,* and *Cibicides* cf. *C. praecursorius; Globorotalia acuta, G. velascoensis,* and *Eponides lotus* are common.
2490-2540	No change.
2540-2550	Moderately large washed residue composed of sand like sample at 2420-2440 ft., fragments of light-green, micaceous clay shale,

Depth (feet)	Description
	and many fragments of light-gray, highly sandy (fine-grained sand), finely glauconitic limestone that is possibly nodular in the clay shale. Specimens of *Darbyella?* sp., *Lenticulina degolyeri*, and *Nodosaria latejugata* very common; *Globigerina* sp., *G. triloculinoides*, and other small Foraminifera, like sample at 2480-2490, are also present.
2550-2610	No change.
2610-2620	Like samples at 2540-2610 ft.; also abundant fragments of white, hard, dense, slightly glauconitic limestone, and several fragments of light-gray, fragmental, porous, slightly glauconitic limestone.
2620-2630	Sample seems to be a mixture of materials described from higher levels.
2828	Sidewall core 64. Recovery 1 in. Clay, bluish-gray, slightly micaceous, somewhat glauconitic, highly calcareous, containing much comminuted microfossil material. Glauconite occurs as small bluish-green nodules. Microfossils are common, but are usually chalky, very small, and poorly preserved. The fauna, which is Paleocene in age, contains specimens of *Cibicides* sp., *Anomalina* sp., and *Globigerina triloculinoides*.
2630-2860	Cutting samples not studied.

Cretaceous

Gulf Series

Beds of Taylor age

The top of the beds of Taylor age is placed at 2855 ft. on the basis of electric log correlation supported by the data from samples.

2860-2880	Chalk, white, and cavings of light-green shaly clay. Fragments of *Inoceramus* wash from the chalk, and *Inoceramus* fragments and prisms are abundant in the sample. Specimens of Foraminifera and Ostracoda are common. Dominant species of Foraminifera are *Dorothia conula, Planulina cedarkeysensis*, and *Planulina dumblei*.
2880-2890	Like the samples at 2860-2880 ft.; numerous specimens of *Arenobulimina americana*, and a few specimens of *Kyphopyxa christneri*.
2890-2900	Material and fauna like the samples of chalk in the beds of Taylor age at 2860-2890 ft.
2900-2940	Like the sample at 2890-2900 ft., but cavings of light-green clay shale are very abundant.
2940-2950	Chalk, white, and *Inoceramus* fragments about 50 percent of washed sample; cavings of light-green clay shale about 50 percent of washed sample. Foraminiferal fauna contains species listed in samples at 2860-2880 ft. and 2880-2890 ft.

Depth (feet)	Description
2950-2960	Chalk, white, soft. The small washed residue of this sample is composed mainly, of *Inoceramus* prisms and fragments, and many specimens of Foraminifera. *Globotruncana* sp., *Globigerina cretacea*, and *Gümbelina* sp. are the most common species; *Kyphopyxa christneri*, *Pseudogaudryinella capitosa*, *Robulus* spp., and *Marginulina* spp. are also common. A few specimens of *Globorotalites umbilicatus*, *Eouvigerina americana*, *Heterostomella austiniana*, and *Planulina austiniana* are present. On the basis of the microfauna, the age of the containing beds is classified as early Taylor or late Austin.
2960-3000	No change.
3000-3010	Limestone, light-gray, chalky, and nodules of pyrite. The small washed residue contains fragments of *Inoceramus* and *Ostrea*-like bivalves, and a foraminiferal fauna similar to that in the sample at 2950-2960 ft.
3010-3060	No change.
	Beds of Austin age
	The top of the beds of Austin age is placed at 3055 ft. on the basis of electric log correlation supported by the data from samples.
3060-3070	Limestone, white, hard, chalky, containing much comminuted, calcitized fossil debris. Fragments of the limestone show masses of *Oligostegina* that are common in the beds of Austin age. Fragments of *Inoceramus* and shells of other fossil bivalves are common. The microfossil material is usually poorly preserved, and no species having a narrowly restricted vertical range were identified.
3070-3080	Limestone, like the sample at 3060-3070 ft., and a little gray marl. The sample contains many fragments of *Inoceramus* and shells of other fossil bivalves; the microfossil material is like that in the sample at 3060-3070 ft.
3080-3090	Marl, gray; many fragments of *Inoceramus;* a few fragments of moderately hard, white, limestone, like the sample at 3060-3070 ft.; abundant nodules of pyrite. The foraminiferal fauna is composed, largely, of specimens of *Globigerina* cf. *G. cretacea*, and *Gümbelina* cf. *G. moremani;* specimens of *Valvulineria* sp. and *Planulina austiniana* are common; a few specimens of *Globotruncana* sp. and *Dorothia* cf. *D. alexanderi* (often common in the lower part of the beds of Austin age) are present. Specimens of ostracodes and a few specimens of arenaceous species of Foraminifera also occur in the sample.
3090-3120	No change.
3120-3130	Shale, gray, marly, and harder than in the sample at 3080-3090 ft. The microfauna is composed almost entirely of specimens of *Globigerina* sp. and *Gümbelina reussi*, and a few specimens of *Planulina* cf. *P eaglefordensis* and *Globotruncana* sp.
3130-3150	Like the sample at 3120-3130 ft.

Depth (feet)	Description
3160-3170	Like sample at 3120-3130 ft. The microfossil specimens are larger and more abundant than in the sample at 3120-3130 ft., but *Globigerina* spp. and *Gümbelina* spp. are still strongly dominant in the fauna; *Globotruncana* spp. are somewhat more common; fragments of *Citharina texana* are very common. *C. texana* is common near the base of the Mooreville chalk of Austin age at the outcrop in Alabama, and one of the species of *Globotruncana* is also common in the lower part of the Austin chalk.
3170-3180	Like the sample at 3160-3170 ft.; *Citharina texana* is much less abundant.
3180-3210	Material and fauna like the preceding samples of the beds of Austin age are mixed with cavings from much higher levels.
3190	Side wall core 65. Recovery 1-3/4 in. Shale, greenish-gray, flaky, marly, slightly micaceous, containing *Inoceramus* fragments, a few fragments of fish bones, and abundant specimens of *Globigerina* cf. *G. Cretacea, Gümbelina reussi, Globotruncana* spp. (including an undescribed form characteristic of the beds of Austin age), and *Anomalina* sp. (small).
3210-3270	Shale, gray, marly, and fauna like the sidewall core 65 at 3190 ft.
3233	Side wall core 66. Recovery 1-1/4 in. Marl, light bluish-gray, chalky, containing abundant fragments of *Inoceramus* and shells of other fossil bivalves, and many specimens of Foraminifera like those in sidewall core 65 at 3190 ft. Also, specimens of *Neobulimina canadensis, Palmula suturalis, Palmula pilulata,* and *Valvulineria infrequens.* Specimens of ostracodes are common: *Cythere cornuta* var. and *Cytherella* sp.
3233	Sidewall core 67. Recovery 1 in. Shale, gray, marly; *Inoceramus* prisms and fragments are common. The microfauna is composed of specimens of several species of ostracodes, and specimens of *Globigerina* sp., *Globotruncana marginata. Kyphopyxa christneri, Gümbelina reussi, Valvulineria infrequens* (Austin var.), *Nodosaria* sp. (fragments), *Planulina austiniana, Robulus münsteri,* and *Marginulina inconstantia?.*
3262	Sidewall core 68. Recovery ½ in. Chalk, light-gray, marly, typically Austin in character; contains specimens of *Oligostegina, Inoceramus* fragments and ostracodes, and abundant specimens of Foraminifera: *Globigerina* sp., *Gümbelina reussi, Globotruncana* spp. fairly common, and a few specimens of a small *Anomalina* sp.
3270-3310	Shale, gray, marly, and abundant fragments of dark brownish gray somewhat light-speckled and light-streaked shale.
3303	Sidewall core 69. Recovery 1 in. Marl, gray, streaked and speckled with white chalk, highly microfossiliferous. The fauna is composed, mainly, of specimens of *Globigerina* sp., *Gümbelina reussi, Globotruncana arca, Planu-*

Depth (feet)	Description
	lina texana, and *Pleurostomella watersi.*
3310-3320	No samples.
3316	Sidewall core 70. Recovery 1/4 in. Chalk, white, marly; fauna like sidewall core 69 at 3303 ft.
3320-3330	No samples.
3324	Sidewall core 71. Recovery 1 in. Shale, greenish-gray, marly, sandy (fine-grained sand), glauconitic, micaceous, containing phosphatic nodules. The fauna is composed of fragments of fish bones, *Inoceramus*, and other fossil bivalves, specimens of several species of *ostracodes*, and specimens of Foraminifera: *Globigerina* spp. *Gümbelina reussi, Gümbelina moremani, Globotruncana arca* var., *Planulina texana, Palmula pilulata, Marginulina austiniana.*
3330-3350	Shale, gray, and some speckled shale; no change in fauna.
3335	Sidewall core 72. Recovery 1¼ in. Shale, gray, marly, highly microfossiliferous. The fauna is composed of fragments of *Inoceramus* and fish bones, specimens of ostracodes, and specimens of Foraminifera; *Globigerina* sp., *Globotruncana arca*, var., *Globorotalia cushmani?, Güembelina reussi, Gümbelina moremani, Marginulina austiniana, Planulina texana?.*
3350-3360	Material and fauna like samples at 3330-3350 feet; also many fragments of white, moderately coarse grained, clear quartz sandstone, containing many phosphatic nodules, nodules of pyrite, and worn fragments of fossil bivalves.
	Atkinson Formation. Upper Member.
3360-3366	Core 6. Recovery 8 in. Sandstone, white, dense, calcareous, quartz; contains phosphatic nodules and fragments of *Ostrea-like* bivalves.
3366-3367	Core 7. Recovery 5 in. Sandstone, grayish-white, moderately fine grained, calcareous, quartz, containing mica, glauconite, fragments of lignite and fossil bivalves.
3367-3372	Core 8. Recovery 5 ft. Top ½ ft. Sandstone, light-gray, hard, dense, micaceous, somewhat fossiliferous, containing fragments of fossil bivalves. Middle 2 ft. Sandstone, light greenish-gray, soft, fine-grained, argillaceous, micaceous, containing small, black, phosphatic nodules, and thin lenses of gray and greenish-gray flaky shale. Bottom 2½ ft. Sandstone, soft, like middle 2 ft., but the sand grains are slightly coarser. The sandstone contains irregular thin lenses of gray and greenish-gray, somewhat sandy and micaceous shale.
3372-3382	Core 9. Recovery 10 ft. Top 4 ft. Siltstone and sandstone, greenish-gray, soft, fine-

Depth (feet)	Description
	grained, argillaceous, micaceous, glauconitic, pyritic, containing a few lenses of greenish-gray, flaky, sandy (fine-grained sand), micaceous shale. Middle 3 ft. Shale, grayish-green, thinly laminated, and white, highly micaceous siltstone, containing a few fragments of carbonaceous material and a few nodules of pyrite. Parts of the core are predominantly shale that is micaceous, irregularly silty, and somewhat carbonaceous. Bottom 3 ft. Sandstone containing lenses of shale. The sandstone is white, dense, fine to moderately fine grained, angular, clear quartz, containing many phosphatic nodules and a few shell fragments. The shale is greenish-gray to green, usually micaceous and somewhat carbonaceous.
3382-3392.	Core 10. Recovery 7 ft. Top 5 ft. Shale, grayish-green, irregularly silty, micaceous, somewhat carbonaceous, containing lenses of light-gray micaceous, containing lenses of light-gray micaceous siltstone, and specimens of a small *Globigerina* sp., *Gümbelina moremani*, *Gümbelina reussi*, and *Planulina eaglefordensis*. A few thin lenses of hard sandstone occur in the shale. Bottom 2 ft. Sandstone, light greenish-gray, fine-grained, micaceous, argillaceous, slightly glauconitic; contains carbonaceous material and fossil bivalves.
3392-3401	Core 11. Recovery 4½ ft. Top. Shale, light-gray, slightly micaceous, containing a few lenses of soft, fine-grained, micaceous sandstone. Middle. Sandstone, white, dense, hard, somewhat glauconitic, containing a few phosphatic nodules and many fragments of fossil bivalves. Bottom 1½ ft. Shale, grayish-green, and moderately fine-grained quartz sandstone containing phosphatic nodules.
3401-3411	Core 12. Recovery 7 ft. Top 1½ ft. Shale, greenish-gray, and a little white, dense, moderately fine-grained sandstone containing many worn and broken fragments of *Ostrea* sp., bryozoan fragments, and phosphatic nodules. Middle 2½ ft. Shale, light grayish-green, irregularly silty, micaceous, containing irregularly distributed soft, micaceous, slightly glauconitic siltstone. Bottom 3 ft. Shale, light greenish-gray, silty, micaceous, carbonaceous, containing many phosphatic nodules, a little glauconite, many small fragments of *Ostrea* sp., and a few specimens of Ostracodes.
3411-3421	Core 13. Recovery 2½ ft. Sandstone, light greenish-gray, soft, argillaceous, micaceous, glauconitic, containing a few shell fragments and phosphatic nodules.

Depth (feet)	Description
3421-3430	Core 14. Recovery 4 ft. Top 2 ft. sandstone, light greenish-gray, argillaceous, highly micaceous and glauconitic; contains phosphatic nodules and fragments of fossil bivalves. Bottom 2 ft. shale, grayish-green, somewhat micaceous, containing scattered grains of sand, fish bones, and a trace of glauconite.
3430-3440	Core 15. Recovery 8 ft. Top 5 ft. Sandstone, argillaceous, fine to moderately fine grained, micaceous, glauconitic; contains fragments and molds of fossil bivalves, and some fragments of phosphatized bones. Bottom 3 ft. Sandstone, light-green, soft, argillaceous glauconitic; contains a few shell fragments and small phosphatic fragments.
3440-3450	Core 16. Recovery 7 ft. No change.
3450-3460	Core 17. Recovery 9 ft. Top. Sand, like core 16 at 3430-3440 ft., containing thin, irregular lenses and splotches of grayish-green shale. The material is slightly glauconitic, phosphatic, and fossiliferous (fragments of *Ostrea* sp.). Middle. Like the top part of the core, but more glauconitic. Bottom. Like the middle part of the core.
3460-3470	Core 18. Recovery 2 ft. No change.
3470-3480	Core 19. Recovery 1½ ft. Top. Sandstone, white, hard, and green, soft, sandy clay. The sandstone is dense, fine to moderately fine grained, calcareous, and contains abundant fragments of white, chalky, shell fragments and many nodules of glauconite and phosphatic material. The green clay is highly sandy and contains a few shell fragments. Bottom. Sandstone, light-gray, dense, containing shell fragments and nodules of both glauconite and phosphatic material.
3480-3488	Core 20. Recovery 3 ft. Top. Sandstone, greenish-gray, glauconitic, phosphatic, like core 19 at 3470-3480 ft., and lenses of thinly flaky green shale. The sandstone contains shell fragments. Bottom. Shale, grayish-green, flaky, interlaminated with light-gray, soft, very fine grained, argillaceous, micaceous, phosphatic, glauconitic sandstone.
3488-3498	Core 21. Recovery ½ ft. Sandstone, light greenish-gray, very fine grained, in part dense, and in part argillaceous; contains mica, shell fragments, phosphatic nodules, and many irregular-shaped, gray nodules of calcitic limestone.

Depth (feet)	Description
3498-3508	Core 22. Recovery 4½ ft. Top. Sandstone, light grayish-green, shaly, micaceous, and lenses of dark grayish-green, thinly flaky shale; contains a few shell fragments, phosphatic nodules, and a little glauconite. Middle. Shale, green, micaceous. Bottom. Shale, like middle part of core, irregularly streaked with micaceous, pyritic, slightly carbonaceous siltstone; contains a few specimens of Ostracodes.
3508-3518	Core 23. Recovery 7½ ft. Top. Shale, like the middle and bottom parts of core 22 at 3498-3508 ft., containing many sandy areas. Fauna consists of a few fragmentary fish bones and a few small specimens of *Globigerina* cf. *G. cretacea.* Middle. Sandstone, light greenish-gray, moderately soft, micaceous, somewhat phosphatic, and containing brown carbonaceous fragments; a few lenses of flaky green shale in the sandstone. Bottom. Shale, green, irregularly sandy (fine-grained sand), micaceous, carbonaceous.
3518-3528	Core 24. Recovery 7 ft. Top 3 ft. Shale, like bottom part of core 23 at 3508-3518 ft. Part of this section of core 24 is sandy, (coarse-grained sand), and contains many phosphatic nodules, nodules of pyrite, and fragments of *Ostrea* sp. Middle 3 ft. Sandstone, light greenish-gray, soft, argillaceous, micaceous, glauconitic, pyritic, and a few thin, irregular lenses of green shale. Bottom 1 ft. Sandstone, light greenish-gray, fine-grained, argillaceous, micaceous; contains a few fragments of carbonaceous material, phosphatic nodules and *Ostrea* sp.
3528-3538	Core 25. Recovery 7 ft. Top. Sandstone, fine to moderately fine grained, slightly glauconitic, phosphatic, and pyritic, irregularly interbedded with green, micaceous, somewhat carbonaceous shale that occurs in lenses of variable thickness. Middle. Like top of this core. Bottom. Sandstone, white, hard to moderately hard, fine to moderately coarse grained, containing a few phosphatic nodules, a few nodules of glauconite, and chalky fragments of fossil bivalves.
3538-3548	Core 26. Recovery 3 ft. 8 in. Top 30 in. Sandstone, light greenish-gray, soft, glauconitic, micaceous, somewhat carbonaceous, containing a few inclusions and thin lenses of shale. Middle. 6 in. Sandstone, soft, argillaceous, somewhat glauconitic, micaceous, and carbonaceous, irregularly interlaminated with shale and siltstone.

Depth (feet)	Description
	Bottom 8 in. Sandstone, light greenish-gray, argillaceous, micaceous, containing many fragments of lignite, a little phosphatic material, and a few fragments of glauconite-coated shells.
3548-3558	Core 27. Recovery 6½ ft.
	Top ½ ft. Sandstone like bottom of core 26 at 3538-3548 ft., and irregular thin lenses of shale.
	2nd 1 ft. Sandstone, light-gray, moderately hard, argillaceous, containing many shell fragments and black, phosphatic nodules, a little glauconite and mica, and a few thin irregular lenses of green shale.
	3d 1 ft. Like the second foot, but containing a few rather large fragments of lignite.
	4th 1 ft. Sandstone, light greenish-gray, soft, micaceous, containing a few shell fragments and thin lenses of shale.
	5th 1½ ft. Sandstone, light greenish-gray, soft, argillaceous micaceous, containing a few shell fragments, phosphatic nodules and a little carbonaceous material.
	6th 1½ ft. No sample?
3558-3560	Core 28. Recovery 2½ ft.
	Top. Sandstone, light-gray, moderately hard, argillaceous, containing irregular laminae of green shale. The sandstone is micaceous, slightly glauconitic and carbonaceous, and contains a little magnetite and a few shell fragments.
	Bottom. Like the top part of the core, but softer and contains phosphatic material.
3560-3570	Core 29. Recovery 7 ft.
	Top 2 ft. Shale, greenish-gray, micaceous, silty, containing abundant fragments of *Ostrea* ap.; small fragments of carbonaceous material are fairly common.
	Bottom 5 ft. Sandstone, grayish-green, fine-grained, micaceous, irregularly streaked with shale laminae, and containing many fragments of *Ostrea* sp. and a few phosphatic nodules.
3570-3578	Core 30. Recovery 4½ ft.
	Top. Sandstone, light greenish-gray, soft, argillaceous, glauconitic, micaceous, containing a few shell fragments and thin lenses of grayish-green flaky shale.
	Bottom. Sandstone similar to the top part of the core, containing small carbonaceous fragments and irregular thin streaks of shale.
3578-3588	Core 31. Recovery 6½ ft.
	Top 2 ft. Like the bottom of core 30 at 3570-3578 ft., but fragments of lignite and small fragments of carbonaceous material are abundant.
	Bottom 4½ ft. Sandstone, light-gray, moderately hard, calcareous, micaceous, containing abundant fragments of *Ostrea* sp., many small phosphatic fragments, and a little glauconite and carbonaceous material.

Depth (feet)	Description
3588-3598	Core 32. Recovery 5½ ft.
	Top 1½ ft. Sandstone, light greenish-gray, shaly and highly sandy clay shale. Parts of the core are white, hard, nodular, sandy (very fine grained sand) limestone, in which shell fragments and small phosphatic nodules are common.
	Middle 3 ft. Sandstone, light greenish-gray, hard, and a few irregular lenses of green, micaceous silt. The sandstone is glauconitic and contains many fragments of fossil bivalves and gastropods, and a few fragments of lignite.
	Bottom 1 ft. Sandstone like middle part of core, and lenses of grayish-green, micaceous shale that is usually silty and in places highly carbonaceous.
3598-3608	Core 33. Recovery 5½ ft.
	Top 2 ft. Shale, grayish-green flaky, containing lenses composed of mica and moderately small fragments of lignite.
	Middle 2 ft. Sandstone, light-gray, moderately soft, fine-grained, micaceous, argillaceous, containing fragments of *Ostrea* sp., and a few very thin lenses of shale.
	Bottom 1½ ft. Sandstone, light-gray, very fine grained, micaceous and somewhat glauconitic. This part of the core is very dense and hard in places, and contains abundant small fragments of fossil shells.
	Atkinson Formation. Lower Member.
3608-3615	Core 34. Recovery 5½ ft.
	Top. Sandstone, like bottom part of core 33 at 3598-3608 ft.; contains moderately large areas of white sandy (fine-grained sand) limestone containing shell fragments. This part of the core seemed to be conglomeratic when first exposed.
	Bottom. Shale, grayish-green, sandy, slightly glauconitic, containing abundant worn and broken fragments of shells, and many specimens of *Valvulineria infrequens* (Eagle Ford variety), a few specimens of arenaceous species of Foraminifera, and a few ostracodes.
3615-3625	Core 35. Recovery 4 ft.
	Top. Shale, greenish-gray, sandy, micaceous, containing many fragments of macrofossils, a trace of glauconite, a few large, calcareous nodules, and specimens of *Valvulineria infrequens*.
	Bottom. Like the top part of the core, and containing a few fragments of carbonaceous material. No change in microfauna. In this part of the core a lens of light green, hard, sandy limestone contains abundant fragments of fossil bivalves, a few fragments of lignite, a trace of glauconite, and a little mica.
3625-3629	Core 36. Recovery 4 ft.
	Top. Shale, grayish-green, flaky, somewhat micaceous, and a few fragments of limestone like that in the bottom part of core

Depth (feet)	Description
	35 at 3615-3625 ft. The shale contains highly micaceous and carbonaceous partings, many specimens of *Globigerina* sp., *Gümbelina* sp., and *Planulina* sp., and a few specimens of small arenaceous species of Foraminifera.
3629-3639	Core 37. Recovery 4 ft. Top. Shale, gray, flaky, micaceous, somewhat carbonaceous; contains a foraminiferal fauna in which specimens of arenaceous species are strongly predominant: *Ammobaculoides plummerae* (common), *Ammobaculites advenus* (present). Middle. Like the top part of the core; a few fragments of macrofossils present. Bottom. Shale like the top part of the core containing fragments of carbonaceous material (common), a few fragments of macrofossils, and a few fish scales.
3639-3649	Core 38. Recovery 10 feet. Top. Shale, greenish-gray, micaceous, slightly silty; contains specimens and fragments of fragile, thin-shelled macrofossils, young specimens of *Ammobaculites advenus*, and a few specimens of ostracodes. Middle. No change. Bottom. No change.
3649-3659	Core 39. Recovery 9 ft. Top. Shale, gray, micaceous, containing irregularly distributed silty areas, and very thin shelled macrofossils. Middle. No change. Bottom. No change.
3659-3669	Core 40. Recovery 10 ft. Top 8 ft. Shale, greenish-gray, containing fragments and molds of thin-shelled bivalves, fragments of fish bones and comatulids; common species of Foraminifera are: *Ammobaculites advenus*, *Ammobaculites agrestis*, *Ammobaculoides plummerae*, *Ammobaculites junceus*, *Trochammina wickendeni*, *Globigerina* sp., *Planulina eaglefordensis* var.; a few specimens of *Gümbelina* sp. Bottom 2 ft. Shale, gray, containing many irregularly silty to finely sandy, micaceous, slightly glauconitic streaks, and small scattered fragments of lignite. The fauna is like that in the top part of this core.
3669-3679	Core 41. Recovery 9½ ft. Like core 40 at 3659-3669 ft.
3679-3689	Core 42. Recovery 9 ft. Top. Shale, greenish-gray, containing many thin irregular streaks and lenses that are silty, micaceous, pyritic, and slightly glauconitic. Middle. Shale, gray, thinly flaky, micaceous, containing many small particles of carbonaceous material.

Depth (feet)	Description
	Bottom. Like the middle part of this core.
3689-3699	Core 43. Recovery 10 ft.
	Top. Shale, greenish-gray, containing fragments of casts and molds of small thin-shelled bivalves, and a few thin, silty, micaceous and somewhat carbonaceous streaks and lenses.
	Bottom. Like the top part of this core, but more silty, micaceous, and carbonaceous.
3699-3709	Core 44. Recovery 10 ft.
	Top 2 ft. Like the bottom part of core 43 at 3689-3699 ft.; contains a few fish bones and fish teeth, a few specimens of Ostracodes, and many specimens of Foraminifera. The common species of Foraminifera are: *Ammobaculites comprimatus* and *Globigerina* sp.
	2nd 2 ft. Like the top 2 ft. of this core.
	3d 3 ft. Shale like the preceding parts of this core, and many thin, highly sandy (very fine-grained sand) micaceous lenses.
	Bottom 3 ft. Shale like the preceding parts of this core, containing specimens of *Ammobaculites comprimatus* and a few specimens of *Ammotium braunsteini.*
3709-3719	Core 45. Recovery 10 ft.
	Top 3 ft. Shale, gray, thinly bedded, somewhat carbonaceous, sandy (fine-grained sand), micaceous. Contains many shell fragments, and specimens of Foraminifera and Ostracoda. Dominant species of Foraminifera are: *Ammobaculites advenus, Ammobaculites agrestis, Ammobaculoides plummerae, Reophax* sp., *Placopsilina* sp., *Pseudoclavulina* sp., *Polyphragma* sp., *Citharina kochii, Anomalina plummerae, Frondicularia* cf. *F. inversa, Globigerina* sp., *Dentalina* sp., *Quinqueloculina lirellangula, Triloculina sp.* Common species of ostracodes are: *Cythereis burlesonensis, Cythere concentrica, Cythereloides obliquirugata, Cytherella* sp., *Cytherideá graysonensis.*
	Middle 4 ft. No change.
	Bottom 3 ft. No change.
	This core is the type locality of the fauna usually called the "Barlow fauna".[2]
3719-3729	Core 46. Recovery 10 ft.
	Top 2 ft. Thinly interbedded gray, micaceous shale and gray, highly micaceous, somewhat carbonaceous siltstone.
	2nd 2 ft. Shale, gray sandy (moderately coarse sand), micaceous, and argillaceous limestone containing a small quantity of moderately coarse, scattered sand grains.
	3d 3 ft. Shale, gray, containing lenses of silty, micaceous shale and lenses of siltstone, fragments of thin-shelled fossil bivalves, and specimens of *Trochammina rainwateri, Ammobaculites ad-*

[2]Applin, E. R., 1955, U.S. Geological Survey, Professional Paper 264-I, p. 187-197, pls. 48, 49.

Depth (feet)	Description
	venus, Globigerina sp., and *Cytheridea graysonensis.* Bottom 3 ft. Shale, gray, containing small particles of carbonaceous material, and thin lenses of light-gray, very fine grained, micaceous, pyritic, slightly glauconitic sandstone.
3729-3739	Core 47. Recovery 9 ft. Top 2 ft. Shale, gray, flaky, micaceous. 2nd 2 ft. Shale, gray, flaky, containing thin, silty, micaceous, slightly glauconitic lenses. 3d 2 ft. Sandstone, gray, argillaceous, micaceous, glauconitic, somewhat phosphatic. Sand grains are poorly sorted, fine to very coarse (pebble-size). Bottom 3 ft. Like the preceding part of this core.
3739-3749	Core 48. Recovery 10 ft. Top 3 ft. Sandstone, light greenish-gray, argillaceous, micaceous, glauconitic sandstone, like the lower part of core 47 at 3729-3739 ft., and a few thin lenses of highly micaceous, flaky shale. 2nd 3 ft. Sandstone like the preceding part of this core; also a little soft, argillaceous, glauconitic, slightly micaceous sandstone. 3d 3 ft. Sandstone, light greenish-gray, soft, fine to moderately fine-grained, argillaceous, glauconitic, slightly micaceous. Bottom 1 ft. Shale, gray, thinly flaky, micaceous, containing thin irregular, sandy (very fine-grained sand), glauconitic, micaceous streaks and lenses.
3749-3759	Core 49. Recovery 8 ft. Top. Like the bottom part of core 48 at 3739-3749 ft. Middle. Siltstone, irregularly and thinly laminated, soft, micaceous, argillaceous, and gray, flaky, somewhat glauconitic shale. Bottom. Shale, gray, silty, micaceous, glauconitic, and fine to coarse-grained, glauconitic, phosphatic, argillaceous sandstone.
3759-3769	Core 50. Recovery 9 ft. Top. Shale, gray, thinly flaky, containing a few rather evenly distributed, small fragments of lignite, and thin lenses of soft, very fine grained, glauconitic sand. Middle. Shale, greenish-gray, highly sandy (fine to coarse grained sand), micaceous. Coarse to moderately coarse, well-rounded sand grains, are common. Bottom. Like the middle part of this core.
3769-3779	Core 51. Recovery 4 ft. Top. Sandstone, light-gray, soft, fine to coarse-grained, argillaceous, glauconitic, somewhat micaceous; moderately fine grains are common. Bottom. Sandstone, light greenish-gray, soft, mostly fine-grained, argillaceous, micaceous, glauconitic.
3779-3788	Core 52. Recovery 3 ft. Top. Like the bottom part of core 51 at 3769-3779 ft. The sand-

Depth (feet)	Description
	stone is mainly fine-grained, but coarse grains are fairly common.
	Bottom. Shale, light bluish-green and reddish-brown mottled, highly micaceous, unctuous.
	Comanche Series, undifferentiated
	The top of the Comanche Series is placed at 3789 ft. on the basis of electric log correlation in connection with the data from samples.
3788-3793	Core 53. Recovery 4 ft.
	Shale, mottled light-green, yellowish-brown, light purplish-gray, micaceous, unctuous.
3793-3803	Core 54. Recovery 9 ft.
	Shale, mottled, dull brownish-red, green, mustard, bluish-gray, and lavender, somewhat micaceous, unctuous.
3803-3812	Core 55. Recovery 9 ft.
	Top 3 ft. Clay, mottled, light-yellowish-green and purple, highly sandy, unctuous. The sand grains are fine to very coarse, rounded to subrounded, and etched; many grains show an orange tint.
	Middle 3 ft. Clay, mottled, light-green, purple, and yellow, unctuous, slightly sandy. Nodules of limonite are fairly common.
	Bottom 3 ft. Clay, mottled, light bluish-green and reddish to yellowish-brown, unctuous.
3812-3819	Core 56. Recovery 7 ft.
	Top. Clay, gray, purplish-gray, and yellow, sandy, unctuous. The sand is fine-grained, evenly distributed in the clay, and constitutes about 10 percent of the sample.
	2nd part. Clay, dark grayish-purple, waxy, containing bands of red, yellow, and white-streaked sand. The sand is composed of fine to very coarse, rounded quartz grains, and a little feldspar. 3d part. Sandstone, white, bentonitic, fine to moderately coarse grained, micaceous; the fine-grained sand predominates.
	Bottom. Sandstone, mottled, light-green, grayish-purple, and mustard, bentonitic, fine to moderately coarse grained, micaceous; the sand grains are etched.
3819-3829	Core 57. Recovery 7 ft.
	Top. Sandstone, mottled, gray, light purplish-gray, and yellow, bentonitic, micaceous. The sand grains are fine to very coarse, etched quartz, and a little feldspar; many grains are tinted yellow and pink.
	Bottom. Sandstone, very light green, fine to very coarse grained, bentonitic; the sand grains are etched, and a few are tinted yellow and pink.
3829-3831	Core 58. Recovery 1 ft.
	Top. Sandstone, mottled, light-green, light purplish-red, and mustard, argillaceous and a little sandy clay in which the sand grains are poorly sorted, fine to coarse, rounded, etched, and

Depth (feet)	Description
	irregularly distributed; many grains are tinted pink and yellow. Bottom. Clay, mottled and streaked, white, yellowish-brown, and mustard, waxy, sandy. The sand grains are poorly sorted, unevenly distributed and etched. One large fragment of quartzite (pebble?) is present.
3831-3835	Core 59. Recovery 4 ft. Top. Quartzite pebble(?) or boulder(?), mottled tan, brown, and pale red. Middle, Clay, mottled red and mustard, highly sandy. Bottom. Sandstone, hard, ferruginous.

Ordovician(?)[3]

Lower Ordovician(?) Series

3835-3835'4"	Core 60. No recovery.
3835'4"-3835½	Core 61. Recovery 2 in. White quartzite.
3839	Fragments of white, hard, fine-grained sandstone and cavings.
3840	Fragments of white and pink, hard, moderately dense, fine-grained sandstone and cavings.
3841	Fragments of white, dense, fine-grained sandstone; a few fragments seem to be quartzitic. Many cavings.
3846½-3846¾	Core 62. No recovery.
3846¾-3847	Core 63. No recovery.
3847	Fragments of white and pink, dense to moderately dense fine-grained sandstone and quartzite(?).

CLINCH COUNTY

Operator: Luke Grace Drilling Co. GGS. No. 338

Landowner: Lem Griffis well 1 Elevation: 176 ft. (derrick floor)

Location: Land District 13, Land Lot 36; center of Land Lot 36 Total depth: 4588 ft.
Completed: Jan. 24, 1953

[3]Bridge, Josiah, and Berdan, J. M., 1951, U.S. Geological Survey open-file report, p. 5, 6, and map. According to Applin, P. L., 1951, U.S. Geological Survey Circular 91, p. 28 the oldest formation penetrated in the Barlow well is classified as "Lower Cretaceous(?)."

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Not studied		
Cretaceous		
Gulf		
Lawson Limestone upper member(?)	2790 (1st sample)	110?
Beds of Taylor age	2900?	?
Beds of Austin Age (no samples 3100-3620 ft.)	?	?
Atkinson Formation upper member	3620?	180?
lower member(?)	3800?	43?
Pre-Cretaceous		
Igneous rocks	3843 to total depth	745

Lithologic and paleontologic description of cutting samples.

Depth (feet)	Description
0-2790	Samples not studied.
	Cretaceous
	Gulf Series
	Lawson Limestone. Upper Member(?).
2790-2800	Dolomite, light-tan, moderately coarsely crystalline, somewhat porous; contains a few blebs of gypsum. The lithology suggests that the sample is from the upper member of the Lawson Limestone.
2800-2810	Like the sample at 2790-2800 ft. The dolomite contains a few blebs of gypsum.
2810-2900	No samples.
	Beds of Taylor age.
2900-2910	Limestone, white, hard, chalky, containing irregularly distributed gray areas. Much finely fragmented calcitic material is embedded in the limestone, and is probably derived from broken molds and fragments of molds of small specimens of Foraminifera, and from fragments and prisms of *Inoceramus*. The foraminiferal fauna, which suggests the uppermost part of the beds of Taylor age, is composed of specimens of *Anomalina cosdeni, Stensiöina americana, Globorotalites conicus, Bolivinoides deco-*

Depth (feet)	Description
	rata, Robulus sp., *Globotruncana marginata, Bolivina incrassata, Buliminella carseyae, Anomalina sholtzensis, Planulina cedarkeysensis.* The sample gives no indication that the lower member of the Lawson Limestone was penetrated in this well.
2910-2950	Samples not studied.
2950-2960	Chalk, white, soft. Washed residue is small, but contains a fauna similar to the sample at 2900-2910 ft.
2960-3000	Samples not studied.
3000-3010	Chalk, white, soft. Washed residue is small and is composed of a few nodules of hard chalk, a few small rounded nodules of pyrite, and fragments of *Inoceramus* and other fossil bivalves.
3010-3020	Like sample at 3000-3010 ft.; also fragments of echinoid spines and a few specimens of *Anomalina* sp.
3020-3030	Chalk, white. Washed residue is small and composed of a few fragments of hard chalk, a few fragments of *Inoceramus*, and echinoid spines.
3030-3040	Chalk, white. Washed residue is moderately large, and is composed of large fragments of indurated chalk in which are embedded fragments of *Inoceramus*, echinoid spines, specimens and calcite casts of specimens of Foraminifera, and small crystals of pyrite. No narrowly restricted species of Foraminifera were indentified.
3040-3050	Like the sample at 3030-3040 ft., but the chalk contains few embedded microfossils and fragments.
3050-3060	Chalk, white, soft, and a moderately large residue of cuttings of dolomite, fragments of *Inoceramus* and other fossil bivalves, and specimens of nondiagnostic species of Foraminifera. The sample may be largely cavings.
3060-3070	Chalk, white, soft. Washed residue is moderately large and composed of fragments of hard chalk, in which are embedded the finely fragmented debris of small fossils; many fragments of *Inoceramus* and other fossil bivalves; a few nodules of pyrite.
3070-3080	Chalk, white, soft. Washed residue is small and like the sample at 3060-3070 ft.
3080-3090	Chalk, soft, white. Washed residue is small and composed mainly of fragments of light-tan dolomite (probably caving), a few fragments of hard chalk, *Inoceramus* fragments, and sparse specimens of Foraminifera.
3090-3100	Dolomite, chalk-coated. Washed residue is large and composed of light-tan and light-brown, moderately finely crystalline, irregularly porous dolomite; nodules of hard chalk, and of pyrite; Inoceramus prisms; a few specimens of Foraminifera. The dolomite is probably caving. The sample contains nothing to suggest that the drill has penetrated a stratigraphic unit older than the beds of Taylor age.
3100-3620	No samples.

Depth (feet)	Description
	Atkinson Formation. Upper Member?. (electric log correlation)
3620-3800	No samples.
	Atkinson Formation. Lower Member(?).
3800-3807	Sand, poorly sorted, fine to moderately coarse-grained, clear quartz. The sample contains small, colorless dolomite rhombs, irregular-shaped nodules of bright-green glauconite, a few phosphatic nodules, nodules of crystalline pyrite, and a few fragments of thin white shells of brackish-water(?) bivalves. The sand is almost exactly like the sand penetrated in the lower member of the Atkinson Formation in other nearby wells. A few cavings of the typical speckled shale of the lower part of the beds of Austin age is believed to indicate that the unit was penetrated in the part of the geologic section from which no samples were received.
3810	Sandstone like the sample at 3800-3807 in its general character, but more highly glauconitic; the sand grains are fairly well sorted and mostly of medium sized.
3821	Sand, coarse-grained, clear quartz; the average grain-size is about 1 to 1.5 mm. The sample contains a little glauconite, a few shell fragments, phosphatic nodules, and nodules of light grayish-brown, dense very finely crystalline, slightly glauconitic dolomite.
3820-3830	Like the sample at 3821, and some pebble-size grains of sand.
3830-3840	Sand like the samples below 3800 ft.; also many dark-gray, worn, sand-encrusted fragments of *Ostrea* sp. and a little glauconitic and phosphatic material.
3840-3850	Conglomerate(?) composed, chiefly, of hard, angular fragments of light bluish-green, light brownish red, and mustard-colored weathered(?) igneous rock; also many fragments of dark brownish-red, and mottled red, green and mustard-colored clay shale that may be the matrix containing pebbles and fragments of igneous rock.
	Pre-Cretaceous
3843-4588 T.D.	Igneous rocks. The top of the igneous rock at 3843 ft. is based on the correlation of the electric log of the well.

CLINCH COUNTY

Operator: H. L. Hunt
Landowner: Alice Musgrove well 1

Location: Land District 12, Land Lot 198; Northwest corner of southwest quarter of Land Lot 198

GGS. No. 481
Elevation: 147 ft. (derrick floor)

Total depth: 4088 ft.
Completed: Jan. 18, 1944.

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Oligocene		
upper, Suwanee Limestone	390	80
Eocene		
upper, Ocala Limestone, upper member	470	150
lower member	620	110
middle, upper middle, Avon Park Limestone	730	210
lower middle, Lake City Limestone	940	520
lower, Oldsmar Limestone	1460	?
Paleocene		
in beds containing Tamesí fauna at 2370 ft.	?	?
Cretaceous		
Gulf		
Lawson Limestone, upper member(?)	2820	40
Beds of Taylor age	2860	220
Beds of Austin age	3080	310
Atkinson Formation, upper member	3390	225
lower member	3615	210
Comanche undifferentiated	3825	128
Ordovician		
Lower Ordovician[1] quartzitic sandstone and dark shale	3953 to total depth	135

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0 to 2370	Samples were studied microscopically but were not described. The different stratigraphic units of Oligocene and Eocene age were

[1]Bridge, Josiah, and Berdan, J. M., 1951, U. S. Geological Survey open-file report, p. 5 and map.

Depth (feet)	Description
	determined on the basis of characteristic species of Foraminifera that were identified in the samples, and the approximate depth to the top of each unit is shown in the summary of stratigraphy.
	In Paleocene Series
	Beds containing Tamesi fauna
2370-2400	Limestone, gray, hard, marly, slightly glauconitic; a few fragments of the limestone are sandy. The sample contains a little light grayish-tan chert.
2400-2410	Chalk, cream, slightly glauconitic. The sample contains abundant specimens of very small, poorly preserved, non-diagnostic Foraminifera; *Asterigerina* sp. common.
2410-2420	Sample not described.
2420-2450	Limestone, light-gray and light-cream, hard, chalky. The sample contains a little chert, and specimens of small Foraminifera like the sample at 2400-2410 ft.
2450-2460	Sample not described.
2460-2470	Limestone, gray and cream, chalky, nodular, slightly glauconitic; many specimens of small Foraminifera like sample at 2400-2410 ft.
2470-2480	Sample not described.
2480-2490	Limestone, cream, nodular, somewhat glauconitic. The sample contains a little chert. The limestone has a sandy appearance because it contains a large amount of very finely fragmental calcitic material. The microfauna is composed of specimens of small Foraminifera like the sample at 2400-2410 ft.
2490-2550	No change.
2550-2560	Limestone, like sample at 2480-2490 ft., but more calcitic. White chert in the sample has a spicular appearance; the microfauna is unchanged.
2560-2680	No change.
2680-2690	Like sample at 2550-2560 ft., but the limestone is softer, contains fine-grained sand and large worn fragments of calcite; the microfauna is unchanged.
2690-2770	No change.
2770-2780	Sandstone, greenish-gray, very fine grained, glauconitic, containing much calcitic material. The sample contains gray, sandy, marly clay; specimens of *Nodosaria affinis* and a few other foraminiferal species.
2780-2800	Samples not described.
2800-2810	Chalk, white, sandy, and gray, very fine grained, somewhat glauconitic sandstone. The sample contains a little gray chert and non-diagnostic specimens of small Foraminifera.
2810-2820	Limestone, light-cream, chalky, glauconitic; light grayish-tan chert

Depth (feet)	Description
	common. The sample contains specimens of small Foraminifera, specimens of *Globorotalia velascoensis*, and other species characteristic of the beds of Paleocene age that contain a Tamesí fauna.
	Cretaceous
	Gulf Series
	Lawson Limestone. Upper Member (?)
2820-2830	Limestone, white, like sample at 2810-2820 ft., a little glauconite, and a little light-gray spicular chert; many fragments of light-brown dolomite that possibly marks the top of the upper member of the Lawson Limestone (Navarro age).
2830-2840	Dolomite, light-cream, finely granular, is the dominant material in this sample.
2840-2850	Limestone, white, containing scattered small grains of dark-green glauconite. The limestone is more chalky than that in the overlying beds of Paleocene age. Indigenous specimens of Foraminifera are not abundant but specimens of *Globotruncana arca* are present.
2850-2860	Like sample at 2840-2860 ft., but the limestone is only slightly glauconitic.
	Beds of Taylor age
2860-2870	Like sample at 2850-2860 ft.; highest appearance of *Inoceramus* fragments, and a few specimens of *Globorotalites conicus* and *Stensiöina americana*.
2870-2880	Sample not studied.
2880-2890	*Inoceramus* fragments are abundant.
2890-2970	Samples not studied.
2970-2980	Clay, gray and greenish-gray, soft, marly, begins to show in the samples and increases in amount in the samples below this depth. A little sand is present but may be caving.
2880-2990	Like the sample at 2970-2980 ft.; fine to moderately fine-grained sand is about 20 percent of the sample.
2990-3060	Samples not studied.
3060-3070	Marl, gray.
3070-3080	Sample not studied.
	Beds of Austin age
	The top of the beds of Austin age is placed at 3080 ft. on the basis of electric log correlation supported by the data from samples.
3080-3090	Limestone, cream, and a few fragments of light-gray marl. The material being drilled seems to be gray and greenish-gray marl containing streaks of limestone. *Inoceramus* fragments are

Depth (feet)	Description
	abundant; fine to coarse-grained sand is about 50 percent of the sample.
3090-3100	Marl, about 75 percent of the sample; fragments of glauconitic limestone are about 25 percent of the sample. *Inoceramus* fragments are common, and a few shell fragments are present in sandy fragments of the marl.
3110-3120	Marl. Highest occurrence of specimens of *Citharina texana* indicates the Austin age of the beds.
3120-3240	Samples not studied.
3240-3250	Marl, dark-gray, slightly speckled; highest occurrence of this type of lithology.
3250-3300	Samples not studied.
3300-3310	Shale, greenish, and brownish-gray thinly flaky shale. Specimens of *Globotruncana* sp., *Globigerina* sp., and *Gümbelina* sp. are common; specimens of *Planulina austiniana* indicate the Austin age of the beds.
3310-3380	Samples not studied.
3380-3390	Shale, dark, flaky, speckled, and fragments of dark-brown, thinly flaky, speckled, greasy-looking shale.
	Atkinson Formation. Upper Member.
3390-3400	Shale, like sample at 3380-3390 ft., and fragments of white, soft, fine-grained, glauconitic sandstone; most of the sand grains are angular.
3400-3410	Sample not studied.
3410-3420	Sand and sandstone like sample at 3390-3400 ft., and several types of gray and greenish-gray thinly flaky clay shale; a little green, smooth-textured, noncalcareous shale; a few fragments of fish bones.
3420-3477	Samples not studied.
3477	Sidewall core. Sand, white, fine-grained, angular.
3477-3620	Samples not studied.
	Atkinson Formation. Lower Member.
3615	Top of lower member of Atkinson Formation is placed on the basis of electric log correlation in connection with the data from samples.
3620-3630	Shale, green and gray, several types; sand; shell fragments.
3630-3640	Sample not studied.
3640-3650	Shale, green, flaky; many specimens of calcareous species of Foraminifera that are characteristic of the upper member of the Atkinson Formation, some or all of which are probably caving; several specimens of arenaceous species of Foraminifera that are indigenous to the lower Atkinson.

Depth (feet)	Description
3650-3680	Samples not studied.
3680-3700	Like sample at 3640-3650 ft.
3700-3710	Shale, like sample at 3640-3650 ft.; fragments of light-gray, hard, dense, fine-grained, micaceous, glauconitic sandstone begin to show in the samples.
3710-3720	Shale, like sample at 3700-3710 ft., and many fragments of white, loosely consolidated, fine-grained sandstone containing a few shell fragments and fish teeth.
3720-3736	Samples not studied.
3736	Sidewall core. Sandstone, white, loosely consolidated, fine-grained, glauconitic.
3736-3840	Samples not studied.
	Comanche Series undifferentiated
3825	Top of Comanche Series is placed on basis of electric log correlation in connection with the data from samples.
3840-3850	Sand, unconsolidated, containing greenish-yellow and pink grains, coarse-grained, and a little feldspar.
3850-3870	Samples not studied.
3870-3880[2]	Sand like sample at 3840-3850 ft., and yellow, green, and multicolored, hard, very finely micaceous shale.

CLINCH COUNTY

Operator: Wiley P. Ballard, Jr.
Landowner: Timber Products Co. Well 1A
Location: Land District 7, Land Lot 306; 2050 ft. east and 1760 ft. south of northwest corner of Land Lot 306.
GGS. No. 496
Elevation: 214 ft. (derrick floor)
Total depth: 4232 ft.
Completed: Feb. 8, 1956

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Eocene		1528
upper, Ocala Limestone, upper member	492 (1st sample)	188
lower member	680	260
middle, undifferentiated	940?	740
lower, beds of Wilcox age	1680	340

[2]Samples below 3880 ft. not studied.

	Depth (feet)	Thickness (feet)
Paleocene		
Beds of Midway age	2020	540
Cretaceous		
Gulf		
Beds of Navarro age	2560	320
Beds of Taylor age	2880	140
Beds of Austin age	3020	340
Atkinson Formation, upper member	3360	430
lower member	3790	220
Comanche undifferentiated	4010	145
Pre-Cretaceous		
Igneous rocks	4155 to total depth	77

Lithologic and paleontologic description of cutting samples.

Depth (feet)	Description
0- 492	No samples.
	Tertiary
	Eocene Series
	Upper Eocene. Ocala Limestone. Upper Member.
492- 522	Coquina, chalky, nodular; composed of worn and broken chalky specimens of Foraminifera. Dominant species are *Operculina ocalanus* and several varieties of *Lepidocyclina ocalana*. Other determinable fossils are *Asterocyclina* cf. *A. asterisca, Sphaerogypsina globula, Heterostegina ocalana,* and a few specimens of smaller Foraminifera. Fragments of bryozoans and fossil bivalves are also present.
522- 610	Coquina, like preceding sample but more chalky and more firmly consolidated. Samples contain worn fragments of large specimens of *Lepidocyclina* and *Operculina*, and some rounded quartz grains. Samples at 572-582 feet and 600-610 feet contain specimens of *Pseudophragmina flintensis*.
610- 620	Coquina, like preceding samples, but "mud conditioner" composes about one-half of washed concentrate.
620- 660	Coquina, composed mainly of worn and broken fragments of *Lepidocyclina, Operculina, Camerina?* and a few other genera of larger Foraminifera; also hard chalky nodules composed of comminuted fossil debris.
660- 680	Dolomite(?), light-brown, slightly chalky, highly calcitic, moderately porous; seems to be an altered coquina.

Depth (feet)	Description
	Upper Eocene. Ocala Limestone. Lower Member.
680- 700	Coquina, 50 percent of sample, composed of hard, chalky, worn, and finely comminuted fossil debris; 25 percent, grayish-brown, finely granular, calcitic dolomite.
700- 720	Coquina, composed of worn and broken, moderately finely comminuted fossil debris; some small nodular fragments of finely granular grayish-brown dolomite. The chalky and dolomitic materials contain traces of pyrite(?). Samples contain poorly preserved specimens of *Amphistegina pinarensis cosdeni, Fabiania cubensis, Rotalia cushmani, Gyroidina* cf. *G. nassauensis,* calcareous algae and a few echinoid fragments.
720- 730	Coquina, composed of chalky, worn, rolled, and broken molds of fossils. The chalky material shows traces of glauconite(?) and pyrite. Fauna is similar to that in the preceding sample with the addition of a few small specimens of *Lepidocyclina* sp.
730- 740	Coquina, moderately hard, chalky, finely comminuted, containing a trace of glauconite. Fossil material abundant, but badly worn and mostly undeterminable. *Amphistegina pinarensis* is the dominant foraminifer; miliolids and a few other species of small Foraminifera are present. Sample contains a little dolomite.
740- 760	No samples.
760- 770	Coquina, worn and finely broken as in preceding sample. Sample contains many fragments of finely granular light-tan dolomite, but little determinable fossil material.
770- 810	No samples.
810- 820	Like sample at 760-770.
820- 840	Coquina, dolomitic, chalky, containing glauconitic areas; dolomite composes about 50 percent of the coquina and is unevenly distributed. Fossils composing coquina are mainly several varieties of *Lepidocyclina ocalana.* Echinoid fragments are also present.
840- 890	Chalk, white, dolomitic, calcitic, somewhat glauconitic; contains specimens of *Lepidocyclina,* and traces of an originally high, but now much altered fossil content. Sample at 880-890 contains much caved material.
890- 940	Dolomite, light-cream, porous, slightly chalky, calcitic; probably recrystallized coquina.
	Middle Eocene. Undifferentiated.
940- 970	Dolomite, light-tan, finely granular, porous, chalky, calcitic, containing worn chalky molds of Foraminifera, *Amphistegina* sp., *Operculinoides,* and others.
970- 980	Chalk, light-cream, moderately hard, dolomitic, containing specimens of *Amphistegina* sp. and *Lepidocyclina* sp.
980-1000	Limestone, white, hard, nodular, porous, chalky, slightly dolomitic. Limestone is composed chiefly of well-sorted, worn, finely broken

Depth (feet)	Description
	molds of small Foraminifera and other fossil debris. Seemingly indigenous specimens are *Amphistegina* cf. *A. nassauensis* and *Operculinoides(?)* sp. Sample at 990-1000 ft. contains a small amount of fine-grained, subangular, quartz sand.
1000-1040	No samples.
1040-1050	Similar to material described at 980-1000, but less well consolidated; contains a few fragments of dark grayish-brown, finely granular dolomite, similar to that described at 700-720 ft.
1050-1090	Limestone, light-cream, moderately hard, chalky, calcitic, dolomitic, coquinoid. Limestone composed of fine to coarse, worn fragments of molds of *Operculinoides, Lepidocyclina, Operculina, Camerina,* bryozoan fragments and undeterminable microfossil and macrofossil debris.
1090-1160	Lithologically similar to the preceding sample, but contains many specimens of *Lepidocyclina (Pliolepidina) r. douvillei* Lisson, and *L. cedarkeysensis;* also bryozoan and echinoid fragments.
1160-1190	Limestone, coquinoid, chalky, calcitic, composed of coarse to fine, worn fossil debris, not usually determinable, but includes *Lepidocyclina* sp., *Amphistegina* sp., bryozoan, echinoid and bivalve fragments. A trace of glauconite present on some of the fossil fragments.
1190-1220	No samples.
1220-1240	Sand, fine to medium-grained, subangular, clear quartz; fragments of grayish-white, very finely granular, slightly porous dolomite; and fragments of white, moderately hard, irregularly sandy, glauconitic coquina composed of worn and broken molds of microfossils and macrofossils. Note. The two samples, 1220-1230 and 1230-1240, seem to be out of place and were possibly misnumbered.
1240-1280	Coquina, white, moderately hard, calcitic, chalky, composed of worn fragments of microfossils and macrofossils and a small amount of irregularly distributed glauconite. The fossil material is usually undeterminable, but fragments of *Lepidocyclina* sp., bryozoans and echinoids were recognized.
1280-1310	Coquina, composed of worn and usually broken cream limestone molds of fossils, among which are specimens of *Amphistegina nassauensis, Epistomaria semimarginata, Discorbis inornatus, Eponides gunteri, Lepidocyclina (Polylepidina) antillea,* and many specimens of smaller Foraminifera and ostracodes.
1310-1325	No samples.
1325-1370	Limestone, light-cream, porous, chalky, probably a water-worn, altered coquina showing only traces of fossil molds. About 50 percent of sample is grayish-brown moderately finely crystalline dolomite, and a little light-gray chert. A trace of selenite is present in some of the chips of dolomite. Fragments of *Asterocyclina asterisca* (an upper Eocene form) in sample at 1350-1360 ft. is probably caving.

Depth (feet)	Description
1370-1410	Limestone, white moderately hard, chalky, showing traces of fossil structure and ornamentation. Some limestone fragments are glauconitic. Washed concentrate contains worn fragments of larger Foraminifera, and a few fragments of dolomite and chert.
1410-1440	Limestone, white to light-cream, moderately hard, porous, chalky, containing abundant fragments of specimens of *Pseudophragmina (Proporocyclina) teres, Lepidocyclina (Polylepidina) antillea, Amphistegina lopeztrigoi*, and many bryozoan fragments.
1440-1460	Limestone, cream, moderately hard, porous, coquinoid, somewhat glauconitic and dolomitic, containing abundant broken and worn specimens of a number of species and genera of Bryozoa.
1460-1500	Limestone, cream, chalky, glauconitic, dolomitic, containing many bryozoan fragments, fragments of fossil bivalves and other fossil debris. The glauconite is dark green, and occurs as small irregular inclusions in depressions in the limestone and as partial filling for some of the fossils.
1500-1520	Limestone, white coquinoid, chalky, dolomitic, glauconitic, containing abundant specimens of *Operculinoides gravelii* Cole, bryozoan fragments, and other undeterminable fossil debris.
1520-1570	No samples.
1570-1640	Coquina, 50 percent of sample, composed of worn and fragmental which limestone molds of small specimens of Foraminifera and other fossils; 50 percent of sample is fine-grained quartzitic sand containing a few phosphate nodules and fragments of dolo-white limestone molds of small specimens of Foraminifera and ⅛ fragmental fossil material.
1640-1670	Sand, fine to medium-grained, subangular, clear quartz, containing a few black phosphatic nodules, is about 90 percent of sample. Fragmental fossil material is about 10 percent of sample. In the sample at 1650-1670, the sand and the fossil molds each compose about 50 percent of the cuttings.
1670-1680	Limestone, white, moderately hard, coquinoid, containing abundant specimens of a strongly beaded tumid *Camerina?* sp., and of *Discocyclina (Asterocyclina) monticellensis* Cole and Ponton. Other fragmental fossil material is present but unidentifiable.
	Lower Eocene. Beds of Wilcox age.
1680-1690	Limestone, chalky, dolomitic, glauconitic, containing a trace of fragmental fossil material and light-gray chert. Note. This material is similar to some in higher samples and may be out of place. Top of lower Eocene is based, in part, on electric log characteristics of the Ballard well.
1690-1700	Limestone, chalky, dolomitic, fossiliferous containing fragments of light-gray chert and specimens of *Asterocyclina monticellensis* Cole and Ponton, (probably caving); *Discocyclina weaveri* (characteristic of the Salt Mountain Limestone), fragments of large

Depth (feet)	Description
	echinoid spines, and other fossil material. *Robulus* cf. *R. midwayensis* occurred in one fragment of limestone.
1700-1720	Sand, very fine to coarse.
1720-1750	Sand, like preceding sample, and about 50 percent small fragments of fossil material composed of white chalky limestone. Small black phosphatic nodules occur at 1740-1750 feet.
1750-1760	No sample.
1760-1770	Sand, very fine to coarse-grained, subangular, clear quartz, and some nodular fragments of white, hard, glauconitic, sandy limestone composed of broken and fragmental molds of fossils.
1770-1780	Sand as in the preceding sample, about 80 percent; about 20 percent white sandy limestone molds of fossil fragments.
1780-1800	Like the preceding sample with the addition of many fragments of limestone similar to that in sample at 1760-1770 feet.
1800-1820	No samples.
1820-1870	Sand, fine to very coarse, subangular, clear quartz; abundant gray and some white fragments of *Ostrea*-like bivalves that have been finely broken and worn; small nodules composed of white chalky limestone, fossil fragments, and glauconite. At 1850-1860 feet, sample contains fragments of several species of Bryozoa and some fragments of *Camerina* sp.
1870-1800	Sand, fine to very coarse, clear quartz, containing large black nodules of phosphate, constitutes most of sample. A smaller part of sample is composed of fragments of a coquinoid limestone, part of which are gray, sandy and glauconitic, and part are white, porous, glauconitic and fossiliferous. A few worn specimens of *Pseudophragmina* (?) sp. are apparently indigenous.
1880-1900	No samples.
1900-1930	Sand, fine to very coarse, subangular, clear quartz. Sample contains a few specimens of *Discocyclina weaveri* and small fragments of other fossils like those described from higher levels in the lower Eocene.
1930-1980	Sand, like preceding sample, and abundant gray and white, sandy, somewhat glauconitic fragments of *Ostrea*, other fossil bivalves, and unidentified fossil material.
1980-2020	Sand, fine to very coarse, subangular, clear, quartz, containing a few phosphatic nodules, and many fragments of white, glauconitic, sandy, fossiliferous limestone; fragments of gray and white, sandy, glauconitic, badly worn, fossil bivalves; pink-stained, sandy, glauconitic, porous, fossiliferous limestone; and other fossil debris. Some of the material is probably caving.
	Paleocene Series
	Beds of Midway Age
2020-2040	Lithology and fauna like the preceding sample, with the addition

Depth (feet)	Description
	of many fragments of fine-grained, highly glauconitic dolomite. A few fragments contain selenite inclusions and a few are chalky. Some fragments of dolomite are sandy.
2040-2060	No samples.
2060-2070	Sand, fine to very coarse, subangular, clear quartz, about 50 percent of sample; about 50 percent white, glauconitic, sandy limestone that contains small fragments of Ostracodes and undeterminable fossils.
2070-2090	Limestone, white, moderately hard, sandy, glauconitic, and somewhat fossiliferous like the preceding sample. Sample contains a little sand, and a few fragments of glauconitic sand cemented with selenite.
2090-2120	Sand, fine to very coarse grained, about 50 percent of sample; 50 percent white, moderately hard, sandy and glauconitic limestone like the preceding sample. The limestone contains fragments of microfossils and macrofossils.
2120-2130	No sample.
2130-2150	Limestone, light-gray, highly sandy, glauconitic; sand is moderately fine grained and contains a trace of mica.
2150-2180	Sand, fine to very coarse, and fragments of sandy limestone and worn fossils that are probably caving from higher levels.
2180-2200	Sand, fine to coarse-grained, with medium-sized grains common at 2180-2200 feet; many small fragments of light-gray, very finely sandy and glauconitic, chalky limestone. A few small poorly-preserved specimens of Foraminifera are possibly indigenous in the sample. Coarse grains of sand are common at 2190-2200 feet.
2200-2250	Sand, fine to coarse-grained, about 25 percent of sample; 75 percent gray, hard, finely sandy and glauconitic, calcareous clay, or argillaceous, calcareous sandstone. The clay contains scattered flakes of mica and small, poorly-preserved fragments of fossils. At 2210-2220 feet, a few fragments of *Nodosaria affinis* wash from the clay.
2250-2260	Sand, fine to coarse, about 25 percent of sample; 75 percent gray, glauconitic, finely sandy, calcareous clay. The clay contains specimens of *Nodosaria affinis*, *Robulus* sp., *Cibicides alleni*, and *Cytheropteron midwayensis*.
2260-2300	Like the preceding sample with the addition of abundant fragments of light-brown, hard, highly glauconitic, coquinoid limestone composed mainly of finely comminuted fossil debris in a dolomitic and chalky matrix.
2300-2330	Limestone, white, hard, chalky, irregularly porous and glauconitic, containing many traces of fragmentary fossil material; a few poorly preserved free specimens of *Anomalina* sp., *Cibicides*(?) sp., and others.
2330-2380	Limestone, white, hard, very finely porous and glauconitic, show-

Depth (feet)	Description
	ing abundant traces of an original very finely fragmental fossil content. This material is more firmly consolidated than in the higher samples. A few fragments of *Nodosaria* cf. *N. affinis are* in the sample at 2370-2380 ft.
2380-2400	Limestone, light-gray, argillaceous, chalky, very finely porous, containing irregularly distributed nodules of glauconite and of phosphate. Poorly preserved specimens of smaller Foraminifera are: *Robulus midwayensis, Nodosaria affinis, Vaginulina longiforma, Cibicides alleni, Cibicides howelli, Cibicides vulgaris, Chilostomelloides eocenica,* and many specimens of the ostracode *Bairdia suborbiculata.*
2400-2410	Like the preceding sample, but containing many fragments of light gray, chalky, very finely sandy, somewhat micaceous limestone.
2410-2430	No samples.
2430-2480	Sand, fine to coarse-grained, and cavings of fossiliferous material and limestone. The sample at 2450-2460 feet contains specimens of *Robulus midwayensis, Robulus degolyeri, Nodosaria affinis, Adhaerentia midwayensis, Ammobaculites paleocenica,* and ostracodes as in sample at 2380-2400 feet.
2480-2510	Limestone, clayey, very finely sandy, slightly glauconitic and micaceous, and a few large, irregular-shaped, dull, phosphatic nodules. Some cavings from higher levels.
2510-2530	No samples.
2530-2540	Like the sample at 2480-2510 feet.
2540-2560	No sample.
	Cretaceous
	Gulf Series
	Beds of Navarro age
2560-2580	Sand, fine to very fine, clear quartz, about 75 percent of sample; about 25 percent fragments of several kinds of limestone from slightly higher depths, and some phosphatic nodules. Nodular fragments of pyrite fairly common; a few phosphatic molds and fragments of gastropods and cup-corals; a few specimens of *Globotruncana arca, Gyroidina* cf. *G. globosa,* and *Planulina spissicostata.*
2580-2610	Sand, fine to coarse-grained, and small fragments of limestone probably caving from higher levels; a few fragments of soft, gray, micaceous, silty clay. The fauna is the same as that in the preceding sample, with the addition of *Pseudotextularia plummerae.*
2610-2620	No sample.
2620-2630	Sand, very fine to coarse, clear quartz; very fine grains dominant. Sample also contains fragments of soft, gray, micaceous, very silty clay, many pyrite nodules, and some specimens of Fora-

Depth (feet)	Description
	minifera characteristic of the Navarro Group.
2630-2640	No sample.
2640-2680	Clay, gray, soft, silty, about 50 percent of sample; 50 percent fine to very fine grained clear quartz sand; a few pyrite nodules and a few specimens of Navarro microfossils.
2680-2710	Clay, gray, soft, silty, micaceous, about 50 percent of sample; 50 percent fine to very fine grained sand; a few specimens of *Globotruncana* sp.
2710-2750	No samples.
2750-2770	Like sample at 2680-2710 feet.
2770-2780	No sample.
2780-2790	Like sample at 2680-2710 feet.
2790-2810	No samples.
2810-2830	Like sample at 2680-2710 feet.
2830-2840	No sample.
2840-2850	Like sample at 2680-2710 feet.
2850-2870	No samples
	Beds of Taylor age
2870-2880	Sand, fine to coarse grained, and gray shale, harder than in preceding samples; pyrite nodules fairly common; many fragments of *Inoceramus*. Fauna includes several species of *Globotruncana* not seen at higher levels and specimens of *Globigerina, Haplophragmoides calculus, Citharina wadei, Bolivina incrassata, Globorotalites conicus, Cibicides stephensoni, Planoglobulina glabrata, Kyphopyxa christneri, Loxostoma clavatum, Gaudryina laevigata*, several species of ostracodes, and other fossils.
2880-2890	No sample.
2890-2900	Like sample at 2870-2880 feet, but contains no *Inoceramus* fragments.
2900-2910	No sample.
2910-2920	Like sample at 2870-2880 feet.
2920-3020	No samples.
	Beds of Austin age
	(electric log correlation)
3020-3110	No samples.
3110-3130	Shale, gray, soft, and sand as in sample at 2870-2880 feet. Sample contains specimens of Foraminifera and a few Ostracodes. The Ostracodes were first observed in the sample at 2870-2880 feet. No *Inoceramus* fragments noted.
3130-3140	Clay, gray, moderately soft, micaceous; pyrite nodules, and *Inoceramus* fragments; cavings of limestone and fossil fragments from higher levels. About 50 percent of sample is fine to

Depth (feet)	Description
	medium-grained quartz sand containing a few cylindrical nodules of pyrite. Specimens of Cretaceous Foraminifera in the sample are, chiefly, several species of *Globotruncana, Cibicides stephensoni, Citharina wadei, Bulimina* sp., and others.
3140-3160	Clay, gray, micaceous about 50 percent of sample; about 50 percent fine to coarse-grained sand; samples contains *Inoceramus* fragments and some specimens of Cretaceous Foraminifera. *Planulina texana* and *Bolivina incrassata* are fairly common.
3160-3200	Samples are lithologically similar to the preceding sample, and contain many fragments of *Inoceramus* and nodules of pyrite. Specimens of Cretaceous Foraminifera are fairly common, and many of them are probably indigenous. Species of *Globotruncana* are most common; *Robulus* sp. is common; and several fragments of *Kyphopyxa* are present. *Citharina texana* occurs at 3180-3190 feet.
3200-3220	Shale, brownish-gray, marly. Shale is more indurated than in the preceding samples, and contains many *Inoceramus* fragments. The sample contains a small amount of sand, some pyrite nodules, and a few nondiagnostic specimens of Cretaceous Foraminifera.
3220-3250	Shale, brownish-gray, marly, containing numerous very small specimens of *Gümbelina* and *Globigerina*. These minute, cream specimens of Foraminifera do not seem to be crushed, but give the shale a slightly speckled appearance. Specimens of several species of *Globotruncana* are fairly common, and specimens of *Globigerina cretacea, Citharina wadei, Robulus* sp., and others are present.
3250-3260	No sample.
3260-3290	Like the sample at 3220-3250 feet.
3290-3300	No sample.
3300-3320	Like the sample at 3220-3250 feet.
3320-3330	Like the preceding sample with the addition of a small amount of very fine grained quartz sand and a little fine-grained glauconite.
3330-3350	Shale, brownish-gray, thinly flaky, containing a few fragments of *Inoceramus* and a few nodules of pyrite. About 20 percent of sample is very fine grained sand and some very fine grained glauconite. Fauna consists mainly of very small specimens of *Globigerina* and *Gümbelina*.
3350-3360	No sample.
	Atkinson Formation. Upper Member (electric log correlation).
3360-3380	The upper member of the Atkinson Formation in this well is a shallow-water marine facies. Shale, brownish-marl, marly, and cavings. At 3370-3380 feet, the sample is composed of 50 percent

Depth (feet)	Description
	shale and 50 percent fine to coarse-grained sub-angular, clear quartz sand.
3380-3390	No sample.
3390-3410	Shale, brownish-gray, flaky, and a little fine-grained, argillaceous, micaceous, glauconitic sandstone. Sample contains specimens of Cretaceous Foraminifera, many of which seem to be caving from higher levels.
3410-3420	Shale, brownish-gray flaky, containing pyrite nodules, *Inoceramus* fragments, and small specimens of long-ranging species of Cretaceous fossils (Foraminifera). Sample contains small irregular-shaped nodules of siderite similar to those usually present in sandy beds of the upper Atkinson in the southeastern region.
3420-3450	Shale, brownish-gray, flaky, and fragments of white, irregularly glauconitic, weakly phosphatic, calcareous, medium-grained sandstone, containing many fragments of *Ostrea*-like fossil bivalves. About two-thirds of the sample is composed of moderately coarse, subangular, clear quartz sand that washes from the sandstone. A few specimens of species of Cretaceous Foraminifera and Ostracoda in the sample are probably caving from higher depths.
3450-3470	Sandstone, fine-grained, glauconitic, irregularly micaceous, fossiliferous; fragments of brownish-gray, flaky shale; and very fine to coarse-grained unconsolidated sand that composes about one-third of the sample. Fragments of *Inoceramus*, and specimens of *Gümbelina*, *Globigerina*, and a few other non-diagnostic Cretaceous microfossils are present. Much of the fossil material is probably caving from higher levels, although fragments of *Ostrea*-like bivalves are probably indigenous. Shell fragments are common in the sandstone chips. The quartz grains in the sandstone seem to be finer than in the preceding samples, and the sandstone itself is less argillaceous and calcareous.
3470-3480	Shale, like the preceding sample; many fragments of white, dense, fine to medium-grained, calcareous, irregularly micaceous sandstone; some fine to coarse-grained unconsolidated sand; and cavings of limestone and *Inoceramus* fragments.
3480-3490	No sample.
3490-3500	Like sample at 3470-3480; very few specimens of Foraminifera and few shell fragments.
3500-3540	Shale, brownish-gray, flaky; a few fragments of sandstone, shells, phosphatized bones, and cavings from higher levels.
3540-3550	Shale, brownish-gray, flaky, is about two-thirds of the sample, and one-third is fine to medium-grained unconsolidated sand, and a few fragments of white, fine-grained, calcareous, glauconitic, irregularly micaceous sandstone. Sample also contains a few specimens of Foraminifera, *Inoceramus* fragments, and cavings of limestone from higher levels.

Depth (feet)	Description
3550-3560	Like the preceding sample, but contains more sand and sandstone and proportionally less shale; shell fragments are common in the sandstone.
3560-3570	Sand, fine to moderately coarse, clear quartz; a small amount of shale; a few fragments of sandstone; cavings of material and fossils from higher levels.
3570-3580	No sample.
3580-3590	Like sample at 3560-3570 feet.
3590-3600	No sample.
3600-3610	Sand, fine to very coarse grained; some fragments of shale and shells; a few specimens of Foraminifera.
3610-3630	Like sample at 3600-3610 feet; a few pink grains in the sand, and a few fragments of very thick shelled bivalves.
3630-3640	No samples.
3640-3660	Like the sample at 3610-3630, but contains no pink grains of sand. Sample contains macrofossil shell fragments and many large nodules of pyrite.
3660-3690	No samples.
3690-3720	Shale, brownish-gray, about 75 percent of sample; 25 percent fine to medium-grained sand. Sample contains a few *Inoceramus* fragments, and a few fragments of other bivalves.
3720-3730	No sample.
3730-3770	Shale, brownish-gray; about 20 to 50 percent of sample is very fine to medium-grained clear quartz sand.
3770-3780	Shale about 75 percent of sample, and 25 percent very fine to medium-grained quartz sand. The sample contains fragments of several types of glauconitic sandstone, fragments of *Inoceramus* and other fossil bivalves, and a few specimens of Foraminifera.
3780-3790	Shale like the preceding sample, about 50 percent, and about 50 percent fine to medium-grained sand. Fragments of white, glauconitic, calcareous sandstone contain small pieces of shells of fossil bivalves.
	Atkinson Formation. Lower Member.
3790-3800	Like the preceding sample with the addition of a few fragments of light bluish-gray, hard limestone containing irregular sandy areas.
3800-3820	Shale, a few fragments of fine-grained glauconitic, irregularly micaceous sandstone, and some unconsolidated sand; fragments of phosphatized bone present, and nondiagnostic specimens of Foraminifera.
3820-3830	Shale, like preceding samples, and many fragments of light-gray, hard, very finely sandy limestone containing shell fragments and mica in very sandy areas; a few fragments of phosphatized

Depth (feet)	Description
	bone are present, and a few small ostracodes that are probably indigenous.
3830-3850	Shale, like preceding sample, and fragments of sandy limestone containing embedded shell fragments.
3850-3890	Shale, like preceding sample, and many fragments of light-gray, hard, dense, irregularly silty to finely sandy limestone containing small worn fragments of heavy-shelled bivalves, *Ostrea*? sp. and others.
3890-3900	Shale, gray, flaky; abundant fragments of light-gray, hard, sandy limestone; hard, calcareous, very fine grained, very micaceous sandstone; large nodules of crystalline pyrite; phosphatic nodules; and small irregular-shaped siderite nodules. Fauna consists of *Inoceramus* fragments, specimens of small nondiagnostic Cretaceous Foraminifera (mainly *Gümbelina*, *Globigerina*, and *Globotruncana*), fragments of macrofossils (in the sandstone and sandy limestone), fish-scales, a few ostracodes, and a few specimens of the foraminiferal species *Ammobaculites comprimatus* that occurs in beds of Woodbine age.
3900-3910	No sample.
3910-3930	Sandstone, fine to very coarse-grained, quartz, containing abundant, large, nodular fragments of siderite; the coarse sand contains grains of white and of pink feldspar. Shale like that in preceding samples, fragments of limestone, and many nodules of pyrite are present.
3930-3940	Sandstone, coarse-grained, quartz; many grains are stained red. Sample contains abundant, large, siderite nodules, fragments of flaky shale, shell fragments, and various other materials, and a few specimens of Foraminifera that have caved from higher levels.
3940-3970	No samples.
3970-3980	Sandstone, very coarse grained, quartz, containing many deep-yellow and reddish-tinted grains.
2980-4010	No samples.
	Comanche Series undifferentiated
4010-4020	Sand and siderite nodules as in preceding samples, many fragments of gray shale, a few fragments of gray red-mottled shale, and some very small fragments of red clay-shale.
4020-4060	No samples.
4060-4080	Sand, very coarse, containing many yellow-tinted grains; a few fragments of red and light greenish-gray mottled shale.
4080-4150	No samples.
4150-4160	Sand, coarse to very coarse, quartz, containing many yellow and reddish-tinted grains, and a small amount of chert and feldspar. Sample contains many fragments of mottled red, gray, and sulfur-yellow micaceous mudstone.

Depth (feet)	Description
	Pre-Cretaceous
4155	Igneous rock (electric log correlation).
4160-4190	No samples.
4090-4210	Igneous rock.
4210-4232 T.D.	No samples.

COFFEE COUNTY

Operator: Carpenter Oil Company
Landowner: Composite log of C. T. Thurman wells 1 and 2 and J. H. Knight well 1[1]
Location: See footnote 1
GGS. Nos. 468, 509 & 508
Elevation: 317 ft. (derrick floor. Thurman well 1)
Total depth: 4130 ft. (Thurman well 1)
Completed: 1955-1956

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Miocene[2] undifferentiated	surface	360
middle, Hawthorn Formation	360	80
Oligocene undifferentiated	440	620
Eocene		
upper, Ocala limestone, upper member	1060	200
middle(?) or upper(?)	1260	100
lower and middle, undifferentiated	1360	470
Paleocene absent?		
Cretaceous		
Gulf		
Beds of Navarro	1830	430
Beds of Taylor age	2260	755
Beds of Austin age	3015(?)	235
Tuscaloosa Formation	3250	500
Comanche(?) undifferentiated	3750(?)	360
Pre-Cretaceous		
Granite[3]	to total depth 4110	20

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Footnotes are on page 87.

Depth (feet)	Description
	Tertiary
	Miocene Series undifferentiated
Surface 10	Sand, quartz, fine to very coarse grained and pebbles of sandy limonite.
10- 20	Sand, clear quartz, fine to coarse-grained, angular to subangular, pitted or rough-textured; a few nodules of limonite.
20- 30	Sand, quartz, fine to very coarse grained, like sample at 10-20 ft.; a few nodules of limonite; and a few nodules of white sandy clay.
30- 40	Sand, fine to very coarse grained, like sample at 20-30 ft., and a few pebbles of sandy limonite. The coarse grains of sand seem to be derived from coarse-grained, poorly-sorted, quartzitic sandstone that was eroded, worn, transported, and redeposited at its present site.
40- 50	Sand, like sample at 30-40 ft. The sand is yellow-stained from the matrix of deep-yellow clay in which it seems to be embedded. The sample contains a few nodules of limonite.

[1]This composite log is based on the microscopic study of the lithology and paleontology of the samples from three closely-spaced wells drilled by the Carpenter Oil Company. The wells are:

Landowner:	C. T. Thurman well 1	GGS. No. 468
Location:	Land Dist. 1, Land Lot 189 center of S.E. ¼	Elevation: 317 ft. (derrick floor) Total depth: 4130 ft. Completed: Sept. 21, 1955
Landowner:	C. T. Thurman well 2	GGS. No. 509
Location.	Land Dist. 1, Land Lot 189, 450 ft. N.W. of center of S.E. ¼	Elevation: 299 ft. (ground) Total depth: 3556 ft. Completed: May 1, 1956
Landowner:	J. H. Knight well 1	GGS No. 508
Location:	Land District 1, Land Lot 144 450 ft. N.W. of center of SE ¼	Total depth: 4151 ft. Completed: May 12, 1956

The samples from a well drilled by the Carpenter Oil Company near the three wells mentioned above were studied but are not used in connection with the preparation of this composite log. The well is:

Landowner:	W. D. Wall well 1	GGS. No. 510
Location:	Land Dist. 1, Land Lot 86 660 ft. north of center of south line	Elevation: Total depth: 2734 ft. Completed: May 24, 1956

The lithologic and paleontologic descriptions shown on the composite lot are based on samples from the different wells at the depths here stated:

Thurman well 1	samples from	surface to 100 ft.
Thurman well 2	do	100 to 3510 ft.
Knight well 1	do	3510 to 4080 ft.
Thurman well 1	do	4080 to 4130 ft.

The decision to prepare a composite log rather than an individual log of each well is based, chiefly on the following considerations: a) no single well provides a complete and continuous sequence of samples; b) the quality of the samples from the different wells is not uniform, and varies at different depths in a single well: c) the electric logs that are availabel for each of the three wells aid in the correlation of the samples.

[2]MacNeil, F. S. 1947, Geologic map of Tertiary and Quaternary formations of Georgia: U.S. Geol. Survey, Oil and Gas Inv., Prelim. Map 72. The outcropping rocks in Coffee County are classified on the map as, chiefly, the undifferentiated Duplin Marl and Hawthorn Formation of the Miocene Series.

[3]Rock determination is by R. L. Griggs, U.S. Geological Survey (written communication to P. L. Applin, 1961), on the basis of petrographic examination of selected fragments of cuttings from the sample at 4120-4130 ft. in the Thurman well 1.

Depth (feet)	Description
50- 60	Sand, like sample at 40-50 ft., but somewhat finer grained.
60- 70	Sand, fine to coarse-grained, and a few pebbles of limonite, as in the preceding samples.
70- 80	Sand, clear quartz, fine to medium-grained, subangular.
80- 90	Sand, fine to very coarse grained, and about 25 percent fragments of light greenish-white, waxy, bentonitic(?) clay that is sparsely to highly sandy. The sand in the clay is extremely fine to medium-grained and poorly sorted.
90- 100	Clay, like sample at 80-90 ft., and very coarse grains of sand that may be caving from higher levels.
100- 110	Sand, quartz, white, fine to very fine grained, subangular; a few coarse grains; a few nodular fragments of white sandy clay.
110- 120	Like sample at 100-110 ft., and a few fragments of white sandy, tubular bodies with branching centers that seem to be casts of worm-borings or sand-coated plant stems. The sandy bodies occur, also, in samples from the Knight well 1 at 100-110 ft.; in the Thurman well 1 at 130-150 ft., and in the Wall well 1 at 160-170 ft.
120- 130	Like sample at 110-120 ft.
130- 140	Like sample at 110-120 ft. The inner part of the tubular bodies is partially coated with a light-brown crystalline substance.
140- 150	Sand, like sample at 100-110 ft., and about 25 percent small fragments of light greenish-yellow, soapy-textured sandy clay that seems to be the matrix containing the sand.
150- 160	Like sample at 140-150 ft. The sand and the fragments of clay are each about 50 percent of the washed concentrate. Another sample from the same depth is composed of fine-grained subangular sand; many small, black, phosphatic nodules and a few broken, polished, phosphatic nodules; a few broken and worn fragments of white and gray limestone showing traces of fossils. This sample may be out of place.
160- 170	Sand and clay, like the first sample described at 150-160 ft.
170- 180	Like sample at 160-170 ft.; sand is about 75 percent of the sample; and clay is 25 percent.
180- 190	Sand, clear quartz, well-sorted, fine-grained, angular to subangular; a few fragments of greenish-yellow clay; sparse flakes of colorless mica.
190- 200	Sand, fine-grained and about 10 percent flaky fragments of light yellowish-tan shaly clay. Scattered fragments of the clay contain specimens of diatoms.
200- 210	Sand, fine-grained, containing small particles of magnetite; about 5 percent of the sample is light greenish-yellow soapy-textured clay.

Depth (feet)	Description
210- 220	Sand, fine-grained, containing a trace of colorless mica and a trace of magnetite; small fragments of greenish-yellow clay compose about 20 percent of the sample.
220- 230	Sand, like sample at 210-220 ft., and about 1 percent fragments of greenish-yellow clay.
230- 240	Like sample at 220-230 ft.
240- 250	Sand and a few fragments of clay, like the sample at 220-230 ft., and in addition, many small, hard, rounded, nodular fragments of greenish-yellow clay.
250- 260	Sand, mainly fine-grained, and a few medium to coarse grains. The sample contains a few fragments and nodules of clay like the sample at 240-250 ft.; a trace of mica; and a few black phosphatic nodules.
260- 270	Like sample at 250-260 ft., but showing an increase in the amount of small, black to gray phosphatic nodules.
270- 280	Sand, clear quartz, fine to medium-grained. About 5 percent of the sample is composed of fragments of light-cream irregularly sandy and silty clay, and a few hard nodules of clay.
280- 290	Sand, mainly fine to medium-grained, but containing many coarse grains. About 5 percent of the sample is composed of fragments of sandy clay like the sample at 270-280 ft. A very few black phosphatic nodules are present.
290- 300	Sand, clear quartz, fine-grained, angular; about 5 percent of the sample is composed of small fragments of greenish-yellow clay.
300- 310	Sand, clear quartz, fine to medium-grained, about 50 percent; fragments of light yellowish-gray clay, about 50 percent.
310- 320	Like sample at 290-300 ft.
320- 330	Sand, clear quartz, fine-grained, subangular, and about 10 percent small, light-gray, tan, and cream, round to irregular-shaped, phosphatic nodules.
330- 340	Sand, clear quartz, fine-grained, subangular, many small phosphatic nodules like sample at 320-330 ft., and a few fragments of light-tan, sandy clay (fine-grained sand).
340- 350	Like sample at 330-340 ft., and about 5 percent small fragments light-tan sandy clay.
350- 360	Like sample at 340-350 ft.
	Miocene Series. Hawthorn Formation.
360- 370	Sand, clear quartz, fine to coarse-grained, subangular; about 10 percent small, black to gray phosphatic nodules; and a few fragments of white, sandy, phosphatic limestone containing debris of poorly-preserved and broken fossil shells. Among the fossils are fragments of bivalves and specimens of *Barnea* sp. About 5 percent of the sample is composed of fragments of clay that are probably caving from higher levels.
370- 380	Similar to sample at 360-370 ft., but about 20 percent of the sample

Depth (feet)	Description
	is composed of phosphatic nodules, fragments of *Barnea* sp., and other shell debris.
380- 390	Like sample at 370-380 ft.
390- 400	Sand, clear quartz, fine to medium-grained, subangular; about 25 percent black to gray phosphatic nodules; and about 5 percent fragments of soft white limestone containing small fragments of shells and a few poorly-preserved calcite molds of specimens of small Foraminifera.
400- 410	Like sample at 390-400 ft., and in addition, a few fragments of light-gray, soft, flaky, bentonitic(?) shale.
410- 420	Sand, phosphatic, like the immediately preceding samples, and a very little white fossiliferous limestone and light-gray, bentonitic(?) shale.
420- 430	Sand, like sample at 410-420 ft., and about 25 percent light-gray bentonitic(?) shale that seems to be irregularly sandy (fine-grained sand); phosphatic nodules are less abundant than in the preceding samples. The sample contains debris of gray, worn and broken molds of fossil shells, and a few fragments of rather thick-shelled fossil bivalves.
430- 440	Like sample at 420-430 ft. A fragment of light-gray limestone contains a mold of a broken specimen of *Archaias* sp.
	Oligocene Series undifferentiated
440- 450	Sand, fine to medium-grained, containing a few phosphatic nodules, about 50 percent of sample; cream, argillaceous, moderately hard limestone is about 50 percent. The cream limestone, which is somewhat spotted with light-gray areas, contains traces of fossil shells, among which are fragments of bivalves, *Archaias* sp., and a mold of an ostracode. The sample contains a few fragments of cream, finely granular, dolomitic (?) limestone.
450- 470	Limestone, cream, chalky, about 75 percent of sample; about 25 percent is sand and a few phosphatic nodules. The cuttings of limestone contain broken shells of fossils, among which are fragments of bivavles, bryozoan fragments, small fragments of *Archaias* cf. *A. compressus*, fragments and specimens of *Miogypsina antillea* (Cushman) and *M. gunteri* Cole and a few specimens of ostracodes.
470- 480	Like sample at 450-470 ft.
480- 490	Clay, light-cream, chalky, about 75 percent of sample; about 25 percent fine-grained, angular, clear quartz sand. Sample contains bryozoan fragments and traces of other fragmentary fossils.
490- 500	Sand, clear quartz, fine-grained, angular; about 1 percent small black phosphatic nodules; about 10 percent chalky clay like sample at 480-490 ft.; a few shell fragments, bryozoan fragments, and a phosphatic mold of a specimen of *Elphidium leonensis* Applin and Jordan.

Depth (feet)	Description
500- 510	Mainly sand like sample at 490-500 ft.; a few phosphatic nodules and a little chalky clay; a few specimens of *Elphidium leonensis*.
510- 520	Sand, clear quartz, fine-grained, angular to subangular; about 5 percent chalky clay shale; a few black phosphatic nodules; and a little fossil shell debris.
520- 530	No sample.
530- 540	Like sample at 510-520 ft. About 10 percent of the sample is composed of chalky clay shale; shell fragments are common.
540- 550	No sample.
550- 560	Like sample at 530-540 ft.
560- 570	Clay, shaly, calcareous, and fragments of white to light-gray, moderately hard, chalky to granular limestone, showing traces of bryozoan fragments in a few chips. Some limestone fragments seem to be dolomitic, and some are nodular and sandy (fine-grained sand). The sample contains a few dolomite molds of immature bivalves.
570- 580	Limestone, irregularly cream and gray, irregularly highly sandy (finely-grained sand).
580- 590	Sand, fine-grained, angular, 50 percent; small fragments of chalky limestone, 50 percent.
590- 600	Limestone, chalky, finely porous, spongy, 75 percent; foraminiferal specimens 25 percent. Specimens are, chiefly, *Streblus mexicanus mecatepecensis* (Nuttall); a few other species of Foraminifera common in the Oligocene are also present.
600- 610	Like sample at 590-600 ft.
610- 620	No change.
620- 630	Like sample at 590-600 ft., but containing little recognizable fossil material.
630- 640	Like sample at 620-630 ft. specimens of *Streblus* are fairly common.
640- 650	Limestone, cream, chalky, containing abundant specimens of *Streblus mexicanus mecatepecensis*, and small tubular bodies of nearly uniform size that are possibly of algal origin.
650- 660	Like sample 640-650 ft. The sample is composed, mainly, of specimens of *Streblus*, a few of the small tubular bodies mentioned in the preceding sample, a few bryozoan fragments, and a few small fragments of *Lepidocyclina (Eulepidina) undosa* Cushman.
660- 670	Similar to sample 650-660 ft., but contains no fragments of *Lepidocyclina*.
670- 680	Limestone, cream, soft, containing abundant specimens of *Streblus mexicanus mecatepecensis*, a few small tubular bodies, and a few bryozoan fragments. A little light-brown very fine grained dolomite also occurs in the sample.
680- 690	Limestone, light-cream, microfossiliferous, containing many fragments of *Streblus*, 50 percent; light-brown, very finely crystal-

Depth (feet)	Description
	line and very highly porous dolomite, 50 percent.
690- 700	Sand, clear quartz, fine-grained, angular, is about one-third of sample; dolomite, like the sample at 680-690 ft., is about one-third of sample; cream, microfossiliferous limestone like sample at 670-680 ft., is about one-third of sample.
700- 710	Like sample at 690-700 ft., and in addition, a few fragments of very light cream coquinoid limestone and a few fragmental specimens of *Lepiodcyclina (Eulepidina) undosa* and *Operculina dia.*
710- 720	Sand, fine-grained, and dolomite like sample at 680-690 ft., about 10 percent; cream, probably water-worn limestone like samples beginning at 590-600 ft., 50 percent. One small fragment of *Operculina dia* Cole and Ponton was observed in the sample.
720- 730	Sand, fine to coarse-grained; about 5 percent small fragments of cream limestone; a few fragments of light-cream coquinoid limestone like sample at 700-710 ft.; and a few fragments of *Operculina* sp.
730- 740	Sand, like sample at 720-730 ft., but course grains are relatively rare; about 50 percent small fragments of cream, porous limestone containing many specimens of *Streblus* sp.
740- 750	Like sample 730-740 ft.
750- 760	Sand, like sample at 720-730 ft., and about 50 percent fragments of cream, moderately hard, finely porous, chalky limestone that seems to be water-worn. The sample contains a few fragments of *Operculina* sp., and a few poorly preserved specimens of *Streblus* that may be caving from higher levels.
760- 770	Like sample at 750-760 ft.
770- 780	Sand and about 75 percent small fragments of cream, irregularly and finely dolomitic limestone, like sample at 750-760 ft. The sample contains a few specimens of *Operculina dia* that seem to be indigenous in the limestone, a few specimens of *Eponides byramensis*, and a fragmental section of *Lepidocyclina* sp.
780- 790	Like sample 770-780 ft.
790- 800	Limestone, dolomitic in part, somewhat fossiliferous, like limestone in sample at 770-780 ft. The limestone contains few determinable fossils, but several specimens of *Operculina dia* and *Streblus* seem to be indigenous.
800- 810	Limestone, cream, chalky, partly dolomitic, like sample at 790-800 ft., and about 25 percent fine-grained sand which may be caving.
810- 820	Dolomite, light-brown, microsucros, highly and finely porous.
820- 830	Like sample at 810-820 ft.
830- 840	No change.
840- 850	Sand, clear quartz, fine-grained, angular, and about 5 percent fragments of dolomite like sample at 810-820 ft. A few fragments of chalky, fossiliferous limestone from several higher levels.

Depth (feet)	Description
850- 860	Limestone, light-cream, finely porous, chalky, calcitic, irregularly sandy (fine-grained sand). The limestone contains much poorly-preserved, usually fragmental fossil material. Identifiable material includes molds of specimens of *Quinqueloculina* sp., *Discorbis* sp., a few fragments of *Lepidocyclina* sp., a few specimens of ostracodes, and a few echinoid spines.
860- 870	Limestone, chalky, calcitic, highly porous, like sample at 850-860 ft., but rarely sandy. Some fragments of the limestone contain traces of fossils.
870- 880	Like sample at 860-870 ft., and a few worn fragments of *Lepidocyclina* sp.
880- 890	Like sample at 870-880 ft. The sample contains a few specimens of smaller Foraminifera that are probably indigenous, a few small fragments of *Lepidocyclina* sp., and specimens of *Streblus* that are probably caving.
890- 900	No change.
900- 910	Material and fauna like sample at 880-890 ft. Many specimens of *Streblus* seem to be definitely embedded in the limestone.
910- 920	Like sample at 900-910 ft. The limestone cuttings contain a specimen of *Dictyoconus floridanus*.
920- 930	No change
930- 940	No change. The limestone contains a trace of glauconite.
940- 950	Like sample at 930-940 ft. Worn, broken and calcitized fossil debris is abundant; fragments of *Lepidocyclina (Eulepidina) suwanneensis* Cushman are somewhat more common and better preserved than in the preceding samples; fragments of *Operculina dia* and a poorly-preserved specimen of *Gypsina* sp. are present.
950- 960	Like sample at 940-950 ft. Several specimens of *Dictyoconus floridanus* occur in the limestone.
960- 970	Similar to sample at 950-960 ft., but containing few specimens of *D. floridanus*.
970- 980	The cuttings of limestone in this sample are softer, more chalky, and less calcitic than the limestone in the immediately preceding samples; the fauna is more abundant and somewhat better preserved. The sample contains many specimens of *Streblus* cf. *S. byramensis*, small fragments of *Lepidocyclina* sp., small fragments of chalk, and fossil debris composed of unidentified shell fragments. About 50 percent of the washed concentrate consists of specimens of *Streblus* sp.
980- 990	Like sample at 970-980 ft.
990-1000	No change.
1000-1010	No change.
1010-1020	Similar to samples beginning at 970-980 ft., but fragments of nodular chalk are common, and molds and fragments of molds of microfossils are less abundant.

Depth (feet)	Description
1020-1030	Chalk, white, in finely cut fragments, and a few specimens of microfossils like those in the immediately preceding samples. About 25 percent of this sample consists of small fragments of grayish-brown, very finely crystalline dolomite.
1030-1040	Like sample at 1020-1030 ft. The nodules of chalk suggest an algal deposit.
1040-1050	No change.
1050-1060	Limestone, chalky, finely porous, containing worn and comminuted fossil debris. No marked change in fauna; the sample contains a little glauconite .
	Eocene Series
	Upper Eocene. Ocala Limestone. Upper Member.
1060-1070	Limestone, cream, like sample at 1050-1060 ft., and about 50 percent fragments of white limestone containing abundant bryozoan fragments.
1070-1080	Limestone, white, porous, coquinoid, containing calcitic areas and a trace of glauconite. The limestone is composed mainly, of fragments of *Lepidocyclina (Pliolepidina) pustulosa* Douville, many fragments of *Operculina floridensis* (Heilprin), and a few fragments of *Sphaerogypsina globula* and *Eponides* sp. Other fossils in the sample are specimens of *Asterocyclina nassauensis* and *Helicostegina polygyralis*. The microfauna indicates a very young late Eocene age of the limestone.
1080-1090	Like sample at 1070-1080 ft.
1090-1100	No change.
1100-1110	No change.
1110-1120	Like the immediately preceding samples, but more calcitic.
1120-1130	Like sample at 1110-1120 ft., but about 50 percent of the washed residue is composed of finely crystalline, dolomitic chalk.
1130-1140	Like sample at 1120-1130 ft.
1140-1150	The sample is lithologically and faunally similar to the preceding upper Eocene samples, but fragmentary specimens of *Lepidocyclina ocalana* and fragments of *Asterocyclina* sp. are much more common; a few specimens of *Sphaerogypsina* sp. are present. The sample is typical of the Ocala Limestone.
1150-1160	Like sample at 1140-1150 ft.
1160-1170	No change.
1170-1190	No change.
1190-1200	Limestone, chalky, highly dolomitic, calcitic, coquinoid, like sample at 1140-1150 ft., but containing little determinable fossil material.
1200-1210	Like sample at 1190-1200 ft.
1210-1230	No change.

Depth (feet)	Description
1230-1240	Dolomite, chalky, glauconitic, fossiliferous, composes about two-thirds of the sample. About one-third of the sample is composed of fine-grained quartz sand and many nodules of dark-green glauconite. The fauna in the chalky dolomite is like that in the samples beginning at 1140-1150 ft.
1240-1250	Limestone, white, chalky, weakly glauconitic; about 50 percent of the sample is fine-grained, subangular, clear quartz sand; about 5 percent of the sample is composed of nodules of glauconite and a little chalky dolomite that may be caving. The small amount of fossiliferous material in the chalky limestone in this sample is composed, mainly, of a few molds of ostracodes and a few fragments of *Operculina*(?).
1250-1260	Sand, clear quartz, fine-grained, subangular, composes about 50 percent of the sample; about 50 percent is composed of white, chalky limestone that is irregularly sandy, irregularly dolomitic, and weakly glauconitic. The size of the crystals of dolomite is not uniform and their color ranges from light-brown to gray. The limestone contains many very small fragments of fossil shells, few of which are identifiable. Fragments of white-shelled fossil bivalves and a fragment of *Pseudophragmina*(?) were observed.
	Middle(?) Eocene or Upper(?) Eocene
1260-1270	Sand, clear quartz, fine to medium-grained, subangular, composes about 75 percent of the sample; about 25 percent is composed of dark-green, rounded but irregular-shaped nodules of glauconite. The sample contains a few fragments of chalky limestone like that in the sample at 1250-1260 ft.
1270-1280	Like sample at 1260-1270 ft., but the sand grains are slightly coarser. This sample contains a few fish teeth.
1280-1290	Sand, clear quartz, fine to coarse-grained, subangular to rounded, and about 40 percent nodules of dark-green galuconite.
1290-1300	Like sample at 1280-1290 ft.
1300-1310	Sand, clear quartz, fine to medium-grained, subangular, and about 10 perecnt nodules of dark-green glauconite.
1310-1320	Like sample at 1300-1310 ft.
1320-1340	No change.
1340-1350	Sand, clear quartz, fine to medium-grained, and about 50 percent nodules of dark-green glauconite.
1350-1360	Like sample at 1340-1350 ft.
	Lower Eocene and middle Eocene undifferentiated
1360-1370	Like sample at 1340-1350 ft., and in addition, a few fragments of white, chalky, glauconitic, fossiliferous limestone.
1370-1380	Clay, light greenish-gray, highly sandy (fine-grained sand), very finely glauconitic, slightly calcareous, soapy textured, containing a few sections of small chalky specimens of Foraminifera. About

Depth (feet)	Description
	75 percent of the sample is sand and glauconite, like samples from 1260 to 1360 ft., and small fragments of white, chalky, fossiliferous limestone like that in samples above the glauconitic sand. This sample also contains a few fragments of light-gray clay that is not sandy.
1380-1390	Like sample at 1370-1380 ft.
1390-1400	No change.
1400-1410	Sample is about 50 percent fine to coarse-grained sand, and 50 percent glauconitic nodules. The sample contains a few fragments of sandy, glauconitic clay, like the samples at 1370-1380 ft., and a few molds of echinoid spines that seem to be indigenous in the clay.
1410-1420	Like sample at 1400-1410 ft.
1420-1430	Like sample at 1400-1410 ft., and containing a few fragments of *Robulus* sp., presumably indigenous in beds near the depth represented by this sample.
1430-1440	Sand and glauconite, like many of the preceding samples, and in addition a few fragments of light-green, silty, very finely micaceous, very finely glauconitic clay.
1440-1450	Like sample at 1430-1440 ft. Samples are much smaller than at higher levels, suggesting that clay is penetrated at this depth, although sand and glauconite compose much of the sample.
1450-1460	Sand, fine to coarse-grained, and about 50 percent fragments of light-gray, moderately hard, highly silty, finely micaceous, slightly glauconitic clay that was observed, first, in the sample at 1430-1440 ft.
1460-1470	Clay, highly silty, which is perhaps better described as micaceous, glauconitic siltstone, composes about two-thirds of the cuttings in this sample; about one-third of the cuttings are fine-grained quartz sand.
1470-1480	Like sample at 1460-1470 ft., but containing much less fine-grained quartz sand.
1480-1490	The relatively small washed sample is composed of a few fragments of soft gray clay, and many fragments of white to light-gray moderately hard limestone showing traces of fragmental fossil debris and a few broken calcite molds of small gastropods.
1490-1500	Like sample at 1480-1490 ft.
1500-1510	Limestone, very light gray, moderately hard, like that in the samples at 1480-1500 ft. The limestone contains faint traces of a highly fragmental fossil content, but little of the material is generically indentifiable. The fossil material consists of bryozoan fragments, fragments of molds of small gastropods and pelecypods, and a few fragments of echinoids.
1510-1520	Like sample at 1500-1510 ft.

Depth (feet)	Description
1520-1530	Like sample at 1500-1510 ft., with the addition of a few fragments of sandstone, a little fine-grained sand, and many small fragments of shells of fossil bivalves.
1530-1540	Sand, quartz, fine to very coarse grained, and many worn and broken shell fragments. The shell fragments usually have attached sand grains, or form nodules with sand grains and calcitic cement.
1540-1550	Sand, clear quartz, fine to medium-grained, and about 20 percent shell fragments and sandy calcitic nodules, like the sample at 1530-1540 ft.
1550-1560	Shell fragments, worn, broken, sandy, and a few limy calcite nodules are about 75 percent of the same; 25 percent of the sample is sand, like the sample at 1540-1550 ft.
1560-1570	Shell fragments 50 percent and sand 50 percent, like the sample at 1550-1560 ft.
1570-1580	Like sample at 1560-1570 ft.
1580-1590	No change.
1590-1600	About 75 perecnt of the washed concentrate consists of loose shell fragments, and fragments of white and gray, sandy, phosphatic coquina composed of fragmental and partly calcitized shells, molds of small bivalves, gastropods, and ostracodes, and traces of other fossil debris.
1600-1610	Sand, fine to medium-grained, about 75 percent of sample; 25 percent is fragments of coquina, like the sample at 1590-1600 ft. The sample contains a few phosphatic nodules, molds of ostracodes, bryozoan fragments, fragments of molds and shells of macrofossils, and a little soft, brownish-gray to greenish-gray clay.
1610-1620	Like sample at 1600-1610 ft.
1620-1630	Sand, fine to very coarse grained, and about 10 percent shell fragments and small calcareous sandy nodules.
1630-1640	Sand, clear quartz, fine-grained, composes most of the sample; about 1 percent is shell fragments, sandstone nodules, and soft, gray, shaly clay. Soft clay or sandy clay is probably the material penetrated at this depth.
1640-1650	Sand, fine to medium-grained, and about 1 percent shell fragments, sandstone fragments and fragments of gray shaly clay.
1650-1660	Like sample at 1640-1650 ft.
1660-1670	Sand, shell fragments, and other material caving from higher levels. This small sample contains a few fragments of two kinds of gray and grayish-green, soft, platy shale.
1670-1680	Sand, clear, quartz, fine-grained, well-sorted, nodular, and a very small amount of shell and sandstone nodules.
1680-1690	Sand, fine to very coarse grained. The sample also contains a few shell fragments, nodules of sandstone and sandy limestone, a few fragments of gray clay shale, and a few small phosphatic

Depth (feet)	Description
	nodules.
1690-1700	Like sample at 1680-1690 ft.
1700-1710	No change.
1710-1720	Sand and a few shell fragments; shell and sand nodules like those in the sample at 1680-1690 ft., and other higher samples; a few fragments of several types of soft, gray, shaly clay. Several fragments of clay contain poorly-preserved specimens of very small Foraminifera; a fragment of a cup-coral is embedded in one fragment of sandy clay.
1720-1730	Like sample at 1710-1720 ft.
1730-1740	Sand and about 5 percent sandy shell fragments. The sample contains several phosphatic molds of ostracodes. A specimen of *Loxoconcha* cf. *L. creolensis*, indicative of beds of middle Eocene age, is attached to a small fragment of shell.
1740-1750	No sample.
1750-1760	Like sample at 1730-1740 ft.
1760-1770	Sand, clear quartz, fine to medium-grained, angular to subangular; about 10 percent of the sample is composed of fragments of poorly-preserved shells of Ostrea(?) sp., and a few nodules of shells and sand.
1770-1780	Sand, fine to very coarse grained, a few shell fragments, and a few cavings of material from higher levels.
1780-1790	Like sample at 1770-1780 ft., and many cavings.
1790-1800	Sand, clear quartz, fine to medium-grained, angular to subangular; a few shell fragments and a few cavings.
1800-1810	Sand, fine to very coarse grained, a few shell fragments and a few cavings.
1810-1820	Like sample at 1800-1810 ft.; a small sample; cavings are common.
1820-1830	Like sample at 1810-1820 ft.

Paleocene Series

The samples from the three wells that are the basis for this composite log contain no faunal evidence for beds of Paleocene age.

Cretaceous

Gulf Series

Beds of Navarro age

1830-1840	Sand, fine to medium-grained, and about 10 percent small fragments of hard, cream limestone and cavings. The sample contains a few specimens of *Robulus* sp., a few poorly-preserved specimens of other species of Foraminifera, and a few specimens of Ostracoda.
1840-1850	Sand, like sample at 1830-1840 ft., about 50 percent; about 50

Depth (feet)	Description
	percent light-cream, moderately soft, irregularly sandy limestone, containing traces and few fragments of fossils. This material closely resembles the material in samples at higher levels and may be caving. A few fragments of several types of light-gray clay are also in the sample.
1850-1860	Sand, very fine grained and about 1 percent small fragments of limestone like that in the sample at 1840-1850 ft. The sample contains a few small fragments of shell and a little mica.
1860-1870	Sand, like sample, at 1850-1860 ft., and about 5 percent mica; a few cavings from higher levels; a few fragments of several types of gray clay.
1870-1880	Like sample at 1860-1870 ft.
1880-1890	No change.
1890-1900	Sand and mica like sample at 1860-1870 ft., a few fragments of gray clay, and a few cavings. The sample contains a few specimens of *Robulus* sp.
1900-1910	Sand, quartz, fine to coarse-grained, a few fragments of gray, soft, micaceous clay; a few fragments of materials and fossils caving from higher levels.
1910-1920	Like sample at 1900-1910 ft. This sample contains molds of several species of ostracodes, a fragment of *Nodosaria affinis*, a fragment of *Marginulina lineara*, and a few fragments of *Robulus navarroensis*.
1920-1930	Like sample at 1910-1920 ft., and several specimens of species of smaller Foraminifera, including *Robulus navarroensis*, *Anomalinoides pinguis*, *Planulina correcta*, *Dorothia bulletta*, and *Gaudryina rudita*.
1930-1940	Sand, like immediately preceding samples, about 50 percent; about 50 percent small fragments of several types of siltstone, clay, and sandy clay, similar to material in samples at higher levels, and all probably caving. This sample contains many specimens of *Robulus* sp., *Anomalina* sp. and other species of smaller Foraminifera which occurred, also, in samples beginning at 1830-1840 ft.
1940-1950	Like sample at 1930-1940 ft.
1950-1960	No change.
1960-1970	Like sample at 1930-1940 ft., but specimens of ostracodes occur in the microfauna.
1970-1980	No change.
1980-2000	No change.
2000-2010	Sand, clear quartz, fine to coarse-grained, subangular, composes most of the large sample. About 5 percent of the sample is composed of small fragments of shell, and fragments of gray clay, sandy clay, siltstone, phosphatic fragments, and a few glauconite nodules. Specimens of species of Foraminifera and Ostracoda are like those in samples beginning at 1830-1840 ft.

Depth (feet)	Description
2010-2020	Sand, clear quartz, fine to medium-grained, subangular; also a few fragments of clay and of fossil debris similar to that in the immediately preceding samples. This sample contains a few black, phosphatic fragments, a trace of glauconite, and a trace of mica.
2020-2030	Like sample at 2010-2020 ft.
2030-2060	No change.
2060-2070	Sand, clear quartz, fine-grained, angular to subangular. About 1 percent of the large sample is composed of small irregular-shaped nodules of very dark green glauconite, and a few brownish-black phosphatic fragments. The sample contains a few fragments of light-gray, soft clay, and a very few fragments of caved material and fossil debris.
2070-2080	Like sample at 2060-2070 ft., but containing some very coarse grains of quartz and about 5 percent cavings.
2080-2090	Sand, clear quartz, very fine grained, angular, composes most of the sample. Also present are a little glauconite, phosphatic material and cavings.
2090-2100	Like sample at 2080-2090 ft.
2100-2110	Like sample at 2080-2090 ft., and a small amount of colorless mica.
2110-2120	Like sample at 2100-2110 ft.
2120-2130	Sand, clear quartz, fine to medium-grained. About 5 percent of the sample is composed of small fragments of shells, small nodules of glauconite, and a few fragments of clay, fossil debris, and other material like that in samples at higher levels.
2130-2140	Like sample at 2120-2130 ft., but showing an increase in the amount of cavings. A few black phosphatic fragments are present.
2140-2150	Sand, clear quartz, fine-grained, angular. About 1 percent of the sample is composed of cavings, small black phosphatic fragments, nodules of glauconite, and mica.
2150-2160	Like sample at 2140-2150 ft.
2160-2170	No marked change in material or fauna. The fauna is composed, chiefly, of specimens of a small *Robulus* sp., *Anomalina* sp., and shell fragments.
2170-2180	No sample.
2180-2190	Like sample at 2160-2170 ft.
2190-2200	No change.
2200-2210	Sand, clear quartz, very fine to coarse-grained. About 5 percent of the sample is composed of fragments of several kinds of gray clay and sandy clay, a few small fragments of shell material, a very few specimens of micro-fossils, a few nodules of glauconite, a few nodules of pyrite, and a few small fragments of phosphatic material. A few specimens of *Robulus* sp. are in the sample.
2210-2220	Sand, like sample at 2200-2210 ft. About 20 percent of the sample

Depth (feet)	Description
	is composed of several kinds of gray and brownish-gray, soft, micaceous, in part silty clay; a few shell fragments; a few specimens of species of Foraminifera already mentioned in the samples beginning at 1830-1840 ft.; a few fragments of light-gray, soft, very fine-grained, highly micaceous sandstone; a few nodules of glauconite, a few nodules of pyrite, and a few phosphatic nodules.
2220-2230	Sand, clear quartz, fine to medium-grained, and about 1 percent fragments of clay, shells, and other material like that in the sample at 2210-2220 ft.
2230-2240	Sand, fine-grained, angular, and about 1 percent small fragments of brownish-gray clay, mica, glauconite, phosphatic material, and shell fragments; specimens of species of Foraminifera are like those in the samples beginning at 1830-1840 ft.
2240-2250	Sand, fine to coarse-grained, and about 1 percent fragments of materials and fossils like those in the immediately preceding samples.
2250-2260	Like sample at 2240-2250 ft. In addition, this sample contains a few fragments of dark brownish-gray, weakly micaceous clay; very little glauconite and phosphatic material occur in the sample.
	Beds of Taylor Age
	The top of the beds of Taylor age in the Thurman well 2 is placed at 2260 ft. on the basis of samples and electric log correlation.
2260-2270	Like sample at 2250-2260 ft.
2270-2280	Like sample at 2250-2260 ft., but this sample contains more of the dark brownish-gray soft clay. Small particles of mica and glauconite, and a few very small specimens of Foraminifera are embedded in the clay.
2280-2290	Sand, fine to coarse-grained. About 10 percent of the sample is composed of small nodules of very dark green glauconite, fragments of dark brownish-gray clay, and a few fragments of very light yellowish-green clay. About 15 percent of the sample is composed of very small fragments of other kinds of clay and other material caving from higher levels.
2290-2300	Like sample at 2280-2290 ft. Glauconite is about 25 percent of this sample.
2300-2310	Sand, clear quartz, fine to coarse-grained. About 10 percent of the sample is composed of nodules of dark-green glauconite, fragments of light yellowish-green clay like sample at 2280-2290 ft., fragments of dark brownish-gray clay like samples beginning at 2250-2260 ft., and other material that is probably caving. A few specimens of small Foraminifera are also probably cavings.
2310-2320	Sand, fine to coarse-grained, about 50 percent of the sample. About 50 percent of the sample is composed of glauconite, small frag-

Depth (feet)	Description
	ments of dark brownish-gray clay that contains specimens of very small microfossils, fragments of light yellowish-green clay, and a few cavings.
2320-2330	Glauconite, green, fine to coarse-grained; sand, like sample at 2310-2320 ft.; and about 25 percent fragments of several kinds and colors of clay and sandy clay; a few shell fragments and some cavings.
2330-2340	Like sample at 2320-2330 ft. Fragments of light yellowish-green clay is the most common kind of clay in this sample.
2348	Circulating.
	Sand, clear, quartz, fine to medium-grained, subangular, and about 40 percent small, rounded, nodules of very dark green glauconite.
2355-2360	Like sample at 2348 ft.
2360-2365	Sand, clear quartz, fine to coarse-grained, subangular, and about 50 percent nodules of dark-green glauconite that are somewhat larger than those in the sample at 2355-2360 ft.
2365-2370	Sand, fine to medium-grained, glauconitic.
2370-2375	Sand, like the sample at 2365-2370 ft., a few fragments of dark brownish-gray clay, and a few *Inoceramus* fragments.
2375-2380	Sand, fine to coarse-grained; about 20 percent of the sample is glauconite; a few fragments of gray clay.
2380-2385	Like sample at 2375-2380 ft.
2385-2390	Like sample at 2375-2380 ft., but smaller and contains relatively less glauconite.
2390-2395	Sand, fine to coarse-grained, and a few fragments of light-cream, soft, chalky, sandy (fine-grained sand) clay.
2395-2400	Sand and a few fragments of clay.
2400-2405	Like sample at 2395-2400 ft. Sample contains fragments of light-colored sandy clay (or argillaceous sand) that was observed first in the sample at 2390-2395 ft.
2405-2410	Sand, fine to very coarse-grained, 50 percent; 50 percent fragments of light-cream, sandy, chalky clay.
2410	Circulating.
	Sand, quartz, medium-grained, subangular, and a few fragments of cream, sandy clay like sample at 2405-2410 ft.
2410-2450	No samples.
2450	Circulating. Like sample at 2410 ft.
2450-2490	No samples.
2490-2495	Sand, clear quartz, fine-grained, and about 1 percent small nodules of glauconite.
2495-2500	Sand, fine to medium-grained; a very little glauconite.
2500-2505	Like sample at 2495-2500 ft.
2505-2525	No change.

Depth (feet)	Description
2525-2530	Sand, quartz, fine to medium-grained. The sample contains a little coarse-grained sand, a few nodules of glauconite and a few fragments of brownish-gray, somewhat silty clay. A few very minute specimens of Foraminifera and a few shell fragments occur in the clay.
2530-2535	Like sample at 2525-2530 ft.
2535-2550	No change.
2550-2555	Sand, clear quartz, fine to medium-grained. Small nodules of dark-green glauconite compose about 1 percent of the sample.
2555-2560	Similar to sample 2550-2555 ft., but contains some coarse grains of sand.
2560-2570	No change.
2570-2575	Sand, clear quartz, fine to moderately coarse grained, subangular. The sample contains a few nodules of glauconite and a few fragments of an *Ostrea*-like bivalve.
2575-2580	Sand and a little glauconite, like the sample at 2570-2575 ft.; also a few shell fragments and a trace of mica.
2580-2585	Like sample at 2575-2580 ft.
2585-2605	No change.
2605-2610	Sand, fine to medium-grained; a trace of glauconite, a few shell fragments, and a few specimens of *Robulus navarroensis, Citharina wadei, Clavulinoides insignis,* and several species of ostracodes.
2610-2615	Sand, clear quartz, fine to medium-grained; a few nodules of glauconite, phosphatic nodules, shell fragments and specimens of ostracodes.
2615-2620	Like sample at 2610-2615 ft., and a few fragments of soft, gray, shaly clay.
2620-2625	Like sample at 2610-2615 ft., and in addition, a few fragments of white, hard, sandy limestone. The sample contains a few specimens of Cretaceous species of Foraminifera.
2625-2630	No change.
2630-2650	No change.
2650-2655	Sand, clear quartz, fine to coarse-grained, subangular. About 5 percent of the sample is composed of small amounts of shell fragments, fragments of gray, soft, micaceous clay, white, hard, sandy limestone, nodules of glauconite, and phosphatic fragments.
2655-2660	Sand and other materials like the sample at 2650-2655 ft., but coarse grains of sand are rare.
2660-2665	Like sample at 2650-2655 ft., but this sample is smaller and contains many specimens of ostracodes and many fragments of dark brownish-gray clay.
2665-2670	Sand, clear quartz, fine to coarse-grained, and about 10 percent worn, broken, sandy fragments of *Ostrea*-like bivalves; frag-

Depth (feet)	Description
	ments of light-gray, moderately hard, highly sandy limestone; a few fragments of dark brownish-gray flaky shale; a few fragments of phosphatic material; a few nodules of glauconite; and rare specimens of Cretaceous species of Foraminifera, among which are specimens of *Kyphopyxa christneri.*
2670	Circulating. Like sample at 2665-2670 ft.
2670-2720	No samples.
2720-2725	Sand, clear quartz, fine to coarse-grained, subangular, in a relatively small sample. The sample also contains about 1 percent shell fragments and a few fragments of clay and sandy limestone; a little glauconite and phosphatic material; and a few specimens of Foraminifera. Worn specimens of *Robulus navarroensis* and *Planulina correcta* are fairly common in the fauna; other specimens are *Globigerina saratogaensis, Gaudryinella pseudoserrata,* and specimens of ostracodes.
2725-2730	Sand, fine to coarse-grained. About 50 percent of the sample is composed of fragments of several other materials that are chiefly fragments of dark brownish-gray, soft clay shale, containing specimens of minute Foraminifera and very finely fragmented fossil shells; fragments of several kinds of very sandy light-gray limestone; a few shell fragments. The sample contains a few specimens of Foraminifera that are probably caving.
2730-2735	Sand, shell and other materials like the sample at 2725-2730 ft. The sample contains a few specimens of species of Foraminifera characteristic of the beds of Taylor age, among which are *Stensiöina americana* and *Planulina taylorensis;* a few specimens of ostracodes also occur.
2735-2740	Like sample at 2730-2735 ft.
2740-2750	No change.
2750-2755	A small washed sample is composed chiefly of fine to coarse-grained quartz sand. The sample contains cuttings of slightly glauconitic, sandy (fine-grained sand) limestone (or calcareous, fine-grained sandstone), and cuttings of sandy limestone in which fragments of *Inoceramus* are embedded. The limestone(?) may, in fact, be calcareous nodules in sandy clay. A few shell fragments and a few nodules of glauconite also occur in the sample.
2755-2760	Sand, fine to coarse-grained composes the largest part of the sample. The sample contains about 5 percent nodules of dark-green glauconite, and in addition, a few shell fragments and a few specimens of Foraminifera. The fossils are, in part, Cretaceous species *(Globigerina sp.)* and, in part, caving from post-Cretaceous beds.
2760-2765	Like sample at 2755-2760 ft.
2765-2770	Sand, fine to medium-grained, and about 5 percent nodules of dark-green glauconite. The sample contains, also, a trace of

Depth (feet)	Description
	mica, a few shell fragments, and fragments of several kinds of clay and sandstone.
2770-2775	Like sample at 2765-2770 ft., mainly sand, but less glauconite.
2775-2780	No sample.
2780-2785	Sand, fine to coarse-grained; about 5 percent glauconite; a trace of mica; a few shell fragments; a few specimens of *Robulus* sp. and a few ostracodes.
2785-2790	Sand, fine-grained; a little glauconite; a trace of mica; a few specimens of Foraminifera that are caving from higher levels.
2790-2795	Like sample at 2785-2790 ft.; a few shell fragments and a few fragments of *Inoceramus*.
2795-2800	Like sample at 2790-2795 ft.
2800-2805	Sand, fine to coarse-grained; a little glauconite; a few shell fragments; a few specimens of *Robulus* sp., and a few ostracodes.
2805-2810	Sand, glauconite, and a few specimens of *Robulus* sp., like sample at 2800-2805 ft.
2810	Circulating. Like sample at 2805-2810 ft., and a few shell fragments, including fragments of *Inoceramus*.
2810-2850	No samples.
2850-2855	Sand, mainly fine to coarse-grained; about 1 percent glauconite; a few small fragments of worn shells.
2855-2860	Like sample at 2850-2855 ft.
2860-2865	No change.
2865-2870	Sand, mostly fine-grained, and a few coarse grains; about 10 percent glauconite; a few phosphatic fragments of clay and sandstone; a few very small fragments of shells.
2870-2875	Sand, fine to coarse-grained; about 1 percent glauconite; a few very small fragments of shells; a few nodules of several kinds of calcareous sandstone.
2875-2880	Sand, clear quartz, mainly fine to medium-grained; about 5 percent nodules of glauconite; a few fragments of sandstone.
2880-2885	Sand, clear quartz, fine to medium-grained, subangular; about 1 percent glauconite; a few phosphatic fragments; a few fragments of different kinds of sandstone; a few fragments of brownish-gray shale; a few very small fragments of shells.
2885-2890	Sand, clear quartz, fine-grained, angular; about 1 percent glauconite; a trace of mica; a few fragments of sandstone and a few fragments of shells.
2890-2895	Like sample at 2855-2890 ft.
2895-2900	Sand and other materials like the immediately preceding sample; coarse grains of sand are somewhat more common.
2900-2905	Sand, fine to coarse-grained; about 5 percent glauconite; a few shell fragments; a few fragments of several kinds of calcareous sandstone.

Depth (feet)	Description
2905-2910	Small sample composed of material like the sample at 2900-2905 ft. A few specimens of *Robulus* sp. occur in this sample.
2910-2915	Sand, fine to coarse-grained; about 1 percent glauconite; many fragments of several kinds of sandy limestone and several kinds of shaly clay that are obviously caving; relatively few fragments of worn shells. This sample is fairly large.
2915-2920	Sand, fine to medium-grained; about 1 percent glauconite; a few fragments of sandstone and a few of shaly clay; a few specimens of ostracodes and Foraminifera (*Robulus* sp. and some very small Foraminifera).
2920-2925	Materials like the sample at 2915-2920 ft. A few specimens of Cretaceous species of Foraminifera which seem to be indigenous, are: *Globotruncana* spp., *Globigerina* sp. and *Gümbelina globulosa*. Other specimens of species indicative of the Taylor age of the beds are: *Planulina taylorensis, Marginulina directa, Loxostoma cushmani,* and the ostracode *Cythereis rugosissima.*
2925-2930	The small, washed concentrate is composed mainly of fine to coarse-grained quartz sand; about 1 percent glauconite; a trace of mica, and a little lignite. Other materials in the washed sample are, a few fragments of several kinds of calcareous, micaceous sandstone; a few fragments of gray and brownish-gray, soft, shaly clay; a few specimens of *Globotruncana* spp. and *Globigerina* sp. are probably indigenous, like the specimens in the sample at 2920-2925 ft. Other foraminiferal specimens are present, but may be caving.
2930	Circulating. Like sample at 2925-2930 ft.
2930-2935	Sand, fine to medium-grained; fine-grained sand predominates in this fairly large sample. The sample also contains about 5 percent glauconite; a very few shell fragments; a few fragments of dark brownish-gray, micaceous, shaly clay containing a few small pieces of fossil shells. The microfauna is like that in the sample at 2925-2930 ft.
2935-2940	A small sample that is like the sample at 2930-2935 ft., and in addition, contains a little carbonaceous material.
2940-2945	No change.
2945-2950	No change.
2954	Circulating. Sand, clear quartz, fine to coarse-grained; about 5 percent glauconite; a few shell fragments; a few fragments of light and dark-gray, flaky, clay shale; specimens of species of Foraminifera and Ostracoda that seem to be caving from several higher levels.
2950-2955	No change.
2955-3005	No change.
3005-3010	Sand and other materials and a few forams as in the immediately preceding samples; a few specimens of *Planulina taylorensis* are possibly indigenous in the beds penetrated near this depth.

Depth (feet)	Description
3010-3015	Sand, fine to coarse-grained; about 1 percent small nodules of glauconite; a few fragments of *Ostrea*-like bivavles; a few fragments of several kinds of gray and brownish-gray shale; a few fragments of sandstone and siltstone; a few specimens of Cretaceous Foraminifera but none are narrowly restricted forms.
	Beds of Austin age
3015-3020	A small sample like the sample at 3010-3015 ft. in character and fauna, but contains many fragments of gray, flaky, micaceous shale, which may be the material penetrated at this depth.
3020-3025	Like sample at 3015-3020 ft.
3025-3030	No change. The gray flaky shale contains fragments of carbonaceous material.
3030-3035	Sand, fine to coarse-grained; about 1 percent glauconite; many fragments of gray, slightly micaceous, irregularly carbonaceous shale containing a few poorly-preserved specimens of Cretaceous Foraminifera.
3035-3040	Like sample at 3030-3035 ft.
3040-3045	No change.
3045-3050	Sand, like the preceding samples; a little glauconite; about 50 percent fragments of gray, slightly micaceous, irregularly carbonaceous shale; a few fragments of extremely fine grained, finely glauconitic, calcareous sandstone, one fragment of which contains a well-preserved part of a specimen of *Citharina texana*.
3050-3055	Shale, gray, soft, and sand like sample at 3045-3050 ft. The sample contains, in addition, fragments of light greenish-gray, extremely fine-grained, argillaceous, calcareous sandstone, and a few specimens of Cretaceous Foraminifera.
3055-3060	Mainly sand and glauconite, but relatively little shale. The fauna is sparse and composed of specimens of Cretaceous Foraminifera that are not narrowly restricted stratigraphically.
3060-3065	Like sample at 3055-3060 ft.
3065-3070	Sand, fine to coarse-grained; about 25 percent fragments of gray flaky shale; a few fragments of extremely fine-grained, argillaceous, calcareous sandstone; a few specimens of Cretaceous Foraminifera.
3070-3075	Like sample at 3065-3070 ft., but showing an increase in the percentage of fragments of gray, shale, which is more thinly flaky than in the preceding sample. The fauna contains a few specimens of *Planulina austiniana*.
3075-3080	Like sample at 3070-3075 ft.; a few specimens of *Planulina austiniana*.
3080	Sample is composed of about 70 percent fine to coarse-grained sand; about 5 percent glauconite; and about 25 percent frag-

Depth (feet)	Description
	ments of gray, flaky shale, a few fragments of extremely fine grained sandstone, and a few specimens of Cretaceous Foraminifera.
3085-3095	No samples.
3095-3100	Like sample at 3080 ft.
3100-3105	No change.
3105-3110	Sand, glauconite, and a little mica, as described in samples beginning at 3015-3020 ft. The sample contains, in addition, many fragments of several kinds of gray shale, a few fragments of extremely fine grained, argillaceous, calcareous, micaceous sandstone, a few fragments of *Inoceramus*, and a few specimens of Cretaceous Foraminifera.
3110-3115	Like sample at 3105-3110 ft.
3115-3120	No change.
3120-3125	Gray shale, sand, glauconite, and a few shell fragments like the sample at 3105-3110 ft.; also a few specimens of Cretaceous Foraminifera and Ostracoda.
3125-3130	Shale and sand, like sample at 3120-3125 ft.; very little glauconite; very few specimens of Foraminifera.
3130-3135	Like sample at 3125-3130 ft.
3135-3140	Material and fauna similar to the immediately preceding samples, but very coarse grains of sand are common at this depth.
3140-3145	Sand, quartz, fine to very coarse grained, a little glauconite, and a little mica, compose about 50 percent of the sample. About 50 percent is composed of fragments of gray, soft, thinly flaky, slightly micaceous shale; a few fragments of very finely granular limestone; a little argillaceous, calcareous, micaceous, glauconitic sandstone; a few fragments of phosphatic material; and a few worn fragments of fossil shells.
3145-3150	Like sample at 3140-3145 ft.
3150-3155	Sand, fine to coarse-grained, and a little glauconite compose about 50 percent of the sample. About 50 percent is composed of fragments of gray, soft, flaky shale; a few shell fragments; and a few specimens of Foraminifera, among which are fragments of *Citharina texana*. The gray shale contains irregularly distributed small flakes of mica, minute fragments of fossil shells, and sparse small fragments of carbonaceous material.
3155-3160	Like sample at 3150-3155 ft.
3160-3170	No change.
3170-3175	Sand, clear quartz, fine to coarse-grained, and a little glauconite compose about 75 percent of the sample. About 25 percent is composed of fragments of gray and dark brownish-gray, argil-

Depth (feet)	Description
	laceous, micaceous siltstone, and very fine-grained sandstone, some of which is finely glauconitic. The sample also contains a few shell fragments and a few specimens of Cretaceous Foraminifera and Ostracoda.
3175-3180	Like sample at 3170-3175 ft. A chip of gray marly shale contains an embedded fragment of a small bivalve.
3180-3185	Like sample at 3170-3175 ft. Specimens of *Robulus* sp. are common in the microfauna.
3185-3250	No change.
	Tuscaloosa Formation
3250-3260	Sand, clear quartz, fine to coarse-grained (coarse grains fairly common), and a little glauconite. The sample contains a few fragments of several kinds of gray clay; a few fragments of siltstone; a few shell fragments; several specimens of Foraminifera and Ostracoda.
3260-3265	Sand, quartz, fine to coarse-grained, subangular; some cavings from higher levels.
3265-3270	Like sample at 3260-3265 ft. Many of the sand grains are more angular than in the preceding sample, and many grains are slightly etched.
3270-3275	Like sample at 3265-3270 ft., and a trace of lignite.
3275-3280	No change.
3280-3285	No change; coarse grains of sand are common.
3285-3290	No change.
3290-3300	Sand, quartz, fine to coarse-grained (medium grains strongly dominant), like the samples beginning at 3265-3270 ft.; a few fragments of lignite; fragments of several kinds of material caving from higher levels.
3300-3310	Like sample at 3290-3300 ft.
3310-3315	Like sample at 3290-3300 ft.; a few sand grains are tinted yellow and pink.
3315-3320	Like sample at 3290-3300 ft.; a few fragments of lignite, and a few large flakes of colorless mica.
3320-3325	Like sample at 3315-3320 ft.
3325-3335	No change.
3335-3340	Like sample at 3315-3320 ft., and sparse nodules of siderite.
3340-3350	Sand, like sample at 3335-3340 ft., but no siderite.
3350-3360	Sand, like sample at 3340-3350 ft., and a trace of mica.
3360-3370	Sand, mainly quartz, and a few grains of white feldspar.
3370-3375	No change.
3375-3380	Sand, clear quartz, fine to coarse-grained; a few spherules of siderite; a trace of lignite; a few cavings.
3380-3385	No change.

Depth (feet)	Description
3385-3420	No change.
3420-3425	Sand, like sample at 3375-3380 ft., but this sample contains more siderite spherules and more fragments of white feldspar.
3425-3430	No change.
3430-3435	Sand, quartz, fine to coarse-grained (medium grains dominant); a few grains of white feldspar, and a few siderite spherules.
3435-3440	Sand, white, quartz, fine to coarse-grained (coarse grains common). The sample contains a trace of mica; a few quartz grains tinted yellow and pink; a few grains of white feldspar; and a few nodules of siderite.
3440-3450	Like sample at 3435-3440 ft.
3450-3460	Sand, similar to sample at 3435-3440 ft., but fine grains are dominant. The sample contains a little glauconite that is probably caving.
3460-3465	Sand, fine to coarse-grained; a few grains of white feldspar; a few nodules of siderite; a few cavings.
3465-3470	Like sample at 3460-3465 ft.
3470-3500	No change.
3500-3505	Sand, quartz, fine to coarse-grained, subangular and a little white feldspar.
3505-3510	Sand, like sample at 3500-3505 ft.; a few quartz grains are tinted pink. The sample contains a few nodules of siderite.
3510-3520	No change.
3520-3590	No change.
3590-3600	Similar to sample at 3505-3510 ft.; a trace of white feldspar.
3600-3610	No change.
3610-3620	Sand, coarse-grained, pink-tinted grains are fairly common; a few nodules of siderite.
3620-3630	Sand, clear quartz, fine to coarse-grained (coarse grains strongly dominant); a few grains of white feldspar; a few nodules of siderite. Some quartz grains are tinted pink.
3630-3670	Like sample at 3620-3630 ft.
3670-3680	Sand, clear quartz, and a few pink grains; the sand is somewhat finer grained than in the sample at 3620-3630 ft. The sample contains a few nodules of siderite, a few grains of white feldspar, and a few small grains of obsidian (?).
3680-3690	Like sample at 3670-3680 ft.; obsidian (?) is rare.
3690-3700	Sand, clear quartz, coarse to very coarse grained; a few grains of pink-tinted quartz; a few grains of white feldspar.
3700-3710	Like sample at 3690-3700 ft.
3710-3750	No change.
	Comanche Series (?) undifferentiated
3750-3760	Sand, like immediately preceding samples. The sample contains, in

Depth (feet)	Description
	addition, a few nodules of siderite, and a few fragments of red, yellow, and gray mottled, micaceous silty mudstone. The unfossiliferous mudstone is lithologically similar to rocks that have been classified as Comanche in many wells in the southeastern Gulf Coast region. On the basis of the highest occurrence of the mudstone in the Knight well 1, supported by electric log characteristics, the top of the Comanche(?) is placed at 3750 ft.
3760-3770	Like sample at 3750-3760 ft.
3770-3810	No change.
3810-3820	Sand, clear quartz, coarse to very coarse-grained; a few grains of white feldspar. A few of the quartz grains are tinted pink.
3820-3850	Like sample at 3810-3820 ft.
3850-3860	Like sample at 3810-3820 ft., but this sample contains more white feldspar.
3860-3870	Sand, coarse to very coarse grained; a few pink-tinted grains of quartz; a few grains of white feldspar; a few grains of obsidian (?); and a few moderately large nodules of siderite.
3870-3880	Sand and other materials like sample at 3860-3870 ft., and in addition, fragments of light yellowish-green clay and red, finely micaceous clay.
3880-3890	Sand, white, very coarse grained; a few grains of white feldspar. A few quartz grains are tinted pink.
3890-3900	Sand, similar to the sample at 3880-3890 ft., but coarser grained; grains of white feldspar are fairly common.
3900-3910	Like sample at 3890-3900 ft., and in addition, a few fragments of red and greenish-yellow mottled micaceous clay.
3910-3920	Like sample 3900-3910 ft., but contains no mottled clay.
3920-3930	Sand, quartz, fine to very coarse-grained, and a little white feldspar. The sample contains, in addition, a few nodules of siderite, fragments of red, gray and greenish-yellow mottled, finely micaceous clay, and cavings of other materials.
3930-3940	Like sample at 3920-3930 ft.
3940-3950	Like sample at 3920-3930 ft., but contains more coarse grains of sand.
3950-3960	Sand, fine to very coarse grained; a few nodules of sandy siderite; a little limonite; many fragments of dark-red micaceous shale, greenish-yellow and gray mottled shale, and red and light-raspberry mottled shale. This sample contains other materials that are caving from higher levels.
3960-3970	Sand, fine to very coarse grained, like samples at 3950-3960 ft., and a very small amount of vari-colored shale.
3970-3980	Like sample at 3960-3970 ft.
3980-3990	Sand, fine to very coarse grained (coarse grains compose about 50 percent), and a little varicolored shale; a few nodules of

Depth (feet)	Description
	siderite and cavings of various materials are components of the sample.
3990-4000	Like sample at 3980-3990 ft.
4000-4030	No change.
4030-4040	Sand, like sample at 3980-3990 ft.; yellow-tinted grains are fairly common. The sample contains a little yellow feldspar.
4040-4050	Like sample at 4030-4040 ft. and a few fragments of bluish-gray, weakly sandy (very fine grained sand) shaly clay.
4050-4060	Like sample at 4040-4050 ft., but fragments of the shaly clay are much more abundant.
4060-4070	No change.
4070-4080	No change.
4080-4090	Sand, yellow and red, fine to very coarse grained, the coarse grains being dominant; a few grains of feldspar; a trace of mica; and a few fragments of brick-red clay.
4090-4100	Sand, like sample at 4080-4090 ft.; grains of feldspar of various colors are common in the sand. The sample contains a few fragments of red and white mottled, sandy, micaceous clay.
4100-4110	Sand, like sample at 4090-4100 ft., but the grains are slightly coarser. The sample contains a trace of red, sandy, micaceous clay.
Pre-Cretaceous rocks	
4110-4130 T.D.	Sand, like sample at 4100-4110 ft., and fragments of granite. The top of the granite in the Thurman well 1 is placed at 4110 ft. on the basis of electric log correlation and the petrographic determination of selected fragments of cuttings.

COLQUITT COUNTY

Operator: R. T. Adams
Landowner: D. G. Arrington Well 1
Location: Land District 8, Land Lot 270; 760 ft. west of east line; 210 ft. north of south line of land lot 270.

GGS. No. 170
Elevation: 270 (est.)
Total depth: 4904 ft.
Completed: Aug. 25, 1948

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Not studied		
Cretaceous		
Gulf		
Beds of Navarro age	1680	220
Beds of Taylor age	1900	540
Beds of Austin age	2440?	366?
Atkinson Formation upper member	2806	484
lower member	3290	220
Comanche undifferentiated	3510 total depth	1394

Lithologic and paleontologic descriptions of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-1680	Samples not studied.
	Cretaceous
	Gulf Series
	Beds of Navarro age
1680-1690	Shale, gray, and a little fine-grained sand probably indicate the material drilled at this depth; the fauna consists of a few specimens of *Globotruncana arca* and a few specimens of other Cretaceous species of Foraminifera. The sample contains many fragments of Limestone from the overlying Clayton (Midway) Formation.
1690-1900	Lithology and fauna like the sample at 1680-1690 ft.
	Beds of Taylor age
1900-1910	Shale, gray, and many fragments of gray, sandy (very fine grained sand) clay shale, and light-gray, hard, very fine grained sandstone.
1910-1920	Like sample at 1900-1910 ft.; sample contains abundant specimens of *Lituola taylorensis.*
1920-2060	Samples not studied in detail.
2060-2070	Shale, gray, a little sandy shale, and specimens of *Globorotalites conicus, Planulina dumblei* and *Stensiöina americana.*
2070-2710	Samples not studied in detail.

Depth (feet)	Description
	Beds of Austin age
2710	Sidewall core. Shale, gray, containing glauconite and pyrite, fragments and prisms of *Inoceramus*, many specimens of *Citharina texana*, and a few specimens of other Foraminifera, mainly *Globotruncana* sp.
2710	Sidewall core. Shale, gray, soft, chalky, containing abundant *Inoceramus* prisms and specimens of *Citharina texana;* specimens of *Gümbelina* sp. and *Globigerina* sp. are common.
2725	Sidewall core. Sandstone, cream, moderately hard, chalky, very fine-grained, glauconitic; contains fragments of *Ostrea* sp.
2731	Sidewall core. Shale, gray, soft, sandy (very fine grained sand), glauconitic. Fauna consists mainly of specimens of a small *Anomalina* sp. indicative of the beds of Austin age.
	Atkinson Formation. Upper Member.
2806	Sidewall core. Shale, gray, soft, fine-grained, argillaceous, containing a few fragments of phosphatic material, carbonaceous material, and a little mica.
2850-2860	Shale, gray, containing many fragments of *Ostrea* sp., a little carbonaceous material, and a few fragments of white, medium to fine-grained, somewhat phosphatic, slightly glauconitic sandstone. The fragments of *Ostrea* sp. are probably indigenous, but the few specimens of Foraminifera in the sample seem to cave from higher levels.
2860-2870	Like the sample at 2850-2860 ft.
2870-2880	Like the sample at 2850-2860 ft., and containing a few fragments of grayish-green shale.
2880-3000	No change. The specimens of Foraminifera are species that occur in the lower part of the beds of Austin age; species indicative of the upper member of the Atkinson Formation (Eagle Ford age) were not observed.
3000-3010	Like the samples at 2880-3000 ft., with the addition of grains of coarse sand.
3010-3020	Samples not studied.
3020-3030	Sand, coarse to very coarse, and a little nodular sandstone.
3030-3060	Samples not studied.
3060-3070	Sand, fine to coarse-grained (coarse grains common). The sample contains a few fragments of white, moderately hard, medium-grained sandstone showing a few pink-tinted grains.

Depth (feet)	Description
3070-3200	Samples are like the sample at 3060-3070 ft. and contain cavings in variable amounts.
3200-3210	Sand and sandstone like the immediately preceding samples, and also many fragments of white, moderately hard, fine to medium-grained, glauconitic, somewhat phosphatic sandstone.
3210-3220	Like sample at 3200-3210 ft., showing an increase in the amount of glauconitic sandstone.
3220-3230	Sample not studied.
3230-3240	Sample is mainly cavings, and the material drilled at this depth is not clearly shown. The material in the sample consists of gray shale (probably from the beds of Austin age), a few fragments of glauconitic sandstone like that in the samples at 3200-3220 ft., and specimens of Foraminifera from higher levels. The sample contains fragments of carbonaceous material that increase progressively with depth from 3240 to 3290 ft.
3240-3290	Samples not studied in detail.
	Atkinson Formation. Lower Member.
3290-3300	Like sample at 3230-3240 ft., and in addition, many fragments of white, fine to medium-grained, calcareous, glauconitic, somewhat micaceous sandstone containing many fragments of shells (*Ostrea* sp. and possibly other fossil bivalves).
3300-3320	Samples not studied.
3320-3330	Shale, dark-gray, hard, flaky, is probably the material drilled at this depth. The sample contains much gray clay shale that is caving from higher levels.
3330-3340	The sample shows an increase in the amount of dark-gray, micaceous shale described in the sample at 3320-3330 ft. The microfauna seems to be mainly caving from higher levels. Specimens of Foraminifera indicative of the lower member of the Atkinson Formation do not seem to occur in this sample, possibly because of the small amount of dark-gray shale in proportion to the large quantity of cavings. It is possible, also, that specimens, if present, were removed from the sample prior to this study.
3340-3510	Samples are mainly cavings of gray clay shale, dark micaceous shale, fine-grained sand, and glauconite; the microfauna is sparse and seems to have caved from higher levels.
	Comanche Series undifferentiated
3513	Materials similar to those described in the sample from 3340 to 3510 ft., and also a little coarse-grained quartz sand.
3520-3530	Sand, coarse-grained, quartz; a few fragments of waxy, mustard-colored, red mottled shale; many cavings.
3530-3540	Like sample at 3520-3530 ft.

Depth (feet)	Description
3540-3550	Like sample at 3530-3540 ft., and a few fragments of greenish-brown, red and light-gray mottled micaceous shale.
3550-3560	Like sample at 3540-3550 ft.
3560-3570	Sand, fine to very coarse grained (coarse grains common) quartz, and a few grains of feldspar; some of the quartz grains are red-tinted. Sand is about 50 percent of the sample. A few fragments of mottled or varicolored shale and cavings from higher levels compose about 50 percent of the sample.
3570-3600	No change.
3600-3610	Sand, varicolored shale, and cavings, like the sample at 3560-3570 ft., and many fragments of dark purplish-red, micaceous shale.
3610-3630	Sample not described.
3630-3640	Sand, 50 percent of sample, and 50 percent cavings of gray clay shale and a few fragments of red and mottled shale.
3640-3770	No change.
3770-3780	Sand, fine-grained, many fragments of brownish to purplish-red, gray and mustard-colored, micaceous shale, and many cavings.
3780-3800	No change.
3800-3810	Sand, white, mainly coarse-grained, quartz; a few amber and pink-tinted grains; a few grains of feldspar; a little red and mottled shale; cavings.
3810-4904 T.D.	Samples not studied in detail. The material is sand, sandy clay, and varicolored clay, and is seemingly not older than Comanche.

COLQUITT COUNTY

Owner: City of Moultrie, well 3

GGS No. ____
Elevation: 340 ft. (est.)
Total depth: 745 ft.
Completed: Aug. (?) 1936

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Pliocene to Recent 1 sample at 150 ft.	?	?
Miocene undifferentiated	165	243
Oligocene do	408	262
Eocene		
upper, Ocala Limestone, upper member	670	to total depth 75

Lithologic and paleontologic descriptions of cutting samples.

Depth (feet)	Description
	Pliocene Series to Recent Series
150	Sand, coarse-grained, subangular, clear quartz, and a few reddish-brown and gray sandy nodules.
	Miocene Series undifferentiated
165	Clay, white, sandy (fine-grained sand). Washed residue, large. Sand, fine-grained, moderately even-grained, angular, clear quartz, and a few nodules of clay.
170	Clay, white to light-green, sandy (fine-grained sand). Washed residue, large. Sand, very uneven-grained, clear quartz, and about 25 percent nodules of hard clay.
200	Clay, light-green. Washed residue, very small. Sand, uneven-grained, angular, clear quartz.
210	Clay, light-green. Washed residue, small. Sand, uneven-grained, angular, clear quartz, and about 10 percent small nodular fragments of light-green clay.
220	Clay, light-green, sandy. Washed residue, moderately small. Sand, very fine grained, even-grained, angular, clear quartz, and a few fragments of hard clay.
230	Clay, light-green and tan, fairly hard. Washed residue, moderately small. Clay, and about 25 percent very fine grained, clear quartz sand, and a few chalky lime nodules.
235	Clay, light-green and light-tan, sandy (fine-grained sand), slightly calcareous. Washed residue, moderately large. Clay, and about 25 percent fine-grained, angular, clear quartz sand.
240(?)	Clay, light-green, somewhat sandy. Washed residue, small. Clay, and about 50 percent fine-grained clear quartz sand.
245	Like samples at 240(?) ft.
250	Clay, light-green, fairly hard, sandy (fine-grained sand), and a few chalky lime nodules. Washed residue, small. Clay, and a small amount of sand.
260	Clay, olive-green, and lime nodules. Washed residue. Sand, moderately fine-grained, even-grained, clear quartz, and a few nodules of hard sandy clay.
270	Like the sample at 260 ft.

Depth (feet)	Description
	Washed residue, large. Nodular fragments of sandy clay.
280	Material and washed residue like sample at 270 ft., with the addition of a few fragments of grayish-green, flaky, somewhat carbonaceous shale.
290	Clay, olive-green, and nodules of white, calcareous clay. Washed residue, moderately large. Clay, nodular, highly sandy, calcareous, and about 25 percent very uneven grained, clear quartz sand and a few fragments of olive-green shale.
305	Clay, olive-green, and cream, calcareous, sandy nodules. Washed residue, moderately large. Clay, nodular, sandy, calcareous, and about 50 percent, uneven-grained, clear quartz sand and many fragments of light-green, shaly clay.
325	Clay, olive-green. Washed residue, moderately large. Clay, nodular, hard, sandy, calcareous, and a little uneven-grained, clear quartz sand.
365	Like the sample at 325 ft., with the addition of a few cream nodules of hard sandy chalk.
370	Clay, cream, shaly, sandy, unctuous. Washed residue, moderately large; composed of angular fragments of the clay, and about 50 percent fine-grained, moderately even grained, angular, clear quartz sand.
390	Clay, olive-green, sandy. Washed residue, moderately large. Sand, fine to coarse-grained, angular, clear quartz; a few fragments of carbonaceous material; about 10 percent nodules of the olive-green hard clay.
	Oligocene Series undifferentiated
408	Clay, green, nodular, and fragments of white, chalky, sandy limestone. Washed residue, large. Fragments of the clay and limestone, and a little uneven-grained, clear quartz sand that washes from the clay nodules; a few poorly-preserved molds of ostracode carapaces, and a few vague impressions of fragments of fossils in the limestone cuttings.
420	Limestone, white, chalky, somewhat sandy; fragments of olive-green, sandy, shaly clay; a little clear quartz sand.
430	Limestone, white, sandy, very finely granular, containing impressions of fragments of fossils; a little clear quartz sand. The fossils are *Pecten* sp. and others that are not determinable.
440	Limestone, greenish-brown, nodular, dense, sandy, unfossiliferous(?).
465	Clay, green, shaly, and a few limestone nodules. Washed residue, small. Sand, uneven-grained, clear quartz; a few nodular, calcareous, sandy fragments of the green shaly clay; and a few reddish-yellow sandy nodules.

Depth (feet)	Description
480	Limestone, light-gray, hard, nodular, fossiliferous, and a few nodular fragments of brown, granular dolomite. The fossils are usually firmly embedded in the hard limestone nodules, and seem to be water-worn, but calcitized specimens of *Lepidocyclina* cf. *L. chattahoocheënsis, Gypsina globula,* and a few miliolids and fragments of *Pecten* sp. were identified.
500	Limestone, cream, hard, nodular, fossiliferous, lithologically and faunally similar to the sample at 480 ft. In addition to the fauna in the preceding sample, the limestone contains bryozoan fragments, a few highly ornamented echinoid spines, a few worn specimens of *Camerina* sp., *ostracode* carapaces, a large specimen of *Quinqueloculina* sp., *Asterigerina* sp., and a number of specimens of *Rotaliidae,* including *Rotalia* cf. *R. mexicana* var.
515	Dolomite, brown, granular, crystalline, and about 15 percent small fragments of white, chalky coquina.
530	Coquina, chalky, porous, and a few nodular fragments of brown, granular dolomite; abundant fragments of *Pecten* sp., Bryozoa, and echinoid spines; specimens of *Lepidocyclina mantelli, Operculina?* sp., *Rotalia mexicana* var., *Quinqueloculina* sp., *Asterigerina* cf. *A. subacuta,* and *Discorbis patteliformis* are common.
540	Like the sample at 530 ft., with specimens added to the fauna as follows: *Gypsina globula* (common), *Eponides* sp. and *Asterigerina* sp. (very common). *Rotalia* cf. *R. mexicana* var. is rare in this sample.
550	Like sample at 540 ft.
560	Dolomite, brown, granular, crystalline, and a few fragments of coquina, probably from closely overlying levels.
575	Like the sample at 560 ft.
585	Limestone, brown, granular, crystalline to cryptocrystalline, in which chalky fragments of specimens of *Lepidocyclina* cf. *L. pseudomarginata* and some fragments of *Pecten* sp. are embedded.
595	Like sample at 585 ft., but containing more abundant fossil material.
605	Like sample at 595 ft.
615	Dolomite, brown to light-tan, finely granular, somewhat chalky; fauna like the immediately preceding samples.
625	Like the sample at 615 ft., but the fauna consists only of a few sections of small miliolids. A few specimens of *Lepidocyclina* sp. in the sample may have caved from higher levels.
635	Limestone, dark-brown to cream, finely granular, crystalline, porous, containing a few very poorly preserved calcitized fragments of shell material and *Lepidocyclina*(?) sp.
650	Like the sample at 635 ft.
660	No change.

Depth (feet)	Description
	Eocene Series
	Upper Eocene. Ocala Limestone. Upper Member.
670	Limestone, white, chalky, fossiliferous, and about 20 percent nodular fragments of brown dolomite. The fauna consists of fragments of specimens of *Asterocyclina georgiana;* fragments of echinoids and echinoid spines; bryozoan fragments; fragment of bivalve (genus not determinable); fragments of specimens of *Robulus alato-limbatus, Pecten* sp., *Eponides* cf. *E. jacksonensis,* and *Massilina* sp.
700	Limestone, tan to cream, granular, crystalline, and a few fragments of coquina caving from higher levels; a few fragments of of *Lepidocyclina* sp. and echinoids.
710	Most of this sample is like the one at 700 ft. but contains many fragments of light grayish-cream crypto-crystalline, porous limestone in which are embedded many sections of small miliolids, and a few molds of fragments of other fossils.
720	Limestone, chalky, nodular, microfossiliferous. The fauna is composed of bryozoan fragments and fragments of *Asterocyclina georgiana* and other species; also specimens of *Robulus alato-limbatus, Eponides jacksonensis,* and a few other Rotaliidae.
745 T.D.	Limestone, white, chalky, highly fossiliferous; bryozoan fragments are abundant; specimens of Foraminifera in the sample are *Asterocyclina georgiana, Robulus alato-limbatus, Eponides jacksonensis,* and others.

DECATUR COUNTY*

Owner Operator: U. S. (War Department) Bainbridge Basic Flying School Well 2
Location: 6 mi. northwest of Bainbridge, Ga.

GGS. No. 55
Elevation: 135
Total depth: 422 ft.
Completed: June 19, 1942

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Oligocene(?) or Eocene(?) (1 sample)	82	?
In **Eocene**		
upper, Ocala Limestone, upper member	100	55
lower member	155	75
upper middle, Avon Park Limestone	230	55

*Publication of this data is authorized by the Sun Oil Company, for whom the report was prepared on a commercial basis.

	Depth (feet)	Thickness (feet)
lower middle, Lake City Limestone(?)	to 285 total depth	137

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
	Tertiary
	Oligocene(?) or Eocene(?)
82	Sand, clear quartz, fine-grained, and very finely cut fragments of hard, white, chalky limestone.
	In Eocene
	Upper Eocene. Ocala Limestone. Upper Member.
100	Limestone, white, chalky, fossiliferous, containing worn fragments of molds and a few sections of *Heterostegina ocalana, Sphaerogypsina globula,* and *Amphistegina pinarensis cosdeni.*
110	Limestone, white, hard, chalky, in nodular fragments that seem to be water-worn. The limestone contains worn molds of *Lepidocyclina* sp. and *Sphaerogypsina* sp.
120	Limestone, light-cream, moderately hard, chalky containing traces of fossils, among which fragmental sections of *Lepidocyclina* sp. are fairly common.
125	Limestone, chalky, porous, similar to sample at 120 ft. Very little of the fossil material is determinable, but poorly-preserved fragments of *Lepidocyclina* sp. are present.
130	Like sample at 125 ft.
144	Like sample at 125 ft.
	Upper Eocene. Ocala Limestone. Upper Member.
155	Like sample at 125 ft. Sample contains specimens of *Amphistegina pinarensis* var., and a few specimens of small Foraminifera typical of the lower member of the Ocala Limestone.
168	Limestone, chalky, fossiliferous, having a water-worn appearance. The fauna consists of bryozoan fragments (common), fragments of specimens of *Lepidocyclina ocalana, Asterocyclina* sp., *Amphistegina alabamensis,* and specimens of small Foraminifera characteristic of the lower member of the Ocala Limestone.
178	Like sample at 168 ft.
195	Limestone, chalky, fossiliferous. The fossils are better preserved than in the preceding samples, and the fauna contains several

Depth (feet)	Description
	varieties of *Lepidocyclina ocalana*, and many specimens of *Amphistegina alabamensis* and *A. pinarensis* var.
210	Limestone, white, dense, containing traces of fossils; also some fragments of white, crystalline, gypsiferous limestone. The cuttings of limestone are very small.
215	Limestone, white, dense. The sample is composed of finely cut fragments.
220	Limestone, white, nodular. The sample is composed of finely cut fragments.
225	Like sample at 220 ft. The limestone contains molds of small Foraminifera that are too poorly preserved for identification.
	Upper Middle Eocene. Avon Park Limestone.
230	Limestone, white, chalky, moderately hard, containing specimens of *Dictyoconus floridanus* and *Valvulina* sp.
235	Limestone, white, chalky, partly crystalline, containing specimens of *Dictyoconus floridanus* and poorly preserved molds of smaller Foraminifera.
238	Limestone, white, chalky, having a water-worn appearance. The fauna consists of poorly-preserved specimens that are chiefly fragments of *Lepidocyclina* sp., *Operculina* sp., and *Camerina* sp., as in samples above 230 ft., and consequently may be caving, in part.
240	Limestone, white, nodular (small nodules), somewhat calcitic, containing a few poorly-preserved, largely unidentifiable molds of smaller Foraminifera, among which are specimens of a small *Cibicides* sp. and a few other questionable rotalid forms.
245	Limestone, white, chalky, porous, nodular (small nodules), somewhat calcitic, containing specimens of several species of miliolids, and specimens of *Coskinolina floridana* and *Valvulammina* sp. common in the Avon Park Limestone.
248	Like sample at 245 ft.
	Lower Middle Eocene. Lake City Limestone (probable equivalent).
285	Limestone, white, dense, chalky, slightly glauconitic. The sample contains many poorly-preserved molds and fragments of *Lepidocyclina* sp., some of which may be caving from higher levels, but some are definitely indigenous, as *Lepidocyclina pustulosa*.
295	Limestone, in part chalky, in part dolomitic; crystals of dolomite are scattered through the chalky material. The limestone contains a little glauconite, and a few fragments of molds and small fragmental sections of *Lepidocyclina* sp. Like the sample at 285 ft., some of the fossil fragments may be caving.

Depth (feet)	Description
315	Sandstone, very fine grained, slightly glauconitic (fine-grained glauconite), is about 80 percent of the sample. About 20 percent of the sample is composed of small chalky fragments, much of which is probably worn and broken fossil debris that was irregularly scattered in the sandstone. Bryozoan fragments are common.
325	Sandstone, grayish-tan, very fine grained, calcitic, slightly glauconitic, like sample at 315 ft.; a few chalky fragments are present.
330	Sandstone, highly calcareous, very fine grained, slightly glauconitic. Many fragments of chalky, glauconitic limestone contain traces and fragments of fossils that indicate the material is probably caving from higher levels.
340	Limestone, white, chalky, glauconitic, containing many fragments of *Operculinoides* sp., *Camerina* sp., *Lepidocyclina (Polylepidina) antillea*, and *Discocyclina flintensis*.
365	Limestone, light bluish-gray, hard, dense, containing small scattered particles of glauconite.
373	Like sample at 365 ft.
422 T.D.	Limestone, light-gray, moderately hard, sandy, glauconitic (fine-grained glauconite); no indigenous fossils.

DECATUR COUNTY*

Owner Operator: U. S. (War Department) Bainbridge Basic Flying School Well 1
Landowner:
Location: 6 mi. northwest of Bainbridge, Ga., and about 3/4 mi. southwest of Georgia Highway 1.

GGS. No. 57
Elevation: 130 ft.
Total depth: 1035 ft.
Completed: May 28, 1942

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Miocene(?) undifferentiated (1 sample)	20	?
Oligocene(?) do (1 sample)	55	?
No samples	60	55
In Eocene		
upper, Ocala Limestone, upper member	115	54
lower member	169	137

*Publication of this data is authorized by the Sun Oil Company, for whom the report was prepared on a commercial basis.

		Depth (feet)	Thickness (feet)
middle	Unit A	306	47
	B	353	77
	C	430	107
	D	537	to total depth 498

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
	Tertiary
	Miocene(?) undifferentiated
20	Clay, tan, sandy, slightly micaceous.
	Oligocene (?) undifferentiated
55	Limestone, chalky, water-worn, containing traces of fossils.
	In Eocene
	Upper Eocene. Ocala Limestone. Upper Member
115	Limestone, light-cream, chalky, porous, composed of poorly-preserved, fragmentary molds of fossil shells, among which are *Lepidocyclina* sp., *Gypsina globula*, bryozoan fragments, and echinoid spines.
130	Limestone, iron-stained, hard, chalky, water-worn, showing traces of fossil shells, among which are fragments of *Lepidocyclina* sp.
	Upper Eocene. Ocala Limestone. Lower Member.
169	Limestone, white, chalky, porous, fossiliferous. Among the poorly-preserved molds, fragments of molds, and impressions of shells, are specimens of *Lepidocyclina* sp., *Operculina* sp., worn fragments of *Asterocyclina*(?), *Amphistegina pinarensis*, *Robulus* sp., *Amphistegina alabamensis*, and specimens of a few other small Foraminifera (Ocala species).
185	Limestone, cream, hard, chalky. A few fragments of limestone contain traces of sections of microfossils.
195	Limestone, chalky. A very small sample.
205	Limestone, white, chalky, highly microfossiliferous, containing many specimens of *Lepidocyclina ocalana* and varieties, a few specimens of *Operculina* sp., and many specimens of *Amphistegina alabamensis* that is common in the lower member of the Ocala Limestone in western Florida.
220	Limestone, chalky, fossiliferous. Worn fragments of *Lepidocyclina* sp. are common, and specimens of *Amphistegina pinarensis*

Depth (feet)	Description
	are abundant. Also present are poorly-preserved specimens of *Camerina* sp., *Operculina* sp., *Gypsina globula*, and bryozoan fragments.
270	Limestone, cream, chalky, fossiliferous. The foraminiferal material consists of worn chalky molds. The species seem to be the same as in the sample at 220 feet, but specimens of *Camerina* sp. are much more abundant.
290	Limestone, white and cream, hard, nodular, containing abundant traces of fossils and a few grains of glauconite. The sample contains fragments of a large coarsely beaded *Lepidocyclina* sp. This sample is possibly the equivalent of the Moody's Branch Marl at the base of the Jackson (upper Eocene) Group in Mississippi.
	Middle Eocene
306	**Unit A**
	Sandstone, clear quartz, very fine grained, somewhat glauconitic, chalky. The sandstone contains many calcitic fragments that seem to be derived from broken fossil shells; one poorly-preserved chalky specimen of *Lepidocyclina* sp.; and worn bryozoan fragments.
318	Like sample at 306 ft.
327	Limestone, white, hard, somewhat glauconitic, containing fragments of sections of *Operculinoides* sp., *Lepidocyclina (Polylepidina) antillea*, *Pseudophragmina* sp. About 50 percent of the sample is very uneven grained clear quartz sand. Cavings of limestone from higher levels are common.
340	Sand, like sample at 327 ft., and small fragments of white, hard, slightly glauconitic chalk. The fauna seems to be like the sample at 327 ft., but the specimens are too poorly presented for specific identification.
353	**Unit B**
	Limestone, light-gray, dense, sandy (very fine grained sand), glauconitic (very fine grained glauconite). The grains of glauconite are evenly distributed in the limestone.
370	Like sample at 353 ft.
375	Like sample at 353 ft.
400	Limestone, light-gray, highly sandy, chalky. The sample contains a trace of mica, fragments of *Ostrea* sp. and echinoids, and a very few specimens of smaller Foraminifera, including *Cibicides westi*.
426	Like sample at 400 ft.
430	**Unit C**
	Chalk, highly sandy, slightly glauconitic, containing many worn fragments of a thin-shelled bivalve (*Ostrea*(?) sp.). Several poorly-preserved specimens of small Foraminifera also occur,

Depth (feet)	Description
	among which *Asterigerina lisbonensis* is the dominant form, and *Globigerina* sp., *Cibicides* sp., and others are also present.
435	Limestone, iron-stained, hard, glauconitic (moderately coarse grained glauconite), sandy (moderately coarse-grained sand), containing many fragments of a partly calcitized fossil bivalve. The material has the appearance of having been weathered during exposure at the surface.
438	Limestone, white, highly glauconitic (moderately coarse grained glauconite), sandy (moderately coarse grained sand), containing a trace of mica. Poorly-preserved fragments of macrofossils are embedded in the limestone. About 50 percent of the sample is very uneven grained clear quartz sand.
445	Like sample at 438 ft.
458	Sand, chalky, coarse-grained, uneven, glauconitic, containing worn fragments of fossil bivalves, and several chalky, glauconitic specimens of *Asterigerina lisbonensis*.
468	Like sample at 458 ft.
476	Sand, clear quartz, uneven-grained, glauconitic; sand grains and angular to subangular. Several specimens of small Foraminifera are present, among which *Asterigerina lisbonensis* is dominant, and *Gyroidina soldanii* var. *octocamerata* is fairly common. The sample also contains a few ostracodes and echinoid spines.
486	Limestone, white, hard, sandy, glauconitic, containing fragments of molds of macrofossils.
490	Sand, clear quartz, moderately coarse-grained, moderately even grained, glauconitic, containing a few fragments of a thin-shelled *Ostrea*(?) sp., and a few chalky fragments of other fossils.
495	Like sample at 490 ft., but both sand and glauconite are coarser grained, and nodules of glauconite are abundant.
500	Sand, clear quartz, slightly glauconitic. The sand grains are moderately fine, moderately even, and angular.
505	Like sample at 500 ft.
537	**Unit D**
	Sand, pinkish-tan, clear quartz, very uneven grained, angular to subangular to rounded. Sample contains some glauconite (probably caving) and some fragments of pink clay.
542	Like sample at 537 ft.
555	Sand, pinkish-tan, clear quartz, moderately coarse, moderately even grained; a trace of colorless mica. The color of the sand is due to staining by the clay matrix.
576	Sand, light-tan. The sand is somewhat coarser than the sample at 555 ft., and contains a few nodules of glauconite.
590	Like sample at 576 ft.
605	No change.

Depth (feet)	Description
625	No change.
642	No change.
651	No change.
664	No change.
666	No change.
681	No change.
697	Like preceding samples, but contains almost no glauconite.
721	Like sample at 697 ft.
755	Like sample at 721 ft., but contains no glauconite.
768	Like sample at 755 ft., but sand is coarser grained.
780	Like sample at 768 ft., but contains fragments of sandy limestone that are probably caving from higher levels.
820	No change.
909	No change.
925	No change.
940	Sand, like preceding samples, but finer grained, somewhat chalky, and containing many nodules of glauconite. The sample contains several poorly-preserved specimens of smaller Foraminifera, among which *Robulus* sp. (close to *Lenticulina rotulata)* is a common form; no diagnostic species seem to be present.
970	Sand, clear quartz, uneven grained, somewhat glauconitic, and similar, in general, to sample at 940 ft. This sample also contains a few specimens of nondiagnostic species of Foraminifera, and a few other specimens which probably caved from higher depths.
1035 T.D.	Sand and a little glauconite like the sample at 970 ft., but the sand is somewhat finer grained.

DECATUR COUNTY

Operator: Hunt Oil Co.
Landowner: Metcalf Well 1
Location: Land District 21, Land Lot 260, center of NE ¼ of Land Lot 260

GGS. No. 168
Elevation: 104 ft. (derrick floor)
Total depth: 6152 ft.
Completed: Aug. 19, 1944

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Paleocene		
In beds containing Tamesí fauna at 1930 ft.—1st sample	?	?

	Depth (feet)	Thickness (feet)
Cretaceous		
Gulf		
Beds of Navarro age	2050	50
Beds of Taylor age	2100	380
Beds of Austin age	2480	420
Atkinson Formation, upper member	2900	420
lower member	3320	280
Comanche undifferentiated	3600 to 5250 ft.[1]	

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-1930	Samples not studied.
	In Paleocene Series
	Beds containing Tamesí fauna
1930-1940	Clay, gray, marly, microfossiliferous; contains many specimens of *Globigerina velascoensis* and *Globorotalia velascoensis*. Other specimens common in the sample are *Bulimina exigua* and *Alabamina wilcoxensis*.
1940-2020	Like sample at 1930-1940 ft.
2020-2030	Like sample at 1930-1940 ft.; contains specimens of *Globorotalia velascoensis* and *G. pseudomenadii*, which are common in the typical Tamesí (Velasco) in Mexico.
2030-2040	Not described.
2040-2050	Clay, marly, but harder and less falky than the preceding samples; contains many typical specimens of *Globorotalia velascoensis*.
	Cretaceous
	Gulf Series
	Beds of Navarro age
2050-2060	Marl, gray; specimens of *Globotruncana arca*, common.
2060-2090	Not described.
	Beds of Taylor age
2090-2100	Marl, gray, and a few fragments of fine-grained, chalky glauconitic sandstone. Sample contains specimens of *Globorotalites*

[1]Samples not studied below 5250 ft.

Depth (feet)	Description
	conicus, Stensiöina americana, and a variety of *Planulina dumblei.*
2100-2350	Not described.
2350-2360	Marl, gray, containing abundant specimens of Foraminifera; common species are: *Globotruncana spp., Globigerina cretacea, Planulina texana,* and *Stensiöina americana.* The sample is probably from the lower part of the beds of Taylor age.
2360-2480	Not described.
	Beds of Austin(?) age.
2480-2490	Marl, gray, containing a specimen of *Valvulineria umbilicata* typical of the Austin Chalk in Texas, and specimens of *Pseudogaudryinella capitosa.*
2490-2570	Not described.
2570	Sidewall core. Clay, greenish-gray, marly, micaceous, containing a microfauna indicative of the Austin age of the beds.
2580-2590	Clay, gray and green, marly, containing specimens of *Kyphopyxa christneri.*
2590-2600	Clay, greenish-gray, shaly, calcareous.
2600-2790	Not described.
2790-2800	Shale, brown, thinly flaky, slightly speckled, and a little green, flaky, noncalcareous shale.
2800-2830	Not described.
2830-2840	Shale, dark brownish-gray, flaky, slightly speckled.
2840-2900	Not described.
	Atkinson Formation. Upper Member.
2900-2910	Sandstone, moderately dense, very fine grained, highly micaceous, and fragments of speckled shale; a few shell fragments.
2910-2920	Like sample at 2900-2910 ft.; the sandstone is somewhat glauconitic.
2920-2930	Sandstone, like sample at 2900-2910 ft., and many fragments of *Ostrea* sp.
2930-2940	Not described.
2940-2950	Sandstone, similar to sample at 2900-2910 ft., but somewhat coarser grained and more micaceous; contains a few black phosphatic fragments, a little bluish-green glauconite, nodules of pyrite, and shell fragments.
2950-2960	Sandstone and abundant shell fragments, including fragments of *Inoceramus.*
2960-2970	Not described.
2975	Sidewall core. Sand, fine-grained, uneven-grained, angular, clear quartz, containing a little glauconite and a few shell fragments.

Depth (feet)	Description
2970-3030	Sand, fine to moderately fine grained, glauconitic, micaceous, containing shell fragments and fish bones. The various types of shale in the sample are probably cavings from higher levels.
3030-3040	Sand, like samples at 2970-3030 ft., and a little green flaky shale; shell fragments are abundant.
3040-3060	Not described.
3060-3070	Sandstone, moderately coarse, glauconitic, fossiliferous; contains fairly large fragments of carbonaceous material, many shell fragments, fish bones, and a few bryozoan fragments. Below this depth, the sandstone becomes harder and finer grained, and shell fragments gradually decrease in abundance.
3070-3080	Not described.
3080-3090	Sandstone, white, dense, fine-grained, glauconitic, somewhat micaceous, containing phosphatic and carbonaceous material, shell fragments, and bryozoan fragments.
3090-3250	Not described.
3250-3260	Sand and shell fragments. Shell fragments are common.
3260-3270	Not described.
3270-3280	Clay, green and bluish-green, shaly, and a little sand. Specimens of Foraminifera are probably cavings.
3280-3320	Not described.
	Atkinson Formation. Lower Member. (electric log correlation)
3320-3330	Clay, green, shaly and sand and sandstone like sample at 3270-3280 ft.
3330-3390	Shale, green, and other types of shale that seem to be cavings.
3390-3400	Shale, dark-gray, hard, is in cuttings at this depth.
3400-3420	Shale, dark-gray, micaceous, containing specimens of arenaceous species of Foraminifera typical of the lower member of the Atkinson Formation. The shale is the so-called "marine shale" of the Tuscaloosa Formation.
3420-3430	Shale, dark-gray, micaceous, containing specimens of *Ammobaculites bergquisti* (abundant), *A. comprimatus*, *Trochammina rainwateri*, *T. exigua*, and others.
3430-3440	Material and fauna like sample at 3420-3430 ft., but specimens of Foraminifera more abundant.
3440-3510	Not described.
3510-3520	Shale, gray, and a little green flaky shale; white, micaceous, glauconitic sandstone is also in cuttings at this depth.
3520-3530	Like sample at 3510-3520 ft.
3530-3540	Sandstone, white, fine-grained, glauconitic, pyritic, somewhat micaceous, slightly phosphatic, increases in abundance. The sandstone contains a few large grains of quartz.

Depth (feet)	Description
3545	Sidewall core.
	Shale, green, thinly flaky, speckled; contains dwarf specimens of *Gümbelina* and *Globigerina* that give the shale a speckled appearance.
3555	Sidewall core.
	Sand, fine to coarse-grained, roughly angular, clear quartz; probably the basal sand of the Atkinson Formation.
3560-3570	Sand and sandstone, like the sample at 3510-3520 ft. and below.
3570-3580	Sand, coarse-grained, is dominant in the sample; contains many greenish-yellow quartzitic grains, and a few grains of pink feldspar.
3580-3590	Sand, like sample at 3570-3580 ft.; ankerite pellets are common.
3590-3600	Sand, like sample at 3570-3580 ft., and a few chips of dark brownish-red micaceous shale.
	Comanche Series undifferentiated
3600-3610	Sand, coarse-grained, containing greenish-yellow and pink grains, and a few grains of feldspar. The sample also contains cuttings of dark brownish-red, micaceous, sandy (fine-grained sand), unctuous, shaly clay.
3608	Sidewall core.
	Sand, poorly sorted, fine to coarse-grained, roughly angular quartz, containing a few greenish-yellow grains.
3623	Sidewall core.
	Mudstone, brick-red, green and ochre streaks and mottling, sandy (fine-grained sand), micaceous.
3610-3900	Samples not studied in detail. The material is, mainly, coarse-grained sand, and red, green and ochre mottled mudstone; grains of pink feldspar become progressively more abundant with depth.
3900-5240	Nodules of white, pink-stained, sandy limestone are in the samples at 3900 feet. The samples were not studied in detail, but are composed, mainly, of coarse-grained sand, mudstone and shale, and nodules of limestone.
5240-5250	Shale, purplish-red, raspberry, and varicolored, and many nodules of white, pink-stained, sandy limestone. The samples were not studied below 5250 ft. At this depth, the samples indicate that the well had not penetrated rocks older than Comanche age.

DECATUR COUNTY

Operator: D. E. Hughes
Landowner: H. W. Martin well 1

Location: Land District 15, Land Lot 189, center of southeast 40 acres of S.E. ¼ of Land Lot 189

GGS: No. 191
Elevation: 132 ft. (derrick floor)
Total depth: 3717 ft.
Completed: Dec. 5, 1947

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Not studied		
Cretaceous		
Gulf		
Beds of Navarro age	1670	210?
Beds of Taylor age	1880?	620?
Beds of Austin age	2500?	270?
Atkinson Formation, upper member	2770	420
lower member	3190	260
Comanche undifferentiated	3450	total depth 267

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-1670	Samples not studied.
	Cretaceous
	Gulf Series
	Beds of Navarro Age
1670-1680	Clay, gray, shaly, somewhat micaceous, irregularly and weakly silty, containing a few specimens of *Globotruncana arca*. The sample also contains abundant cuttings of the overlying white, chalky, silty, glauconitic Clayton (Paleocene) Limestone, specimens of Midway species of Foraminifera, and some species that occur in the Tamesí (Paleocene) fauna.
1680-1790	Materials and fauna like the sample at 1670-1680 ft. but showing gradual increase in the amount of gray shaly clay and specimens of Cretaceous species of Foraminifera.

Depth (feet)	Description
1790-1800	Clay, shaly, fine to coarse-grained sand, and cavings of the Clayton (Paleocene) Limestone. The specimens of Cretaceous species of Foraminifera are mixed with Midway species that have caved from higher levels.
1800-1880	No change.
	Beds of Taylor age
1880-2000	The top of the beds of Taylor age is placed at 1880 ft. on the basis of electric-log characteristics. The highest occurrence of specimens of *Stensiöina americana*, a diagnostic Taylor species, is in the sample at 1960-1970 ft. If the species occurred at a higher level, the specimens were obscured by the coarse-grained sand that composes about 50-75 percent of the samples. Beginning with the sample at 1960-1970 ft., the sand content diminishes gradually, and is small in the sample at 2000-2010 ft.
2000-2010	Small sample, composed of fine-grained sand, glauconite, and fragments of gray shaly clay containing *Inoceramus* fragments, and specimens of *Stensiöina americana*, *Planulina dumblei*, and other species of Foraminifera.
2010-2260	No change.
2260-2270	Shale, gray, hard, begins to show in this sample and increases in abundance with depth as the sand content of the samples decreases. The microfauna indicates the Taylor age of the beds.
2270-2410	No change.
2410-2420	Clay, gray, shaly, also fine-grained sand, glauconite, and specimens of Foraminifera, including *Pseudogaudryinella capitosa* that indicates the early Taylor(?) or late Austin(?) age of the beds.
2420-2500	Not described.
	Beds of Austin age (electric log correlation)
2500-2520	Not described.
2520-2530	Clay, gray, shaly, fairly hard; contains *Inoceramus* fragments and fragments of specimens of *Kyphopyxa christneri* (early Taylor(?) or late Austin(?) age).
2530-2560	Not described.
2560-2570	Highest occurrence of *Citharina texana* (definite Austin age).
2570-2670	Not described.
2670-2680	Shale, gray, speckled, begins to show in the samples.
2680-2770	Not described.
	Atkinson Formation. Upper Member.
2770-2780	Clay, gray, shaly, and a little speckled shale like samples at 2670-

Depth (feet)	Description
	2680 and below; in addition, many fragments of white, very fine grained, micaceous, slightly glauconitic sandstone, containing many fragments of *Ostrea* sp.
2784-2793	Core. Recovery? Top. Sandstone, gray, moderately soft, extremely fine grained, highly micaceous and carbonaceous, weakly glauconitic. Middle. Like the top part of the core, but is less carbonaceous and contains thin streaks of greenish-gray shale. Bottom. Clay, gray, shaly, micaceous, sandy (medium-grained sand); contains glauconite, many phosphatic nodules, and a few shell fragments.
2780-2820	Cuttings not described.
2820-2830	Sandstone, white, very fine grained, somewhat glauconitic, micaceous, phosphatic, containing many fragments of *Ostrea* sp., is about 10-25 percent of the sample; a few fragments of greenish-gray, soft flaky shale. Cuttings of gray shaly clay that are probably caving from higher depths, composed most of one sample; the specimens of Foraminifera in the sample do not seem to be indigenous to the material penetrated at this depth, but are probably cavings.
2830-2860	Like sample at 2820-2830 ft.
2860-2870	Sandstone, white, medium-grained, phosphatic, glauconitic, micaceous, calcareous, containing many fragments of *Ostrea* sp., is at least 25 percent of the sample. The upper member of the Atkinson Formation seems to consist of clay, interbedded with *Ostrea*-bearing sandstone and relatively thin lenses of greenish-gray shale.
2870-2940	No change.
2940-2950	Sand, fine to coarse-grained is at least 75 percent of the sample; fragments of white, fossiliferous sandstone, like sample at 2860-2870 ft.; a few fragments of carbonaceous material. Cuttings of gray shaly clay are probably cavings.
2950-3030	No change.
3030-3040	The coarse-grained sand composes a smaller part of the cuttings than in the sample at 2940-2950 ft., and the gray clay and fossiliferous sandstone are relatively more abundant.
3040-3060	Not described.
3060-3070	Sandstone, white, medium-grained, glauconitic, phosphatic containing abundant fragments of *Ostrea* sp., composes most of the sample. Other constitutents are a little clay, fine to coarse-grained sand, and a few fragments of grayish-green shale.
3080-3090	Clay fragments are dominant in the sample. Fragments of grayish-green shaly clay are more common here than in samples from higher parts of the upper member of the Atkinson Formation.
3090-3110	Not described.

Depth (feet)	Description
3130	Sidewall core.
	Sandstone or siltstone, light greenish-gray, very fine grained, micaceous, glauconitic, carbonaceous.
3110-3170	Sample seems to be mostly cavings composed of sand and clay from higher levels.
3178	Sidewall core.
	Siltstone, light-gray, soft, finely glauconitic.
3170-3190	Not described.
	Atkinson Formation. Lower Member
3190-3200	Shale, grayish-green, soft, flaky, somewhat micaceous and finely carbonaceous.
3200-3270	Samples are similar to the one at 3190-3200 ft., and contain varying amounts of shale that caves from higher levels.
3270-3280	Shale, grayish-green, that is the principal constituent of the sample, contains minute specimens of Foraminifera.
3280-3290	This sample is the highest occurrence of specimens of *Ammobaculites advenus*, a characteristic species of the lower member of the Atkinson Formation (Woodbine age).
3290-3358	Not described.
3358-3364	Core. Recovery?
	Top. Sand, gray, soft, fine to medium-grained, argillaceous, micaceous, somewhat glauconitic.
	Bottom. Sand, light-gray, fine-grained, argillaceous, micaceous, glauconitic, containing fragments of carbonaceous material.
3370-3380	Shale, greenish-gray, flaky, containing a little fine-grained sand and a few specimens of species of Foraminifera characteristic of the lower Atkinson.
3380-3410	No change.
3410-3420	Shale, like sample at 3370-3380 ft., but 50 percent of the sample is fine to coarse-grained, roughly angular, etched quartz and containing a little coarse-grained glauconite.
3420-3430	Not described.
3430-3440	Sandstone, fine to very coarse grained, containing a little glauconite and few phosphatic nodules. The washed sample is composed, chiefly, of loose sand and cemented fragments of the sandstone.
3440-3450	Not described.
	Comanche Series undifferentiated
3450-3460	Sand, fine to coarse-grained, roughly angular, clear quartz, and a little feldspar; some sand grains are yellow and pink-tinted.
3460-3470	No change.
3470-3480	Sand, like sample at 3450-3460 ft., and a few small fragments of brownish-red, gray and green mottled, slightly micaceous shale.
3480-3717 T.D.	The samples were not studied in detail and are composed, mainly, of sand like the immediately preceding samples, and sparse fragments of red and multi-colored shale. The samples do not suggest that the well penetrated beds older than Comanche.

EARLY COUNTY

Operator: Mont Warren et al
Landowner: A. C. Chandler well 1
Location: Land District 26, Land Lot 406, 250 ft. north and 968 ft. west of southeast corner of north one-third of Land Lot 406

G.G.S. No. 121
Elevation: 187 ft. (derrick floor)
Total depth: 7320 ft.
Completed: Oct. 2, 1943

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Not studied		
Cretaceous		
Gulf		
Beds of Navarro age	1200	158
Beds of Taylor age	1358	472
Beds of Austin age	1830	565
Atkinson Formation, upper member	2395	520
lower member	2915	225
Comanche undifferentiated	2915	
	3140	2530(?) or 2637(?)
Triassic(?)		
Upper Triassic(?)		
Newark(?) Group	5670(?) or 5777(?)	930(?) or 823(?)
Devonian(?)		
Middle Devonian(?) Weathered(?) shale	6600	181
Devonian		
Middle Devonian[1] Black shale	6781	459
Ordovician(?)		
Lower Ordovician(?) White sandstone	7240 to total depth	80

[1]Swartz, F. M., 1949, Journal of Paleontology, v. 23, no. 3, p. 320, questionably classified the black shale as "Late Ordovician or Early Silurian in age."

Bridge, Josiah, and Berdan, J. M., 1951, U.S. Geological Survey open-file report, p. 7, table 1, and map, tentatively classified the black shale as "Silurian or Upper Ordovician" and the underlying white sandstone as lithologically similar to rocks in wells in Florida which they had classified as Lower Ordovician.

J. M. Berdan (written communication to E. R. Applin, 1959) stated that on the basis of spores, J. M. Schopf, U.S. Geological Survey, classified the black shale as not older than Middle Devonian.

Lithologic and paleontologic description of cores and cuttings.

Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-1510	Samples not studied.
	Cretaceous
	Gulf Series
	Beds of Navarro age
1200	Top of Cretaceous by Southeastern Geological Society Mesozoic Committee, 1949, Mesozoic cross section E-E, Bullock County, Alabama to Franklin County, Florida.
	Beds of Taylor age
1358	Top of beds of Taylor age on the basis of the highest occurrence of *Stensiöina americana.*
1510-1525	Marl, dark gray; cream, hard, sandy limestone (fine-grained sand); fine to coarse-grained sand. Cuttings contain specimens of *Planulina dumblei* and other Taylor species.
1525-1540	Sample composed, mainly, of fragments of sandstone, sandy limestone, and gray marl; unconsolidated sand; a little glauconite. Specimens of several species of Foraminifera indicate the Taylor age of the beds; a few specimens from higher levels also occur.
1540-1591	Like sample at 1525-1540 ft.
1591-1606	Shale, gray, marly, highly microfossiliferous and fragments of light-gray, hard, sandy limestone. Specimens of several species of Foraminifera that indicate the Taylor age of the beds; fragments of *Inoceramus* and *Ostrea* sp.; specimens of Foraminifera from higher levels.
1606-1787	Like sample at 1591-1606 ft.
1787-1804	Like sample at 1591-1606 ft., but contains specimens of *Kyphopyxa christneri* and *Pseudogaudryinella capitosa* that are common in the lower part of the beds of Taylor age.
1804-1830	Like sample at 1787-1804 ft.
	Beds of Austin age (electric log correlation)
1830-1847	Like sample at 1787-1804 ft.
1847-1865	Like sample at 1787-1804 ft., but contains fragments of light greenish-gray marly shale. Coarse sand that composes part of the sample is probably caving.
1865-1905	Like sample at 1847-1865 ft.

Depth (feet)	Description
1905-1935	Sandstone, gray, hard, very fine grained, calcareous; fine to coarse-grained unconsolidated sand; many *Inoceramus* fragments; a little dark-gray marly shale. The microfauna is a mixture of specimens of species from various levels, but includes specimens of species that are common only in the lower part of the beds of Taylor age and the upper part of the beds of Austin age.
1935-1940	No sample.
1940-1955	Shale, gray, marly, slightly micaceous, and some sand and other materials like sample at 1905-1935. The microfauna contains specimens of *Darbyella brownstownensis, Kyphopyxa christneri,* and *Gaudryina ellisorae. D. brownstownensis* is common in the upper part of the beds of Austin age, and the accompanying species are common only in the lower part of the beds of Taylor age and the upper part of the beds of Austin age.
1955-1961	Like sample at 1940-1955 ft.
1961-1977	This sample contains the highest occurrence of specimens of *Globorotalites umbilicatus,* a form typical of the beds of Austin age.
1997-2000	Like sample at 1940-1955 ft.
2000-2015	This sample contains the highest occurrence of specimens of *Citharina texana.*
2015-2153	Like sample at 1940-1955 ft.
2153-2168	Sand; fine-grained; small fragments of gray marly shale; abundant *Inoceramus* fragments. The foraminiferal fauna is a mixture from various levels, as in all the foregoing samples, but contains specimens of species typical of the beds of Austin age, *Hastigerinella watersi, Dorothia alexanderi* and others.
2168-2230	Like sample at 2153-2168 ft.
2230-2245	Shale, gray, calcareous, and fragments of dark brownish-gray, somewhat light-speckled, flaky, slightly carbonaceous shale. Abundant *Inoceramus* fragments and specimens of Foraminifera are seemingly caving from various depths.
2245-2260	No sample.
2260-2275	Shale, gray, slightly calcareous, somewhat micaceous. The fauna is composed of *Inoceramus* fragments and fairly numerous specimens of Foraminifera from higher levels. Small specimens of *Globigerina* sp. and *Gümbelina* sp. are the dominant forms; *Globotruncana* sp., *Planulina* cf. *P. eaglefordensis,* and *Globorotalites umbilicatus* are fairly common.
2275-2364	Like sample at 2260-2275 ft.
2364-2380	Similar to sample at 2260-2275 ft., but with the addition of many fragments of dark brownish-gray, light speckled, marly shale; no marked change in fauna.
2380-2395	Like sample at 2364-2380 ft.

Depth (feet)	Description
	Atkinson Formation. Upper Member.
2395-2411	The upper member of the Atkinson Formation in this well is a shallow-water marine facies. Like sample at 2364-2380 ft., but with the addition of a few fragments of very fine grained, calcareous, micaceous, slightly glauconitic and phosphatic sandstone.
2411-2439	Like sample at 2395-2411 ft.
2439-2454	Like sample at 2395-2411 ft. but contains many fragments of the very fine grained sandstone, and a few fragments of light-gray, hard, micaceous, sandy (very fine grained sand) limestone.
2454-2481	Like sample at 2439-2454 ft., with the addition of many fragments of light-gray, moderately fine-grained, glauconitic, somewhat phosphatic sandstone containing many fragments of *Ostrea* sp.
2481-2495	Like sample at 2454-2481 ft., but this sample shows an increase in the fragments of the light-gray, fossiliferous sandstone.
2495-2510	Sandstone, light-gray, moderately fine to moderately coarse grained, clear quartz, containing glauconite, phosphatic material, and abundant fragments of *Ostrea*-like bivalves and bryozoan fragments.
2510-2525	Like sample at 2495-2510 ft. This sample is the highest occurrence of fragments of thinly flaky grayish-green shale.
2525-2540	Sand, unconsolidated, fine to moderately coarse grained, angular to subangular, quartz; fragments of the fossiliferous sandstone first observed in the sample at 2495-2510 ft.; and a few fragments of flaky grayish-green shale.
2540-2555	Sand, unconsolidated, fine to coarse-grained, quartz; many fragments of white, glauconitic, phosphatic sandstone containing bryozoan and shell fragments; a little grayish-green, flaky, unctuous, slightly carbonaceous shale.
2555-2565	No sample.
2565-2590	Like sample at 2540-2555 ft.
2590-2605	Sand, unconsolidated, fine to very coarse grained, clear quartz; fragments of fossiliferous sandstone and shells (*Ostrea* sp.) like sample at 2540-2555 ft., but much less abundant; increase in fragments of grayish-green shale.
2605-2628	Sand, unconsolidated, like sample at 2590-2605 ft.; fragments of *Ostrea* sp., phosphatic nodules, and fossiliferous sandstone; fragments of green shale slightly more common than in sample at 2590-2605 ft. Specimens of *Valvulineria infrequens* fairly common; *Planulina eaglefordensis* and *Gümbelina moremani* also present. This sample seems to indicate a brief change to a deeper-water marine environment.
2628-2658	Sand, unconsolidated, like sample at 2605-2628 ft.; fossiliferous sandstone; fragments of *Ostrea* sp., flaky green shale, and phosphatic nodules.

Depth (feet)	Description
2658-2668	Sample almost entirely unconsolidated, fine to moderately coarse-grained quartz sand.
2668-2688	Sand, unconsolidated, fine to very coarse grained; white, slightly glauconitic, phosphatic, calcareous sandstone, containing embedded fragments of *Ostrea* sp.; grayish-green, flaky, carbonaceous shale.
2688-2703	Sample, mainly, unconsolidated fine to moderately fine-grained sand; a few fragments of other material like sample at 2668-2688 ft.
2703-2730	Like sample at 2688-2703 ft.
2730-2748	Sand, like sample at 2688-2703 ft.; fragments of fossiliferous sandstone and *Ostrea* sp. common; a few fragments of flaky, grayish-green shale; much caved material from higher levels.
2748-2825	No change.
2825-2840	Sand, unconsolidated, fine to moderately fine grained, quartz; abundant fragments of an *Ostrea*-like bivalve. Fossils apparently wash from a fine-grained, somewhat glauconitic, phosphatic, calcareous sandstone. The well may have penetrated a shell reef at this depth.
2840-2855	Like sample at 2825-2840 ft., and in addition, a few fragments of yellowish-brown and light bluish-green mottled shale, and reddish-brown shale. A few of the fossiliferous sandstone fragments are carbonaceous.
2855-2870	Sand, unconsolidated; fine to moderately fine grained; many fragments of *Ostrea* sp., and a few fragments of white, fine-grained, fossiliferous sandstone; many cavings from higher levels.
2870-2915	Like sample at 2855-2870 ft.; fragments of grayish-green shale are more common.
	Atkinson Formation. Lower Member.
2915-2934	Like sample at 2870-2915 ft., but fragments of hard, very fine grained, calcareous, somewhat glauconitic, phosphatic, micaceous sandstone are fairly common.
2934-2949	Like sample at 2915-2934 ft., but fragments of sandstone are more common, and some of them contain embedded shell debris. Sample contains many fragments of grayish-green shale, and a few fragments of grayish-green shale, and a few fragments of flaky, somewhat micaceous, carbonaceous shale.
2949-2962	Sand, unconsolidated, fine to coarse-grained, and abundant fragments of gray and grayish-green, flaky shale.
2962-2978	Like sample at 2947-2962 ft., and a few fragments of very highly micaceous, slightly carbonaceous, fine-grained sandstone.
2978-2993	Shale, dark brownish-gray, flaky, micaceous, slightly carbonaceous, and a little grayish-green shale; a little highly micaceous sandstone like the sample at 2962-2978 ft.; fragments of *Ostrea* sp.

Depth (feet)	Description
2993-3007	Like the sample at 2978-2993 ft.; contains a fragment of the highly micaceous sandstone that shows embedded fragments of grayish-green shale, and a fragment of a specimen of an arenaceous species of Foraminifera.
3007-3022	Shale, dark-gray, flaky, micaceous; grayish-green shale; a little sand and a few fragments of micaceous sandstone. The sample contains specimens of *Ammobaculites comprimatus* and *Trochammina rainwateri*.[2]
3022-3037	Like the sample at 3007-3022. The microfauna is composed of specimens of *Ammobaculites comprimatus, A. bergquisti, A. agrestis, A. advenus.*
3037-3052	Like sample at 3007-3022 ft. The microfauna is composed of specimens of *Ammobaculites bergquisti, A. agrestis, A.* cf. *A. fragmentarious, Ammobaculoides plummerae, Ammotium braunsteini,* and fragments of *Polyphragma* sp.
3052-3067	Shale, gray and greenish-gray, flaky; a little fine-grained micaceous sandstone; a little unconsolidated sand. The microfauna is composed of specimens of *Ammobaculites bergquisti, A. junceus, A. agrestis.*
3067-3082	Like sample at 3052-3067 ft., and cavings of several kinds of material from higher levels; unconsolidated sand composes about 50 percent of the sample. Fragments of light-gray, silty, possibly nodular limestone are fairly common.
3082-3097	Shale, gray, soft, flaky, and many fragments of white to light-gray, fine-grained, calcareous, micaceous, sandstone and siltstone; a little silty, micaceous limestone. About 25 percent of the sample is unconsolidated fine to coarse-grained quartz sand.
3097-3112	Sand, unconsolidated, fine to moderately coarse grained, roughly angular, quartz; many nodules of dark-green glauconite and of pyrite.
3112-3127	Sand, unconsolidated, fine to coarse-grained, roughly angular quartz; fragments of several kinds of micaceous sandstone and siltstone.
3127-3142	Sand, like sample at 3112-3127 ft. Sample contains a few nodules of siderite, large flakes of colorless and pale-green mica, and a trace of glauconite.
3140	**Comanche Series undifferentiated (electric log correlation)**
3142-3157	Like sample at 3127-3142 ft., but contains no nodules of siderite.
3157-3172	Sand, unconsolidated, fine to coarse-grained, roughly angular quartz; a few green-tinted grains; a few large flakes of mica. Phosphate nodules and shell fragments are probably caving.

[2]Samples from 3007 to 3067 feet contain specimens of species of Foraminifera characteristc of the so-called "Barlow" fauna described by E. R. Applin, 1955, U.S. Geological Survey Prof. Paper 264-I, p. 187-197, pls. 48 and 49.

Depth (feet)	Description
3172-3182	No sample.
3182-3197	Like sample at 3157-3172 ft.
3197-3212	Sand, unconsolidated, fine to very coarse grained, roughly angular quartz; fragments of red and gray mottled shale and purplish-red, silty clay shale; a few siderite nodules.
3212-3227	Sand, unconsolidated, fine to very coarse grained, containing grains of feldspar; a little varicolored shale.
3227-3242	Like the sample at 3212-3227 ft. A few siderite nodules present.
3242-3298	No change.
3298-3314	Sand, unconsolidated, fine to very coarse grained, quartz; very coarse grains of quartz and grains of feldspar are common; a few small fragments of multi-colored clay shale are present.
3314-3329	No change.
3329-3408	Sand, like sample at 3298-3314 ft., but no shale present.
3408-3423	Sand, unconsolidated, coarse-grained, roughly angular. The color of the sand in the samples from 3329 to 3423 ft. changes progressively with depth from white to pink because of the steady increase of pink and yellow-tinted grains of feldspar and quartz.
3423-3438	Sand, like sample at 3408-3423 ft., but no shale; grains of pink feldspar very common.
3438-3453	Sand, like sample at 3408-3423 ft.; a few nodules of pink sandy limestone; feldspar grains abundant.
3453-3469	Sand, like sample at 3408-3423 ft., and a few fragments of dark brownish-red and bluish-gray mottled clay shale.
3469-3484	Sand, unconsolidated, fine to moderately fine, roughly angular quartz; a few coarse grains present; feldspar common.
3484-3499	Sand, like sample at 3469-3484 ft., and a few fragments of sandy, mustard-colored clay shale.
3499-3514	Sand, like sample at 3469-3484 ft., but coarse grains again common; many fragments of dark-brown and purplish-red and gray mottled, micaceous clay shale.
3514-3530	No samples.
3530-3545	Sand, unconsolidated, fine to coarse-grained, quartz; coarse grains rare; a little feldspar and a few fragments of multicolored shale.
3445-3639	No change.
3639-3747	Sand, unconsolidated, fine to coarse-grained; a little feldspar and a few fragments of dark-red and bluish-gray mottled, micaceous shale. No shale in sample at 3669-3685 ft.
3747-3762	Sand and a little mottled shale like the samples from 3639 to 3747 ft.; a few fragments of flaky, purplish-gray, slightly sandy, micaceous shale.
3762-3803	Sand, unconsolidated, fine to coarse-grained, quartz; a little feldspar; a few fragments of brownish-red and gray mottled shale; a little purplish-gray shale.

Depth (feet)	Description
3803-3807	No sample.
3807-3867	Sand like the samples from 3762-3803 ft.; fragments of red, gray and mustard-colored shale more common.
3867-3967	Sand and a little multicolored shale like the samples from 3807-3867 ft.
3967-3978	Sand like the samples from 3867-3967 ft., and many fragments of brownish-red and gray mottled micaceous shale; a few fragments of bluish-green shale; a few fragments of red, gray, and mustard-colored mottled shale.
3978-3994	Shale, dark brownish-red, grayish-green mottled, highly micaceous; a few nodules of pink sandy limestone.
3994-4009	Shale, like the sample at 3978-3994 ft., 50 percent; unconsolidated sand 50 percent.
4009-4024	Sand, unconsolidated, fine to coarse-grained, roughly angular, quartz, and a little feldspar about 75 percent; multicolored shale fragments about 25 percent.
4024-4083	Sand and multicolored shale like the sample at 4009-4024 ft.; the amount of shale in the samples ranges from about 25 to 50 percent.
4083-4098	Sand, unconsolidated, fine to coarse-grained, 50 percent; 50 percent small fragments of red and gray mottled shale, and many large nodules of dark-green glauconite(?) or chlorite(?) that seem to come in at about this level.
4098-4115	Like the sample at 4083-4093 ft.; some sand grains are stained green, possibly from the glauconite(?) or chlorite(?).
4115-4176	Sand, unconsolidated, fine to coarse-grained; glauconite(?) or chlorite(?), and many green-tinted grains of sand; phosphatized fish remains and other phosphatic fragments; a little multicolored shale.
4176-4207	Sand, unconsolidated, and nodules of glauconite(?) or chlorite(?) like samples at 4115-4176 ft., fragments of red and gray mottled shale fairly common; fragments of red, hard (nodular?), sandy (very fine grained sand) limestone.
4207-4237	Sand, unconsolidated, fine to coarse-grained, quartz, containing many green-tinted grains, is about 75 percent of sample. Large nodules of dark-green glauconite(?) or chlorite(?), a little red and gray mottled clay, and a few phosphatic nodules, compose about 25 percent of sample.
4237-4297	Sand and glauconite(?) or chlorite(?) like sample at 4207-4237 ft., shale fragments, and a few fragments of red nodular limestone.
4297-4327	Sand like sample at 4237-4297 ft.; glauconite(?) less common; shale fragments rare; no red nodular limestone.
4327-4342	Sand and glauconite(?) like sample at 4297-4327 ft.; a few fragments of red shale and a few of dull-red nodular limestone.

Depth (feet)	Description
4342-4357	Sand like the sample at 4327-4342 ft.; a little shale and no limestone; glauconite(?) and green-tinted sand grains less common.
4357-4372	Like sample at 4342-4357 ft.; a few small nodules of red limestone.
4372-4391	Sand, unconsolidated; glauconite(?); numerous fragments of red and gray mottled, micaceous, sandy clay shale; a few nodules of red limestone.
4391-4422	Sand, unconsolidated, fine to moderately coarse-grained, quartz; a little feldspar, but no green-tinted grains; a little glauconite(?), possibly caving, and a little red shale.
4422-4437	Sand, unconsolidated, fine to coarse grained, quartz; numerous fragments of red and gray mottled micaceous clay shale; a few nodules of red limestone.
4437-4452	Sand, fine to coarse-grained, quartz.
4452-4483	Sand, like sample at 4437-4452 ft.; many fragments of red and gray mottled micaceous shale.
4483-4498	Limestone, hard, cream, dense, containing a trace of glauconite and a few small specimens of Ostracodes; a few large fragments of chert; a little gray clay shale. (Note: This sample is definitely out of place.)
4498-4528	Sand, unconsolidated, fine to coarse-grained, quartz, and a little feldspar, about 80 percent of sample; small fragments of red shale, about 20 percent.
4528-4559	Sand, unconsolidated, fine to very coarse grained, containing many large deep-yellow-tinted grains; a little dull-red and gray mottled shale.
4559-4634	Sand, like sample at 4528-4559 ft.
4634-4669	Sand, unconsolidated, fine to coarse-grained; fragments of red and gray mottled micaceous shale common.
4669-4684	Like sample at 4634-4669 ft., a little glauconite(?) which may be caving.
4684-5088	No change.
5088-5106	Sand, unconsolidated, fine to coarse; green-tinted grains common; a little dark purplish-red clay shale.
5106-5135	No samples.
5135-5168	Sand, like sample at 5088-5106, a little red shale, and cavings from higher levels.
5168-5205	No change. The samples questionably show the material penetrated by the drill at this level.
5205-5309	Sand, unconsolidated, fine to coarse-grained quartz, containing green-tinted grains, a few pink and yellow-tinted grains, and a little feldspar; fragments of dark, dull-red and gray mottled, micaceous, somewhat sandy clay shale, and sparce nodules of red and gray silty limestone; cavings of gray marl and other material from much higher levels.
5309-5325	Sand like samples at 5205-5309 ft., but coarse grains are rare; a

Depth (feet)	Description
	little purplish-red, gray, green-mottled shale; many cavings.
5325-5340	No samples.
5340-5354	Sand, unconsolidated, fine to coarse-grained; a little red shale; purplish-red and purplish-gray, highly sandy, micaceous shale; a little very fine grained highly micaceous sandstone.
5354-5369	Sand like sample at 5340-5354 ft.; fragments of purplish-red and gray clay; green, highly sandy, micaceous clay fairly common; a few nodules of red and white limestone.
5369-5452	No change.
5452-5541	Sand, like sample 5340-5354 ft., and many fragments of dark purplish-red, and gray, highly micaceous, sandy shale; several fragments of bright-yellow, highly micaceous, sandy shale; a few nodules of limestone.
5541-5677	Mainly sand and a small amount of shale.
5672-5692	Sand, unconsolidated, fine to coarse-grained, quartz, containing many green-tinted grains; a little glauconite (caving?), a little red micaceous shale; a few nodules of red limestone
5692-5727	No change.
5727-5777	No samples.

Triassic(?)

Upper Triassic(?) Series

Newark(?) Group

5777-5792	Sand, unconsolidated, fine to coarse-grained quartz; a few fragments of dark-red shale; a few fragments of light bluish-green shale, some of which are highly silty and micaceous.
5792-5807	Sand unconsolidated, fine to coarse-grained; red and light-green shale like the sample at 5777-5792 ft.; a few nodules of red and white sandy limestone.
5807-6007	No change.
6007-6023	No samples.
6023-6038	Core 1. Recovery 8 ft. Top. Sandstone, light greenish-gray and pink, thinly laminated, very fine to moderately fine grained, argillaceous, highly micaceous (black and green flakes). The sand grains are usually etched and roughly angular. Part of the sandstone has a white ashy(?) cement. Three feet from the top of the core, a streak of white soft sandstone is fine to very coarse grained and contains small pebbles, the cementing material is white and ashy(?). Middle. Sandstone, light green, very fine-grained, micaceous. Bottom. Sandstone, light-green, fine to moderately coarse grained, micaceous, bentonitic. The sand grains are usually etched and roughly angular.

Depth (feet)	Description
6024-6039	Sand, unconsolidated, fine to moderately coarse grained, and a few fragments of red shale.
6039-6190	Like the sample at 6024-6039 ft., with the addition of a few nodules of pink to red limestone.
6190-6222	Sand, unconsolidated, fine to moderately fine grained; a few coarse sand grains and a few fragments of red and gray mottled shale.
6222-6600	Sand, unconsolidated, fine to coarse-grained, quartz, and a little feldspar; many small fragments of dull, dark-red and gray mottled micaceous shale; a few nodules of red and pink limestone.

Devonian(?)

Middle Devonian(?). Weathered(?) Shale.

6600-6607	Core 2. Recovery 3 ft. Corrected depth 6630-6637 ft. Top. Shale, dull brick-red, sandy. The sand, which is fine to moderately fine grained quartz, constitutes about 10 percent of the fragment of core, and is rather evenly distributed. The shale contains a small amount of mica, a few small inclusions of greenish-yellow unctuous clay, and molds and impressions of small fossil bivalves. Middle. Shale, dark reddish-brown and bright greenish-blue-streaked, micaceous, somewhat silty, containing yellowish-brown inclusions. Bottom. Shale, greenish-blue and dull reddish-brown, silty, splintery.
6600-6615	Sand, unconsolidated, fine to coarse-grained, and fragments of the shale like core 2 at 6600-6607 ft. The sample contains one large fragment of white quartzite, and one of red-stained quartzite.
6615-6631	Sand, unconsolidated, fine to coarse-grained (probably caving), and fragments of several types of shale, including fragments of smooth, splintery, flaky, reddish-brown and yellowish-green-streaked shale.
6631-6646	Like the sample at 6615-6631 ft. and a few fragments of multicolored limestone nodules that seem to belong near this depth.
6646-6682	Sand, like sample at 6615-6631 ft., and fragments of several types of multicolored shale and a few nodules of multicolored limestone.
6682-6697	Sand and shale fragments like sample at 6646-6682 ft., and in addition, a few fragments of bright greenish-blue bentonitic(?) shale, and of red and greenish-gray, yellow-speckled, very fine grained sandstone.
6697-6707	Sand and fragments of several types of red, brown and blue shale.
6707-6722	Sand, unconsolidated, about 50 percent of sample, in contrast to 75-90 percent in samples about 100 feet higher in this well; the sand is probably caving from higher levels. The sample contains various types of multicolored shale and many fragments of

Depth (feet)	Description
	dark reddish-brown and greenish-blue-streaked shale which was not observed in samples from higher levels; the shale contains traces of impressions of small fossils.
6722-6737	Like sample at 6707-6722 ft., and in addition, a few fragments of bright bluish-green, micaceous siltstone.
6737-6766	Sand, shale, and siltstone like sample at 6722-6737 ft. Fragments of brownish-red and greenish-blue-streaked shale, green siltstone, and bright blue-green bentonitic(?) shale are common in the sample.
6766-6781	Sand, unconsolidated, about 75 percent of sample. About 25 percent of sample is composed of fragments of several types of multicolored shale, green siltstone, and a few nodules of limestone. A fragment of black shale, which was not observed in samples from higher levels, is probably from near this depth.

Devonian

Middle Devonian. Black Shale.

6781-6842	Like sample at 6766-6781 ft.; increase in fragments of black shale.
6842-6872	Like sample at 6781-6842. Fragments of dark reddish-brown, smooth, splintery shale, very common; a little black shale.
6863-6873	Core 3. Recovery 0. Corrected depth 6893-6903 ft.
6872-6888	Sand, unconsolidated, and multicolored shale like sample at 6766-6781 ft. Fragments of bluish-green shale abundant; dark brownish-red shale common; a few fragments of black, waxy shale.
6888-6948	Like sample at 6872-6888 ft. A few fragments of black shale: a) smooth, flaky, splintery shale; b) rough-textured, micaceous shale having a conchoidal fracture.
6948-6965	Shale, mainly brownish-red, reddish-brown and green, and a little black shale.
6965-6985	Core 4. Recovery 20 ft. Corrected depth 6995-7015 ft. Top. Shale, dark-gray, smooth, thinly laminated, somewhat silty; in part, highly micaceous and highly pyritic (small crystals); small particles of carbonaceous material. Another part of the core is dark-gray, hard, laminated, micaceous siltstone, containing minute particles of carbonaceous material. Middle. Shale, dark-gray, laminated, containing minute particles of carbonaceous material, and a few specimens of *Lingula* sp. Bottom. Like the middle part of the core.
6985-7006	Core 5. Recovery 20 ft. Corrected depth 7015-7036 ft. Black shale containing specimens of *Lingula* sp.
7006-7009	No sample.
7009-7024	Sand, unconsolidated; multicolored shale, and black shale like core 4 (6965-6985 ft.) and core 5 (6985-7006 ft.)
7024-7039	Like sample at 7009-7024 ft.; fragments of black shale more abundant.

Depth (feet)	Description
7039-7221	No change. Samples contain much caved material.
7221-7251	Sand, unconsolidated; fragments of multicolored shale, and black shale; a little light-tan, dense, fine-grained sandstone.
	Ordovician
7240	**Lower Ordovician(?). Quartzitic sandstone. (electric log correlation)**
7251-7284	Like sample at 7221-7251 ft. Some fragments of the standstone are moderately coarse grained, and a few fragments seem to be quartzitic.
7284-7320	T.D. No samples.

ECHOLS COUNTY

Operator: Hunt Oil Company
Landowner: Superior Pine Products Co. Well #3
Location: Land District 13, Land Lot 532; 218 ft. east and 242 ft. north of southwest corner of Land Lot 532.
GGS No. 150
Elevation: 144 ft. (derrick floor)
Total depth: 4003 ft.
Completed: July 29, 1947

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Samples not studied		
Cretaceous		
Gulf		
Lawson Limestone, upper member(?)	2590(?)	80(?)
Beds of Taylor age	2670	280
Beds of Austin age	2950	370
Atkinson Formation, upper member	3320	145
lower member(?)	3465	160
Comanche(?) undifferentiated	3625	32
Ordovician		
Middle Ordovician[1] black shale and sandstone	3657	to total depth 346

[1]Bridge, Josiah and Berdan, J. M. 1951, U.S. Geological Survey open-file report, p. 5 and map.

Lithologic and paleontologic descriptions of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-2750	Samples not studied.

Cretaceous

Gulf Series

Lawson Limestone. Upper Member(?).

Top of the upper member(?) of the Lawson Limestone is placed at 2590 ft. on the basis of electric log correlation.

Beds of Taylor age

Top of the beds of Taylor age is placed at 2670 ft. on the basis of electric log correlation.

2750-2760	Chalk, white, containing abundant fragments of *Inoceramus* and other fossil bivalves, and many specimens of *Anomalina sholtzensis* and *Anomalina cosdeni*.
2760-2770	Like sample at 2750-2760 ft. Pyrite and pyritized shell fragments are common.
2770-2820	No change.
2820-2830	Like preceding samples with the addition of a little light greenish-gray marl.
2830-2840	Sample shows an increase in the light greenish-gray marl.
2840-2850	Like preceding samples and many cavings(?) of light-tan dolomite and moderately fine-grained sand. The sand is about 50 percent of the sample.
2850-2860	Like sample at 2840-2850 ft.
2860-2870	Chalk, white, tan dolomite, a little sand, and fragments of greenish-gray marl. The sample contains fragments of *Inoceramus* and other fossil bivalves, echinoid spines, and a few specimens of Foraminifera and Ostracoda. The microfossils seem to wash from the chalk which is probably caving.
2870-2880	Like sample at 2860-2870 ft.
2880-2890	The sample is composed of about 50 percent light-gray and greenish-gray marl; the remainder is white chalk and a little dolomite. The sample contains abundant fragments of *Inoceramus* and other fossil bivalves, echinoid spines, and a few specimens of Foraminifera and Ostracoda. The microfauna seems to wash from the chalk which is probably caving.
2890-2940	No change.

Depth (feet)	Description
2940-2950	Marl, light greenish-gray, chalky, is the largest part of the sample. In addition, the sample contains a little chalk and tan dolomite, fragments of *Inoceramus* and other fossil bivalves, and a few specimens of Foraminifera, all of which seems to have caved from higher levels.
	Beds of Austin age
2950-2960	Like sample at 2940-2950 ft., with the addition of a few fragments of a somewhat darker greenish-gray laminated marl. The top of the beds of Austin age is based in part, on electric log correlation.
2960-2970	Like sample at 2950-2960 ft.
2970-2980	The sample is mainly chalk, and a few fragments of marl and dolomite; a few *Inoceramus* fragments.
2980-2990	Marl, light-gray, chalky, is again dominant. Fossils are, chiefly, fragments of *Inoceramus* and other macrofossils, and a few specimens of Foraminifera from higher levels.
2990-3000	No change.
3000-3010	Like sample at 2980-2990 ft. The marl is somewhat softer, and microfossils are fairly well preserved. The microfauna contains specimens of *Globotruncana* sp., *Globotruncana marginata, Planulina austiniana, Citharina texana,* and *Marginulina* cf. *M. plummerae.*
3010-3060	No change.
3060-3070	Marl, gray, and a few fragments of brownish-gray, somewhat light-speckled marl; contains specimens of Foraminifera like sample at 3000-3010 ft., and a few specimens of ostracodes.
3070-3100	No change.
3100-3110	Marl, darker gray, somewhat light-speckled; nodules of pyrite and pyritized fragments of *Inoceramus* are common. Microfossils are, chiefly, specimens of *Globigerina* sp., *Globotruncana marginata,* a few specimens of *Globorotalites umbilicatus,* and a few specimens of ostracodes.
3110-3180	No change.
3180-3190	Like the sample at 3100-3110 ft., and about 50 percent cavings(?) of fine to moderately coarse grained sand.
3175-3185	Core. Recovery 10 ft. Top. Chalk, gray, marly, somewhat light-speckled. The slightly speckled appearance is due to crushed fragments of fossil shells. The marl contains fragments and prisms of *Inoceramus* and a few fish scales.
3185-3195	Core. Recovery 10 ft. Top and bottom. Chalk, marly, as in core at 3175-3185 ft. A washed sample at the top part of the core contains specimens of *Globigerina* sp. and *Globotruncana marginata* that are common in the lower part of the beds of Austin age.

Depth (feet)	Description
3195-3200	Core. Recovery 10 ft. Top. Chalk, brownish-gray, marly, light-speckled. More highly speckled than the core at 3185-3195 ft. Bottom. Like top part of the core, but softer and more shaly.
3200-3210	Marl, gray, somewhat light-speckled, like the preceding cores. Nodules of pyrite and fragments of *Inoceramus* are fairly common.
3210-3230	No change.
3230-3240	Core. Recovery 2 ft. Marl, light brownish-gray, somewhat light-speckled, chalky, containing shreds of carbonaceous material. The sample of cuttings from the same depth as the core contains specimens of *Nonionella austiniana.*
3240-3250	Sample not described.
3250-3252	Core. Recovery 1½ ft. Like core at 3230-3240 ft.
3252-3262	Core. Recovery 10 ft. Top. Chalk, light brownish-gray, marly; contains a few shreds of carbonaceous material. Middle. Like top part of the core; contains fragments of *Inoceramus;* much fragmental, calcitized microfossilerous material, and specimens of *Globigerina* sp. (common). Bottom. Like middle part of the core, but more shaly and more highly speckled with crushed yellow, chalky fossil material.
3262-3268	Core. Recovery 6 ft. Top. Marl, light tan-gray, chalky. Bottom. Like top part of the core; contains fragments of Inoceramus and small fragments of calcitized microfossils. This kind of material commonly occurs in the lower part of the beds of Austin age.
3268-3278	Core. Recovery 5 ft. Top. Like core at 3262-3268 ft., but not as well consolidated. Bottom. Marl, light tan-gray, soft, chalky.
3278-3288	Core. Recovery 10 ft. Top. Marl, brownish-gray, yellow-speckled. Bottom. Marl, like top part of core; chalky.
3288-3297	Core. Recovery 8 ft. Top. Marl, tan-gray, containing darker bands or laminations of the same material; speckled with crushed, chalky, dark-stained, fragmental fossil shells. Bottom. Like top part of core.
3297-3300	Core. Recovery 3 ft. Top. Like core at 3288-3297 ft., but less highly speckled, and, in part, hard, white chalk. The marl is somewhat carbonaceous.

Depth (feet)	Description
	Bottom. Marl, brownish-gray, moderately hard, chalky, somewhat light-speckled.
3200-3310	Core. Recovery 10 ft.
	Top. Not described or no sample.
	Bottom. Like core 3297-3300 ft.
3310-3320	Core. Recovery 10 ft.
	Top. No sample?
	Middle. Chalk, white, hard, highly sandy. Sand is at least 50 percent and possibly 75 per cent of the sample.
	Bottom. Sandstone, light-tan, fine to moderately fine grained, highly pyritic, containing lenses of grayish-green shale.
	Atkinson Formation. Upper Member.
	The top of the Atkinson Formation may be at the middle part of the core at 3310-3320 ft.
3320-3328	Core. Recovery 7 ft.
	Top. Shale, grayish-green, containing lenses and inclusions of light-gray, fine-grained sandstone.
	Bottom. Like top part of core.
3328-3338	Core. Recovery 6 ft.
	Top. Clay, grayish-green, moderately soft, highly silty, irregularly sandy, micaceous.
	Bottom. Siltstone, light grayish-green, moderately soft, micaceous, and highly argillaceous.
3320-3340	Like the cores at 3320-3328 ft. and 3328-3338 ft., and cavings from higher levels.
3340-3350	Shale, grayish-green, flaky, and fragments of sandstone that may occur as lenses in the shale. The sandstone contains fragments of *Ostrea* sp.
3350-3360	Not described.
3360-3410	Like sample at 3340-3350 ft.; mainly shale and a little sand.
3410-3430	Not described.
3430-3440	Shale, grayish-green, flaky, somewhat micaceous, and a little greenish-gray micaceous siltstone that may occur as lenses in the shale. The sample contains a few specimens of very small *Gümbelina* sp. and *Globigerina* sp. (common in the Eagle Ford Shale in Texas), and a few fragments of fish bones and carbonaceous material.
3440-3450	No change.
3450-3460	Shale, 50 percent; siltstone 50 percent. Shale contains a few specimens of *Gümbelina* sp., *Globigerina* sp., and *Planulina eagleforddensis*. Small, brown, irregular-shaped nodules of siderite are in the sample.
3460-3470	Shale, grayish-green, flaky, and micaceous siltstone.

Depth (feet)	Description
	Atkinson Formation. Lower Member.
	The top of the lower member (?) of the Atkinson Formation is questionably placed at 3465 ft. on the basis of electric log correlation.
3470-3480	Like sample at 3460-3470 ft. The shale contains crushed fragments of chalky shells and specimens of Foraminifera; the species are not identifiable.
3480-3490	Shale, greenish-gray, flaky, and many fragments of cream, fine-grained sandstone.
3490-3500	Shale, green, flaky, and a little sandstone and siltstone.
3500-3510	Like the sample at 3490-3500 ft., and a few specimens of *Planulina eaglefordensis*, *Gümbelina* sp., and *Globigerina* sp.
3510-3520	No change.
3520-3530	No sample?
3530-3540	Shale, green, flaky, and a few fragments of light greenish-gray, poorly-sorted, fine to moderately coarse grained sandstone.
3540-3550	Like sample at 3530-3540, but showing an increase of sand; a few green-tinted moderately coarse grains.
3550-3560	Shale, green, flaky; a little siltstone. Shale contains small, crushed, white specimens of unidentifiable microfossils.
3560-3570	Like sample at 3550-3560 ft.
3570-3580	Shale and siltstone like the immediately preceding samples. A little fine to coarse-grained, soft, glauconitic sandstone.
3580-3590	Like sample at 3570-3580 ft.
3590-3600	Shale, green, flaky, somewhat silty; a little sand, and a little carbonaceous material; a few fragments of a thin-shelled *Inoceramus*.
3600-3610	Shale, and a few fragments of siltstone and sandstone.
3603-3623	Core. Recovery 13.3 ft. 4th 4 ft. Siltstone, light-gray, moderately hard, micaceous, argillaceous, containing thin lenses of white, fine-grained, glauconitic sandstone. Glauconite occurs in very small nodules. The sample contains a little siderite.
	Comanche Series undifferentiated
3625-3635	Core. Recovery 4 ft. Top. Sandstone, brownish-red, argillaceous, micaceous, poorly sorted, fine to coarse-grained. Bottom. Clay, red and mustard mottled, moderately hard; contains scattered, fine to coarse quartz grains.
3635-3645	Core. Recovery 1 ft. Sand, mottled red and mustard. Clay like the bottom of core at 3625-3635 ft.

Depth (feet)	Description
3645-3655	Core. Recovery 2½ ft. Top 1 ft. Sandstone, red and gray, soft, fine to moderately fine grained, argillaceous, micaceous. Middle 1 ft. Sand, red, soft, argillaceous. Bottom ½ ft. Sandstone, red, and red and greenish-yellow mottled clay.
3655-3665	Core. Recovery ½ ft. Top 3 in. Sand, soft, fine to coarse-grained, quartz, in matrix of red clay. Bottom 3 in. Sandstone, light-red, pale-green and white mottled, fine-grained, highly argillaceous (possibly ashy); contains one large pebble of quartzite.

Ordovician

Middle Ordovician Series

The top of the Paleozoic is placed at 3657 ft. on the basis of electric log correlation. The samples from 3657 to 3735 ft. are possibly weathered Paleozoic rocks.

3665-3667	Core. Recovery 2 ft. Top. Clay, brownish-red and yellowish-green mottled, hard, irregularly sandy, highly micaceous; contains a fragment of a fossil bivalve. Bottom. Like the top part of core. Red clay with light greenish-gray streaks.
3667-3672	Core. Recovery 4 ft. Top. Clay, shaly, red, moderately hard, highly micaceous. Bottom. Clay, shaly, red, gray and greenish-yellow streaked, highly micaceous.
3672-3680	Core. Recovery 6 ft. Top. Clay, shaly, like the core at 3667-3672 ft. in lithology and color, but highly sandy (fine-grained sand); might be classified as an argillaceous sandstone; contains a mold of an unidentified microfossil. Middle. Clay, shaly, red, highly micaceous. Bottom. Shale, red, showing yellowish-green and light bluish-gray streaks, and irregular areas of sandy shale.
3680-3685	Clay, shaly, red, and sandy micaceous clay and red sandstone like preceding cores; about 50 percent of the sample is composed of cavings of different kinds of material from higher levels.
3680-3685	Like the preceding sample from the same depth. Also contains a few fragments of a white and pink, hard, dense, fine-grained, quartzitic sandstone.
3685-3690	Like the sample at 3680-3685 ft.; red shale, sandstone, and quartzitic sandstone.

Depth (feet)	Description
3690-3695	Like the sample at 3685-3690 ft.; but containing little quartzite.
3695-3700	Like the sample at 3690-3695 ft., and many fragments of purplish-red, very fine grained, moderately hard sandstone.
3700-3720	No change.
3720-3725	Mainly cavings of light purplish-red, hard, fine-grained sandstone, and a little light-green sandstone.
3725-3735	Clay, red, micaceous, sandy, and light purplish-red and light-green, hard, fine-grained sandstone; a few fragments of quartzite. About 50 percent of the sample is cavings from higher levels.
3735-3740	Like the sample at 3725-3735 ft., with the addition of a few fragments of black, unctuous, highly micaceous shale and hard black sandstone. This sample is probably the top of the unweathered Paleozoic rocks.
3745-3795	No change.
3790-3795	Cuttings are a mixture of red shale and sandstone, and materials from the Atkinson Formation; also, cuttings of the black, micaceous shale and black shaly sandstone of the Paleozoic.
3795-3800	Like the sample at 3790-3795 ft., and many fragments of light greenish-gray, hard, micaceous sandstone that is possibly interbedded with the black shale and the black, shaly, highly micaceous sandstone of the Paleozoic.
3800-3895	No change.
3892-3895	Core. Recovery 2 ft. Sandstone, light greenish-gray, very dense, very fine grained, quartzitic sandstone containing thin partings of black, highly micaceous, unctuous shale.
3900-3905	Sample at least 75 percent cavings from much higher levels; also fragments of the black shale and sandstone like core at 3892-3895 ft.
3905-3950	No change.
3950-3955	Cavings about 50 percent. The remainder of the sample is fragments of the black-shale-streaked sandstone described in core at 3792-3795 ft.
3955-3965	No change.
3965-3970	Similar to the immediately preceding samples, but with few fragments of the black shale, and many fragments of the light-green to white, highly micaceous, hard sandstone.
3970-3990	No change.
3990-3995	This sample shows an increase in the amount of black, micaceous shale and the gray micaceous sandstone.
3995-4003 T.D.	No change.

ECHOLS COUNTY

Operator: Hunt Oil Company
Landowner: Superior Pine Products Co. Well 4
Location: Land District 13, Land Lot 219; from Northwest corner of Land Lot 219, go 1978 ft. east, thence 1106 ft. S. 8° W. to location.

GGS. No. 158
Elevation: 156 ft. (derrick floor)
Total depth: 3916 ft.
Completed: Mar. 16, 1948

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Paleocene	?	?
In beds containing Tamesí fauna at 2600 ft.		
Cretaceous		
Gulf		
Lawson Limestone, upper member	2610(?)	70
Beds of Taylor age	2680	270
Beds of Austin age	2950	322
Atkinson Formation, upper member	3272	168
lower member	3440	189
Comanche undifferentiated	3629	282
Ordovician		
Middle Ordovician[1] weathered(?) zone	3911	to total depth 5

Lithologic and paleontologic descriptions of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-2620	Samples not studied.
	Cretaceous
	Gulf Series
	Lawson Limestone. Upper Member.
2610(?)	The top of the upper member of the Lawson Limestone (uppermost Cretaceous) is provisionally placed at 2610 ft. on the basis of electric log correlation.

[1]Bridge, Josiah and Berdan, J. M. 1951, U.S. Geological Survey open-file report, p. 5 and map.

Depth (feet)	Description
2620-2630	Sandstone, greenish-gray, fine and even grained, highly glauconitic, calcareous, containing many specimens of *Globorotalia velascoensis, Globigerina triloculinoides,* a small form of *Cibicides* sp.,
2600-2610 (est. depth)	and other small Foraminifera.[2]
2630-2640 (2610-2620 est. depth)	Limestone, cream, hard, calcitic, gypsiferous, containing poorly-preserved molds and fragments of molds of macrofossils and a few microfossils.
2640-2650	Limestone, cream, chalky, composed, mainly, of a mass of poorly-preserved molds of microfossils and a few macrofossils. The microfauna in this sample is unusual, and is somewhat similar to the fauna that has been reported from the "Upper Cretaceous" beds in Trinidad; also, it contains several species occurring in the upper member of the Lawson Limestone in a few wells in Florida, and even seems to have certain Tertiary aspects.
2650-2660	Limestone, light-cream, somewhat gypsiferous, containing fragments of poorly preserved molds of fossils. The character of the material is somewhat like sample at 2640-2650. Among the unusual features, is a mold of a *Borelis*-like form in a fragment of the limestone, and a fragment showing distinct coralline structure.
2660-2670	Like sample at 2650-2660 ft., but contains more traces of molds and impressions of microfossils.
2670-2680	Like sample at 2660-2670 ft. A few fragments are highly pyritic, and a few others show a trace of glauconite.
	Beds of Taylor age
2680-2690	Chalk, white, glauconitic. The fauna is composed of fragments of of *Inoceramus*, a few specimens of Ostracoda, and many specimens of *Anomalina sholtzensis, Anomalina cosdeni, Globotruncana arca, Bolivinoides decorata, Globorotalites conicus.*
2690-2700	Like sample at 2680-2690 ft. *Inoceramus* fragments and prisms abundant.
2700-2720	No change, but few well-preserved specimens of Foraminifera, and a decrease of glauconite.
2720-2730	Chalk, white, *Inoceramus* fragments and a few specimens of Foraminifera.
2730-2740	Chalk, white, containing much fragmental calcite material (*Inoceramus* prisms, specimens of Foraminifera, and fragments of

[2]This sample contains a foraminiferal assemblage closely resembling the Tamesi fauna that occurs in beds of Paleocene age in many wells in western Florida and southern Georgia. The sample that follows at 2630-2640 ft., is classified as the upper member of the Lawson Limestone, which is Navarro (Late Cretaceous) in age. As a possible explanation of the discrepancy between the depth shown by the electric log characteristics and the depth of the hole at the time the samples were taken, we suggest a lag in the returns amounting to about 20 feet. On this basis, the estimated corrected depth of this sample would be 2600-2610 ft. and the estimated corrected depth of the next deeper sample would be 2610-2620 ft.

Depth (feet)	Description
	molds of microfossils and macrofossils). The chalk is somewhat speckled with small grains of dark-green, glauconite and of pyrite; some fragments of chalk are highly pyritic.
2740-2750	Chalk, white; and a little gray marly chalk. The sample contains *Inoceramus* fragments and prisms, and a few specimens of long-ranging species of Foraminifera.
2750-2800	Like sample at 2740-2750 ft.
2800-2810	Chalk, white, *Inoceramus* fragments and prisms, many large nodules of pyrite, and a few specimens of Foraminifera.
2810-2820	Chalk, white, many fragments of *Inoceramus* and other fossil bivalves, a few specimens of Foraminifera, and a few fragments of light olive-gray marl.
2820-2830	Like sample at 2810-2820 ft.
2830-2840	Chalk, light olive-gray, and about 25 percent gypsum.
2840-2850	Chalk, light-gray, marly; abundant Inoceramus prisms, and a few specimens of Foraminifera and Ostracoda; also a few fragments of gypsum, which may be caving.
2850-2860	Like the sample at 2840-2850 ft.; *Anomalina* sp. is the common species of Foraminifera in the sample; no gypsum.
2860-2960	No change.
	Beds of Austin age
	The top of the beds of Austin age is placed at 2950 ft. on the basis of electric log correlation.
2960-2980	Chalk, white and light-gray, soft, and a few fragments of harder, light-speckled, olive-gray chalk. The sample contains abundant *Inoceramus* prisms, fragments of *Inoceramus* and other fossil bivalves and a few specimens of Foraminifera.
2980-2990	Chalk, dark-gray, marly; contains abundant *Inoceramus* prisms, abundant specimens of Foraminifera, and several species of Ostracoda. The common foraminiferal species are: *Globotruncana* spp. *Globigerina* sp., *Planulina* sp., *Planulina austiniana*, a few specimens of *Valvulineria infrequens*, *Planulina texana*, *Gümbelina* sp., *Robulus* sp., and *Kyphopyxa christneri*. The sample is definitely Austin in age.
2990-3000	Like the sample at 2980-2990 ft.; contains specimens of *Citharina texana*.
3000-3100	No change.
3100-3110	Chalk, gray, somewhat white-speckled, marly containing many *Inoceramus* prisms and Austin species of Foraminifera.
3110-3180	No change.
3180-3190	Core 5. Recovery 8 ft. Top 3 ft. Marl, gray, somewhat white-speckled (microfossiliferous). No change in fauna. Middle 2 ft. Marl, somewhat lighter in color.

Depth (feet)	Description
	Bottom 3 ft. No change.
3190-3200	Core 6. Recovery 4½ ft.
	Top 3 ft. Chalk, gray, marly, containing Austin species of Foraminifera; Gümbelina sp. common.
	Bottom 1½ ft. Like top part of core, but slightly darker.
3200-3210	Core 7. Recovery 4½ ft.
	Top 1½ ft. Chalk, light-gray, marly; no change in fauna.
	2nd 1½ ft. Marl, dark-gray.
	3d 8 in. No change.
	Bottom 10 in. Marl, lighter gray.
3210-3215	Core 8. Recovery 5 ft.
	Top 4 ft. Like the bottom part of Core 7 at 3200-3210 ft.
	Bottom 1 ft. Slightly darker marl; no change in fauna, but specimens of Foraminifera less abundant.
3215-3224	Core 9. Recovery 9 ft.
	Top 3 ft. Chalk, light-gray, moderately hard. No change in microfauna.
	2nd 3 ft. Marl, dark-gray, light-speckled, containing fragments of fish scales, a few fragments of *Inoceramus* and specimens of Foraminifera.
	3d 1 ft. Chalk, white, marly, moderately hard. No change in microfauna.
	4th 2 ft. Marl, gray, somewhat white-speckled, containing fragments of fish scales and a *Pecten*-like bivalve. Dominant species of Foraminifera are: *Gümbelina* sp., *Globigerina* sp., and a small *Anomalina* sp.
3224-3234	Core 10. Recovery 10 ft.
	Top 1 ft. Like the bottom part of core 10 at 3224-3234 ft. *Globotruncana* sp. common in the fauna.
	2nd 2 ft. Chalk, light and dark-gray, marly; contains fish scales; no change in microfauna.
	3d 3½ ft. Marl, dark-gray, light-speckled.
	Bottom 3½ ft. Chalk, white, moderately hard, no change in microfauna.
3234-3244	Core 11. Recovery 3½ ft.
	Top 2 ft. Like bottom part of core 10 at 3224-3234 ft.
	Bottom 1½ ft. Marl, gray, soft; no change in microfauna.
3244-3250	Core 12. Recovery 2 ft.
	Chalk, white, moderately hard, common species of Foraminifera are: *Globigerina* sp., *Gümbelina* sp., *Pleurostomella* sp.
3250-3255	Core 13. Recovery 5 ft.
	Top. Chalk, gray, somewhat light-speckled, marly; Microfauna like core 12 at 3244-3250 ft.
	Bottom. No change.

Depth (feet)	Description
3255-3265	Core 14. Recovery 3 ft.
	Top 1 ft. Like core 13 at 3250-3255 ft.
	Bottom 2 ft. No change.
3265-3272	Core 15. Recovery 3½ ft.
	Top. Marl, gray, white-speckled, and lens of light-gray chalk containing much comminuted calcitic, chalky debris of microfossils and macrofossils. No change in microfauna.
	Bottom. Chalk, light-gray, moderately hard, and dark-gray, white speckled marl.
	Atkinson Formation. Upper Member.
3272-3277	Core 16. Recovery 1 ft.
	Shale, dark greenish-gray, flaky, unctuous. Core seems to be contaminated with drilling mud; no definitely indigenous specimens of Foraminifera observed.
3277-3285	Core 17. Recovery 3 ft.
	Top. Shale, green, containing irregular vein-like silty streaks, and a few rounded, moderately coarse grains of quartz. The sample contains a few fragments of fine-grained, somewhat glauconitic sandstone, and a few fragments of *Ostrea*-like fossil bivalves.
	Middle. Shale, green, flaky, interbedded with light-gray, micaceous, slightly glauconitic siltstone; contains a few small specimens of *Planulina eaglefordensis*.
	Bottom. Siltstone, gray, soft, micaceous, interlensed with green shale; contains a few phosphatic fragments, a few shreds of carbonaceous material, and pyrite; a few small specimens of *Planulina eaglefordensis*.
3285-3287	Core 18. Recovery 2 ft.
	Shale, green and light greenish-gray, argillaceous, micaceous, and very fine and even grained, soft sandstone, in thin alternating layers. The material contains a little phosphatic material and glauconite; a few carbonaceous shreds. The fauna is composed of shell fragments. Ostracodes, abundant specimens of *Planulina eaglefordensis*, *Globigerina* sp., and others.
3287-3297	Core 19. Recovery 6 ft.
	Top. Sandstone, light greenish-gray, soft, very fine grained, argillaceous, micaceous, containing very thin partings and streaks of green shale; phosphatic nodules and traces of glauconite and pyrite.
	Middle. No change.
	Bottom. No change.
3297-3307	Core 20. Recovery 9 ft.
	Top 4 ft. Siltstone, light greenish-gray, micaceous, finely glauconitic, containing very thin lenses of green shale; a few frag-

Depth (feet)	Description
	ments of carbonaceous material, phosphatic material and worn shells.
	2nd 2 ft. Like the top part of the core, but containing much glauconite.
	Bottom 3 ft. Shale, green, flaky, and lenses of micaceous siltstone.
3300-3310	Shale, green, a little micaceous siltstone, and cavings from higher levels.
3310-3330	No change.
3330-3340	Shale, and many cuttings of moderately hard, fine-grained, somewhat glauconitic, micaceous siltstone that contains phosphatic nodules and fragments of lignite and shells of *Ostrea*-like bivalves.
3340-3350	Like sample at 3330-3340 ft.
3350-3360	Sandstone, greenish-gray, containing abundant fragments of *Ostrea*-like bivalves; glauconite and phosphatic nodules (fairly common); a little green shale.
3360-3370	Sandstone, shell fragments and phosphatic nodules; many fragments of green shale; a little glauconite and mica.
3370-3380	Sandstone and sand, fine-grained, quartz; many fragments of *Ostrea* sp.; a little shale, a little mica, and a few phosphatic nodules.
3380-3390	No change.
3390-3400	Sand, fine-grained, even-grained, micaceous; containing many fragments of *Ostrea* sp. and other fossil bivalves; a few fragments of green shale; a few phosphatic nodules and fragments of carbonaceous material.
3400-3410	Like sample at 3390-3400 ft.
3410-3430	Sand, mica, and fragments of green shale; shell fragments much less abundant; a few fragments of carbonaceous material, and a trace of glauconite.
3430-3440	Like sample at 3410-3430 ft., but green shale more abundant.
	Atkinson Formation. Lower Member.
3440-3450	Material like sample at 3410-3430 ft., but contains specimens of *Reophax pepperensis*, *Ammobaculites agrestis*, *A. junceus*, *Trochammina rainwateri*, and others.
3450-3460	Shale, green, micaceous, and fine-grained sand; a few fragments of carbonaceous material and a few shell fragments.
3460-3470	Shale, grayish-green, and a little silty, micaceous shale; a little fine-grained sand, probably caving. The sample contains a few fragments of carbonaceous material and of shells.
3470-3490	Like the sample at 3460-3470, and a few fish teeth and fish bones.
3490-3500	Similar to the samples at 3470-3490 ft., but fragments of very

Depth (feet)	Description
	fine grained sandstone are common. The sample contains fragments of shells and fish bones and specimens of *Reophax* sp., and many specimens of *Ammobaculites agrestis* and *Ammobaculoides plummerae*.
3500-3510	Like the sample at 3490-3500 ft., but shale is strongly dominant, and the sample contains very few specimens of the arenaceous species of Foraminifera.
3510-3560	Like the sample at 3500-3510 ft.
3560-3570	Shale, green; and a little light-gray, micaceous siltstone; a few shell fragments and a few fragments of carbonaceous material.
3570-3580	Like the sample at 3560-3570 ft.
3585-3595	Core 21. Recovery 2½ ft. Top. Sandstone, soft, light greenish-gray, fine-grained, even-grained, argillaceous, glauconitic, somewhat phosphatic. Bottom. No change.
3595-3602	Core 22. Recovery 6 ft. Top 4 in. Sand, unconsolidated, like the sandstone in core 21 at 3585-3595 ft. and fragments of gray and greenish-gray, micaceous shale. 2nd 4 in. Sandstone, greenish-gray, moderately hard, argillaceous, micaceous, glauconitic, very fine grained. 3d 4 ft. Like 2nd 4 inches of this core, but less firmly consolidated. Bottom 16 in. Shale, greenish-gray, silty, micaceous, glauconitic, containing specimens of *Ammobaculites advenus*, and fragments of phosphatized fish bones.
3602-3612	Core 23. Recovery 10 ft.[3] Top 1 ft. Clay, shaly, greenish-gray, silty to sandy (very fine grained sand), highly micaceous. Contains a few shreds of carbonaceous material, a little phosphatic material, a few specimens of Ostracodes, and small fragments of shells. 2nd 3 ft. Clay, shaly, greenish-gray, silty, somewhat glauconitic, highly micaceous, containing shreds of carbonaceous material, a few fragments of fish bones, a few specimens of *Ammobaculites advenus*, and a few specimens of ostracodes. 3d 8 in. Shale, greenish-gray, thinly laminated, slightly micaceous, silty, and carbonaceous; contains a few fragments of *Inoceramus*, specimens of *Trochammina wickendeni*, and very small specimens of *Globigerina* sp. and *Gümbelina* sp. 4th 10 in. Shale, greenish-gray, micaceous, silty, irregularly glauconitic; contains pyrite nodules, a little phosphatic material, a few shell fragments, and a few minute specimens of *Globigerina* sp.

[3]Two feet of core unaccounted for.

Depth (feet)	Description
	Bottom 2½ ft. Shale, green, unctuous, containing silty micaceous partings (mainly drilling mud?).
3612-3620	Core 24. Recovery 9 ft.
	Top 8 ft. Sandstone, gray, soft, fine-grained, argillaceous, highly micaceous; contains a trace of glauconite, a few phosphatic nodules, and a little dark-gray shale, possibly occurring in thin lenses. The shale contains specimens of very small Foraminifera, and a few shreds of carbonaceous material.
	Bottom 1 ft. An unsatisfactiory sample of greenish-gray shale, fine to coarse-grained quartz sand, and a little glauconite, mica, and phosphatic material.
3620-3629	Core 25. Recovery 5 ft.
	Top 3 ft. Sand, light grayish-tan, fine to moderately fine grained, etched, argillaceous, containing a few coarse-grains, fragments of gray shale, and a little mica.
	2nd 1 ft. Sand, greenish-gray, fine to coarse-grained, argillaceous, glauconitic, quartz. The glauconite occurs in crevices in some coarse grains, and one highly glauconitic plant fragment was observed.
	Bottom 1 ft. Sandstone, gray, soft, micaceous, argillaceous. The sandstone contains irregular partings of gray shale, and a few lenses of gray, flaky shale, in which occur faint traces of dwarf specimens of Foraminifera.
	Comanche Series undifferentiated
3629-3639	Core 26. Recovery 7 ft.
	Top 2 ft. Sandstone, light-gray, fine-grained, argillaceous (bentonitic?), micaceous, the sand grains are etched and angular.
	2nd 2½ ft. Clay, shaly, gray and red mottled highly micaceous, sandy (fine-grained sand).
	Bottom 2½ ft. Sandstone, greenish-gray, soft, fine-grained, highly argillaceous and micaceous.
3639-3648	Core 27. Recovery 1 ft.
	Top ½ ft. Sand, fine to coarse-grained (coarse grains common), etched, argillaceous, and a little light greenish-tan, unctuous, sandy (very fine grained sand) clay shale. The sand contains many lemon-yellow and a few pink grains of quartz and a few grains of feldspar.
	Bottom ½ ft. Mudstone, light-gray, mustard, and light-red, mottled, unctuous, sandy, somewhat micaceous.
3648-3658	Core 28. Recovery 4½ ft.
	Top 2½ ft. Clay, shaly, red and gray mottled, sandy, highly micaceous; the sand is fine to coarse-grained, and moderately fine grains are common.
	Bottom 2 ft. Mudstone, gray, reddish-brown and mustard, mottled, highly micaceous.

Depth (feet)	Description
3658-3668	Core 29. Recovery? Top. Sand, light-red, clay-stained, fine to coarse-grained, etched. Bottom. Sand, light-red and gray, mottled and stained, soft, argillaceous, quartz. The sand grains are mostly moderately fine and subangular.
3668-3678	Core 30. Recovery ½ ft. Sand, fine to very coarse-grained, containing many lemon-yellow, pink and a few rose quartz grains, and a little feldspar; a few fragments of purplish-red clay.
3680-3700	Mainly cavings of gray shale, brownish-red, purplish-red and mustard-yellow clay shale, sand and mica.
3698-3708	Core 33. Recovery 1½ ft. Top 1 ft. Sand, brownish-red stained, soft, fine-grained, subangular, argillaceous, highly micaceous; a few coarse grains of sand in the sample. Bottom ½ ft. Sandstone, red and gray, soft, fine to coarse-grained, argillaceous, highly micaceous.
3708-3718	Core 34. Recovery 1 ft. Sand, fine to coarse-grained, subangular to rounded, quartz, containing yellow and pink grains and a little feldspar.
3718-3728	Core 35. Recovery 3 in. Clay, red and gray mottled, silty, very highly micaceous.
3728-3738	Core 36. Recovery 2 ft. Top. Sand, light purplish-red, soft, fine to very coarse-grained (small pebbles), argillaceous, highly micaceous; yellow and pink-tinted grains abundant. Bottom. Sand, like top part of core, in a matrix of highly micaceous red clay.
3738-3748	Core 37. Recovery 1 ft. Top. Sand, light-red like core 36 at 3728-3738 ft., and mustard-yellow micaceous clay. The sand grains are moderately fine to moderately coarse. Bottom. Sand, light-red, fine to very coarse-grained, micaceous; many grains are tinted yellow and pink.
3748-3758	Core 38. Recovery 1 ft. Like core 37 at 3738-3748 ft. The sand is mainly quartz and a little feldspar.
3758-3768	Core 39. Recovery 2 ft. Top. Sand, light-red, mostly fine-grained, micaceous, argillaceous; a few moderately coarse grains, tinted yellow and pink. Bottom. Sand, red and gray mottled, fine-grained, even-grained, highly micaceous, quartz.
3768-3770	Core 40. Recovery ½ ft. Sand, red and gray, fine-grained, highly micaceous, argillaceous, quartz.

Depth (feet)	Description
3778-3788	Core 41. Recovery 3 ft. Top 2 ½ft. Sand, light-red and gray, soft, fine to coarse-grained, micaceous, argillaceous. Bottom ½ ft. Clay, brick-red, and gray mottled, silty to very finely sandy, micaceous.
3790-3800	Sand, fine to very coarse grained, a few fragments of red shale, and cavings of gray shale from much higher levels.
3798-3805	Core 43. Recovery 2 ft. Top. Sand, light-red, fine to moderately coarse grained, etched, somewhat micaceous, argillaceous. Bottom. Shale, dark-red, and some sand like top part of core. The appearance of the shale differs somewhat from the overlying red clay shale.
3805-3807	Core 44. Recovery 1 ft. Shale, red, like bottom part of core 43 at 3798-3805 ft.
3807-3817	Core 45. Recovery? Top. Shale, dark-red, somewhat gray spotted, somewhat silty. Bottom. Clay, shaly, red, silty.
3817-3827	Core 46. Recovery ½ ft. Shale, red, somewhat gray and mustard-yellow mottled, unctuous, somewhat silty.
3827-3837	Core 47. Recovery 3 in. Clay, red, and sand, unconsolidated.
3837-3840	Core 48. Recovery 3 in. Sand, fine to coarse-grained, roughly angular, and red shale.
3840-3850	Core 49. Recovery 2 ft. Sand, micaceous, and some red shale. The core seems to be contaminated.
3850-3860	Core 50. Recovery 1 ft. Sand, soft, fine to moderately fine-grained, micaceous, argillaceous; a few coarse grains of sand. The sand is similar to that in beds of definite Comanche age.
3860-3868	Core 51. Recovery 8 in. An unconsolidated lump of red shale and a little sand, as in the samples beginning at 3805 ft.
3870-3880	Sand, fine to very coarse-grained, red shale, and about 50 percent cavings from much higher levels.
3880-3900	No change.
3900-3903	Many cavings, and abundant fragments of bluish-green, fine-grained, sandstone; white and yellow, fine-grained quartzite; and fragments of an opaque green mineral. The sample may be from a bed of quartzite boulders and other material derived from the weathered surface of the underlying early Paleozoic rocks and redeposited in sedimentary beds near the base of the Mesozoic.

Depth (feet)	Description
3903-3905	Clay, shaly, red and greenish-gray, mottled, and many fragments of yellow and white quartzite, green sandstone, and the opaque green mineral like the sample at 3900-3903 ft.
3905-3912	Mainly fragments of quartzite and other kinds of material like samples at 3900-3905 ft.

Ordovician

Middle Ordovician Series

The top of the weathered(?) Paleozoic is placed at 3911 ft. on the basis of electric log correlation.

3912	Bit sample. Red and gray mottled irregularly silty shale, and fragments of quartzite.
3912-3916 T.D.	Core. Recovery? Top 3 in. Quartzite, light-green, very fine grained. Bottom. Shale, dull reddish-brown, thinly laminated, micaceous, somewhat silty.

ECHOLS COUNTY

Operator: Hunt Oil Company
Landowner: Superior Pine Products Co. Well 2
Location: Land District 13, Land Lot 317; southwest corner of Land Lot 317

GGS. No. 169
Elevation: 142 ft. (derrick floor)
Total depth: 4062 ft.
Completed: Apr. 7, 1945.

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Not studied		
Cretaceous		
Gulf		
Lawson Limestone(?) upper member(?)	2700?	85?
Beds of Taylor age (1st sample 2890)	2785?	285?
Beds of Austin age	3070	390
Atkinson Formation, upper member	3460	118
lower member	3578	152
Ordovician		
Lower Ordovician[1] quartzitic sandstone and shale	3770?	to total depth 292?

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

[1]Bridge, Josiah, and Berdan, J. M., 1951, U.S. Geological Survey open-file report, p. 5 and map.

Depth (feet)	Description
0-2890	Samples not studied.
	Cretaceous
	Gulf Series
2700(?)	**Lawson Limestone(?) Upper Member(?)** **(electric log correlation)**
2785(?)	**Beds of Taylor age.** **(electric log correlation)**
2890-2900	Chalk, white, containing fragments of *Inoceramus* and other macrofossils, and a few specimens of ostracodes. Specimens of Foraminifera, if present, are indistinguishable owing to insufficient preparation of sample.
2900-2920	Like sample at 2890-2900 ft.
2920-2930	Chalk, like sample at 2890-2900 ft. and a few fragments of light-tan, hard cryptocrystalline limestone. *Inoceramus* fragments are common.
2930-2940	Like sample at 2920-2930 ft., and a few fragments of a large *Ostrea*-like bivalve.
2940-2950	Chalk, many fragments of hard, light-tan limestone, and a few fragments of light olive-gray chalk; *Inoceramus* fragments common.
2950-2960	Limestone, light-tan, hard, about 50 percent of sample.
2960-2970	Limestone, like sample at 2950-2960 ft. about 50 percent of sample; about 50 percent light greenish-gray chalk, a little white chalk, many fragments of *Inoceramus*, and a few fragments of other fossil bivalves.
2970-2980	Chalk, about 75 percent of sample; light-tan, hard limestone about 25 percent.
2980-2990	Sample is chiefly cavings from beds of Eocene age and higher levels.
2990-3000	Marl, light greenish-gray, chalky, and a few fragments of light-tan, hard, limestone; many fragments of *Inoceramus*, and some cavings.
3000-3020	No change.
3020-3030	Chalk, light-gray, marly, and cavings(?) of white chalk and light-tan limestone; many *Inoceramus* fragments.
3030-3070	No change.
	Beds of Austin age
	(Southeastern Geological Society, Mesozoic Committee, 1949, Cross Section CC1)
3070-3080	Chalk, light-gray and many cavings.

Depth (feet)	Description
3080-3090	Chalk, light greenish-gray, and darker gray chalky marl. *Inoceramus* fragments and prisms common; specimens of *Globotruncana marginata, Planulina austiniana,* and other species of Foraminifera.
3090-3100	Like the sample at 3080-3090 ft.
3100-3110	Chalk, light greenish-gray, and darker gray chalky marl. *Inoceramus* fragments common, specimens of several species of ostracodes, and specimens of Foraminifera: *Globotruncana marginata, Globigerina* sp., *Planulina austiniana,* and *Marginulina austiniana.*
3110-3120	Like sample at 3100-3110 ft., and a few fragments of fish bones.
3120-3130	No change.
3130-3140	Marl, greenish-gray, and material and fauna like sample at 3100-3110 ft. Highest occurrence of specimens of *Citharina texana.*
3140-3150	Like sample at 3131-3140 ft.
3150-3300	No change.
3300-3310	Like samples at 3130-3140 ft. and below. The dominant species of Foraminifera are *Gümbelina reussi* and *Globigerina* sp.
3310-3350	No change.
3350-3360	No change. Fauna contains specimens of *Massilina* sp., indicative of the lower part of the beds of Austin age.
3360-3370	Marl greenish-gray, like the preceding samples, containing fragments of *Inoceramus,* and specimens of Foraminifera, mainly *Globigerina* sp. and *Gümbelina* sp.
3370-3390	No change.
3390-3400	Like preceding samples beginning at 3130-3140 ft.; contains in addition, many cuttings of dark-gray marl and dark brownish-gray, light-speckled marl. The speckled appearance is caused by crushed microfossil debris. Fish scales are common in the speckled marl.
3400-3410	Marl, chiefly gray-green, and fragments of brownish-gray speckled marl; many cavings.
3410-3420	Like sample at 3400-3410 ft.
3420-3430	Like the sample at 3400-3410 ft., and many cuttings of cream, chalky, highly microfossiliferous limestone containing abundant comminuted calcitic molds of small specimens of *Gümbelina* sp. and *Globigerina* sp. Sample also contains *Inoceramus* prisms and fish scales.
3430-3440	Like the sample at 3420-3430, and many cavings.
3440-3450	Mainly fragments of greenish-gray marl, and a few fragments of highly microfossiliferous chalky limestone. Many cavings from much higher depths.
3450-3460	Like the sample at 3440-3450 ft. A few fragments of the highly microfossiliferous chalk contain sandy areas.

Depth (feet)	Description
	Atkinson Formation. Upper Member.
3460-3470	Sandstone, fine-grained, angular, clear quartz, containing glauconite, phosphatic nodules, mica and pyrite, is about 50 percent of the sample. The sandstone also contains fragments of fossil bivalves. Cavings are about 50 percent of the sample.
3470-3480	Sandstone, like the sample at 3460-3470 ft., and abundant fragments of green, thinly flaky shale. Sample contains a few fragile specimens of *Planulina eaglefordensis*.
3480-3490	Shale, grayish-green, thinly flaky, slightly micaceous, and fragments of very fine and angular grained, micaceous, carbonaceous sandstone that is probably interbedded with the shale.
3490-3500	Shale, like the sample at 3480-3490 ft., and much light-gray, micaceous siltstone that probably occurs as thin lenses in the shale.
3500-3510	Shale, like the sample at 3480-3490 ft., and a little siltstone.
3510-3520	Shale, about 75 percent of sample; soft micaceous siltstone about 25 percent.
3520-3530	No change.
3530-3540	Shale, gray-green, micaceous; also a little soft micaceous siltstone, and very fine grained sandstone, both of which are slightly carbonaceous.
3540-3550	Like the sample at 3530-3540 ft. The shale is more micaceous, and is slightly carbonaceous.
3550-3560	Like the sample at 3540-3550 ft. The shale contains small, crushed, chalky fragments of fossil shells; a few specimens of *Planulina eaglefordensis*, and very small irregular-shaped nodules of siderite.
3560-3570	Material like the sample at 3550-3560, but contains no determinable fossils. Reddish-brown, irregular-shaped nodules of siderite are common in some fragments of siltstone.
3570-3580	Like the sample at 3560-3570 ft.
	Atkinson Formation. Lower Member.
3580-3590	Like the sample at 3560-3570 ft. The shale contains a few molds of macrofossils and fragments of fish bones. The top of the lower member of the Atkinson Formation is placed at 3578 ft. on the basis of electric log correlation. Earlier workers reported a microfauna characteristic of the lower Atkinson at the depth of 3778 ft., but at the time of this study, the samples contained no fossils.
3590-3600	Mainly shale and a little siltstone; no identifiable microfossils or macrofossils.
3603-3623	Core. Recovery? Top. Sandstone, brownish-gray, hard, calcareous, argillaceous, slightly glauconitic; sample is, in part, a nodular(?) sandy limestone.

Depth (feet)	Description
	Middle. Sandstone, tan-gray, moderately hard, highly argillaceous, glauconitic, somewhat micaceous. Bottom. Sandstone, gray, soft, fine-grained, highly argillaceous, micaceous, glauconitic.
3620-3630	Like cuttings at 3590-3600 ft.
3623-3642	Core. Recovery 4 ft. Top. Clay, gray, silty, highly micaceous, slightly glauconitic. Bottom. Like top part of core, but slightly carbonaceous.
3630-3640	No change in cuttings.
3640-3650	No change. A few specimens of *Planulina eaglefordensis*, and a small *Gümbelina* sp.
3650-3660	No change. No determinable fossils.
3660-3670	Shale and a little micaceous siltstone; also many fragments of moderately soft, moderately fine-grained sandstone.
3670-3680	No sample?
3680-3690	Sandstone, poorly sorted, fine to coarse-grained; green-tinted grains common.
3690-3700	Sandstone, moderately fine to coarse-grained, slightly argillaceous, somewhat glauconitic, about 50 percent of sample; 50 percent grayish-green shale.
3700-3710	Mainly flaky gray-green shale; a little sand and sandstone.
3710-3720	Sand, fine to coarse-grained, and soft sandstone 50 percent of sample; green-tinted grains common; a little feldspar.
3720-3730	Like the sample at 3710-3720 ft.
	Ordovician
	Lower Ordovician Series
3730-3740	Like sample at 3710-3720 ft. and many fragments of light to dark-red fine-grained quartzite.
3740-3750	No change.
3750-3760	Quartzite, red to light-pink, fine-grained, and moderately hard sandstone. In addition, the sample contains many cavings of grayish-green, flaky, micaceous shale, and gray, micaceous, irregularly carbonaceous siltstone and very fine grained sandstone.
3760-3770	Like the sample at 3750-3760 ft., but very little quartzite.
3770-3780	Shale and sandstone, like the samples from the Atkinson Formation; very little quartzite.
3780-3840	Like the sample at 3770-3780 ft.
3845-3855	Core. Recovery 4 ft. Sandstone, quartzitic, dense light greenish-gray, fine-grained, irregularly highly micaceous.
3840-3850	Sandstone, quartzitic, light greenish-gray, micaceous, like core at 3845-3855 ft., is about 50 percent of sample. The remainder of the sample is mainly cavings.

Depth (feet)	Description
3850-3900	Like sample at 3840-3850 ft.
3900-3910	Sandstone, dense, light-green, very fine grained, micaceous; a few fragments of red quartzite, and cavings from the upper Atkinson.
3910-3980	No change.
3980-3990	Like the samples from 3900 to 3980 ft., with the addition of a few fragments of red and reddish-brown quartzite.
3990-4062 T.D.	No change.

ECHOLS COUNTY

Operator: Humble Oil & Refining Co.
Landowner: Bennett and Langsdale Well 1
Location: Land District 12, Land Lot 146; 660 ft. south and 666 ft. east of northwest corner of Land Lot 146
GGS. No. 189
Elevation: 181 ft. (derrick floor)
Total depth: 4185 ft.
Completed: May 6, 1949

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Paleocene		
In beds containing Tamesí fauna; 1st sample 2700 ft.	?	?
Cretaceous		
Gulf		
Beds of Taylor age	2810	240
Beds of Austin age	3050	290
Atkinson Formation, upper member	3340	210
lower member	3550	210
Comanche undifferentiated	3760	360
Silurian		
Upper Silurian[1] quartzitic sandstone	4120	to total depth 65
Diabase intrusion[2]	4125-4150	

[1]Bridge, Josiah, and Berdan, J. M. 1951, U.S. Geological Survey open-file report, p. 7 and map, tentatively classified the age of the quartzitic sandstone and dark shale as Early Ordovician. J. M. Schopf (written communication to J. M. Berdan, February 1959; written communication to P. L. Applin, July 1963), U.S. Geological Survey, classified the age of the rocks as Silurian on the basis of "acid resistant" microfossils in the sample at 4171 ft.

[2]Applin, P. L., 1951, U.S. Geological Survey Circular 91, p. 15-16, and table 4.
———1957, Geological Society of America Bulletin v. 68, p. 1486-1489.

Lithologic and paleontologic descriptions of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-2700	Samples not studied.

Tertiary

In Paleocene Series

Beds containing Tamesi fauna

2700-2705	Marl, light-gray, chalky, highly silty, glauconitic, about 50 percent of sample. Fragments of grayish-green shale.
2705-2710	Mainly silty marl, like sample at 2700-2705 ft., and fragments of hard gray limestone that is probably lenticular in the silty marl. The fauna includes specimens of ostracodes and specimens of the small foraminifer *Globigerina triloculinoides;* also specimens of *Cibicides* sp., *Globorotalia velascoensis,* and a small *Robulus* sp.
2710-2740	Like the sample at 2705-2710 ft., but showing an increase of limestone fragments. No marked change in fauna.
2745-2790	No change in material.
2790-2795	Shale, gray, soft, silty, glauconitic, is probably drilled at this level. The microfauna in the samples at 2745-2790 ft. and 2790-2795 ft. includes specimens of *Spiroplectammina mexiaensis, Marssonella oxycona, Robulus midwayensis, Nodosaria affinis, Cibicides alleni, Anomalina acuta,* and *Globigerina pseudobulloides.*
2795-2810	No change.

Cretaceous

Gulf Series

Beds of Taylor age

2810-2815	Limestone, white, hard, chalky, glauconitic, somewhat sandy (very fine-grained sand); sample contains fragments of *Inoceramus,* and cavings from higher levels. The fauna contains specimens of *Globotruncana marginata, Marssonella oxycona, Planulina dumblei, Stensiöina americana,* and others.
2815-2820	Chalk, white, hard, somewhat glauconitic; many fragments of *Inoceramus,* other fossil bivalves, and echinoids. Microfauna as in sample at 2810-2815 ft.; many specimens of *Planulina dumblei.*
2820-2825	Chalk, white, moderately soft; many *Inoceramus* fragments, and microfauna as in the samples beginning at 2810 ft.
2820-2825	Chalk, white, moderately soft; many *Inoceramus* fragments, and microfauna as in the samples beginning at 2810 ft.
2825-2855	No change.

Depth (feet)	Description
2855-2860	Washed residue, small, probably from a soft white chalk, containing fragments of green shale (caving?), abundant *Inoceramus* fragments and prisms. Microfauna similar to preceding Cretaceous samples: *Planulina dumblei* (common), and many specimens of *Lituola taylorensis* (highest occurrence).
2860-2865	Material and fauna is similar to the sample at 2855-2860 ft., but sample contains few fragments of *Lituola* sp.
2865-2900	No change.
2900-2905	Chalk, white, also fragments of hard gray limestone and soft gray marl that are probably caving. The fauna contains fragments of *Inoceramus*, specimens of *Lituola taylorensis* and other species as in the preceding Cretaceous samples, and specimens of several species of ostracodes.
2905-3910	Material and fauna like sample at 2900-2905 ft.; about 25 percent of the washed sample is composed of fine to coarse-grained quartz sand (from drilling mud?).
2910-2915	Like sample at 2905-2910 ft., but with about 50 percent sand.
2915-2920	Marl, gray, soft, cavings from higher levels, abundant fragments of *Inoceramus*, and specimens of Foraminifera that are mainly, *Planulina dumblei*, *Globotruncana cretacea*, and a few fragments of *Lituola taylorensis*.
2920-2925	Like sample at 2915-2920 ft. and a few fragments of *Kyphopyxa christneri*.
2925-2945	Material and fauna like samples at 2920-2925 ft.
2945-2950	Washed residue, small. Probably from a soft gray marl, containing *Inoceramus* fragments, specimens of Foraminifera (*Globotruncana* sp. fairly common), and many small nodules of pyrite.
2950-2955	Like sample at 2945-2950 ft. Specimens of *Robulus* sp. and *Globotruncana* sp. are dominant in the fauna, which contains, also, specimens of *Marginulina austiniana*.
2955-2965	No change.
2965-2970	Material and fauna as in immediately preceding samples; also a few specimens of *Pseudogaudryinella capitosa*.
2970-2975	Like sample at 2965-2970 ft.
2975-2980	Marl, gray, containing small nodules of pyrite, abundant *Inoceramus* fragments, and specimens of Foraminifera, among which *Globotruncana* sp. and *Robulus* sp. are common.
2980-2990	No change.
2990-2995	Material and fauna like sample at 2975-2980 ft., with the addition of specimens of *Citharina wadei*.
2995-3000	Like sample at 2990-2995 ft. but specimens of *Citharina wadei* absent. Specimens of *Marginulina austiniana* and *Globigerina* sp. fairly common.
3000-3050	Like sample at 2995-3000 ft. and abundant cavings.

Depth (feet)	Description
	Beds of Austin age
3050-3060	Chalk, white, moderately hard; many fragments contain much very fine calcitic material, and abundant specimens of *Oligostegina*, characteristic of the beds of Austin age. Nodules of pyrite and fragments of *Inoceramus* are common.
3060-3070	No change.
3070-3075	Marl, brownish-gray, soft, is probably drilled at this level. Sample contains many *Inoceramus* fragments, nodules of crystalline pyrite, and cavings. Among the indigenous specimens of Foraminifera, *Globotruncana marginata* and *Globigerina* sp. are dominant; *Planulina austiniana* and *Gümbelina reussi* are fairly common; specimens of *Valvulineria infrequens* (Austin var.) are present.
3075-3080	Like the sample at 3070-3075 ft., also fragments of *Citharina texana*.
3080-3085	Not described.
3085-3090	Clay, gray, marly; contains many *Inoceramus* fragments and prisms, nodules of crystalline pyrite, and specimens of species of Foraminifera characteristic of the beds of Austin age.
3090-3100	Clay, gray, marly; contains a few *Inoceramus* fragments, nodules of pyrite, specimens of Foraminifera, and many ostracodes.
3100-3125	No change.
3125-3130	Clay, gray, marly; contains *Inoceramus* fragments and nodules of pyrite. Specimens of *Gümbelina* sp. and *Globigerina* sp. are dominant in the microfauna, which also contains many specimens of *Globotruncana* sp. and a small *Anomalina* sp.
3130-3230	No change.
3230-3235	Washed residue, small. Contains fragments of gray marly clay, *Inoceramus* fragments, nodules of pyrite, and a few small fragments of dark brownish-gray slightly speckled, marly shale. The microfauna is like that in the sample at 3125-3130 ft.
3235-3240	Two separate samples at this depth. a. Like sample at 3230-3235 ft. b. Like sample at 3230-3235 ft., with the addition of many fragments of gray, hard, sandy (fine-grained sand) limestone, and fragments of *Ostrea*-like bivalves.
3240-3250	Materials and fauna like sample at 3230-3235 ft.
3250-3255	Core 4. Recovery 4 ft. Top. Clay, light-gray, marly slightly micaceous. Washed residue is small and consists of specimens of *Gümbelina* sp. and *Globigerina* sp., many specimens of *Globotruncana marginata*, *Planulina austiniana* (small), and *Virgulina tegulata;* a few specimens of ostracodes, including *Cythereis dallasensis*.
3255-3265	Core 5. Recovery 3 ft. Clay, brownish-gray, marly, light-speckled. The fauna consists

Depth (feet)	Description
	of a few fish scales, and specimens of Foraminifera and Ostracoda like sample at 3250-3255 ft.
3265-3270	Core 6. Recovery 4 ft. Top. Chalk, light-gray, moderately hard. The fauna consists of specimens of Foraminifera and Ostracoda like sample at 3250-3255 ft., with the addition of specimens of *Citharina texana*. Bottom. Like top part of core, but no *C. texana*.
3270-3280	Core 7. Recovery 5 ft. Top. Marl, gray (darker gray than preceding cores), light speckled. No change in fauna. Bottom No change.
3280-3285	Core 8. Recovery 5 ft. Top. Marl, gray and brownish-gray, light speckled. No change in fauna. Bottom. Marl, gray, soft. No change in fauna.
3285-3295	Core 9. Recovery 4 ft. Top. Chalk, white, moderately hard; few specimens of Foraminifera wash free. Bottom. Marl, dark-gray, highly light-speckled. Microfauna like the preceding core samples.
3295-3300	Core 10. Recovery 9 ft. Top. Chalk, white, moderately hard. No change in fauna. Middle. Like top of core. Bottom. Marl, gray and brownish-gray, speckled; contains thin hard lenses composed of masses of calcitized microfossils and microfossil fragments; no change in fauna.
3300-3310	Core 11. Recovery 10 ft. Top 3 ft. Marl, dark brownish-gray, speckled, highly pyritic. No change in fauna. 2nd 3 ft. Chalk, light-gray, moderately hard; contains much calcitized microfossiliferous material (*Inoceramus* prisms and specimens of Foraminifera). *Globigerina* sp. and *Gümbelina* sp. very abundant; also many specimens of *Globotruncana* sp. typical of the lower part of the Austin chalk. 3d 3 ft. Chalk, white, moderately hard, similar in general character and fauna to the 2nd 3 ft. Bottom 1 ft. No change.
3310-3320	Clay, gray, calcareous, and speckled marl. Sample contains many *Inoceramus* fragments, nodules of pyrite, and specimens of Foraminifera like the preceding cores; also a few specimens caving from higher levels.
3320-3325	Material and fauna like sample at 3310-3320 ft.; also a few fragments of very fine grained, somewhat glauconitic, calcareous sandstone that contains specimens of many small foraminiferal species like those mentioned in preceding cores.

Depth (feet)	Description
3320-3330	Core 13. Recovery 10 ft.
	Top 1 ft. Clay, shaly, gray, soft, silty. Sample contains small nodules of glauconite, a few nodules of pyrite, and many specimens of Foraminifera. Specimens of a small *Globigerina* sp. and a small *Planulina* sp. are common; specimens of *Gümbelina* sp. are in the fauna, though not abundant.
	2nd 2 ft. Marl, gray, containing a very large amount of *Inoceramus* prisms and calcitized molds of specimens of Foraminifera. Common forms are: *Globigerina* sp., *Globotruncana* sp. (lower Austin form), *Gümbelina* sp., and a few *Planulina* sp., like the top part of the core.
	3d 4 ft. Marl, light-gray, chalky, like the preceding part of the core in character and fauna.
	Bottom 3 ft. Marl, gray, highly microfossiliferous, somewhat white speckled. No change in fauna.
3330-3340	Core 14. Recovery 10 ft.
	Top 5 ft. Marl, gray, soft. Fauna composed of *Inoceramus* prisms and specimens of *Globigerina* sp. and *Gümbelina* sp.
	2nd 4 ft. Marl, gray, sandy (medium-grained to moderately coarse-grained sand). Phosphatized fragments of fish bones common. Washed residue large; composed of 50 percent sand and 50 percent *Inoceramus* prisms and specimens of Foraminifera. Fauna like core 13 at 3320-3330 ft., and a few specimens of *Planulina eaglefordensis* and *Cythereis eaglefordensis*.
	Atkinson Formation. Upper Member.
	Bottom 1 ft. Marl, gray, soft, sandy, like top part of core, and gray, hard, sparsely sandy limestone containing fragments of fossil bivalves. The limestone marks the top of the upper member of the Atkinson Formation.
3340-3345	Core 15. Recovery 4 ft.
	Top 2 ft. Sandstone, white, hard, fine to medium-grained, calcareous, highly pyritic; contains phosphatic fragments and fragments of fossil bivalves.
	2nd 1 ft. Sandstone, white, hard, medium to coarse-grained, calcareous, pyritic; contains fragments of phosphatized fish bones, and fragments of fossil bivalves.
	Bottom 1 ft. Sandstone, light-gray, hard, calcareous, very fine grained, and sandy limestone, containing many shell fragments, a little phosphatic material, a trace of fine-grained, bright-green glauconite, a trace of mica, and a few specimens of ostracodes.
3345-3350	Core 16. Recovery 3 ft.
	Top ½ ft. Siltstone, light-gray, moderately soft, micaceous, slightly glauconitic; contains fragments of *Ostrea* sp. (common), and fragments of phosphatized fish bones. Washed residue contains much fine to medium-grained quartz sand.

Depth (feet)	Description
	2nd ½ ft. Sandstone, light-gray, hard, calcareous, and sandy limestone; contains abundant shell fragments, and is irregularly micaceous and somewhat phosphatic. Bottom 2 ft. Sandstone, light-gray, fine-grained; calcareous, micaceous; contains many shell fragments and phosphatized fragments of fish bones.
3350-3355	Core 17. Recovery 2 ft. Top ½ ft. Shale, gray-green, flaky, slightly silty; contains phosphatic fragments, shell fragments, and a few specimens of ostracodes. Bottom 1½ ft. Siltstone, light-gray, soft, micaceous, calcareous; contains fairly common specimens of several species of ostracodes, and specimens of *Valvulineria infrequens* (Eagle Ford variety), and of a very small *Gümbelina* sp.
3358-3362	Core 19. Recovery? Washed sample is very fine grained sandstone and a few shell fragments.
3362-3367	Core 20. Recovery 5½ ft. Top. Sand, fine to medium-grained quartz; containing many worn and broken shell fragments, a few phosphatic nodules, and a few specimens of ostracodes. Bottom. Sandstone, fine to medium-grained, soft, quartz, containing many worn and broken shell fragments (*Ostrea?* sp.), pyrite, a trace of glauconite, mica and phosphatic material.
3367-3372	Core 21. Recovery 5 ft. Top. Clay, light greenish-gray, soft, sandy, micaceous; contains a few shell fragments and phosphatic nodules. Bottom. Shale, greenish-gray, soft, sandy (fine-grained sand), slightly glauconitic.
3372-3377	Core 22. Recovery 5 ft. Top. Like bottom part of Core 21 at 3367-3372 ft. Bottom. Clay, light greenish-gray, sandy (fine to medium-grained sand), micaceous, slightly glauconitic, somewhat phosphatic.
3375-3380	Sand, light-gray, fine-grained, and shale; contains many shell fragments, many bryozoan fragments, specimens of Foraminifera from younger beds, a few fragments of light-green shale, and a little glauconite.
3380-3390	No change.
3390-3395	Like sample at 3375-3380 ft. The microfauna contains specimens of Foraminifera that have caved from various levels, but also contains specimens of species that are typical of the upper member of the Atkinson Formation. Common species are: *Gümbelina* sp. (small), *Valvulineria infrequens* (Eagle Ford variety), and small specimens of *Planulina eaglefordensis*.
3395-3400	Like sample at 3390-3395 ft. Sample composed, mainly, of frag-

Depth (feet)	Description
	ments of *Ostrea* sp., bryozoan fragments, a few fragments of fine-grained, micaceous sandstone, and a few specimens of Foraminifera caving from the beds of Austin age.
3400-3420	No change.
3420-3425	Sample composed of shell fragments, bryozoan fragments, loose sand, and micaceous sandstone; also many fragments of white, sandy limestone, containing many embedded shell fragments.
3425-3430	Like the sample at 3420-3425 ft.
3430-3435	Dominant materials in the sample are about 50 percent fine to moderately coarse grained sand, and fragments of white, irregularly sandy, macrofossiliferous limestone reported in the sample at 3420-3425 ft. Sample also contains bryozoan fragments, shell fragments, phosphatic nodules, and a few fragments of sandstone.
3435-3475	No change.
3475-3480	Like sample at 3430-3435 ft., but fragments of white, fine to medium-grained, glauconitic, micaceous sandstone are slightly more common. Sample also contains a few fragments of flaky green shale.
3480-3500	No change.
3500-3505	Sandstone, white, medium-grained, calcareous, somewhat glauconitic and phosphatic; contains many fragments of *Ostrea* sp. and a small *Gryphea*. Loose sand and shell fragments compose about 75 percent of the sample.
3505-3555	No change.
	Atkinson Formation. Lower Member.
	The top of the lower member of the Atkinson Formation is placed at 3550 ft. on the basis of electric log correlation supported by the samples.
3555-3560	Sample is composed mainly of loose sand and abundant shell fragments, but also contains many fragments of light-tan, hard, sandy limestone in which shell fragments are embedded.
3560-3570	No change.
3570-3575	Washed sample, composed mainly of sand and shell fragments.
3575-3580	Washed sample, small; composed of fragments of gray, micaceous siltstone; fragments of the sandy, fossiliferous limestone reported in sample at 3555-3560 ft.; a little loose sand; and phosphatic nodules. The material drilled at this level is probably siltstone and soft, greenish-gray shale, a few fragments of which are in the sample. The sample contains specimens of arenaceous species of Foraminifera, among which are specimens of *Ammobaculites stephensoni*.
3580-3585	No change.

Depth (feet)	Description
3585-3590	No change in material, but no specimens of arenaceous Foraminifera observed.
3590-3595	No change in material but contains specimens of *Ammobaculites stephensoni;* specimens of *Planulina eaglefordensis,* and some other species that are probably caving from higher levels.
3595-3605	No change.
3605-3610	Washed sample, small; composed of fragments of grayish-green shale, a little loose sand, and a few shell fragments. The microfauna contains specimens of *Ammobaculoides plummerae* and *Ammobaculites advenus.*
3610-3620	No change.
3620-3625	Washed sample, small; composed of greenish-gray and light-brown, somewhat micaceous shale. Shell fragments and sparse specimens of Foraminifera are probably caving.
3625-3630	Material like sample at 3620-3625 ft.; specimens of Foraminifera like sample at 3605-3610 ft.
3630-3660	No change.
3660-3665	Core 23. Recovery 1 ft. Shale, olive-gray, flaky, slightly micaceous; contains a few small reddish-brown, irregular-shaped nodules of siderite, and a few specimens of Ostracodes.
3665-3670	Core 24. Recovery 5 ft. Top 1 ft. Shale, gray, flaky, containing irregular streaks of light-gray, micaceous silt. 2nd 1 ft. Material like top 1 ft. Washed residue, small; composed of fragments of shale and siltstone, and abundant small, irregular-shaped nodules of siderite. The microfauna contains specimens of *Ammobaculites comprimatus, Trochammina rainwateri,* specimens of small *Globigerina* sp., small *Planulina* sp. (related to *P. eaglefordensis),* and small *Gümbelina* sp. 3d 1 ft. Shale, olive-gray, micaceous, and a little siltstone, containing a few small irregular-shaped nodules of siderite, a few comatulid fragments, and specimens of Foraminifera like preceding part of core. 4th 1 ft. Shale, gray, slightly micaceous, containing a few silty areas. No change in microfauna. Bottom 1 ft. No change.
3670-3680	Core 25. Recovery 10 ft. Top 3½ ft. Shale, gray, micaceous; almost no washed residue. Middle 3½ ft. Shale, like top part of core, and a little siltstone. Fauna like core 24 at 3665-3670., and in addition, many specimens of *Ammobaculoides plummerae.* Bottom 3 ft. Unaccounted for.

Depth (feet)	Description
3680-3690	Core 26. Recovery 10 ft. Top 1 ft. Shale, gray, flaky. 2nd 1 ft. Shale, gray, micaceous, somewhat carbonaceous, containing lenses of siltstone and very fine grained micaceous sandstone. 3d 2 ft(?). No sample? 4th 4 ft. Shale, gray. Bottom 2 ft. Shale, gray, flaky, containing lenses of light-gray, micaceous siltstone. The shale contains scattered specimens of very minute dwarf species of Foraminifera.
3690-3700	Core 27. Recovery 10 ft. Top 1 ft. Shale, gray, and gray, hard, silty clay. Washed sample. Sand, fine to coarse-grained, quartz, worn and broken shell fragments, and phosphatized bone fragments. 2nd 2 ft. Sandstone, gray, very fine grained, calcareous, micaceous, slightly glauconitic, containing abundant specimens of small *Gümbelina* sp. and small *Planulina* sp., a few specimens of ostracodes, and small fragments of shells. Thin lenses of gray shale contain specimens of *Ammobaculites agrestis*, and two species of *Gümbelina*. 3d 2 ft. Sandstone, very fine-grained, calcareous, micaceous, slightly glauconitic, containing shell fragments and phosphatic material. 4th 3 ft. Clay, gray, sandy (fine-grained sand). Washed sample. Sand, fine-grained, containing many shell fragments, echinoid spines, nodules of pyrite, and many specimens of species of Foraminifera characteristic of the so-called "Barlow" fauna[1]. Common species are: *Ammobaculites agrestis, A. advenus. Haplophragmoides langsdalensis, Trochammina rainwateri, Citharina kochi, Placopsilina langsdalensis, Quinqueloculina lirellangula, Marsonella* cf. *M. ellisorae, Ammobaculites junceus, Globigerina* sp., *Nodosaria* sp., *Discorbis* cf. *D. minima;* several species of ostracodes also common Bottom 2 ft. Siltstone, gray, micaceous; gray, micaceous shale; soft, argillaceous, medium to coarse-grained sandstone; a little glauconite; a few fragments of worn shells; a few phosphatic nodules. The lenses of shale contain many small, irregular-shaped nodules of siderite and of glauconite, fine-grained sand, and a few small specimens of *Ammobaculites*.
3700-3710	Core 28. Recovery 10 ft. Top 3 ft. Shale, gray, slightly micaceous, containing lenses of gray, very fine grained, calcareous sandstone. The sandy lenses contain the "Barlow" fauna described in the 4th 3 ft. of Core 27 at 3690-3700 ft., with slight difference in the species. *Globi-*

[1]Applin, E. R., 1955, U.S. Geological Survey, Prof. Paper 264-I, p. 187-197, pls. 48 and 49.

Depth (feet)	Description
	gerina sp. is common in this sample, and *Ammobaculoides plummerae* is fairly abundant.
	Middle 3 ft. Shale, gray; lenses of gray, highly sandy (fine-grained sand), micaceous shale, and of hard, very fine grained, calcareous sandstone. The sample contains shell fragments; fish teeth; specimens of several species of ostracodes; many specimens of *Globigerina* sp.; and a few specimens of other species of Foraminifera common in the "Barlow" fauna.
	3d 2 ft. Shale, gray, containing scattered silty and sandy (very fine grained sand) areas; many small shell fragments; phosphatized fish bones; a trace of glauconite and mica; many specimens of Ostracodes; and a few specimens of *Globigerina* sp. and other Foraminifera common in the "Barlow" fauna.
	Bottom 2 ft. Sandstone, gray, very fine grained, micaceous, argillaceous, or highly sandy shale containing thin lenses of light-gray, hard, fine-grained, calcareous, slightly glauconitic sandstone, in which pyritic areas and small fragments of carbonaceous material are fairly common. Some lenses of shale contain a few specimens of ostracodes, small fragments of shells, and a few specimens of Foraminifera.
3710-3720	Core 29. Recovery 3 ft.
	Top 2 ft. Limestone, gray, hard, sandy, argillaceous. The sand is medium-grained, and seems to be evenly distributed in the fragments of limestone. Softer parts of the core contain very fine grained argillaceous sand, mica, and a little glauconite.
	Bottom 1 ft. Shale, dark-gray, thinly laminated.
3720-3730	Core 30. Recovery 10 ft.
	Top 2 ft. Clay, gray, soft, sandy (fine to medium-grained sand), micaceous; contains some coarse grains of sand and a few phosphatic nodules.
	2nd 4 ft. Shale, gray, somewhat micaceous and glauconitic; a few small worn shell fragments.
	3d 2 ft. Shale, gray, containing a little fine-grained sand and glauconite.
	Bottom 2 ft. Clay, gray, soft, highly arenaceous. The sand is fine to very coarse grained quartz, in general, but some grains are about the size of small pebbles. A few shell fragments and phosphatic nodules are in the sample.
3730-3740	Core 31. Recovery 5 ft.
	Top 2 ft. Sand, gray, soft, highly argillaceous, containing lenses of buff-gray, sandy, slightly glauconitic limestone. The sand is poorly sorted, fine to coarse-grained, and composes about 50 percent of the sample. A few shell fragments are in the sample.
	Bottom 3 ft. Sandstone, gray, highly argillaceous. The sand is fine to very coarse grained; coarse to very coarse grains are common. The sample contains a few shell fragments and a few phosphatic nodules.

Depth (feet)	Description
3740-3750	Core 32. Recovery 5 ft. Sandstone, light-gray, soft, argillaceous. The sand is poorly sorted, fine to coarse-grained, roughly angular, slightly etched; contains a few pink-tinted grains.
3750-3755	Core 33. Recovery 1 ft. Top 10 in. Sandstone, light-gray, highly argillaceous, micaceous, glauconitic, like core 32 at 3740-3750 ft.; contains a few shell fragments. Bottom 2 ft. Clay, gray, soft, silty, micaceous.
3755-3765	Core 34. Recovery 11 ft. Top 2 ft. Clay, greenish-gray, irregularly red-streaked, micaceous, sandy (fine to medium-grained sand), and a few fragments of brownish-red waxy shale.
	Comanche Series undifferentiated
	The top of the Comanche is placed at 3760 ft. on the basis of samples and electric log correlation. 2nd 5½ ft. Clay, dull-red and greenish-gray mottled, waxy, micaceous, highly sandy. Washed sample contains fragments of gray and dull purplish-red sandy clay, and fine to coarse grains of sand washed from the clay; also flakes of biotite and muscovite. Bottom 3½ ft. Clay, light greenish-gray, waxy, irregularly sandy, micaceous. The clay shows irregularly stained red and mustard-yellow areas probably caused by oxidation of iron minerals.
3765-3775	Core 35. Recovery 8 ft. Top 4 ft. Sandstone, dull-red, argillaceous, micaceous, moderately coarse grained. The sand grains are roughly angular, etched quartz and a little feldspar; the mica is biotite and muscovite. Bottom 4 ft. Clay, dull-red and greenish-yellow mottled, silty to sandy (fine-grained sand), micaceous.
3775-3780	Sand, coarse to very coarse grained, quartz, and a little feldspar; many grains red-tinted.
3780-3880	No change.
3880-3890	Sand, like sample at 3775-3780 ft., and a few fragments of dark-red clay shale.
3890-3900	Sand, very coarse grained, quartz, (many amber-tinted grains), and a little feldspar; a few fragments of red shale.
3900-3930	No change.
3930-3940	Sand, very coarse grained, quartz, and feldspar; many of the grains are amber-tinted and pink-tinted; a little mica.
3940-3990	No change.
3990-4000	Sand, fine to very coarse grained, and a little feldspar; many grains are amber-tinted.

Depth (feet)	Description
4000-4010	No change.
4010-4020	Sand, coarse to very coarse grained quartz, and a little feldspar; many grains are amber-tinted and pink-tinted; also a few fragments of "basement" rocks.
4020-4120	Like sample at 4010-4020 ft., and a few fragments of weathered Paleozoic shale.
	Silurian
	Upper Silurian Series
4120-4127	Sand, like sample at 4020-4120 ft., and fragments of red and gray mottled, thinly laminated shale that are probably from the weathered surface of the Paleozoic sedimentary rocks.
4130-4135	Cuttings of diabase, and cavings from higher levels.
4135-4140	Diabase fragments, mainly, and a few fragments of the weathered(?) Palezoic rocks.
4140-4145	Like sample at 4135-4140 ft., with the addition of fragments of dark brownish-gray, hard, material (resembles dolomitic limestone) attached to fragments of diabase; a few fragments of dark-gray shale (Palezoic).
4145-4150	Not described or no sample.
4150-4155	Diabase, like preceding samples, many fragments of reddish (weathered(?) Paleozoic) shale, and a few fragments of black shale (Paleozic).
4155-4160	Sandstone, gray, quartzitic, extremely fine-grained, a little black shale, and cavings.
4160-4165	Diabase, quartzitic sandstone, and a little black shale.
4169-4170	Core 36. Recovery 1 ft. Bottom ½ ft. Quartzite, gray, and thin lenses of black shale.
4170-4185	T.D. Paleozoic sedimentary rocks.

LOWNDES COUNTY*

Owner: U.S. Government (War Department) well 3
Location: 3 mi. southeast of Base (Moody Field) at Ordnance Site

GGS. No. 182
Elevation: 202 ft.
Total Depth: 248 ft.
Completed:

*Publication of this data is authorized by the Sun Oil Company, for whom the report was prepared on a commercial basis.

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Miocene undifferentiated	5	160
lower, Tampa Limestone	165	25
Oligocene		
upper, Suwannee Limestone	190 to 205 ft. (last sample)	15

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
	Tertiary
	Miocene Series undifferentiated
5	Clay, red, highly sandy.
10	Like sample at 5 ft.
15	Clay, purplish-red, sandy.
20	Clay, pinkish-tan sandy.
25	Clay, yellowish-brown, soft, highly sandy.
30	Sand, clear quartz, iron-stained, coarse; rounded grains. Sample contains nodules of limonite that were probably embedded in red clay.
34	Clay, yellowish-tan, highly sandy (coarse-grained sand).
37	Like sample at 34 ft.
45	Clay, light, yellowish-brown, highly sandy.
50	Like sample at 45 ft., and many white, moderately soft, polished nodules.
55	Like sample at 50 ft.
60	Like sample at 55 ft., but much less sandy.
65	Clay, yellowish-tan, sandy, sticky.
70	Clay, light-gray, sandy (fine-grained sand).
75	Clay, cream, highly sandy (very fine-grained sand); contains a trace of carbonaceous material.
80	Clay, light-tan, highly sandy, sticky.
85	Clay, white, highly sandy, sticky.
90	Sand, white, moderately fine-grained, argillaceous.
95	Like sample at 90 ft.
100	Clay, white, highly sandy; some fragments show dendritic markings.
105	Like sample at 100 ft.

Depth (feet)	Description
110	Like sample at 100 ft.
115	Clay, white, highly sandy, sticky.
120	Clay, white, sandy, containing nodules of light-green, unctuous clay.
125	Sand, clear quartz, containing nodules of white sandy clay.
130	Clay, greenish-white, highly sandy.
135	Clay, white and light-brown, sticky, somewhat sandy.
140	Sand, clear quartz, uneven-grained. The sample contains many nodules of white clay, and a few worn fragments of shells of fossil bivalves.
145	Sand, clear quartz, uneven-grained, and a few nodules of white sandy clay.
150	Like sample at 145 ft.
155	Like sample at 145 ft., and a few cream, sandy, calcareous nodules.
160	Like sample at 155 ft.
	Lower Miocene. Tampa Limestone.
165	Limestone, white, moderately hard, chalky, slightly sandy, containing echinoid fragments, fragments of fossil bivalves and crab claws, and fragmentary sections of *Sorites?* sp.
170	Like sample at 165 ft.
175	Sand, chalky; a small sample.
180	Limestone, tan, hard, somewhat sandy.
185	Limestone, reddish-tan, hard, somewhat sandy.
	Oligocene Series
	Upper Oligocene. Suwannee Limestone.
190	Limestone, white, moderately hard, chalky; also fragments of tan, slightly sandy limestone, and a little unconsolidated clear quartz sand.
195	Like sample at 190 ft.
200	Limestone, light-cream. The cuttings are nodular, seem to be somewhat water-worn, and contain vague traces of impressions of fossil fragments. The sample also contains a few fragments of partially dolomitized limestone, and cavings from higher levels.
205 (last sample)	Limestone, white, hard, containing traces of fossils. The sample also contains fragments of brown dolomitic limestone, cavings from higher levels, and a few calcitized specimens of *Rotalia* cf. *R. byramensis*.

MITCHELL COUNTY

Operator: Stanolind Oil & Gas Co.
Landowner: J. H. Pullen, Well 1
Location: Land District 10, Land Lot 133, 700 ft. south of north line, and 700 ft. west of east line of Land Lot 133

GGS. No. 109
Elevation: 338 ft.
Total Depth: 7490 ft.
Completed: Aug. 14, 1944

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
In Eocene		
lower Beds of Wilcox age; 1st sample 1335 ft.		
Paleocene		
Clayton Limestone	1560	130
Cretaceous		
Gulf		
Beds of Navarro age	1690	220
Beds of Taylor age	1910	440
Beds of Austin age	2350	480
Atkinson Formation, upper member	2830	530
lower member	3360	280
Comanche undifferentiated	3640	2580
Triassic(?)		
		to
Upper Triassic(?)		
Newark(?) Group	6220(?) total depth	1270

Lithologic and paleontologic description of cores and cuttings. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-1335	Samples not studied.
	Tertiary
	In Eocene
	Lower Eocene. Beds of Wilcox age.
1335-1350	Limestone, white, chalky, underlies a sequence of glauconitic sand and gray glauconitic clay. The sample is probably in the Salt Mountain Limestone, the top of which is at about 1320 ft. as suggested by the electric log of the Pullen well. Specimens of

Depth (feet)	Description
	Discocyclina weaveri occur in the other samples of the limestone, although none were observed in this sample.
1350-1560	Samples not described.

Paleocene

Clayton Limestone

1560-1575	The top of the Clayton Limestone is at about 1560 ft. on the basis of the electric log of the Pullen well. This sample contains the highest occurrence of white, hard, rough-textured limestone.
1575-1590	No samples.
1590-1605	Limestone, white, hard, chalky, and abundant fragments of grayish-brown chert. The sample contains a few specimens of *Anomalina alleni.*
1605-1620	Limestone, white, hard, chalky (composed of very small chalky fragments), and abundant fragments of chert. The sample contains some specimens of Foraminifera indicative of the Clayton Limestone. Same to:
1680-1695	Limestone, somewhat sandy (fine-grained sand) and slightly glauconitic; chert is abundant and seems to occur in streaks in the limestone. Specimens of *Anomalina vulgaris* var., *A. alleni,* and other forms typical of the Clayton Limestone are common in the sample. Beds of Midway age seem to overlie the Clayton Limestone, inasmuch as specimens of *Vaginulina robusta* occur in cavings in this sample.

Cretaceous

Gulf Series

Beds of Navarro age

	The top of the beds of Navarro age is placed at 1690 ft. on the basis of lithologic data and electric log characteristics. The highest occurrence of specimens of Foraminifera that definitely indicate the Cretaceous age of the beds is at 1800 ft. The highest occurrence of *Globotruncana arca* is in the sample at 1815-1830 ft.
1695-1710	Samples not described.
1710-1725	Clay, dark brownish-gray, marly, occurs in this sample and increases in abundance in the samples just below this depth.
1725-1845	Samples not described.
1845-1860	The microfauna in this sample contains specimens of species characteristic of the beds of Navarro age; *Pseudogümbelina costulata, Anomalina pseudopapillosa, Globotruncana cretacea, Pseudoclavulina clavata.*
1860-1870	Limestone, light-gray, hard, very finely glauconitic, sandy (fine-grained sand), occurs in this sample and in the sample at 1845-1860 ft. The microfauna is sparse and Navarro in character.

Depth (feet)	Description
1870-1905	No change.
	Beds of Taylor age
	The top of the beds of Taylor age is placed at 1910 ft. on the basis of electric log characteristics.
1905-1920	Materials like the sample at 1860-1870 ft. The sample contains one specimens of *Planulina dumblei*, many specimens of *Anomalinoides pinguis*, and a few fragments *Bolivinoides decorata*.
1920-1935	Like sample at 1905-1920 ft., with the addition of specimens of *Lituola taylorensis* (common).
1935-1950	Like sample at 1920-1935 ft., and some fragments of light-green bentonite.
1950-1965	Sandstone, gray, hard, fine-grained, calcareous; specimens of *Lituola taylorensis* are common.
1965-1980	Shale, gray, composes most of a very small sample. The sample contains some *Inoceramus* prisms and a few specimens of *Heterostomella americana*.
1980-1995	Like sample at 1965-1980 ft. Fragments of *Inoceramus* are common.
1995-2010	The microfauna in this sample contains specimens of species characteristic of the beds of Taylor age; *Planulina texana, Gyroidina umbilicata, Globorotalites conicus, Bolivina incrassata; Bulliminella carseyae.*
2010-2025	No sample.
2025-2040	Sample is mainly cavings from higher levels. Some specimens of *Stensiöina americana* are in the sample but these may have caved, as the species usually occurs at or near the top of the beds of Taylor age.
2040-2295	Samples not described.
2295-2310	Sandstone, extremely fine-grained, calcareous; micaceous, containing abundant fragments of *Inoceramus*, many nodules of pyrite, and some fragments of gray, micaceous marl. The microfauna is a mixture of specimens from several stratigraphic units but includes specimens of *Planulina taylorensis* and other Taylor species.
2310-2325	Like sample at 2295-2310 ft., but marly shale fragments are dominant in the relatively small sample. The microfauna contains species of Foraminifera that are characteristic of the beds of Taylor age.
2325-2370	Like sample at 2310-2325 ft.
	Beds of Austin age
	The top of the beds of Austin age is placed at 2350 ft. on the basis of electric log correlation.

Depth (feet)	Description
2370-2385	Similar to sample at 2310-2325 ft., but the material is somewhat harder, more calcareous, and leaves a larger washed residue. The fauna is also similar to that in the samples below 2310 ft., but contains a few specimens of *Pseudoclavulina clavata* and *Heterostomella austiniana*.
2385-2400	Like samples at 2370-2385 ft., and containing *Globorotalites umbilicatus* and *Gaudryina austiniana*.
2400-2460	Samples not described.
2460-2475	Clay, dark-gray, soft, marly, containing specimens of *Pseudogaudryinella capitosa, Planulina dumblei, Globotruncana arca,* and *Globorotalites conicus*.
2475-2505	Samples not described.
2505-2520	Clay, dark-gray, soft, marly, containing specimens of *Globorotalites umbilicatus*.
2520-2580	Samples not described.
2580-2595	Sandstone, gray, extremely fine grained, glauconitic, calcareous, micaceous, and some fragments of gray, flaky, marly, micaceous shale. The sample contains many fragments of *Inoceramus* and of *Ostrea* sp. The microfauna is largely a mixture of specimens that caved from higher levels, but contains some specimens of species that are characteristic of the beds of Austin age.
2595-2610	Like sample at 2580-2595 ft.
2610-2685	No change.
2685-2700	Shale, brownish-gray, marly, a few fragments of gray, fine-grained sandstone, and many fragments of *Inoceramus*. The foraminiferal fauna is chiefly a mixture of specimens that caved from higher levels, but contains a few specimens of species that are characteristic of the beds of Austin age.
2700-2730	No change.
2730-2745	Like sample at 2685-2700 ft., with the addition of fragments of light-cream, hard, dense, sandy (fine-grained sand) limestone.
2745-2760	Like sample at 2730-2745 ft., but showing an increase in the amount of fragments of sandy limestone. The fauna is a mixture of specimens of Foraminifera from higher levels, including species characteristic of the beds of Austin age.
2760-2785	The sample is composed, mainly, of gray marly shale and a small amount of sandy limestone. The fauna is similar to that in the sample at 2745-2760 ft.
2785-2790	No sample.
2790-2805	Shale, gray, flaky, marly, and a few fragments of greenish-gray marly shale. The foraminiferal fauna is a mixture of specimens from various higher levels, but Austin forms, especially *Citharina texana* are very abundant.
2805-2830	No change, except that specimens of *Citharina texana* are much less abundant.

Depth (feet)	Description
	Atkinson Formation. Upper Member.
2830-2850	Shale, dominantly greenish-gray, and some gray shale. The shale contains small, brown, granular, irregular-shaped nodules of siderite. Specimens of *Pleurostomella watersi* and *Valvulineria infrequens* (Eagle Ford variety) are present. The samples from 2830 to 2895 ft. are characteristic of the deep-water marine facies of the upper member of the Atkinson Formation.
2850-2865	Sample not described.
2865-2880	Like sample at 2830-2850 ft.; contains specimens of *Gaudryina* cf. *G. bosquensis*.
2880-2895	Like sample at 2830-2850 ft.; contains in addition, specimens of *Ammobaculites* sp., characteristic of the Eagle Ford Shale in Texas.
2895-2900	Sandstone, quartz, light-gray to white, fine-grained, containing many fragments of *Ostrea* sp., and some fish bones, glauconite, and mica. The samples from 2895 to about 3360 ft. are characteristic of the shallow-water marine facies of the upper member of the Atkinson Formation. The depth of 2895 ft. is probably the top of the Tuscaloosa Formation of some geologists.
2900-2910	No sample.
2910-2925	Like sample at 2895-2900 ft., with the addition of fragments of flaky, smooth, green shale.
2925-2940	Shale, gray, flaky, fragments of green shale, fragments of *Ostrea* sp., and fragments of light-gray, micaceous, glauconitic sandstone which also contains phosphatic material and fish bones.
2924-2933	Core. Recovery? Sand, clear quartz, fine-grained, well-sorted, containing a little mica and some tan-gray flaky clay. The clay contains small fragments of carbonaceous material.
2933-2943	Core. Recovery? Top. Shale, bluish-green, thinly flaky, containing a few sandy and pyritic flakes, small fragments of brown and black carbonaceous material, a little mica, and a trace of blue-green glauconite. No specimens of Foraminifera were observed. Middle. Like top part of core. Bottom. Sandstone, light-greenish-gray, fine-grained, highly micaceous, containing inclusions of flaky green shale and small fragments of carbonaceous material that is highly pyritic in small scattered areas.
2940-2955	Shale, green, flaky and many cavings from higher levels.
2955-2970	Like sample at 2940-2955 ft., and many fragments of *Ostrea* sp. that are probably cavings.
2970-2985	Shale, flaky, many fragments of *Ostrea* sp., and fragments of white, fine-grained, well-sorted sandstone that contains a little light-green glauconite, mica, and a few fragments of *Ostrea* sp.

Depth (feet)	Description
2985-3060	No change.
3060-3075	Like sample at 2970-2985 ft. and in addition, many moderately large fragments of brown, fibrous, carbonaceous material.
3075-3120	No change.
3120-3135	Shale, flaky, and sandstone as described in the immediately preceding sample. The sample also contains fragments of oyster shells and large grains of quartz.
3135-3150	No sample.
3150-3160	Like sample at 3120-3135 ft., and also very coarse grains of quartz and some grains of pink feldspar.
3160-3210	No change.
3210-3225	Like sample at 3150-3160 ft., about 50 percent, and about 50 percent fragments of dark-brown carbonaceous material.
3225-3255	No change.
3255-3270	Shale, greenish-gray, and some bluish-green shale; a little coarse-grained sand and carbonaceous material like the sample at 3210-3225 ft.
3270-3315	Samples not described.
3315-3330	Like immediately preceding samples, but the shale is more micaceous and irregularly sandy (very fine grained sand). The only fossils seemed to be caving from beds of Austin age.
3330-3345	Like sample at 3315-3330 ft., and in addition, specimens of *Gümbelina* sp. that are characteristic of the upper member of the Atkinson Formation (Eagle Ford age).
3345-3375	Like sample at 3330-3345 ft.; also fragments of *Ostrea* sp. and of cabonaceous material, all of which may be caving.
	Atkinson Formation. Lower Member.
	The top of the lower member of the Atkinson Formation is placed at 3360 ft. on the basis of electric log correlation.
3375-3420	Samples not described.
3420-3435	The sample is composed of material similar to the immediately preceding samples, and, in addition, fragments of darker gray, flaky, unctuous shale that resembles the characteristic "marine shale" of the Tuscaloosa Formation.
3435-3465	Samples not described.
3465-3480	Shale, dark-gray, flaky, somewhat carbonaceous, is strongly dominant in the sample. Specimens of Foraminifera in the sample seem to be caving from much higher levels.
3480-3495	No sample.
3495-3510	Shale, grayish-green, flaky, slightly micaceous. The sample contains one specimen of *Trochammina rainwateri* which is characteristic of the lower member of the Atkinson Formation (Woodbine age). The base of the "marine shale" of the Tuscaloosa is

Depth (feet)	Description
	placed at 3500 ft. on the basis of electric log correlation.
3510-3525	Like sample at 3495-3510 ft., and, in addition the sample contains specimens of species of *Ammobaculites agrestis* that are characteristic of the lower member of the Atkinson Formation.
3525-3540	Sample is mainly shale, but contains, also, fragments of white, fine-grained, somewhat glauconitic sandstone.
3540-3570	No change.
3570-3585	Sample contains much gray flaky shale, and some coarse-grained sand. Many worn fragments of *Ostrea* sp. and other bivalves, with attached sand grains are also present. The shell fragments seem to be indigenous in beds near this depth; they are chalky, and grains of glauconite and phosphatic grains are attached to them.
3585-3615	Samples not described.
3615-3640	Shale, flaky, is the dominant material; siderite pellets, some glauconitic sandstone, and some shell fragments are also present.
	Comanche Series undifferentiated
3640-3660	Shale fragments, like sample at 3615-3640 ft., some coarse-grained sand, and a few fragments of red, highly ferruginous clay.
3660-3675	No sample.
3675-3690	Like sample at 3640-3660 ft., and many small fragments of red and mustard-colored clay.
3690-3705	Clay, gray, that may be caving, and small fragments brick-red clay.
3705-3720	Sand, coarse, subangular, containing a few pink grains, a few greenish-yellow grains, and a few grains of feldspar.
3720-3810	No change.
3810-3825	Sand, coarse, like sample at 3705-3720 ft.; pink and yellow grains are more abundant.
3825-3870	No change.
3870-3885	Sand, coarse, like sample at 3810-3825 ft.; greenish-yellow grains very abundant.
3885-3960	No change.
3960-3975	Sand, like sample at 3870-3885 ft., and a fragment of mulberry-colored, somewhat micaceous clay-shale.
3975-4200	Samples are, mainly, sand like the preceding samples, and a few scattered fragments of gray, hard, dense, very fine grained sandstone.
4200-4210	Sand, like the samples at 3975-4200 ft., and the highest occurrence of multicolored (gray, purplish-red, and mustard-colored), very finely and highly micaceous shale. The multicolored shale occurs in the upper part of the Comanche Series in many wells in the southeastern Gulf region.
4210-4250	Samples not described.

Depth (feet)	Description
4250-4251	Core. Recovery? Sand, quartz, very fine to moderately coarse, angular, and about 50 percent fragments of brown and green streaked ferruginous clay shale.
4251-4270	Samples not described.
4270-4285	Sand, fine to coarse-grained, and many fragments of gray and of brick-red streaked, finely micaceous, highly sandy (very fine grained sand) clay; also some fragments of raspberry-colored clay shale.
4278-4288	Core. Recovery? Top. Sand, pink-stained, fine-grained, moderately well sorted, and many flakes of colorless and colored mica. Middle. Sand, etched, fine-grained, moderately well sorted, about 10 percent pink grains, and a few grains of feldspar; gray mica flakes are abundant; brown, gray and green mica flakes are common. Bottom. Sand, fine-grained, and small fragments of dark brownish-red and yellowish-green, sandy, micaceous clay.
4288-4298	Core. Recovery? Top. Clay, highly sandy (very fine-grained sand), highly micaceous, highly ferruginous. Bottom. Washed sample. Sand, pink-stained, fine-grained, angular, well-sorted, and mica (mostly colorless).
4298-4308	Core. Recovery? Top. Sand, quartz, fine to coarse-grained, roughly angular; some greenish-yellow and some pink grains of feldspar; a little mica. Another part of core. Clay, red-brown, streaked with bluish-gray and yellowish-green areas, micaceous, highly sandy (very fine-grained sand).
4308-4318	Core. Recovery? Top. Sand, poorly sorted, very fine to very coarse grained; many greenish-yellow grains; some feldspar. Bottom. Sand, like top part of core but contains some mica.
4318-4328	Core. Recovery? Top. Sand, fine to very coarse grained; many greenish-yellow grains and some pink grains; feldspar common. Bottom. Clay, greenish-gray, highly sandy (very fine grained sand), highly micaceous. Much of the mica is dark (brown, gray and green), but some is colorless.
4328-4338	Core. Recovery? Top. Sand, fine to coarse-grained. Bottom. Clay, red, sandy (fine to moderately coarse grained).
4338-4348	Core. Recovery? Clay, tan, sandy (fine to coarse grained sand); many sand grains are etched.

Depth (feet)	Description
4348-4358	Core. Recovery? Clay, bluish-gray and yellowish-brown streaked, hard, sandy (very fine grained sand), highly micaceous.
4358-4368	Core. Recovery? Sand, fine to coarse-grained, roughly angular, somewhat micaceous.
4368-4378	Core. Recovery? Sand, fine to moderately coarse grained; many greenish-yellow grains and some feldspar; a little mica.
4378-4388	Core. Recovery? Top. Sand, mainly fine-grained and a few coarse grains; a little mica. Middle. Clay, brick-red, streaked with bluish-green areas; highly micaceous. Bottom. Clay, red, sandy, very highly micaceous. The flakes of mica are coarse, and green and brown flakes are common.
4388-4398	Core. Recovery? Bottom. Sand, mainly moderately fine grained, poorly sorted. Many sand grains are greenish-yellow and a few are pink. Both colorless and colored flakes of mica are present.
4398-4405	Sample not described.
4405-4420	Core. Recovery? Sand, coarse-grained; many greenish-yellow grains; a few grains of tourmaline (?); a little mica.
4405-4420	Sand, coarse-grained; many grains are greenish-yellow. The sample contains cavings of gray clay and varicolored micaceous clay.
4420-4440	No change.
4440-4450	Core. Recovery? Sand, fine to coarse-grained, green, brown, and gray flakes of mica are common, some of which seem to show transition to glauconite.
4450-4460	Core 23. Recovery 3½ ft. Top 1½ ft. Sand, quartz, fine to medium-grained, in a matrix of gray clay. Middle 1 ft. Like top part of core, but fine grains are strongly dominant. Bottom 1 ft. Sand, quartz, fine to coarse-grained, roughly angular, in a matrix of gray clay; medium grains are dominant.
4465-4480	Sand, quartz, fine to coarse-grained, roughly angular; coarse grains are dominant; a few grains are pink, a few are yellow. The sample contains a few fragments of dark-red and grayish-green mottled, micaceous shale.
4460-4470	Core 24. Recovery 7 ft. Sand, quartz, fine to coarse-grained (medium grains dominant) in a matrix of gray clay. The sample contains a few tinted

Depth (feet)	Description
	grains, and a few grains of feldspar.
4470-4480	Core 25. Recovery 3 ft. 2 in. Clay, red and greenish-gray, micaceous, highly silty, and gray, highly sandy (very fine-grained sand), micaceous clay.
4480-4490	Core 26. Recovery 4 ft. Top 2 ft. Shale, red and grayish-green, mottled. Bottom 2 ft. shale, red and grayish-green, mottled, unctuous.
4490-4500	Core 27. Recovery 1½ ft. Sand, quartz, light-gray, soft, fine to medium-grained, argillaceous; mica common.
4495-4510	Sand, quartz, coarse-grained; some feldspar. About 25 percent of the sample is red and green mottled shale.
4510-4525	Washed sample composed of coarse-grained sand, like sample at 4495-4510 ft., and a few fragments of red and grayish-green mottled shale.
4525-4555	No change.
4555-4570	Sand, like sample at 4510-4525 ft., and about 25 percent red and gray mottled, finely micaceous shale.
4570-4585	Sand and about 10 percent shale, like sample at 4555-4570 ft., some cavings.
4580-4590	Core 28. Recovery? Sand, quartz, fine to coarse-grained, in a matrix of soft white clay; medium grains are dominant; a few tinted grains, and a few grains of feldspar are present.
4585-4600	Washed sample; composed of fine to coarse-grained quartz sand and some feldspar; coarse grains are common. The sample contains many cavings of material from the Gulf Series.
4600-4615	Like sample at 4585-4600 ft., and in addition, a few fragments of red and gray mottled shale.
4615-4630	No change.
4630-4645	Like sample at 4600-4615 ft., and in addition, a few nodules of red-stained limestone.
4645-4660	Sand, quartz, fine to coarse-grained (coarse grains common); some sand grains are tinted yellow and some pink. The sample contains a few grains of feldspar and a few fragments of red and gray mottled shale.
4660-4690	No change.
4690-4705	Mainly sand, like sample at 4645-4660 ft., and a few fragments of red chert.
4705-4735	No change.
4735-4750	Sand, mainly coarse grains; a few tinted grains; a little feldspar. The sample contains a few fragments of gray, moderately hard, highly micaceous, silty clay.
4750-4765	Sand, like sample at 4735-4750 ft., and a few fragments of red shale.

Depth (feet)	Description
4765-4774	No change.
4774-4780	Core 29. Recovery 5½ ft. Top 5 ft. 3 in. Sand, quartz, fine to coarse-grained (fine to medium grains dominant), argillaceous, and some feldspar, in a matrix of white, bentonitic clay. Bottom 3 in. Clay, mottled red, gray, and mustard-colored, micaceous, somewhat sandy.
4780-4790	Core 30. Recovery 8 ft. Sand, light-gray, micaceous, fine to coarse-grained (medium grains dominant).
4795-4810	Sand, fine to coarse-grained (coarse grains dominant), mainly quartz and some feldspar. Some sand grains are tinted pink and some yellow.
4810-4890	No change.
4890-4900	Core 31. Recovery 3 ft. Sand, gray and red, soft, fine-grained, argillaceous.
4900-4915	Sample not described.
4915-4930	Sand, fine to coarse-grained, and about 10 percent fragments of dark purplish-red, gray-mottled, very finely micaceous shale.
4930-4987	No change.
4987-4989	Core 32. Recovery? Sand, clear quartz, etched, coarse-grained, in a matrix of soft white ashy clay.
4990-5005	Sand, fine to coarse-grained and about 25 percent fragments of red shale.
5005-5020	Sand, fine to coarse-grained. About 10 percent of the sample is composed of red shale. The sample contains many cavings.
5020-5035	Sand, about 50 percent of the sample; cavings about 50 percent; a little red shale.
5035-5050	No change.
5035-5050	No change.
5050-5065	Small washed sample composed of about 50 percent sand, and 50 percent red shale.
5065-5080	No change.
5080-5095	Mainly sand, about 50 percent coarse grains, and 50 percent fine grains.
5095-5110	Shale, red, about 75 percent; sand about 25 percent.
5110-5125	Sand, coarse and fine-grained in roughly equal amounts constitutes about 75 percent of the sample; about 25 percent of the sample is composed of red shale and a few nodules of limestone.
5125-5155	Sand, like the samples at 5110-5125 ft., and about 10 percent red shale.
5155-5170	Sand, like sample at 5110-5125 ft., a few nodules of limestone, and 50 to 75 percent dark-red, very finely micaceous shale.

Depth (feet)	Description
5170-5185	No change.
5185-5200	Sand, many nodules of limestone, some of which are red-stained, and about 10 percent red shale.
5200-5230	No change.
5230-5245	Sand, nodules of limestone, and about 25 percent dark-red shale, like the sample at 5185-5200 ft.
5245-5260	Sand, nodules of limestone, and about 5 percent red shale.
5260-5290	No change.
5290-5305	No change in materials, but red shale composes about 25 percent of the sample.
5305-5320	No change.
5320-5335	Sand, fine to coarse-grained, many nodules of limestone, some of which are red-stained; a little red shale.
5335-5350	Sample contains red shale, some nodules of limestone, and a little sand, like the immediately preceding samples; 50 to 75 percent of the sample is composed of cavings of materials from various levels in the Gulf Series.
5350-5625	No change.
5625-5650	Sand, fine to coarse-grained; nodules of limestone, and about 25 percent dark-red, finely micaceous shale, and some grayish-green, slightly red-mottled, micaceous shale.
5650-5665	Mainly cavings.
5665-5680	Sand, nodules of limestone, a little red shale, and abundant cavings.
5680-5695	Sand, many nodules of limestone, a little red shale, abundant cavings.
5695-5710	No change.
5710-5725	Shale, dark-red, finely micaceous, is about 50 percent of the sample; 50 percent is composed of a little sand, many nodules of limestone, and abundant cavings.
5725-5740	Like sample at 5710-5725 ft., but the red shale is about 25 percent of the sample.
5740-5830	No change.
5830-5845	Shale, dark-red, micaceous, is about 50 percent of the sample; 50 percent is composed of a little sand, many nodules of limestone, and abundant cavings. Many of the limestone nodules are sandy.
5845-5890	No change.
5890-5905	The indigenous material seems to be a conglomerate composed of pebbles of varicolored quartzite, but amber is the most common color. The individual grain-size varies in different fragments of the quartzite. Other materials in the sample are sand, nodules of limestone, fragments of red shale, and cavings, all of which occur in the immediately preceding samples.
5905-5920	No change.
5920-5935	Mainly cavings and a little red shale.

Depth (feet)	Description
5935-5950	Like the sample at 5920-5935, with the addition of a few nodules of limestone.
5950-5965	Like the sample at 5935-5950, but with the addition of fragments of green shale, and an increase in the amount of limestone nodules. Some of the nodules are sandy.
5965-6025	No change.
6025-6040	Like the sample at 5950-5965 ft., with the addition of a few fragments of chert and a few fragments of quartzite.
6040-6130	No change.
6130-6145	Shale, red and green mottled; many nodules of limestone; a little sand (including a few fragments of green pebbles), a few coarse grains of chert, and a few of quartzite.
6145-6190	No change.
6190-6205	Shale, red and grayish-green mottled; some cavings.
6205-6220	Shale, red (in part bright-red), and some mottled red and grayish-green; many nodules of limestone; fragments of chert; fragments of quartzite; fragments of green slate(?), and other materials.

Triassic(?)

Upper Triassic (?) Newark (?) Group

6220-6250	Like sample at 6205-6220 ft., but bright-red shale is much more common.
6250-6295	No change.
6295-6310	Shale, bright-red, moderately hard; a little sand, nodules of limestone, and fragments of chert, like the sample at 6205-6220 ft. The red shale shows a little mottling of light grayish-green, and contains a few pebbles.
6310-6385	No change.
6385-6400	Shale, bright-red, slightly grayish-green mottled, and many fragments of light-pink to greenish-gray, fine-grained micaceous sandstone.
6400-6410	No sample.
6410-6415	Like sample at 6385-6400 ft.
6415-6430	Shale, like sample at 6385-6400 ft., a few nodules of limestone, and a few fragments of pebbles of various kinds of material.
6430-6510	No change.
6510-6525	Shale, bright-red with light-green mottling, like samples beginning about 6205-6220 ft. The shale contains irregular-shaped nodules of siderite (?) and a few fragments of chert.
6525-6540	Like sample at 6510-6525 ft., but siderite seems to be absent.
6540-6550	No change.
6550-6560	Shale, like sample at 6510-6525 ft., and many fragments of diabase, some of which is possibly weathered.

Depth (feet)	Description
6560-6570	Like sample at 6550-6560 ft. but contains less diabase.
6580-6640	No change.
6640-6650	Shale, red; much less diabase than in the samples beginning at 6550 ft.; many fragments of light-red, fine-grained, argillaceous sandstone.
6650-6660	Like sample at 6640-6650 ft., but contains less sandstone.
6660-6670	Shale, red, mottled with green areas; some diabase that is probably caving; very little sandstone; a few fragments of red chert.
6670-6680	No change.
6680-6690	Shale, red, mottled with light-green areas; a few fragments of chert pebbles; a few cavings of diabase. The shale is a somewhat duller shade of red than in the preceding samples.
6690-6780	No change.
6780-6790	Shale, and a few cavings of diabase; a few fragments of pink, moderately hard, fine-grained, argillaceous, micaceous sandstone.
6790-6800	No change.
6800-6810	Shale, like sample at 6780-6790 ft., and in addition, a few fragments of light pinkish-tan, fine to medium-grained sandstone containing colored grains of different kinds of materials that give the sandstone a finely speckled appearance.
6810-6820	No change.
6820-6830	Mainly shale; a few fragments of sandstone, like sample at 6800-6810 ft.; a few cavings of diabase.
6830-7030	No change.
7030-7040	Shale, red, somewhat green-mottled.
7040-7059	No change.
7059-7065	Core 33. Recovery? Top 2 ft. Shale, red. Middle do Bottom do
7065-7070	No sample.
7070-7080	Shale, red, somewhat green-mottled, and a few fragments of diabase.
7080-7100	Shale, red, and a few fragments of diabase.
7100-7110	Shale and about 25 percent diabase.
7110-7120	Shale and a little diabase.
7120-7130	Shale, and about 10 percent diabase.
7130-7140	Mainly red shale, and a little diabase.
7140-7230	No change.
7230-7240	Shale and a little diabase, like sample at 7130-7140 ft., with the addition of fragments of light-red, hard, fine-grained, micaceous sandstone.

Depth (feet)	Description
7240-7250	Like sample at 7230-7240 ft., but showing an increase in fragments of sandstone.
7250-7260	Shale, red; a little diabase; a few fragments of sandstone.
7260-7310	No change.
7310-7320	Shale, and some fragments of diabase like sample at 7250-7260 ft. A few fragments of shale contain small inclusions of limestone.
7320-7330	No sample.
7330-7340	Like sample at 7310-7320 ft.
7340-7350	Like sample at 7330-7340 ft., and many cavings.
7350-7360	Shale, red, and many fragments of black shale similar in texture to the red shale. The black coloring is due, possibly, to alteration by intrusions of diabase.
7360-7370	Similar to samples at 7350-7360 ft., but this sample contains less black shale and more diabase.
7370-7380	Shale, red, and 50 percent diabase.
7375-7377½	Core 34. Recovery 14 in.
	Diabase.
7380-7390	Shale, red, and about 25 percent diabase.
7390-7400	Shale, red, and from 50 to 75 percent diabase.
7400-7410	No change.
7410-7420	Like sample at 7390-7400 ft., and in addition, a few fragments of splintery gray shale which may be indigenous in beds near this depth.
7420-7430	Shale, red, about 20 percent diabase, and a few fragments of gray to greenish-gray shale.
7423	Bit sample. Shale, red, and cavings.
7430-7440	Shale, red, about 50 percent diabase, and a few fragments of quartzite pebbles.
7440-7450	Shale, red, and about 75 percent diabase.
7450-7480	No change.
7483	Bit sample? Like the immediately preceding samples, with the addition of many fragments of pink, hard, dense, fine-grained, arkosic sandstone.
7480-7487	Like sample at 7483 ft., but this sample contains less standstone.
7486-7489	Core 39. Recovery? Top 14 in. Unidentified black material. Bottom 5 in. Sandstone, pinkish-gray, dense, somewhat arkosic, very fine grained.
7489-7490	T.D. No sample.

SEMINOLE COUNTY

Operator: Mont Warren
Landowner: W. E. Harlow Est. Well 1
Location: Land District 27, Land Lot 82; 660 ft. from south line; 660 ft. from east line of Land Lot 82.
GGS. No. 187
Elevation: 145 ft. (derrick floor).
Total depth: 3572 ft.
Completed: Feb. 27, 1949.

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Paleocene		
In beds of Midway age; 1st sample at 1420 ft.	?	?
Cretaceous		
Gulf		
Beds of Navarro age	1430	80
Beds of Taylor age	1510	640
Beds of Austin age	2150	390
Atkinson Formation, upper member	2540	510
lower member	3050	229
Comanche undifferentiated	3279	to total depth 293

Lithologic and paleontologic description of cores and cuttings. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-1420	Samples not studied.
	Tertiary
	In Paleocene Series
1420-1430	Chalk, light-gray, highly sandy (very fine-grained sand), glauconitic, and a little medium-grained sand. Sample contains many specimens of Midway species of Foraminifera.
	Cretaceous
	Gulf Series
	Beds of Navarro age
1430-1440	Like sample at 1420-1430 ft., but less chalk and more sand. Many specimens of *Globotruncana* sp., *Gümbelina* sp., and other Cretaceous species of Foraminifera.

Depth (feet)	Description
1440-1450	Sample not studied.
1460-1470	Washed sample. Sand, fine to medium-grained; fragments of hard, silty to sandy chalk (Paleocene); and fragments of white, glauconitic, slightly sandy chalk.
1470-1510	Samples not studied in detail.
	Beds of Taylor age
1510-1520	Washed sample; large residue. Sand, medium to coarse-grained; fragments of chalky, glauconitic siltstone; and somewhat silty, glauconitic hard chalk. Sample contains many specimens of *Lituola taylorensis;* a few specimens of *Stensiöina americana, Globorotalites conicus,* and many other species of Foraminifera.
1520-2150	Samples not described in detail. Samples from 1520 to 1550 ft. like sample at 1510-1520 ft. with the addition of *Inoceramus* fragments at 1550 ft. Below 1700 ft., the samples are smaller, and contain fine to coarse-grained sand; glauconite and *Inoceramus* fragments; fragments of gray, somewhat silty clay shale; and many specimens of Foraminifera.
	Beds of Austin age
2150-2160	Shale, gray, marly; a little sand; nodules of pyrite; many fragments of *Inoceramus.* Abundant specimens of Foraminifera: *Pseudogaudryinella capitosa* var. (Austin variety); a few specimens of *Kyphopyxa christneri* (upper part of beds of Austin age or lower part of beds of Taylor age); a few specimens of species of ostracodes that, usually, are indicative of the beds of Austin age.
2160-2420	Shale, gray. The samples usually contain fragments of *Inoceramus* in varying amounts, some nodules of pyrite, and many specimens of Foraminifera and Ostracoda. Herrick[1] (1961, p. 355) reported the occurrence of specimens of *Citharina texana* in a sample at 2310-2320 ft.
2420-2540	Highest occurrence (2420 ft.) of fragments of speckled shale, which are progessively more abundant in deeper samples.
	Atkinson Formation. Upper Member.
2540-2550	Like samples from 2160 to 2540 ft., with the addition of many fragments of *Ostrea* sp., also a few fragments of very fine grained, somewhat micaceous, argillaceous sandstone containing a little carbonaceous material and a trace of glauconite.
2550-2560	No change.
2560-2570	Highest occurrence of grayish-green, micaceous, somewhat sandy (fine-grained sand) shale.

[1]Herrick, S. M., 1961, Georgia Geological Survey Bull. 70.

Depth (feet)	Description
2570-2600	Shale, grayish-green; many fragments of *Ostrea* sp.; a few fragments of fine-grained sandstone like sample at 2540-2550 ft. The sample also contains loose sand, shale, and specimens of Foraminifera caving from different higher levels.
2600-2616	Core 1. Recovery 6 ft. Top. Sandstone, light-gray, fine to medium-grained, glauconitic, somewhat phosphatic, slightly micaceous. Middle. Sandstone, like top part of core, but more glauconitic, and containing fragments of *Ostrea* sp. Bottom. Sandstone, light-gray, hard, fine to medium-grained, glauconitic, somewhat phosphatic, calcareous.
2616-2770	Samples are a mixture of cavings from higher levels, composed of fragments of grayish-green shale; several types of fine-grained, micaceous sandstone; and fragments of *Ostrea* sp. in varying amounts. The material drilled is interpreted as, mainly, fine to medium-grained sandstone and some coarse-grained sand, containing fragments of *Ostrea* sp., phosphatic nodules, and glauconite.
2770-2780	Sand, coarse-grained, containing phosphatic nodules, and glauconite; also a few fragments of hard, calcareous, fine to medium-grained sandstone. The sample contains fragments of *Ostrea* sp. and a little lignite.
2780-2940	Samples are similar to sample at 2770-2780 ft. The lignite is progressively more abundant in the samples to 2830 ft., and although present in the samples from 2830 to 2940 ft., it may be caving, in part.
2940-2950	Mainly sand and shell fragments; also fragments of sandstone and lignite (as in the samples from 2770 to 2940 ft.), and a little grayish-green, splintery shale. This sample contains a few specimens of *Planulina eaglefordensis*.
3030-3040	Mainly cavings of gray clay shale. Also in the sample are fragments of grayish-green, irregularly micaceous shale, in which crushed fossil debris is fairly common.
3040-3050	Like sample at 3030-3040 ft., but fossil debris is more abundant.
	Atkinson Formation. Lower Member.
3050-3060	Shale, gray, flaky, micaceous, slightly carbonaceous is fairly common in the sample.
3060-3100	Samples not described.
3100-3110	Gray, irregularly micaceous shale, and fragments of hard, fine-grained, glauconitic sandstone compose most of the sample; specimens of *Ammobaculites advenus* also occur.
3110-3197	Samples not described.
3197-3216	Core 2. Recovery 7 ft.

Depth (feet)	Description
(corrected depth 3210-3224)	Top 3 ft. Sandstone, gray, medium-grained, argillaceous, glauconitic, micaceous, somewhat phosphatic. 2nd 22 in. Shale, dark-gray, flaky, containing partings of light-gray, soft, medium-grained, glauconitic, micaceous sand. 3d 22 in. Sand-streaked shale like middle part of core.
3216-3258	Cuttings are mainly, gray shale like samples below 3050 ft., a little-fine-grained sand and glauconite, and cavings from higher levels.
3258-3268	Core 3. Recovery 10 ft.
(corrected depth 3272-3282)	Top 1½ ft. Sandstone, gray, fine to very coarse grained, containing pebbles of phosphatic material, glauconite, and large fragments of pyritized lignite. The sandstone is streaked with lenses of gray, flaky shale like core 2 at 3197-3216 ft.
	Middle 3½ ft. Shale, gray, flaky, slightly micaceous, containing partings of fine-grained, glauconitic sandstone. The bottom 4 in. of this part of core 3 is gray, hard, micaceous, glauconitic, calcareous sandstone, containing fragments of carbonaceous material.
	Bottom 5 ft. The upper 2 ft. of this part of core 3 is fine to moderately coarse-grained, roughly angular sand in a tan, waxy clay matrix, containing, also, light-brown, irregularly-shaped nodules of siderite(?).
	Comanche Series undifferentiated
	The lower 3 ft. of the bottom 5 ft. of core 3 is medium to coarse-grained, roughly angular sand in a white, somewhat micaceous, bentonitic matrix.
3268-3290	Sand, mainly coarse-grained, roughly angular, quartz, and a little white feldspar. Some sand grains are pink-tinted quartz.
3290-3300	No change.
3300	Like sample at 3290-3300 ft., but with the addition at this depth of fragments of mustard-yellow and gray mottled waxy shale.
3300-3554 T.D. (corrected total depth 3572)	Mainly coarse-grained quartz sand (a few pink-tinted and yellow-tinted grains); a little white feldspar; a few fragments of mustard-yellow shale; and a few fragments of red and gray mottled, silty, micaceous clay shale.

SEMINOLE COUNTY

Operator: Mont Warren
Landowner: Grady Bell Well 1A

Location: Land District 27, Land Lot 61; 560 ft. north of south line; 660 ft. east of west line of Land Lot 61

GGS. No. 204
Elevation: 114 ft. (derrick floor)
Total depth: 3810 ft.
Completed: Mar. 10, 1950

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Paleocene		
In beds containing Tamesí fauna; 1st sample at 1860 ft.	?	?
Cretaceous		
Gulf		
Beds of Navarro age	1900	55
Beds of Taylor age	1955	445
Beds of Austin age	2400	300
Atkinson Formation, upper member	2700	410
lower member	3110	310
Comanche undifferentiated	3420	390

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings, unless otherwise stated.

Depth (feet)	Description
0-1860	Samples not studied.
	Tertiary
	In Paleocene Series
1860-1870	Clay, gray; about 25 percent of sample is fine to coarse-grained, subangular, quartz sand, and many specimens of Foraminifera that are a mixture of Midway and Tamesí (Velasco) species.
1870-1880	Like sample at 1860-1870 ft., but sand is 50 to 75 percent of sample.
1880-1890	No change.
1890-1900	Like sample at 1870-1880 ft., with the addition of a little glauconite.
	Cretaceous
	Gulf Series
	Beds of Navarro age
1900-1910	Like the preceding samples with the addition of a few fragments of cream, fossiliferous limestone and specimens of *Globotruncana* sp.
1910-1960	Clay fragments decrease in abundance and specimens of Late Cretaceous species of Foraminifera show an increase.

Depth (feet)	Description
	Beds of Taylor age
	The top of the beds of Taylor age is placed at 1955 ft. on basis of electric log correlation supported by sample data.
1960-1970	Washed sample, small. Sand, fine to coarse-grained; fragments of glauconitic clay; a little chalky marl. Sample contains specimens of *Globotruncana* sp. *Stensiöina americana, Bolivina incrassata.*
1970-2400	Samples not studied in detail. In general, the samples consist of soft, gray, calcareous, somewhat glauconitic shale and varying amounts (usually small) of fine to coarse-grained sand.
	Beds of Austin age
2400	The samples do not seem to contain lithologic or paleontologic data that definitely place the top of the beds of Austin age. The top of the unit is provisionally placed at 2400 ft. on the basis of electric log correlation. The highest occurrence of the speckled shale characteristic of the lower part of the beds of Austin age is near 2600 ft.
2400-2700	Like samples at 1970-2400 ft.
	Atkinson Formation. Upper Member.
2700	The top of the upper member of the Atkinson Formation is placed at 2700 ft. on the basis of electric log correlation supported by sample data.
2710-2720	Highest occurrence of hard, very fine grained, calcareous, phosphatic, micaceous sandstone.
2720-2730	Sandstone, cream, very fine grained, micaceous, slightly glauconitic, phosphatic, calcareous, that seems to contain fragments of *Ostrea* sp.
2730-2740	Sandstone, like the sample at 2720-2730 ft.; fragments of grayish-green, slightly carbonaceous shale, containing thin partings of fine-grained, micaceous, slightly glauconitic sandstone; a few fragments of *Ostrea* sp.
2740-2750	The sample is at least 50 percent cavings of shale from higher levels. The possibly indigenous part of the sample is composed of very fine-grained sand; fragments of gray, soft, fine-grained, micaceous, weakly glauconitic sandstone; a few fragments of greenish-gray flake shale; fragments of fish bones and fish scales; and specimens of Foraminifera that are, mainly, caving.
2750-2820	Samples are similar, in general, to sample at 2740-2750 ft.; but the amount of greenish-gray shale seems to increase progressively with depth. The material drilled seems to be grayish-green, flaky, slightly carbonaceous shale, containing thin beds of fine-grained, micaceous, weakly glauconitic sandstone.

Depth (feet)	Description
2820-2830	Shale, grayish-green, flaky, and many fragments of moderately hard, very fine grained, micaceous, slightly glauconitic sandstone containing fragments of *Ostrea* sp. Sample contains a few specimens of *Planulina eaglefordensis.*
2830-2856	Sand, fine-grained; fragments of sandstone; fragments of grayish-green, flaky shale; fragments of *Ostrea* sp. The samples contain a few specimens of *Planulina eaglefordensis.*
2856-2875	Core 1. Recovery? Top. Shale, grayish-green, flaky; about 20 percent very fine grained sand; and traces of glauconite and carbonaceous material. Other parts of the core are, mainly, shale containing fine-grained sand, a little glauconite, a few small specimens of *Globigerina* sp., and a few fragments of *Ostrea* sp.
2880-2890	Shale, grayish-green; a few fragments of speckled shale that may be caving; many fragments of *Ostrea* sp. and bryozoan fragments; a little glauconite and phosphatic material. The specimens of Foraminifera in the sample seems to be caving.
2890-2900	Sample not described or no sample.
2900-2910	Sandstone, medium-grained, calcareous, somewhat glauconitic, containing many fragments of *Ostrea* sp. and a few phosphatic nodules. The sample contains a few fragments of grayish-green shale, bryozoan fragments, and a few specimens of *Planulina eaglefordensis.*
2910-2950	No change.
2950-2960	Shale, flaky, and fine-grained sand; a few fragments of *Ostrea* sp.
2960-3120	Samples not studied in detail, but the strata drilled seem to be alternating beds of grayish-green flaky shale, and light-gray, fine-grained, glauconitic, phosphatic, sandstone in which fragments of *Ostrea* sp. are common.
	Atkinson Formation. Lower Member.
3110	The top of the lower member of the Atkinson Formation is placed at 3110 ft. on the basis of electric log correlation supported by sample data.
3120-3130	Like samples at 2960-3120 ft. with the addition of a few fragments of dark-gray flaky shale.
3130-3270	Samples are like the samples at 3120-3130 ft., but the amount of dark shale increases progressively with depth and the shell fragments decrease.
3270-3280	Shale, dark-gray, flaky, slightly carbonaceous, containing fragments of fish bones, fish scales, and white, micaceous, moderately hard siltstone.
3280-3300	No change.
3300-3310	Like sample at 3270-3280 ft., with the addition of specimens of

Depth (feet)	Description
	Ammobaculites agrestis, and a few other species common in the lower Atkinson.
3310-3400	Like sample at 3300-3310 ft. No change in fauna.
3400-3410	Sand, coarse-grained, quartz, about 75 percent of sample; also a little dark-gray shale like the preceding samples, a few large phosphatic nodules, fragments of lignite, and *Ostrea* sp.
3410-3420	Sample almost entirely coarse-grained quartz sand, a few shell fragments and a few large phosphatic nodules.
	Comanche Series undifferentiated
3420-3510	The top of the Comanche is provisionally placed at 3420 ft. on the basis of electric log correlation. The samples from 3420 to 3510 ft. seem to contain much caved material and the top of the Comanche may be, in fact, at 3510 ft. where the sample shows the characteristic lithology of the Comanche.
3510-3520	Sand, coarse to very coarse, roughly angular quartz in a white, bentonitic matrix. The sand contains a few pink-tinted and a few yellow-tinted grains, and a few grains of feldspar.
3520-3550	Like sample at 3510-3520 ft.
3550-3560	Highest occurrence of fragments of red and gray mottled micaceous, silty shale.
3560-3810 T.D.	Sand, coarse to very coarse, quartz, containing a few pink-tinted and a few yellow-tinted grains, and a few grains of feldspar.

THOMAS COUNTY*

Owner: U. S. Government (War Dept.)
Operational Training Station Well 1
Location: 8 mi. northeast of Thomasville, Ga.

GGS No. 19
Elevation: 227 ft.
Total Depth: 295 ft.
Completed: Sept. 14, 1942

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Miocene undifferentiated	5	115
lower, Tampa Limestone	120	15

*Publication of this data is authorized by the Sun Oil Company, for whom the report was prepared on a commercial basis.

	Depth (feet)	Thickness (feet)
Oligocene		
upper, Suwannee Limestone	135	90
do *Dictyoconus zone*	225	35
middle and lower, Vicksburg Group	260	30
Eocene		
upper, Ocala Limestone upper member	290 to total depth	5

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
	Tertiary
	Miocene Series undifferentiated
5	Sand, clear quartz, fine-grained, sharply angular.
10	Clay, yellow and white streaked, highly sandy.
15	Sandstone, tan, moderately fine grained, argillaceous.
20	Sandstone, yellowish-brown, white-streaked, argillaceous.
25	Like sample at 20 ft., but loosely consolidated.
30	Like sample at 25 ft.
35	Like sample at 25 ft.
40	Like sample at 25 ft.
45	Like sample at 25 ft.
50	Clay, tan, argillaceous, sandy (fine-grained angular sand). The sample contains a few small nodules of chalk.
55	Like sample at 50 ft., and a few small fragments of lignite.
60	Sand, white, argillaceous, containing small particles of limonite.
70	Like sample at 60 ft.
75	Like sample at 60 ft.
80	Like sample at 60 ft.
85	Like sample at 60 ft.
90	Like sample at 60 ft.
95	Like sample at 60 ft.
100	Like sample at 60 ft.
105	Clay, white, sandy, and a few large nodules of sandy clay showing dendritic markings; a few nodules of quartz.
110	Sand, clear quartz, white, fine-grained, sharply angular, argillaceous.
115	Like sample at 110 ft., and a few nodules of cream sandy limestone.

Depth (feet)	Description
	Lower Miocene. Tampa Limestone.
120	Limestone, cream, hard, sandy, irregularly porous, nodular, containing traces of impressions of fossils.
125	Like sample at 120 ft.
130	Like sample at 120 ft.
	Oligocene Series
	Upper Oligocene. Suwanee Limestone
135	Limestone, white, chalky, microfossiliferous. The microfauna contains specimens of *Rotalia byramensis* and *Asterigerina subacuta*, which are characteristic of the Oligocene in this area.
140	Like sample at 135 ft.
145	Like sample at 135 ft.
150	Limestone, white, moderately hard. Large chips of the limestone contains molds and fragments of molds of fossil bivalves, and a few echinoid spines.
155	Like sample at 150 ft. Sections of small miliolids are common in some fragments of the limestone.
160	Like sample at 155 ft.
165	Like sample at 155 ft.
170	Limestone, chalky, hard, nodular, like sample at 155 ft., and a few nodules of flint.
175	Like sample at 170 ft.
180	Like sample at 170 ft.
185	Limestone, white, hard, chalky, coquinoid, composed chiefly of chalk-cemented, worn and rounded molds of microfossils and fragments of macrofossils. The fauna contains a few specimens of *Archaias* (?) sp. that is characteristic of phases of the Oligocene in Florida; specimens of *Rotalia mecatepecensis* and small miliolids are common.
190	Like sample at 185 ft.
195	Like sample at 185 ft., but the determinable fossils are *Rotalia* cf. *R. choctawensis*, echinoid spines and sections of miliolids. The sample contains a few fragments of flint.
200	Similar to sample at 195 ft., but softer. Specimens of several species of small Foraminifera that are common in this sample are characteristic, also, of the Oligocene in Florida.
205	Like sample at 200 ft.
210	Like sample at 200 ft.
215	Like sample at 200 ft. Fragments of echinoids are fairly common.
220	Limestone, white, hard, chalky, nodular, containing fragments of *Pecten* sp., and traces of molds and fragments of molds of microfossils.

Depth (feet)		Description
		Upper Oligocene. Suwaneee Limestone
		Dictyoconus Zone.
225		Limestone, chalky, hard, fossiliferous. The fossils are, mainly, poorly preserved molds. Among the megafossils are fragments of *Pecten* sp. and large echinoid spines. The microfauna contains specimens of species characteristic of the Oligocene; *Valvulammina* sp., *Valvulina* sp., *Dictyoconus* sp., and *Lepidocyclina* sp.
230		Like sample at 225 ft.
235		Like sample at 225 ft.
240		Limestone, chalky, fossiliferous, nodular, and numerous fragments of brown, dense, dolomitic(?) limestone.
245		Dolomite, dark-brown, porous, granular crystalline.
250		Dolomite, like sample at 245 ft., and moderately soft chalky limestone.
255		Dolomite, brown, and a little chalky limestone that is possibly caving from higher levels.
		Middle and lower Oligocene. Vicksburg Group.
260		Limestone, dolomite, like sample at 255 ft., and white chalky limestone that contains abundant irregular-shaped, rounded, chalky algal concretions, and many specimens of *Lepidocyclina mantelli.*
265		Limestone, chalky, fossiliferous, concretionary, like sample at 260 ft. Fauna like sample at 260 ft.; *Lepidocyclina mantelli* is common, and fragments of *Lepidocyclina yurnagunensis* also occur.
270		Material and fauna like sample at 265 ft. Specimens of *Lepidocyclina mantelli* and *L. yurnagunensis* are very abundant.
275		Like sample at 270 ft., but the fauna is much less abundant and less well preserved.
280		Like sample at 275 ft.
285		Like sample at 275 ft.
		Eocene Series
		Upper Eocene. Ocala Limestone. Upper Member
290		Limestone, white, hard, porous, fossiliferous, that seems to be a water-worn coquinoid limestone.
295	T.D.	Limestone, like sample at 290 ft., and a small amount of fine-grained clear quartz sand. Specimens of *Lepidocyclina* like those in the samples at 260-270 ft. are probably cavings. Specimens of *Lepidocyclina ocalana* (two varieties) in the sample indicate the upper Eocene age of the limestone.

THOMAS COUNTY

Owner: City of Thomasville, Ga.
Well 4

GGS. No. 56
Elevation: 263 ft.
Total Depth: 305 ft.
Completed: Aug. 20, 1936

Summary of Stratigraphy

	Depth Depth	Thickness (feet)
Tertiary and Quarternary		
Pliocene (?) to Recent (?) Undifferentiated	5	30
Tertiary		
Miocene Undifferentiated	35	140
Oligocene		
upper, Suwannee Limestone	175	53
middle (?) or lower (?)[1], Vicksburg (?) Group	228	to total depth 77

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
	Tertiary and Quarternary
	Pliocene(?) Series to Recent(?) Series
	Undifferentiated
5	Sand, deep-orange, argillaceous. Washed residue, large. Clear, subangular, moderately fine, moderately well sorted sand, and a few fragments of clay matrix; no fossils.
15	Sand, like sample at 5 ft.
25	Sand, lemon-yellow, argillaceous. Washed residue, large. Fine-grained, angular, well sorted quartz sand, containing a few hard fragments of clay matrix; no fossils.

[1]The occurrence of specimens of *Lituonella floridana*, the abundance of specimens of *Dictyoconus floridanus*, and the absence of specimens of typical Oligocene species in the samples from 286 ft. to the bottom of the hole, suggest that the rocks in this 19-foot interval may be middle Eocene (Avon Park Limestone) rather than Oligocene in age. Nothing in the samples suggests the well penetrated beds of upper Eocene age.

Depth (feet)	Description
	Tertiary
	Miocene Series undifferentiated
35	Clay, white, sandy. Washed residue, small. Fine-grained, angular, clear quartz sand, and a few clay nodules.
45	Clay, white and very light green, chalky. Washed residue, moderately small. Fine-grained, angular, clear quartz sand, like the sample at 35 ft., a few fragments of indurated clay, and about 25 percent small, white, chalky nodules; no fossils.
55	Clay, light-green, sandy, slightly calcareous. Washed residue, large. Clear, angular, fine-grained, quartz sand, and about 50 percent small nodules of clay.
65	Like sample at 55 ft.
70	Like sample at 55 ft.
80	Like sample at 55 ft.
85	Clay, light-greenish-gray, sandy (fine-grained sand), somewhat calcareous. Washed residue, moderately large. Very fine-grained, angular, clear quartz sand, and about 25 percent fairly large, greenish-gray nodules of limestone; no fossils.
95	Clay, greenish-cream, hard, sandy, bentonitic. Washed residue, moderately large. Fragments of sandy clay, and about 50 percent fine-grained, angular, clear quartz sand; a few chara stems.
106	Clay, cream, hard, sandy (fine-grained sand) calcareous. Washed residue, large. Fragments of clay, and about 50 percent moderately fine grained, moderately well sorted angular, clear quartz sand; a few specimens of arenaceous Foraminifera, possibly of brackish-water origin.
110	Like sample at 105 ft., but no Foraminifera present.
115	Clay, light yellowish-green, sandy (fine-grained sand), finely granular, calcareous clay, containing a very few questionable specimens of arenaceous Foraminifera.
125	Limestone, cream, hard, slightly sandy, irregularly porous (water-worn?), containing fragments of molds and fragments of impressions of bivalves (*Pecten* sp. and others); a few traces of specimens of small Foraminifera, but no determinable species.
136	Limestone, white (chalky), sandy (fine-grained sand), porous (water-worn?), nodular. The sand content of the limestone is about 25 percent. The limestone seems to have been originally highly fossiliferous, but much of the fossil material may have been destroyed by percolating water, leaving only a very few poorly-preserved fragmentary casts and molds.
145	Like sample at 136 ft.
155	Limestone, white, chalky, hard, somewhat sandy, showing a few fragments of fossil molds.

Depth (feet)	Description
165	Like sample at 155 ft.
167	Limestone, deep-cream, dense, cryptocrystalline, somewhat sandy, showing a very few questionable sections of microforams.
170	Like sample at 167 ft.
173	Like sample at 170 ft., and, in addition, a few fragments of white, soft, sandy, finely granular limestone.

Oligocene Series

Upper Oligocene. Suwannee Limestone.

175	Limestone, white, very finely granular, slightly sandy, and a few nodules of deep-cream, dense, limestone. The sample contains a few fragmentary casts and impressions of fossils, among which are a few echinoid spines, bryozoan fragments, and many calcite-encrusted specimens of smaller Foraminifera. Small-mesh screenings of the sample contain about 10 percent fine-grained, angular, clear quart zsand.
180	Limestone, similar to the sample at 175 ft., but the fossils are more abundant, and small calcitic nodules are common. The fauna contains fragments of echinoid spines and plates; a cast of *Operculinella* (?) sp.; many specimens of *Dictyoconus cookei;* and a fauna of small Foraminifera. Among the small Foraminifera specimens of *Rotalia mexicana* var. and *Asterigerina subacuta* are the most common species; several species of miliolids are also present.
183	Limestone, white, calcitic, highly microfossiliferous; many of the fragments contain a large number of specimens of miliolids; echinoid spines are common, and the foraminiferal fauna is like that in the sample at 180 ft. This sample also contains many small calcitic nodules, and a few fragments of dense brown limestone.
190	Limestone, white, porous, highly microfossiliferous, having an oölitic appearance because of the abundance of molds of specimens of small Foraminifera. The sample also contains a few nodules of light-brown, granular, dolomite or dolomitic limestone. The fossil material occurs, chiefly, as calcite molds that are usually lime-encrusted. Specimens of miliolids are common, as in the sample at 183 ft.; specimens of a large *Quinqueloculina* sp., and specimens of *Asterigerina subacuta* are common.
193	Limestone, white, chalky, microfossiliferous, and a few nodules of brown, cryptocrystalline limestone; fauna is like that in the sample at 190 ft.
197	Limestone, white, hard, nodular, somewhat calcitic, slightly porous, containing a number of poorly-preserved casts of macrofossils and microfossils. The material and the fauna are similar to those described in the sample at 190 ft. *Asterigerina* sp. is the most abundant microfossil.

Depth (feet)	Description
200	Limestone, white, chalky, porous, microfossiliferous, having an oölitic appearance because of the abundance of poorly preserved molds of specimens of miliolids and other small Foraminifera. The sample contains nodules of calcite, and the fauna is similar to that in the sample at 197 ft.
203	Limestone, white, chalky, highly calcitic, somewhat porous, fossiliferous. The fossils are very poorly preserved in the form of molds and casts that are usually fragmentary and chalk-coated. The recognizable fossils are the same as those in the immediately preceding samples.
207	Limestone, white, chalky, porous, highly fossiliferous. The fossils are usually in the form of chalk-coated molds and fragments of molds. Among the common and recognizable specimens of Foraminifera are *Asterigerina subacuta*, *Rotalia mexicana* var., and *Dictyoconus cookei*.
214	Like sample at 207 ft. Miliolids are more common in the fauna in this sample than in the sample at 207 ft.; otherwise the fauna is the same.
218	Like sample at 214 ft.
	Middle(?) or lower(?) Oligocene
	Vicksburg(?) Group
228	Similar to sample at 218 ft. The sample contains many bryozoan fragments, and a few fragments of *Lepidocyclina* sp. Specimens of *Asterigerina* sp., *Rotalia* cf. *R. mexicana*, and miliolids are common.
237	Like sample at 228 ft.
247	Limestone, white, hard, highly calcitic, microfossiliferous. The fauna seems to be, in general, like that in the sample at 237 ft., although few of the fossils are identifiable; *Rotalia* cf. *R. mexicana* is the most common identifiable species.
257	Limestone, porous, highly fossiliferous. The fossils are usually poorly preserved in the form of molds and casts. Bryozoan fragments are common, and the fauna contains many specimens of miliolid Foraminifera and *Rotalia* cf. *R. mexicana*.
267	Like sample at 257 ft. The sample contains several specimens of *Dictyoconus cookei*, a few fragments of *Lepidocyclina* sp., and specimens of small Foraminifera, as in the preceding sample.
276.5	Like sample at 267 ft. Specimens of *Dictyoconus cookei* are common at this depth; the small Foraminifera are like those in the sample at 257 ft.
286	Similar to the sample at 276.5 ft. but the limestone is harder and more calcitized; a few nodules of dark-brown dolomite are present. The fauna contains many bryozoan fragments and abundant specimens of *Dictyoconus floridanus*; echinoid spines and

Depth (feet)	Description
	fragments are common; also occurring are a few fragments of *Pecten* sp., several specimens of *Lituonella floridana* and *Pseudochrysalidina floridana*, and specimens of two species of large miliolids.
296	Limestone, cream, calcitic, porous, highly fossiliferous. The fauna seems to be similar to that in the sample at 286 ft. but there are few well-preserved specimens.
298	Material and fauna like the sample at 296 ft. and, in addition, many fragments of dark-brown granular dolomite.
300	Dolomite, dark-brown, granular, composes most of the sample. A few fragments of white, calcitic, highly microfossiliferous limestone are possibly caving from higher levels.
305 T.D.	Dolomite, dark-brown, granular, porous, composes most of the sample. In addition, the sample contains fragments of calcite, fragments of white fossiliferous limestone as in the sample at 300 ft., and fragments of white, hard, sandy limestone showing impressions of a few fragments of macrofossils (*Pecten* sp.)

THOMAS COUNTY

Owner: City of Meigs, Ga.

GGS. No. 59
Elevation: 340 (approx.)
Total Depth: 1530 ft.
Completed:

Summary of Stratigraphy

	(feet) Depth	(feet) Thickness
Tertiary		
Miocene undifferentiated	25 (1st sample)	459
Oligocene		
upper, Suwannee Limestone	484	102
middle(?) or lower(?), Vicksburg(?) Group	586	80
Oligocene(?) or Eocene(?)	666	149
Eocene		
upper, Ocala Limestone, upper member	815	?
no samples from 835 to 1320 ft.		
middle(?), undifferentiated	1320 to total depth	210(?)

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0- 25	No samples.

Tertiary

In Miocene Series undifferentiated

25- 55	Sand, clear quartz, angular, coarse-grained, somewhat ironstained, unfossiliferous. The sand seems to be contained in a matrix of red clay.
55- 135	Clay, light-tan, compact, laminated, diatomaceous; a very small amount of fine-grained quartz sand washes from the clay.
135- 157	Sand, clear quartz, angular, poorly-sorted, somewhat ironstained, and a few fragments of clay similar to sample at 55-135 ft., but containing fine-grained sand.
157- 185	Clay, tan, highly sandy (fine-grained sand); greenish-gray, unctuous clay; and about 50 percent fine-grained, angular, poorly-sorted, clear quartz sand.
185- 205	Clay, in part, gray and, in part, tan, sandy (fine-grained sand); about 50 percent poorly-sorted, angular, clear quartz sand; a few nodules of limonite, and a few fragments of white sandy limestone.
205- 246	Limestone, cream, hard, sandy (fine-grained sand); a small amount of greenish-gray clay, and angular, fine-grained sand, no fossils.
246- 270	No samples.
270- 289	Limestone, cream, highly sandy (fine-grained sand), containing a few impressions of fragments of microfossils, and a few indistinct sections of molds of specimens of Foraminifera. About 10 percent of the washed sample is composed of poorly-sorted clear quartz sand.
289- 293	Like sample at 270-289 ft.
293- 302	Like sample at 270-289 ft., but about 50 percent of sample is unconsolidated, angular, clear quartz sand; no fossils.
302- 312	Like sample at 293-302 ft., and also a few fragments of greenish-gray sandy clay.
312- 320	No samples.
320- 334	Like sample at 302-312 ft., but about 75 percent of sample is fine to coarse-grained, angular, clear quartz sand.
334- 346	No samples.
346- 365	Limestone, cream, hard, sandy, containing fragments of molds, and impressions of fragments of fossils. One chip of limestone showed a few fairly well preserved sections of *Archaias* sp. About 25 percent of the sample is composed of fine-grained sand and a little tan clay.
365- 388	No samples.
388- 417	Sand, quartz, angular, very poorly sorted; a few fragments of

Depth (feet)	Description
	cream, argillaceous sandstone; a few fragments of sandy limestone like sample at 346-365 ft., no fossils.
417- 459	Limestone, cream, irregularly sandy, a few fragments of which show indistinct impressions of fossils. About 25 percent of the sample is composed of coarse-grained quartz sand.
462- 484	Limestone, hard, sandy, irregularly porous, containing a few impressions of fossils, and a few hard greenish-gray areas. About 10 percent of the sample is composed of unconsolidated quartz sand.
	Oligocene Series
	Upper Oligocene. Suwannee Limestone.
484- 511	Limestone, cream, hard, porous, somewhat glauconitic, highly microfossiliferous. Macrofossils are, chiefly, fragments of *Pecten* sp. and echinoid spines. Among the many poorly-preserved foraminiferal specimens, the most common species are *Rotalia mecatepecensis, Asterigerina subacuta, Gypsina* sp., and a fragment of *Lepidocyclina* sp.
511- 586	Limestone, white, hard, containing many specimens of *Lepidocyclina undosa, Camerina dia, Elphidium* cf. *E. Chapmani,* and *Asterigerina subacuta.*
	Middle(?) or lower(?) Oligocene.
	Vicksburg(?) Group.
586- 606	Limestone, white, gray-spotted, hard, nodular, highly fossiliferous. Macrofossils are, chiefly, bryozoan fragments, echinoid spines and crab claws. Among the microfossils, the common species of Foraminifera are *Lepidocyclina undosa, Camerina dia, Asterigerina subacuta, Lepidocyclina mantelli, Rotalia mecatepecensis, Elphidium* cf. *E. chapmani, Asterigerina* sp., *Cibicides choctawensis,* and *Eponides alabamensis.*
606- 632	Limestone, cream, nodular, in part finely crystalline, and about 10 percent coarse-grained quartz sand. The fauna contains echinoid spines, specimens of *Rotalia* sp. and *Asterigerina* sp., a few specimens of *Camerina* sp. and a few small fragments of *Lepidocyclina* sp.
605- 620	Core. Limestone, white, chalky, gray-spotted, microfossiliferous, partially calcitized. The fauna contains many echinoid spines, and specimens of *Rotalia mecatepecensis* and *Asterigerina subacuta.*
620- 641	Core. Limestone, deep-cream, gray-spotted, hard, porous, partially calcitized, highly fossiliferous. The limestone seems to have been altered by percolating water. The fauna, which is similar to that in the samples starting at 586-606 ft., is characterized by large echinoid spines, specimens of *Rotalia mecatepencensis,* and poorly preserved specimens of *Lepidocyclina* sp., *Camerina*

Depth (feet)	Description
	sp., and *Massilina* sp. Many of the core fragments are composed of brown, coarsely crystalline dolomitic limestone that shows few traces of fossils.
641- 666	Core. Limestone, light-brown, hard, crystalline, containing soft, chalky, very poorly preserved molds of fossils fragments. The fauna, which contains traces of *Lepidocyclina* sp. and *Rotalia* sp., seems to be related to the fauna in the sample at 620-641 ft.
	Oligocene(?) Series or Eocene(?) Series
	Middle (?) or lower (?) Oligocene or upper (?) Eocene.
666- 688	Core. Limestone, white, hard, calcitic, containing many poorly preserved traces of microfossils but no determinable forms.
688- 727	No samples.
727- 753	Limestone, brown, crystalline; a little water-worn(?) chalky, limestone; a few fragments of thinly laminated gray-green shale; and about 20 percent coarse-grained sand. The sparse foraminiferal fauna contains specimens of *Camerina* sp., *Asterigerina* sp., *Lepidocyclina* sp., and other species, like the samples starting at 586-606 ft. Some of the cuttings in this sample, and possibly all the fossil material, may be caving from higher levels.
753- 770	Like sample at 727-753 ft., with the addition of nodules of limonite. The sample may be composed entirely of cavings.
770- 796	Core. Dolomite, light-brown, granular, containing abundant traces of chalky microfossils, all of which are too poorly preserved for identification. A part of the core is composed of dense, very finely granular dolomite that shows no trace of fossils.
796- 815	Core. Dolomite, brown, hard, dense, very finely granular; no fossils.
	Eocene Series
	Upper Eocene. Ocala Limestone. Upper Member.
815- 835	Core. Limestone, cream, chalky, containing many specimens of Foraminifera. The common species are *Cibicides ocalanus, Robulus alato-limbatus, Uvigerina dumblei, Dentalina jacksonensis, Reussella sculptilis, Siphonina jacksonensis, Cribrogloborotalia marielina, Operculina mariannensis, Anomalina bilateralis, Robulus* sp., *Eponides jacksonensis.*
835-1320	No samples.
	Middle(?) Eocene. Undifferentiated.
1320-1530 T.D.	Sand, clear quartz, moderately fine grained, angular, highly glauconitic, containing fairly numerous specimens of small Foraminifera and Ostracoda. Among the specimens of Foraminifera are *Robulus alato-limbatus, R. alabamensis, R.* cf. *R. pseudo-mamilligerus, Textularia dibollensis, Globorotalia crassata densa, Valvulineria persimillis, Globigerina rotunda* var., *Coleites* sp., and others.

WAYNE COUNTY

Operator: The California Company
Landowner: Brunswick Peninsula Corp.
Well 1
Location: Land Lot 7, Williams Survey
625 ft. from south line; 2500 ft. from west line of Land Lot 7.

GGS. No. 52
Elevation: 73 ft. (derrick floor)
Total depth: 4626 ft.
Completed: Dec. 17, 1944.

Summary of Stratigraphy

	Depth (feet)	Thickness (feet)
Tertiary		
Not reported		
Cretaceous		
Gulf		
Beds of Navarro age	2862	635?
Beds of Taylor age	3497?	74
Beds of Austin age	3571	318
Atkinson Formation, upper member	3889	419
lower member	4308	154
Comanche undifferentiated	4462	164
Pre-Cretaceous(?)		
Arkosic quartzite	4570	to total depth 56

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
0-2856	Samples not reported.
	Cretaceous
	Gulf Series
	Beds of Navarro age
2856-2887	Sample is a mixture of sand, sandstone, gray sandy marly shale, and limestone, that are probably mostly caving. However, specimens of *Globotruncana cretacea*, *Gümbelina striata*, and *Gümbelina carseyae* indicate the Cretaceous age of the beds. The top of the beds of Navarro age is placed at 2862 ft. on the basis of electric log correlation.

Depth (feet)	Description
2887-2903	Mainly fragments of cream, chalky limestone (Tertiary); fragments of light-gray, extremely fine-grained, calcareous micaceous, glauconitic sandstone; and some fine to coarse-grained loose sand. A few specimens of Navarro species of Foraminifera are in the sample.
2903-2990	No change. The quantity of loose sand in the samples below 2856-2887 ft. decreases progressively with depth.
2990-3000	Core 4. Recovery ? Part A. Siltstone, slightly argillaceous, micaceous, carbonaceous, glauconitic, which grades into extremely fine-grained sandstone; contains specimens of *Globotruncana cretacea, Gümbelina striata,* and other Navarro species. Part B. Like part A, but sand is slightly coarser grained, and specimens of Foraminifera are slightly more abundant; *Globotruncana* and *Gümbelina* are dominant. Part C. Like part B.
3000-3011	Sand, very fine to moderately fine-grained, loose, quartz; many fragments of buff to pink chalky limestone (caving); fragments of extremely fine grained sandstone (several types, caving from higher levels); nodules of glauconite; fragments of gray marly shale; specimens of species of Foraminifera as in the preceding samples.
3011-3071	No change.
3071-3086	Materials like sample at 3000-3011 ft.; specimens of *Robulus* sp. also in the microfauna.
3086-3102	No samples.
3102-3118	Core 5. Recovery? Part A. Sandstone, brownish-gray, hard, dense, silty to extremely fine grained, micaceous, glauconitic, highly calcareous; contains a fauna of small specimens of species of Foraminifera that are nondiagnostic, for the most part; a few typical Navarro species occur in the sample. Part B. Like part A. Part C. Sandstone, gray, very fine grained, argillaceous, micaceous, somewhat glauconitic. Common species of Foraminifera are *Globotruncana cretacea, Gümbelina striata,* and *Gümbelina* carseyae.
3118-3146	Washed residue, small. Like sample at 3000-3011 ft.
3146-3191	No change.
3191-3201	No sample?
3201-3215	Core 6. Recovery? Part A. Sandstone, greenish-gray, extremely fine grained, argillaceous, calcareous, micaceous, glauconitic. The microfauna consists, mainly of specimens of *Globotruncana cretacea, Gümbelina* spp., *Pseudotextularia elegans;* fairly common specimens are *Dorothia bulletta* and *Clavulinoides trilaterus;* several arena-

Depth (feet)	Description
	ceous species of Foraminifera characteristic of the Navarro also occur.
	Part B. No change.
	Part C. Clay, gray, highly sandy (very fine grained sand), micaceous, calcareous. Fauna like part A of this core.
	Part D. No change.
3215-3221	Sand, fine to coarse-grained, and many fragments of extremely fine grained micaceous sandstone and highly sandy clay; nodules of glauconite; cavings of buff to pink chalky limestone; microfauna like part A of core 6 at 3201-3215 ft.
3221-3283	No change.
3293	Bit sample. Clay, gray, sandy, micaceous.
3293-3309	Core 7. Recovery? Parts B, C, and D. No change.
3309-3325	Very small sample, composed of fine to moderately fine grained sand; a few fragments of very fine grained micaceous sandstone; fragments of the buff to pink chalky limestone; and a few specimens of Navarro species of Foraminifera.
3325-3358	Like sample at 3309-3325 ft., with the addition of a few fragments of gray marly shale. A few specimens of *Globotruncana fornicata* are added to the microfauna.
3362-3374	Core 8. Recovery? Part A. Shale, gray, silty, somewhat micaceous, calcareous. Microfauna like core 7 at 3293-3309 ft. with the addition of specimens of *Globotruncana* sp., and *Spiroplectammina semicomplanata*.
	Part B. Shale, gray, somewhat sandy (extremely fine grained sand), micaceous, highly calcareous. Fauna like part A.
	Part C. No change.
3374-3376	Shale, gray, micaceous, somewhat silty, and a little loose, fine-grained sand; microfauna like part A of core 8 at 3362-3374 ft.
3376-3427	Shale and sandy shale like sample at 3374-3376 ft., and about 50 percent fine-grained sand. No change in fauna.
3429-3444	Core 9. Recovery? Part A. Shale, gray, micaceous, silty, and thin lenses of light-gray, fine-grained sandstone. No change in fauna.
	Part B. No change.
	Part C. No change.
3444-3460	Marl, green, somewhat sandy, micaceous; fragments of light-gray, fine-grained sandstone; about 25 percent of sample is loose, fine-grained sand.
3460-3495	No change.

Depth (feet)	Description
	Beds of Taylor age
3497-3510	Core 10. Recovery? Part A. Marl, gray, hard, in part highly sandy (fine-grained sand). Washed residue composed almost entirely of specimens of Foraminifera. Common species are: *Globotruncana* spp., *Gümbelina* spp., *Loxostoma cushmani, Eouvigerina gracilis, Heterostomella americana.* The microfauna indicates the Taylor age of the beds.
3514-3526	Shale, gray, marly, micaceous; a little fine-grained sand and fine-grained, argillaceous sandstone. Fauna like core 10 at 3497-3510 ft.
3526-3540	Like sample at 3514-3526 ft., with the addition of many fragments of *Inoceramus.* The microfauna contains specimens of *Planulina spissocostata, Planulina dumblei,* and *Globorotalites conicus,* a typical Taylor fauna.
3540-3571	No change.
	Beds of Austin age
3571-3587	Like sample at 3540-3571 ft., with the addition of many fragments of white hard chalk highly impregnated with specimens of *Oligostegina.* The chalk is typically Austin in character, and the specimens of *Oligostegina* are typical of the top of the beds of Austin age in many wells in southern Georgia and northern Florida.
3587-3602	Like sample at 3571-3587 ft.
3612-3626	Core 11. Recovery? Part A. Chalk, gray, hard, like the white chalk in the samples from 3571 to 3602 ft. Dominant species in the microfauna are: *Pseudoclavulina moorevillensis* (characteristic of the upper part of the outcropping Mooreville Limestone in Alabama and Mississippi), *Globorotalites umbilicatus, Planulina texana.* Part B. No change. Part C. No change. Part D. Chalk like part A, but softer, and leaving a washed residue composed almost entirely of *Inoceramus* prisms and specimens of Foraminifera: Characteristic species are: *Pseudoclavulina moorevillensis* *Neoflabellina suturalis* *Ammobaculites subplanatus* *Gaudryina austiniana* *Pseudoclavulina clavata* *Ventilabrella eggeri* *Kyphopyxa christneri* *Planulina texana*

Depth (feet)	Description
	Globorotalites umbilicatus *Robulus pondi.* The fauna indicates the upper part of the beds of Austin age.
3626-3632	Sample is mainly cavings, composed of gray sandy marl, light-gray sandstone, and loose sand. Some specimens of Foraminifera are like those in core 11 at 3612-3626 ft.; others are cavings from higher levels.
3632-3642	Like sample at 3626-3632 ft., and fragments of the hard gray chalk reported in core 11 at 3612-3626 ft.
3642-3693	Mainly fragments of hard white chalk and hard gray chalky marl; a little sand, gray marl, and sandy marl, probably caving from higher levels; many *Inoceramus* fragments and prisms. The microfauna is mainly a mixture of specimens caving from higher levels.
3693-3738	Like sample at 3642-3693 ft., with the addition of a few fragments of dark-gray flaky shale. The washed sample at this depth is much smaller than the immediately preceding samples, suggesting that the shale, which washes out, probably was the largest part of the unwashed sample.
3746-3760	Core 12. Recovery? Part A. Marl, gray, hard; and light-gray, hard, dense, highly microfossiliferous, slightly sandy limestone, composed of a mass of microfossils, small fragments of macrofossils, and *Inoceramus* prisms. The microfauna is, mainly, small specimens of *Globigerina cretacea, Gümbelina globulosa, Planulina austiniana,* and a few specimens of *Eouvigerina* sp. Part B. Limestone, gray, hard, marly. Fauna like part A, above. Part C. Like part B, and containing a few fragments of *Citharina texana* var. and a few specimens of *Dorothia alexanderi.* A similar fauna occurs in the Ector Tongue of the Austin chalk in Texas. Part D. Limestone, gray, hard, marly, containing abundant specimens of *Oligostegina* that occur in the lower part of the beds of Austin age in many wells in southern Georgia and northern Florida.
3760-3776	Clay, gray, shaly; gray sandy shale; light-gray sandstone; and loose sand. The material and the microfauna are probably caving from higher levels.
3776-3823	Washed sample, small. Like sample at 3760-3776 ft., but contains a little dark-gray marly shale. No marked change in microfauna.
3838-3847	Core 13. Recovery? Part A. Limestone, gray, hard, marly. Specimens of *Citharina texana* are fairly common; otherwise the microfauna is similar to core 12 at 3746-3760 ft. Part B. Like part A. Part C. Shale, gray, marly. The washed residue contains frag-

Depth (feet)	Description
	ments of the gray shale, many *Inoceramus* fragments, fragments of *Ostrea* sp., and specimens of Foraminifera and Ostracoda. Common in the fauna are: *Globigerina cretacea, Globotruncana* spp., *Planulina austiniana,* and *Dorothia alexanderi.*
3849-3859	Washed residue, small; composed of dark-gray, soft, marly shale, and a little fine-grained sand that may be caving. The material drilled is probably dark-gray, waxy, calcareous shale. No change in microfauna.
3859-3877	No change.
	Atkinson Formation. Upper Member.
3889-3899	Shale, dark-gray, soft; fragments of light-gray, very fine-grained sandstone; a little coarse-grained quartz sand. Fragments of gray flaky shale, lignite, and fine to moderately fine grained sand are common.
3899-3920	No change.
3930-3944	Core 14. Recovery? Part A. Shale, gray, flaky, that seems to be lenticular in light-gray, very fine grained, micaceous, somewhat carbonaceous sandstone. A little carbonaceous material also occurs in the shale, and a few brown irregular-shaped nodules of siderite are present. The microfauna is composed of a few specimens of ostracodes, and specimens of *Globigerina cretacea* var., *Gümbelina* sp., *Valvulineria infrequens,* and *Ammobaculites* sp. Part B. No change.
3944-3950	Shale, dark-gray, flaky, slightly carbonaceous, and fragments of brownish-gray, very fine grained micaceous sandstone; a few specimens of Foraminifera and Ostracoda.
3950-3960	Like sample at 3944-3950 ft. Fragments of gray flaky shale are more abundant.
3960-3972	Like sample at 3950-3960 ft. Many of the shale fragments are thinly flaky and smoother in texture than in the preceding samples.
3972-3987	Like sample at 3960-3972 ft.
3994-4004	Core 15. Recovery? Part A. Marl, dark-gray, hard, containing fragments of *Ostrea* sp. and fish scales. Specimens of Foraminifera common in the sample are: *Globigerina cretacea, Gümbelina moremani, Gümbelina reussi, Neobulimina* sp., *Valvulineria infrequens, Planulina eaglefordensis;* other species are: *Globotruncana* sp., and fragments of *Citharina texana.* Part B. Like part A, but contains no specimens of *Neobulimina* sp. Part C. No change.
4004-4013	Shale, dark-gray, marly, flaky, and fragments of light-gray, fine-

Depth (feet)	Description
	grained, micaceous sandstone containing fragments of *Ostrea* sp. and a microfauna like core 15 at 3994-4004 ft.
4013-4081	Washed sample, small. Composed mainly of fragments of gray and some greenish-gray flaky shale, and fragments of light-gray, fine-grained, micaceous sandstone. The microfauna is like core 15 at 3994-4004 ft.
4081-4096	This sample seems to mark a change from the deeper-water marine facies of the upper Atkinson, above, to the shallow-water marine facies, below. The electric log indicates that the change in facies is at 4060 ft. The sample is composed, chiefly, of fragments of light-gray, dense, very fine to fine-grained, micaceous sandstone, many fragments of lignite, and a little shale like the samples just above.
4096-4112	Core 16. Recovery? Part A. Sandstone, clear quartz, fine-grained, moderately even grained, angular, micaceous, somewhat pyritic. Part B. Sandstone, clear quartz, fine to moderately coarse grained, micaceous; and greenish-gray, flaky, smooth-textured shale containing a few fragments of lignite.
4112-4124	Sandstone, white, and a little olive-green flaky shale like core 16 at 4096-4112 ft.; also cavings of shale and sandstone from higher levels.
4124-4139	Like sample at 4112-4124 ft. with the addition of a few coarse grains of clear quartz sand.
4139-4155	Sand, coarse-grained, clear quartz; and fine-grained, dense, micaceous, clear quartz sandstone; gray and greenish-gray flaky shale; many fragments of lignite.
4155-4171	Core 17. Recovery? Part A. Sandstone, clear quartz, moderately fine and even grained, loosely consolidated, micaceous. Part B. Sandstone, hard, dense, moderately fine grained, somewhat uneven grained; conglomeratic, containing many fragments of carbonaceous material, nodules of gray clay, fragments of greenish-gray shale, quartz pebbles, and nodules of limonite.
4171-4188	Shale, gray and greenish-gray, flaky; also coarse-grained quartz sand; lignite; fragments of the conglomeratic sandstone reported in core 17 at 4155-4171 ft.
4188-4209	No change.
4209-4221	Core 18. Recovery? Part A. Sandstone, light-gray, very hard, dense, fine-grained to silty, containing many highly micaceous lenses, and a few lenses of gray flaky shale. Part B. Sandstone, white, loosely consolidated, uneven-grained, silty, micaceous.
4227-4242	Shale, gray, flaky; and fragments of white, fine-grained sandstone; a few shell fragments.

Depth (feet)	Description
4242-4253	Shale, gray, flaky, and many fragments of white, moderately coarse grained, highly fossiliferous, calcareous sandstone.
4253-4260	Core 19. Recovery?
	Part A. Sand, clear quartz, fine-grained, even-grained, angular; also fragments of gray flaky shale, containing many small pieces of carbonaceous material and a trace of mica.
	Part B. Like part A.
	Part C. Sand, clear quartz, fine to moderately fine grained, angular; also many fragments of carbonaceous material, and a few shell fragments.
	Part D. Sand, clear quartz, fine to moderately fine grained; also many fragments of gray, flaky, slightly micaceous, carbonaceous shale that seem to be embedded in the sand.
4260-4269	Shale, gray, and fragments of white, hard, highly microfossiliferous, calcareous sandstone; a few fragments of lignite.
4269-4308	No change.
	Atkinson Formation. Lower Member.
4308-4325	Core 20. Recovery?
	Part A. Sandstone, light-gray, dense, fine-grained, micaceous, somewhat glauconitic.
	Part B. Limestone, light-gray, very hard, dense, microfossiliferous; contains a few fragments of carbonaceous material, and is partially dolomitized.
	Part C. Fragments of limestone like part A, and many fragments of greenish-gray, micaceous siltstone, containing abundant worn and broken shells of fossil bivalves, a few molds of small gastropods, a trace of glauconite, a few phosphatic nodules, and shreds of carbonaceous material.
	Part D. Shale, gray, micaceous, containing much carbonaceous material, fish scales, many fragments of an *Ostrea*-like bivalve; and a few lenses of light-gray, sandy shale in which the sand is very fine grained.
4325-4331	Shale, greenish-gray, and white, hard, fossiliferous limestone.
4331-4347	No change.
4347-4359	Like the preceding samples of the lower Atkinson, but shale fragments are relatively more abundant. The microfauna is composed of a few specimens of ostracodes, and a few specimens of *Ammobaculites agrestis* and other species characteristic of the so-called "marine shale" of the Tuscaloosa.
4360-4371	Core 21. Recovery?
	Part A. Sandstone, gray, hard, silty to very fine grained, micaceous.
	Part B. Shale, gray, hard, sandy, micaceous, containing many fragments of *Ostrea*-like bivalves.

Depth (feet)	Description
	Part C. Sand, clear quartz, fine to coarse-grained, micaceous; and many fragments of light-gray, soft, micaceous, finely carbonaceous siltstone.
	Part D. Sand, clear, quartz, fine to coarse-grained and fragments of very fine grained, micaceous, somewhat glauconitic sandstone containing worn fragments of *Ostrea*-like bivalves and a little carbonaceous material.
4371-4380	Sandstone, light-gray, hard, dense, calcareous, containing worn and broken fragments of microfossils; also cuttings of gray and greenish-gray flaky shale.
4380-4389	Sandstone, gray, dense, highly micaceous; and gray and greenish-gray shale.
4389-4419	Like sample at 4380-4389 ft., but shale fragments are dominant.
4419-4437	Core 22. Recovery?
	Part A. Sandstone, dark-gray to black-streaked, very fine grained, highly micaceous, argillaceous.
	Part B. Like part A, and a little loose, coarse-grained sand.
	Part C. Sand white, loosely consolidated, fine to very coarse grained, micaceous.
	Part D. Like part C.
4437-4449	Sand like part C and part D of core 22 at 4419-4437 ft.
4449-4462	Like sample at 4437-4449 ft. The sand contains a few yellowish-green grains.
	Comanche Series undifferentiated
4462-4477	Like sample at 4449-4462 ft. Greenish-yellow grains are common in the sand, which also contains many pink grains.
4477-4497	Core 23. Recovery?
	Part A. Shale, hard, mottled, gray, mustard-yellow, purple, and reddish-brown, micaceous, unctuous; contains small siderite spherules.
	Part B. Like part A, siderite common.
	Part C. Like part B, and white, fine to coarse-grained, clay-cemented, clear quartz sand.
	Part D. Clay, multicolored, hard; and fine to coarse-grained sand; abundant siderite spherules.
4497-4506	Like core 22 at 4477-4497 ft., and a few fragments of pink and white, moderately coarse-grained, calcareous sandstone.
4506-4515	Like sample at 4497-4506 ft., and many fragments of pink sandstone.
4515-4529	Sand, fine to very coarse grained, clear quartz, and fragments of multicolored shale. The sand contains many greenish-yellow and pink grains.
4529-4544	Sand, similar to sample at 4515-4529 ft., but is composed mainly

Depth (feet)	Description
	of white and yellow grains and a little white feldspar; also a little multicolored shale.
4555-4575	Core 24. Recovery? Part A. 2 ft. Sandstone, pinkish-white, loosely consolidated, fine to moderately coarse grained, somewhat calcareous, cemented with white bentonitic clay; pink-tinted and greenish-yellow grains are fairly common. Part B. Like part A, but sand is mostly coarse grained.

Pre-Cretaceous(?)

The top of the pre-Cretaceous(?) rocks is placed at 4570 ft. on the basis of electric log correlation, supported by sample data.

4575-4585	Like core 24 at 4555-4575 ft., and also fragments of reworked and weathered "basement" rocks.
4585-4595	Like sample at 4575-4585 ft., but the reworked and weathered "basement" material is dominant.
4595-4604	Pink and gray arkosic quartzite.
4607-4616	Top of black "basement" material; igneous rock?

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