

THE UNIVERSITY OF TEXAS
BUREAU OF ECONOMIC GEOLOGY
AUSTIN, TEXAS

Mimeograph Circular No. 12

April 1929

(Stencils recut September 1964)

The mimeograph circulars issued from the Bureau of Economic Geology contain the record of cores and cuttings from wells received and described in the Bureau. In some instances drillers logs and other data are given although it is usually impracticable to include logs of all wells, the logs given being selected as representative of the county or area to which the circular relates. The elevations given are for the most part those reported with the drillers log. In some instances the elevation given, as indicated, is that obtained from the location of the well on the topographic map. In all cases the elevation is to be regarded as approximate only.

E. H. Sellards

SOME WELL RECORDS OF CROCKETT COUNTY

Friend 1, Plateau Oil Co.

Located on Section 12, Block G, G.C. & S.F. Ry. Co., 11 miles E. and 14 miles S. of Ozona (2 miles from East and 14 from South county line). Elevation 2527. Drilled in 1921. Encountered 9 caverns between 40 and 150 feet. Very large cavern at 90 feet; 3 caverns between 180 and 200 feet.

Driller's log

	<u>Depth in feet to</u>		<u>Depth in feet to</u>
soil	10	soft blue mud, fishing	
white lime	154	for tools	570
yellow sandy clay	158	gray hard lime	590
white lime	260	gray lime	620
lime, very hard	280	soft blue mud, stringing	
blue lime	320	up tools, cleaning	
white lime	350	out bottom	630
blue shale, sea mud	355	blue soft mud, caving	650
sandy lime	380	soft blue mud running	
blue shale, sea mud,		12½" casing	660
caved badly	454	soft blue mud, cleaning	
brown sand	455	out	670
blue shale, sea mud	470	gray lime	672
gray sand	471	blue mud	677
blue shale	505	gray lime	680
(caved over tools at		hard gray lime	710
496', fishing setting		blue shale	720
15½" down at 511')		soft blue sea mud	730
soft blue mud	515	soft blue shale	760
gray sandy shale	454	soft blue mud	780
hard gray lime	558	gray hard lime	815

blue slate	830	hard brown lime	1705
gray hard lime	835	hard black slate	2270
blue slate	840	hard brown lime	2290
gray hard lime, fishing		hard black slate, running	
for tools, running		8 $\frac{1}{4}$ " csg.	2475
10" casing with bowl,		brown lime	2485
pulling 10" underreaming		hard black slate	2540
12 $\frac{1}{2}$ " casing landed at 127'		hard brown lime	2550
hard blue slate	932	hard black slate	2620
hard blue slate	1420	hard gray lime	2625
soft gray lime	1425	hard black slate	2650
hard black slate	1550	hard brown broken lime	2675
soft white shale	1580	At 2675' hard black slate	
hard black slate, preparing		drilling.	
to run 10" clamping			
12 $\frac{1}{2}$ " casing	1690		

Description of samples by H. T. Kniker and E. B. Stiles; submitted by Houston Smith, 1921.

	Depth in feet
The sample is ground very fine. It consists mostly of crystalline calcite and fine sand. Some grains of asphalt were noted	200

Light bluish gray marl containing fragments of white to light gray marly and sandy limestone grading into marly sandstone, probably from concretions. The limestone contains crystals of pyrite. The sand grains are fine and rounded. In thin section the limestone is seen to be unevenly finely to medium crystalline. No fissils were seen. When heated in closed tube faint bituminous fumes were noted. Lower Commanchean . . .	400
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Grayish white and light gray sandy limestone grading into calcareous sandstone and containing some pyrite. A number of fragments of oyster shells and some smooth ostracods are present.	660-762
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Light yellow and blue slightly calcareous sandy clay. One fragment consists of soft rather fine gray sandstone in which were noted a number of smooth ostracods, a Cythereis, and other undeterminable shells. In washed material a Productus spine (?) was noted. Upper Paleozoic (?)	700
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Bluish gray marl. In washed material were found fragments of bluish calcareous sandstone probably from concretions. Fragments of shells and a minute Textularia were noted.	760-780
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Gray calcareous sandstone containing some crystals of pyrite. Several Productus spines were noted. A few crinoid fragments and smooth ostracods are also present. Probably Pennsylvanian, possibly Permian	780-785
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Fine gray calcareous shale. In washed material were noted: a few sponge spicules, fragments of whells, several fragments of crinoid joints, two casts of Bellerophon, and a smooth ostracod. Probably Pennsylvanian, possibly Permian. (Dr. Beede). 815-820 ft.

Gray calcareous shale. In washed material were noted many fragments of calcareous sandstone, probably from concretions. Fragments of crinoid joints, fragments of brachiopod (?) shells, and two Pleurotomarias were found. 830-835 ft.

Bluish gray calcareous shale. After thorough washing a very small residue of pyritiferous lumps and clear grains of calcareous material is obtained. No fossils were seen. In closed tube very faint fumes of ammonia and bitumen were given off 1000 ft.

Bluish gray very slightly calcareous shale minutely micaceous. In washed material Carboniferous foraminifera resembling Nodosaria and Textularia and small Ammodisci were seen. Pyrite present. In closed tube bituminous fumes and strong ammonia fumes were noted. Pennsylvanian, E. B. S. 1200 ft.

Black minutely micaceous shale containing some calcite. No fossils were seen. Pyrite noted. In closed tube strong bituminous fumes and fumes of ammonia were noted 1500 ft.

Black minutely micaceous coarse grained shale. Some fragments are slightly calcareous. No fossils were seen. In closed tube test strong ammonia and bituminous fumes were given off. 1550 ft.

Grayish black shale like that from 1550. 1635 ft.

Grayish black shale like that from 1550. 1690 ft.

Very dark gray fine textured calcareous shale containing foraminifera and sponge spicules. In thin section some very small sponge spicules were seen, most of which appear to be less than one-sixty fourth mm. in diameter. These are very much smaller than those occurring in the Bend. A small test almost identical with the Nodosaria (.) figured in Univ. of Tex. Bulletin 363, Fig. 11, as occurring in the Cisco, was seen in section and several were noted in washed material. A small Nodosaria somewhat resembling a Dentalina was also noted. In closed tube ammonia and bituminous fumes were given off. 1700-1725 ft.

Very dark gray slightly calcareous shale containing considerable very fine angular quartz fragments and a few small scales of mica. In washed material an occasional fragment of a small sponge spicule and foraminifers like these mentioned from 1700-1725 were seen. In closed tube strong ammonia fumes and bitumen sufficient to sustain a flame were given off. 1725-1750 ft.

Henderson 1, Ryan Petroleum Co.

Located in Section 6, Block 56, G. C. & F. S. Lands, 4 miles from E. and 16 from N. county line. Drilled 1919-20.

Drillers Log

	Depth in feet to:		Depth in feet to:
Hard white lime-crevice at 160' and 175'	410	soft brown slate	1295
soft blue shale	440	hard white lime	1371
soft white slate-flash (water at 275')	446	soft brown slate	1377
soft brown sand-sulphur water at 450 feet	480	loose white lime	1395
soft white sand	500	soft brown shale and shell	1500
soft blue mud	530	soft brown shale	1550
soft blue sand	542	hard sandy lime	1630
soft blue mud	575	soft brown shale	1795
soft white sand	579	hard white lime shell	1798
soft blue mud	698	soft brown shale	2000
soft white sand, sulphur water	700	brown shale, shells	2500
hard white lime	720	brown shale	2802
soft brown sand	740	lime shells	2804
soft blue mud	799	brown shale	3000
hard white lime	801	soft brown slate	3180
soft blue lime	806	hard lime shell	3182
hard white lime	826	soft brown slate	3234
soft white slate	831	hard lime, shell	3236
hard white lime	834	brown slate and shells	3362
soft blue slate	840	medium hard dark sandy shale, light show oil	3408
hard white lime	843	brown slate, (at 3395' in dark sandy shale yellow oil)	3460
soft blue slate	846	blue shale	3500
hard white lime	868	white slate and shells	3600
soft blue sandy shale, water	878	dark shale	3648
hard white lime	888	gray lime and shell	3649
soft white slate	894	dark shale	3660
hard white lime	898	brown lime	3664
soft blue slate	903	brown shale	3733
hard white lime	908	gray lime	3735
soft blue mud	912	brown shale and shell	3875
hard white lime	917	blue shale and shell	3920
soft blue shale	930	brown shale and shell	4000
hard white lime	940	brown shale and shells	4350
soft blue mud	950	red shale	4490
hard white lime	955	light brown shale	4950
soft blue mud	965	brown shale	5240
hard white lime	985	hard black lime	5315
soft blue mud	990		
hard white lime	1000	Remainder of log wanting.	
hard white lime	1035	Total depth about.	5910
soft blue shale	1040		
hard white lime	1287		

Description of samples by Hedwig T. Kniker; submitted by Houston Smith, 1920.

Light gray indurated silt with some pyrite present. The sand grains are seen to be worn and rounded. No fossils noted. In closed tube very strong sulphur fumes with a heavy deposit in tube were noted. 600'

Light gray to dark gray laminated shale or sandy silt containing much pyrite and a few minute mica scales. In some layers shreds of lignitic vegetable material probably foliage, were seen. Nothing noted diagnostic of age, but evidently Comanchean. Another labeled as coming from the same depth consists of gray sand with pink and black grains. . . 700'

Light greenish blue clay of fine texture, containing a considerable quantity of pyrite in very small nodular concretions. The sample as submitted contains considerable sand and pebbles which have evidently fallen down from above and been mixed with the clay. No fossils were noted . . 750'

Gray, calcareous shale containing some small pelecypods (Nucula?). Gives peaty bituminous odor and weak fumes of ammonia in closed tube. Fossils: Some minute pelecypods and minute spires of gastropods, crinoid joints, ostracods, Dentalina multicostrata, D'Orbigny (?), Dentalina, Nodosaria, Textularia, Ammodiscus, Bigenerina, sponge spicules, Climacamina, Trochamina gordialis (?). 2225'

Gray shale and brownish gray clay-iron-stone containing veins of calcite. The shale is minutely micaceous. Oval bodies of pyrite with hemispherical protuberances covering the surface are numerous. Tests of foraminifera resembling the Nodosaria (?) referred to in Fig. 11, Bulletin 363, University of Texas. Small flat Ammodiscus were seen in abundance. Two small slightly curving spicules (?) in pyrite were seen. In closed tube very strong ammonia fumes were noted. Some calcite in comb structure noted in shale fragments. 2700'

Gray shale, minutely micaceous, which contains considerable calcite in comb structure evidently from veins. Some clay-iron-stone present. Foraminifera as noted in previous sample present. Strong fumes of ammonia noted in closed tube. Many minute pyritized tubes resembling sponge spicules noted. 2725'

Gray shale containing some clay-iron-stone and pyrite. Considerable calcity in comb structure present. Foraminifera as noted previously and Fusulina noted. In closed tube slight bituminous fumes and very strong fumes of ammonia were noted 2750'

Gray, calcareous shale containing pyrite and some clay-iron-stone. No comb structure calcite was noted. Nodosaria like those previously mentioned are present but are smaller and not so numerous. In closed tube strong fumes of ammonia were noted. 2775'

Dark gray shale containing minute scattered mica scales and gray, fine-grained dolomitic limestone, partly impure and partly clear, and coarsely crystalline. In thin section the shale is seen to contain minute sand grains. One fragment of dolomitic limestone contains veins and another one round bodies of clear crystalline colomite. The two veins branch at one end, and one of them is slender and tapering. The other one measures about one-fourth mm. in diameter. The clear round bodies vary in diameter from one-tenth to one-sixth mm. in diameter. Very strong bituminous fumes and strong ammonia fumes were obtained in closed tube 3385'

Like sample from 3385 feet. In thin section the dolomite is seen to be finely crystalline, having larger crystals than that from 3385 feet. Rounded bodies consisting of larger crystals than those composing the body of the rock, and a slender tapering vein were also noted. Very strong bituminous fumes that sustained a good flame and formed a deposit of oil in the tube were noted in closed tube. Ammonia fumes were also obtained 3395'

Gray sandy, non-calcareous shale and light gray, slightly calcareous and silty shale. A few fragments of clay-iron-stone and several small pyrite fragments were seen. Two trilobites (?) fragments and a piece of a small crinoid stem were noted. One of the trilobite (?) fragments perhaps represents the margin of half of the pygidium and the margin of one lateral lobe. It is three-fourths of a millimeter long. The lamellar plates of the lobe slope posteriorly and have the edges broken off, while those of the pygidium (?) seem to have terminated in spines. The other trilobite (?) fragment is indistinct but appears to represent a portion of a plate. Very strong ammonia fumes and strong bituminous fumes were noted in closed tube 3600'

Sample consists of three fragments, about two and one-half by three inches, of black indurated shale which contains faint mica and fine silt. In one fragment a part of what appears to have been a disk-shaped concretion three inches or more in diameter, is seen. This is composed of brownish gray silt and shale. This gives strong test for phosphate. It differs from the shale in color and in the increased quantity of silt as well as in the size of the grains of silt, being slightly coarser. The shale is non-calcareous. After crushing and washing a fragment of the black shale a small test resembling a Nodosaria was seen. Upon heated in closed tube, enough bituminous material is obtained to sustain a good flame and leave a deposit of oil in the tube. Ammonia fumes also noted. 3600-4800'

Black and slightly silty shale and a few fragments of impure limestone. In thin section the limestone shows sponge spicules and spherical bodies, one showing fine concentric rings, in an argillaceous and granular matrix. Bituminous fumes sufficiently strong to sustain a flame and make a deposit of oil in the tube were obtained upon heating the material. Strong ammonia fumes were also noted. The spicular limestone slightly suggests the Bend formation. However, no glauconite grains were noted. E.B.S. 5025'

Dark gray bituminous shale containing sand, minute mica scales and coaly shreds, and some calcareous material and pyrite. Some argillaceous sandstone is present. No fossils were seen. Strong bituminous and ammonia fumes were obtained in closed tube. Enough bitumen is present to sustain a flame and form a deposit of oil in the tube 4200'

Hard gray and very dark gray, calcareous shale, containing vine sand, hard slightly calcareous sandstone, and a few grains of shaly limestone. The sample contains numerous minute mica scales and some coaly shreds and is stained slightly by iron oxide. No fossils were seen. In closed tube strong bituminous fumes that sustained a flame and strong ammonia fumes were obtained 4400'

Very hard only a slightly calcareous firmly cemented shale containing fine sand; some hard sandstone; and a few fragments of gray limestone. The rock fragments contain minute mica scales and numerous sponge spicules of which some are pyritized. In thin section several pieces of shale show a network of spicules, some of the larger ones having a number of transverse cracks. The spicules are embedded in bituminous matrix. In closed tube strong ammonia fumes and bituminous fumes that sustained a flame and caused a slight deposit in the tube were obtained 4500'

Rock like that found at 4500 feet, but the sandstone is more abundant and sponge spicules less abundant. The bituminous fumes liberated in closed tube sustain a flame and there was a heavy deposit of oil in the tube. Ammonia fumes also liberated 4520'

Hard grayish, black slightly calcareous and sandy shale, gray sandstone, and some gray limestone. The shale contains scattered sponge spicules. Strong bituminous fumes that easily sustained a flame and formed a deposit in the tube were obtained in closed tube. Ammonia was also noted . . . 4540'

Medium grained, hard and compact gray, siliceous shale containing small mica scales and an abundance of minute sand grains. When a piece of the shale is hit with a hammer and broken, the fractured surfaces are parallel to each other, the fractures all extending in the same direction. In thin section the shale is seen to be foliated, thin dark shaly bands alternating with sandy bands. No fossils were seen. Strong bituminous fumes were obtained that sustained a flame in closed tube 4600'

Fine hard, dark gray, siliceous and slightly calcareous highly bituminous shale containing minute mica scales. Some calcareous and argillaceous sandstone is present. Very small pyritized sponge spicules and scattered minute pyrite crystals were seen in some fragments. Upon heating in closed tube, a deposit of oil formed in the tube, and the bituminous fumes supported a big flame 4650'

Gray, bituminous shale containing fine sand and minute mica scales; some argillaceous sandstone, and a few grains of pyrite. The shale and sandstone are slightly calcareous. Upon heating in closed tube, strong bituminous fumes that caused a deposit of oil in the tube and supported a flame, were obtained. Ammonia fumes were also noted. 4680'

Like sample from 4680 feet 4690'

Dark bluish, gray, minutely micaceous fine bituminous shale and some light gray argillaceous and calcareous fine hard sandstone. In closed tube strong bituminous fumes were noted. A deposit of oil was found in the tube, and the fumes supported a strong flame. Faint ammonia fumes were also obtained. 4715'

Dark, gray, slightly calcareous shale, containing minute mica scales and coaly shreds; gray silty limestones; and a few grains of light gray shaly and slightly calcareous sandstone containing pyrite. In thin section the shale is seen to contain an abundance of fine sand and a few clear round bodies about one-eighth of a millimeter in diameter. The shale is stained brown by bituminous impregnations. In a thin section of the limestone were seen a number of sponge spicules and fine sand. When digested in acid, the limestone leaves a residue of sponge spicules of various sizes and some minute sand grains. Upon heating in closed tube, strong bituminous fumes were given off. They sustained a flame, and a deposit of oil formed in the tube. Strong ammonia fumes were also noted. The three kinds of rock noted are quite alike in general appearance and may perhaps be regarded as variations of the same type 4800'

Like sample from 4800 feet. 4820'

Black, very minutely micaceous and slightly silty shale and fine silty rock with calcareous and argillaceous matrix. In the washed material several fragments of sponge spicules and a test resembling a *Nodosaria*-like specimen shown in Figure 11: a *Spur Billetin*, were seen. No indications of any other fossils were seen. Upon heating material in closed tube very strong bituminous fumes were obtained. These fumes sustained a strong flame and left a deposit of oil on the wall of the tube. Ammonia fumes were also noted. 5125'

Black, slightly silty shale and very little dark gray limestone, containing some argillaceous material and pyrite. No fossils were seen in the shale. In thin section the limestone shows spicules of rather small diameter, a body resembling a *Nodosaria* (?), and minute spherical bodies

of clearer calcite. In closed tube, ammonia fumes and very strong fumes of bitumen were given off. The bitumen was sufficiently strong to sustain a flame at end of tube, and a deposit of oil was made in the tube. 5150'

Black, slightly micaceous shale and some dark gray, fossiliferous limestone. In thin section the limestone shows sponge spicules, several ammodiscus, two bodies resembling a Stacheia, and other undetermined bodies. The shale seems to be unfossiliferous and only slightly calcareous. In closed tube, bituminous fumes strong enough to sustain a good flame and make a deposit of oil in tube were given off. Ammonia fumes also noted. Probably Marble Falls limestone (J.A.U.). 5300'

Black, slightly calcareous and silty shale, and some dark gray fossiliferous limestone containing a small amount of pyrite. The shale contains small and large scattered sponge spicules. In thin section the limestone is seen to contain a number of sponge spicules of various sizes and numerous round calcareous structureless bodies having a rough surface. But in fine washed material they were found to be clear spherical, slightly flattened bodies of various sizes, the largest having a diameter of slightly less than one-fourth mm. Some show finely concentric layers. When digested in acid some of the round bodies leave a film-like outer shell. In closed tube, strong ammonia and bituminous fumes were noted. There were enough bituminous fumes to sustain a good sized flame and leave a deposit of several drops of oil in the tube. 5314'

Like sample from 5314 feet, but limestone predominates, and the calcareous shale grades into a shaly limestone. Resembles the Bend. (J.A.U.). 5316"

Black, calcareous and bituminous shale, and light gray and darker gray fossiliferous limestones containing pyrite. In thin section the shale shows fine sand and a few sponge spicules, while one limestone fragment shows a network of sponge spicules, and number of round bodies as found at 5314 feet and 5316 feet. Several of these round bodies show indistinct concentric rings, several other limestone fragments show humerous irregular bodies which could not be identified. Very strong ammonia and bituminous fumes were noted in closed tube. Enough bitumen was present to sustain a strong flame and form a deposit of oil in the tube. 5325'

Dark gray, fossiliferous limestone and dark gray almost black bituminous shale. The limestone contains a few scattered minute mica scales and pyrite crystals. Scattered mica scales are also found in the shale. In thin section the limestone shows numerous sponge spicules and rounded bodies as found at 5314 feet. These round bodies were also found in fine washed material. A thin section of the shale shows fine sand and some sponge spicules. Enough bituminous material to form a deposit of oil in the tube and support a strong flame were obtained in closed tube. Strong ammonia fumes were also noted. 5360'

Dark gray, finely laminated hard shale grading into shaly limestone. The shale contains a few scattered minute mica scales, coaly shreds and pyrite crystals, and pyritized sponge spicules. In limestone fragments were noted some sponge spicules. In thin section the shale is seen to contain very fine sand. Bituminous fumes, strong enough to form a deposit of oil in the tube and support a flame were obtained when heating sample in closed tube. Strong ammonia fumes were also noted. Apparently Bend. 5420'

The sample consists of a large piece of place, very compact limestone with flinty fracture, appearing uniformly fine grained in thin section. This is cut by some transverse fissures, suggesting that this fragment, which shows tangential flaking on its rounded exterior, is a concretion. 2. Three large square fragments of black coarse grained hard shale of uniform texture and indistinct bedding. This gives no reaction to acid and shows no fossils. 5470'

Very dark gray almost black slightly calcareous shale, and very dark gray almost black spicular limestone containing a few crystals of pyrite. In thin section the limestone is seen to contain numerous bodies such as were found at 3314 feet. One spicule shows three arms and has the appearance of having probably been an Hexactinellid spicule. The shale contains very fine sand. Minute spherical bodies that were seen in cross-section in the thin section, and a few sponge spicules were seen in fine washed material. Strong bituminous fumes that supported a flame and caused a deposit of oil in the tube were obtained in closed tube. Ammonia fumes were also noted. 5500'

Like sample from 5500 feet. 5512'

Like sample from 5500 feet, but there is more shale than limestone in the sample 5525'

Black shale and some gray spicular limestone. The shale shows scattered minute mica scales, and the limestone contains a few crystals of pyrite. In thin section the limestone shows sponge spicules and small spherules, such as were found at 5314 feet. The shale also shows a few spirules and spherules. In one of the shale fragments a bryozoan-like fragment was seen 5580'

Very dark gray limestone and very dark gray shale. In thin section the limestone shows sponge spicules and spherical bodies as found at 5314 feet. Enough bituminous material is present to support a flame and form a deposit of oil in closed tube. Strong ammonia fumes were also obtained in closed tube . 5635'

Dark gray, slightly calcareous shale and dark gray limestone. A few fragments of light gray shale are present. In thin section the dark gray shale is seen to be fine grained and to contain numerous very fine sand grains. It contains round bodies such as found at 5314 feet and a few sponge spicules. One of these spherical bodies shows about twenty

forams on the upper surface, indicating that the spherical bodies which have been found for the last 300 feet more or less are foraminifera. The limestone shows numerous sponge spicules and some of the spherical bodies in thin section. The light gray shale is seen to contain very fine sand in thin section. The dark gray shale and the limestone are heavily impregnated with bituminous material. The light gray shale which grades into an impure sandstone occurs as lenses in the dark shale. In one fragment a lense one-half to one mm. wide branches off from one to two and one-half to three and one-half mm. wide. In closed tube strong bituminous fumes that supported a flame and formed a deposit of oil in the tube were obtained. Ammonia fumes were also liberated. . 5640'

Very dark gray, almost black, hard and finely laminated shale. In thin section it is seen to be highly bituminous and to contain minute sand grains. No fossils were seen. . . . 5690'

Very dark gray, almost black, slightly calcareous, hard shale, and some limestone of the same color. In thin section the shale is seen to be highly bituminous and to contain fine sand. In section the limestone shows numerous sponge spicules, several Nodosarias, a Bigenerina, several clear spherical bodies, an Ammodiscus, several bryozoan fragments, and other organic remains. Several Nodosarias and a Textularia cf. were found in fine washed material. When sample was heated in closed tube, strong bituminous fumes and ammonia fumes were obtained. Note: The limestone fragments in this sample are typical Bend limestone (J.A.U.). 5850'

Very dark gray, almost black, hard shale, and some limestone of the same color. The shale is slightly calcareous. In thin section the shale is seen to be like that at 5850 feet. A thin section of the limestone shows it to contain a network of sponge spicules, a few clear, round bodies, as found at 5314 feet; a Nodosaria fragment, and a few other organic forms. Several sponge spicules with three arms were noted in a thin section of the limestone. In closed tube bituminous fumes that supported a slight flame and formed a slight deposit of oil, were noted. Faint ammonia fumes were also obtained. 5870'

Shannon 1, Crockett Drilling Syndicate

Located on Section 21 or 22, Block Q, E. L. & R. Ry. Lands,
11 miles from N. county line and approximately S. of Powell field.
Elevation 2730 (A). Casing: 15½", 565½ ft.; 12½", 661½ ft.;
10", near 1676 ft.; 8½", 2365 ft. Standard Rig.

Drillers Log

	Depth in feet to:		Depth in feet to:
cellar	7	rock, red	700
lime, white	170	sand, red	715
shale and lime shell	205	rock, red	940
lime, white	213	sand	945
shale, blue	217	making about 2 bailers of water	
lime, white	235	rock salt	1190
lime, sandy white	240	rock salt	1240
lime, white	310	sand, coarse, gray	1250
gravel	314	slight show of oil	
lime, white	327	rock salt	1350
gravel	334	red beds	1365
lime, white	400	salt	1395
5ft. break, gravel		sandy lime, gray	1400
carrying water 375-80		broken sand and lime	1415
30 ft. water in hole		sand, gray	1420
shale, blue	415	red rock	1430
lime, sandy	420	sand, red	1445
shale, sandy	425	red beds	1470
pink shale	427	sand, red	1500
sand, white, water	448	red rock	1518
Prob. 1st Cret. sand.		lime, white	1520
Hole full of water		sand, white	1525
shale, blue	453	red rock	1540
sand, white, water	479	lime	1548
Prob. 2nd. Cret. sand		lime, sandy gray	1578
redbeds	500	lime, white	1586
water, sand, white	512	gritty lime, gray	1599
lime, hard, sandy	515	red rock	1630
sand, water	527	lime, gray	1645
shale, blue, sandy	548	lime and shell, white	1647
red rock	558	congl., some salt, shale, etc. red rock	1649
blue shale	573	lime	1676
lime, sandy	578	lime, hard	1683
sand, water	590	red sand and lime shells	1695
blue gumbo	606	salt, hard	1720
hard gray sandy lime	609	salt & red rocks, soft	1730
blue shale	612	sandy lime, medium	1735
coal (lignite) very young	614	red rock, hard	1750
sample seen: lignite		salt	1772
E.H.S.		sandy lime hard, red	1776
shale, blue, show of oil	624	lime, hard, white	1785
hard gray sandy lime	630	lime hard gray	1790
shale, blue	635	sandy lime & redrock	1800
redbeds	670	sandy lime, hard	1810
sand, red	675		

	<u>Depth in feet to:</u>		<u>Depth in feet to:</u>
broken formation, red		light gray & white &	
rock, lime shells	1830	greenish dolomitic	
sand, soft	1850	lime, a little fine	
sandy lime, salt, red		silica sand, gray	2368
rock	1890	soft brown dolomitic lime	
lime, hard, gray	1910	some white & green dolo-	
sand shells, red rock	1950	mitic lime, a round sand	
lime, hard gray	1965	grain was noted, slight-	
red rock	1970	ly bituminous	2376
sand shells, medium	1985	light brown & gray dolomitic	
sand, soft	1995	lime, grayish brown	2382
sand shells, sand and		brown, soft white & light	
red shale, medium	2060	brown dolomitic lime	
		& anhydrite	3287
sand, soft red	2067	gray dolomitic lime &	
salt, white	2074	anhydrite, bituminous	2400
red beds, soft	2079	dolomitic lime, brownish	
salt, white	2084	gray	2405
lime, hard gray	2088	light gray and white dolo-	
lime	2095	mitic lime	2412
sand, medium, white	2110	soft brown dolomitic lime	2418
salt water at 2098.		soft brown dolomitic lime,	
Hole filled 1600		some anhydrite	2424
sand, hard gray	2135	soft brown dolomitic lime,	
lime, hard white	2146	some green shale	2430
red rock, soft	2149	light brown, gray & white	
lime, hard light	2151	dolomitic lime	2437
slate, soft light	2155	dolomitic lime	2444
lime, hard light	2160	soft brown & white dolo-	
slate, soft	2163	mitic lime, bituminous	2450
lime, hard light	2165		
red rock, soft	2173	soft, fine, bluish green	
lime, hard	2178	color, dolomitic lime	2459
sandy shale, soft	2207	light gray & white dolo-	
lime, hard light	2220	mitic lime	2470
red rock, soft	2229	brown dolomitic lime &	
sandy lime, hard	2242	gypsum	2476
red rock, soft	2246	brown gray & dolomitic	
sandy lime, hard light	2256	lime & gyp, slightly	
light clay	2265	bituminous	2482
lime, hard	2280	gray dolomitic lime	2489
red rock, soft	2284	gray & white dolomitic lime	2495
sandy lime, hard	2348	gray & white dolomitic	
red rock, soft	2349	lime, soft	2501
brown bituminous dolomitic		dolomitic lime, gray	2506
lime, a few fine sand		dolomitic lime with fine	
grains	2356	greenish specks	2515
fine brown dolomitic lime		brown, gray & white dolo-	
and silica sand	2357	mitic limestone, bitu-	
good show oil		minous. $\frac{1}{2}$ bailer water	
light gray & white, some		per hour at 2910	3010
greenish grains, dolo-		shale and slate	3700
mitic lime & fine silica			
sand, hard gray	2365		

Description of samples by E. H. Sellards and T. L. Bailey.
All the samples are cuttings.

	<u>Depth in Feet</u>
Salt. Slight potash flame	960-970
Salt.	970-975
Red clay and salt	975-980
Salt. Strong potash flame	980-988
Dull red non-calcareous sandstone with some small pieces of gray sandstone and fibrous gypsum . .	985
Salt. Strong potash flame	988-996
Red sandstone more or less impregnated with gypsum	985-995
Gray and red sandstone	995-1000
Light colored salt. Strong potash flame . . .	996-1005
Salt, some of it brilliant red	1005-1023
Red salt and red anhydrite	1023-1030
Similar to last, consisting of red and gray sandstone	1025-1030
Dull red sandstone, much of it impregnated with gypsum	1030-1040
Salt. Faint potassium flame	1035-1045
Red sandstone chiefly. Some soft white gyp- sum present. The gypsum penetrates the sandstone, coating the sand grains and occurring as "stringers") In some pieces the rock has become largely gypsum. Strong potassium flame	1043-1050
Salt. Fair potassium flame	1050-1060
About equal parts of gray and red sandstone and anhydrite. The gray sandstone is fairly hard. Strong potassium flame. Salt	1060-1070
Salt. Strong potassium flame	1070-1080
Salt. Faint potassium flame	1080-1090
(Second sample) chiefly red sandstone. Some soft gypsum	1080-1090
Red anhydrite and salt	1095

	<u>Depth in Feet</u>
Red sandstone in which is some fibrous gypsum and a few selenite crystals; also considerable salt.	1100
Red and gray sandstone including numerous pieces of white fibrous gypsum	1100-1105
Red sandstone, anhydrite and gypsum	1110
Chiefly anhydrite	1110-1118
Anhydrite, including some pieces of gray non-calcareous sandstone. One piece of sandstone in this section is seen to contain pyrite	1118-1123
Red sandstone anhydrite and fibrous gypsum . .	1123-1130
Anhydrite and gypsum	1125
Red sandstone with some anhydrite and some gray sandstone. Thin section of the sandstone shows unusual characters	1130-1135
Red sandstone and anhydrite with some pieces of gray sandstone	1135-1140
Salt. Fair potassium flame	1140
Consists of gray slightly calcareous sandstone and anhydrite	1140-1145
Salt. Faint potassium flame	1145
Red sandstone and anhydrite	1145-1150
Chiefly anhydrite with some red sandstone . .	1150-1155
Salt and anhydrite. Good potash flame	1155
Gray sandstone anhydrite and gypsum	1160
Bright red anhydrite. In thin section it is seen that the anhydrite consists largely of needle or red shaped small crystals which tend to cluster about certain centers. In addition to the crystals there is other material of the same color which does not seem to be crystalline. Red anhydrite of this kind seen in numerous samples in this well. Fair potassium flame	1163
Slightly calcareous greenish gray shale, with some white gypsum present. One piece of red sandstone	1170
Salt. Potassium flames of varying strength. .	1171-1338
Red clay and salt.	1350

Sandy red clay impregnated with anhydrite or gypsum	1354
Red clay and anhydrite	1360
Chiefly salt with some red clay. Faint potassium flame	1365
Salt. Good potassium flame	1370
Salt. Faint potassium flame	1400
Light colored anhydrite	1410
Chiefly gypsum broken up by the drill and re - cemented into a solid mass. Some anhydrite	1415
Similar to the last sample	1420
Red sandstone and red clay. Includes some gray sandstone spots in the red	1425
Red slightly micaceous sandstone or mudstone	1430
Very fine mudstone	1435
Chiefly very fine loose red sand	1440-1445
Chiefly loose red sand	1475
Loose red sand with some pieces of gray and red sandstone	1480
Loose dull red fine sand	1500
Rich red loose sand and sandstone	1515
Very largely light colored flakey anhydrite	1520
Chiefly gypsum which has been broken up by the drill and recemented	1525
Red and gray sandstone and anhydrite. A few pieces of rounded sand grains present	1530
Dull red sand	1535
Red sandstone with some pieces of gray	1540
Largely anhydrite broken into flakey pieces	1548
Light colored anhydrite, broken up fine by the drill	1555
Gypsum and anhydrite	1560

Red sandstone	.1610
Micaceous red sandstone	.1615
Mainly loose red sand. Some anhydrite present	1649
Same as sample at 1649	1659
Light colored gypsum	1665
Salt. Some pieces of sandstone present. The sandstone is in part gray and part red. Strong test for potash	.1695
Fine cuttings of brownish-gray, dense-textured to granular, crystalline dolomite	.2356
Like the preceding sample at 2356	.2357
Light gray and whitish dolomite, some anhydrite and a few rounded quartz grains	.2368
Very fine cuttings of white anhydrite, gray dolomite and quartz and felspar sand	2365
Granular anhydrite and dolomite	2387
Cuttings of yellowish-gray dolomite and anhydrite ...In the dolomite are numerous more or less recrystallized circular or elliptical bodies from a fraction of a millimeter to one millimeter in diameter that seem to be recrystallized oolites for the most part. Part of these bodies may possibly be recrystallized foraminifera. A few angular quartz sand grains are present in the dolomite.	2418
Cuttings of brownish-gray, finely granular, dolomite and a number of fragments of whitish anhydrite	2424
Similar to the preceding sample from 2424 . . .	.2430
Light gray dolomite cuttings	2444
Cuttings of light yellowish-brown, fairly bituminous dolomite which contains considerable anhydrite and gypsum	2450
Similar to the preceding sample except that all the sulphate mineral is apparently anhydrite, no gypsum being noted	2476
Cuttings of light brownish-gray dolomite and whitish anhydrite	.2482

Fine cuttings of bluish-gray, dolomite and anhydrite mixed with finer cuttings of brownish-gray bituminous dolomite containing anhydrite	2489
Cuttings of light brownish-gray, slightly bituminous, sandy anhydrite-dolomite rock	2495
A bluish-gray, sandy, dolomitic anhydrite	2501
Cuttings of a fine-grained sandstone cemented with anhydrite and dolomite	2506
Cuttings of brownish-gray, slightly bituminous dolomite-anhydrite rock	2515
Like the preceding sample from 2515	2525-2530
Dark grayish-brown, strongly bituminous dolomite with numerous areas of anhydrite traversing it or scattered through it	2530-2536
Like the preceding sample from 2530-2536	2536-2543
Like the preceding sample from 2536-2543	2543-2550
Cuttings of strongly bituminous somewhat sandy dolomite and some anhydrite and calcite. Can smell petroleum without heating	2550-2555
Like the sample from 2550-2555	2562-2570
Brown, bituminous, sandy anhydrite-dolomite rock	2562-2570
Cuttings of brownish-gray bituminous, dolomitic and gypsiferous very fine sandstone	2570-2575
A dark brown, bituminous, sandy anhydrite-dolomite rock. Some gypsum also present	2575-2581
Fine cuttings of light to dark brownish gray anhydritic dolomite, sandy dolomite, and some anhydritic gypsum	2581-2585
Cuttings of dark brownish-gray, bituminous dolomite and dolomite-anhydrite rock	2590
About like the preceding. More selenite gypsum is present	2596-2604
Cuttings of medium-gray to brownish-gray sandy dolomite	2604-2611
Like sample from 2604-2611	2611-2615

Fine cuttings of brownish- bituminous dolomite and bluish-white and white anhydrite	2615-2621
Like the preceding except that sand grains are common in the dolomite and dolomite-anhydrite rock	2621-2627
Cuttings of dark brownish sandy dolomite or dolomitic sandstone containing anhydrite and gypsum	2627-2633
Cuttings of brownish-gray dolomite and white anhydrite-gypsum rock	2633-2640
Dark brownish-gray, bituminous, sandy dolomite and dolomite-anhydrite rock containing some gypsum	2640-2649
Like the sample from 2640-2649	2649-2660
Like the sample from 2640-2649	2660-2667
Cuttings of brownish-bituminous dolomite and whitish calcite-gypsum rock containing some unaltered anhydrite and dolomite	2667-2676
Cuttings of brownish-gray dolomite-anhydrite rock and some gypsum	2676-2684
Similar to the sample from 2676-2684	2684-2693
Similar to the sample from 2676-2684	2693-2701
Dolomite anhydrite rock having a coarse pseudo-oolitic texture	2701-2710
Like sample from 2701-2710	2710-2718
Cuttings of brownish-gray bituminous dolomite containing anhydrite and many cuttings of white, pearly gypsum	2718-2725
Brownish-gray dolomite and white anhydrite cuttings	2725-2735
A fine-grained, slightly bituminous, brownish-gray dolomite containing numerous small areas of anhydrite	2735-2745
A fine-grained, brownish-gray dolomite containing areas of anhydrite	2745-2753
Light gray, very slightly bituminous dolomite containing anhydrite	2753-2761
Like the preceding sample except more anhydrite and gypsum present	2761-2776

Like the preceding sample from 2761-2776	2776-2784
Like the preceding sample	2784-2793
Like the preceding sample	2793-2802
Like the preceding sample	2802-2810
Brownish, somewhat bituminous, anhydrite-bearing dolomite	2810-2818
Like the preceding sample	2818-2824
Cuttings of grayish-brown, somewhat bituminous dolomite containing a little gypsum and anhydrite	2824-2830
Cuttings of bluish-gray and cream-colored to creamy gray, partly dolomitic, fine-grained fossiliferous limestone... Many large foraminifera, bryozoa and a few fossils whose affinity is unknown occur. The only foraminifera noted belong to the genus Fusulina, a common Carboniferous and Permian genus. This Fusulina is about 7 mm. long and 4 mm. wide. The walls of the chambers are composed of very fine-grained calcite. The fillings of the chambers are coarsely crystalline calcite in irregular, sutured crystals. The bryozoa are elongated branching forms with elongated elliptical and rounded quadrangular chambers. There are two specimens of an unknown fossil present. This fossil is composed of two bean-shaped chambers of equal size with a prominent straight partition between them. The outer wall of the two chambers is heavy and has many short triangular spines on the outside. The spines are of approximately equal size, although the spine at each end of the junction line between the two chambers is a little longer and more slender than the others. This form is similar to the fossil figured in Fig. 13e of the Spur Well Bulletin, but is evidently a different species	2830-2841
Cuttings of bluish gray and creamy-gray somewhat dolomitic limestone and several fragments of chert...few fragments of limestone show Fusulina	2841-2851
Cuttings of light bluish gray and whitish crystalline limestone and a few chert fragments...This rock contains a great many small fragments of bryozoa, Palechinoid spines and other unrecognized fossils. One large Palechinoid spine in thin section shows a great number of tiny circular chambers arranged in rows. Several hundred of these chambers are present in one square millimeter	2851-2860

Cuttings of fossiliferous limestone and a little chert of about the same appearance as the preceding sample. A few smooth, blunt spines of Palechinoids are noted in the cuttings 2860-2869

Cuttings of bluish-gray, marly shale, whitish limestone, whitish dolomite and a little gray chert . . . 2869-2877

Cuttings of white and gray dolomitic limestone and bluish-gray chert.. and only a few traces of organisms can be noted 2877-2885

Like sample from 2830-2841. Fusulina is frequent in some cuttings 2885-2891

Cuttings of light gray, slightly dolomitic, finely crystalline limestone and some shert. In thin section a number of small sand grains and fossils are noted. Most of the fossils are too much recrystallized to identify. Those which can be determined are ostracods (?) and foraminifera of the genera Stacheia (?) and Orbulina 2891-2900

Like the preceding sample 2900-2907

Cuttings of creamy-gray, finely crystalline limestone and sandy limestone. Some chert replacing part of the limestone is present. A few palechinoid spines and a number of shell fragments, possibly pelecypods, are noted 2907-2920

Like the preceding sample 2920-2929

Cuttings of bluish-gray, calcareous sandy shale and white chert. Crystals of pyrite are present 2929-2935

Cuttings of dolomitic gray, fine-grained fossiliferous limestone...Thin section shows the rock to be highly fossiliferous. A triangular-shaped Textularia with a blunt apex is noted. Several bryozoa and Palechinoid spines are present 2935-2944

Cuttings of light gray limestone which effervesces very freely in cold acid 2944-2954

Cuttings of light gray dolomitic, sandy limestone....Fragments of palchinoid spines seen in thin section. Otherwise much like preceding sample. . . 2954-2964

Light gray limestone with a number of pieces of calcite 2964-2970

Rather fine cuttings of light gray limestone . . . 2970-2975

Fine cuttings of light gray limestone 2975-2982

Cuttings of light gray limestone	2982-2989
Cuttings of light gray sandy limestone and limy sandstone....In thin section fragments of bryozoans and Palechinoid spines are seen	2989-3002
Cuttings of light gray sandy limestone	3002-2009
Cuttings of light gray, dolomitic limestone .. Few bryozoan fragments seen	3009-3017
Cuttings of light gray sandy limestone and limy sandstone in which are seen a number of pieces of pure calcite....Number of fragments of shells are seen in thin sections. Fragments of bryozoa and palechinoid spines noted	3017-3025
Cuttings of bluish-gray, hard, calcareous sandy shale which grades into fine-grained shaly siltstone. ...Traces of a few tiny, coiled, foraminifera are noted in thin section of the more shaly material	3025-3033
Like the preceding except that more calcite cement is present	3049
Like the preceding sample	3095
Bluish-gray, calcareous, shaly siltstone	3106
Like the preceding sample	3132
Like the preceding sample	3146
Like the preceding sample	3153
Like the preceding sample. A few white, crys- talline calcite fragments are also present	3163
Cuttings of light gray, somewhat argillaceous, calcareous siltstone or very fine sandstone	3172
Like the preceding sample	3182
Like the sample from 3132	3192
A bluish-gray, calcareous, slightly shaly silt- stone	3206
Like the preceding sample	3224
Like the sample from 3132	3260
Like the sample from 3132 except that the cement is nearly all fine-grained calcite and a few angular sand grains up to 1/10 mm. and in diameter are noted . . .	3276

Like the preceding sample. Possibly a little more shaly	3290
Cuttings of dark gray, slightly calcareous, hard silty shale	3306
Cuttings of light gray, slightly calcareous and argillaceous siltstone or fine sandstone	3320
Medium gray siltstone or fine sandstone like part of the preceding sample	3340
Like the sample from 3306	3355
Like the preceding sample	3370
Like the preceding sample	3383
Like the sample from 3320	3395
Cuttings of fine sandstone, or siltstone, and sandy shale, much like the preceding	3407
Like the preceding sample	3420
Dark, bluish-gray, nearly non-calcareous, shaly siltstone	3430
About like the preceding	3440
Light to dark gray argillaceous non-calcareous siltstone	3455
Light gray, non-calcareous, argillaceous siltstone or fine sandstone	3466
Cuttings of dark to medium gray, shaly, non-calcareous, fine sandstone or siltstone	3486
Cuttings of dark gray, non-calcareous, shaly siltstone or silty shale	3508
Like the preceding samples	3520
Cuttings of dark gray, somewhat micaceous, shaly siltstone. A few tiny dolomite rhombs noted in thin section	3531
Like the preceding sample	3542
Like the preceding sample	3554
Cuttings of medium to dark gray, somewhat micaceous, non-calcareous shaly siltstone	3573

Like the preceding	3583
Cuttings of slightly calcareous, black, silty shale and grayish-brown silty or sandy dolomite	3592
Cuttings of dark gray or black dolomitic silty shale, gray and whitish shaly siltstone and brownish-gray sandy dolomite	3601
Cuttings of medium gray, dolomitic, hard, shaly, fine sandstone or siltstone	3609
Rather large cuttings of hard, medium-gray, dolomitic, somewhat micaceous shaly siltstone or silty clay	3625
Dark gray, slightly dolomitic, shaly siltstone or fine sandstone	3637
Mixed cuttings of dark, brownish-gray, sandy and shaly dolomite and medium gray to black shaly siltstone	3645
Dark gray, calcareous, shaly siltstone cuttings . .	3667
About like the preceding sample	3671
Cuttings of light gray, dolomite siltstone	3671-2679
Cuttings of light gray, sandy dolomitic siltstone with some muscovite mica	3679-3691
Cuttings of light gray, dolomitic and micaceous siltstone with some pyrite ...Shreds of vegetable material noted	3691-3699
Cuttings of gray, dolomitic siltstone, with some quartz grains, muscovite, and pyrite	3699-3708
Rather fine cuttings of dark, almost black dolomitic siltstone	3708-3712
Cuttings of dark gray, dolomitic siltstone. The rock is bituminous. In thin section several casts of radiolaria were noted	3712-3720
Cuttings of dark gray, dolomitic siltstone, with some quartz grains, and a few small mica scales..One radiolarian noted	3720-3725
Like sample from 3720-3725	3725-3730

Light dolomitic siltstone	3730-3739
Gray to dark gray dolomitic siltstone. 3749-3750, 3750-3760, 3760-3767, 3767-3773, 3773-3779, 3779-3790, 3790-3800, 3800-3808, 3808-3817, 3817-3827, 3827-3825	3835-3848
Gray to dark sandy dolomitic siltstone with some chert. 3848-3858	3858-3867
Light gray limestone and gray or light gray dolomitic siltstone. 3867-3873, 3873-3880, 3880-3888, 3888-3896, 3896-3905, 3905-3914	3914-3924
Dark gray calcareous shaly siltstone, and some in part dolomitic. 3923-3940-3940-3954, 3954-3965, 3965-3975, 3975-3985	3985-3998
Dark gray to black dolomitic silty shale, for the most part strongly bituminous, 3998-4012, 4012-4025, 4025-4039, 4039-4050, 4050-4064, 4064-4075, 4075-4090, 4090-4095, 4095-4108, 4108-4120, 4120-4132, 4132-4145, 4145-4153, 4153-4164, 4164-4173, 4173-4180, 4180-4188, 4188-4200, 4200-4215, 4215-4225	4225-4231
Cuttings of dark gray, almost black dolomitic shale with calcite and pyrite present. The rock is bituminous. In thin section the rock is seen to be brown siltstone with numerous shreds and splotches of carbonaceous and bituminous matter present. The rock is slightly laminated	4231-4240
Similar samples at 4240-4250	4250-4260
Cuttings of rock like that from 4240-4250 feet. The sample is highly bituminous. In thin section the rock is a brown laminated, dolomitic shale with shreds of carbonaceous material. Several sponge spicules and Radiolaria were noted	4260-4271

NOTE: It is believed that from 3025 feet the well is in the Word.
J. A. U. and E. W. B.

SUMMARY: 1. Dolomite with more or less anhydrite, anhydrite-dolomite rock, and some beds of dolomitic, gypsiferous sandstone. Much of the dolomite-anhydrite rock has a pseudo-oolitic texture. All more or less bituminous 2536-2830

2. Bluish-gray and cream-colored fossiliferous limestone (Fusulina, bryozoa, etc.) containing more or less dolomite in well formed rhombs and replacements of bluish-gray to white chert. A sandy calcareous shale or shaly siltstone at 2929-2935

3. Dark, slaty-gray, bituminous siltstone or silty shale,
more or less dolomitic or calcareous but practically non-calcareous
between 3430 and 3592 3025-3671

May 7, 1924.

Dr. J. W. Beede examined the Fusulina from 2839-2841' and
stated that this rock should be from the Lower Permian, probably
below the Word formation, but does not believe the Pennsylvanian
has been penetrated.

T. L. B.