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GROUND WATER RESOURCES OF LIBERTY COUNTY, TEXAS

By W. H. Alexander, Jr.

With section on surface-water runcff By Seth D. Breeding

Frepared in cooperation with the United States Department of the Interior, Geological Survey

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- Geologic map of Liberty County, and adjacent territory, Texas
 Geologic cross section A-A' Liberty County, Texas.
 Geologic cross section B-B' Liberty County, Texas.
 Relation of temperature of water to depth of screen in 19 pumped or flowing wells in Liberty County, Texas.

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October 1945

INTRODUCTION

Location and extent of area

Liberty County is a part of the Coastal Plain in scutheastern Texas and the south boundary of the county is 25 to 40 miles from the Gulf Coast. It is bounded on the west by Harris and Montgomery Counties, on the north by San Jacinto and Folk Counties, on the east by Hardin and Jefferson Counties, and on the south by Chambers County. The land surface is level to gently rolling except in areas bordering the valleys of the Trinity River and the East Fork of the San Jacinto River where it has been eroded into small hills. The minimum elevation is about 5 feet above sea level on the flood plain of the Trinity River at the southern boundary of the county and the maximum elevation is about 170 feet near Cleveland in the northwestern part of the county. The Trinity River crosses the county from north to south in a broad valley 4 to 8 miles wide and 25 to 50 feet below the general level. The county has an area of 1,160 square miles and in 194C, according to the U. S. Bureau of the Census, had a population of 24,541, an average of 21 persons per square mile. The principal towns and their population in 1940 are: Liberty, (ccunty seat) 3,087; Daisetta, 2,000; Cleveland, 1,783; Dayton, 1,279; Hall, 1,000.

Economic development

The economic development of Liberty County is diversified. The county ranks high as a producer of cil. During the year ending August 31, 1942, a total of 5,258,800 barrels was produced according to the Texas Almanac for 1942-44, published by the Dallas News. The total production in the county from 1918 to 1940, inclusive, was 129,640,000 barrels 1/. Other mineral resources are natural gas, sulphur, sand, and gravel. Considerable timber is cut commercially, especially in the northern part of the county. Agriculture is diversified, the most important crops being rice and cotton. Beef cattle and hogs are the major livestock products, but some sheep and goets are raised. Dairying is also an important industry.

^{1/} Leavenworth. P. B , Oil and gas production in the Texas Gulf Coest during 1940: Am. Inst. Min. Met. Eng., Petroleum Development and Technology, 1941, pp. 440-458.

Precipitation

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According to records of the United States Weather Bureau, the average annual precipitation at Liberty during 40 years was 51.05 inches. Among the wettest years were 1914 with 68.64 inches; 1919 with 85.08 inches; 1923 with 71.56 inches; 1926 with 62.13 inches; 1941 with 65.27 inches; and 1943 with 63.74 inches. The driest years include 1904 with 30.15 inches; 1909 with 39.36 inches; 1916 with 34.88 inches; 1917 with 29.82 inches; 1924 with 33.99 inches; and 1936 with 39.61 inches, The following table gives the U. S. Weather Bureau records of precipitation at Liberty by months.

Precipitation in inches, 1993 to 1944, at Liberty, Texas

Yoar	Jan.	Feb.	Mar.	Aur.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Anrual
1905	-	-	-	-		-	-	-	-	1.96	• 00-	1.60	-
1904	•08	2.20	• 07	5 70	4.00	4.50	2.50	2.85	2.00	1.70	1.65	2.90	30.15
1905	2.60	5.09	9.9 5	4.60	4.65	6.85	3.60	1.10	•40	2 65	4.70	5.10	51.29
1905	1.40	2,50	1.85	3.30	·80	•59	5,60	2,10	7.63	10.65	.75	4.30	41.47
1907	.61	2.11	2.70	2.65	18.10	2.2)	1.45	3.03	5.75	6.85	6.75	4,80	57.00
1908	3.65	8.00	2.35	9,50	4.39	5.95	4.10	3.66	6.32	2.24	1.66	1.31	53.04
1909	Т	1.88	• 67	1.85	5,02	7.01	5.17	2.29	• 60	8.25	2.51	4.11	39.36
1910	2.46	2.72	. 94	2,19	6.28	4.66	7.42	1.95	2.77	4.27	•82	6.06	42.54
1911	• 35	•04	3.98	6.52	5.08	3.83	8.93	2.54	1.68	2.82	2.24	14.10	52.il
195.2	1.31	2.98	4.65	7.68	5.86	6.39	3.90	5.50	1.16	1.22	1.41	11.79	53.85
1913	5.67	4.42	2.28	5.44	3.43	2.39	•65	4.85	8.49	9.13	4.28	5.13	56.1 0
1914	1.34	3.47	6.30	3.93	14.88	2.14	1.23	9.28	3.19	1.84	13.91	10.13	68.64
1915	3.44	4.38	3.16	3.30	1.65	• 37	4.80	22.70	1.48	2.60	3,45	6.30	57.63
1916	3.39	,18	т	2.27	7.69	1.08	4.09	4.12	5.73	• 32	2.94	3.97	34.98
1917	2.12	2.08	2.72	4.28	2.66	•13	5.38	3.96	+81	2.31	.92	1.95	29.82
1918	1.41	2.47	3.79	5.55	•81	3.97	1.17	2.66	3.21	5.12	6.36	4.89	41.41
1919	7.60	4.62	5.02	1,63	10.31	15.66	6.35	6.60	4.39	16.76	3.29	2.84	85.08
1920	6.22	2,05	2.24	• 33	6.25	6,19	3.24	9.64	1.18	9.87	4.08	3.99	55.28
1921	4.22	1,12	3,65	5.72	2.22	4,97	5.34	•56	5.71	1.12	1,04	7.19	42.86
1.922	6.31	3.27	7.44	4.93	5.58	7.24	5.39	1.51	1.46	1.25	7.14	4.48	56.00
1923	2.59	5.71	5.74	9,06	7,33	5.77	3.66	5.13	4.42	4.41	3.71	14.03	71.56
1024	5.34	4.77	2.47	3.81	4.42	3.08	, 93	2.24	1.16	Т	1.58	4.19	33.99
1.925	4.86	1,90	1.49	, 66	• 63	4.39	3.14	3,79	3.15	10.51	12.67	2.44	48.73
1926	6.25	1.68	11.27	4 • ਰਉ	4.19	9.32	4.23	3.25	5.47	5.60	2.01	3.98	62.13
1927	1.33	2,99	2.80	5,00	2.72	11.78	2.03	T	5 06	6.39	2.05	7.90	50.55
1020	1.24	4,40	1.87	2,90	7.03	9.29	2,00	3.67	3.53	3.15 1 02	10.00	0.02 9 70	57.97
1020	6 49	2 67 2 67	2.20	4.00	13.10	2 50	0,90 1 79	950	2.00	1,3%	70.21	5 36	10.27 10 10 10 10 10 10 10 10 10 10 10 10 10 1
1931	5.66	7.09	4,65	3.02	2.28	1.00	4.42	3.19	1.39	1,18	4.58	7.11	40.77
1932	7.78	4.24	1.24	1,91	3,38	4.38	1.23	6.88	1.81	1.42	2.51	6.09	42.87
1933		4,10	2.88	1,93	2.98	2.41	15.04	2.42	3.63	1.57	.63	3.30	-
1934	10.08	4,56	6.79	6.01	1,31	. 97	2.24	3.36	7.41	.69	6.04	3.69	53.15
1935	3.34	3.34	4.66	4.71	4.18	6.76	5.62	1.84	7.28	2.74	4,05	10.85	59.38
1936	1.40	3.72	.99	2,29	8.81	•39	6.55	1.24	2.16	2.45	2.72	6.89	39.61
1030	6.11	7.02	2.10	2 30	1 03	6 90	2 · 22	1 00	4 99	0,19	1 07	0.00	
1939	10.73	4.06	1.14	2.73	2.72	1.77	8.20	2.49	2.25	.71	3.38	3.21	43.39
1940	1.42	3.86	1.54	4.25	2.20	4.42	2.03	6.68	•83	4.84	10.33	10.37	53.47
1941	2.59	2.93	5.28	6.80	7 06	8.94	4.81	. 97	12,62	8,99	2.04	2.24	65.27
1942	3,59	3.05	3.00	8.50	3.29	6,82	7.33	7,45	5.11	3.22	2.18	2.55	56.09
1943	4.20	• 55	3.64	1.14	7.00	2,82	16,40	1.24	4,89	•70	6.79	4.80	54.17
1944	8.73	2,19	7.71	•76	13.42	1,80	2.01	8.59	1.91	1.66	5.93	9,03	63.74

Average -- 51.05

Acknowledgments

The writer is indebted to many persons who have contributed information for this report. The representatives of several oil companies, city officials of Liberty, Cleveland, and Dayton, and water-well drilling contractors furnished well logs and other important well data.

The work was done under the general direction of W. N. White, engineer in charge of ground-water investigations in Texas.

The water analyses were made under the supervision of W. W. Hastings, chemist of the Quality of Water Division of the U. S. Geological Survey. The results of the analyses, which relate to the mineral constituents in the water and not to its sanitary character, are tabulated in parts per million on pages 61 to 66.

OCCURRENCE AND MOVEMENT OF GROUND WATER

General principles

For discussion of the fundamental principles of the occurrence and movement of ground water the reader is referred to papers by Meinzer and Wenzel 2/.

Ground water is derived chiefly from water that falls as rain and snow. A part of the precipitation runs off in streams, a part is returned to the atmosobere by evaporation and transmiration of trees and other plants, and a part sinks be the zone of saturation in which all the interstitial openings of the rocks are filled with water.

In most places ground water is slowly but steadily moving under the influence of gravity from areas of intake to areas of discharge. In the more permeable rocks, such as coarse sand, gravel, and porous limestone, the water moves with comparative freedom although the movement is very slow as compared to the flow of a stream. Such rocks are capable of yielding abundant supplies of water to wells. In less permeable rocks such as shale or clay, molecular attraction and surface tension retard the movement of the water which may be almost infinitely slow. Such rocks yield little or no water to wells.

On the outcrop of water-bearing beds, the water is usually unconfined and does not rise in wells above the water table, which is the upper surface of the zone of saturation and the level at which the water is first encountered.

The water table is not a level surface, but it usually slopes in about the same direction as the slope of the land surface. It is generally high under areas of ground-water intake and low under areas of ground-water discharge. The land surface in places is lower than the water table in adjacent areas and in such localities some of the ground water emerges as springs. In some localities perched water accumulates above the main zone of saturation, especially during the winter and spring when the rates of evaporation and transpiration are low. Such supplies are usually small and are not dependable.

2/ Meinzer, O. E., The occurrence of ground water in the United States; U. S. Geol. Survey Water-Supply Paper 489, 1923; Outline of methods for estimating ground-water supplies: U. S. Geol. Survey Water-Supply Paper 638C, pp. 99-145,1931.

Wenzel, L. K., Method for determining permeability of water-bearing materials: U. S. Geol. Survey Water-Supply Paper 887, 1942,

Meinzer, O. E., and Wanzel, L. K., Physics of the Earth, vol. 9, Hydrology, pp. 385-478, McGraw-Hill, New York, 1942.

In areas down the dip of the water-bearing beds where the rocks are under cover and inclined between relatively impermeable strate, the water usually is under artesian pressure and will rise in wells above the level at which it is first encountered. If the altitude to which the water will rise is gr ater than the altitude of the land surface, flowing wells may be obtained.

The rocks underlying Liberty County to depths of at least 2,000 feet consist chiefly of clays and shales interbedded with sands. The beds are inclined, the dip being toward the Gulf of Mexico. The general slope of the land surface is also toward the southeast. Hence, artesian conditions occur in all parts of the county. The valley of the Trinity River is well known for its flowing water wells which range from 100 to 808 feet in depth. On the upland only the deeper wells flow, the shallowest flowing well being about 1,200 feet.

Most wells are subject to water-level fluctuations of varying magnitude. These fluctuations are due to many different causes, but most of them are a manifestation of a change in the ratio between the rate of ground-water intake or recharge and the rate of loss or discharge. Most water-table wells are supplied in part from intake areas close at hand and respond with a moderate lag to changes in rainfall. In very shallow wells the water level may rise sev ral feet after heavy rains and decline until the wells go dry during prolonged droughts. Artesian wells that draw from sand or sandstone and at considerable distanes from the outcrops of the water-bearing beds seldom are affected by seaschal or yearly changes in rainfall, although they may respond to the effect of a series of wet or dry years. Fluctuations in pressure in such wells and accompanying rise and fall in water levels are usually due to withdrawals of ground-water from the well itself or from other wells.

When a well is pumped the water level in the well drops and a hydraulic gradient is developed toward the well from all directions. It is this hydraulic gradient that causes water to flow toward the well. Within limits the amount of water that will enter a well veries directly with the amount the water level is lowered. For example, if a pumped well in fairly permeable material will yield 50 gallons a minute when the water level is lowered 10 feet, it will yield about 100 gallons a minute when the water level is lowered 20 feet. This ratio between the drewdown and the yield of the well is called the specific capacity and is expressed as yield in gallons a minute per foot of drawdown. The ratio is a v ry useful gage of the productivity of a well.

Heavy withdrawals of ground water are sure to be accompanied by a general lowering of the water table or artesian pressures, a cone of depression gradually spreading out in all directions from the center of pumpage until large areas may be affected. However, this is usually considered not very serious unless the rate of decline persists without a corresponding increase in the rate of pumping or the trend is such as to indicate that the pumping lift may eventually exceed the economic limit. In some areas beds carrying fresh water are overlain by beds carrying salty water and excessive pumping may lead to the invasion of salt water into the wells.

GEOLOGIC FORMATIONS AND THEIR WATER-BEARING PROPERTIES

With the exception of recent alluvial deposits along the Trinity River and one small area of Willis sand in the northwestern corner of the county, the rocks that crop out in Liberty County are of Pleistocene age and belong to the Lissie formation and Beaumont clay (see geologic map, fig. 1). These rocks are underlain in downward succession by the Willis sand (and possibly by the Goliad sand), Lagarto clay, and Oakville sandstone, Catahoula sandstone, and older rocks. The Oakville sandstone and Lagarto clay have not been differentiated east of the Brazos River on the U. S. Geological Survey map of Texas and are considered in this report as though they were one unit. The rocks of these formations crop out in Montgomery, San Jacinto and Polk Counties, and a part of the outcrop area is shown on the geologic map. The Goliad sand has not been identified in outcrop in this part of Texas, but may be present and hidden by overlap of younger formation.

The information given below is based in part on Bulletin 3232 of the Texas Bureau of Economic Geology 3/, in part on recent articles in the Bulletin of the American Association of Petroleum Geologists, and in part on well logs obtained by the writer,

Beginning with the Orkville sandstone and Lagarto clay, the rocks are listed in the order in which they were deposited or in age from oldest to youngest. This is the order in which the outcrops are successively crossed in travelling over the area from northwest to southeast.

Miocene and Pliocene series

<u>Oakville sandstone and Lagarto clay</u> - The beds of the Oakville sandstone (Miocene) and Lagarto clay (Miocene?) which, as previously mentioned, crop out in Montgomery, San Jacinto and Polk Counties, dip southeastward toward the Gulf at the rate of about 60 feet to the mile (see figs. 2 and 3). In northern Liberty County they consist predominantly of clay, usually containing calcareous layers, but include important beds of water-bearing sands. They are believed to have a total thickness of at least 1,400 feet. At Cleveland, in the northwest corner of the county, wells in sands of these formations yield water of good quality. Down the dip in the central part of the county the water becomes brackish. The estimated position of the contact between fresh and brackish water in these formations based on the writer's interpretation of electrical logs of a few oil tests, is shown by the dashed lines in figures 1 and 2.

<u>Willis sand (and Goliad sand?)</u> - The Willis sand of Pliocene (?) age and possibly the Goliad sand of Pliocene age crop out in a belt 10 to 15 miles wide, paralleling and just south of the outcrop of the Oakville sandstone and Lagarto clay. The Willis sand has been described 4/ in general as a red sand, coarse and gravelly in part, and slightly indurated, having a total thickness of about 85 feet.

3/ Sellards, E. H., Adkins, W. S., and Plummer, F. B., The Geology of Texas: vcl. 1, Stratigraphy, Texas Univ. Bull. 3232, pp. 727-795, 1932.

4/ Dcering, John, Post-Fleming surface formations of Coastal Scutheast Texas and South Louisiana: Am. Assoc. Pet. Geologists Bull. vol. 19, pp. 660-668, 1935.

1 leistocene and Recent series

Lissie formation - The Lissie formation of Pleistocene age overlies the Willis sand (and Goliad sand?) and appears in outcrop in a belt about 15 miles wide, paralleling and just south of the outcrop of the Willis sand (see fig. 1). The Lissie formation has been described by Meyer 5/ as a sequence of gravels, sands, sandy clays, and clays which are distinguished from the underlying Willis sand by a generally finer texture and from the overlying Beaumont clay by a generally coarser texture. However, in Liberty County it is not possible to differentiate between the beds of the Willis sand, Goliad sand (in present), and Lissie formation in drillers' and electrical logs, and for convenience in this report the combination will be called the Lissie formation. The total thickness of the Lissie formation, as thus designated, ranges from about 200 feet in the northwestern part of the county to about 1,400 feet in the southern part. The individual beds of sand range from a few feet to about 80 feet in thickness.

In the morthern and central parts of the county the Lissie formation contains frash water at all depths, but in the southern part the middle and lower beds contain brackish or salty water. The estimated position of the contact between the fresh and salty water in the formation in the southern part of the county is shown in figures 2 and 3.

Beaumont clay - The Braumont clay of Plaistocene age overlies the Lissie formation. and its outcrop area covers all the county south of the outcrop of the Lissie. The Beaument clay has been described 6/ as being composed of calcareous, mottled clays and sand, and silt, with clays locally comprising as much as 80 percent of the formation. Surface exposures of sand in the Beaumont clay are largely confined to narrow belts which are believed to be old stream channels. The individual beds of sand range in thickness from a fraction of a foct to 30 feet, and locally slightly mcre. Drillers' logs of wells within a belt which extends for 5 or 6 miles south cf the outercp belt of the Lissie formation show a distinct contrast between the clays and thin sands of the Beaument clay and the thicker sands of the underlying Lissie formation. Farther south the distinction is not so sharp and the lower limit of the Beaumont clay is difficult to define. "The Beaumont clay thickens from a feather-eige at the Lissie outcrop to an estimated depth of about 400 feet in the scuthern part of the county. The sands in the Beaumont are finetextured, and it is usually more difficult to develop a satisfactory well in them than in the sands of the Lissie formation.

<u>Alluvial deposits</u> - Deposits of Recent alluvial sand. clay, and gravel, having a thickness of a few feet to 80 feet, are reported in drillers' logs of water wells in the flocd plain and adjacent terraces of the Trinity River. The alluvium covered area ranges from 4 to 8 miles in width and extends all the way across the county. These deposits are an important source of ground water for domestic use and stock. The water is of varying chemical quality, but is usually potable.

5/ Meyer, Willis G., Stratigraphy and historical geology of Gulf Coastal Plain in vicinity of Herris County, Texas: Am. Assoc. Patrolaum Geologists Bull., vcl. 23, pp. 188-190, 1939.

6/ Meyer, Willis G., op. cit., pp. 190-192. Plummer, F. B., cp. cit., p. 788.

PRESENT DEVELOPMENT OF WATER SUPPLIES FROM WELLS

One railroad in Liberty County uses water from the Trinity River, but with this exception all the public and industrial water supplies in Liberty County are obtained from wells. In 1944 approximately 24,000 acres of rice was grown in the county, of which about 4,000 acres was irrigated from wells. Most of the ground water is obtained from the Lissie formation from wells ranging between 350 and 1,000 feet in depth.

Most of the wells in the rural areas are less than 50 feet in depth and furnish small supplies of water for domestic use and stock. Such supplies can be obtained almost anywhere in the county from shallow wells. In the northern part of the county and in the Trinity River valley shallow bored or dug wells are common but in the southern part practicelly all the wells are drilled.

The development of ground water in different parts of the county is briefly discussed below.

Northwestern part of the county, Cleveland-Hightower area

The railroad well at Cleveland (well 2), is 1,512 feet in depth and draws water from the Oakville sandstone - Lagarto clay sequence. When the well was completed in 1937 it is reported to have had an artesian flow of 30 gallons a minute. At present it is equipped with a deep-well turbine pump and a 5-horsepower electric motor by means .f which water is raised to an elevated storage tank. The pumpage from this well is estimated to have averaged about 220,500 gallons a day in 1944.

The municipal water supply of the city of Cleveland is obtained from wells 7 and 8, respectively 845 and 929 feet in depth, drawing from the Oakville sandstone - Lagarto clay sequence. These wells were drilled in 1938 and each had an initial yield of 350 gallons a minute with a drawdown of 70 feet. The pumpage from the two wells is estimated to have averaged 97,000 gallons a day in 1944.

Well 21, about one mile west of Hightower, reported to have been 1,200 feet in depth, also drew from the Oakville sandstone - Lagarto clay sequence. The well was destroyed in 1939.

Several wells in the Cleveland area are used to supply water to lumber mills, and oil pipeline pump stations. These wells range from 100 to about 300 feet in depth and draw water from the Lissie formation.

Wells 14 and 15. about 4 miles southwest of Cleveland in the valley of the East Fork of the San Jacinto River, have small flows, although they are comparatively shallow, the reported depth being 197 and 327 feet deep, respectively. The flow of each was estimated as about 10 gallons a minute in April 1945. The water is used for household supply.

Well 20, about six miles northeast of Cleveland. supplied water for the irrigation of 250 acres of rice in 1944. The well is equipped with a deep-well turbine pump and a 125-horsepower diesel engine. It is reported to yield 900 gallons a minute.

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All the wells in this area for which analyses are available yield water of comparatively low mineral content (see table of analyses pages 61 to 66). In general, the hardness of the water decreases with depth, the water from wells 2 and 22, the two deepest wells, being exceptionally soft. However, some of the shallow wells yield very soft water; wells 11, 20, and 25, for example.

Northeastern part of county, Romayor-Rayburn area

The Romayor area is locally well known for its flowing water wells. Information was obtained on 13 such wells, wells 44 and 45, and 47 to 57. The flow from 9 of the wells was measured with a current meter, or with a barrel or smaller container, and the flow from 3 of them was estimated. It was noted that with one or two exceptions the deeper wells (580 to 808 feet in depth) have the largest flow, the range in flow being from 152 to 205 gallons a minute. The flow from the shallower wills (100 to 480 feet in depth) is comparatively small, ranging from 4 to 60 gallons a minute. At the time of the investigation three of the flowing wells were used to supply savmills, one to supply locative boilars, two for washing gravel and demestic supply; and six of the wells were unused.

Woll 50 at the Santa Fe Railroad station at Remayor, used to supply loccmotives, is 645 feet in depth and had a flow of 205 gellens a minute, the largest in the area. The artesian head in this well was 37 feet above the surface in January 1945. The well supplied an average of only about 55,000 gallens a day in 1944, the flow being out off most of the time.

The non-flowing wells of the area are shallow and used for domestic purposes and stuck.

The water from nearly all the wells recorded in the Romayor-Rayburn area is how in total dissolved solids. In four wells less than 200 feet in depth, the hardness ranges from 11 to 135 parts per million and averages 90 parts per million. In 11 wells between 233 and 808 feet in depth the herdness ranges from 88 to 168 parts per million and averages 122 parts per million.

Scuthwestern part of county, Dayton area

The largest development of ground water in Liberty County is in the rice-growing district near Dayton where a total of about 4,000 acres of rice was irrighted from wells in 1944. This development was started in 1943 and by the spring of 1945 twelve irrightion wells had been drilled. The irrightion wells are numbered 76 to 79 inclusive; 81, 82, an' 84 to 89, inclusive. Well 87 had a flow of about 30 gallons a minute when it was visited, and is reported to be 2,500 feet in depth. The others range from 558 to 1,005 feet in depth and average about 800 feet. The water level in four of them ranged from about 38 to about 54 feet below the surface when the wells were measured by the writer in the spring of 1945, before the start of the irrightion season. The reported pumping yield of 10 of the wells (given in the remarks column of the table of well records) ranges from 1,170 to 3,500 gallons a minute. Well 78 is reported to have a specific capacity of about 26 (yield in gallons a minute per four of drawdown), and well no. 82 a specific capacity of about 20. The wells are equipped with deep-well turbine pumps and diesel engines.

The casings in the rice wells are perforated opposite all the principal waterbearing sends, storting at depths as shallow as 118 to 150 feet in some wells and at greater depths in others, for example, at 389 feet in well 78, The boundary between the base of the Beaumont clay and the top of the Lissie formation is easily recognized in drillers' logs of the rice wells and varies in depth from 146 to 370 feet below the surface. Most of the wells are supplied with water from both formations. The individual sands in the Beaumont clay range from 10 to 30 feet in thickness and are not numerous, while in the underlying Lissie formation the drillers' logs of some of the wells show sands ranging upword to 80 feet in thickness and comprising 60 to 75 percent of the sediments penetrated (see logs of wells 78, 82, 84, 85 and 90).

The public water supply of the city of Dayton is obtained from wells 119 and 120, respectively 395 and 399 feet in depth. Each well is equipped with a deepwell turbine pump operated by a 15-horsepower electric motor. The original yield of these wells is reported to have been 300 gallons a minute each with a specific capacity of about 27. The pumpage from the wells is estimated to have averaged 190,000 gallons a day in 1944 of which 65,000 gallons a day was used by the city and 115,000 gallons a day in 1944 of which 65,000 gallons a day was used by the city Railroad. The water is obtained from a sand 75 to 80 feet thick in the upper part of the Lissie formation and is of fairly good chemical quality.

As shown by the analyses of water from about 30 wells(see table pages 61 to 66). the ground water in the Dayton area shows a rather wide range in chemical content. There is a tendency for the total diss.lved solids to increase and the herdness to decrease with depth, but several wells show exceptions to this general rule. In most of the wells of shallow or moderate depth, the water is mather hard.

South-control part of county. Liberty, Moss Bluff, Rayburn and Daisetta areas

Information was obtained regarding 10 flowing wells in the Liberty area of which nos. 175, 191 to 184 inclusive, 188 to 190 inclusive, and 199, were drilled between 1895 and 1911 and one, well 187, was drilled more recently. Six of these wells are in use today: two furnish a part of the public supply for the city of Liberty, two are used for stock one furnishes water for a swimming pool, and one is used as a domestic supply.

Most of the public supply of Liberty is pumped from well 179, which is 565 feet deep, and is reported to have had a yield of 321 gallons a minute with a specific capacity of about 7 when completed in 1939. Well 180, 351 feet deep, serves as an additional supply. Both wells are equipped with deep-well turbine pumps and electric motors. Two flowing wells, nos. 178 and 182, respectively 680 and 651 feet in depth, also contribute a small supplementary supply. The production from the four wells in 1944 is estimated to have averaged about 115,000 gallons a day.

The ice plant of the Trinity Valley Cold Storage Company at Liberty is supplied from well 195, 350 feet deep, which is equipped with a deep-well turbine pump and electric motor, and has an average production of 3,000 gallons a day.

According to the logs of the deeper wells at Liberty, the individual sands range from 15 to 40 feet in thickness and in the aggregate make up about 25 percent of the total thickness of the sediments penetrated by the wells. The city water supply is obtained from sands which are probably in the upper part of the Lissie formation. In well 168, below a depth of 320 feet which is regarded as the base of the Beaumont clay, sands make up about 70 percent of the material logged. Analyses of well waters in the Liberty area show a rather wide range in mineral content. In 7 wells, 260 to 651 feet in depth, the total dissolved solids ranged from 312 to 750 and averaged 454 parts per million; the hardness ranged from 63 to 234 and averaged 170 parts per million; and the chloride ranged from 46 to 303 and averaged 156 parts per million.

Twenty-two of the water wells recorded in this part of the county are in the vicinities of Moss Bluff and Rayburn, respectively south and east of Liberty. One well (no. 218) was drilled to a depth of 1,500 feet as an oil test, then pulled to 800 feet. It has a flow of about 50 gallons a minute but is unused. Thirteer of the wells are less than 250 feet in depth and 9 range from 275 to 538 feet in depth. One well (no. 213), 628 feet in depth, wes not completed when it was visited in May 1945. Well 223 and 224, respectively 349 and 568 feet in depth, formerly supplied water for oil drilling rigs. These two wells are in Chambers County, a short distance south of the Liberty County boundary. The remaining wells are used for demestic purposes and stock. Logs of 9 water wells and 2 oil tests are given in the table of drillers' logs.

In the Moss Bluff-Rayburn areas, analyses of samples from 7 wells, ranging in depth from 137 to 528 feet, showed an average of 750 parts per million in total dissolved solids, 300 in chloride and 144 in hardness. Five wells less than 100 feet in depth yield water having a rather wide range in mineral character.

Well 166, 365 feet in depth, owned by the Hull-Daisetta Water Company, furnishes the public supply for Daisetta. This well is equipped with a centrifugal pump and a 5-horsepower electric motor and the average pumpage is estimated to have been 50,000 gallons a day in 1944. Well 173, 255 feet in depth, supplies water for a drilling rig. Well 168, 3 miles west of Daisetta, drilled to a depth of 703 feet in 1917, is reported to have furnished enough water by pumping to irrigate about 500 acres of rice in 1918. The well is no longer in use,

Wells 166 and 173 yield water of relatively low minoral content, 288 and 358 parts per milli n total dissolved solids, respectively. Well 175, 161 feet in depth, yields water containing 631 parts per million of total dissolved solids and 946 parts per million of chloride.

Scutheastern part of the county, Devers area

Water for the irrigation of rice in the area is supplied from the Trinity River. Of the 22 wells recorded in this area, 12 are less than 250 feet in depth and 10 range from 318 to 501 feet. Wells 227 and 237, respectively 406 and 492 feet in depth, formerly furnished water for the operation of oil pipe line pump stations, but are now used for domestic supply. Wells 232, 245, 246, 247, and 248, respectively 232, 224, 344, 335, and 318 feet in depth, formerly supplied water for drilling oil tests, but are now unused. The remaining wells are used for domestic purposes and stock.

Analyses of samples from 18 wells in the Devers area show a rather wide range in the chemical character of the water. The range in total solids, chloride and hardness is indicated in the following table.

Numba:	r Darth	Motol Janés Ja-				TT - 3	
Q1	Descon	TCTHI MISSULV	a serias	Unieria	-) -	Haranes	35
wells		Range	Avorage	Range	Average	Range	Average
11	92 to 23	1 274 to 204	504	55 to 300	127	110 t¢ 350	203
7	400 to 50	L 420 to 932	644	68 to 344	209	55 to 104	69

Chemical content of ground water in Devers area (in parts per million)

ESTIMATED WITHDRAWALS OF GROUND WATER

The withdrawals of ground water for irrigation. and for municipal and industrial purposes in Liberty County is estimated to have averaged about 7,500,000 gallons a day in 1944. The distribution of the draft for these uses is shown in the following table.

> Estimated average daily withdrawals of ground water in Liberty County in 1944 (in gallons a day)

Irrigation	6,780,000
Industrial	
Railroads	390,000
Sewmills	5,000
	395,000
Municipal	
Liborty	115,000
Cleveland	95,000
Dayton	65,000
Daisetta	50,000
	325,000
Grand Total	7,500,000

In computing the above figure on the amount pumped for the irrigation of rice, it was estimated that 4,000 acres was irrigated and that an average of 1.9 acre-feet of water was applied to each acre of land. In order that a comparison can be made between the volumes of water used for each purpose, the rice pumpage is expressed as a daily average, although the water is used only during the summer.

TEMPERATURE OF GROUND WATER

The temperature of ground water has become incr asingly important in the last few years because of the large quantities of water used for cooling and air conditioning. The relation of the temperature of the water to the depth of the screens in 19 flowing or pumped wells in Liberty ^County is shown graphically in figure 4. Most of these wells have only one section of screen, and the middle of the screen section was considered to be the point of entry of the water into the well. Measurements were made with a mercury thermometer, and in pumped wells no measurements were made until the pump had been in operation for at least half an hour. The temperature for wells of about the same depth veries somewhat and the heavy line in the graph has been drawn to represent the approximate average. Based on this median line, the average rate of increase in temperature is one degree Fahrenheit to each 94 feet increase in depth.

SURFACE WATER SUPPLIES

Stream runoff

By

S. D. Breeding, Associate Engineer Surface Water Division, U. S. Geological Survey

The principal stream in Liberty ^County is the Trinity River which traverses the county from north to south near the center, and with its tributaries, drains about one-half of the county. The eastern part of the county is drained by the West Fork of Fine Island Bayou, a tributary of the Neches River, and the northwestern part is drained by the East Fork of San Jacinto River and its tributary, Luce Bayou. The extreme southwestern and southeastern parts of the county are drained by small coastal streams.

Records of daily flow have been obtained for the Trinity River at a gaging station at Remayor near the northern boundary of the county since May 1924, and for the East Fork of the San Jacinto River at a station near Cleveland since April 1939. In addition, records of the daily flow of the Trinity River at Liberty have been obtained since 1940 when the flow amounted to 4,000 cubic feet per second or the the flow at thet point has been below 4,000 cubic feet per second the lecords have not been prepared because of tidal effect. These records were collected by the U. S. Geological Survey, in cooperation with the Texas Board of Water Engineers, and have been published in Geological Survey Water-Supply Papers which are obtainable at the Government Printing Office, Washington, D. C. Copies of the papers may be consulted at the Washington office of the Geological Survey, or at the offices of the Survey and the Texas Board of Water Engineers in Austin.

Records of rainfall collected at Liberty (south-central Liberty ^County) by the United States Weather Bureau from October 1903 to date, with the exception of January 1933, are tabulated elsewhere in this report. These records show the average annual rainfall for the 40 complete years of record, through 1944, to be 51.05 inches. For the 41 years included, the annual rainfall varied from a minimum of 29.82 inches in 1917, to a maximum of 85.38 inches in 1919. However, the minimum 12 consecutive months of rainfall occurred June 1924 to May 1925, and amounted to 21.82 inches. Annual rainfall of less than 40 inches occurred in only six of the 40 complete years of record, namely - 1904, 1909, 1916, 1917, 1924, and 1936.

The following tables give the maximum and minimum runoff in one day and in one month, the average daily run-off, and the total yearly run-off, in acre-feet, at the gaging station on the Trinity River at Remayor from 1925 to 1943 inclusive, and at the station on the East Fork of the San Jacinto River near Cleveland from 1940 to 1942 inclusive.

Run-cff of Trinity River in acra-feet at Remayor, Taxas,										
		1925-43,	(Drainage	area, 17,190	square miles) •				
Colendar	Maximum	Minimum	Average	Maximum	Minimum	Total				
yea r	day	dav	daily	menth	month	yearly				
1925	90,400	262	5,670	1,030,000	9,850	2,070,000				
1926	92,400	823	17,700	1,380,000	107,000	6,440,000				
1927	80,500	774	15,600	1,190,000	29,700	5,670,000				
1928	·		8,930	582,000	16,000	3,230,000				
1929	132,000	793	18,900	2,240,000	30,400	6,880,000				
1930	114,000	486	15,500	1,420,000	20,800	5,650,000				
1931	48,800		9,560	725,000	23,900	3,490,000				
1932	101,000	1,040	21,800	2,090,000	35,200	7,980,000				
1933	61,300	803	10,300	972,000	34,200	3,750,200				
1934	87,470	357	10,350	1,290,000	15,200	3,779,000				
1935	122,200	1,500	23,740	2,823,000	100,200	8,667,000				
1936	49,590	585	8,315	677,200	21,240	3,044,000				
1937	42,840	486	8,188	845,600	26,100	2,989,000				
1938	81,920	700	17,470	1,750,000	28,720	6,376,000				
1939	60,300	417	6,379	419,700	14,650	2,328,000				
1940	120,600	793	17,760	2,658,000	25,930	6,500,000				
1941	103,900	2,192	28,320	1,751,000	158,600	10,340,000				
1942	218,200	1,469	25,210	3,732,000	177,200	9,206,000				
1943	44,630	781	10,560	847,100	47,240	3,854,000				

Run-off of East Fork San Jacinto River near Cloveland, Texas, in acro-feet, 1940-42

Calendar Yaar	Maximum day	Minimum day	Av rage daily	Maximum month	Minimum menth	Tctal yearly
1940	85,690	15	954	184,500	669	349,100
1941	26,980	50	940	64,310	2,210	343,400
1042	12,460	54	555	52,040	2,460	202,900
	1	Ncte: An req of 325	acre-foot uired to one foot	is the quant cover one acr and amcunts t ons.	ity of watar a to a daoth c about	

No continuous records of the flow of any of the small streams in Liberty County have been obtained; however, sufficient periodic measurements have been made on Luce Bayou at a point near its mouth to show that during periods of drought its flow is very small or may cease altogether.

The data indicate that abundant supplies of surface water are available in Liberty County from the Trinity River and other streams within the county, but storage will have to be provided if large continuous supplies of water are to be obtained.

Quality of water of Trinity River in Liberty County

Analyses of water from the Trinity River near Romayor are available in a report issued by the Texas Eoard of Water Engineers $\underline{a}/$, Specific conductance and chloride of daily samples, with occasional partial enalyses of composite samples, have been made on daily samples collected from the Trinity River near Romayor from October 1941 to September 1942, and from January 1944 to September 1944.

The water during these periods was generally of good chemical quality. The analyses show that the dissolved solids exceeded 500 parts per million only on 11 days during the 21 months of study. The dissolved solids were less than 250 parts per million more than one quarter of the time. The hardness of the Trinity water was greater than 100 parts per million at most times.

SUMMARY

Liberty County is in the Gulf Coastal Plain of southerstern Texas in the second tier of counties back from the Gulf.

The geologic formations discussed in the report in upward sequence consist of the Onkville sendatone of Miocene age, and the Legarto clay of Miocene (?) age, the Willis send of Plicopne (?) age, and the Lissie formation and Beaumont clay of Pleistocene age. The rocks of these formations crop out in belts roughly parallel to the Gulf shore, and dip southeastward. As one travels across San Jacinto and Liberty Counties from northwest to southeast the belts of outcrop are traversed in the above order beginning with the Oakville sandstone and Legarto clay.

The land surface slopes southeastward toward the Gulf at a rate less than the dip of the rocks, consequently, artesian conditions exist in all parts of the county. The valley of the Trinity River is well known for its flowing wells which range from 100 to 808 feet in depth.

Most of the ground we have used in the county is obtained from wells ranging in depth from 350 to about 1,000 feet and is drawn from the Lissie formation. Wells yielding from 1,000 to 3,500 gallons a minute and ranging from 740 to 1,030 feet in depth have been developed for rice irrigation in the North Dayton area in the southwestern part of the county. These wells draw mostly from sends in the Lissie formation but most of them are also screened in overlying thinner sonds in the Beaument dlay. The municipal water supplies of Liberty, Cleveland, Dayton, and Daisetta are obtained from wells ranging from 350 to 833 feet in depth with reported yields of from 300 to 350 gallons a minute.

Most of the wells in the rural areas are loss than 50 feet in depth and furnish small supplies of water for demostic use and stock. Such supplies can be obtained almost anywhere in the county from shellow wells in the Lissie and Beaumont formations or alluvial deposits.

a/ Chamical Composition of Texas Surface Water, 1938-1944, by W. W. Hastings and J. H. Rowley. Mimeographed report, Texas Board of Water Engineers, and U. S. Department of the Interior, Geological Survey, and others. The average daily withdrawals of ground water for irrigation, public supply and industrial use is estimated to have been about 7,500,000 gallons in 1944, divided as follows: irrigation, 6,780,000 gallons; public supply, 325,000 gallons; industrial use, 395,000 gallons.

As shown by analyses of water from 145 wells and springs the chemical choracter of the ground water varios materially in different localities and in different wells in the same locality. In general the water is relatively low in total dissolved solids but somewhat hard. Beds containing comparatively fresh water extend to depths exceeding 1,000 feet in the northern and central parts of the county, and to a few hundred feet in the extreme southern part according to estimates based on electrical logs of 8 oil tests. These logs are shown in cross sections A-A' in figure 2 and B-B' in figure 3, and extend across the county from northwest to southeast.

Abundant supplies of surface water are available in Liberty County from the Trinity River and other streams within the county, but storage will have to be provided if large continuous supplies of water are obtained.

According to daily tests of water from Trinity River from October 1941 to September 1942, and from January 1944 to September 1944. the total dissolved solids exceeded 500 parts per million on only 11 days during the 21 months of study and was less than 250 parts per million more than a quarter of the time. The hardness was greater than 100 parts per million most of the time.

	All wells	s are drilled unless	otherwise noted in	n the	remark	s culum	n
1	:	1	1	1	1		Height of
"oll	Distance	Owner	Driller	Date	Depth	Diam-	measuring
2	from	2		com-	of	eter	point
1	Cleveland	* 8. 1	1 2 9	plo-	woll	of	above
1	:	4	1	ted	(ft.)	well	ground
) :	1		1 1	(in.)	(ft.)
1	In Cleveland	Gulf Colorado and	R. C. Davant	1916	1,360	8,6,4	0.0
1		; Santa Fe R.R. Co.	1	:	1	1 · · ·	
		•	1 2			, ,	
1 2			1			;	
2	do,	do.		1937	1,512	13.	0.0
1			1	1	1 1	8-5/8	•
			t 7	1	1	6.4	
3	do.	Gulf States	A.J. Lesteriette	1905	306	4.3	0.0
1		Utilities Co.		1	7 1 4		
4	7 ¹ / ₂ miles	Jordan Campbell	Humble Oil and	1920	2.000		
1	south		Refining Co.		1	1	
5	2 miles	Hernbeck	d0.	1931	5.633	· · · · · ·	
1	southwest			-	ļ - , Ļ	t i	
6	do.	Humble Oil and	F. Gav	1931	125		
1	•	Rafining Co.	1				
7	In Clevelard	City of Claveland	Lavne-Texas Co.	1938	845	13-378	3. 0.0
		1			1	7	,
		8		1			
- 2 -	d0.	b.	. 06	1938	929	13-3/8	0.0
						1 7 1	,
		1 2		1			
- 9	54 miles	Black Glid		1954	05	6	
	southeast	Petroleum Co.		1001		1	
10	34 milas	Russ Mitchell Co.	Pitre Water Woll	1936	304		1.6
	sintheast		Drilling Co	1500			1.0
11	In Claveland	Crimes Veneer		1077	00	6	0.0
	TH OTSACTUR	and Eanel Co.		1 201	50		0.0
· 12	05	Claveland Voncon Co		1030	300		0.0
10 1	u v •	oreverand veneer co.		1,1,200	1 300	1 1	0.0
1.2	do	Clempland Mfr. Co		1075	200	6	0.0
10	u Çi ş	oreverand mige ooe		1200	200	0	0.0
	4 milon	Concern Mfra (lo	l	1010	107	<u>i</u> i	0.0
T.L 1	a miles	GLOBAIL MILE, CO.		1910	1 701	4	0.0
	Southwest						
i			1 1	1			
	Al miles		i Tional and	1000	707		
10	entprest	L ULARKSON AND	rora ana	1920	1 327	1 8	
	Southwest		Thompsen	1040		<u>.</u>	
10	48 m1148	Guir Oil Corp	1 	1940	100	4	0.0
	soutneast		······				
17	TU CLAVATANU	Magnetia Pipe Line		1919	175	; 6	
	4			1000			
TR	4 m1108	W. L. Honry	L. L. Chambers	1944	T8	12	0.0
	SUULIW'SL	Chall Art C			· · · · ·	 	
та	4 M1198 .	Snell Uil CO.	L. latterson	1944	179	4	0,0
	SOUTHOAST	•			!	1	

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a' Plus (+) indicates water level above measuring point.

b/ Pump or lift; T, turbine; Cf, centrifugal; A, air lift; C, cylinder; B, rope and bucket,
For the state of the

Power: E, electric; G, gas or masoline engine; S, steam; W, windmill; H, hand. Number indicates horsepower.

of these wells and springs are given in f analyses		Remarks		<pre>sreens: 690 to 710; 763 to 784, 912 to 952, ,190 to 1,203 1,258 to 1,298 feet. Re- brted flow Dec. 1916, 300 gallons a minute. splaced by well no. 2 in October 1937.</pre>	<pre>sreened in five sands between 1,181 and ,478 feet. Reported flow Oct. 1937, 30 allons a minute. Supplies locomotive boilers</pre>	<pre>sreen from 364 to 386 feet. Well See log. saled in 1938. Formerly used for municipal</pre>	il test. See log. water supply.	Do.	sreen from 105 to 125 feet. Formerly upplied water for drilling oil test.	<pre>ity wall 1. Screened in [Hornbeck well 1] sands between 618 and 833 feet. Reported teld 378 gallons a minute on June 17, 1938.</pre>	It well 2. Screened in 3 sands between 14 and 833 feet. Reported yield 353 gellons minute on June 17, 1938, Temperature $73\frac{1}{2}$ F.	upplied water for drilling rig. See log. se log.	vner's well 1. Supplied water for construc- ion of concrets highway. See log.	upplies beilers at lumber will.	sreen at 277 to 300 foet. Supplies boilers : lumber mill	ipulies boilars at lumber mill.	lcw estimated 10 gallons a minute on Apr. 6, 945. Formerly supplied water for boilers at awmill. Hydraulic ram pumps water to tank or domestic use of six families.	creen at 287 to 327 feet. Flow estimated 10 allons a minute on Anr. 6, 1945. Formerly	steen at 94 to 100 supplied graval pit. set. Supplies water for boilers at pump	upplies water for vipe line pump station.	sreen at 15 to 18 feet.	preen at 129 to 152 foet. Formerly supplied stor for drilling oil test. (Gregan well 1).	railroed; D, domestic; S, stock; N, not used ar. . Ş, Geological Survey Water-Supply Paper
rom most table o		Use	vater c/	N N N	RR. S I	N N N	0	 	N S S S	д 	ю о о 	N N	r 0 • • • •	Ind	Ind S a	Ind S	н н юч	ນ ຄ A	Ind S	Ind S s	0 	N W	al; RR, corown ced in U
water fi the		Method	b/d b/	Flows	н С.	 	1 I I			т,в, 15 г.	Т,Е, 15		 ! !	A,S	A.S	A,S	Flows	EWO LT	Ng	A,G	с,н	 	industri / driller is list 1914.
analyses of	LEVEL	Date of measure-	ment	Dec. 1916	0ct. 1937	1950	 		 [Jan. 26, 1945	•op		June 8, 1345	Jan. 26, 1945	do.	do.	Feb. 1945		1940		Apr. 5, 1 1940	0ct. 5, 1 1944	ipply; Ind, reported by ? which well ler Deussen,
Chemical £	WATER	Below	point (ft.) a/	+ 44	දා දා +	32	1 1			14•70	16.90	}	7.75	<u>d</u> /24	<u>d</u> /30	28.40	¢ +	Ī	<u>d</u> /20		<u>a/1</u> 3	<u>d</u> /20	, public su ater level umber under 35, Alexand
		Well		Ч	CZ	ы	4	ມ	9	6	Ø	o,	10	TI I	12	13	14	15	16	17	18	19	୍ କୁ ଜୁ ଓ କୁ ନୁ ଅନ୍

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Records of wells and springs in Liberty County--Continued

				· · ·		•	Height of
Mell	Distance	Owner	Driller	Date	Depth	Diam-	measuring
	from			c.m-	of	etor	point
	Cleveland	1		ple-	well	of	above
1	o 1 of o 1 and			ted	(ft.)	well	around
1				1	1	(in.)	(ft.)
20	55 milag	M. A. Tllie	Lavna-Toras Co.	1943	226	18	0.0
20	northeast	M		1010	~~~	123	
· •	Her medbe		1 1	1	1 1	-~4	: ; ;
21	6t miles	B. E. Quinn Est.		01a	1.200	8	0.0
***	northeast			,			
			5 7 1		1	1 1	
22	6 miles	M. A. Ellis		1912	36	30	0.0
~~	northeast		1				
23	73 miles	W. P. Johnston	Pitre Water Well	1945	440	4	0.5
~0	northeast		Drilling Co.	1			
24	7 1 miles	J. W. Whatley	Jim Gibson	1943	52	8	2.6
~ 1	northrast					1	
25	d o.	I. H. Ellington	Otte Adams	1940	110	3	0.0
						1	
26	7 miles	Ida Smith		01d	45	12	0.0
	east			i '		1	
27	6ª miles	Russ Mitchell Co.	Pitre Water Well	1956	284	4	
	southeast		Drilling Co.			1	
28	104 miles	do.	dc.	1936	204	4	2.0
	southeast			i		1	
29	94 milos	M. N. Cunningham	de,	1913	368	4	1.0
	scutheast	-					
30	74 miles	W. C Crawley		1939	35	8	1.0
-	southeast						
31	d0.	Tarkington School		1933	500	4,2늘	0,0
52	94 mil-s	L. O. Ward	A. E. Fawcett,	1944	247	3	1.0
	southeast		Sr.			l 	l
33	$13\frac{9}{4}$ miles	Charles Morris	do.	1944	222	3	
	southeast			l 			
34	13g miles	C. D. Jones	C. D. Jones	1942	60	2	
	southeast						
35	10g miles	J. E. Wigley	A. E. Fawcett,	1944	103	4	0.0
	southeast		Sr.				<u></u>
36	og miles	R. E. Worthem	Adams	1936	100	2	0.0
	southeast	· · · · · · · · · · · · · · · · · · ·		2050			
č7	dC.	d o.	Lee Angel	TA30	39	8	2,6
		¥7 17		1011	2.5		
38	So wites	H. E. Airk	Bland	TA:54	95	4	0.8
- 70	Cast	Tee Offerent		1000		40-40	
59	10 miles	JOG SIMMONAS		TA00	24	48 X 48	0+0
	SOUTHAST						!

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	WATER	LEVIL	J 1	1 1	
Well	Below	Date of	Method	Use	Remarks
	measuring	measure-	of	OÎ	
	point	ment	lift	water	
	(ft.)		<u>b</u> /	<u>c</u> /	1
	<u>a</u> /	1			
20	<u>a</u> /32	June 16,	T,D,	Irr	Casing slotted opposite 3 sands between 57
	2	1943	120	1	and 225 feet. Reported yield 900 gallons a
		1000			minute. Irrigated 250 acres of rice in 1944.
z_1	+ 5	Dec. 29,	FLOWS	N	Drilled to 1,900 feet as an oil See log.
		1936			test, casing then pulled to 1,200 feet and
	7 (20	:			completed as a water well. Well was des-
22	d/28	Mar. 29,		ש	Tile casing. troyed in 1939.
		1945		<u> </u>	
23	61.50	Apr. 17,	J,G,	, D,S	Screen at 415 to 430 feet. See 1cg.
	<u> </u>	1945		! 	
24	34.50	Apr. 5,	, в,н	L D	Concrete casing.
	2/20	1945			
25	arzz	ao.	U,G,	л,s	Screen at 98 to 110 reet.
- 00		1		·	
26	32.25	Apr. 17,	в,н	L D	Wooden casing 12 x 12 incn.
	1/10	1945	ļ		
27	<u>a</u> /18				Owner's No. 2. Supplied water for construc-
		1			tion of concrete highway. See log.
28	41.45	Jan. 25,	C,G	S	Owner's No. 3. Formerly supplied water for
		1945			construction of concrete highway. See log.
29	50.90	d o.	, ت ا , ال	b,S	Screen at 322 to 343 feet. Supplies water
		1	<u> </u>		for dairy. See log.
30	24.95	ac.	в,н	D	Concrete casing.
71	1.2/50		<u> </u>	, Т.	1 Animinally depilled to 325 foot and later
JT.	<u>u</u> 50	u u.	,≏, 1/3	. r	deepend to 500 fact Supplies Terkington
29	45.05	1 30	T T	2 9	Server 241 to 247 foot Supplies School
26	1 40.50	1 40.	J,, <u>1</u>	,	beream 241 to 247 1980. Suppries Demot
77	I	1	<u> </u>	חפ	Samoon at 210 to 222 feat
00			, 0 ,0	, D, O	
34			Сн	חק	Screen at 57 to 60 feet.
UT		1	-,11	, 2,0	
35	d/14	Mar.	J.E.	D.S	Screen at 96 to 103 feet. Supplies water for
	<u> </u>	1944	<u>, 3</u>	; - , -	dairy.
36	d/15	Jan. 26.	A.G.	' D	Screen at 90 to 100 feet.
		1945	1		
37	12.54	do.	B.H	D	Concrete casing.
	1	1	- ,	1	· · · · · · · · · · · · · · · · · · ·
38	42.30	Apr. 17.	J.E.	D.S	Screen at 85 to 95 feet. Supplies water for
	1	1945		,	dairy.
39	7.50	June 8.	C.W	D.S	Dug well.
-	 1	1945	, , I		

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	De	and wells and any	- 20 -	County	Cont:	inu⇔d	
Well	Distance from Romayor	Owner	Driller	Date ccm- ple- ted	Depth of well (ft.)	Diam- cter of well (in.)	Height of measuring point above ground (ft.)
40	ll milos south	Mrs. Corin; Brown	Pitre Water Well Drilling Co.	1942	174	4	0.0
41	8t miles	John Kite	John Kita	1936	18	14	0.0
42	7 ³ / ₄ miles southwest	Wirt Davis	J. W. Gibson	1943	40	8	2,0
43	8 ¹ / ₂ miles south	N. Gibson	Lee V. Angel	1940	46	8	2.5
44	9 miles south	A. G. Lesterjette		1907	662		
45	4 miles east	P. A. Racki Lumber Co.		1906 i	580	10,4	
46	d o.	do.	Chas. Carlson	1935	86	6,3	0.0
47	2 miles east	Millor and Vidor Lumbor Co.	R. B, Melat	1907	585	10,4	0.0
48	do.	T. B. Allen and Co.	do.	1907	659	3	0.0
49	In Romayor	Gulf, Colcrado and Santa Fe R.R. Co.	Gilos-Williams	1902 1909	300 650	6	0.0
50	do.	do.	Homer Wright	1.943	645	8,6	0.0
51	<u>s</u> mile scutheast	Texes Construction Material Co.	Jacksen	1917	808	8	0.0
52	4克 miles southeast	de.	dç.	1937	808	6,4	
53	d o.	do.	dc.	1937	310	6	0.0
54	4 miles	do.	1 1 1	1937	135	4	0.0
55	64 miles scuth	South Texas Hardwood Co.	IA, E. Fawcett	1933	3 480	6	0.0
56	2 miles west	Liberty Herdwood Lumbor Co.	W. J. Giles	1907	608	8,6	0.0

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ררקוו	<u>WATER</u>	L: V. L	, , , , , , , , , , , , , , , , , , ,	: 	Domonica
9.911 	Derow	Date OI	i method	USE	remerks
;		, measure-			
	(++) Dorna	incht c	; 1110 • h/	, water	
		1	<u> </u>	<u> </u>	
40	<u>1/16</u>	Sept. 5, 1942	C,d	D	Screen at 133 to 143 feet. See log.
41	<u>1</u> /15	1936	С,Н	D,S	No screen.
42	34.10	Jan. 9, 1945	B,H	D	Concrete casing.
43	25.55	Apr. 17, 1945	B,H	D,S	Do.
44		1908	Flows	N	Owner's No. 1. Water reported mineralized, well was plugged in 1909 Doussen No. 763 e/.
45			Flows	Ind	Flow estimated 150 gal- Oil test. See lcg. lons a minute Jan. 11, 1945. Supplies boilers
4 6	<u>d</u> /40	1935	С,Е,	Ind	Screen at 76 to 86 feet. Sup- at sawmill. plies drinking water to employees.
47	+ <u>1</u> /40	1908	Flows	D	Measured flow 152 gallons a minute on Jan.11, 1945. 42 feet of screen. Formerly supplied boilers at sawmill; domestic supply at present Temperature 75 ¹⁰ F. Deussen No. 761 <u>e</u> /. (Flow of 300 gallons a minute reported in
48	+ <u>a</u> /30	1908	Flows		Estimated flow 25 gallons a minute on 1908.) Jan. 11, 1945. Formerly supplied boilers at sawmill. Temperature 75 ¹⁰ F. Deussen No.
49	+ <u>1</u> /32	1932	Flows	Ind	Estimated flow 200 762 e/. See log. gallens a minute on July 22, 1932. Drilled to 300 feet in 1902, deepened to 650 feet in 1909. Formerly supplied water for locomotive boilers. Replaced by well No. 50 in June
50	+ 37	Jan, 5, 1945	Flows	RR	Screen from 536 to 600 feet. Measured 1943. flow 205 gallons a minute on Jan. 4, 1945. Surplies water for loc motive boilers. Water flows from well and is lifted to elevated tank by a centrifugal pump driven by a 2 horsepower electric motor. Temperature 75 ¹⁰
51!	+ 15	Nov. 23, 1944	Flows	Ind	Measured flow 170 gallons a F. See log. minute on Nov. 23, 1944. Supplies water for gravel pit. Temperature 76 ¹⁰ / ₂ F.
52			Flows	N	Measured flow 173 gallons a minute on Jan. 4, 1945. Screens in tw. sands between 706 and 808 feet. Formerly supplied water for gravel pit. Temperature 782° F. See log.
53	+ 20	Jan. 5, 1945	Flows	N	Measured flow 25 gallons a minute on Jan. 5, 1945. Screen from 270 to 310 feet. Formerly supplied water for gravel pit. Temperature
54	+ 18	Jan. 9, 1945	Flows	Ind	Measured flow 60 gallons a minute 714 F. on Jan. 9, 1945. Supplies water for gravel
55	+ 15	do.	Flows	Ind	Measured flow 28 <u>pit.</u> Temperature 69 F. gallens a minute en Jan. 9, 1945. Supplies water for boilers at sawmill. Temperature
56	+ 55	1908	Flows	N	Measured flow 165 gallons a minute on 72° F. Jan. 10, 1945. Formerly supplied water for boilers at sawmill Deussen No. 762 e'. Tem- perature 75° F.

- 22 -Records of wells and springs in Liberty County--Continued

		· · · · · · · · · · · · · · · · · · ·	1 1 11	1	i		Hoight Of
Well	Distance	Own∋r	Driller	Date	Dopth	Diam-	measuring
1	from	1	•	ccm-	of	eter	point
i	Romayor		3 2 4	ple-	well	of	above
1			•	tod	(ft.)	well	grcund
		i	l 1	1	t !	(in.)	(ft.)
· 57	$4\frac{1}{4}$ miles	Dolen School		1940	100+	4	
	southwest	1	1	1	1		
		2 1 		1 1			
58	1 mile	W. D. Dunnan		1939	233	4	1.7
	west	ł ł	I I		: 		
59	$2\frac{3}{4}$ miles	A. M. Smith		1924	23	ᅽ	0.0
	west	2	1	; •	1		
60	4 miles	C. Die	Jim Gibson	1911	56	8	1.0
	west	I		i 	l L		
61	37 miles	do.	J. W. Smith	1911	140	4	1.0
ا ليبينين	west		1 	(
62	4t miles	S.J.Keith		1940	86	2	2,3
	west	i •	1		i		
63	3 5 miles	Pearl Kirkham	Reuter	¦1943	22	2	0.0
	southwest	1 1	• •				
64	$4\frac{9}{4}$ miles		-			 -	
	scuthwest	1					
65	6 milos	J. W. Phillips		i 1940	85	3	0.0
	southwest			1			
60	٥٥.	J. U. Carter	Jim Gibson	1842	- 1 0	8	1.0
	51		1	1040	70	5	
67	og miles	Henderson Landers		11940	50	6	0.0
	Southwest	T U Uoltom	Tim Gibeon	1040	62	2	0.0
0/1				13.40		2	0.0
- 60	Al milog	Concord School	Ditro Waton Wall	2010	101	Λ	0.0
03			Drilling Co.	10.0	104	-1	0.0
70	4 ³ milag	Boyd Sawell	do.	1940	135	2	0.0
.0					100	-	3.0
71	44 miles	I. John Griffin	Chas, Carlson		165	4	0.6
-	l east					_	
72	do.	Hollis Griffin		1940	90	2	0.0
. ~							•
72	4 miles	Mrs. W M. Emanuel	Chas. Carlson	1929	87	4,2	0.0
	east			l t	1		
72	4 miles	1			Spring		
	southeast			1			
	1 1	;		/ /			

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	WATER	LEVEL	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
Well	Below	Date of	Method	Use	Remarks
	measuring	z measure-	of	of	
	point	ment	lift	water	
	(ft.)	1	h/	c/	
			-	; =	
57	······································		Flows	P	Estimated flow 4 callons a minute Nov.23 1944
•••	1		1	1	Supplies Dolen School. Drilled for seismo-
	1	1	1	, 1	graph test hole. Temperature $70^{\pm0}$ r
58	4.30	. Tan. 10	Cf G	i n g	
0.9		1945	<u>1</u>		
59	a/14	Apr. 4.	C, A	D	Screen at 20 tc 23 feet.
	1	1945	1	1	
60	48,85	do.	B.H	D	Concrete casing.
	1	1		1	
61	50.50	do.	C.E.	D.S	Screen at 130 to 140 feet.
	1	r r	<u>a</u>		
62	9.35	£0.	C,H	, D.S	†
		1	1	1	
63	d/ 9	do.	С,Е,	D	Screen at 18 to 22 feet.
	-	1	2	1	7 1 2
64	;		Flows	N	Estimated flow 5 gallens a minute, Aer. 4, 1945.
	1		1	1	Temperature 69° F.
65	1/37	June	C,G,	D	Screen at 80 to 85 feet.
	1	1940	1	1	
66	33.67	Apr. 5,	B,H	D	Concrete casing.
	1	1940	1	1	
67	1/20	Apr. 6,	C,H	D	
	1	1945	1		1 1
68	d/52	do.	; C,E,	¦D,S	Screen at 58 to 62 feet.
	1	i 1	1 <u>3</u> 1 4	1	
69	11/21	Jan. 25,	C,E,	P	Screen at 87 to 97 feet. Supplies Concord
	1	1943	34	1	School. See log.
70	<u> 1/70</u>	Dec.		N	Screen at 116 to 126 feet. Abandoned. Algae
	1	1940	1	1 1	in well. See lcg.
71	42.10	Jan. 11,	C,H	D	· · · · · · · · · · · · · · · · · · ·
	1	1945	1	1	
72	d/40	1940	J,E,	D	
	i 	, 1		i	
73	<u>d</u> /47	Jan. 23,	C E,	D	Screen at 81 to 87 feet.
	1 L	1945	1 1	1	ı 1
74			Flows	N	Estimated flow 10 callons a minute, Jan. 24.
	1	2	1		1945. Deussen no. 758 e/. Kncwn as Concord
		1	1 1	1	Spring. Temperature 690 F.

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	No CO	rus er werrs and spri		<u>1110 y</u>	-00110111	usu	Haight of
711	Distance		Drillar	Data	Denth	Diam-	mesuring
	from			ccm-	of	etr	ncint
1	Dorton				woll !	of	ebowo
1	Dayton			+ 24	(**) (**)		abovo
1				"eu	(10.)	(sell)	SUCATIO
			· · · · · · · · · · · · · · · · · · ·		7 100	(1n.)	(10.)
75	4 miles northwest	Unas. B. Feterson		OTU	з , 407	6449 arts	
76	7 ¹ / ₂ miles	J. W. Anslen	A. E. Fawcett,	1943	750	20,12	
	nortnwest		Sr.	1044	749	20 12	
77	og milas northwest	W. A. Connor	Layne-Texas CO.	19 4 4	742	۵0,1۵	£•0
79	6 miles	A. J. and S. O.	do.	1943	569	18-5/8	3, 0.0
1	northwest	Cartor		1		14	• # !
79	dc.	D. A. Reidland	do.	1943	740	16,10	1.0
1							\$ } 1
	1	1	1				! !
80	61 miles	do.	dc.	1943	550	*****	, ., ., ., ., ., ., ., ., ., ., ., ., .,
	northwost	: 1	1				
°1	7 miles	do.	dc.	1944	1,000	20,8	2.0
1	northwest				•	1	1
	El miles	Delah Gaeree		1047	, 550	10 105	<u> </u>
·~ ,	og miles	Raiph Graves	1 00.	1940	1 220	10,104	E 0.0
•	nerunwest				1	I 1	1
!	de		0.	1943	189	21	
				T 2.HO		~2	
84	5 miles	Arnold Wolfe	do.	1913	834	20.16	. 0.0
1	northwest				i i		
85	7 ³ / ₄ miles	E. J. Steasser	do.	1944	808	24,12	0.0
	west	4			1	1 !	1 1 2
		!			1	! !	1
:		1	1		i L	t I	1 1
86	44 milos	W. F. Graves	A. E. Fawcott,	1944	1,005	20,12	
1	west	1	Sr.	r F		1	1
		1 • •			 		F 1
87	$4\frac{1}{2}$ miles	do.		01d	2,500	6	
	west		1		1	r 1	1
			-'	1011	1	00.10	
88	4 miles	LOC Moreau	A. E. Feiwcett,	1944	870	20,12	1.0
	West		DI.	, , ,	1	1	
	5 milco	·	+	1041	780	20 12	0.0
ן פר	woot	A. C. HOLDFOOK		1 5 2 4	1 700	100,10	
1	1 49/22-00	1		1			
	1	1		, 1	1	1	1 1
90	42 miles	Feterson and	Lavne-Texas Cc.	1920	592	!	
	west	Storling		1	į	, ; ;	
91	do.	Chas. B. Peterson			1,910	,	
	1 1 1	1	1	I L	 	1	
92	7 milos	Patrick-Tyrrell	Pitro Vater Woll	1941	256	4	0,0
	west	Drilling Co.	Drilling Co.	1	<u>i</u>	i 	1
93	do.	Henry Bode	Rudclph Ckracha	1942	276	3,2	1.0
		1 1 One Taris Tar One	1	1	+	<u> </u>	
94	; og miles	Dun Fine Line VO.		17883	38/1	6	0.0
05	1 WUSU	B T. Sturmoult	I B. T. Sturment	11076	10	21	- 0.0
30	t in the second	To to DuffLOCK	I DE LE COULLCOK	1 2000	1 10	2~	

- 24 -Records of wells and springs in Liberty County--Continued

1	WAUSR		1	1	
Well	Below	Date cf	Method	Use	Remarks
1	measuring	measure-	of	े of	
1	point	ment	lift	water	
i	(ft_{\star})		b/	c/	
1	(100)			, <u> </u>	
75	<u>a</u> /			L.,	(when's No. 2. Oil test. See log.
75					OWNER S NO. 2. OII COSC. Dec 103.
	1/50			· · · · · · · · · · · · · · · · · · · ·	Turing tod 750 company of pice in 1044
70	<u>a</u> /50	1345	, T,D,	lrr	, irrigated 550 acres of rice in 1944. Tempe-
		1	165	I. L.	rature 75° F.
77	50.30	Apr. 19,	Υ,D,	Irr	Casing slotted opposite sands below 150 feet.
		1945	150	1	Reported yield 2,500 gallons a minute. Irri-
78	d/60	Sept.	T,D,	Irr	Casing gated 400 acres cf rice in 1944.
		1943	150		slotted opposite sands below 389 feet. Re-
			5 1	1	ported vield. 1.700 gallons a minute. See log.
79	38.40	Apr. 19	<u>ע ידי</u>	! Irr	Casing slotted opposite sands below 118 feet.
	00010	1045	1 -, -,		Reported vield ? 000 calluns a minute. Irri-
	t 1	1 19-20		4	reted 400 scres of rice in 1944. Owner's No.1.
	<u>,</u>	· · · · · · · · · · · · · · · · · · ·		+	Best well
30		·			rest well.
				¦	
<u>e1</u>	¦ 40.55	Apr. 19,	т,D,	¦ Irr	Casing slotted opposite sands below 120 13et.
	2 F	1945	160	1	Reported yield 2,500 gallons a minute. 1rri-
	1	1		1	gated 500 acres of rice in 1944. Temperature
52	1/41	May 24,	T,D,	: Irr	Casing slotted conosite sands 765° F.
	1	1943	120	1	below 140 fest. Reported yield 1,170 gallens
	1 7			1	a minute. Irrigated 350 acres of rice in
83	<u> </u>	· · · · · · · · · · · · · · · · · · ·		······	Screen 169 to 189 feet. 1944. See 1cc.
00	1 3				Drilled to 558 feet as a test well.
	1 1/15	i Aug	- T D	Trn	Benorted yield 2 000 gellons a minute. Irri-
-0 4	¦Ψλ#2	1047	1,2,	, <u>, , , , , , , , , , , , , , , , , , </u>	reported 500 conce of nice in 1944 . Temperature
	1	1940		<u> </u> T	Garing alatted errorite 1099 F See log
go	<u>a</u> /07	Mar.	T,D,	LTT	Casing slotted coposite 70° F. See 10g.
	1	1944	125	1	sands below 135 feet Reported yield 5,000
	1 1		1		gallons a minute. Irrigated 300 acres of rice
	1				in 1944. Temperature 75° F. See log.
-36	d/60	Mar.	; T,D,	! Irr	Casing slotted opposite sands belcw 240 feet.
		1944	160	1	Reported yield 3,000 gallons a minute. Irri-
		i		-	gated 300 acres of rice in 1944: 400 acres in
87			Flows	Irr	Estimated flow 1945. Temperature 77° F.
					30 gallons a minute on Auril 18, 1945. Used
				1	with wall 86 to invigete nice. Temperature
		1.	<u>;</u>	÷	Contraction and analytic conder 1000 F
81	54.32	Apr. 18,	, , , , , , , , , , , , , , , , , , ,	¦ ILL	Lalam 240 fact. Deposite salus 104 F.
	i	1945	160		below 240 iset. Reported yield 5,500 gallons
	1			-1 	a minute. Irrigatod 425 acres of rice in 1944.
89	<u>[d</u> /60	Feb.	т,D,	¦ Irr	Casing perforated oppo-
		1944	160	1	site sands below 240 feet. Reported yield
	1		i		3,000 gallens a minute. Irrigated 500 acres
		1	1	i 1	of rice in 1944. Temperature 74° F.
90	· · · · · ·		·	Ň	Screens opposite three sands between 349 and
	i I		1	1	592 feet. Formerly used for rice irrigation.
91	· · · · · · · · · · · · · · · · · · ·		+	N	Oil test. See log. See log.
с· 1.	4				
02	14/46	Tuno		M	Someon at 243 to 253 frat Formerly supplied
97.	10 =0	;J UIIE			weten for drilling rig See log
	47.00	14		-	AMARAL JOS. ALTITING LIG. ORG 102.
23	47.00	Apr. 18,	¦ ℃,≋	, n's	
<u> </u>		11945			
94	1/56	Jan. 27,	; C,E,	Ind	Screen at 376 to 384 feet. Supplies water for
		1945	<u>i 2</u>	<u>i</u>	pipe line pump station.
95	<u>id</u> /10	do.	C,H	i S	Nc screen.
	i	: _1	1	1	

	- 40 -	
cords of wells a	nd springs in Liberty	CountyContinued

	Reco	ords of wells and spri	ngs in Liberty Co	unty	-Contin	ued	
Well	Distance from	Own∙∋r	Driller	Dato com-	Depth of	Diam- eter	Height of measuring point
!	Dayton			pla-	well	cf	abevo
		2	• •	ted	(ft.)	well	grcund
1		8 2	1	1	, , , , , ,	(in.)	(ft.)
96 ;	8 miles	Myrtle Ridge School	F. Gay	1928	165	4,2	0.8
	northwest		r t	1	i t		; 1
97	7 ³ miles	Joe Sobctik	J. N. Nadrntil	: 1927	20	4	0.0
	wost	1	, ,	: I	\$ <i>i</i>		; •
98 ;	75 miles	i Magnelia Pipe Line	······································	1927	540	4	0.0
:	wrst	Cc.	1	1	1		1
99	6 ¹ / ₄ miles	Wolf Island School	F. Gey	1928	360	4	/
1	west			1	1	1	l t
100	87 miles	R. F. Janik	R. F. Janik	1913	32	8	0.0
	northwest		, !		1		1
101	5 ³ miles	Roy Seaburgh	'Lavne-Texas Co.	1945	1.030	16.12	0.0
i	ncrthwest					1	
102	7 ⁺ miles	dc.	F. Gav	1945	209	4	0.0
	ncrthwest					_	
103	7 miles	C. Newman	C. A. Brown	010	400	10.7	0.0
	west					,	
104	6 miles	Sun Oil Co.	Sun Oil Co.	1905	775		
10.2	northwest			1000			1
05	64 milos	<u>+</u>	0.	1005	1 763	<u> </u>	I
100	northwast		u U •	1300	!		1
106	74 miles	Taylon Deuton Co	•	1017	1 200		<u> </u>
100	nonthwest	i layter-bayton ou.	1		11,200		
107	64 milos			 	105		· · · · · · · · · · · · · · · · · · ·
107		r. rreeman	1		175	6	·
100	Southwest		· ↓	011	<u> </u>		
102	of miles	C. M. Regars	·	010	1 650	4	0.0
100	SOULDWAST	1	1 T. D. 1. O.			0.5/0	·
103	o miles	Heat and Brown	Layne Bowler Co.	, ora	1 407 1	9-5/8,	
	soutnwest		! 		1	8	<u> </u>
110	dO •	du.		014	487	8	; 0.0
			· · · · · · · · · · · · · · · · · · ·		1		l
111	65 miles	J. M. Hlavaty	F. Gay	1940	400	42	0,0
	southwest	1	i 	، ا	į		l !
112	3g miles	N. B. Sapp	C. A. Brown	01d	380	10,8	0.5
	southwest	1	1 ••••••••••••••••••••••••••••••••••••	, , ,	<u>į</u>		1 1 7
113	$4\frac{5}{4}$ miles	Chas. Seaburgh	dc.	1902	115	11,8	0.0
	scuthwest	1 	* * *	1 4	<u>.</u>		
114	5 _호 miles	W. A. Noble	de.	1004	-100	9	0,0
	southwest	1	* *}****) 1	/ !		1 1
115	$3\frac{3}{4}$ miles	C. S. Brown	C. S. Brown	1902	400		0.0
	southwest	1			к 1		i L
116	$7\frac{9}{4}$ miles	Bud Kay	F. Gay	1928	125	4,2	0.0
i	scuthwest	1 	1	l †	1		1
117	8 miles	General Crude Oil	do.	1931	375		
	southwest	Cc.	4 . J	i I	1		1
118	7 ¹ / ₂ miles	Rewan Drilling Co.	do,		480		
!	southwest	<u> </u>	, ,	1	1		2 4
119	In Dayton	City of Dayton	J. A. Walling	1929	395	8,6	0.0
		1		i 1	1		
120	do.	de.	dc.	1929	399	8,6	0.0
			1	1	į		; ;
1			1		Į į		
		j	1	:			!
	5		, y				

- 27 -

	WATER	TLA. T	1		1
Well	Below	Date of	, Method	Use	Remarks
	measuring	measure-	cf	of	
1	point	ment	lift	water	
	(ft.)		h/	c/	1
	(<u></u> _0, ,			-	1
96	77 00	Ann 10	<u></u>	NT	General 155 to 165 foot Formerly gunplied
90	37:90	Apr. 18,) 		bereen at 155 to 165 reet. Formerry superied
		1945	l	·	water for Myrtle Ridge School. School house
97	<u>d</u> /12	do.	C,G,		No screen. abandoned.
_			12	۱ ۱	
98	1/30	do.	A,G	Ind	Supplies water for pipe line pump station.
		8			
99				N	Screen at 350 to 360 feet. Formerly supplied
					water for Welf Island School. School heuse
10.	d/15	Apr. 19	СН	DS	No screen. abandoned.
	<i></i>	1945	-,	,~	
101	a/117	Von		Tan	Penertal minita & 000 mollong a minuta
TOT	77.41		, 1,D,	TLT.	Reported yield 5,000 gallons a minute. Tem-
		1940	180		perature 20° F.
102	47.00	June 9,	с,н	D	Screen at 199 to 209 feat.
		1945			
103	d/17	1908		N	Formerly used for rice irrigation. Deussen
		l t	1		No. 740 g/
104					Reported in 1908 as producing oil at 775 feet.
		1	t 1		Deussen Nc. 752 e/.
105		<u> </u>		·	Owner's No. 1. Oil test. Deussen No. 753 9/
200			r		
100		•		·	Old Log.
100					UII test. Deussen No. 755 e/. See 10g.
					l
107			с,н	D,S	
		1	/ !	i	
108	13.02	Oct. 10,	None	N	Formerly used for rice irrigation.
	I	1931	1		l
109		·		N	Screens set in two sands between 248 and 395
	1	1	1		feet. Formerly used for rice irrigation.
110	d/10	1903		N	Formerly used for rice irriga- See log.
		1	1	1	tion. Deussen No. 743 e/.
111	11/39	' 4ug.	L No		Sancen et 390 to (00 feet
T T T	100	13044	1 112		
110	50.00				
1.12	00.22	Jan. 27,	С,н	D,S	Formerly used for rice irrigation. Deussen
	1	1945	,	1	<u>No. 739 <u>A</u>/.</u>
113	<u>d</u> /17	;1908	;	N	Formerly used for rice irrigation. Deusson
		t 1	1	1	No. 741 e/.
114	d/ 8	1908		N	Formerly used for rice irrigation. Deussen
	1	1 1	1	1	No. 742 m/.
115 /	d/16	1908	·	N	Formerly used for rice irrigation. Deussen
	:	1	1		No. 744 p/
116		1020	, }	NT	Component 115 to 125 foot Terrerly cumplied
TIO	i u s	1 1920		14	Screen at 115 to 125 feet. Formerly supplied
110	<u> </u>	·	, 	1	Water for stock.
117	, 			IN I	Formerly supplied water for drilling oil test.
	• •	·	/ L	t	(Kirby no. 1).
118	; 	·		N	Formerly supplied water for drilling oil test.
	l 1	1	1		
119	d/45	Nov.	; T,E,	P,RR	City well No. 1, also supplies locomotive
	1	1929	15	1	boilers. Reported yield in 1929. 300 callens
120	11/45	Nov.	T.E.	P.RR	City well No. 2. also supplies la minute.
) 1	1929	15	,	lacemotive boilers. Screen from 316 feet to
) 		1 20	• •	1 376 feet. Reported vield in 1996 300 colling
	1		• •		o minuto Mamanatura M20 E Corda
	!		ļ		a minute. remperature 75° F. See 10g.

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Records of walls and springs in Liberty County--Continued

		1	1	1	1		Height Of
Wall	Distance	Owner	Drillor	Date	Depth	Diem-	moasuring
	from	1		com-	of	eter	point
	Devton	1	1 f	ple	well	of	abcve
		3 1		ted	(ft.)	ພດ]]	ground
			1	UCU		(in.)	(ft.)
121	94 milog	League	The Teres Co.	1926	1.428		
*~ *	scuth				;		
122	1 ³ miles	C. A. Greboy	Pitre Water Well	1944	193	4	0.0
	northwest		Drilling Co.		1		1
123	3 miles	Frank Gav	Frank Gay	1942	404	4	0.0
	scutheast			:	1		
124	In Deyton	Peoples Lumber and	dc.	1942	685	4	0.0
		Supply Co.		1			
125	2 [‡] miles	Humble Fine Line Co.		01d	400	6	1.0
1	scuth			i !	2 1	1	
126	2 miles	A. Graves	F. Gay	1931	135	4	0,0
	south				1 !		
127	4 miles	Bullard and Wilson		014	670		
1	scutheast	1			1		
1					1		
129	2 miles	Ed Pruitt	J. A. Conklin	1904	1,014	8	0.0
	east	!			1 <u> </u>	 	
129 ;	7 ¹ / ₂ miles	; Meeros Bluff Canal	F. Gay	1935	110	4	
:	scuth	<u> </u>			1 1 1		
130	37 miles	J. B. Sterling	dc.	1941	i 108	4,2	0.0
	south	!) K	, , ,	
131	$2\frac{9}{4}$ miles	F. Gay	dc.	1941	376	4 2 2	0.0
	scuth				i		
132	2 _호 milos	E. R. Gordon			180	4	
	north			1010	750		
133	3 miles	Texas Pipe Line Co.		1918	550	0	0,0
1	Jast				1		
1341	73 milog	Noble and Bakan	F Corr	1041	404	A	0.0
T0.7	$5\frac{1}{4}$ miles	NOOTE and paker	1 V BTO • 1	1991	404	*	(:•0
135	AS miles	Culf Fina Lina Co.	Bloin	1019	428	6	
TCO	erutheest	Gutt TTP:: FIRE OO.	DIGII	1910	1 10		
136	5 ⁸ milas	Leftis Bros.	F. Cev !	1942	190	41	
100			r duy	10 IL.		-2	
137	6 miles	Joe Duree	dc.	1934	120	4	0.0
	southeast				1	 -	
138	65 miles	Davton Canal Cc.	de.	••• •••	350	4,2	0.0
i	southeast	1	1		1		1
139	dc.	di.	dc.		350	4.2	0.0
	1					1	
140;	6 [±] / ₂ miles	Sudormann-Delson Co.	Layne-Bowler Co.	1906	225	4	
	ncrth		t 		1 1	1	
141	34 miles	Russ Mitchell Cc.	Pitre Water Well	1936	413	3	0.0
	north	· · · · · · · · · · · · · · · · · · ·	Drilling Cc.		, ; •	i 4	
142	4 miles	A. H. Case	Ed Paul	1933	45	4	0.0
	north	t +			 	·	
143	5g miles	V. L. Moere	F. Gay	1934	116	4	0.0
	northeast						
144	D MILES	L. L. Batchelor		1940	26	36	0.0
14=	nertneast !	Nee C D Desite	E 0-	1000	703		
140 i	77 miles	Mrs. J. B. Brantch	r. Gay	TA9A	JUL	4	0.0
	1101-011	i 	· · · · · · · · · · · · · · · · · · ·	-,	I		

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WATER LEVEL Weli Below Date of Method | Use Remarks measuring! measureof of water point m∴nt lift (ft.) ъ/ c/ a/ 121 See log. --------Oil test. -----122 d/44 July 19, D Screen at 179 to 190 feet. See log. J,E, 1944 123 d/42Jan. 25, C,E, D.S Screen at 384 to 404 feet. 1945 Supplies sawmill Jan. 27, Screen at 665 to 685 feet. 124 d/60 A,S Ind 1945 boilers. Formerly supplied water for pipe line pump 125 D.S 50.46 do. A.G station. C,W Screen at 132 to 135 feet. 126 d/17 do. D.S 127 N Salty water charged with hydrogen sulphide -------reported below 360 feet. Well abandoned and casing pulled Oil test Nc. 5. Deussen No. S Drilled as oil test, developed as 751 3/. 128 +1/50 1904 Flows water well. Deussen No. 757 g/. C . 11 129 Screen at 98 to 108 feet. 130 d/10 C.W S 1941 S Screen at 356 to 376 feet. 131 | d/40 1941 C.W D 132 -----___ ------133 7.95 Formerly supplied water for pipe line pump June 15. C.H D 1945 station. Flow reported 50 gallens a minute in 1919; ceased flowing in 1940. $134 \pm d/50$ 1941 N Screen at 384 to 404 foct. Formerly supplied ___ water for drilling rig. C,W 135 D,S Formerly supplied water for pipe line pump -----station. Formerly supplied 136 N Screen at 170 to 190 fest. 1942 ___ Flows water for drilling rig. Flowed when drilled, C.W D.S now abandoned and plugged. 137 d/201934 No screen. Supplies water for Screen at 330 to 350 feet. 138 $\frac{1}{35}$ Ind ----_____ pump station. 139 d/35 Ind Do. مند منه ---Screen at 204 to 225 feet. 140 See 107. ------------Owner's No. 4. Well sealed. d/50 1936 N Supplied water 141 -for construction of concrete highway. See log. 142 C.W D.S No screen. 1 15 Arr. 1933 143 d/30 C,H D,S Formerly supplied Moore School. 1934 No screen: d720 J,E, 144 D June 15. Dug well.

1934

1937

C.H

D,S

No screen.

145

d/28

Records of wells and springs in Liberty County--Continued

	, , ,	,		:	1	;	Height of
Well	Distance	Owner	Driller	Date	Depth	Diam-	measuring
	frum		1	ccm-	of	etor	point
1	Liberty		ι 1	ple-	well	of	above
		1	1	ted	(It.)	well	ground
146	1% milog	T F Wigging	Litma Watan Wall	10/0	116	<u>(1n.)</u>	(16.)
T,∓O I	10 millos	T. T. MIGRINA	Pitro water well	19-22	110	6	
147	15t miles	Sun Oil Co.	A. E. Fawcott	1939	286	64	·
	north		Sr.	1,000		, 0,±	
148	13 miles	J. E. Dillon	Pitre Water Well	1945	213	2	0.0
i	north		Drilling Co.		1		t – – – 1
149	$12\frac{1}{4}$ miles	John Morgan	d c .	1945	192	4	0.0
	north	1	8		: •		1
150	do.	Luther A cDaniel	de.	1945	183	2	0.0
		i				,	
151 j	101 miles	L. Daffern	dc.	1945	125	4	0.0
150	n. rth		2.	1077	000		0.0
102	74 M1145	Morgan and Morgan		1937	228	- 4	6.0
153	de.	Hardin Bantiet	de	1043	00	12	0.0
100	uc (Church		Tarto	33	7,~	0.0
154	7 miles	John Rosnick	do.	1944	110	4	0.0
	north					_	
155;	8 miles	Humble Oil and	do.	1938	230	4	0.0
1	north	Refining Co.					
156	dc.	do.	de.	1940	257	4	0.0
!		a 4 2					
160	0 miles) 		1070			
1071	y Miles	(ac.	Taru	200	<u>4</u>	0.0
1 1 7	nerun	1					
158	7 ¹ mil:s	James R. Nowerv	de.	1941	254	4	2.0
	north	Drilling Co.				-	
159	8 ³ / ₄ milos	Humbl: Oil and	de,	1938	218	6,4	0.0
i	north	Refining Co.					
		1	, 				
160	84 miles	dc.	dc.	1938	226	6	0.0
161	73 miles			10:0	270		
TOT	74 miles		u u .	± 0±0 i	200	<u>+</u>	3.0
	1101 011	1	· · · · · · · · · · · · · · · · · · ·				
162	8 miles	d:•	do.	19:0	244	4	0.0
1	north	1					
1					1		
163	84 miles	·do.	dc.	1938	223	$4\frac{1}{2},4$	0.0
	north	1			i	1	
			 				· · · · · · · · · · · · · · · · · · ·
164	8g miles	Mrs. A. Cessna	dc,	1945	192	4,22	Ø •8
-165	nortn Ri milor			1015	100		
100 I	ry miles north	A. J. AUGUISSON	ae.	таљо¦	107	4	0.0
166	ll miles	Hull-Deisetta Water	de.	1940	365	6	0 0
	ncrtheast	Ce.		10.20			00
167	104 milos	Jca Haines	dc.	1938	106	6	0.0
1	northeast	1	· ·	1	1	1	_
:	•	1		1		1	

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Well: Bolew Date of measuring measures is the hold of e/ Remarks measuring measures of e/ e/ e/ if if b/ g/ e/ if 0 oct. 25. J.E. 1942 J.E. 2 D Screen at 263 to 2%6 first. Numerly surplied water for drilling rig. if if		WATER	LYVEL	1	;	
measuring modeure- pointcfof lift water b/cf16 $\frac{4}{40}$ 0ct. 25,J.F.D18 $\frac{4}{2}$ 00ct. 25,J.F.1942bb01945b01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01945c01946c01947194801948c01944194801944194819441948194419481944194819441948194419481944194919441949194419491944194919441949194419491944194919441949194419491945194919441949194519491949194919491949 <td>Well</td> <td>Below</td> <td>Date of</td> <td>Method</td> <td>Use</td> <td>Remarks</td>	Well	Below	Date of	Method	Use	Remarks
Point (ft.)Pirt water 2/a/DScreen at 90 to 75 frot. Some log.144144J.E.147N1481471491471491471491441491441491441491945149194515004/0May151194515227.5015419451553/401563/40157194515827.501597.5.1501945151194615227.5015415519461561947157194815827281591947154194715519401551940156194015619401561940156194015619401561940157194015819401591941159194115919401591941159194115919411591941159194115919411591941159194115919411501941151 </td <td></td> <td>measuring</td> <td>measure-</td> <td>cf</td> <td>of</td> <td></td>		measuring	measure-	cf	of	
146 0/2 2/ 2/ 146 0/40 0et. 25, J. E. D D Screen at 90 to 55 fyst. See log. 147 N Screen at 200 to 206 fyst. See log. 149 1/40 May J.E. D Screen at 200 to 206 fyst. See log. 149 1/40 May J.E. D Screen at 163 to 173 fyst. See log. 149 1/40 May J.E. D Screen at 103 to 120 fest. See log. 150 d/40 Apr. J.E. D Screen at 103 to 120 fest. See log. 151 1/40 Apr. J.E. D Screen at 103 to 120 fest. See log. 153 1/26 J.E. P Supplies water to Hardin Battist Church. 153 1/26 Jue Screen at 103 to 120 fest. See log. 154 1/25.5 Mar. 91. Cf.0. D Screen at 164 to 66 fest. See log. 154 1/25.5 Mar. 91. Cf.0. D Screen at 126 to 211 fest. Fermerly supplicit water for drilling oil test. (Fartlow no.10); cesing pilled and well abandoned in 1939. See log. 155 d/12 Doc. 14 N Screen at 126 to 129 frot. Least. (Fartlow no.10); cesing pilled and well		point	mont	i lift	water	
146 d'40 Oct. 25, J,E, D Screen at 90 to 75 frot. See log. 147 N Screen at 263 to 276 frot. Formerly surplied weter for drilling rit. 148 d/40 May J,E, D Screen at 200 to 206 frot. See log. 19 d/40 May J,E, D Screen at 163 to 173 frot. See log. 19 d/40 May J,E, D Screen at 163 to 173 frot. See log. 1945 f. D Screen at 106 to 120 feet. See log. 1945 f. D Screen at 106 to 120 feet. See log. 1945 f. D Screen at 106 to 120 feet. See log. 1945 f. D Screen at 106 to 120 feet. See log. 1945 f. D Screen at 106 to 120 feet. See log. 1945 f. D Screen at 11 to 52 feet. See log. 1945 f. D Screen at 12 to 52 feet. See log. 1944 f. Screen at 12 to 52 feet. See log. Screen at 12 to 52 feet. See log. 1944 f. Screen at 12 to 52 feet. See log. Screen at 12 to 52 feet. See log. 1945 f. Screen at 12 to 152 feet. See log. Screen at 12 to 52 feet. Forme		(It.)	5 6 1	<u>b</u> '	<u>e</u> /	
1942 1942 1 5 5 5 19 10 <td< td=""><td>146</td><td>d/40</td><td>Oct. 25</td><td>TE</td><td></td><td>Screen at 90 to 05 foat. See log.</td></td<>	146	d/40	Oct. 25	TE		Screen at 90 to 05 foat. See log.
147 N Screen at 263 to 266 fyst. Numerical summary summa	110	<u> </u>	1942	<u>1</u>		
image: state image: state image: state image: state 148 d/40 May J,E, D Screen at 200 to 206 freet. See log. 149 1945 J Screen at 163 to 173 freet. See log. 1945 150 1945 J Screen at 107 to 192 feet. Screen at 107 to 192 feet. 151 1945 J Screen at 107 to 192 feet. Screen at 108 to 120 feet. 152 37.50 June 7, N Formerly supplied boller at sawmill. Screen at 61 to 62 feet. 153 1/25. Mar. 21, Cf 16, D Screen at 61 to 62 feet. Sce log. 154 1/25.5 Mar. 21, Cf 16, D Screen at 183 to 211 fset. Screen st 199 to 229 fset. Screen st 199 to 229 fset. Screen st 199 to 229 fset. Screen st 177 to 192 foot. 1940. Screen st 178 to 199 foot. 1940. Screen st 178 to 197 foot. <td>147</td> <td></td> <td></td> <td></td> <td>N</td> <td>Screen at 263 to 286 feet. Furmerly supplied</td>	147				N	Screen at 263 to 286 feet. Furmerly supplied
148 d/40 May J,E, D Screen at 200 to 206 feet. See log. 149 1945 1 Screen at 163 to 173 feet. See log. 150 d/40 Apr. J,E, D Screen at 109 to 182 feet. 151 d/40 Apr. J,E, D Screen at 109 to 182 feet. 151 d/40 Apr. J,E, D Screen at 109 to 182 feet. 152 37.50 Tune 7. N Formerly supplied boiler at sawmill. See log. 153 d/28 June 0.E, P Supplies water to Hardin Eatist Church. 154 125.5 Mar. 21, Gf 0. D Screen at 163 to 211 feet. Formerly supplid 154 d/12 Doc. 14, N Screen at 163 to 211 feet. Formerly supplid 156 d/15 July N Screen at 163 to 211 feet. Formerly supplid 156 d/15 July N Screen at 163 to 213 feet. fermorly Log. 157 d/15 July N Screen at 175 to 129 foot. 1940. See log.			1 1) (water for drilling rig.
1945 1 19 d/40 May J.E. D Screen at 163 to 173 fest. See log. 1945 1 d Apr. J.E. D Screen at 103 to 182 fest. 181 1945 1 D Screen at 103 to 180 fest. See log. 1945 181 1945 1 D Screen at 103 to 180 fest. See log. 1945 183 1945 1 D Screen at 103 to 180 fest. See log. 1945 183 1945 1 D Screen at 103 to 180 fest. See log. 1945 184 1945 1 D Screen at 185 to 211 fest. See log. 1945 185 J183 June C.E. P Supplied water for drilling. It test. (Partlow no.10); 184 Dec. 14. N Screen at 185 to 211 fest. Fermerly supplied water for drilling oil test. (Partlow no.10); 1940 N Screen at 186 to 212 fest. Partlew no.10; 1940 N Screen at 196 to 229 fest. Fermerly 196. 1941 <	148	<u>d</u> /40	May	J,E,	D	Screen at 200 to 206 feet. See log.
149 J40 May J,E, D Screen at 163 to 173 fest. See log. 150 J/40 Apr. J,E, D Screen at 107 to 152 fest. 151 J/40 Apr. J,E, D Screen at 107 to 152 fest. 151 J/40 Apr. J,E, D Screen at 108 tc 120 fest. See log. 152 27.50 Funce 7, N Formerly supplied boller at sawmill. See log. 153 J/26 June 7, N Screen at 163 to 211 fest. See log. 154 J/25.5 Mar. 21, Gf G, D Screen at 108 to 211 fest. Formerly supplied 155 J/12 Dsc. 14, N Screen at 108 to 211 fest. Formerly supplied 156 J/12 Dsc. 14, N Screen at 178 to 19 fest. Formerly supplied 156 J/15 July N Screen at 178 to 19 fest. Iferation no.10; 157 J/15 July N Screen at 178 to 19 fest. Iferation no.11 (ssing pulled and well abandoned in 1939. See log. 157 J/15 July N Scre			1945	<u><u></u></u>	<u> </u>	
1945 3 1 Screen at 177 to 192 feet. 101 1945 1 1 1945 1 151 1945 1 1 1945 1 152 27.50 June 7, N Formerly supplied boilsr at sawmill. See log. 153 1945 1 Screen at 61 to 66 frat. See log. 1 154 1945 1 Screen at 61 to 66 frat. See log. 1 154 1/25.5 Mar. 21, Cf 0, D Screen at 183 to 211 frat. Formerly supplied water for drilling il tist. (Partlow no.10); 155 g/12 Doc. 14, N Screen at 192 to 228 frat. Formerly supplied water for drilling oil tast. (Partlow no.10); 156 d/15 July N Screen at 192 to 228 frat. Formerly supplied water for drilling oil tast. (Partlow no.10); casing pulled and well abandoned in 1939. See log. 157 d/15 June N Screen at 176 to 197 loned in 1939. See log. 158 d/15 June N Screen at 176 to 197 loned in 1939. See log. 159	149	<u>d</u> /40	May	J,E,	D	Screen at 163 to 173 feet. See log.
100 1045 1 151 2/40 Apr. J,E, D Screen at 103 to 120 feet. See log. 152 37.50 June 7, N Formerly supplied bollar at sawmill. See log. 153 2/26 June 7, N Formerly supplied bollar at sawmill. See log. 153 2/25 June 7, N Screen at 61 to 66 feet. See log. 154 1/25.5 Mar. 21, 6f.0, D Screen at 163 to 211 feet. See log. Screen at 163 to 211 feet. Formerly supplied 155 d/12 Doc. 14, N Screen at 163 to 211 feet. Formerly supplied 156 d/15 July N Screen at 172 to 129 feet. Termorly supplied 156 d/15 July N Screen at 172 to 129 feet. [Patlow no.10]; 157 d/15 July N Screen at 172 to 127 feet legt feet. [Patlow no.10]; 158 d/15 June N Screen at 172 to 127 feet legt feet. [Patlow no.10]; 158 d/15 July N Screen at 172 to 127 feet legt feet. [Patlow no.10]; 159 fol15 July N <	150	d / 4 0	1945	·		Company at 100 to 100 frat
151 1/40 Arr. J.E. D Screen at 103 to 120 feet. See log. 152 37.50 June 7. N Formerly supplied boiler at sawmill. See log. 153 1245 June C.E. P Supplies water to Hardin Battist Church. 154 1245 Arr. Screen at 61 to 66 feet. See log. Screen at 61 to 62 feet. See log. 154 1/25.5 Mar. 21. Cf.G. D Screen at 185 to 211 feet. Formerly supplied water for drilling it test. Formerly supplied water for drilling cil test. 155 d/12 Doc. 14. N Screen at 199 to 223 feet. Formerly supplied water for drilling cil test. Fortlow no.10); 156 d/15 July N Screen at 199 to 223 feet. Formerly supplied wall abandoned in 1930. See log. 157 d/15 July N Screen at 197 to 127 logd. See log. 158 d/15 June N Screen at 197 to 127 logd. See log. 158 d/15 June N Screen at 197 to 127 logd. See log. 159 d/15 Nov.	100	<u>u</u> /40	нрг• 1045	J,E, <u>1</u>	ע	Screen at 177 to 152 leet.
111 112 1	151	d/40	<u>Apr.</u>		Π	Screen at 108 to 120 feet. See log.
152 37.50 June 7, N Formerly supplied boiler at sammill. See log. 153 1/26.5 Mar. 21, Cf 0, D Screen at 61 to 66 feet. See log. 154 1/26.5 Mar. 21, Cf 0, D Screen at 185 to 211 feet. Formerly supplied water for drilling :1 test. (Fartlow no.10); casing pulled and well abandoned in 1939. See log. 155 d/12 Dec. 14, N Screen at 185 to 211 feet. Formerly supplied water for drilling :1 test. (Fartlow no.10); casing pulled and well abandoned in 1939. See log. 156 d/15 July N Screen at 199 to 228 feet. Formerly log. 157 d/15 June N Screen at 178 to 199 for 289 feet. Formerly supplied water for drilling oil test. (Tartlow no. 17); casing pulled end well abandoned in 1939. See log. 158 d/15 June N Screen at 178 to 199 for 289 feet. [Partlow no.1] 159 d/15 June N Screen at 178 to 199 for 289. See log. 159 d/15 Nov. N Screen at 185 to 212 feet. [Partlow and well ebandoned in 1939. See log. 160 d/15 Aug. T.E. D Screen at 185 to 121 freet. [Camp. See log. 161 d/15 <t< td=""><td>101</td><td><u></u>, ±0</td><td>1945</td><td>1,1, 1,</td><td>J</td><td></td></t<>	101	<u></u> , ±0	1945	1,1, 1,	J	
1945 1945 153 1/26 June C,E, P Supplies water to Hardin Bartist Church. 154 1/25.5 Mar. 21, Cf.G, D Screen at 61 to 66 frat. See log. 154 1/25.5 Mar. 21, Cf.G, D Screen at 71 to 52 fest. See log. 155 1/12 Dac. 14, N Screen at 183 to 211 frat. Formerly supplied water for drilling (i) tast. (Partlow no.10); casing pulled and well abandoned in 1939. See log. 156 1/15 July N Screen at 199 to 228 fest. Formorly low. 157 1/15 July N Screen at 175 to 197 lond in 1939. See log. 157 1/15 June N Screen at 175 to 197 lond in 1938. See log. 158 1/15 June N Screen at 185 to 212 foot. leasing pulled and well ebandoned in 1939. 158 1/15 June N Screen at 185 to 212 foot. leasing pulled and well ebandoned in 1939. 163 1/15 Nov. N Screen at 185 to 212 foot. leasing pulled and well ebandoned in 1936. 164 1/15	152	37,50	June 7.		N	Formerly supplied boiler at sawmill. See log.
133 d/26 June C, E, P Supplies water ti Herdin Bartist Church. Screen at 61 to 66 freet. See log. 154 1/25.5 Mar. 21, Cf G, D D Screen at 61 to 66 freet. See log. 155 d/12 Doc. 14, N Screen at 183 to 211 freet. Formerly supplied water for drilling if trst. (Fartlow no.10); casing pulled and well abandoned in 1939. See 156 d/15 July N Screen at 183 to 211 freet. Formerly 100; casing pulled and well abandoned in 1939. See 156 d/15 July N Screen at 109 to 228 freet. Formorly 100; casing pulled water for drilling cil test. (Fartlow no. 17); casing pulled and well abandoned in 1939. See log. 157 d/15 June N Screen at 175 to 197 ioned in 1938. See log. 153 d/15 June N Screen at 185 to 212 freet. 1940. See log. 158 d/15 Nov, N Screen at 185 to 212 freet. 1941. See log. 159 d/15 Nov, N Screen at 185 to 212 freet. 1941. See log. 160 d/15 Aug. T,E, D Screen at 185 to 212 freet. 1941. See log. 1940 N	1		1945			
1943 Screen at 61 to 66 feet. See log. 154 1/255 Mar. 21, 0f.0, D Screen at 71 to 72 feet. See log. 155 1944 N Screen at 185 to 211 feet. Formerly supplied water for drilling it test. (Partlow no.10); casing pulled and well abandoned in 1939. See 156 1940 N Screen at 199 to 228 feet. Formerly [log. 156 1940 N Screen at 172 to 199 feet. Formerly [log. 157 1940 N Screen at 172 to 199 feet. Formerly [log. 157 1940 N Screen at 172 to 199 feet. [log. 157 1940 N Screen at 175 to 137 Jeand well ebandoned in 1939. See log. 153 1941 N Screen at 175 to 137 Jeand in 1938. See log. 159 1941 N Screen at 185 to 211 feet. 1941. See log. 159 1941 N Screen at 185 to 212 feet. 1941. See log. 160 1945 Aug. T,E, D Screen at 185 to 214 feet. Jeandoned	153	<u>d</u> /28	June	C,E,	Р	Supplies water to Hardin Baptist Church.
154 1/25.5 Mar. 21, 104, 10 Screen at 71 to %2 fest. See log. 155 1/12 Dec. 14, N Screen at 185 to 211 fest. Formerly supplied water for drilling of test. (Fartlow no.10); casing pulled and well abandoned in 1939. See log. 156 1/15 July N Screen at 199 to 229 feet. Formerly supplied water for drilling oil test. (Fartlow no. 10); casing pulled and well abandoned in 1939. See log. 156 1/15 July N Screen at 178 to 129 feet. Formerly log. See log. 157 1/15 July N Screen at 178 to 129 feet. [1940. See log. formerly supplied water for drilling oil test (Johnson no. 1); casing pulled and well ebandoned in 1938. See log. formerly supplied water for drilling oil test (Johnson no. 1); casing pulled and well ebandoned in 1939. See log. formerly supplied water for drilling oil test. (Fartlow A no. 8); casing pulled and well 159 1/15 Nov. N Screen at 185 to 212 freet. [1941. See log. Formerly supplied water for drilling oil test. (Fartlow A no. 8); casing pulled and well abandoned in 1939. See log. [1938] 150 1/15 Aug. T.E. D Screen at 185 to 212 freet. [amp. See log. [1940] 161 1/16 May 26, N Screen at 199 to 228 freet. Formerly supplied and well abandoned in 1939. See log. [1940] Screen at 199 to	ر ا		1943	$\frac{3}{4}$		Screen at 61 to 66 feet. See log.
19444155d/12Dec. 14,NSoreen at 183 to 211 feet. Fermerly supplied water for drilling if test. (Partlow no.10); casing pulled and well abandoned in 1939. See156d/15JulyNSoreen at 109 to 223 feet. Formerly supplied water for drilling cil test. (Partlow no. 17); casing pulled and well abandoned in no. 17); casing pulled and well abandoned in 1940. See log.157d/15JulyNSoreen at 178 to 199 feet. [1940. See log. formerly supplied water for drilling oil test. (Johnson no. 1); casing pulled and well abandoned in 1938.158d/15JuneNSoreen at 175 to 197denod in 1935. See log. fremerly supplied water for drilling oil test. (Johnson no. 1); casing pulled and well abandoned in 1938.159d/15NovNSoreen at 185 to 212 feet. [1941. See log. fremerly supplied water for drilling oil test. (Fartlow A no. 8); casing pulled and well abandoned in 1939. See log. formerly supplied water for drilling oil test. (Fartlow A no. 8); casing pulled and well abandoned in 1938.160d/15Aug.T,E,DSoreen at 185 to 211 feet. [emp. See log. formerly supplied water for drilling oil test. (Cassing pulled and well abandoned in 1940.161d/16MayNSoreen at 185 to 211 feet. [doned in 1940. formerly supplied water for drilling oil test. (Cassing pulled and well abandoned in 1940.162d/15MayNSoreen at 185 to 211 feet. [doned in 1939. fermerly supplied water for drilling cil test. (Cassing pulled and well abandoned 	154	<u>1</u> /25.5	Mar. 21,	Cf,G,	D	Screen at 71 to 52 feet. See log.
155 d/12 Dec. 14, N Screen at 185 to 211 Prot. retmerly supplied water for drilling, il test. (Fartlow no.10); casing pulled and well abandoned in 1939. See log. 156 d/15 July N Screen at 109 to 228 feet. Formerly supplied water for drilling cil test. (Fartlow no. 17); casing pulled and well abandoned in 1938 157 d/15 July N Screen at 178 to 199 foot. 1940. Soc 164, no. 17); casing pulled and well abandoned in 1938. See log. 158 d/15 June N Screen at 175 to 197 dened in 1939. See log. 159 d/15 June N Screen at 185 to 212 feet. 1941. See log. 158 d/15 June N Screen at 185 to 212 feet. 1941. See log. 159 d/15 Nov. N Screen at 185 to 212 feet. 1941. See log. 160 d/15 Aug. T.E. D Screen at 185 to 212 feet. 1941. See log. 161 d/15 Aug. T.E. D Screen at 185 to 214 feet. eapp. See log. 162 d/15 May N Screen at 191 to tabadoned in 19		1/10	1944	*		
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156 d/15 July N Screen at 199 to 228 feet. Former1y log. 157 d/15 July N Screen at 178 to 199 to 228 feet. Former1y log. 157 d/15 July N Screen at 178 to 199 freet. lydo. species 157 d/15 July N Screen at 176 to 197 dende in 1939. See log. 153 d/15 June N Screen at 175 to 197 dende in 1939. See log. 153 d/15 June N Screen at 175 to 197 dende in 1939. See log. 153 d/15 June N Screen at 175 to 197 dende in 1939. See log. 154 d/15 Nov. N Screen at 185 to 212 feet. 1941. See log. 159 d/15 Aug. T.E. D Screen at 186 to 212 feet. 1941. See log. 160 d/15 Aug. T.E. D Screen at 180 to 12 feet. camp. See log. 161 d/16 May 26, N Screen at 180 to 212 feet. feet.<			1928			water for drilling (if tist. (Partiew no.10);
1061071071071071940supplied water for drilling oil test. (Fartlew no. 17); casing pulled end well abandoned in 1978.1940. Soe Los.1071940NScreen at 178 to 199 fort.1940. Soe Los.1081978NScreen at 175 to 1971000 in 1938. See Los.1081941NScreen at 175 to 1971000 in 1938. See Los.1091941NScreen at 175 to 1971000 in 1938. See Los.1091941NScreen at 175 to 1971000 in 1938. See Los.1091941NScreen at 185 to 212 foot.1941. See Los.1091941NScreen at 185 to 212 foot.1941. See Los.1091938NScreen at 191 to labandoned in 1929. Sce Los.1001938NScreen at 185 to 212 foot.1941. See Los.101101Aug.T.E.DScreen at 165 to 214 foot.1942. Sce Los.101101May 26,NScreen at 166 to 214 foot.camp. See Los.1040NScreen at 185 to 211 foot.1940.10411940NScreen at 199 to 228 foot. For, in 1940.10521940NScreen at 199 to 228 foot. For, in 1940.1053NScreen at 199 to 228 foot. For, in 1940.10544/14Oct. 21,NScreen at 199 to 228 foot. For, in 1940.1053 <t< td=""><td>156</td><td>a/15</td><td>T11 1 **</td><td></td><td>NT</td><td>Samean at 100 to 220 foot Formerly</td></t<>	156	a/15	T11 1 **		NT	Samean at 100 to 220 foot Formerly
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157 d/15 July N Serven at 172 to 199 frot. 1940. See log. 153 d/15 June N Serven at 175 to 197 done in 1938. See log. 153 d/15 June N Serven at 175 to 197 done in 1938. See log. 154 d/15 June N Serven at 175 to 197 done in 1938. See log. 159 d/15 June N Serven at 175 to 197 done in 1938. See log. 159 d/15 Nov. N Serven at 185 to 212 frot. 1941. See log. 159 d/15 Nov. N Serven at 185 to 212 frot. 1941. See log. 160 d/15 Aug. T.E. D Serven at 185 to 212 frot. 1941. See log. 161 d/16 May 26, N Serven at 186 to 214 frot. Camp. See log. 1940 161 d/16 May 26, N Serven at 190 to 228 frot. For- in 1940. 162 d/15 May N Screen at 190 to 228 frot. For-	5		1340			no. 17): casing pulled and well abandoned in
Image: Section of the section of th	157	d/15	July	~~~~	N	Screen at 178 to 199 feet. 1940. See log.
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initial constraintoil test; casing pulled and well abandoned in 185 to 212 feet.1941. See log.1938NScreen at 185 to 212 feet.1941. See log.1938Fermerly supplied water for drilling oil test (Fartlew A no. 8); casing pulled and well160d/15Aug.T.E.DScreen at 191 to abandoned in 1939. See log.161d/16May 26,NScreen at 186 to 214 feet.camp. See log.1940NScreen at 196 to 214 feet.camp. See log.162d/15MayNScreen at 196 to 228 fiet. For-in 1940.162d/15MayNScreen at 199 to 228 fiet. For-in 1940.163d/14Oct. 21,NScreen at 185 to 211 fiet.doned in 1940.163d/14Oct. 21,NScreen at 185 to 211 fiet.doned in 1940.1938NScreen at 185 to 211 fiet.doned in 1939.16440.06Jun. 16, J.E.DScreen at 179 to 191abandoned in 1939.165d/25MayJ.T.DScreen at 83 to 94 fiet.166d/27MayCr.E.FScreen at 85 to 106 fiest.Supplies water for16731.5May 30,NScreen			1941			foot. Formerly supplied water for drilling
159 d/15 Nov, 1938 N Screen at 185 to 212 feat. [1941. See loc. 160 d/15 Aug. T.E. D Screen at 185 to 212 feat. [1941. See loc. (Fartlow A no. 8); casing pulled and well 160 d/15 Aug. T.E. D Screen at 191 to [abandoned in 1939. See loc. [1940.] 161 d/16 May 26, N Screen at 186 to 214 feet. [camp. See loc. [1940.] 162 d/15 May 26, N Screen at 199 to 228 feet. For- [in 1940.] 162 d/15 May N Screen at 199 to 228 feet. For- [in 1940.] 163 d/14 Oct. 21, N Screen at 185 to 211 feet. [doned in 1940.] 163 d/14 Oct. 21, N Screen at 185 to 211 feet. [doned in 1940.] 164 40.06 June 16, J.E. D Screen at 185 to 211 feet. [doned in 1939.] 164 40.06 June 16, J.E. D Screen at 179 to 191 [abandoned in 1939.] 165 d/25 May J.T. D Screen at 327 to 350 feot. Supplies water for city of Daisetta. Temperature 7420 F. See 166 d/27 May Cf.E. P Screen at 327 to 350 feot. Supplies water for city of Daisetta. Temperature 7420 F. See 167 S1.5						oil test; casing pulled and well abandoned in
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160d/15Aug. 1938T,E, 3DScreen at 191 to abandoned in 1939. See log 213 feet. Supplies drinking water for oil161d/16May 26, 1940NScreen at 186 to 214 feet. Formerly supplied water for drilling oil test (Rye no. 1); casing pulled and well abandened162d/15May 1940NScreen at 199 to 228 feet. Formerly supplied water for drilling oil test (Cessna no. 1); casing pulled and well aban- 1930163d/14Oct. 21, 1938NScreen at 185 to 211 feet. formerly supplied water for drilling cil test (Partlow A no. 5); casing pulled and well abandoned in 1939.16440.06Jun. 16, 1945J,E, 1DScreen at 179 to 191 feet. Sce log.165d/25May 1945J,E, 1DScreen at 327 to 350 feet. feet.166d/27May 1945Cf,E, 1FScreen at 327 to 350 feet. feet.16731.5May 30, 1938NScreen at 35 to 106 feet. rater re- 1940.16731.5May 30, 1938NScreen at 35 to 106 feet. rater re- 1940.16731.5May 30, 1938NScreen at 35 to 106 feet. rater re- 1940.16731.5May 30, 1938NScreen at 35 to 106 feet. rater re- 1940.			1938			Formerly supplied water for drilling cil test.
1601/15Adg.1,3,DScreen at 191 to [abandoned in 1925. Sep 1051611/16May 26,NScreen at 186 to 214 feet. [camp. See log.19401940Formerly supplied water for drilling oil test1621/15MayNScreen at 199 to 228 feet. For- in 1940.1621/15MayNScreen at 199 to 228 feet. For- in 1940.1631/14Oct. 21,NScreen at 185 to 211 feet. [doned in 1940.1631/14Oct. 21,NScreen at 185 to 211 feet. [doned in 1940.16440.06Junt 16,J,E,DScreen at 179 to 191 [abandoned in 1939.16440.06Junt 16,J,E,DScreen at 327 to 350 feet. Supplies water for1651/25MayJ,T,DScreen at 327 to 350 feet. Supplies water for1661/27MayCf,E,PScreen at 327 to 350 feet. Supplies water for19381938NScreen at 85 to 106 feet. Water re-193819405116731.5May 30,NScreen at 85 to 106 feet. Water re-193819405N19405116731.5May 30,N19381940. See log	160	4/15		<u> </u>		(Particw A no. 8); casing pulled and well
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161194019401940194019401940194019401940194019401940162d/15MayNScreen at 199 to 228 flet. For-in 1940.163d/14Oct. 21,NScreen at 185 to 211 flet.doned in 1940.163d/14Oct. 21,NScreen at 185 to 211 flet.doned in 1940.163d/14Oct. 21,NScreen at 185 to 211 flet.doned in 1940.16440.06Juni 16, J,E, DScreen at 179 to 191abandoned in 1939.165d/25MayJ,T, DScreen at 327 to 350 flot.Supplies water for166d/27MayOf,E, PScreen at 327 to 350 flot.Supplies water for16731.5May 30,NScreen at 85 to 106 flot.Supplies water re-1938NScreen at 85 to 106 flot.Supplies water re-1938NScreen at 85 to 106 flot.Supplies water re-1940.5NScreen at 85 to 106 flot.Supplies water for1940.5NScreen at 85 to 106 flot.Supplies water for1938NScreen at 85 to 106 flot.Supplies water for1938NScreen at 85 to 106 flot.Supplies water for1940.5NScreen at 85 to 106 flot.Supplies water for1940.5NScreen at 85 to 106 flot.Supplies water for1	161	d/16	May 26		N	Screen at 186 to 214 fact. Comp. See log.
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162d/15May .1930NScreen at 199 to 228 fact. For-in 1940.163d/14Oct. 21, .1938NScreen at 199 to 228 fact. For-in 1940.163d/14Oct. 21, .1938NScreen at 185 to 211 fact.doned in 1940.16440.06Junt 16, 			1010			(Rve no. 1): casing pulled and well abandoned
1930merly supplied water for drilling oil test (Cessna no. 1); casing pulled and well aban- to 211 fret. doned in 1940.163d/14Oct. 21, NScreen at 185 to 211 fret. doned in 1940.19381938Formerly supplied water for drilling cil test (Partlow A no. 5); casing pulled and well abandoned in 1939.16440.06Junt 16, J,E, DScreen at 179 to 19116440.06Junt 16, J,E, DScreen at 179 to 191abandoned in 1939.165d/25MayJ,E, DScreen at 83 to 94 fret.166d/27MayCf,E, FScreen at 327 to 350 frot. Supplies water for city of Daisetta. Temperature 74½° F. See16731.5May 30, NScreen at 85 to 106 frot. Vater re- ported highly mineralized; well destroyed in 1940. See log.	162	d/15	May		N	Screen at 199 to 228 f.et. For- in 1940.
Include(Cessna no. 1); casing pulled and well aban- Screen at 185 to 211 fret.IncludeOct. 21, NScreen at 185 to 211 fret.Include <t< td=""><td>i</td><td>--1</td><td>_1900</td><td></td><td></td><td>marly supplied water for drilling oil test</td></t<>	i	- -1	_1900			marly supplied water for drilling oil test
163d/14Oct. 21, 1938NScreen at 185 to 211 feet.doned in 1940.19381938Formerly supplied water for drilling cil test (Partlow A no. 5); casing pulled and well16440.06Junt 16, 1945J,E, 1DScreen at 179 to 191 feet.abandoned in 1939.165d/25May 1945J,T, 1DScreen at 327 to 350 feet.Supplies water for city of Daisetta.166d/27May 1940Cf,E, 5PScreen at 327 to 350 feet.Supplies water for city of Daisetta.16731.5May 30, 1938NScreen at 85 to 106 feet.Water re- log.19380NScreen at 85 to 106 feet.Water re- log.1940.50000016731.5May 30, 1938NScreen at 85 to 106 feet.Water re- log.	!	1	3			(Cessna no. 1); casing pulled and well aban-
1938Formerly supplied water for drilling cil test16440.06June 16, J.E, DScreen at 179 to 191abandoned in 1939.16440.06June 16, J.E, DScreen at 179 to 191abandoned in 1939.19451feet. See log.165d/25MayJ.E, DScreen at 83 to 94 feet.166d/27MayCf.E, PScreen at 327 to 350 feet. Supplies water for city of Daisetta. Temperature 74½° F. See16731.5May 30,NScreen at 85 to 106 feet. Water re- ported highly mineralized; well destroyed in 1940. See log.	163	d/14	Oct. 21,		N	Screen at 185 to 211 feet. doned in 1940.
16440.06June 16,J,E,DScreen at 179 to 191abandoned in 1939.1641945 $\frac{1}{4}$ feet. See log.165 $\frac{1}{25}$ MayJ,E,DScreen at 83 to 94 feet.165 $\frac{1}{25}$ MayJ,E,DScreen at 83 to 94 feet.166 $\frac{1}{27}$ MayCf,E,PScreen at 327 to 350 feet.Supplies water for19405city of Daisetta. Temperature 74 $\frac{1}{5}^{\circ}$ F. SeeSeeScreen at 85 to 106 feet.Vater re-16731.5May 30,NScreen at 85 to 106 feet.Vater re-log.1938ported highly mineralized; well destroyed in1940.See log.			1938			Formerly supplied water for drilling cil test
164 40.06 Junc 16, J,E, D Screen at 179 to 191 abandoned in 1939. 1945 1 feet. See log. 1 feet. See log. 165 d/25 May J,T, D Screen at 327 to 350 feet. Supplies water for 166 d/27 May Cf,E, P Screen at 327 to 350 feet. Supplies water for 167 31.5 May 30, N Screen at 85 to 106 feet. Tater re- log. 1938 ported highly mineralized; well destroyed in 1940. See log.						(Partlow A no. 5); casing pulled and well
165 $d/25$ May J, T, D Teet. See log.165 $d/25$ May J, T, D Screen at 83 to 94 feet.194511166 $d/27$ MayCf,E, PScreen at 327 to 350 feet. Supplies water for city of Daisetta. Temperature $74\frac{1}{5}^{O}$ F. See16731.5May 30,NScreen at 85 to 106 feet. Water re- ported highly mineralized; well destroyed in 1940. See log.	164	40.06	Jun: 16,	J,E,	D	Screen at 179 to 191 abandoned in 1939.
1031/23May3,1,DScreen at 83 to 94 Test.1945111661/27MayCf,E,PScreen at 327 to 350 feet.Supplies water for19405city of Daisetta.Temperature 745° F.See16731.5May 30,NScreen at 85 to 106 feet.Vater re-1938ported highly mineralized; well destroyed in1940.See log.	165	1/25	1940 I	<u> </u>		Ieet. See log.
166d/27MayCf,E,PScreen at 327 to 350 feat.Supplies water for19405city of Daisetta.Temperature 7450F.See16731.5May 30,NScreen at 85 to 106 fest.Tater re-log.1938ported highly mineralized; well destroyed in1940.See log.	700 1	<u> </u>	1945	· , · , <u>1</u>	ע	Dereon Ar 92 fo 34 1391.
19405city of Daisetta.Temperature 745° F.See16731.5May 30,NScreen at 85 to 106 fest.Water re-log.1938ported highly mineralized; well destroyed in1940.See log.	166	d/27	Mav	ርተፑ	- P	Screen at 327 to 350 Paut. Supplies water for
167 31.5 May 30, N Screen at 85 to 106 fest. Water re- log. 1938 ported highly mineralized; well destroyed in 1940. See log.		2/11	1940	5		city of Daisetta. Temperature 7440 F. See
1938 ported highly mineralized; well destroyed in 1940. See log.	167	31.5	May 30.		N	Screen at 85 to 106 fest. Vater re- 10g.
1940. See log.	i		1938		! ,	ported highly mineralized; well destroyed in
					1	1940. See log.

- 31 -

Records of wells and springs in Liberty County--Continued

				i	1		Height of
Well	Distance Owner		Driller	Date	Depth	Diam-	measuring
	from			ccm-	ſ	eter	point
	Liberty			-ela	well	of	abcve
1				ted	(ft.)	well	round
			, , ,			(in.)	(It.)
168	7克 miles	Liberty Ranch Co.		1917	· 703	24,13,	0.0
- 100	northeast			1047	000	10	<u> </u>
169	11 miles	Hancomer Lumber Co.	Pitre Water #ell	1940	1 666	4	0,0
100	northeast		Drifting CO.	1044	7.91	A	0.0
170	97 MILES	Gull Oll Corp.	1 QU+	1244	JAL	4	0.0
	norcheast						1
121	10 miles	Tohn Mecom		1937	236	4	0.0
±/÷ (northeast			1507			
172	94 miles	Hamill and Smith	dc.	19:38	305	4	0.0
11~	northeast			12000		-	
173	do.	do.	do.	1938	255	5승.5	0.0
				1	1	21	
174	do.	Houston Production	dc.	1939	255	7,5	0.0
		Co.		1		-	
175	dc.	de.	dc.	1941	161	7,5	0.0
1				1	1		
176	do.	dç.	' do.	1941	374	5	0.0
				1 1			t 1
177	$9\frac{3}{4}$ miles	The Texas Co.	L. Patterson	1941	383	. 5	0.0
	northeast			1			
178	In Liberty	City of Liberty	J. A. Walling	014	63 0	8	0.0
	l L	/ 		; ;			
179	de.	do.	Texas Water	1939	565	13,7	1,6
			Supply Company	1			
				1	1		
				1			
180	d Q •	aci	ao.	1939	991	8	0.0
- 101	20	30	Tuolean	014	605	0	0.0
171		u u .	iucker	iora	095	o	0.0
192	10.	do	10.	014	651	4	0.0
TOP	(10/0			Ulu		Т	
183	do.	Southern Pacific	Lavne-Bcwler Cc.	1911	601	10	0.0
		R.R. Co.					0.0
				1 1	1		
			• 1 2	1	1		
194	ic.	do.		01d	576	6	
				i t			
185	de.	Layl Sandwich Shop	Pitre Water Well	1940	119	4	1.0
			Drilling Cc.		1		l I
186	3 miles	Texas Pipe Line Co.	dc.	1941	333	4눒,4	0.2
	scuth			r 1 • • • • • • • • • • • • • • • • • • •			,
187	l milə	John Mecom			540	4	· ·
	south			1		19.2.9	· · · · · · · · · · · · · · · · · · ·
198	[⊉] mile	Mecom and Harrison	Serles Yount	1909	260	8	0.0
100	south		,	1	0.00		,
T8A	00.	۵0.	~~ ~ .	, TA., S	200	42	·
100	3 mila			1007	862	· · · · · · · · · · · · · · · · · · ·	
т.90				1:03		42	~ ~ ~
101	14 milor	Liberty County	Ditno Waton Wall	10472	65		0.0
TaT	L4 MILUS	Fairgrounds	Drilling Co	: 1240 :	00	4	0,0
••••••	3000.16030	1011%1 941143		•••••			

Weak Energy Lights of mean large large mean large mean large mean large mean large me	1944 4 4 restaurant. See loc. dc. Cf,E Ind Screen at 301 to 321 feet. Supplies w 3 pipe line pump station. Temperature 7 Flows D Flow estimated 5 callens a minute [Sec Dec. 9, Flows S Flow estimated 1 callen a minute on De 1944 Flows S 1944. Flows D Flow estimated 50 callens a minute on De 1944 Flows S 1944. Flows D Flow estimated 50 callens a minute on Le Flows D Flow estimated 50 callens a minute on Le Flows D Supplies water for swimming poc Flows S Measured flow 50 gallons a minute on L Flows S Measured flow 50 gallons a minute on L	1	
	19:44 1 restaurant. See log. dc. Cf,E Ind Screen at 301 to 321 feet. Supplies w dc. Cf,E Ind Screen at 301 to 321 feet. Supplies w Flows D Flow estimated 5 callens a minute Sec Flows D Flow estimated 1 callens a minute on De Dec. 9, Flows S Flow estimated 1 callen a minute on De 1944 1944. 1944. Flow estimated 50 callens a minute on 1 log. Flows D Flow estimated 50 callens a minute on 1 log. 1944 Flows D Flow estimated 50 callens a minute on 1 log.		1901
Mail Energy Lights Method Use Hemarks 1 Balow 1040 of of of No of 109 101 nut N of of No of 109 101 nut N of No Sorven at 101 to 131 from triggtion of 109 102 109 N Sorven at 101 to 131 from triggtion of 109 4/21 Solut 22 N Sorven at 101 to 131 from triggtion of 109 4/21 Solut 22 N Sorven at 286 Sorven at 286 to 265 front. Newson 11 sector reported 101 1093 N Sorven at 286 to 255 front. Supplies used Sorven at 286 to 255 front. Supplies used 101 1093 N Sorven at 286 to 255 front. Supplies used Sorven at 286 to 279 front. Supplies used 109 1091 N Sorven at 286 to 279 front. Supplies used Sorven at 286 to 279 front. Supplies used 109 1091 N Sorven at 286 to 100 front. Supplies used Sorven at 286 to 100 front. Suplies used Sorven at 286 to	1944 1 restaurant. See log. dc. Cf, F Ind Screen at 301 to 321 feet. Supplies w dc. 3 pipe line pump station. Temperature 7 Flows D Flow estimated 5 callens a minute See Dec. 9, Flows S J944 1944. 1944.].	139
	19:44 10:4 10:4 dc. Cf,E Ind Screen at 301 to 321 feet. Supplies w 3 pipe ling pump station. Temperature 7 Flows D Flow estimated 5 callons a minute Sec on Jan. 16, 1945.	+ បា	138
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	1944 (A) restaurant. See log. dc. Cf,E Ind Screen at 301 to 321 feet. Supplies w 3 pipe line pump station. Temperature 7	1	137
Well FAUWE Defect Wethod Use Hemarks measuring measuring not of of of of 166 d_{j} 1917 Formerly supplied water for irrigation of 167 d_{j} 1917 Notice and ild to 181 feat. Somerly supplied water for irrigation of 168 d_{j} 1917 N Screen at 288 Supplied water for darking 170 d_{j} 1944 N Screen at 286 to 266 cell Water for darking 171 d_{j} 1938 N Screen at 285 to 266 cell Water for darking 172 d_{j} 1939 N Screen at 285 to 265 cell Water for darking water for darking water for darking 173 d_{j} 1939 N Screen at 285 to 255 feet. Supplied water 174 d_{j} 1941 N Screen at 285 to 255 feet. Supplied water	1944 / A restaurant. See lor.	5.30	196
Wall Flow Method Balow Method of (ft.) Method of (ft.) Method of (ft.) Method of (ft.) Method of (ft.) Method of (ft.) Method (ft.)	Dec. 7. J.E. P Screen at 98 to 108 feet, Supplies wa	13.60	185
WellENDER BALOWDete of late of and enderWethof of of of of of of of of of of of pointWethof and ant b/Wethof afHemarks af af afHemarks af afHemarks af af afHemarks af af afHemarks af af afHemarks af af afHemarks af af afHemarks af af afHemarks af af afHemarks af af afHemarks af af afHemarks af af af af afHemarks af af af afHemarks af af af afHemarks af af af af afHemarks af af af afHemarks af af af afHemarks af af af afHemarks af af af afHemarks af af af afHemarks af af af afHemark af af af afHemark af af af afHemarks af af af af afHemark af af af afHemark af af af af afHemark af af af af a	N Formerly supplied water for locmotive Reported flowing in 1907. Deussen No.		134
WellFirst Prise Prise Prise 	Nov. 1, 1927 See log.	0,0	
wellFedrex DecompositionWethed DecompositionWethed of 	FebNFormerly supplied water for loc motive19115creen at 559 to 591 feet. Deussen No	+ 7	103
Wall Bright Event Balance Method Use Remarks measuring measure of of of of point mont h' \underline{c}' not of of 168 \underline{a}' 1917 500 acrss of rice. Spint spint 168 \underline{a}' 1917 N Serven at 161 to 181 feet. Formerly suml 170 \underline{a}' Serven at 161 to 181 feet. Formerly suml spinind spinind spinind 170 \underline{a}' 1937 N Serven at 288 Serven at 286 to 266 feet. Set reported 171 \underline{a}' 1938 N Serven at 286 to 255 feet. Serven at 286 to 255 feet. Supplies water 177 \underline{a}' 1939 N Serven at 286 to 255 feet. Supplies water 177 \underline{a}' 1939 N Serven at 286 to 255 feet. Supplies water 172 \underline{a}' 1939 1939 N Serven at 285 to 275 feet. Supplies water<	Nov. 17, Flows P Reported flow 40 callens a minute on N 1944 1 1944. Temperature 7630 F.	+ ©	192
WellPrice Price Besturing measure- (ft.)Method of of 	0ct. 30, Well destroyed in 1939. 1931	81/P+	ц Ц
well Below Detect Method Use Remarks $m=sesuring_measure-(ft.) of of of of of point munt h't water ft' water a' 1917 Formerly supplied water for irrigation of 168 d' 1917 N Serven at 161 to 181 feet. Somerly supplied water for drilling 170 d/21 Serven at 288 Decema min:relized. Set loc. Serven at 288 Decema min:relized. Set loc. 171 d/20 1937 N Screen at 286 to 305 feet. Water reported sulph 172 d/20 1938 A,E Ind,D Screen at 285 to 305 feet. Water reported sulph 173 d/17 1938 A,E Ind,D Screen at 285 to 356 feet. Water supplied water 30. 175 d/30 July A,E Ind,D Screen at 285 to 356 feet. Supplied water 31. 176 d/30 1941 N Screen at 355 to 356 feet. Supplied water 31. 177 d/30 0et. N Screen at 355 to 356 feet.$	July [T,3,] P [This well and wells no. 178, 179, and 1945 [)] [ply the city of Liberty. Temperature	₫/ 6	180
well Panarks Mathed massuring measure- (ft.) Mathed mode Use Remarks 168 $d/5$ 1917 Formariy supplied water 500 acres of rice. Spilor. Spilor Spilor 169 6.75 Nov. 5, 1923 N Screen at 161 to 181 fpet. Formariy supplied water for maring supplied water for drilling to 310 fpet. Supplied water for drilling 1944 170 $d/20$ 1937 N Screen at 288 boreau min-radized. Spelor. 171 $d/20$ 1938 N Screen at 288 to 305 feet. Water reported test (Well Hamah no. 20). See log. 173 $d/17$ 1938 A,E, Ind,D Screen at 286 to 305 feet. Supplies water test (Well Hamah no. 20). See log. 175 $d/30$ 1941 A,E, Ind,D Screen at 235 to 255 feet. Supplies water for drilling oil test (Supplies Water 1941 Supplies Water for drilling oil test (Supplies Usplies lease 195 176 $d/30$ July N Screen at 355 to 373 feet. Supplies lease 196 177 $d/30$ July N Screen at 355 to 373 feet. Supplies lease 197 Supplies water 198 178 + 7 Dec.	19:5 SO is reported yield betagallons a mindow of $Dec. 8$, 24 , 1939. Temperature $75\frac{10}{2}$ F. See 10 1944	2.75	
wellPAINER PAINELYUNL LOWMethodUseHemarksmessuring amore of montof nfof of of nfof of of nfof of of of nfof of of of nfof of of of of of of of of of of of of of of point montMethod not nf the the the of of of of of of of of of of of of point mont not point mont 	Nov. 26, T.E. F Screened in two sands from 445 to 562	1.02	179
WellPATER ParticeLeven of aMethodUseRemarksmeasuring amontn' c' A168 d' 1917Formorly supplied water for irrigation of 1917169 6.75 NovN169 6.75 NovN170 $d/21$ Sept.22,N19371938NSersen at 286171 $d/20$ 1938N172 $d/30$ 1939N174 $d/30$ 1939N175 $d/30$ JulyA.E,Ind S176 $d/30$ 1941N177 $d/30$ 1941N178 $d/30$ 1941N177 $d/30$ 1941N177 $d/30$ 1941N177 $d/30$ 1941N177 $d/30$ 1941N178 $d/30$ 1941N179 $d/30$ 1941N177 $d/30$ 1941N178 $d/30$ 1941179 $d/30$ 1941177 $d/30$ 1941178 $d/30$ 1941179 $d/30$ 1941179 $d/30$ 1941177 $d/30$ 1941178 $d/30$ 1941 <td>Dec. 7, Flows P Estimated flow 4 gallens a minute Se 1944 cn Dec. 7, 1944.</td> <td>7 +</td> <td>178</td>	Dec. 7, Flows P Estimated flow 4 gallens a minute Se 1944 cn Dec. 7, 1944.	7 +	178
WeilingInvestigation of patter of point measure- (ft.)Method Use of of of point matter for invigation of inf water for invigation of point measure- a/Method Use of of point point measure- the seven at the seven in the seve	Oct N Screen at 355 to 379 feet. Supplied 1941 water for drilling cil test (Armelin r	<u>d</u> /30	177
WeillPerformLever Date of point measuring measure- 	July N Screen at 353 to 373 feet. Supplies w 19:1 for drilling cil test (Heimple no. 1).	<u>1/30</u>	176
WellPAINER Balow (ft.)Lever (Date of 	July A.E. Ind Screen at 120 to 140 feet. Supplies 1 1941 5 1	₫/30	175
Well Parker Level Mathod Use Remarks massuring measure- of of of ft. model model model model use ft. model model model model use ft. model model model model use ft. model model model model model ft. ft. model model model model ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. ft. <td< td=""><td>1939 ; N Screen at 233 to 255 feet. Suprlied w</td><td>₫/3C</td><td>174</td></td<>	1939 ; N Screen at 233 to 255 feet. Suprlied w	₫/3C	174
WelliPerformLever BelowMathodUseHemarksBelowDate of measuring (ft.)MathodUseHemarkspointmontlift 	1938 A.E. [Ind,D] Screen at 228 to 255 feet. Suppling w 15 for oil lease. See log.	<u>a</u> /17	173
Well Date of Balow Mathod Use of of of sasuring Mathod Use massuring Remarks msasuring measure- point of mont of mont <td>1938 N Screen at 285 to 305 feet. Reported s water. See log.</td> <td><u>a/20</u></td> <td>172</td>	1938 N Screen at 285 to 305 feet. Reported s water. See log.	<u>a/20</u>	172
WellMatterMathodUseRemarksmassuringmeasure-ofofofpointmonth/ $c/$ h/(ft.)1917Formarly supplied water for irrigation of168 $d/5$ 1917N1696.75Nov. 5,N170 $d/21$ Sept.22,N194419441944to 310 feet.supplied water for drillingtest (Well Hannah nc. 20).See log.	Nov N Screen at 226 to 236 feet. Water reported in the second state of the second	<u>d/20</u>	171
Well Matrix LEVEL Well Balow Date of Mathod Use Remarks massuring measure- of of of Ift point mont lift water ift water (ft.) a/ 1917 Formerly supplied water for irrigation of 168 d/5 1917 Formerly supplied to late to la	Sept.22, N Screen at 288 became minoraldzed. 1944 to 310 feet. Supplied water for drill test (Well Hannah nc. 20). See log.	<u>d</u> /21	170
WellPATERLEVELWellBolowDate of assuringMathodUseRemarksmosesuringmeasure- montof h'of c/of(ft.)montliftWater $(ft.)$ h' $c/$ $a/$ 1917 168 $d/5$ 1917 $formerly supplied water of500 acres of rice.Soe log.$	Nov. 5, N Screen at 161 to 181 feet. Formerly s 1943 boiler at sawmill. Well abandoned whe	6.75	169
Well Polow Date of Mathod Use Remarks measuring measure- of of point mont lift water a/ h/ c/	1917 Formerly supplied water for irrigation 500 acres of rice. See log.	₫⁄ 5	168
Well Below Date of Method Use Remarks measuring measure- of of	mont lift water h' <u>c</u> /	point (ft.) a/	1
	LEVEL Date of Method Use measure- of of	l ^{WATER} l Below measuring	Wel.

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							Height cf
Well	Distance	Owner	Driller	Date	Denth	Diam-	measuring
	from	,		com-	cŕ	eter	point
1	Liberty			ple-	wəll	of	abcve
1				ted	(ft.)	well	grcund
•	1					(in.)	(ft.)
192	l÷ miles	Liberty County	Pitre Water Well	1943	65	4	0.0
	southeast	Fairgrounds	Drilling Co.				
193	In Liberty	Mrs. Laggie L.	d`•	1941	200	2	0.0
		Moorefield					1 T
194	5 miles	Martin Leissner	do.	1941	103	3	0.0
	north		•	• •			
195	In Liberty	Trinity Valley Cold		1924	350	10	
i		Storage Co.	1				
196	d o.	Lcuis Fair	Louis Fair	1933	18	2	0.0
							1 1 1
197	dc.	A. C. Neyland	بالدوادة من معانية من معانية من معانية مسلما معانية من معانية من معانية من معانية من معانية من معانية من من م جور هذه	1927	28	4	0.0
1		·					
199	d o.	Sun Pipe Line Co.	Sun Fire Line	1932	40	6	0.0
, 1			Co.				
199 :	10.	C. W. Fisher	C. W. Fisher	1895	232	2	0.0
	-						i I
200	7 [±] miles	Howard -e Cour	Pitre Water Well	1942	191	25	0.0
	east		Drilling Cc.			~	
201	9 [±] / ₅ miles	Carl Johnson	do,	1942	528	4	0.0
1	cast						1
202	9 miles	Chas. Welch	do.	1938	96	2 ¹ /2	0.0
1	southeast					~	
203	75 miles	Silva and Welch	do.	1940	151	4,2	0.0
	east		1				
204	de.	Mrs Robinett	d o.	1944	161	4	0.0
ļ	•						, 1
205	6 miles	C. C. Thernton	d o.	1944	287	4	0.0
1	southeast						
206	7 miles	Leo B. Fitre	do.	1944	370	4	0.0
	east	1			,		l
207	• 0 b	J. W. Swinney	do.	1942	137	2	0.0
208	4 miles	Edward Mallet	Edward Mallet	1938	35	14	0.0
	southoast						
208	5g miles	Cleveland Domain	Cleveland Demain	1944	20	5	2.0
	s.utheast						
210	2 ⁺ miles	do.	Pitre Water Well	1940	80	ະ	0.0
	Cast		Drilling Co.	1000	100		
SIT	74 miles	C. M. Mitchell	ay	19:00	400	z	0.0
	Southpast		T 1 1	1045	145		0.0
212	7 [™] miles	Chas. Welch	Pitre Water Well	1945		2	0.0
1210	2850	Loo B. Ditma	Driffing oc.	1045	620		
210		THE D FICTH	uU •	1240	0~0	***	
214	7 miles	S S Hill	S S Hill	1094	20	, <u></u>	0.0
~ / 	south		C. D. TITT	TANT	~~~ I	4 .*	0.0
215	61 miloo	Took Moog	Took Voor	1012	20		0.0
61.U	south		Vaux MUSS	T 3.7 ()	6.3	тğ	- J + U
216	7 ² milon	Dewarg Canal Co	Faul Achaeon	1940	176		0.5
10101	(4 mires	Devers canar of	Taur Honeson	T 2.7.1	T.0		0.0
217	7ª milee	-05		1943	238		0.0
	southeast			1040		~ ;	0,0
		•			•		

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Records of wells and springs in Liberty County--Continued
	"ATER	LTVEL	1	1	1
Well	Pelow	Date of	Methcd	Use	Romar's
	measuring	measure-	of	of	
	point	mont	lift	water	
	(ft.)	8	<u>b</u> /	<u>c</u> /	
	<u>a/</u>	 	/ /		l Ly
192	<u>d</u> /19	Oct. 1943	J,E, 1	P	Screen at 47 to 57 feet.
193	<u>d</u> /18	Aug. 1941	J,E, 1	D	Screen at 134 to 144 feet, See log.
194	<u>d</u> /25	June	J,Ĕ, <u>1</u>	D,S	Screen at 87 to 97 feet. See log.
195	·		ΤΞ, 15	Ind	Supplies water for ice plant.
196	<u>d</u> / 8	Jan. 27, 1945	C,E,	D	Screen at 14 to 18 feet.
197	<u>d/12</u>	Mer. 31,	С,Е, <u>1</u>	D	Screen at 24 to 28 feet.
198	<u>d</u> /10	Apr. 20,	C,E, 20	Ind	Screen at 30 to 40 feet. Supplies water for
199	+ <u>1</u> /34	1908		N	Flow reported 17 gallons a minute in 1908, no flow in 1945. Deussen No. 731 ^e /. See log.
200	<u>d</u> /24	Feb.	J,E, <u>1</u>	D	Screen at 179 to 189 fost. See log.
201	<u>a</u> /22	Nov. 20,	J,E,	D,S	Screen at 415 to 437 fect. See log.
202	<u>d</u> / 8	July 1938	Cf,G, 2	D,S	Screen at 88 to 93 feet. See log.
203	<u>1/26</u>	Sept. 1940	J,E, 1	D	Screen at 139 to 148 feet. See log.
204	<u>1</u> /26	Apr. 1944	J,E,	D	Screen at 147 to 157 feet. See log.
205	<u>a</u> /32	Sept. 1, 1944	C,W	S	Screen at 273 to 283 feet. See log.
206	<u>a</u> /27	July 1944	J,E,	D	Screen at 360 to 370 feet. See log.
207	<u>d</u> /17	Oct. 1942	J,É,	D,S	Screen at 132 to 137 feet.
208	<u>a</u> /15	1938	C,Ĥ	D,S	**************
209	4.27	Jan. 16, 1945	C,W	S	
210	<u>d</u> /30	1940	J,2, 長	D	Screen at 70 to 80 foot.
211	<u>d</u> /25	1930	C,W	D,S	
212	d/24.50	May 22, 1945	J,E, 1	D	Screen at 134 to 145 feet. See log.
213	~~~				Well not completed. See log.
214	<u>d</u> /16	Dec. 8, 1944	С,Н	D,S	Screen from 20 to 22 feet. Temperature 73° F.
215	<u>d/15</u>	do.	C,H	D,S	Screen from 25 to 28 f et. Temperature 71° F.
216	4.10	do.	C,E, ;	D	Screen from 170 to 176 feet. Temperature 70° F.
217	<u>d/17</u>	Aug. 1943	C,W	D	Screen from 226 to 238 feet. Supplies water for 4 families.

Records	of	wells	and	springs	in	Liberty	CountyContinued
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	1	, , , , , , , , , , , , , , , , , , ,	1 111,0 111 1100109	<u> </u>		,	Height of
W-11	Distance		Driller	Date	Denth	Diam-	measuring
	from		DITION	C. m-	of	eter	ncint
	i livm ⁱ Tibonter	1 1 -	i i			of	
	LIDerty		ł	pre-	NGTT	01	
	1		1	τεα	(It.)	werr	ground
	·		1			(in.)	(1't.)
218	5 giles	Bab Le Cour	Waggoner	1910	<u> </u>	8	0.0
	southeast	1	1		1		
	; [1	-1		1		
	1	3 1 •	1		1		1
		·	* 1		1		;
219	8 ¹ / ₂ miles	J. M. Heiskell Est.	Rycade Oil Corp.	1930	5,927		
	south	l I			i 1		: :
220	10 miles	Liberty Investment	The Pure Oil Co.	1929	5,766		
	south	Co.	1				1
221	9 miles	Shilo School	Pitre Water Well	1940	333	2등	0.0
	southeast	4 4	Drilling Cc.			~	
222	68 miles	A R. Milintz	de.	1944	275	4	. 1.5
	southeast	1	1			_	1
223	124 miles	Franklin and Tideman	do.	1943	349	4	0.0
	southeast	I.t.d.				-	
	Chambers Co.	1					1
224	13 miles	Shell Oil Co.	Levne-Teres Co.	1930	568	4	0.0
- 51	southeast Cl	ambers Co.		1000		Ŧ	
225	93 milas	B. F. Whittington	F. Cov	1030	746		
280	l ogutheget		, r. day	1900	640		
			fritzienen, erst bibereteren				
707 7 7 7				-			Height of
Well	Distance	Owner	Driller	Date	Depth	Diam-	measuring
i	from	1	1	com-	of	eter	point
	Devers	1		nle-	well	Oſ	apcae
	8			ted	(ft.)	well	ground
	l L		1			(in,)	(ft.)
226	2 miles	Sabine Tram Co.	Humble Oil and	1930	5,800		
	northeast	1 L	Refining Co.				
227	3 miles	Texas Pips Line Co.	Pitre Water Well	1938	406	4	0.0
	scuth	8	Drilling Co.				
228	33 miles	Bert Hays	do.	1942	234	2	0.0
	south						
229	l mile	V. D. Myers	do.	1943	99	25	0.2
	east	1		1		~	
230	In Devors	W. E. Jonkins	dc.	1943	443	2	0.0
231	6 ¹ / ₄ miles	Dan Hart	do.	1944	488	4	0.0
	south	1				_	
232	34 miles	The Texas Co.	do, i	1944	232	4	0.0
	northeast	1				-	• • •
233	1 mile	E. V. Bovt	Jess	1937	210	4	0.0
	south	1 1 1 3 v	Hollingshead			_	..
234	57 miles	B. H. Willis Est.			190	6	1.8
4	east						2,0
235	75 miles	.0b	······································		200	6	2.0
	east					, i	2,0
236	9t miles	0.		10/1	100		0 0
~	04 11100 088t			1941	TOO	3	0.8
237	54 miles	Sinclein Pine Line		1022	402	0 6	1 0
207		Co Co Libe Tille		TAUO	496	0,0	T'S
1	0000			i	1		
220	In Devera	Amoniaca Diao	Ditmo Woton Wall	1041	1001		
~00	TT DOVELS		LICLA MATEL MOTT	794Ti	101	3	0.0
		GTOWELS ASSOCIATION	DLITING OC.	!	1		

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	WATER	LEVEL	[1	
Well	Below	Date of	Method	Use	Remarks
	measuring	measure-	of	of	
	point	ment	lift	water	
	(ft.)	1	h/	c/	
			<u> </u>	<u> </u>	
213	+ 3	Dec. 22.	Flows	N	Drilled to 1 500 feet as an oil test: casing
	1	1944	1 2000		then nulled to 800 feet and completed as
	i,	, T °. L.I	E 1	1	flowing motor well "otor is minorelized and
	2	: 1	1	1	ilowing water wall. ater is mineralized and
	1	1	1	1	contains marsh 388. Estimated 1100 5. gallons
010	, 	1 4	1	1 	a minute on Dec. 22, 1944. Temperature 72° F.
219			·		Ull test, See log.
220				!	Do.
	l 	, , ,	· ·		
221	d/ 4.5	June	¦ J,⊠,	P	Screen at 306 to 317 feet. Supplies Shilo
	1	1940		1	School. See log.
222	12.23	June 16,	C,W	D,S	Screen at 261 to 273 feet, See log.
	t f	1945	t 1	1	
223	d/ 3	Aug.	l	N	Screen at 326 to 347 feet. Water reported
		1943	1	1	highly mineralized: supplied water for drill-
	t I	,	1	1	ing rig. (Sherman no. 1). See log.
2.24	1/6	Feb. 19	·	N	Screen at 546 to 566 feat. Supplied water for
1310-2	i di la	1020 10,	:	1	drilling mig. Sulphun weter reported between
2015	l	: 12:00		~ ~ ~	Gol and Rog foot Soc log
420		·	, U, W	5	681 and 707 10et. Dec 10g.
	WATER	LEVIL	i -	1	
Well	Below	Date of	Mathod	Use	Romarks
	measuring	measure-	of	of	
	point	ment	lift	water	
	(ft.)		b/	c/	
	a/		_	, , , , ,	
226					Oil test. See log.
227	d/14	Mar. 17.	C.G.	D.S	Screen at 384 to 404 feet. Formerly supplied
		1938	<u>1</u> .	- j -	water to nine line numn station. See log.
228	1/13.5	June 11		DS	Screen at 211 to 221 feet. See log.
2.70	9,2000	1942	1	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
229	9.00	Ton 23	CT	·	Samoon of 71 to 79 foot Soo log
<u>, , , , , , , , , , , , , , , , , , , </u>	5.0		, <u>,</u> ,		DOLGON AL 14 DO LA 1960. DOS 108.
276.	4/21	Nor 10	1 <u>0</u> 7 F		Company at 100 to 110 foot See lon
ະວຸດ	<u>u</u> /21	NOV. 10,	رت, ل 1	ע	Boreen at 407 to 417 199t. See tog.
0.11	1/15	1940	~~~~~	2.2	
201	<u>a</u> /12	rep.	0,₩	<i>D</i> ,S	Screen at 476 to 498 Feet. See log.
	1/11	19:14			
332	<u>a/11</u>	Aug.		N	Screen at 209 to 231 feet. Supplied water for
		1944			drilling oil test (C. A. Moore nc. 1). See
233	<u>d</u> /14	;1937 ;	C,E,	D	Screen at 201 to 210 feet.
	d/18	1945			
234	14.90	Jan. 17,	Ċ,₩	D,S	"Pearson Flace".
		1945			
235	11.40	do.	C,W	D,S	"Headquarters well".
			_		
236	11.18	do.	C.H	D	"Gilmore Place".
			,	-	
237	13.72	June 20	А	D	Formerly supplied water to nine line nump
		1945		~	station: domestic gualy at present Samoan
					at 429 to 492 feet. See low
230	1/12	Tuna	Τΰ		Sanoon at 02 to 112 test Cumulton Antabian
200	₩ ±~	10/1	יש, ש, ש 1	L L	weter for employees
	·	T2.2.7	12		MARRI IOI GMDIOARG.

Records	of	wells	and	springs	in	Liberty	CountyContinued
10000100	~.		CITTLE I				

	:	and a second second I second second I second	4	1 1	1	1	Height of
Woll	Distance	Owner	Driller	Date	Depth	Diam-	measuring
	frcm			com-	of	eter	point
	Devers		1	ple-	well	cf	above
			1 1	ted	(ft.)	well	round
		, 	· •		۱ ــــــ	<u>(in.)</u>	(ft.)
239	45 miles	J. E. Clark, Jr.	Hollingshead	1940	92	<u>ነ</u> 1ይ	0.0
	southeast		1 1 1	, 		1	1
240	6 ¹ miles	J. M. Rich	Abshier	1940	200	2	0.0
	south) 	:) 	1 1 1
241	In Devers	H. A. Gripon	Pitre Water Well	1945	501	2	0.0
			Drilling Co.	, , , , , , , , , , , , , , , , , , , ,		l L	 {
242	9† miles	E W. Boyt	Paul Acheson	1941	403	2	0.0
	scutheast	 					/ !
243	7 ³ miles	do.	Jack White	1928	401	2	0.0
	southeast	l Tanan and a state of the stat	1 1				
244	8, miles	E. F. Abshier	J. F. Abshier	1920	150	2	0.0
	south						
245	9 milos	E. W. Boyt	Gulf Oil Corp.	1935	225	7	
	south			1			
246	9 [†] / ₂ miles	do.	dc.	1935	344	6	
	south						
ି- ≟7	9 miles	de.	do.	1935	335	6	
·	south		1				
248	do.	dc.	do.	1935	318	6	
	1			1	1		

a/ Plus (+) indicates water lavel above measuring point.

b/ Fump or lift: T, turbine; Cf, centrifugal; A, air lift; C, cylinder; B, rope and bucket.

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Power: E, electric; G, gas or gasoline engine; S, steam; W, windmill; H, hand. Number indicates horsepower.

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	WATER	LTVEL		1	· · · · · · · · · · · · · · · · · · ·
W911	Below	Date of	M [~] th o d	Use	Remarks
	mesuring	¦measure-	cf	of	· · · ·
	point [.]	ment	lift	water	
	(ft.)		b/	c/	
	a/			-	
239	<u>d</u> /4	Jan. 3,	С,Ж	D,S	Screen at 77 to 92 feet.
240		1940	CF	DS	
NTO.		, T 2 T 0	1/6	, D,0	
241	d/21.30	Mar. 12,	J.E.	D	Screen at 483 to 499 feet, Supplies 8
		1945		i i	customers. See log.
242	d/15	July	C,W	D.S	Screen at 391 to 403 feet,
•	-	1941		1 1	
243	d/15	Nov.	C,W	D,S	Screen at 390 to 400 feet.
	-	1928		1 1 1	
244	<u>d</u> /16	1920	C,W	D,S	
245				N	Schoon at 182 to 205 fact. Supplied water
~10				1	for drilling oil test. (Bowt no. 19). See log.
246	·			I N	Screen st 71 to 336 fast. Supplied water for
~ 10				1 14	drilling oil test (Bout no 20) See log
247				N	Senser at 315 to 335 feet. Supplied weter for
~ 11		;		1.	drilling oil test (Bout no 3)
248				N	Semeen at 974 to 319 foot Sumplied water for
ылаў. 1				TA I	drilling oil test (Bout no. 5)
c/ P	nublic s	unnly. Ind	inducto	iol. E	P mailmond: D domentia: S stock: N not

c/ P, public supply; Ind. industrial; RR, railroad; D, domostic; S, stock; N, not used.

 \underline{d}' Water level reported by driller or owner.

e/ Number under which well is listed in U. S. Geological Survey Water-Supply Paper 335, Alexander Deussen, 1914.

Table of Drillers' Logs, Liberty County, Texas

••••••••••••••••••••••••••••••••••••••	Thickness	Depth	11	Thickness	Depth
	(feet)	(feet)		(feet)	(feet)
Well 2			Well 2Co	ontinued	
Gulf, Colorado and	Santa Fe K.	R. Co.,	Gumbo	9	980
in Cleveland.			Shale	127	1107
			Fine packsand	21	1128
Surface	44	44	Gumbo	42	1170
Sand	62	106	Shale streaks	10	1180
Clay	13	119	i Sand	25	1205
Sand and gravel	27	146	Boulders	2	1207
Rock	3	149	Sand and Aravel	32	1239
Clay	66	215	Gravel	6	1245
Fine-grained sand	24	239	Gumbo	5	1250
Shale	34	273	Sand	30	1280
Sand and gravel	55	328	Gumbo	5	1285
Gumbo	137	465	Sand	52	1337
Shale	35	500	Shale and boulders	58	1395
Rock	1	501	Tight sand	21	1416
Gumbo	26	527	Sen d	35	1451
Gumbo and boulders	40	567	Shale streaks	13	1464
Soft shale	23	590	Sand	14 :	1478
Bould ers	5	595	Shale	34	1512
Shale	7	602			
Boulders	9	611	ell 4		
Ledges of rock	13	624			
Gumbo	68	692	Humble Oil & lefinin	ng Co., Camp	be 11
Fino-grained sand	18	710	No. 1, 72 miles sout	th of Clevel	and.
Gumbo	7	717		i	
Shale	. 33	750	Surface sand	12	12
Sand	20	770	Sandy clay	13	25
Gumbo	24 !	794	Sand	13	38
Sand	45	839	Clay	22	60
Shale	66	905	Sand	26	86
Loose sand	13	918	Clay	5	91
Gumbo	3	921	Gumbo	13	104
Sen d	9	930	Sale	27	131
Shale ·	15 ;	945	Sand	42	173
Rock	12 ¦	957	Gravel	64	237
Gumbo	8	965	Shale	11	248
Shale	6	971	Sand and gravel	13	261
	1	t	' (continued o	n next page)

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 Table of Drillers' Logs, Liberty County--Continued

 Thickness
 Depth (feet)
 Thickness
 Depth (feet)

 Well 4 --Continued
 Well 4--Continued

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Well 4Conti	nued		<u>Cell 4Co</u>	ntinued	
Sticky shele	22	283	Gumbo	32	1192
Shale	24	307	Hard sandy shale	3	1195
Gumbo	5	312	Gumbo and boulders	9	1204
Sticky shale	17	329	Gumbo	9	1213
Sand and aravel	44	373	Boulders	3	1216
Bock	3	376	San d	24	1240
Gumbo	40	416	Hard sandy shale	5	1245
Gumbo, lime and sand	17	433	Gumbo	121	1366
Gumbo and lime	32	465	Sand	2	1368
Sand and boulders	21	486	Sandy shale	17	1385
Hard sand	5	491	Gumbo	15	1400
Gumbo and lime	20	511	Sand	3	1403
Hard lime	4	515	Soft sandy shale	16	1419
Sand and boulders	15	530	Jumbo	62	1481
Hard lime	4	534	Sand	21	1502
Gumbo and lime	47	581	Gumbo	39	1541
Sand and boulders	19	600	Sandy shale	40	1581
Hard brown sand	12	612	Rock	2	1583
Sand	8	620	Gumbo	11	1594
Gumbo and lime	108	728	Sticky shale and lime	11	1605
Sand	3	731	Packsend	5	; 1610
Sand and boulders	28	759	Sand	10	1620
Gumbo and lime	41	800	Sticky shale	6	1626
Shale and line	18	818	Gumbo and lime	2	1628
Tough sticky shale	18	836	Shale and lime	1	1629
Rock	1	837	Sticky shale and lime	28	1657
Sticky shale	16	853	Shale and lime	15	1672
Gumbo	54	907	Sand and shale	4	1676
kock	1	908	Hard sand and shale	10	1686
Gumbo	27	935	Shale and lime	18	1704
Sand	9	944	Gumbo	4	1708
Gumbo	43	987	Gumbo and lime	47	1755
San d	3	380	Gumbo and lime, sand		! !
Sandy shale	26	1016	and boulders	62	1817
Gumbo	44	1060	Sand	52	1869
hock	1	1061	Sand and boulders	16	1885
Gumbo	- S A O	1070	Gumbo	7	1892
Darta Darta	4U 24		Tough gumbo	55	1947
duilloo	04 16		Gumbo	2	¦ 1949
Sand and pourders	10	1100	Sandy snale and lime	32	1981
		1	Gumbo	19	2000

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	Thickness	Danth	Thickness	Denth
	(feet)	(feet)	(feat)	(foet)
•		(1000)		(1000)
Well 5, partie	l log		Well 5, partial logcontinu	ued
Humble Oil & Refinir	ng Co., Hor	nbe*k	Water sand 11	1891
No. 1, 2 miles south	west of Cl	.eveland.	Sand 14	1905
			Sticky shale and gumbo 15	1920
Surface clay	55	55	Hard rock 1	1921
Quicksand	50	105	ater sand and red	
Clay and gravel	207	312	shale 4	1925
Roolt	1	313	Sand and broken lime 10	1935
Send and boulders	59	372	Gumbo and hard shale 30	1965
No record	248	620	Broken lime, shale,	
Gumbo	15	635	and gumbo 120	2085
Sandy shale	60	695	Shale and gumbo 215	2300
Gumbo	20	715	Gumbo 10	2310
Sandy shale and	~~~	. 20	Rock 3	2313
boulders	170	885	Send 2	2315
Gumbo	15	900	Sand and shale 15	2330
Sendy shala and		000	Gumbo 15	2345
boulders	45	945	Sand and sandy shale 10	2355
Sticky shale and	10	010	Broken sand and shale 75	2430
gumbo	172	1117	Sticky shale and gumbo 15	2445
Rock	1	1118	Sand and shale 15	2460
Gumbo with streeks o	 ∩f		Broken sand and shale 35	2495
shale	- 91	1209	Gumbo 11	2506
Gumbo with stracks o	رت م	1.00		
sticky shale	76	1285	TO TAL DEPTH	5633
Send and shale	6	1201	- 	
Fresh weter send	с х	1204	Well 8	
Sand and shale	6	1300		
Broken line and mumb	0	1000	City of Cleveland, No. 2, in Cl	eveland.
Broken ine and gunt	, oc	1306		
Sendy shele	5	1401	Surface soil 6	6
stiely shale with et	monice	7407	Soft yellow clay 14	20
of lime	24	1495	Sand 6	26
Broken lime and sond	4 T	1407	Soft clay 24	50
Copyso-grained send		1/21	Sand 29	79
Broken line and sand		1475	Clay 2	81
Gumbo	85	1560	Scind 29	110
Sticky shele with	00	1000	Clay 5	115
stracks of lime on	d		Sand 30	145
gunbo	88	1648	Clay 61	206
Send	3	1651	Coarse sand and gravel 11	217
Foter sond	29	1680	Clay 17	234
Gumbo and sticky sha	le 35	1715	Gravel 51	285
Sindy shale	35	1750	Soft yellow city and	
Gumbo	18	1768	sand 4	289
Stud and sandy shale		1700	Sand and gravel 25	314
with strucks of lim	ie 30	1798	Clay with sand breaks 21	335
Sticky shale	13	1811	Clay 98	433
Sticky shale and sum	ibo 19	1830	Hard Layers 1	434
Rock	1	1831	Clay 61	495
Teter sind	19	1850	Hard layers 2	497
Sticky shale and mum	100	1880	Clay 29	526
		1000	(continued on next page)

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1	Thickness (foot)	Dopth (foot)		Thickness	Depth
	(1000)	(1080)		(1001)	(leet
Well 80	Continued		Well 20C	ontinued	
Hard layors	1	527	Clay	2	226
Clay	83	610		,	
Sand	26	636	<u>Woll 23</u>		
Clay	10	64 6	-3		
Gumbo	105	751	III. P. Johnston, 74 mil	es northeast	t of
Sand	19	770	Cleveland.		
Sticky shale	21	791		20	70
Hard sandy shale	22	813	Intra, rea to pink sena	38 ; 01	30 50
Sand broaks and shall	lo 17	830	Sundy, red clay	21	59
Sticky shale	80	910	Brown sund	<u>۲</u> ۲	80
Send	16	926	Graver and streeks of	10	00
Sticky shale	3	929	- I Schuy Cluy	10 1	98
	•		lism dy alow	19 1	19/
<u>1.c11 9</u>			(howe)	2	126
Black Cold Potroloum		iles	Sen dy alow	2	120
southeast of Clavel	u 00•, 0 <u>4</u> 10 and	1105	Growel	11	140
	~11Cl •		bite condu alou		140
Sand	10	10	UTough crown colored	3	149
Clay	33	43	alow	24	172
Sand rook	24	67	Rock	24	174
Sund and gravel	21	88	Sond and gravel	16	190
Clay	7	95	Hard, brown, rod, and		100
			- white clay	47	237
Vell 10			Sand and lenses of lime	9 18 J	255
••••••••••••••••••••••••••••••••••••••			Lime rock	2	257
Russ Mitcholl Co N	No. 1. 37 m	iles	Sand	1	258
southeast of Clevela	und.		Lime rock	2	260
			Sand	8	268
Send and gravel	112	112	Lime rock	6	274
Sm dy shale	88	200	Hard and soft send	32	306
Send and gravel	104	304	Brown, red, and white		
			- clay	48	354
<u>"'oll 20</u>			Sand	2	356
5			Clay	44	400
M. A. Ellis, $5\frac{1}{4}$ mile	s northeus	t of	Brown sand rock	4	404
Cleveland.			Gray s and	26	430
			I Clay	4	434
Sandy soil	2	2	Stindy city	<u> </u>	440
Red clay	10	12			·
Fine red sand and	70				
Streams of citay	30	4±6	Duss Mitchell Co No	$2 6^{1} milos$	south-
White sand (good)	18	60	anst of Clowaland	2, 02 miles	south-
atroirs of aler	10	70	Il case of Creverand.		
SUPPLIES OF CLEY	10	70		69	60
Cray cond (mod)	20	30	Sand	10	U7 70
Clov	69 70	160	Clov	5	1 J Q A
Prokon fino har	30 <u>.</u>	1 T25	Shalo	13	04
sond ond alow	9 1	1	Sand	22	97
Send and fine march	άR	1 1/9 224	Sticky alow	1	רב נ נב נ
Sand and THE BLANCT	TO TO		(Continued of	* !	101
		•	· (continued o	n next page	1

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*******	Thickness	Depth (feet)	[]	hickness	Depth (feet)
	(1660)	(1690)		(1990)	(1660)
Yell 27Co	intinued		Well 4	<u>+0</u>	
Sand and gravel	9	140	Mrs. Corine Brown, 11	. miles sou	ith of
Clay	11	151	Romayor.		
Sandy Clay	6	157			~ 1
Sand	3	160	Sand	31	31
Ciay	47	207	Clay	0	37 00
Sand	11	284	Sand	40	02
Well 28	3		Five-grained sand	26	00 114
	- 		Medium sand	16	130
Russ Mitchell Co	No. 3. $10\frac{3}{4}$ m ⁴	iles	Shale	3	133
southeast of Clevel	and.		Sand	9	142
	1		Clay	32	174
Sand	8	8			· · · · · · · · · · · · · · · · · · ·
Clay	16	24	Well 4	4	
Send	61	85		 ,	
Jand and gravel	34	119	A. G. Lesterjette, we	11 No. 1.	9 miles
Fine gray s and	51	170	south of Romayor.	•	
Shale	6	176		1	
Sand and gravel	26	202	Top soil	12	12
Fine-grained sand	2	204	Shale and sand; showi	ng	
	•		of dead oil	173	185
<u>Well 2</u>	:9		Blue gumbo	100	285
- <u>.</u>	•		Shale and packsand	95	380
M. N. Cunningham, 9	🕆 miles south	neast of	Gumbo, showing oil	40	420
Cleveland.			Sand and shale	150 !	570
	ř	_	Gumbo	5	575
Sand	3	3	Oil sand (blow-out)	18	593
Clay	9	12	Gumbo	47	640
Sand Name alere	6	18	Sand with salt water	22	662
Hard Clay	49	67		0	
Hard clay	29	90 117		8	
Red sund	6	193	T B Allen & Co 2	miles east	. of
Hard clay	40	163	Romayor.	MII 62 643(, 01
Sand	23	186			
Hard clay	12	198	Clav	10	10
Sand	6	204	Sand	70	80
Hard clav	2	206	Clay and gravel	20	100
Coarse red sand and			San d	40	140
gravel	15	221	Clay and Gravel	20	160
Hard clay	72	293	Sand	20	180
Sand and gravel	12	305	Rock	2	182
Hard clay	2	307	Clay and gravel	6	188
Sand and gravel	4	311	Roch	3	191
Hard clay	10	321	Gravel	19	210
Sand and gravel	15	336	Rock and sand	30	240
Hard clay	10	346	Clay and gravel	160	400
Medium gravel	5	351	Sand	20	420
Clay	17	368	Clay and gravel	. 50	470
			Thin layers of "rocks	and"12	482
		Ì	Shale	SR 1	520
		i	Ulay and gravel	30	550
			iater sand	T03 i	659

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	Thickness	Depth		Thickness	Depth
	(feet)	(Inet)		(feet)	(feet)
ell 50			vell 520	Continued	
Gulf, Colorado, and	l Santa Fe 🔒	i. (o.,	Sand, clay and boul	lders 15	530
in Romayor.			Shale	102	652
	!		Sand and gravel	96	728
Surface soil	7	7	Shale and gumbo	21	749
Sandy clay and grav	el 39	46	Sand and gravel	59	808
Red clay	12	58			
Sand and clay	32	90	Well	69	
Very fine sand	34	124			
Shale	17	141	Concord School, 42	miles east o	of Romayor
ard sand	7	148		<u>.</u>	
Shale Soud and bank	21	169	Soft clay	24	24
Sand and Doulders	63	232	Send and gravel	13	37
Shale .	29	261	Medium clay	5	42
Sana Comb -	24	285	Soft sand	53	95
Gundo	17	302	Medium clay	9	104
Sana	40	342		-	
Share hand sand	43	385	<u>ett</u>	70	
very hard sand	20	405	Dend (ter 12 dir 12)		
	67	472	Boyd Sevell, 42 mil	es east of !	omayor.
Hard sand	12	484	Rem 2		
Hard gumbo	8	492	Sand	י רר	7
nara sana	40	532	Ciay Ding cond	11	
Vorw nough cond		596	Fine Sand	41 20	39 67
Sinle	14 i 75 i	610	Citay Gand and mercial	۵۵ الا	70
			Clow	11	101
5011 52			CIAy	20	101
		1	Cles	1	105
Texas Construction	Matarial ('a	A=	5 nd	18	128
miles southeast of	Pomeyor	, *2	Clev	10	129
millos soumeaso or	itomayor •		Sand	т і 4	133
Clay and sand	24	24	Clav	2	135
Sand and Fravel	26	50			
Clay	8	58	Voll	75	
Sand and gravel	72	130			
Clay and gravel	16	146	Chas. B. Peterson,	ell <u>7</u> 2, 4 m	niles
Sand and gravel	26	172	northwest of Daytor	l.	
Hard clay	68	240		;	
Sand and gravel	12 ¦	252	Shale and clay	60	60
Clay	26	278	Clay	283	343
Sand and gravel	17	295	Blue gumbo	64	407
Gravel	52	347	Sand and gravel	22	429
Shale	3	350	Shale and sand	91	520
Gravel	29	379	Hard sand and grave	el 55	555
Rock	1	380	Shale and sand	40	595
Clean sand	11	391	Gumbo and sand	115	710
Clay and gravel	5	395	Shale and sand	25	735
Sand and gravel	20	416	Shale and jumbo	17	752
Sand	26	442	Kock	4	756
Sand and gravel	62	504	Hard sand and bould	iers 24	780
Shale	11 :	51.5	Gyp and umbo	14	794
	1		Sand and shale	46	840
	:		Sand and rock	17	857
		11	(continue	ed on next pa	ιge)

(continued on next page)

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Well 75ContinuedGumbo15Hard sand and boulders68Rock5Gumbo58	872 940 945	Well 75(Gumbo and shale	Continued	
Gumbo 15 Hard sand and boulders 68 Rock 5 Gumbo 58	872 940 945	Gumbo and shale		
Hard sand and boulders 68 Rock 5 Gumbo 58	940 945	Lime rock	70	2750
Rock 5 Gumbo 58	945		18	2768
Gumbo 58	1007 1	Gypsum and sand rock	23	2791
	1002	Gumbo and sand	35	2826
Rook 2	1005	Hard send rock	21	2847
Sand and boulders 25	1030	Hard rock	5	2852
Shale and shell 20	1050	Hard sand and houldons	27	2000 2001
Sand and boulders 12	1062	Gypsum rock	3	2801
Gumbo and sand 119	1181	Herd send	8	2000
How and gypsum 4	1185	Hard rock	3	2002
hard sand and boulders 29	1214	Rock and hard sand	50	29.52
Cumbo	1224	Gumbo	23	2975
Sand and bouldons 28	1200	Shale and sand	8	2983
Gumbo and munsum 15	1278	Gumbo and shale 4	.24	5407
Rock 2	1280			
Pyrites and sand 32	1312	Vell 78		
Rock 3	1315			
Shale 5	1320	A. J. and S. O. Carter.	6 miles nort	hwest
Gumbo and gypsum 42	1362	of Dayton.		•
Rock 3	1365			
Gumbo 23	1388	Soil, sand, and clay	56 ¦	56
Rock 3	1391	Clay	42	98
Hard sand and boulders 8	1399	Clay	22	120
Rock 16	1415	Sandy clay	20	140
Gumbo and shale 101	1516	Clay	10	150
Hard packsand 19	1535	Sand	30	180
Shale and gumbo 75	1610	Sandy clay		190
Sund and boulders 17	1627	Sandy City	15	205
Gumbo and bouldars 46	1673	Sendy alow	20	228
Hard send 21	1694	Cloy	40 : 36 I ·	200 20.3
Rock 2	1696	Sandy cley	14	304 318
Sand and boulders 6	1702		7 . 7	510
Gumbo 16	1718	Cray Sandar olori	42	360
Hard sand and boulders 14	1732	Sandy Clay		370
Gumbo 14	1746	Clor	30	400
Lime rock 6	1752	Sond	20 I	440
Guindo and sand 195	1947	Clav	10	402 472
Sund and boulders 4	1951	Sand	68	540
Hund and and abola 70	1962	Clay	12	552
furd sand the shale 59	2024	Sand	14	566
Gunsum 2	2140	Sandy clay	16	582
Shele and mumbo Al	6147 9199	Clay	12	594
Hard sticky shale 24	2212	San d	24	618
Shelly clay 53	2265	Clay	7	625
GVD, rock and blue shale 15	2280	Sand	85	710
Shale 50	2330	Clay	15	725
Gypsum 1	2331	Sandy clay	5	730
Gumbo and shale 311	2642	Sand	÷2	772
Hard shell 38	2880	Clay	5	777
		Sand	30	80 7
ł	! !	Clay	5	812

	Thickness	Denth		Thickness	Lenth
	(feet)	(feet)		(feet)	(feet)
ell 82	(
Ralph Graves, 52 mi	les northwe	st of	Well 8	34Continued	
Dayton.					i
	:		Clay	75	120
Surface	9	9	Sand	12	132
Sandy clay '	35	44	Clay	28	160
Sand and clay strea	ks 12	56	Sand	10	170
Joint clay	34	90	Clay	46	216
Sandy c lay	20	110	Sand	30	245
Hard shale	7	117	Clay	19	265
Shale	29	146	Sandy clay	15	280
Sand (good)	57	203	Clay	82	362
Sandy shale	10	213	Sand	25	387
Sand and streaks of	1		Clay	7	394
shale	11	224	Sand and clay	18	412
Sandy shale	6	230	Sand	12	424
Sand and streaks of			Clay	6	430
shale	21	251	Sand .	54	484
Sandy shale	6	257	Clay	29	513
Sand (good)	18	275	Sand	40	553
liard shale	8	283	Clay	32	585
Sand	32	315	Sand	20	605
Hard shale	3	318	Clay and sand	79	684
Sand and boulders	7	325	Sand	40	724
Hard shale	5	330	Clay	15	739
Sand and streaks of			Sand	93	832
hard shale	28	358	Clay	<u> </u>	834
Shaley sand	6	364		11 05	
Sand (good)	58	422		11 00	
Shale and sand	17	439		7 ¹ miles most	of Douton
Sand und hould one	10	452	E. J. Stoesser,	14 miles west	or Day con.
Sand shale and	*	400	Sandır soil	3	3
band, share and	16	479	Clow	17	20
Shale and lime	8 1	480	Gandre oler	21	41
Sandy shale	3	400	Clay and sendy C	lav 92	133
Send (mod)	14	407	Sand (good)	31	164
Hard packsand and		701	Clay	22	186
hould are	5	502	Sandy abole	16	202
San d	12	514	Cholo	10	212
Hard sand	2	516	Sondy shole	10	222
Sand	19	535	Sandy Share	22	244
Shale	4	539	Sund (rood)	19	263
Sand and boulders	14	553	Sandy shale	13	276
Shale and sand bould	ders 5	558	Sandy Share	58	334
			Shale	7	341
Vell 84			Shale and lavers	of	
			bhaite and ingoit	and 22	363
Arnold .olfe, 5 mile	es northwest	5 of	Sand (rood)	31	394
Dayton.			Hard sandy shale	20	414
			Shale	8	422
Surface clay	4 ¦	4	Sand (good)	87	509
Yellow clay	14	18	Hard shale	6	515
Sand	27	45	Sand (mod)]7	532
			Shale	3	535
	!		(continued o	n next page)	

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(continued on next page)

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- <u> </u>	Thickness (foot)	Depth (feet)
and the second	(1660)	(1660)
Tell 85Cont	inued	
Sand (good)	45	580
Sandy shale	5	585
Shale	13	598
Sand (good)	12	610
Sticky shale	14	624
Sandy shale	6	630
Sticky shale	15	645
Sendy shale	5	650
Sand (good)	37	687
Shale	13	700
Sand	55	755
Sand and gravel	27	782
•Fine sand and boulde	ers 20	802
Hard shale	6	808
1.ell 90		
Peterson & Sterling, Dayton.	$4\frac{1}{4}$ miles	west of
Soil	3	3
Clay	63	66
Buckshot clay	85	151
Soft clay and gumbo	176	327
Fine-grained sand	16	343
Coarse grained sand	50	393
Gumbo	11	404
Coarse grained sand	74	478
Gumbo	35	513
Gumbo	2	590
		002
ell 91		
Chas. B. Peterson, 4 Dayton.	🗄 miles we	st of
Shale and clay	21	21
Gumbo	138	165
Sand	171	336
Gumbo	5	341
Hater sand	10	351
Gumbo	48	399
Snale	6	405
Sana	15	420
Gumbo	00 i	475
Shale	2 I	450
Sand	97 I	120 592
Gumbo	70	593
Sand	49	642
	!	

	Thickness	Depth
	(feet)	(feet)
· · · · · · · · · · · · · · · · · · ·		
Vell 91Co	ntinued	
	;	
Gumbo	5	647
Sand	13	660
Gumbo	66 ¦	726
Sand	12	738
Shale	10	748
Sand rock	12	760
Gypsum	12	772
Gumbo	15	787
Shale	25 ¦	812
Gravel and shale	15 ¦	827
Gumbo	11	838
Send	19	857
Rock	12	869
Gumbo	2	871
Sand	9	880
Gypsum	35	915
Gumbo	21	036
Gamesum	40	076
Gypsun	40	970
Chall and chalo	6	979
Pool	55	305
AUCK Cumba	00 j	1040
		1041
Sand and shale	86	1127
(Jumbo	36	1163
Sand and boulders	2	1165
Gumbo	38	1203
Rock	14	1217
Sand, shell and boul	ders 3	1220
Gumbo	23	1243
Sand and boulders	15	1258
Gumbo	36	12 94
Hard sand and boulde	rs 8	1302
Soft rock	26	1328
Hard sand	2	1330
Rock	10	1340
Sand, boulders and		
gravel	3	1343
Gumbo and boulders	40	1383
Sen d	30	1413
Gypsum and hard bumb	xx 6	1419
San d	179	1598
Gumbo	6	1604
Sand	46	1650
Gumbo	15 ;	1665
Sand and boulders	17	1682
Gumbo and boulders	20	1702
Lime rock	14	1716
Gumbo and boulders	14	1730
Gumbo	24	1754
Send	36	1790
Gumbo	18	1808
(continued o	n next pag	e)

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Thickness Depth Thickness Depth (feet) (feet) (feet) (fect) Lell 91--Continued Well 105--Continued Hard shale Sand Gypsum and Lumbo Gumbo Sand Shale, rock, and clay Rock Shale Hard rock Well 92 Gumbo Sand Patrick and Tyrrell Drilling Co., 7 miles Shale west of Dayton. Gumbo Rock Clay Gumbo Fine-grained sand Shale Clay Gumbo Streaks of sand and Yellow clay clav Gumbo Fine-grained sand Clay Clay Gumbo Fine - rained sand Sand, putty sand Clay Limestone Fine- rained sand Sand, putty sand Rock Coarse-grained sand Fine -; rained sand Gumbo Medium sand Sand, putty sand Shale Rock Well 105 Gumbo and shale Sun Oil Co., Quintette well No. 1. 62 Shale, rock, and shale 11 miles northwest of Dayton. Rock Shale Yellow surface clay Rock Gumbo and shale Blue shale Shale and rock Thite sand Limestone Sand and clay White quicksand Sand, putty s and Blue shale Limestone hite sand Brown and blue shale Blue shale No record Boulders(concretions) Gumbo and rock Sand and gravel Gumbo Gumbo Shale Sand, putty sand Rock and clay Sand and gravel Gumbo Shale Shale Sand Hard sand Gumbo Shale 14 06 Sand Gumbo Gumbo Shale Sand, putty sand Very tough gumbo Gumbo Hard shale Sand, putty sand (continued on next page) Shale

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	Thickness	Denth		hickness	Leuth
	(feet;	(feet)		(feet)	(reet)
.ell 105Co	ontinued	uque : e co `e : e ,sentine	hell 109Continued		
Shale and Cumbo	39	1591	Shale and clay	57	88
Thite shell and rock	7	1598	Sa: d	11	99
Blue shale	32	1630	Clay	71	170
Soft rock	2	1632	Sand	5	175
Gumbo	8	1640	Clay	70	245
hard blue sand with			Sand, layers of rock	42	287
strata of rock	10	1650	Soft clay	16	303
Blue _f umbo	30	1680	Sand	2	305
Rock	3	1683	Clay	5	310
Shale	8	1691	Sund, layers of rock	87	397
hard sandstone	2	1693	Clay	6	403
Blue shale and blue s	sand,	1 000	Sand	<u> </u>	407
very slight show of	011 12	1705			
Blue shale and thin s	strata	1910	<u>ell 120</u>	-	
	13	1718			
blue snale	45	1763	City of Dayton, No. 2	, in Dayto	n.
.ell 106			Cla v	52	52
	•		Sand	11	63
Taylor-Dayton Co., 7:	miles nor	thwest	Clay	7	70
of Tarton.			Boulder	2	72
			Red clav	41	113
Plack dirt	6	6	Sticky clay	46	159
Elue clay	22	28	Sandy shale	11	170
ater sand	8	36	Shale	43	213
Blue marl	37	73	Gumbo	97	310
Juicksand	12	85	Sand	75	385
Blue clay	15	100	Shale	14	399
Boulders (sandstone)	2	102			
Quicksand	39	141	Cell 12	1	
Slue marl	6 6	207			
Boulders	2	209	The Texas Co League	No. 3. 9#	miles
Coarse quicksand	20	229	south of Dayton.		•
Blue marl and boulder	rs 3	232			:
Blue marl	6	238	Soil	1	1
Boulders	3	241	Clay	21	22
5lue marl: gas at 244	Ft.32	275	Yellow clay and prave	1 62	84
Juicksand	47	320	Sand and clay	37	121
Tater sand	6	326	Gumbo, blue	260	381
Juicksand	3	329	Shale, sand, shell,		f 1
Blue marl	-		and gruvel	56	437
No record	271	600	Gray sand and shell	33	470
Limestone	200	800	Blue gumbo	34	504
Rock salt	400	1200	Gumbo and shell, sand	y 57	561
			Blue gumbo	44	605
<u>.e11 109</u>			Gray sand and shell	46	651
			3lue sandy gumbo	58	709
Heal & Brown, 5 miles	southwest	of Dayton.	Shale, sand, shell,	-	
	6.6		and gravel	48	757
Soll and clay	26	26	Blue sandy gumbo	52	789
Fine- grained sand	5	31	Blue gumbo	38	827
			(continued on	next puge))

······································	Thickness	Depth		Thickness	Depth
	(feet)	<u>(feet)</u>		(feet)	(feet)
.ell 121Con	ntinued		<u>lell 141</u>	Continued	
Blue shale and shell	1 36	863	Fine- rained sand	41	405
Blue sandy gumbo	94	957	Sand	8	413
Blue shale and shell	1 61	1018			
Gray sand and shell	16	1034	ell 14	-6	
Jumbo and lime, sand	ly 65	1099			
Blue shale and shell	L 24	1123	L. E. Higgins, 13 mil	es north of	f Liberty.
Blue sandy gumbo	28	1151		i	
shale and boulders	68	1219	Yellow clay	65	65
Blue gumbo	17	1236	Sand	14	79
Blue gumbo and lime	28	1264		4	83
Gundo Shala anà lima	52	1316	Sand and gravel	33 !	116
	19	1000		40	
Blue shele and lime	39	1074	eil i	.40	
Blue gumbo	17	1428	J. E. Dillon, 13 ¹ / ₇ mil	es north of	[°] Liberty.
				i ior on or	. Erser of
Well 122			Clay	22	22
• ••••••••••••••••••••••••••••••••••••			Sand	22	44
C. A. Grebey, $l_4^{\frac{12}{4}}$ mil	les northwe	stof	Clay	22	66
Dayton.			Fine-grained sand	23	89
	+		Coarse-grained sand	20	109
Clay	140	140	Fine-grained sand	17	126
Fine-grained sand	10	150	Clay	69	195
Clay	14	164	Sand and gravel	18 !	213
Coarse-grained sand	29 .	193		10	
Tell 140				49	
**************************************			John Morgan, 12 mile	s north of	Libertv.
Sudermann-Dolsen Co.	, 6 miles	north		i	
of Dayton.			Yellow clay	15	15
	1		Tight fine-grained sa	nd 6	21
Clay	60	60	Yellow clay	31	52
Sand	13 ;	73	Fine-grained sand	32	84
Joint clay	17	90	Clay	3	87
Gumbo	20	110	Hard packs and	13	100
Joint clay	35	145	Clay	29	129
Gumbo	40	185	Sand and gravel	63	192
Sand	40 :	225		•	
· 011 141	:		<u>err 15.</u>	<u> </u>	
			L. Daffern. 105 miles	north of L	iberty.
Russ Mitchell Co., N	0.4, $3\frac{3}{4}$ m	iles		···· · · · · · · · · · · · ·	01 05.
north of Dayton.			Yellow clay	60	60
	1		Blue clay	21	81
Clay	23	23	Coarse-prained sand	41	122
Sand	8	31	Shale	3	125
Clay	89	120			
Very fine, red and		_	<u>ell 152</u>	2	
gray sand	58	178			
Hard shale	122	300	Morgan and Morgan Lum	per Co., $7\frac{6}{4}$	miles
Sticky clay	64	364	north of Liberty.		
	:		(continued on	next page)	

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Table of Prillers' Logs, Liberty County--ContinuedThickness
(feet)Depth
(feet)Thickness
(feet)Depth
(feet)Well 152--Continued1.0001.0001.000Well 152--Continued1.0001.0001.000Sained sand26861.00026291151.0001.00097

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Well 152Cont	inued		Lell 156Continu	ued	
	60	60		26	26
Clay	60	60	Citay	20	20
Fine-grained sand	26	86	Fine-grained sand	51	77
Clay	29	115	Clay	20	97
Sand	2	117	Rock	2	99
Clay with lenses of			Clay	31	130
sand	28	145	Fine-grained sand	29	159
Clay	15	160	Clay	18	177
Slue sandy clay	22	182	Send	14	191
Good sand and gravel	46	228	Clav	14	205
			Course-grained sand	23	228
1611 153			Glow	14	242
	-		Coorse-grained sand	11	253
Hewitz Dentiet Chunch	7 <u>5</u>	- waith	Clar	11	257
Hardin Baptist Church	$\sqrt{\frac{1}{4}}$ mile	as north		<u>+</u>	
of Liberty.				•	
			<u>.ell 157</u>		
Soft sand	4	4		<i>i</i>	
Soft clay	66	70	Humble Oil & Retining (Jo., (Joh	nson No.
Coarse-grained sand	18	88	1), 9 miles north of Li	iberty.	
Medium clay	11	99		i	
			Red sond	42	42
Kell 154			Red clav	20	62
			Sand	4	66
John Rosnick, 7 miles	north or	f Liberty.	Sandy clay	4	70
			Bine sond "solt and	-	.0
01937	50	50	penne said, said and	20	90
Cray Send on crevel	32	82	pepper .	20	90
alor	20	110	lough red cluy	0	90
Clay			Very line fray sand	30	126
			Sand with lenses of		
Sell 155			of shale	26	152
			Sand and gravel	15 ;	167
Humble Oil & Refining	Co., (Pe	artlow No.10) Blue clay	10	177
87 miles north of Lib	erty.	,	Sand and gravel	23	200
	-		Destination of the state of the		
Sand	2	2	Well 158		
Clay	10	12			
Sand and gravel	26	38	James P. Nowery Prillin	ng Co. 7	b miles
Clay	4	42	north of Liberty		<u> </u>
Sandy clay	56	98			
Send	18	116	Sand and crewol	36	36
Jenses of sand and			Sanu and Braver	60	50
alay	35	151	Citay	00	90 91
Sord	25	176	Fine-grained sand	22	110
	20	190	Clay	43	161
Cray	10	109	Fine-grained sand	35	196
Sand and gravel	30	219	Streaks of sand and		
Clay	11	230	clay	6	202
			Gravel	5	207
<u>ell 156</u>			Clay	13	220
			Streaks of clay and	i	
Humble (il & Refining	Co., (Pa	urtlow No.	gravel	13	233
17), 82 miles north o	f Libert	y.	Clav	8	241
			Fine-grained sand	13	254
		ł	(continued on net	xt page)	
			Conternant on ner	L~P~1	

Tł	nicknes	s Depth		Thickness (foot)	Depth (feet)
	(166.0)	(100)	· · · · · · · · · · · · · · · · · · ·	(1000)	(1000)
1.ell 159			Well 166Con	ntinued	
Humble Oil & Refining Co.	(Part	low "A"	Clav	3	78
No. 8), $8\frac{1}{4}$ miles north of	f Liber	·ty.	Coarse-grained sand	4	82
			Yellow clay	3	85
Sand	2	2	Coarse-Erained sand	5	90
Clay	10		Clay	1	91
Sand and gravel	26	38	Sand	5	90
Ulay	4 56	42	Clay	60	100
Lenses of sand and clay	00 19	90	Fine-grained sand	19 ;	108
Send of sond and clev	35	110		6	204
Lenses of sand and dray	24	175	ROCK	30	234
	6	181	Gravel	3	237
Sand and gravel	35	216	Clev	71	308
Touch clay	2	218	Coarse wonined sand	57	365
iough orag			<u>obar so - grained sand</u>		
"ell 160			<u>Nell 16</u>	7	
Humble Oil & Refining Co.	, Hard	lin Camp	Joe Haines, $10\frac{1}{4}$ mile	s northeast	of
cell, 8 miles north of 1	Liberty	/•	Liberty.		
Clay	12	12	Tough clay	53	53
Loose, fine, red sand	23	35	Sand	26	79
Clay	15	50	Tough clay	5	84
Send and gravel	18	68	Send and gravel	22	106
Clay	41	109			
Sand and gravel	29	138	<u>i.ell 1</u>	<u>68</u>	
Blue olay	37	175			, , ,
Sand and gravel		226	Liberty Rench Co., 7	g miles nort	cheast
ell 164			of Liberty.	i	
			Yellow clay	120	120
Mrs. A. Cessna, 8 ² / ₂ miles	north	of	Soft shale	10	130
Liberty.			Light blue gumbo	110	240
(hunder	7	7	Sand	20	260
Volley elev	0 79		Gumbo	60	320
Cleve streeks and sund	24	41	Sand	120	440
Cray cond	21	86	Gumbo	32	472
Vellow elex	60	155	Sand	36	508
Grev sand	37	192	Gumeo	61	529
			Fine-,rained sand	35	504 504
Tell 166			Gumbo	20	504 507
		1	Sand	10	643
Hull-Daisetta ater Co.,	ll mil	es	Fine are ined send	19	662
northeast of Liberty.			Gumbo	5	667
	_		Good sand	36	703
Clay	20	20		······	
Fine-grained sand	10	30			
Coarse-grained sand	33	63			
Clay	1	64			
Coarse-grained sand	ΤŢ	75			

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	Thickness	Depth	-	Thickness	Depth
Multiplyingengengen an	(feet)	(feet)		(feet)	(feet)
i.ell 169			Vell 173	-	
Handomer Lumber Co., 11 miles northeast of Liberty.			Hamill and Smith, (Ba 9g miles northeast of	rngrover l Liberty.	ease),
Sand	2	2	Clay	6	6
Clay	15	17	ked sand	34	40
Fine- rained sand	41	58	Sandy clay	10	50
Clay	4	62	Tough blue clay	69	119
Send	12	74	Coarse sand and grave	1 6	125
Shale	24	98	Tough blue clay	33	158
Sand	24	122	Fine gray sand	9	167
Clay	24	146	Clay	3	170
Medium sand	32	178	Coarse-prained sand	10	180
Clay	44	222	Tough blue clay	10	190
			Hard packsand	10	200
iell 170			Tough blue clay	23	223
			Coarse sand and grave	1 32	255
Gulf Oil Corp. (Hanna northeast of Liberty.	ah No. 20),	$9\frac{3}{4}$ miles	Well 176	9.	
~]	60	60		o.)	
Clay Final Land		00	Houston Production Co	., 92 miles	5
Volley elan	67 197	87	northeast of Liberty.		
Pano un and cond	121	614 975		^ 0	: 40
fine-grained sand	61 97	200	Clay	42	42
	6 (50	202 201	Fine-Graned sand	25	67
Fine-Arained sand	<u> </u>		Clay	57	104
11013 171			Fine sand and streaks	20	1 194
Well 111	<u>.</u> .		Ol clay	20	165
John Macon 10 miles	northeast	` £	CIRY CLOS	95 95	100
Liberta	norcheast		Sandy Clay	20 99	1 190
Hiber 07.			Cand	20	232
Clav	12	12	Sand and gravel	20	235
Send	43	55	Sand and graver	23	258
Shale	2	57	Sand and ravel	21	279
Sen d	23	80	Sand	21	300
Shale	20	100	Fine-cruined sand	20	320
Sand	7	107	Hard send	13	333
Shale	113	220	Clay	10	343
Sand	16	236	Sand and gravel	27	370
			Fine sand	4	374
lell 172	-			7	
Hamill and Smith. 98	miles nort	heast of		<u> </u>	
Liberty.			The Texas Co., $9\frac{5}{4}$ mil	es northea	st of
Clay	35	35	TTOOL OF .		
Sandy clay	5	40	Soil	24	24
Sand	35	75	Shale	ルエ 91	45
Clav	70	145	Sand	63 63	108
Touch clev	78	223	Chele	1/	100
Fine send and clay	52	275	Sond	10	130
Clean send and oray	30	305	(continued	on nevt v	
orean pano ano graver		000	(contrined	on next p	55 0 /

Thickness Lepth Thickness Depth (feet) (feet) (feet) (feet) Well 177--Continued Well 185 Shale Layl Sandwich Shop, in Liberty 249 117 Sand 134 383 32 32 Sand Coarse red sand 17 49 hell 179 43 92 Clay 14 106 City of Liberty, in Liberty. Coarse-grained sand Clay 2 108 Surface clay 4 112 12 Coarse-grained sand 12 7 Sand 119 48 60 Clay Clay 20 80 Sand 14 94 Well 186 Clay 25 119 Sand and clay 27 Texas Pipe Line Co., 3 miles south of 146 Sticky shale 110 256 Liberty. Sand 42 298 Sticky shale Sand 60 60 8 306 Sand and gravel 14 320 Clay 45 105 Sticky shale Streaks of sand 40 360 Sand 16 376 and shale 46 151 Sticky shale 69 445 Sand and gravel 9 160 Sand 70 10 Fine-grained sand 230 455 Sand and shale 10 276 465 Coarse-grained sand 46 Sticky shale 58 2 523 Rock 278 Sand 39 562 Coarse-grained sand 37 315 Sticky shale 3 565 Shale 3 318 Fine-grained sand 10 328 Well 183 Tight sand 4 332 kock 1 333 Southern Pacific R. R. Co., in Liberty. Well 191 Soil and clay 8 8 Sand 33 Liberty County Fair Grounds, 12 miles 41 Clay 2 southeast of Liberty. 43 Sand 30 73 Sandy clay 21 Soft clay 15 94 15 Sand Sand 16 31 23 117 5 36 Clay Clay 33 150 Sand 14 164 Sand 29 65 Clay 9 173 Sand 8 181 Well 193 Sandy clay 20 201 Clay 75 276 Mrs. Maggie L. Moorefield, in Liberty. Sandy clay 27 303 60 60 Sand with streaks of Sand 73 clay 28 331 Clay 133 Clay 45 376 Fine-frained sand 11 144 10 Sand 386 Clay 56 200 Clay 174 560 28 588 Sand 13 601 Clay

Table of "rillers' Logs, Liberty County -- Continued

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Thickness (feet)	Depth (feet)	Thickness Depth
	<u></u>	Lell 201Continued
Martin Leissner, 5 miles north o Liberty.	ť	Sand 3 462 Fine-grained sand 7 469
Clay37Fine-grained sand17Shale14Gravel4Clay9Medium sand16Clay6	37 54 68 72 81 97 103	Clay 59 528 Well 202 Chas. welch, $9\frac{1}{4}$ miles southeast of Liberty. Sand 4 4 Clay 31 35
C Fisher, in Liberty.		Fine-grained sand 25 60 Sand 22 82 Sand and gravel 14 96
Clay with layers of sand 40 Sand and Gravel 160 Blue clay 30 Later-bearing sand 8-	40 200 230 238	Liberty.
Howard LeCour, $7\frac{1}{4}$ miles east of Liberty.		Clay 72 72 Fine-grained sand 6 78 Clay 59 137 Fine-grained sand 10 147 Clay 4 151
Clay106Fine-grained sand9Clay25Fine-grained sand7Clay8Fine-grained sand5Clay21Fine-grained sand7Clay21	106 115 140 147 155 160 181 188	Well 204Mrs. Robinett, 72 miles east of Liberty.Hard yellow clay147Hard yellow clay147Fine-grained sand5Hard clay9161
<u>Clay 3 ; 191</u>		Well 205 C. C. Thornton, 6 miles southeast of Liberty.
Carl Johnson, 95 miles east of L Clay 41 Fine-grained sand 19 Coarse-Grained sand 45 Sandy clay 10 Clay 63 Cand and gravel 3 Shale 31 Fine-Grained sand 44 Sand 85 Fine-Grained sand 94 Clay 24	41 60 105 115 178 181 212 256 341 435 459	Yellow sticky clay149149Clay72221Shale16237Fine-grained sand20257Medium sand30287Nell 206Leo B. Pitre, 7 miles east of Liberty.Clay310310Sand60370

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Inel 213inell 223inell 220, particl loginell 220, particl logClaySandClaySandClaySandSandClaySand		Thicknes (feet)	s Depth		Thickness	Depth (foot)	
Leo B. Pitre, 7 miles east of Liberty. Clay d sund stroaks 43 41 41 Clay and stroaks 43 64 Fine-trained sand 24 106 Clay 109 217 Fine hard sand 15 232 Clay 55 287 Clay 55 287 Clay 55 287 Clay 6 354 Clay 6 354 Clay 6 354 Clay 7 30 226 Clay 6 354 Clay 7 30 226 Clay 6 354 Clay 8 3 362 Pine hard sand 67 429 Clay 8 3 362 Pine hard sand 67 429 Clay 8 3 362 Clay 8 3 3 3 362 Clay 8 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	;;ell 213				1 220	102	
Lee 3. Fitre, 7 miles east of Liberty. Clay and sund streaks 43 64 Fine-trained sand 24 106 Clay 109 217 Fine-trained sand 16 223 Clay 55 287 Fine hard sand 25 359 Clay 6 334 Fine hard sand 25 359 Clay 6 334 Fine hard sand 67 429 Fine hard sand 67 429 Fine hard sand 67 429 Fine hard sand 67 429 Fine, hard, gray to white 57 Fine, hard, gray to white 57 Fine, hard, gray to white 57 Fine hard sand 35 80 Clay 16 572 Fine, hard, gray to white 572 Fine hard sand 35 80 Clay 26 60 Sand, gravel 69 770 Clay 26 60 Sand, gravel 103 925 Sand, gravel 103 925 Sand 22 1051 Clay 26 820 Sand, gravel 103 925 Sand 22 1051 Clay 100 180 Sand, gravel 103 925 Sand 22 1051 Clay 26 820 Sand, gravel 103 925 Sand 22 1051 Sand, gravel 103 925 Sand 22 1051 Sand, gravel 103 925 Sand 22 1051 Clay 100 180 Sand 21 122 Sand and gravel 102 498 Sand 22 1051 Gumbo 33 1029 Sand 22 125 Sand 37 1324 Sand							
$\begin{array}{c clay on sund stroke 43 & 64 \\ Clay on sund stroke 43 & 64 \\ Clay on sund stroke 43 & 64 \\ Clay & 109 & 217 \\ Sand, clay & 31 & 31 \\ Sand, clay & 31 & 29 \\ Clay & 109 & 217 \\ Sand, clay & 30 & 256 \\ Clay & 30 & 256 \\ Clay & 30 & 256 \\ Clay & 6 & 354 \\ Clay & 6 & 354 \\ Clay & 47 & 329 \\ Clay & 6 & 354 \\ Gunbo & 37 & 406 \\ Sand, gravel & 42 & 371 \\ Gunbo & 15 & 572 \\ Fine hard sand & 67 & 429 \\ Clay & 3 & 3662 \\ Clay & 32 & 552 \\ Gunbo & 37 & 406 \\ Sand, gravel & 122 & 553 \\ Clay & 32 & 552 \\ Clay & 36 & 672 \\ Sand & 15 & 572 \\ Sand & 16 & 766 \\ Clay & 26 & 822 \\ Sand & gravel & 103 & 925 \\ Sand, gravel & 103 & 925 \\ Sand, gravel & 103 & 925 \\ Sand & 35 & 80 \\ Sand gravel & 102 & 498 \\ Sand gravel & 103 & 925 \\ Sand & 32 & 212 \\ Sand and shale & 184 & 396 \\ Gunbo & 122 & 620 \\ Gunbo & 122 & 620 \\ Gunbo & 10 & 1155 \\ Sand & 30 & 1330 \\ Lard and bulders & 40 & 860 \\ Gunbo & 57 & 1055 \\ Sand & 71 & 1211 \\ Gunbo & 28 & 1140 \\ Sand and bulders & 40 & 860 \\ Gunbo & 17 & 1510 \\ Gunbo & 28 & 1140 \\ Sand and bulders & 41 & 1236 \\ Sand & 71 & 1211 \\ Gunbo & 28 & 1140 \\ Sand and bulders & 41 & 1236 \\ Sand & 71 & 1211 \\ Gunbo & 28 & 1140 \\ Sand & 71 & 1211 \\ Gunbo & 28 & 1140 \\ Sand & 116 & 61 & 3500 \\ Gunbo & 17 & 1510 \\ Gunbo & 17 & 1510 \\ Gunbo & 17 & 1510 \\ Gunbo & 10 & 1155 \\ Sand & 1112 & 1221 \\ Gunbo & 28 & 1140 \\ Sand and line & 64 & 1300 \\ Gunbo & 17 & 1510 \\ Gunbo & 17 & 1510 \\ Sand & 1112 & 121 \\ Sand and line & 64 & 1300 \\ Gunbo & 17 & 1510 \\ Sand & 111 & 211 \\ Sand & 111 & 221 \\ Sand & 112 & 21 \\ Sand & 29 & 1514 \\ Clay & 17 & $	Leo 3. Pitre, 7 miles	east of L	iberty.	The Pure Oil Co., No. 1. 10 miles a	, Liberty Inves south of Libert	tment Co.,	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Clay	41	41			0	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Clay and sand streaks	43	84	Clay	31	31	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Fine-grained sand	24	108	Sand, clay	129	160	
Pine-induct sand 15 232 Clay 50 236 Clay 55 287 Sand 46 226 Clay 6 324 Sand, gravel 42 371 Clay 6 354 Sand, gravel 42 371 Clay 6 354 Sand, gravel 42 371 Guay 3 362 Sand, gravel 122 555 Pine hard sand 67 429 Sand, gravel 122 556 Pine hard sand 67 429 Sand, gravel 68 606 Clay 15 572 Sand 15 628 Pine, hard, gray to white 5 628 Clay 78 701 sand ::th lenese of clay f.3 628 Sand, gravel 69 770 Clay 10 766 Gambo, line 29 945 Sand y clay 10 186 Sand, gravel 10 766 Sand 32 22 1051 Gambo 4 1136 <t< td=""><td>Clay</td><td>109</td><td>217</td><td>Sand</td><td>46</td><td>206</td></t<>	Clay	109	217	Sand	46	20 6	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Fine- rained sand	15	232	Clay	30	236	
Fine har6 sand 41 320 Clay 47 320 Clay 6 354 Sand, gravel 42 371 Clay 3 362 Sand, gravel 42 371 Pine hard sand 67 429 Clay 37 408 Pine hard sand 67 429 Clay 32 552 Tough clay 57 466 Sand, gravel 122 550 Clay 15 572 Sond 15 628 Pine, hard, gray to white 57 628 Clay 78 701 sandith lenses of clay F3 628 Clay 10 780 Woald Corp., Heiskell No. 1, Sri Sand, gravel 103 925 miles south of Liberty. Sand, gravel 103 925 Sand and shale 184 396 Gumbo 33 1029 Sand and shale 184 396 Gumbo 32 122 Gumbo 122 620 Gumbo 12 124 Gumbo 122 620	Clay	55	287	Sand	46	282	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Fine hard sand	41	328	Clay	47	329	
Fine hard sand 25 359 Gumbo 37 406 Clay 3 362 Sand, gravel 122 530 Truph clay 57 486 Sand, gravel 122 530 Clay 15 572 Sand 21 553 Pine gray sand 71 557 Gumbo 15 623 Pine, hard, gray to white Sand 15 623 Clay 76 701 sand .ith lenses of clay f.3 628 Sand, gravel 69 770 Well 219, partial log Clay 10 780 Wards cold of Liberty. Sand, gravel 103 925 Sand orlay 45 45 Sand, gravel 42 966 Sand and sale 184 396 Sand, gravel 42 966 Sand and gravel 102 498 Sand, gravel 42 966 Sand and gravel 102 498 Sand, gravel 42 966 Sand and gravel 102 498 Sand, gravel 91145 1126 <t< td=""><td>Clay</td><td>6</td><td>334</td><td>Sand, gravel</td><td>42</td><td>371</td></t<>	Clay	6	334	Sand, gravel	42	371	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Fine hard sand	25	359	Gumbo	37	408	
Pine hard sand 67 429 Clay 32 552 Ring gray sand 71 557 Clay 25 668 Clay 15 572 Sand 15 623 Fine gray sand 71 557 Clay 25 666 Clay 15 572 Sand 15 623 Sand .ith lenses of clay F3 628 Sand, gravel 69 770 Well 219, partial log Clay 26 822 Ryoace 0il Corp., Heiskell No. 1, $\delta_{\overline{21}}$ Sand, gravel 103 925 Gunbo clay 45 45 Sand, gravel 103 925 Sand and shale 164 396 Sand, gravel 103 925 Sand and shale 164 396 Sand, gravel 42 966 Sand and shale 164 396 Sand, gravel 9 1145 Sand and gravel 102 498 Sand, gravel 9 1145 Sand and ing gravel 102 498 Sand, gravel 10 115	Clay	3	362	Sand, gravel	122 ;	530	
Torugh clay 57 466 Sand 21 563 Pine gray sand 71 557 Clay 25 608 Clay 15 572 Sand 15 623 Pine, hard, gray to white 57 628 Clay 78 701 sand .ith lenses of clay 63 628 Clay 78 701 Sand .ith lenses of clay 63 628 Clay 10 780 Well 219, partial log Clay 16 790 Sand, gravel 69 770 Sandy clay 45 45 Sand, gravel 103 925 Sand clay 35 80 Sand, gravel 103 925 Sand and shale 184 396 Sand, gravel 42 996 Sand and gravel 100 180 Gumbo 118 1132 Sand and gravel 102 498 Sand, gravel 9 1145 Sand and spale 60 680 Sand, gravel 45 1200 Gumbo 40 820 Sand	Fine hard sand	67	429	Clay	32	562	
Prime gray sand71557Clay25608Clay15572Sand15623Sand .ith lenses of clay F3628Sand, gravel69770Well 219, partial logSand, gravel69770Well 219, partial logClay10780Woace Oil Corp., Heiskell No. 1, δ_{71} Sand, gravel16796Sandy clay4545Sand, gravel29954Sandy clay3580Sand221051Sand and shale184396Sand, gravel42996Sand and shale184396Sand, gravel91145Gumbo ·122620Gumbo41136Sand and gravel102498Sand, gravel91145Gumbo ·122620Gumbo101165Sand and boulders40820Gumbo101165Sand and boulders40820Sand371224Gumbo571055Sand901493Gumbo211232Sand901493Sand and boulders41236Sand901493Sand and boulders41236Sand901493Sand and boulders41236Sand901493Sand and lime6413001715101510Sand and lime641300Clay1717Gumbo <td< td=""><td>Tough clay</td><td>57</td><td>486</td><td>Sand</td><td>21</td><td>583</td></td<>	Tough clay	5 7	486	Sand	21	5 8 3	
clay 15 572 Fine, hard, gray to white sand ith lenses of clay f3 628 Well 219, partial log Sand, gravel 69 Well 219, partial log Sand, gravel 69 Wycade Oil Corp., Heiskell No. 1, δ_{77} Sand, gravel 16 miles south of Liberty. Sand, gravel 103 925 Sand 35 80 Sand, gravel 103 925 Sand and shale 184 396 Sand, gravel 9 946 Sand and igravel 102 498 Sand, gravel 9 1445 Sand and shale 184 396 Sand, gravel 9 1445 Sand and igravel 102 498 Sand, gravel 9 1445 Sand and boulders 40 720 Gumbo 4 126 Gumbo 20 Sand Gravel 16 122 Sand and boulders 56 998 Sand 37 1324 Gumbo 21 1232 Sand 37 1324 Gumbo 21 1232	Fine gray sand	71	557	Clay	25	608	
Fine, hard, gray to white sand with lenses of clay F3628Clay78701Sand with lenses of clay F3628628770Well 219, partial log iles south of Liberty.Sand, gravel69770Well 219, partial log miles south of Liberty.Sand, gravel16796Sandy clay4545Sand, gravel103925Sandy clay4545Sand, gravel103925Sandy clay4545Sand, gravel42996Sandy clay100180Sand, gravel42996Sand and gravel102498Sand, gravel91145Sand and gravel102498Sand, gravel91145Sunbo122620Gumbo4012001165Sand and gravel102498Sand, gravel91145Gumbo40720Gumbo321232Hard sundy lime60760Sand371324Gumbo211232Sand371324Gumbo211232Sand and boulders41236Sand and lime641300171510Sand and lime64130017157Gumbo301330Clay1717Gumbo951465Fine-(rulned sand2239Sand and lime61390Clay1251Sand and lime61390 <t< td=""><td>Clay</td><td>15</td><td>572</td><td>Sand</td><td>15</td><td>623</td></t<>	Clay	15	572	Sand	15	623	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Fine, hard, gray to wh	ite		Clay	78	701	
Usell 219, partial log(lay10780Well 219, partial log(lay10780Ryoade Oil Corp., Heiskell No. 1, δ_{T} miles south of Liberty.Sand, gravel10780Sandy clay4545Sandy clay100180Sandy clay100180Sandy clay100180Sandy clay100180Sandy clay100180Sandy clay100180Sandy clay100180Sand and shale184Sand and shale184Sand and shale184Sand and shale182Clay20Sand and boulders40Sand182Clay100Sand22Sand and shale184Sand22Sand182Clay182Clay182 <th colsp<="" td=""><td>sand with lenses of</td><td>clay F3</td><td>628</td><td>Sand, gravel</td><td>69</td><td>770</td></th>	<td>sand with lenses of</td> <td>clay F3</td> <td>628</td> <td>Sand, gravel</td> <td>69</td> <td>770</td>	sand with lenses of	clay F3	628	Sand, gravel	69	770
Well 219, partial logSand, gravel16796Rycade Oil Corp., Heiskell No. 1, δ_{77} Sand, gravel103925miles south of Liberty.Sand, gravel103925Sandy clay4545Sand, gravel42996Sandy clay100180Sand, gravel42996Clay100180Gumbo631114Sand and shale184396Sand gravel91145Sand and gravel102498Sand, gravel91145Gumbo102498Sand, gravel91145Gumbo40720Gumbo101155Sand and boulders40820Sand371224Gumbo281140Sand371247Gumbo281140Sand901493Sand and boulders571055Gumbo171510Sand and boulders41236Sand901493Gumbo211232Sand901493Gumbo211232Shilo'School, 9 miles southeast of1Sand and lime641300Gambo171510Gumbo301330Gambo1717Gumbo951485Fine-grained sand2239Sand and boulders41236Shilo'School, 9 miles southeast of13Liberty.Clay17 <td></td> <td></td> <td></td> <td>Clay</td> <td>10</td> <td>780</td>				Clay	10	780	
Rycade Oil Corp., Heiskell No. 1, δ_{21} Clay26822miles south of Liberty.Sand, gravel103925Sandy clay4545Sand, gravel42996Sandy clay4545Sandy gumbo331029Sand3580Sandy gumbo631114Sand32212Send181132Sand and shale184396Gumbo41136Sand and gravel102498Sand, gravel91145Gumbo122620Gumbo101155Sency shale60630Gumbo321232Hard sundy lime60760Sand, gravel451200Gumbo40820Sand371324Gumbo80940Gumbo791403Sand and boulders58998Sand901493Gumbo211232Sand901493Sand and boulders41236Shilo'School, 9 miles southeast ofLiberty.1121232Sand and lime641300Gumbo301330133013401217Sand and lime61390Clay1717Gumbo951485Fine-grained sand2239Sand and lime61390Clay1251Sand2915145927Sandy clay1364 <td>Well 219,</td> <td>partial lo</td> <td>og</td> <td>Sand, gravel</td> <td>16</td> <td>796</td>	Well 219,	partial lo	og	Sand, gravel	16	796	
Aycade Oil Corp., Heiskell No. 1, 87 Sand, gravel 103 925 miles south of Liberty. Sand, gravel 29 954 Sandy clay 45 45 Sand, gravel 42 996 Sandy clay 45 45 Sand, gravel 42 996 Sand 35 80 Sand, gravel 42 996 Sand 35 80 Sand, gravel 42 996 Sand 35 80 Sand, gravel 42 996 Sand and shale 184 396 Gumbo 33 1029 Sand and gravel 102 498 Sand, gravel 9 1145 Gumbo 102 498 Sand, gravel 9 1145 Gumbo 102 498 Sand, gravel 9 1145 Gumbo 40 720 Gumbo 32 1232 Hard sundy lime 60 720 Gumbo 37 1324 Gumbo 80 940 Gumbo 79 1403 Sand and boulders 57				Clay	26	822	
miles south of Liberty.Gumbo, lime 29 954 Sandy clay4545Sand, gravel 42 996 Sandy clay100180Sandy gumbo33 1029 Clay100180Gumbo63 1114 Sand32212Sand18 1132 Sand and gravel102498Sand, gravel9 1145 Sand and gravel102498Sand, gravel9 1145 Gumbo122620Gumbo10 1155 Sency shale60680Sand, gravel45 1200 Gumbo40720Gumbo32 1232 Hard sandy lime60700Sand, gravel15 1247 Gumbo40820Sand37 1324 Gumbo571055Gumbo79 1403 Sand and boulders58998Sand90 1493 Gumbo211232Sand90 1493 Sand and boulders41266Sahool, 9 miles southeast ofSand and lime641300 1330 1330 1330 Sand and lime61390Clay1717Gumbo951485Fine-(Fuined sand2239Sand291514Clay1251TOTAL EEPTH5927Sandy clay1364	Rycade Oil Corp., Heis	kell No.	1,8;	Sand, gravel	103	925	
Sandy clay 45 45 Sand, gravel 42 996 Sand 35 80 Sandy gumbo 33 1029 Sand 35 80 Sand 22 1051 Clay 100 180 Gumbo 63 1114 Sand 32 212 Sand 18 1132 Sand and shale 184 396 Gumbo 4 1136 Sand and gravel 102 498 Sand, gravel 9 1145 Gumbo · 122 620 Gumbo 4 1136 Sand and gravel 102 498 Sand, gravel 9 1145 Gumbo · 122 620 Gumbo 10 1155 Sand and boulders 40 820 Sand, Gravel 15 1247 Gumbo 80 940 Gumbo 79 1423 Gumbo 57 1055 Gumbo 17 1510 Sand and boulders 48 998 Sand 90 1493 Sand and boulders	miles south of Liberty	ř.	• • •	Gumbo, lime	29	954	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				Sand, gravel	42	99 6	
Sand 35 80 Sand 22 1051 Clay 100 180 Gumbo 63 1114 Sand 32 212 Sand 18 1132 Sand and gravel 102 498 Sand, gravel 9 1145 Gumbo 122 620 Gumbo 10 1155 Sency shale 60 680 Sand, gravel 45 1200 Gumbo 40 720 Gumbo 32 1632 Hard sandy lime 60 700 Sand, gravel 45 1200 Gumbo 40 720 Gumbo 32 1632 Hard sandy lime 60 700 Sand, gravel 15 1247 Gumbo 40 820 Gumbo 40 1287 Sand and boulders 58 998 Sand 37 1324 Gumbo 21 1232 Sand 90 1493 Gumbo 21 1232 Sand 90 1493 Sand and boulders 4	Sandy clay	45	45	Sendy gumbo	33	1029	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Sand	35	80	Sand	22	1051	
Sand 32 212 Sand 18 1132 Sand and shale 184 396 Gumbo 4 1136 Sand and gravel 102 498 Sand, gravel 9 1145 Gumbo 122 620 Gumbo 10 1155 Sandy shale 60 680 Sand, gravel 45 1200 Gumbo 40 720 Gumbo 32 1232 Bard sundy lime 60 760 Gumbo 40 1287 Gumbo 40 820 Gumbo 40 1287 Sand and boulders 40 860 Sand 37 1324 Gumbo 80 940 Gumbo 79 1403 Sand and boulders 58 998 Sand 90 1493 Gumbo 21 1232 Sand 90 1493 Gumbo 21 1232 Gumbo 17 1510 Sand and boulders 4 1236 Shilo' Sohool, 9 miles southeast of Sand 1330 1330	Clay	100	180	Gumbo	63	1114	
Sand and shale 184 396 Gumbo 4 1136 Sand and gravel 102 498 Sand, gravel 9 1145 Gumbo 122 620 Gumbo 10 1155 Sandy shale 60 680 Sand, gravel 45 1200 Gumbo 40 720 Gumbo 32 1232 Hard sandy lime 60 760 Sand, gravel 45 1200 Gumbo 40 820 Gumbo 32 1232 Hard sandy lime 60 760 Sand, gravel 15 1247 Gumbo 40 820 Gumbo 40 1287 Sand and boulders 40 860 Sand 37 1324 Gumbo 80 940 Gumbo 79 1403 Sand and boulders 58 998 Sand 90 1493 Gumbo 28 1140 Sand 90 1493 Gumbo 28 1140 School, 9 miles southeast of Sand 17 1510	Sand	32	212	Sand	18	1132	
Sand and gravel 102 498 Sand, gravel 9 1145 Gumbo 122 620 Gumbo 10 1155 Sandy shale 60 680 Sand, gravel 45 1200 Gumbo 40 720 Gumbo 32 1232 Hard sundy lime 60 760 Sand, gravel 45 1200 Gumbo 40 720 Gumbo 32 1232 Hard sundy lime 60 760 Sand, gravel 15 1247 Gumbo 40 820 Gumbo 40 1287 Sand and boulders 40 860 Sand 37 1324 Gumbo 80 940 Gumbo 79 1403 Sand and boulders 58 998 Sand 90 1493 Gumbo 57 1055 Gumbo 17 1510 Sand and boulders 4 1232 Sand 90 1493 Gumbo 21 1232 Sand 90 1493 Gumbo	Sand and shale	184	396	Gumbo	4	1136	
Gumbo 122 620 Gumbo 10 1155 Sandy shale 60 680 Sand, gravel 45 1200 Gumbo 40 720 Gumbo 32 1232 Hard sundy lime 60 780 Sand, gravel 15 1247 Gumbo 40 820 Sand, gravel 15 1247 Gumbo 40 820 Gumbo 40 1287 Sand and boulders 40 860 Sand 37 1324 Gumbo 80 940 Gumbo 79 1403 Sand and boulders 58 998 Sand 90 1493 Gumbo 57 1055 Gumbo 17 1510 Sand and boulders 58 998 Sand 90 1493 Gumbo 28 1140 Yell 221 5766 Sand and boulders 4 1236 Shilo' School, 9 miles southeast of Sand and lime 64 1300 Liberty. 17 17 Gumbo 30	Sand and gravel	102	498	Sand, gravel	9	1145	
Sandy shale 60 680 Sand, gravel 45 1200 Gumbo 40 720 Gumbo 32 1232 Hard sundy lime 60 780 Sand, gravel 15 1247 Gumbo 40 820 Gumbo 40 1287 Sand and boulders 40 860 Sand 37 1324 Gumbo 80 940 Gumbo 79 1403 band and boulders 58 998 Sand 90 1493 Gumbo 57 1055 Gumbo 17 1510 Sandy shale 57 1112 TOTAL DEPTH 5766 Gumbo 21 1232 Sand and boulders 4 1236 Sand and boulders 4 1236 Shilo' School, 9 miles southeast of Liberty. Gumbo 30 1300 Liberty. 17 17 Gumbo 30 1390 Clay 17 17 Gumbo	Gumbo ·	122	620	Gumbo	10	1155	
Gumbo 40 720 Gumbo 32 1232 Hard sundy lime 60 760 Sand, gravel 15 1247 Gumbo 40 820 Gumbo 40 1287 Sand and boulders 40 860 Sand 37 1324 Gumbo 80 940 Gumbo 79 1403 Gumbo 80 940 Gumbo 79 1403 tand and boulders 58 998 Sand 90 1493 Gumbo 57 1055 Gumbo 17 1510 Sandy shale 57 1112 TOTAL DEPTH 5766 Gumbo 21 1232 Shilo' School, 9 miles southeast of Sand and boulders 4 1236 Shilo' School, 9 miles southeast of Sand and lime 64 1300 Liberty. 17 17 Gumbo 95 1485 Fine-grained sand 22 39 Sand 29 1514 Clay 12 51 Gumbo 95 1485 Fi	Sandy shale	60	680	Sand gravel	45	1200	
Hard sundy lime 60 780 Sand, gravel 15 1247 Gumbo 40 820 Sand, 37 1324 Gumbo 80 940 Gumbo 79 1403 Land and boulders 58 998 Sand 90 1493 Gumbo 57 1055 Gumbo 17 1510 Sandy shale 57 1112 TOTAL DEPTH 5766 Gumbo 21 1232 Sand and boulders 4 1236 Sand and boulders 4 1236 Shilo' School, 9 miles southeast of Sand and lime 64 1300 Liberty. 17 17 Gumbo 30 1330 Identity 12 39 Sand and lime 61 1390 Clay 17 17 Gumbo 95 1485 <td>Gumbo</td> <td>40</td> <td>720</td> <td>Gumbo</td> <td>32</td> <td>1232</td>	Gumbo	40	720	Gumbo	32	1232	
Gumbo 40 820 Gumby Gumby Gumbo 40 1287 Sand and boulders 40 860 Sand 37 1324 Gumbo 80 940 Gumbo 79 1403 Sand and boulders 58 998 Sand 90 1493 Cumbo 57 1055 Gumbo 17 1510 Sandy shale 57 1112 TOTAL DEPTH 5766 Gumbo 28 1140 Vell 221 5766 Sand and boulders 4 1236 Shilo'School, 9 miles southeast of Sand and boulders 4 1236 Shilo'School, 9 miles southeast of Sand and lime 64 1300 Liberty. 17 17 Gumbo 30 1330 Iberty. 12 19 Sand and lime 61 1390 Clay 17 17 Gumbo 95 1485 Fine-grained sand 22 39 Sand 29 1514 Clay 12 51 Gumbo 29 1514 Clay<	Hard sundy lime	60	780	Sand, cravel	15	1247	
Sand and boulders 40 860 Sand 37 1324 Gumbo 80 940 Gumbo 79 1403 Sand and boulders 58 998 Sand 90 1493 Cumbo 57 1055 Gumbo 17 1510 Sandy shale 57 1055 Gumbo 17 1510 Sandy shale 57 1112 TOTAL DEPTH 5766 Gumbo 28 1140 Mell 221 5766 Sand and boulders 4 1236 Shilo' School, 9 miles southeast of Sand and boulders 4 1236 Shilo' School, 9 miles southeast of Sand and lime 64 1300 Liberty. 17 17 Gumbo 30 1330 Image: Southeast of Southeast of 17 17 Gumbo 30 1330 Image: Southeast of Southeast of 13 17 17 Gumbo 95 1485 Fine-grained sand 22 39 Sand 29 1514 Clay 12 51	Gunbo	40	820	Gumbo	40	1287	
Gumbo 80 940 Gumbo 79 1403 band and boulders 58 998 Sand 90 1493 Cumbo 57 1055 Gumbo 17 1510 Sandy shale 57 1055 Gumbo 17 1510 Gumbo 28 1112 TCTAL DEPTH 5766 Gumbo 28 1140 Vell 221 5766 Gumbo 21 1232 Shilo'School, 9 miles southeast of Sand and boulders 4 1236 Shilo'School, 9 miles southeast of Liberty. 30 1330 Iterty. 17 17 Gumbo 95 1485 Fine-gradined sand 22 39 Sand 29 1514 Clay 12 51 Moto 29 1514 Sandy clay 13 64 </td <td>Sand and boulders</td> <td>40</td> <td>860</td> <td>Sand</td> <td>37</td> <td>1324</td>	Sand and boulders	40	860	Sand	37	1324	
band and boulders 58 998 Sand 90 1493 Cumbo 57 1055 Gumbo 17 1510 Sandy shale 57 1112 TOTAL DEPTH 5766 Gumbo 28 1140 Mell 221 5766 Gumbo 28 1140 Mell 221 5766 Gumbo 21 1232 Shilo'School, 9 miles southeast of 58 Sand and boulders 4 1236 Shilo'School, 9 miles southeast of 530 Sand and lime 64 1300 Liberty. 17 17 Gumbo 30 1330 1330 1330 1330 Sand and lime 6' 1390 Clay 17 17 Gumbo 95 1485 Fine-gradined sand 22 39 Sand 29 1514 Clay 12 51 Moto 29 1514 Clay 12 51 Moto 5927 Sandy clay 13 64	Gumbo	80	940	Gumbo	79	1403	
Cumbo 57 1055 Gumbo 17 151C Sandy shale 57 1112 TCTAL DEPTH 5766 Gumbo 28 1140 1211 1211 5766 Gumbo 28 1140 1211 1211 5766 Gumbo 21 1232 1232 1232 566 Sand and boulders 4 1236 Shilo' School, 9 miles southeast of 566 Sand and lime 64 1300 Liberty. 17 17 Gumbo 30 1330 1330 1330 1330 Sand and lime 61 1390 Clay 17 17 Gumbo 95 1485 Fine-prained sand 22 39 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13 64	band and boulders	58	998	Sand	90	1493	
Sandy shale 57 1112 TCTAL DEPTH 5766 Gumbo 28 1140 Vell 221 5766 Gumbo 28 1140 Vell 221 5766 Gumbo 21 1232 1232 1232 Sand and boulders 4 1236 Shilo' School, 9 miles southeast of Sand and boulders 4 1236 Shilo' School, 9 miles southeast of Sand and lime 64 1300 Liberty. Gumbo 30 1330 1330 Sand and lime 6' 1390 Clay 17 Gumbo 95 1485 Fine-provined sand 22 39 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13 64		57	1055	Gumbo	17	1510	
Gumbo 28 1112 Gumbo 28 1140 Sand 71 1211 Gumbo 21 1232 Sand and boulders 4 1236 Sand and lime 64 1300 Gumbo 30 1330 Sand and lime 6 1390 Gumbo 95 1485 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13	Sandy shale	57	1112	тоты	DEPTH	5766	
Sand 71 1211 Mell 221 Gumbo 21 1232 Shilo'School, 9 miles southeast of Sand and boulders 4 1236 Shilo'School, 9 miles southeast of Sand and lime 64 1300 Liberty. Gumbo 30 1330 17 17 Sand and lime 6' 1390 Clay 17 17 Gumbo 95 1485 Fine-(rained sand 22 39 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13 64	Gumbo	28	1140				
Gumbo 21 1232 Sand and boulders 4 1236 Sand and lime 64 1300 Gumbo 30 1330 Sand and lime 6' 1390 Clay 17 17 Gumbo 95 1485 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13	Sand	20 71	1240	bell bell	221		
Sand and boulders 4 1236 Shilo'School, 9 miles southeast of Sand and lime 64 1300 Liberty. Gumbo 30 1330 1330 Sand and lime 6' 1390 Clay 17 17 Gumbo 95 1485 Fine-prained sand 22 39 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13 64	Gumbo	21	1049				
Sand and lime 64 1300 Liberty. Gumbo 30 1330 Sand and lime 61 1390 Gumbo 95 1485 Fine-prained sand 22 Sand 29 TOTAL DEPTH 5927	Sand and boulders	7.T	1006	Child' School 9 m	ilor couthoast	- of	
Gumbo 30 1300 Efferty. Gumbo 30 1330 Sand and lime 6 1390 Clay 17 17 Gumbo 95 1485 Fine-grained sand 22 39 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13 64	Sand and lime	т Сл	1300	Tiberty	TTEP PORTUESP	5 O I	
band and lime 6 1390 Clay 17 17 Gumbo 95 1485 Fine-grained sand 22 39 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13 64	Gumbo	04 80	1220	TTDELCA.			
Gumbo 95 1485 Fine-grained sand 22 39 Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13 64	hand and lime	50 6 ·	1 1 200	Clow	717	19	
Sand 29 1514 Clay 12 51 TOTAL DEPTH 5927 Sandy clay 13 64	Cumbo	0	1 1990	Diay	1 00 L	1 / 20	
TOTAL DEPTH 5927 Sandy clay 13 64	Gond	50	1400	I rine-grained sand		09 E1	
101/1711 : 5927 Sandy Clay 13 64		69	1014	Cray		1G	
	IOIAL JEITH		: 5967	Sandy clay	10	0 1	

Thickness Depth Thickness Depth (feet) (feet) (feet) (feet) Vell 221--Continued Well 224--Continued Clay 392 23 152 216 Gumbo Fine-grained sand 21 414 34 250 Sandy shale Clay 52 302 Sticky shale 12 426 band 10 312 10 436 Sand Fine-grained sand 320 8 102 538 Gumbo 13 333 30 568 Clay Sand Gumbo 81 650 Well 222 31 681 Tough shale 26 707 Sand A. R. Milintz, 62 miles southeast of Liberty. Well 226, partial log Clay 5 Humble Oil & Refining Co., Sabine Tram 5 Sand 15 20 Fo. 1, $2\frac{1}{4}$ miles northeast of Levers. Clay 180 200 23 Sand 223 Surface clay 45 Blue shale 4 227 Sand 49 Sand 5 232 Shale, sand 78 172 Blue shale 2 234 Sand 42 214 Fine-grained sand 16 250 Shale 53 267 Coarse_grained sand 23 273 37 304 Gumbo Shale 2 275 334 30 Sand Shale 27 361 ell 223 Sand 29 390 Gumbo 160 **55**0 Franklin and Tideman, Ltd., 124 miles 98 648 Sand southeast of Liberty. Gumbo 38 686 709 Shale 2373 782 Clay 18 Sand, gravel 18 Coarse-grained sand 7 Gumbo 16 798 25 20 818 Hard clay 92 117 Sand Hard shale 144 12 830 261 Gumbo Tight fine sand 840 10 69 330 Sand Soft, coarse sand Gumbo 16 856 902 13 343 Sand 46 salt water Sand, boulders 40 942 Hard shale 6 349 Shale, lime 30 972 1030 Sand, boulders 58 Well 224 1049 Gumbo 19 Sand, boulders 159 1208 Shell Oil Co., 132 miles southeast of Shale, lime 15 1223 Liberty. 26 1249 Sund Clay Shale, lime, sand 32 1281 44 44 Sand 117 Shale, lime 17 1298 161 Clay 45 1343Lime 36 198 Sandy shale 84 Sand, boulders 35 1378 282 Gumbo, lime 40 1418 Sandy shale 15 297 Sticky shale 34 1452 21 Sand, lime 319 Sandy shale Gumbo 4 1456 22 341 44 · 1500 Sticky shale 28 Sand 369

Table of Drillers' Logs, Liberty County--Continued

(continued on next page)

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	Thickness	Depth		Thickness	Depth
	(1000)	(leet)		<u>(feet)</u>	<u>(feet)</u>
Nell 226Co	ntinued		Nell 2	229	
Lime, shale, sand	2	1502	V. D. Meyers, 1 mile	e east of Dev	ers.
Sandy shale	12	1514			
Gumbo, lime	38	1552	Clay	74	74
Sand	2	1554	Coarse, loose sand	25	99
Sand, shale	15	1569		· · · · · · · · · · · · · · · · · · ·	
bandy shale	16	1585	Nell	230	
Gumbo	169	1754			
Sand	3	1757	1. E. Jenkins, in De	vers.	
Sandy lime	40	1797			
Gumbo	32	1829	Clay	19	19
Sand	5	1834	Soft sand	49	68
Sticky shale	88	1922	Sand and shale	32	100
Sandy lime	10	1932	Sandy shale	154	254
sticky shale	33	1965	Soft, fine sand	11	265
Sand	31	1996	Shale	34	299
Shale	27	2023	Fine-grained sand	45	344
TO TAL DE	PTH !	5800	Shale	15	359
			Sandy shale	14	373
<u>Well 2</u>	27		Later sand	70	443
Texas Pipe Line Co.	3 miles sou	th of		921	
Devers.	0 111100 000			201	•
			Dan Hart 6- miles s	outh of Down	
Clav	38	38		DAGIT OF DEVEL	rs.
Shell	3	41	Clay	95	. 05
Sandy shale	59	100	Fine grained agend	65	30
Fine red sand	22	122	Hard alay	40	140
Sandy shale with bed	s !		Fine emained cond	10	150
of shell	79	201	Shele	10	160
Fine_regined sond	5	206	Fine second cond	40 40	182
Sandy shale	49	255	Chelo	40	230
Sandy shale and shel	1 21	276	Ding under daried	55	285
Fine sand with lense	s	~10	Sholo	11	296
of shale	21	297	Shale and and	10	314
No record	36	333	shale and sand	141	455
Send and boulders	5	338		18	473
Lime rock	3	34]	Fine-grained sand	13	486
Very fine grav sand	45	386	Shale	2	488
Fine grav sand	20	406			
		100	<u>e11 2</u>	232	
Hell 22	8		The Texas Co., (Moore	No. 1) 3 ² m	iles
Post Hours 73 miles	outh of D		northeast of Devers.		
Dert mays, or miles	SOUTH OF DEV	ers.	0107	40	
Clav	209	209	Clay	40	40
Fine white send	<u></u>	220	Sand	21	61
Clav	<u>]</u> 4	234	Sand and shale	142	203
			Fine-grained sand	29	232

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Table of Drillers' Logs, Liberty County--Continued

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]	hicknes (feet)	s Depth (feet)		Thickness (feet)	Depth (feet)
Lell 237			Hell 241Con	tinued	
Sinclair Pipe Line Co east of Devers.	ompany,	$5\frac{1}{2}$ miles	Streaks of sand and blue shale	38	433
Clay Sand Blue clay	22 86 319	22 108 427	Hard fine sand Blue sandy clay Gray hard fine sand Tough clay	25 8 32 3	458 466 498 501
Vell 241	00	· 492	<u>Yell 2</u>	45	
H. A. Gripon, in Deve Red and white sand	rs. 66	66	Gulf Oil Corp., 9 m Clay Clay and sand	iles south o 39 110	f Devers. 39 149
Streaks of sandy clay and sticky blue clay Fine gray sand Sandy clay	80 44 36 70	170 214 250 320	Gulf Oil Corp., 92 1	46 niles south of	 of Devers
Fine gray sand Elue shale Gray sand Gray sandy clay	6 2 10 51	326 328 338 379	Surface clay and san Sand Gumbo Sand and boulders	nd 150 90 50 54	150 240 290 344
Gray sandy shale	10	395			

Partial analyses of water from wells and springs in Liberty County, Texas

Analyzed at The University of Texas under the direction of W. W. Hastings, Chemist, U. S. Department of the Interior, Gological Survey, and Dr. E. P. Schoch, Director of the Bureau of Industrial Chemistry. Results are in parts per million. Well numbers corr spond to numbers in table of well records.

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			1			•					Sodium							
We11	Owner	Depth	Da	ate	i	Total	Silica	Iron	Cal-	Magne_	and	Bicar-	Sul-	Chlo-	Fluor-	Ni-	Totel	
		of		of		di s-	(Si0)		ດຳມາກາ	ດຳນຫ	Potas_	bonate	fate	ride	ide	trate	hardness	3
		well	m	laet:	ion	solved	2'	(16)	(Ca)	(M_{σ})	sium	(HCO_2)	(SO_{1})	(21)	(F)	(NO_2)	as CaCOa	, ,
		(ft.)	1 00 1			solids		, 	(lua)	1-167	(Na+K)	((004)	(31)		·	(calc.))
1						001100					(calc)							
+	Gulf, Colorado &		Oct.		1931	[!]			16		129		31,	1.9				
-	Santa Fe R.R.	1.360	Jan.	ຊ່	1937	323			1.		133	270	16	1.7		0	16	
2	do.	1,512	Jun	8.	19/5	373	19	0.02	65	0.9	140	269	15	17	0.8	0.8	20	
ĩ	Gulf States	 , , , , , , , , , , , , , , , , , , ,	U un	٠,	-/-/	210	/	0.00		3.7	140	~~ /		- (000	0,0	~~~	
1	Utilities Co.	396	Jan.	3.	1037	190					1.5	186	2	14		0	171	
8	City of Cleveland	929	Apr.	11.	1944	377	17	0.12	2 34	7.2	97	321	15	27	0.6	0.5	114	
11	Grimos V neer and		1	,	-////	211			2.4	1	<i>,</i> ,		-,		- • •			
	Panel Co.	90	Jen.	26.	1945	171			12	3.2	33	29	2	57		10	43	
12	Cloveland Veneer			,		•								21				Ŧ
	Co.	300		do.		190	26	0.0	5 47	3.4	11	154	2	18	0.2	0	131	പ
13	Cleveland Mfg. Co	. 200	Jan.	27,	1945	157			21	2.7	22	52	3	47		0.5	64	1
14	Grogan Mfg. Co.	197	Apr.	6.	1945	265			71	3.7	17	239	3	21		0.2	192	•
15	Clarkson and		L	-		-			·	2.			-				-	
	Mechim	327		do.		238			68	3.1	12	222	3	16		0	192	
16	Gulf Oil Corp.	100	Mar.	30,	1945	298			31	5.7	43	24	7	118		0	101	
17	Magnolia Pipe Line	2																
	Čo.	175		do.		207			51	2.7	20	191	3	16	-	0.2	138	
13	M. F. Henry	19	Apr.	6,	1945	268			40	7.5	27	104	10	47		33	131	
20	M. A. Ellis	226	June	8,	1945	143		0.10) 17	1.7	19	66	2	22		0.5	49	
21	B.E.Quinn Est.	1,200	Jen.	- 8,	1937	493			2		205	402	1	593		0.0	16	
22	M. A. Ellis	36	lar.	29,	1945	119			9.2	3.3	21	42	2	21		20	31	
23	W. P. Johnston	440	Apr.	17,	1945	201		0.29	33	6.0	31	172	4	20		0.2	107	
24	J Whatley	52	Apr.	5,	1945	600			81	7.3	104	136	13	215		5.6	232	
25	I. H. Fllington	110	•	do.		9 7			7.7	1.3	24	. 64	2	11		7.5	25	
26	Ida Smith	45	Apr.	17,	1945	92		0.71	5.7	2.9	14	34	5	15		3.7	26	
29	M.N.Cunningham	368	Jan.	25,	1945	212			49	4.1	19	179	3	20		0.2	139	
30	W. C. Crawley	35		do.		1,040		0.11	. 62	10	256	88	26	410		94	196	
31	Tarkington School	500		do.		252	30	0.05	5 64	4	15	221	2	18	0	0.2	176	
32	L. 7. Ward	247		do.		238			57	4.4	17	205	4	18		0	160	
<i>33</i>	Unarias Marris	222		do.		T83			36	2.7	24	139	5	24		0	TOT	
54	U. D. Jones	0č		do.		99		17	6.9	2.0	28	64	3	18		ΤŦ	23	

						1/	ieauros	are 1	In part	us per i			•				
Well	Owner	Depth of	Dat	te C		Total dis-	Silica	Iron	Cal-	Magne-	Sodium and Potas-	Bicar-	Sul-	Chlo-	Fluor-	Ni-	Total
		well (ft.)			lon	solved solids	(5102)	(re)	(Ca)	(Mg)	(Na+K) (calc.)	(HCO ₃)	(so ₄)	(C1)	(F)	(NO ₃)	as CaCO3 (calc.)
35	J. E. Wigley	103	Jan.	25,	1945	161			13	1.9	38	90	2	32		2.5	40
36	R. E. Wortham	100	Jan.	26,	1945	145		0.06	17	2.2	26	87	4	23		0.2	52
37	do.	39		do.		120		0.09	19	1.4	18	61	2	26		4.5	53
38	H. E. Kirk	95	Apr.	17,	1945	106		0.41	5.9	1.7	27	63	2	18		1.2	22
39	Joe Simmonds	24	June	8,	1945	85		0.26	5.2	2.4	16	19	2.	19		16	23
41	John Kite	- 18	Jan.	9,	1945	380		0.07	103	4.4	22	350	14	13		Π.	288
42	Wirt Davis	40		do.		164		0.10	31	1.9	13	117	9	6		0.0	85
43	N. Gibson	46	Apr.	17,	1945	218		0.23	34	4.1	11	63	4	34		28	102
45	Racki Lumber Co.	580	Apr.	13,	1942	211			6.4	5.4	75	207	4	19		0	38
47	Miller and Vidor															-	- (-
	Lumber Co.	585		do.		197			60	4.6	12	207	4	14		0	168
48	T.B. Allen Co.	659	Jan.	11,	1945	268		0.08	41	7.1	31	210	4	16		0	132 ,
49	Gulf, Colorado an	nd														_	o D
	Santa Fe R.R.	650	Apr.	13,	1942	210			53	2.2	29	214	5	16		0	141 .0
50	do.	645	Nov.	23,	1944	237		0.49	44	7•4	32	216	7	18		0	140 '
51	Texas Construction	n		-													
	Materials Co.	808	Apr.	13,	1942	211		0.15	46	4.5	33	220	5	14		0	133
52	do.	808	Apr.	12,	1942	209			27	1	58	207	5	16		0	71
-			Jan.	4,	1945							196	6	17			88
53	do.	310	Apr.	13,	1942	158			51	2.2	9.2	171	2	10		0	136
			Jan.	4,	1945							155	3	12			135
54	do.	135	Nov.	23,	1944	232		0.06	55	3.8	15	188	2	21		0	153
55	South Texas Hard-																
	wood Co.	480	Jan.	19.	1945	217		0.04	45	3.9	22	163	2	29		0	128
56	Liberty Hardwood	•		.,													
	Lumber Co.	603	Jan.	10.	1945	244	20	0.06	36	6.6	44	219	7.8	3 19	0	0	117
57	Dolen School	100	Nov.	23.	1944	247		0.06	48	4.7	5.8	150	2	19		0	139
58	\mathbb{W} , D. Dunnan	233	Jan.	10.	1945	207	22	0.04	43	3.5	25	170	3	24	0	0.2	122
59	A. M. Smith	22	Anr	,	19/.5	619			19	16	61	11	17	7/		139	111
60		رم ۲۸	wh.	4. do	±/4/	1 060			217	1).	<u>01</u> .	210		1.25		20	599
61	da da	110		do.		2LQ	~~		~11	 1. Ø	74	207	2	26		~0.5	192
62	S.I. Koith	140 04		do.		47 157			21	4•7 2 7	11	201 QJ.	2	22		0	38
U.C.	OF OF VETCH	00		u0 v		T) (<u>)</u> L	~•1		74)	~)		Ū	,

Partial analyses of water from wells and springs in Liberty County--Continued (Results are in parts per millin)

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Monit	i Outroom	Donth	Data	Tet ol	Silion	Thom	0.01	Mama	Sodium	Pt com	C11	Chlo	Fluer	NE	<i>Па</i> + а 7
werr	Owner	Depun	Date	locar	STTICE	(De)		magne-	and	bicar-	Sul-		riuor-	NI-	lotal
		01			(5102)	(re)		sium	Potas-		(ac)	riae		trate	nardness
		(er)	correction	solved			(0a)	(Mg)	(No K)	(HOU3)	(SO_4)		(F)	(103)	as CaCO3
		(10.)		501109		1				ļ					(carc.)
42	Doc m] Ki mishom			E ZE	I						l,	L	L	E E	
41	Fearr KITKHam	Caniaa	Apr. 4, 194	כט כ			י זיח	0.9	12	20	4	0		2.2	11 57
64 65	T W Dhilling	opring		145 5 170			17:	∠•⊥ 1 0	20	52 00	ر د	47		1.5)⊥ 4 r
46	J. R. FILLIES	つ) 」 F	Apr. 7, 194	2 172		 .	~)	1.9	22	27	~ ~	~ (0)
00 4r7	J. C. Carter	47		E 1/9			27	2.2	27	101	ט רר	21			70
0.70 4 0	H. Landers	30	Apr. 0, 194	2 147			~)	2•4	17	71	11	24		101.0	07
60	J. H. Halton	102		r 229		~ 70	28	0.4	17	21	7	17		104	90
09	Concord School	104	Jan. 10, 194	5 103		0.10	30	1.8	20	92	2	34		0.2	82
71	John Griffin	105	Jan. 11, 14	5 121		37	,20	1.5	16	62	14	18		0.2	56
72	Hollis Griffin	90	do.	72		0.8T	6.6	1.6	15	26	2	22		0.5	23
73	Mrs.W.M.Emanuel	. 87	Jan. 24, 194	5 123	18	5.2	19	2.3	15	65	2	24	0.2	0	57
74		Spring	do.	184			29	3.2	24	78	10	45		0.5	- <u>86</u> •
76	J. W. Anslen	750	June 9, 194	5 254		0.06	53	4.9	28	201	4	32		0.2	152 g
.79	D. A. Reidland	740	do.	470		0.48	97	8. 3	46	264	12	104		0.2	275
81	do.	1,000	do.	550		0.61	92	8.5	104	354	12	133		0.2	264
84	Arnold Wolfe	840	Apr. 19, 194	5 1,140		0.40	26	3.3	423	240	12	560	 .	0.8	79
85	E. J. Stoesser	808	June 9, 194	5 388		0.26	68	8.1	61	205	8	113		0	20 3
86	W. F. Graves	1,005	June 19, 194	5 709		0.21	18	2.1	250	221	18	270		0	54
87	do.	2,500	Apr. 18, 194	5 856		1.7	5.2	1.2	329	455	2	254		0	18
89	Leo Morgau	370	June 9, 194	5 542		0.08	4.2	0.8	212	258	19	172		0.2	14
89	A.C. Holbrook	790	June 15, 194	5 382		0.65	11	1.6	132	204	12	69		0	34
93	Henry Bode	276	Apr. 13, 194	5 264		0.26	50	5.9	40	204	7	43		0.2	149
94	Sun Pipe Line Co.	384	Jan. 27, 194	5 401	14	2.3	51	5.7	91	228	2	112	0.6	0	151
95	B. T. Sturrock	19	do 🕯	400		4.3	110	5.2	32	408	2	21		0.3	296
97	Joe Sobotik	20	Apr. 18, 194	5 523		0.38	129	11	40	423	6	68		5.9	367
99	Magnolia Pipe								•					-	
1	Line Co.	540	do.	502		0.89	66	7.5	108	210	7	173		0	196
100	R. F. Janik	32	Apr. 19. 194	5 623		1.7	103	11	106	434	ġ	119		0	302
101	Rov Seaburgh	1.030	do.	638		0.54	12	2.0	235	250	12	234		Ō	38
102	do.	209	June 9, 19/	5 235		0.06	40	1.8		178	2	 L3		0.2	120
107	R. Freeman	175	Oct. 30, 193	/ ~//				~		±,0	~	221.		_~	
111	J. M. Hlavaty	1.00	Jan. 27, 101	5 330	12	0.68	5.2	1.5	1/9	333	2	+	1.4	0.2	19
		400	······································			0.00	J•~	±•)		رور	~	-+-/		~ •	-/

Partial analyses of water from wells and springs in Liberty County--Continued (Results are in parts per million)

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Well	0wn⇔r	Depth of well (ft.)	Di c วไ	ato of lecti	ion	Total dis- solved solids	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Magne- sium (Mg)	Sodium and Potas- sium (Na+K) (calc.)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluor- ide (F)	Ni- trate (NO ₃)	Total hardness as CaCO3 (calc.)
112	N. B. Sapp	380	Jan.	27,	1945	1,030		64	128	21	271	450	11	436	••••	0	406
119	City of Dayton	395	Oct.	30,	1931									208			
120	do.	399	Apr.	17,	1944	590	21	0.1	1 40	4.	4 174	239	2	207	0.8	0	118
122	C. A. Grebey	193	Jan.	27,	1945	592		4.2	· 126	13	60	400	9	115		0	368
123	Frank E. Gay	404	Jan .	25,	1945	296	19	3.1	87	3.	1 15	283	2	17	0	0	230
124	Peoples Lumber																
	and Supply Co.	685	Jan.	27,	1945	753	11	0.0	6 29	5.	6 247	272	2	307	0.2	0.5	96
125	Humble Pipe Line																
	Co.	400		do.		304			7	.2 1.	3 112	229	4	54		0.2	24
126	A. Graves	135		do.		382		7.6	103	6	32	382	2	25		0	282
133	Texas Pipe Line																
•	Co.	350	June	15,	1945	542		1.4	32	3.	8 166	243	3	177		0	96
142	A. H. Case	45	Jan.	12,	1945	503		0.0	2 147	5	35	446	9	61		3.5	398
3.43	V. L. Moore	116	June	15,	1945	559		6.9	130	14	54	464	9	72		9.0	382
144	L.L. Batchelor	26	_	do.		77 0		0.2	6 202	11	39	394	14	210		1.0	549
146	L. E. Wiggins	116	June	_7,	1945	317		1.4	82	4.	4 27	292	4	26		0.5	222
148	J. E. Dillon	213	June	16,	1945	365		0.7	9 92	4.	4 29	247	4	49		0	248
150	L. McDaniel	183	June	20,	1945	384		1.2	92	4.	9 45	319	10	54		0	250
153	Hardin Baptist									,		- / /	_				
- 4 -	Church	99	June	- 7,	1945	359		0.8	5 107	ó.	1 14	366	3	14		0.2	292
160	Humble Oil and									-		(
- / .	Refining Co.	226	Apr.	<i>7,</i>	1945	379			89	5.	1 42	316	7	47		0.5	243
164	Mrs. A. Cessna	192	June	16,	1945	407		1.3	96	6.	3 43	345	5	50		0	266
T00	Hull-Daisetta						~ .			•			· · .		~ *	~ ~	7.04
3 80	Vat r Works Co.	355	Apr.	17,	1944	288	24	0.0	3 50	3.	2 50	213	4	•7 44	0.8	0.5	138
173	Hemill-Smith Co.	255	June	21,	1945	358		0.0	8 42	4.	6 81	203	9	- 77		0	124
175	Houston Production	n - (-				(.	,						-	
7 6 6	Co.	161		do.		531		0.5	B45	5.	8 180	220	4	246		0	140
175	City of Liberty	650	Nov.	1,	1931	<u>.</u>							5	256			
179	do.	555	Nov.	18,	1943	419	21	0.0	в 70 Г	Ó.	6 66	190	6	.8 125	0.4	0.2	202
TRO	ao.	351		-00.		312	21	0.10	53	4.	7 57	240	9	•5 46	0-6	0.8	152

Partial analyses of water from wells and springs in Liberty County-Continued (Results are in parts per million)

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Ye ll	Owner	<u>D</u> epth	Da	ıt∘		Total	Silica	Irən	Cal-	Magne_	Sodium and	Bicar_	Sul-	Chlo-	Fluor-	Ni-	Total
		of	C C)f		dis-	(SiO_2)	(Fe)	cium	sium	Potas-	bonate	fate	ride	ide	trate	hardness
		well	coll	<u>-~cti</u>	.0 n	solvad			(Ca)	(Mg)	sium	(HCO ₃)	(SO_4)	(CI)	(ፑ)	(NO ₃)	as CaCO3
		(10.)				SOLIDS					$\left(\left(Na+K \right) \right)$						(calc.)
100			Nor	10	10/2	626	16		> 76	<u>ור י</u>	175	1	27	251			221
102	TO DI	602	Nov.	2Ω 1	1021	0,00	IO	0.00	5 70	11	11)	147	10	130	0.2	1.0	~ 54
102	Town Pine Line Co	222	Doc	7	101.1	750		0.04	5 10	3 8	277	282	5	303		^	63
107	John Mecon	• 570 570	Jec.	16	1015	341		21.	55	7.5	65	202	2	202		0.8	168
100	Mecon and Harrison	260	Dec.	<u>q</u>	1947	379		~4	67	7	89	231	5	1 39		1.0	196
101.	M. Leissner	103	June	7.	19/5	333		0.49	3 30	7.3	45	342	ź	32		0.5	230
195	Trinity Velley Col	4 U U	Vunc	"	± /4/			•••		1•2	47	24~	~	2~		.,	~)0
エ 7 ノ	Storage Co.	.u 350	Jen.	23.	1945	345	20	0.37	7 60	6.8	54	210	4	83	0.4	0	178
196	Louis Fair	18	Jan	27.	1945	361			26	28	îi	12	6	30		130	130
197	A. C. Nevland	28	Mar.	31.	1945	259	-		ó2	5.2	15	135	Ļ.	33		0	176
193	Sun Pipe Line Co.	40	Apr.	20	1945	142		0.53	3 38	2.4	1.'	7 109	3	8		0.2	105
201	Carl Johnson	528	J=n.	24.	1945	788	23	0.01	44	4.8	254	292	2	316	1.0	0.8	130
202	Chas. Welch	96	Jan.	17,	1945	312			74	6.1	38	315	2	23		0.2	210 0
206	Leo B. Pitre	370	Dec.	23,	1944	868	0	0	50	6.3	285	280	2	382		0	151 I
207	J. W. Swinney	137		do.		688		0.0/	4 78	11	15 7	398	14	170		0	240
203	Edward Mallet	35	Jan.	16,	1945	650		0.1	5 166	6.8	20	302	13	101		103	442
209	C. Domain	20		do.		330		0.12	2 80	4.3	49	352	2	22		1.5	217
210	do.	80	Jan.	23,	1945	414		9•7	98	4.8	47	360	7	45		0	264
211	C. M. Mitchell	400	Jan.	74,	1945	808	20	5.4	65	7	233	252	2	345	0.2	0.5	191
214	S. S. Hill	22	Dec.	8,	1944	508		0.02	2 59	3.9	43	94	20	64		82	160
215	Jack Moss	- 28		do.		84		0.0	37.	5 2.1	18	24	14	14		16	27
216	Devers Canal Co.	176		do.		760		0.0	4 39	7.4	244	294	3	294		0	128
217	đo.	238	Jan.	6,	1945	752		0.10) 30	2.9	269	368	2	2 60		0.2	37
213	"Bab Le Cour Well"	1,500	Dec.	22,	1944	1,090		0.06	550	4.8	336	136	2	510		0.2	144
221	Shilo School	333	Jan .	6,	1945	.836		0.0'	7 26	4.1	. 300	319	2	334		0	82
227	Texas Pipe Line																
	· · · · · · · · · · · · · · · · · · ·	406	Jan.	24,	1945	615	24	1.1	23	3.1	213	279	2	212	1.0	0.2	70
228	Bert Hays	234		do.		673			45	9.8	206	358	3	215		0	153
229	V. D. Meyers	99	Jan.	23.	1945	274		25	56	6.6	29	171	21	49		0	167
230	W. F. J nkins	443	Jan.	^4,	1945	420	25	0.1	1 19	2.4	131	292	2	69	0.6	0-5	55
231	Dan Hart	488		ch.		332	22	0.26	5 20	3.8	304	338	2	315	1.0	0.8	66
233	F. V. Boyt	210	Jan.	17,	1945	449			36	5	142	360	3	36	-	0.8	110
	-			-							•	-	-				

Partial analyses of water from wells and springs in Liberty County-Continued (Results are in parts per million)

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Well	Owner	Depth of well (ft.)	Date of collect:	i. ¬n	Total dis- solved solids	Silica (SiO ₂)	Iron (Fe)	Cal- cium (Ca)	Magna- sium (Mg)	Sodium and Potas- sium (Na+K) (calc.)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluor- ide (F)	Ni- trate (NO ₃)	Total hardness as CaCO3 (calc.)
234	B. H. Willis Est.	180	Jan. 17,	1945	339			35	5.6	94	269	4	63	 	1.0	110
235	• 05	200	do.		311		0.03	3 61	3.2	47	229	3	55		0.2	165
236	ർഠ.	190	do.		804		0.20) 76	9.3	213	303	18	300		0.2	228
237	Sinclair Pipe															
	Line Co.	585	June 20,	1945	854		1.1	21	3.9	308	281	2	344	-	2.5	63
239	Amorican Rice		·												-	
	Growers Assn.	107	Jan. ?3,	1945	395		15	58	6.3	47	358	4	36		0	246
239	J. F. Clark, Jr.	92	do.		372		7.8	75	4.6	30	308	5	56		0.2	206
240	J. M. Rich	200	Jan. 24,	1945	69 2		-	117	14	114	344	48	188		0	350
241	H. A. Gripon	501	June 20,	1945	441		0.37	7 16	2.2	154	270	2	90		0	49
242	F. W. Boyt	403	Jan. 16,	1945	673		0.19	3 21	2	242	330	2	223		0	673
243	F. V. Boyt	400	do.		671	12	0.16	5 32	5.9	236	353	2	211	0.6	0	104
244	". F. Abshier	15 0	Jan. 24,	1945	737			95	15	163	356	37	228		0	298

Partial analyses of water from wells and springs in Liberty County-Continued (Results are in parts per million)

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Figure 2 MLC 845


