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GROUND-WATER RESOURCES OF KLEBERG COUNTY, TEXAS

BY

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Prepared in cooperation with the
TEXAS BOARD OF WATER ENGINEERS

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GROUND-WATER RESOURCES OF KLEBERG COUNTY, TEXAS

By Penn Livingston and T. W. Bridges

ABSTRACT

Abundant supplies of fresh water are obtained from deep artesian wells in all parts of Kleberg County. The water is derived from a stratum of sand, 10 to 150 feet thick, which usually has been referred to the Goliad sand but possibly may be at the base of the Lissie formation. The top of the sand is reached at depths of around 400 feet in the western part of the county, 600 to 700 feet in the locality of Kingsville, and 1,250 to 1,450 feet in the eastern part of the county. Small supplies of fairly good water are obtained from shallow wells in very sandy areas in the eastern and southern parts of the county, but with this exception, so far as known, no good water has been obtained in the county either above or below the artesian fresh-water horizon.

The fresh artesian water is supplied by percolation from the outcrop of the water-bearing sands, which is many miles to the west in Jim Wells, Brooks, and Duval Counties. The estimated average replenishment from the outcrop to the wells of Kleberg County is 3,000,000 gallons a day.

Available information regarding most of the wells of the county is given in the table of well records. Of the 437 wells listed 34 are not in use, and the water supplies from the others are used as follows: Entirely for stock, 151; domestic use and stock, 241; public supply, 3; industrial supply, 2; irrigation, 4; railroad supply, 1; unrecorded, 1. About 80 are flowing wells in the southern and eastern parts of the county.

It is concluded that the total withdrawal from those wells averages about 4,000,000 gallons a day. Some water is wasted, but the amount is not very great.

There has been a general decline in the artesian head throughout the county. The largest decline has been in the western part of the county and in the vicinity of Kingsville, where the water level is now 15 to 45 feet below the surface in wells that once had a strong flow. Wells continue to flow in the southern and eastern parts of the county, but under less head than formerly. There was a small net loss in head in most parts of the county between the winters of 1932-33 and 1934-35, indicating that the decline is slowly continuing. Originally the artesian pressure in the fresh-water sands was much higher than the pressure in the overlying salt-water sands, but this relation has been reversed in the western part of the county and in the district around Kingsville, as a result of the decline in artesian head.

Water obtained from the fresh-water horizon is comparatively fresh in the western and central parts of the county but contains a somewhat higher proportion of chlorides toward the Gulf. Samples obtained from about 100 wells, located for the most part in the central part of the county, showed a higher chloride content than is normal for the fresh-water beds in the area. These wells are believed in large part to be defective and to be admitting salt water. This was demonstrated and the leaks located in several wells that were tested. No evidence was found of salt-water contamination by percolation through the formations, however. The leaky wells should be repaired, if practicable, or sealed to prevent them from contaminating the fresh-water sand. The chances of leaks developing can be largely eliminated if the wells are properly drilled and provided with casing of good grade, and the casing is adequately seated.

INTRODUCTION

The supply of underground water in Kleberg County, Tex., is the subject of an investigation started in December 1932, as a part of the survey of the underground-water resources of Texas by the United States Geological Survey in cooperation with the Texas Board of Water Engineers. The investigation in Kleberg County is being made by Penn Livingston and

T. W. Bridges under the general direction of O. E. Meinzer and W. N. White, of the Geological Survey. Though the study is continuing, a large part of the field work has been completed and conclusions have been reached regarding the extent of the water supply and proper methods for conserving it.

The streams of the county are small and intermittent, and the valleys for the most part are wide and flat and unsuitable for reservoir construction. A few small natural fresh-water lakes furnish water for livestock in parts of the area. In the greater part of the county, however, ground water is the only trustworthy source of water supply.

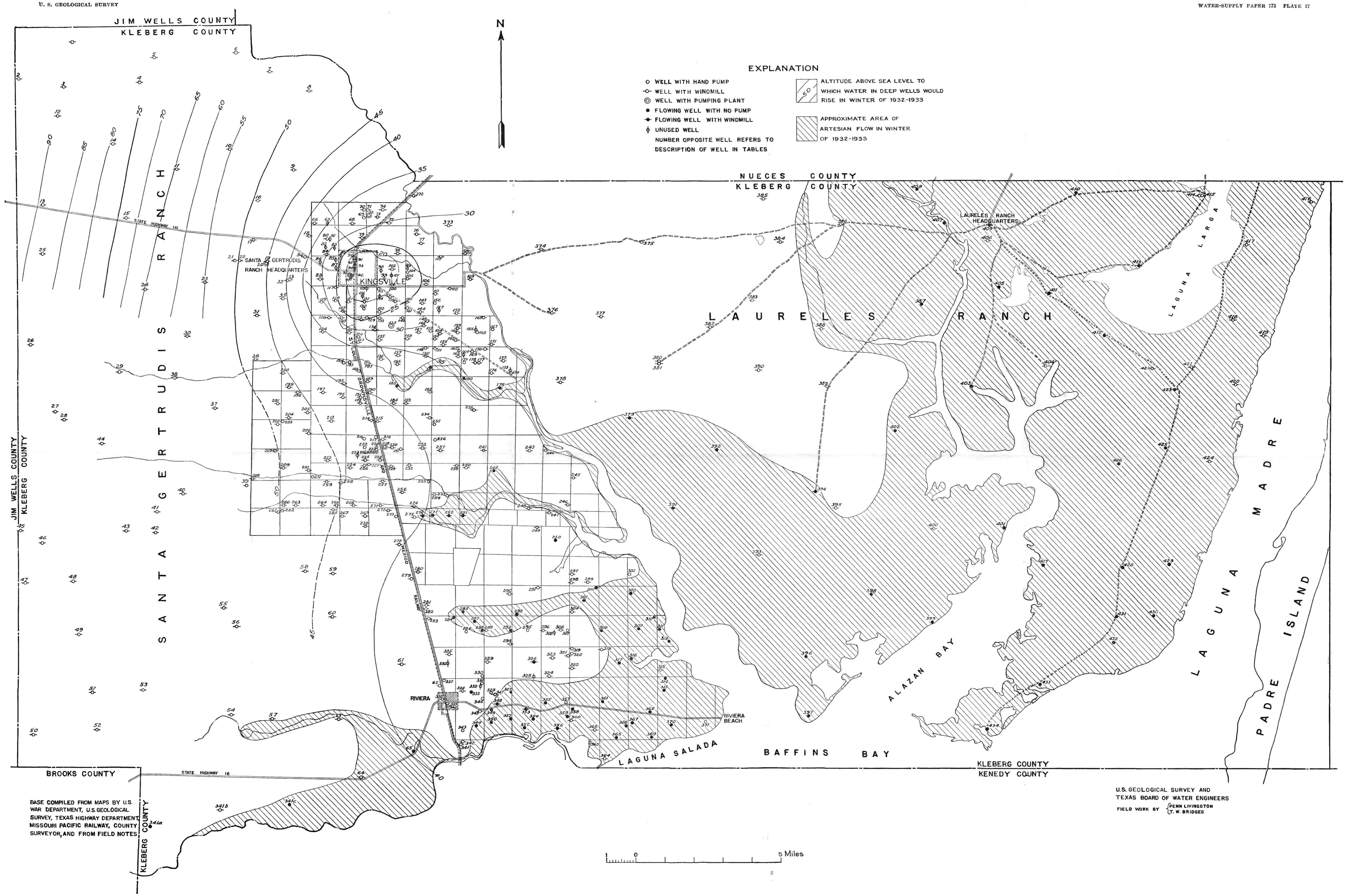
Kleberg County is part of the Coastal Plain in southern Texas. It borders on the Gulf, and the coast is indented by several shallow bays or sounds. (See pl. 17.) The surface is comparatively flat and featureless, the land gradually rising from an altitude of about 15 feet along the Gulf to about 65 feet at Kingsville, 35 miles inland. Thence westward the surface rises a little more rapidly and reaches an altitude of about 135 feet at the Jim Wells County line, 12 or 13 miles west of Kingsville. There are no natural perennial streams in the county. Drainage is provided by small intermittent creeks that empty into Baffin's Bay or Olmos Creek. The average annual precipitation at Kingsville for 30 years, according to records of the United States Weather Bureau, was 25.15 inches.

A description of artesian wells in Nueces County, to which Kleberg County once belonged, was given by Taylor[1] in 1907. Brief investigations of ground water in the county were made by Alexander Deussen in 1913 and by S. Spencer Nye in 1928. The data they obtained are in the files of the Geological Survey at Washington and have been used in the preparation of this report.

HISTORY OF GROUND-WATER DEVELOPMENT

In pioneer days travelers learned that supplies of fresh water sufficient for camp use might be obtained by digging shallow pits in sand dunes that were covered by thickets of hackberry, this type of brush apparently being an indication of the presence of fresh water close to the surface. It was found, however, that these shallow wells could not be relied upon to yield water through long periods of drought. Later more trustworthy supplies were obtained in sandy areas in the eastern part of the county, especially along the Gulf, by means of wells, some of which

1 Taylor, T. U., Underground waters of the Coastal Plain of Texas: U. S. Geol. Survey Water-Supply Paper 190, pp. 9-13, 1907.



MAP OF KLEBERG COUNTY, TEX., SHOWING LOCATION OF WATER WELLS, AREA OF ARTESIAN FLOW, AND HEIGHT TO WHICH WATER WOULD RISE IN WELLS NEAR KINGSVILLE IN THE WINTER OF 1932-33.

were drilled into the sand to a depth of nearly 100 feet. These wells ordinarily yielded good water, but when they were drilled too deep or pumped too rapidly the water became salty. In the greater part of this region, however, the water from shallow wells was found to be unfit for domestic use or stock, and both stock raising and farming in the region were handicapped until it was found that abundant supplies of fresh water could be obtained from deep wells.

In 1899 a well 532 feet deep was drilled by T. L. Herring in the Palo Alto pasture, west of Bishop, in Nueces County, not far from the north boundary of Kleberg County. This well developed a substantial flow, the water in it rising about 8 feet above the surface. A second well was put down about 5 miles west of the first one and also proved to be a flowing well. Mr. Herring then put down a well 530 feet deep at the Santa Gertrudis ranch headquarters, 2 miles west of Kingsville. (See pl. 17.) The artesian head in this well was sufficient to raise the water 25 feet above the surface, and the well had a flow of 250 gallons a minute. By 1904 several additional flowing wells had been drilled in the county, including one at the railroad station at Kingsville, which is said to have had a flow more than 20 feet above the surface. In 1904, experimental irrigation of garden truck with artesian water having proved successful, a part of the King ranch, comprising 42,000 acres in the vicinity of Kingsville, was subdivided into small tracts, and a large number of wells were put down to irrigate them.

By 1908 or 1909 some of the wells had ceased to flow, and by 1910 pumping was started. The height of the development was reached in 1912, when, it is estimated, about 3,500 acres was irrigated from wells. About 1913 or 1914 pumping for irrigation was discontinued, owing to the low prices for garden truck and other irrigated crops.

PURPOSE OF THE INVESTIGATION AND FIELD OPERATIONS

The purpose of the investigation was to obtain information from which an estimate could be made of the extent of the available supplies of fresh ground water and from which a plan could be worked out for conserving the water and preventing it from being contaminated by salt water.

In the course of the field work 434 wells were located and mapped, and all available information regarding them was collected, tabulated, and studied. Samples of water were obtained from most of the wells and tested in the field for hardness and chlorides. Samples from 13 wells were collected and analyzed in the water-resources laboratory of the Geological

Survey at Washington. Tests were made in 10 wells by means of electrical conductivity apparatus to determine the location of salt-water leaks. Static water levels were determined in nearly all the wells by means of a pressure gage or elevated pipe in flowing wells and by water-level measurements with a steel tape from a fixed measuring point on nonflowing wells. The measuring points on wells along the Missouri Pacific Railroad, the highway northwest of Kingsville, and the road to the Laureles ranch, east of Kingsville, were connected by levels, and a map was compiled showing the depth to which water in these wells would rise above sea level in the winter of 1932 (pl. 17). In the next 2 years the water levels in 107 selected observation wells were measured several times in order to determine the fluctuations in artesian pressure.

RELATION OF THE GEOLOGY TO THE OCCURRENCE OF GROUND WATER

In Kleberg County the well drill first passes through a layer of soil or wind-blown sand and then penetrates a long succession of beds of clay and sand, some of which are moderately cemented, belonging in turn to the Beaumont clay (Pleistocene), Lissie formation (Pleistocene), and Goliad sand (Pliocene). If the well is continued still deeper it passes through the Lagarto clay (Miocene?) and successively lower formations.

Many of the beds were undoubtedly deposited in shallow lagoons along the shore, and some of the beds down the dip may be of marine origin. These beds, therefore, were originally saturated with more or less salty water. In addition marine terraces on the Gulf Coastal Plain indicate that the area was covered by the sea from time to time during the Pleistocene epoch. In general the beds of sand vary considerably in thickness, and some of them pinch out entirely. The clays not only predominate but usually are thicker and more persistent than the sands. In few places do they pinch out entirely, and as they are very nearly impermeable they serve as barriers to the penetration of rainfall and to the passage of water from one bed of sand to another. The formations dip to the east at an angle that is considerably greater than the surface slope. Therefore, in crossing this part of the Coastal Plain from east to west the traveler passes over the beveled edges of successively older formations. Beds that are far beneath the surface in Kleberg County crop out in Brooks, Duval, and Jim Wells Counties. These conditions are favorable for the development of a fresh-water artesian system in a sand or sandy zone that persists from the outcrop down the dip for long distances. In such a bed the water enters the sand at the outcrop and moves slowly down the dip, filling or nearly filling the interstices in the sand. The highest part of the bed is at the outcrop. Farther down the dip, if the bed is overlain by an impermeable or relatively impermeable clay, the water will be under hydrostatic pressure and may rise to the surface when it is encountered by wells.

During successive inundations by the sea the sediments presumably were saturated practically everywhere with sea water. Since the retreat of the sea the thicker and more persistent sands have gradually been flushed out by fresh water, which moves from the outcrop down the dip to some unknown outlet, perhaps under the Gulf at the edge of the Continental Shelf. The thin-bedded lenticular sands, however, are surrounded by impermeable or relatively impermeable clays, and a certain amount of salt water is still trapped in them.

GEOLOGIC FORMATIONS AND THEIR WATER-BEARING PROPERTIES

The geologic map (fig. 19) shows the outcrop areas of the Beaumont clay, Lissie formation, and Goliad sand in Kleberg and adjacent counties, together with the largest important areas of recent wind-blown sands or sand dunes. The boundary between the Beaumont clay and Lissie formation is taken from a preliminary geologic map of Texas, compiled by the United States Geological Survey. The boundary between the Lissie and Goliad was mapped for the most part by A. N. Sayre and is shown in a preliminary mimeographed report released February 12, 1933, entitled "Ground-water resources of Duval County, Texas."

Wind-blown sand of recent origin covers large areas in the eastern part of the county, as is shown by the map, and also occurs in isolated tracts in the southwestern part. This sand in places reaches a thickness of about 100 feet, and wells drilled into it yield small quantities of fairly good water, except in places where the sand has filled old salt-water lakes in the underlying clay.

The Beaumont clay is the outcropping formation in the greater part of the county. This formation consists predominantly of clay but contains thin beds of shale and sand. The formation does not yield good water in this part of Texas.

The Lissie formation lies just below the Beaumont and crops out in the western part of Kleberg County, in Jim Wells and Brooks Counties, and in the extreme eastern part of Duval County. It also consists of clay and sand but contains a larger proportion of sand than the Beaumont.

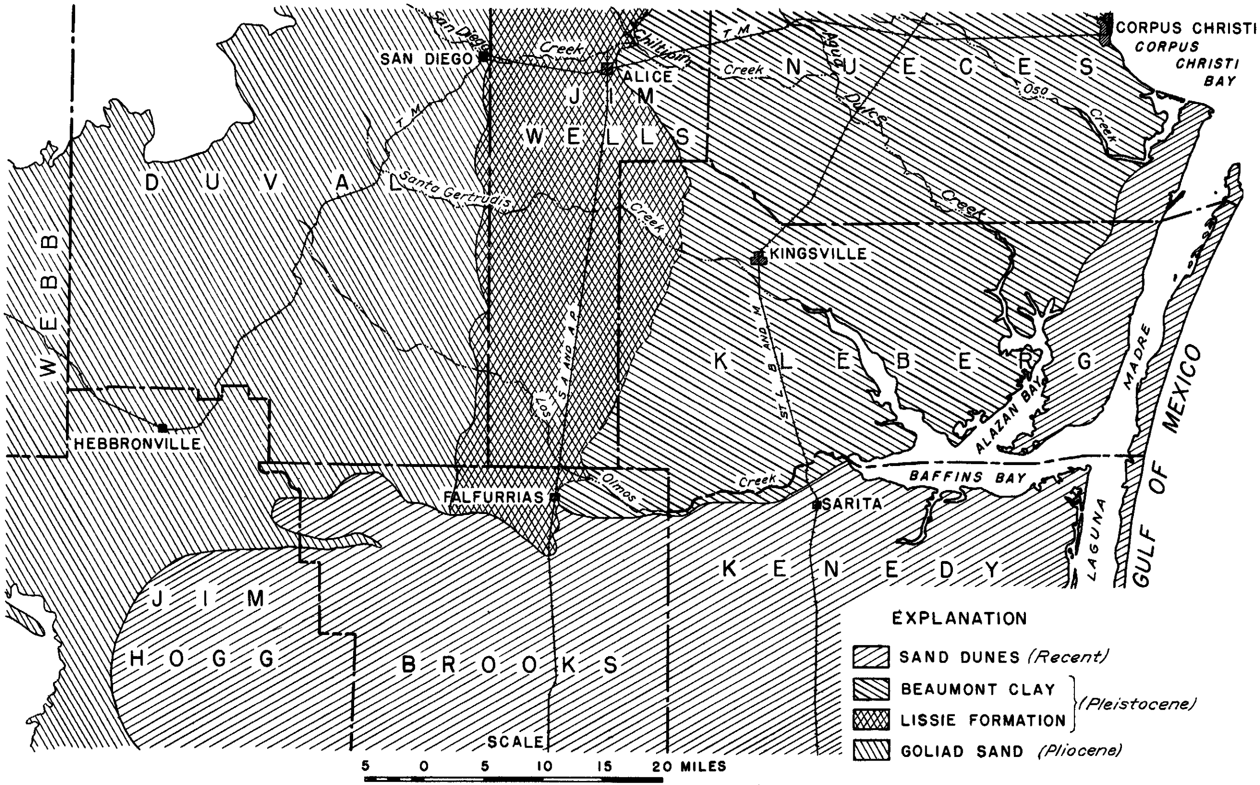


Figure 19.--Geologic map of Kleberg and adjacent counties, Texas.

The Lissie is underlain by the Goliad sand, which crops out in a broad belt in Duval, Jim Hogg, and Brook Counties. This formation, although composed largely of clay, contains more sand than either the Beaumont clay or the Lissie formation. Most of the sands in the Lissie and Goliad formations, like those in the Beaumont, contain highly mineralized water. A sandy member that has usually been referred to the Goliad but possibly may be at the base of the Lissie formation, however, yields abundant supplies of good water. This sand is encountered by deep wells in all parts of the county. According to well logs it ranges in thickness from 10 to 150 feet and in most places is divided by a layer of clay. The top of the sand is reached at depths of around 400 feet in the western part of the county, 600 to 700 feet in the locality of Kingsville, and 1,250 to 1,450 feet in the eastern part of the county. Good water is obtained from this sand down to 1,450 feet below sea level in the eastern part of the county. So far as known, no good water has been obtained in the county beneath this sand.

The Goliad is underlain by the Lagarto clay. It is thought that at least two wells in the western part of the county (wells 38 and 340; see well tables) reached this formation. These wells yielded salty water from sands encountered at depths of about 1,100 feet, probably belonging to the upper part of the Lagarto. The chances of obtaining good water in the Lagarto or beneath it are thought to be negligible.

The following logs represent wells widely spaced throughout the county:

Drillers' logs of wells in Kleberg County

21. Santa Gertrudis ranch, Dairy No. 1

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Caliche or clay......	60	60	Salt sand...........	20	390
Salt sand............	20	80	Clay.................	110	500
Red clay.............	200	280	Clay.................	20	520
Salt sand............	30	310	Water sand..........	105	625
Red clay.............	60	370			

34. Santa Gertrudis ranch, Yoakum Hill well

Black soil...........	4	4	Hard sandy clay.....	16	480
White clay...........	90	94	White clay and shale	102	582
Soft chalk rock......	100	194	Sandy clay..........	21	603
White clay...........	170	364	Hard and soft sand..	124	727
Limestone............	13	377			
White clay...........	87	464			

Drillers' logs of wells in Kleberg County - Continued

38. Santa Gertrudis ranch, Escondido

	Thick-ness (feet)	Depth (feet)		Thick-ness (feet)	Depth (feet)
Clay..................	208	208	Clay.................	62	680
Sand and clay.........	41	249	Water sand, strainer.	60	740
Clay..................	42	291	Clay.................	38	778
Clay and rock.........	21	312	Water sand, strainer.	21	799
Clay..................	20	332	Blue clay............	62	861
Clay and rock.........	21	353	Blue clay............	87	948
Clay..................	103	456	Red clay.............	147	1,095
Sand and clay.........	21	477	Sand and shale.......	108	1,203
Clay..................	41	518			
Water sand, cased off.	100	618			

Casing: 513 feet of 5 3/16-inch, 318 feet of 4 1/4-inch, 372 feet of 3 1/4-inch. The 3 1/4-inch casing is set about 20 feet above bottom of well.

92. City of Kingsville

Surface soil..........	5	5	Clay.................	35	350
Clay..................	35	40	Gumbo................	50	400
Caliche...............	60	100	Sand.................	18	418
Clay..................	10	110	Gumbo................	39	457
Caliche...............	32	142	Clay.................	23	480
Clay..................	14	156	Sand.................	20	500
Sand..................	21	177	Clay.................	10	510
Gumbo.................	24	201	Gumbo................	80	590
Clay..................	99	300	Sand; water..........	144	734
Sand..................	15	315	Gumbo................	2	736

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Soil..................	3	3	Blue and red clay....	87	518
Yellowish clay........	17	20	Rock boulder.........	10	528
White sand............	11	31	Sandy clay, blue and red................	12	540
Yellowish clay and gravel; rock........	17	48	Blue and red clay....	50	590
White sand; soft water	8	56	Red clay.............	30	620
Whitish clay and gypsum.................	52	108	Sand (sulphur water cut off)............	12	632
Blue clay and shell...	144	252	Red clay.............	110	742
Rock, very hard.......	26	278	Artesian sand........	24	766
Blue clay and gypsum..	118	396	Red clay.............	19	785
Rock, hard............	12	408	Artesian sand........	23	808
Blue and brownish clay	11	419	Red clay and rock....	5	813
Rock boulder..........	12	431			

372. Laureles ranch, Caesar well

Clay..................	272	272	Sand clay............	21	518
Sand..................	21	293	Sand.................	21	539
Clay..................	40	333	Sand clay............	41	580
Sand..................	20	353	Clay.................	82	662
Clay..................	144	497	Sand.................	88	750

Casing: 600 feet of 5 3/16-inch, 150 feet of 4 1/4-inch.

Drillers' logs of wells in Kleberg County - Continued

422. Laureles ranch, Augustin well

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Sandy clay	2	2	Blue shale, brown clay, mixed with rock and gravel	50	700
White caliche and dry sand	18	20	Hard, sticky clay, blue, white, and brown	20	720
White and yellow clay	20	40	White-blue clay with rock	30	750
White sand	10	50	White clay and rock	30	780
White and yellow clay and sand	50	100	White sand and gravel	20	800
White clay and rock	20	120	White clay and rock, very hard	40	840
Yellow clay with rock	30	150	White and red clay with rock and white sand	40	880
Yellow sand and rock	10	160	Red and pink clay	30	910
Yellow clay, rock, yellow sand	20	180	Pink and white clay	20	930
White and yellow clay and sand	20	200	Very hard rock	10	940
Yellow-blue clay and rock	40	240	Blue clay with shell and gravel	20	960
Gray sand	25	265	Blue sand and rock	20	980
Hard sticky white clay, rock	35	300	White and blue clay	20	1,000
Hard sticky yellow and white clay	20	320	Blue clay, rock	20	1,020
Hard blue-gray clay	20	340	Blue clay, gravel, blue sand	40	1,060
Sand and whitish-yellow clay	40	380	Pink and white clay mixed with green clay	40	1,100
Gray-blue clay, rock and sand	20	400	Green and white-brown clay with shell and better water	30	1,130
Blue clay, hard rock, blue shale	50	450	Pink and white clay	50	1,180
Blue rock and shale	30	480	Red clay	20	1,200
Hard rock, black rock	20	500	Red and white clay	30	1,230
Sand, shale and rock	40	540	White sand with hard rock	10	1,240
White sand with blue rock	40	580	Red clay	10	1,250
Blue sticky clay	20	600	Brown sand; water sand	26	1,276
Blue-gray clay and rock	20	620			
Hard rock, blue-white clay	20	640			
White-blue sand	10	650			

Casing: 910 feet of 6 5/8-inch, 436 feet of 5 3/16-inch. Lap of casing 70 feet.

423. Laureles ranch, Ojo del Agua well

Soil	2	2	Caliche and clay	12	468
White clay	10	12	Blue clay and rock	21	489
White sand	4	16	Yellow clay	21	510
White clay	9	25	White sand	28	538
Yellow sand	11	36	Hard rock and blue clay	22	560
Yellow clay	104	140	Blue soft clay	19	579
Caliche	19	159	Caliche	20	599
Blue clay	139	298	Blue clay	31	630
Light-blue sand and some gravel	20	318	White sand	17	647
Blue rock and clay	31	349	Blue clay	12	659
White clay	31	380	Gypsum	7	666
White sand	18	398	Blue clay	10	676
Blue rock	10	408	Blue rock	9	685
Blue clay	12	420	Gypsum	11	696
Blue rock	6	426	Blue clay	9	705
White sand	19	445	White clay and caliche	35	740
Blue rock	5	450	Blue clay	19	759
White sand	6	456	White sand	10	769

Drillers' logs of wells in Kleberg County - Continued

423. Laureles ranch, Ojo del Agùa well - Continued

	Thickness (feet)	Depth (feet)
White clay and caliche	21	790
Light-red clay	18	808
Gypsum	22	830
White clay and caliche	30	860
Blue clay	10	870
Blue clay and gypsum	10	880
White sand	6	886
Blue clay and gypsum	14	900
Red clay	30	930
Blue sticky clay	10	940
White sand	10	950
Red clay	20	970
Light-blue clay and gypsum	20	990
Red clay	12	1,002
Blue clay and gypsum	23	1,025
Light-red clay	20	1,045
Hard rock	2	1,047
Red sticky clay	18	1,065
White clay	15	1,080
Light-red clay	20	1,100
White sand	3	1,103
Red clay	22	1,125
White sand	3	1,128
Red clay	32	1,160
White sticky clay	15	1,175
Hard rock	3	1,178
Red clay	7	1,185
Blue sticky clay	11	1,196
White clay and gypsum	4	1,200
Blue rock	4	1,204
Blue sticky clay	12	1,216
Red sand	14	1,230
Blue clay and gypsum	18	1,248
White sticky clay	13	1,261
Red sticky clay	15	1,276
Blue clay	3	1,279
Gypsum	7	1,286
Blue sticky clay	4	1,290
Gypsum	20	1,310

Casing: 802 feet of 5 3/16-inch, 540 feet of 3 1/4-inch. Lap of casing 32 feet.

427. Laureles ranch, Mato Mesquite well

Soil, black sand, white clay, and rock	20	20
Salt sand, white	5	25
White and yellow clay mixed with rock	35	60
Yellow clay and rock	20	80
White sand and shell	20	100
Rock and white clay	60	160
Gravel, rock, and blue and white clay	40	200
Blue sand and shell	50	250
Hard rock with white and yellow clay	50	300
White and yellow clay with rock	50	350
White clay with rock and white sand	50	400
Rock with blue and white clay	100	500
Very hard rock with white and blue clay	35	535
Blue rock and sand	15	560
Blue and white clay and hard rock	30	590
Blue clay, sand, and rock	30	620
Blue clay and hard rock	20	640
Rock and blue clay	23	663
Blue-white clay with rock	21	684
White and blue clay and rock	22	706
Gray and blue clay and rock	24	730
Gray-blue clay and rock	18	748
Gray and blue clay, white sand, and rock	22	770
Gray sticky clay with rock	21	791
Brown, white, and blue clay	21	812
Gray clay and rock	21	833
Brown, blue, and white sticky clay	21	854
Brown and white clay	21	875
Brown and blue clay, very sticky	25	900
Mixed white, blue, and brown clay	20	920
Mixed clay, brown, red, white, and blue	20	940
Mixed clay, brown and white	17	957
Brown, white, and pink clay with rock	20	977
Pink and white clay, rock, white sand	21	998
Pink and white slate clay, rock, white sand	22	1,020
Mixed clay, red, brown, green, and blue, with rock	21	1,041
Blue and red clay, with hard rock, white sand	13	1,054
Brown and blue clay, gray sand, rock	21	1,075
Rock, red clay, gray sand	20	1,095
Red and blue clay, white sand, rock	20	1,115
Red and brown clay	20	1,135
Brown and red clay, white grains	19	1,154

Drillers' logs of wells in Kleberg County - Continued

427. Laureles ranch, Mato Mesquite well - Continued

	Thickness (feet)	Depth (feet)		Thickness (feet)	Depth (feet)
Brown and red clay, rock	20	1,174	Brown sand	30	1,279
Red clay, fine gray sand, and rock	19	1,193	Clay and rock	10	1,289
Red sticky clay	19	1,212	Hard clay, white and red	11	1,300
Red clay	18	1,230	Water sand, dark gray	31	1,331
Red clay, sticky; artesian sand	19	1,249			

Casing: 5 3/16-inch from surface to 1,135 feet, 3 1/4-inch below 1,135 feet.

429. Laureles ranch, Alta Prieta well

Soil sand	60	60	Gray clay	40	1,160
Blue clay and shale	40	100	Gray and blue rock, very hard	40	1,200
Shell and blue slush	150	250	White and blue and brown clay mixed	40	1,240
White rock, gravel, and blue shale	150	400	Black rock with dark-brown clay	40	1,280
Blue rock, very hard	150	550	White sand with shell, very hard rock	25	1,305
No change; shell, gravel, clay	200	750	Rock, shell, white sand	15	1,320
Very hard rock and gravel	173	923	Strawberry clay, red, white, and yellow	40	1,360
Yellow clay	22	945	White and gray sand	5	1,365
Yellow and white sand	15	960	Red clay	35	1,400
Hard blue and white rock	20	980	Brown sand	20	1,420
Blue and white clay	40	1,020	Red clay	5	1,425
White sand	15	1,035	Brown sand	10	1,435
Mixed rock, shell, blue clay	45	1,080			
White and blue gravel mixed with whitish-blue sand	40	1,120			

430. Laureles ranch, Devisadero well

Soil sand	60	60	Brown and white clay	40	1,060
Blue sand and slush	60	120	White and pink clay	40	1,100
Blue clay	80	200	White sand with rock or shale	20	1,120
Blue clay mixed with white clay	100	300	Blue and white-brown clay	40	1,160
Blue clay, gravel, and blue rock	100	400	White sand	60	1,220
Blue sand	40	440	Red and white clay	40	1,260
Blue clay, white sand, and rock	80	520	Strawberry clay, red, white, and blue	60	1,320
Hard white rock with white and blue clay	40	560	Sand, white and brown	9	1,329
White and blue clay with gray rock	40	600	Red and brown clay	12	1,341
Hard rock; used roller bit	70	670	Brown sand	15	1,356
Blue-gray sand	30	700	Red clay	19	1,375
Blue and white clay	200	900	Yellow-brown sand; 20-gallon flow of good water	25	1,400
White sand	20	920	Red clay mixed with brown	22	1,422
Blue, yellow, and white clay	40	960	Good brown sand	23	1,445
Yellow, white, and brown clay	40	1,000	Blue, white, and red clay	30	1,475
White sand	20	1,020			

Casing: 632 feet of 6 5/8-inch, 697 feet of 5 3/16-inch, 165 feet of 4 1/4-inch, and 125 feet of 3 1/4-inch.

Drillers' logs of wells in Kleberg County - Continued

434. Laureles ranch, Rincon well

	Thickness (feet)	Depth (feet)
Soil, black clay streaked with white	5	5
White and yellow clay with salt water	45	50
Brown and blue clay	5	55
Bits of white or bluish sand with oyster shell	25	80
Gray and blue clay	40	120
Blue shell with rock and slush	130	250
Blue-gray clay with some sand	64	314
Hard gray rock with white pebbles	36	350
Blue-gray clay with some sand and rock	100	450
Blue and gray clay streaked with brown clay	200	650
Brown clay with blue and black rock very hard	100	750
Blue, brown, white, and red clay; some sand; salt	200	950
Strawberry clay, white and red	70	1,020
Fine white sand	10	1,030
Red and brown clay	70	1,100
Solid red clay	67	1,167
Water found. Color brown with hard rock	45	1,212

Casing: 650 feet of 6 5/8-inch and 664 feet of 5 3/16-inch. Lap of casing 102 feet.
Strainer: 3 lengths. Water sand 45 feet.

Oil test 7 miles east of Kingsville near well 374;
Trees Oil Co. well 1 of Gillespie & Pitcairn

	Thickness (feet)	Depth (feet)
Red clay	45	45
Clay and limerock, soft, white	355	400
White sandy clay	65	465
Red and blue clay	45	510
Clay	140	650
Sandy clay	70	720
Packed water sand	15	735
Clay, sandy	32	767
Water sand	14	781
Gumbo, sticky clay	204	985
Water sand	55	1,040
Gumbo	83	1,123
Water sand	17	1,140
Soft shale	60	1,200
Sticky gumbo	10	1,210
Blue clay	140	1,350
Red clay	110	1,460
Soft blue clay	120	1,580
Hard gypsum formation	175	1,755
Soft shale	35	1,790
Hard white gumbo	95	1,885
Sticky shale, salt water	175	2,060
Sand shale and pack sand	30	2,090
Hard sticky gumbo	60	2,150
Gumbo	3	2,153
Hard shale	31	2,184
Sticky gumbo	8	2,192
Shale	148	2,340
White sticky shale	25	2,365
Very soft blue sand (quicksand)	10	2,375
White shale	15	2,390
Shale and shell rock	5	2,395
Shale	2	2,397
Gumbo, blue	43	2,440
Shale and pebbles	90	2,530

UTILIZATION OF GROUND-WATER SUPPLIES

Information was obtained in regard to nearly all the wells in the county, and a table was prepared giving the available information in regard to 437 of them (pp. 222-233). Of the wells listed in the table 34 are not in use. The water supplies from the others are used as follows: Entirely for stock, 151; domestic use and stock, 241; public supply, 3; industrial supply, 2; irrigation, 4; railroad supply, 1; unrecorded, 1. About 80 are flowing wells, in the southern and eastern parts of the county. In addition to the information on the 437 wells listed in the table, some data were obtained on 13 wells on the Santa Gertrudis ranch and 36 wells on the Laureles ranch that had been abandoned for one reason or another. Of the wells in the subdivided area 14 were not visited or included in the tabulation.

The withdrawals of ground water in the county reached a maximum when irrigation from wells was at its peak about 1912. If 3,500 acres was then irrigated and 2 acre-feet of water was applied annually, the consumption of ground water for irrigation alone amounted to 7,000 acre-feet a year, which is the equivalent of about 6,250,000 gallons a day throughout the year. The total consumption at that time probably exceeded 7,000,000 gallons a day.

It is difficult to estimate the present consumption of ground water in the county. The records as to the amount of water pumped for public and industrial uses are not complete, and the use of water for stock can be only roughly estimated. Moreover, no exact information is available as to the proportions of the time the flowing wells are allowed to flow and are shut down during the different seasons. However, the discharge from a large number of wells was measured, and after consideration of all the available data it is concluded that the present withdrawals average about 4,000,000 gallons a day. The heaviest withdrawals are in the vicinity of Kingsville.

FLUCTUATIONS IN ARTESIAN PRESSURE AND DECLINE IN HEAD

When the first wells were drilled into the artesian sand the water was under high pressure, but soon after the beginning of irrigation from wells in 1904 the pressure began to drop. Some of these wells had ceased to flow in 1908 or 1909, and pumping was started in 1910.

At present the water level in wells is from 15 to 45 feet below the surface in the vicinity of Kingsville and in the western part of the county, where strong flows were formerly obtained. The decline is smaller elsewhere in the county. Wells continue to flow in the southern and eastern parts of the county, but under less head than formerly. Originally the artesian pressure in the fresh-water sands was much higher than the pressure in the overlying salt-water sands, but this relation has been reversed in the western part of the county and in the district around Kingsville, as a result of the decline in the fresh-water head.

A comparison of measurements by S. S. Nye with measurements of the same wells by the writers indicates that some decline in head occurred in parts of the area between the spring of 1928 and the winter of 1932-33.

During the following 2 years several rounds of measurements were made to determine the fluctuation in artesian pressure, as determined by changes in water levels, in 107 observation wells in all parts of the county. The results of these measurements are shown in the table below, the location of the wells is indicated on plate 17, and other data in regard to the wells are given in the table at the end of the report. The measurements show that in most of the wells there was a small net loss in head between the winters of 1932-33 and 1934-35. Similar measurements should be made once or twice a year for an indefinite period.

Water levels in observation wells in Kleberg County, Tex., in feet above or below measuring point[1]

No. of well	Prior to 1907	1913 (Mar.)	1928 (Mar.)	1932-33 (Dec. to Feb.)	1933 (Dec.)	1934 (Feb.)	1934 (Nov.)	1935 (Mar.)
4	....	....	....	-62.1	....	-61.2	-63.3	-63.8
5	....	....	....	-47.0	....	-46.7	-48.3	....
8	....	....	....	-31.6	....	-30.7	-32.9	-32.7
9	....	....	....	-38.1	....	-36.4	....	-38.7
10	....	....	....	-48.6	....	-47.5	-49.6	-49.6
13	Flow	....	....	-45.2	-45.0	-44.7	-46.3	-47.2
15	....	....	....	-40.3	-40.5	-40.1	-42.0	-42.5
16	....	....	....	-42.7	....	-45.8	-44.1	....
23	....	....	....	-47.4	....	-45.9	-48.5	-48.2
24	....	....	....	-28.1	....	-27.6	....	....
26	....	....	....	-31.2	....	-30.7	-32.5	-33.3
27	....	....	....	-33.8	....	-33.3	-34.8	....
29	....	....	....	-32.1	....	-31.6	-32.8	-33.3
30	....	....	....	-30.3	....	-29.3	-31.1	....
31	....	....	....	-30.0	....	-28.8	-32.1	....
35	....	....	....	-31.5	....	-29.8	-34.1	-33.8
37	....	....	....	-13.8	....	-14.1	-15.5	-14.9
40	....	....	....	-16.2	....	-15.8	....	....
41	Flow	....	....	-20.0	....	-20.3	-21.5	-20.9
43	....	....	....	-19.4	....	-19.1	-19.9	....
44	....	....	....	-38.4	....	-37.8	-38.6	....
45	Flow	....	....	-28.3	....	-27.8	-29.0	-29.1
46	....	....	....	-30.7	....	-30.2	-31.3	....
49	....	....	....	-22.7	....	-22.4	-23.6	-23.4
51	....	....	....	-17.3	....	-16.7	-18.4	....
52	....	....	....	-13.2	....	-12.6	-13.7	-13.6
53	....	....	....	-14.7	....	-14.1	-15.3	-15.3
56	....	....	....	-15.8	....	-16.1	-17.6	-17.5
57	....	....	....	- 2.6	....	- 2.2	- 3.0	- 3.3
59	....	....	....	- 8.9	....	- 8.6	- 9.6	-10.0
61	....	....	....	- 3.7	....	- 3.2	- 3.7	- 4.3
64	....	....	....	- 1.1	....	- .7	- 1.2	- 1.3
73	....	....	....	-33.3	-32.2	-32.2	-35.6	-36.1
79	....	....	....	-42.6	....	-40.4	-46.1	-45.9
83	....	....	....	-40.8	....	....	-43.6	-42.5
91	....	....	....	2/-46.9	-42.9	-41.1	-46.0	....
92	....	....	....	2/-46.6	-42.0	-40.6	-44.9	....
93	....	....	....	2/-48.7	-41.8	-40.9	-47.6	....
96	....	....	....	-24.1	....	....	-24.4	-23.3
103	....	....	....	-28.8	....	....	-29.2	-28.6

1/ The top of the well casing or top of the pump-pipe clamp was used as the measuring point in most of the wells.
2/ Measured in October 1932.

Water levels in observation wells in Kleberg County - Continued

No. of well	Prior to 1907	1913 (Mar.)	1928 (Mar.)	1932-33 (Dec. to Feb.)	1933 (Dec.)	1934 (Feb.)	1934 (Nov.)	1935 (Mar.)
106	....	....	....	-25.1	....	-24.0	....	....
111	....	....	....	-23.1	....	-21.1	....	....
113	....	....	....	-33.2	-31.7	....	....	....
127	....	....	....	-24.4	-22.8	-22.7	-26.3	-25.1
128	....	....	....	-36.1	....	-34.9	-40.8	-37.7
136	....	....	....	- 8.6	....	- 8.5	- 9.5	....
144	....	....	....	-23.4	....	-21.5	-25.3	-24.2
150	....	....	....	- 7.3	....	- 7.0	- 8.3	- 7.4
156	....	....	....	-21.4	....	....	-21.0	....
165	Flow	....	....	-14.9	....	-14.0	-16.2	-15.5
173	....	....	....	- 1.3	....	....	- 1.1	- 1.2
179	....	....	....	-14.7	....	-14.2	-15.8	-15.4
188	....	....	....	-18.9	-18.6	-18.4	-21.4	-20.2
190	....	....	....	-15.2	....	-14.7	-16.9	-16.3
201	....	....	....	-27.6	....	-24.8	....	....
207	....	....	....	-16.1	....	-15.0	-17.9	-17.0
210	....	....	....	-13.8	....	-13.7	-14.2	....
217	....	+ 2.0	-10.8	-12.5	-11.5	....	-13.3	-13.3
219	....	+ 4.0	- 9.0	-10.3	-10.1	- 9.8	-11.2	-11.1
222	....	....	....	-22.0	....	....	-19.1	....
228	....	....	....	-17.7	-17.5	....	-18.4	-18.4
236	....	....	....	-30.9	....	-30.7	-33.8	....
238	....	....	....	- 3.6	....	- 3.3	- 4.7	- 4.5
244	....	....	....	- 9.6	....	-10.7	-11.8	-12.1
257	....	....	....	-10.7	....	- 9.9	-11.0	-10.8
258	....	....	....	-11.7	....	-12.8	....	....
262	....	....	....	-12.5	....	-11.8	-12.9	-13.1
264	....	....	....	- 9.6	....	- 8.4	- 9.7	-10.5
269	....	....	....	- 9.2	....	- 8.6	- 8.5	- 9.5
271	....	....	....	- 3.0	....	- 2.2	- 3.2	....
273	....	....	....	- 3.5	- 3.1	- 2.8	- 4.6	- 3.8
278	....	....	....	- 7.5	....	- 7.3	- 9.2	- 9.5
282	....	....	....	- .8	....	- .8	....	....
283	....	....	....	- 2.2	....	- 2.1	....	....
290	....	....	....	- 4.5	....	- 4.2	....	....
298	....	....	....	- 2.9	....	- 2.7	- 2.1	- 3.0
307	....	....	....	- 4.4	....	- 3.5	- 3.5	- 3.4
325	....	....	....	- 4.2	....	....	- 4.2	- 4.2
337	....	....	....	-10.7	-10.7	-10.4	-11.4	-11.7
339	....	....	- 3.8	....	....	- 4.0	- 3.4	- 3.5
372	....	....	....	-23.6	-21.4	-20.6	-22.4	-22.4
375	....	....	....	- 7.5	....	....	- 7.9	- 7.8
380	....	....	....	-13.4	....	-13.0	....	....
381	....	....	....	-18.6	....	-17.2	-17.7	-13.7
382	....	....	....	- 4.4	....	- 4.0	- 4.6	....
383	....	....	....	- 5.2	....	- 4.5	- 4.6	- 4.6
384	....	....	....	-17.9	....	-14.8	....	....
385	....	....	....	+ 3.0	....	- 2.7	- 3.0	- 3.2
387	Flow	....	....	+ 4.3	....	....	+ 4.2	+ 5.5
389	....	....	....	- 2.5	....	....	- 2.3	- 2.2
390	....	....	....	-10.3	....	....	- 9.4	- 9.3
395	....	....	....	- 3.5	....	- 1.6	- 3.0	- 2.4
396	....	....	....	+ 8.5	....	+ 9.1	+ 9.1	+ 9.8
397	....	....	....	+11.5	....	+12.7	-11.5	....
398	Flow	....	....	+ 4.1	....	+ 3.2	+ 4.6	+ 4.0
399	....	....	....	- 4.1	....	....	- 4.2	- 5.0
400	....	....	....	- 2.5	....	- 2.1	- 2.4	- 1.7
403	....	....	....	+ 8.5	....	....	+ 9.1	+10.6
406	....	....	....	-23.3	....	-23.2	-23.6	....
408	....	....	....	+ 5.4	....	....	+ 5.3	+ 5.4

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Water levels in observation wells in Kleberg County - Continued

No. of well	Prior to 1907	1913 (Mar.)	1928 (Mar.)	1932-33 (Dec. to Feb.)	1933 (Dec.)	1934 (Feb.)	1934 (Nov.)	1935 (Mar.)
412	Flow	....	....	+ 4.2	....	....	+ 4.5	+ 4.2
416	....	....	....	- 3.1	....	....	- 5.2	....
425	....	....	....	+ 8.6	....	+ 9.2	+ 7.5	+ 9.3
427	....	....	....	+15.2	....	....	+16.4	+18.0
431	....	....	....	+13.6	....	....	+19.9	+20.1
433	....	....	....	+15.4	....	....	+18.2	+18.7
434	....	....	....	+12.4	....	....	+13.9	+14.2

MOVEMENT OF GROUND WATER

The water withdrawn from the underground reservoir of fresh water in Kleberg County is supplied by percolation from the outcrop, which is many miles to the west. The water moves in the direction of the hydraulic gradient, which is at right angles to lines of equal artesian pressure. Such lines have been drawn for a part of the county from data obtained in the winter of 1932-33 and are shown on plate 17. Apparently in the western part of the county the general movement is from west to east; but in the locality of Kingsville a depression in the artesian head has been created by the heavy pumping, and water is moving toward Kingsville from all directions. It is possible that a small depression in the artesian head has also been produced in an area a few miles east of Riviera, where the discharge from flowing wells is rather heavy, but the available data are insufficient to determine whether or not this depression exists.

The amount of the inflow of ground water to any part of the county depends on the hydraulic gradient and the thickness and permeability of the water-bearing sands. The coefficient of permeability can be expressed as the number of gallons of water that will flow through a cross section of the water-bearing bed 1 foot high and 1 mile wide for each foot of head per mile. The total flow across a segment of the formation 1 mile wide is obtained by multiplying the coefficient of permeability by the thickness of the formation and multiplying the product by the hydraulic gradient. The average coefficient of permeability is very difficult to obtain and at the best can be only roughly estimated. On the basis of extensive investigation the average permeability was estimated as 200 for the Carrizo sand (Eocene) in Dimmit and Zavala Counties and 150 for the Lissie and Goliad sands in the Houston district. No tests were made of the permeability of the Goliad sand in Kleberg County, but by comparative study it was estimated at 150.

In order to reach a tentative figure as to the annual replenishment from the outcrop to the wells of Kleberg County, it has been assumed that the inflow passes through a vertical section of the fresh-water sand 30 miles long having an approximately north-south direction across the western part of the county. (See pl. 17.) It is roughly estimated that along this line the average thickness of the fresh-water sand is 125 feet, the average coefficient of permeability 150, and the average hydraulic gradient 5 feet to the mile. On this basis the estimated flow into the county is about 3,000,000 gallons a day. The artesian pressures in the county appeared to show a general slight downward trend during the years 1933 and 1934, and the withdrawals of ground water in the county are estimated to average about 4,000,000 gallons a day.

The hydraulic gradient would be increased if the pressure cone were deepened by still heavier pumping. In that event the movement of the water, according to Darcy's law, would increase proportionally. The inflow of water from the direction of the outcrop might thus be increased, but in order to accomplish this it would be necessary to lower the water levels still further in the central part of the county, and inequalities in pressure would be produced that might cause a general intrusion of salt water.

CHEMICAL CHARACTER OF THE GROUND WATER

Samples of water from most of the wells of the county were tested in the field for chlorides and hardness, and samples from 24 wells were analyzed in the water-resources laboratory of the United States Geological Survey at Washington. The results of the field tests are given in the table of well records at the end of this report, and the analyses are shown in the following table:

Analyses of water from Kleberg County, Tex.

[Parts per million. Well numbers correspond to numbers in table of well records]

Well No.	Total dissolved solids	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Total hardness as $CaCO_3$ (calculated)
20	951	21	0.25	24	12	303	13	316	135	265	12	109
65	1/749	..	....	2/25	..	1/243		336	176	138	1.2	3/126
87	1/930	..	0	..	..	1/340		312	143	260	....	3/ 86
91	1/950	..	0	..	..	1/340		308	164	252	....	3/ 92
92	986	24	.08	24	9.9	315	9.0	310	163	265	8.0	101
93	979	22	.08	24	10	314	12	305	161	266	8.3	101
95	1,108	32	....	..	..	362		314	220	289	4.4	112
121	1,729	..	....	68	33	521		302	425	531	....	305
127	1/925	..	.20	2/36	..	1/296		296	231	216	6.8	3/150
138	1,214	..	....	45	17	379		286	339	295	....	182
185	1/895	..	....	2/28	..	1/301		300	225	199	8.3	3/114
191	1/1,100	..	0	..	..	1/340		279	344	216	....	3/212
211	1/655	..	1.1	2/28	..	1/222		318	116	142	.20	3/ 99
217	1/940	..	0	..	..	1/330		320	208	208	....	3/108
219	1/930	..	0	..	..	1/340		326	127	268	....	3/ 98
252	1/928	..	....	2/34	..	1/301		277	270	192	8.3	3/132
279	1/16,750	..	....	668	580	1/4,657		413	3,165	7,475	1.9	4,048
310	1/998	..	1.5	2/22	..	1/349		284	215	288	.10	3/105
333	1/844	..	.60	2/20	..	1/290		333	178	198	.0	3/108
340	1/7,686	..	6.3	368	121	1/2,120		63	3,095	1,950	.87	1,416
345	1,082	..	.0	33	9.0	1/325		359	204	226	....	119
353	1/1,400	..	0	..	..	1/510		319	492	244	....	3/106
407	1/1,444	..	....	2/7	..	1/558		278	341	466	.20	3/ 27
427	2,195	17	.10	22	7.0	750	9.3	204	616	658	.0	84

1/ Calculated.
2/ By turbidity.
3/ Determined.

Owner, date of collection, analyst, and remarks

20. King ranch, Feb. 20, 1933. Margaret D. Foster, analyst.
65. King ranch, Feb. 18, 1933. Margaret D. Foster, analyst.
87. J. W. Schlenke et al., Mar. 3, 1913. W. T. Read, analyst; sample collected by David Donoghue under the supervision of Alexander Deussen.
91. City of Kingsville, Mar. 3, 1913. W. T. Read, analyst; sample collected by David Donoghue under the supervision of Alexander Deussen.
92. City of Kingsville, Mar. 9, 1928. Margaret D. Foster, analyst.
23. City of Kingsville, Feb. 20, 1933. Margaret D. Foster, analyst.
95. Missouri Pacific Railroad Co., Jan. 30, 1929. Dearborn Chemical Co., analyst.
121. Missouri Pacific Railroad Co., Sept. 30, 1932. Missouri Pacific Railroad Co., analyst.
127. R. F. Preuit, Feb. 20, 1933. Margaret D. Foster, analyst.
138. Mrs. W. K. Cumberland, Nov. 11, 1932. Missouri Pacific Railroad Co., analyst.
185. J. E. Foster, Mar. 4, 1933. Margaret D. Foster, analyst.
191. Texas-Mexican Institute, Mar. 3, 1913. W. T. Read, analyst; sample collected by David Donoghue under the supervision of Alexander Deussen.
211. F. B. Duke, Mar. 4, 1933. Margaret D. Foster, analyst.
217. J. R. Trussell, Mar. 3, 1913. W. T. Read, analyst; sample collected by David Donoghue under the supervision of Alexander Deussen.
219. A. J. Williams, Mar. 3, 1913. W. T. Read, analyst; sample collected by David Donoghue under the supervision of Alexander Deussen.
252. Ed. Ramirez, Mar. 4, 1933. Margaret D. Foster, analyst.
279. Herbert Andrews, Feb. 21, 1933. Margaret D. Foster, analyst.
310. Leo Yaklin, Feb. 20, 1933. Margaret D. Foster, analyst.
333. G. A. Risken, Feb. 18, 1933. Margaret D. Foster, analyst.
340. B. A. Whitcomb, Jan. 1932. Margaret D. Foster, analyst. Sample taken when well was 1,100 feet deep. It was plugged later at 783 feet.
345. V. E. Mately, June 20, 1913. W. T. Read, analyst; sample collected by David Donoghue under the supervision of Alexander Deussen.
353. Koch et al., Mar. 3, 1913.
407. King ranch, Mar. 3, 1933. Margaret D. Foster, analyst.
427. King ranch, Mar. 2, 1933. Margaret D. Foster, analyst.

A comparison of the field and laboratory determinations for water from identical wells indicates that the field tests for chlorides are fairly good, but the field tests for hardness are uniformly too high. Nevertheless, the field tests are believed to be sufficiently accurate to serve as a valuable index of the comparative mineral content of the different waters, and the brief discussion that follows is based largely on them.

Wells in the sand dunes usually yield small quantities of water that contains less than 300 parts per million of chloride or hardness and is acceptable for drinking. In some localities, however, the sand seems to occupy low places that were formerly filled with brackish water, and a well in such a locality will yield water that is too salty to drink. Along the Gulf, where the sands are relatively deep, wells sunk to a considerable depth below sea level yield good water. The fresh water floats on the salt water, and if the wells are sunk too deep or pumped too heavily salt water is drawn into them. It is probable, however, that fairly large quantities of fresh water could be obtained in these areas from a large number of closely spaced and slightly pumped wells. The possibility of doing this along the coast of Connecticut is discussed by Brown.[2]

Water obtained from the fresh-water beds in the Goliad sand or Lissie formation is comparatively fresh in the western and central parts of the county but contains a somewhat higher proportion of chloride toward the Gulf. In the subdivided area in the central part of the county the chloride ranges from 200 to 300 parts per million. There are two outstanding areas of unusual water in the northeastern part of the county -- one along Agua Dulce Creek, where the water is exceptionally fresh and soft, and the other along the north county line east of Laguna Larga, where it is exceptionally high in both hardness and chloride.

Water in the salt-water beds above the fresh-water sands contains chloride ranging from an amount sufficient to give the water a somewhat salty taste to more than 7,000 parts per million. The hardness in these waters is usually about equal to the chloride. Well 279, about 4 miles north of Riviera, was said by the driller to have passed through a bed of gypsum. The water from this well recently

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2 Brown, J. S., A study of coastal ground water, with special reference to Connecticut: U. S. Geol. Survey Water-Supply Paper 537, p. 17, 1925.

developed a bitter taste and when analyzed showed about 7,000 parts per million of chloride and about 4,000 parts per million of hardness. (See table of analyses.) This water is probably coming entirely from some of the upper salt-water sands.

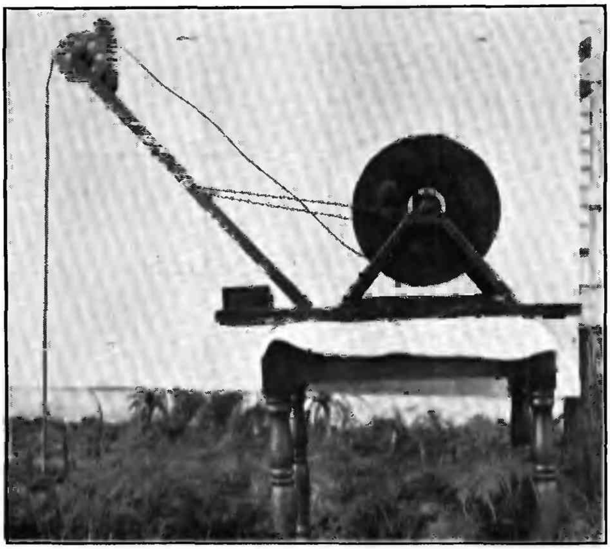
According to the well drillers, all attempts to find fresh water below the fresh-water sand have been unsuccessful. A water sample taken from the 1,100-foot sand in well 340, at Riviera, contained nearly 2,000 parts per million of chloride and about 1,400 parts per million of hardness. (See table of analyses.) This well was shut off at a depth of 783 feet and has since yielded potable water. Salty water was obtained in well 38 from a depth of 1,183 feet, several hundred feet below the fresh-water sands. A short distance south of Ricardo a well drilled below the fresh-water sand yielded salt water.

Samples of water from 394 wells were tested for chloride and hardness, and the results of these tests are shown in the table of well records. Of the 59 samples collected on the Santa Gertrudis ranch 8 show a higher chloride content than is normal for the fresh-water beds in the area. Of the 273 samples collected in the subdivided area, 92 show a materially higher chloride content than the others. Altogether 62 samples were collected on the Laureles ranch, but owing to the large area over which the wells are spaced and the normal increase in salinity toward the Gulf it is difficult to determine whether or not a high salt content in a given well is abnormal.

DEFECTIVE WELLS

The wells mentioned in the preceding section as yielding water exceptionally high in chloride are believed in large part to be defective. Either holes have developed in the well casing by corrosion, or the wells were improperly constructed in the first place and leaks have developed as a result of the decline of the fresh-water pressure. Several wells in different parts of the county were tested in an attempt to determine the position of the salt-water leaks. In these tests an instrument is used consisting essentially of a pair of electrodes connected to a battery and milliammeter and a cable operated by a small winch for lowering the electrodes into the well. (See pl. 18.) As the electrodes are slowly lowered the milliammeter indicates the conductivity of the water at different depths, and when the instrument reaches salty water higher readings are immediately shown. Then if the test has been made under

A. SALT-WATER LEAKAGE TESTING EQUIPMENT WITH CRANE FOLDED FOR MOVING.



B. LEAKAGE EQUIPMENT READY FOR A TEST.

proper conditions and the milliammeter readings are plotted against the depths at which they were taken the locations of the salt-water leaks are plainly indicated.

The part of the instrument carrying the electrodes is made as small as possible in order to pass the pump cylinder or pump bowls and avoid the work of removing the pump. However, in many of the wells in Kleberg County the necessary clearance of one-fourth inch is not available, and it was possible to lower the electrodes into only 10 wells of the 20 that were tried. The contamination of wells by salty water thus far is believed to have been due to defective well casings. No evidence has been found of contamination by percolation through the formations nor of contamination of a good well by a salty well at any considerable distance from the good well. However, if a defective well is admitting salt water and the water is being transmitted by the well into the fresh-water sand, a long time is required for the salt water to replace the fresh water and move any considerable distance from the well. No one can say, therefore, that a leaky well is not a source of danger, and any well that yields water that is too salty to use should be repaired, if practicable, or sealed to prevent it from contaminating the fresh-water sand. If there is a further decline in the fresh-water pressures more wells will become salty, and those already contaminated will become more highly mineralized.

A summary of the results of the tests on the 10 wells is given below:

Results of tests for determining location of salt-water leaks in wells in Kleberg County, Tex.

No. of well	Owner	Date of test	Location of leaks	Remarks
88	G. Nolan et al.	Feb. 13, 1933	58, 141, and 198 feet below pipe clamp.	Three leaks.
92	City of Kingsville	Dec. 6, 1932	294.3 feet below top of casing.	Depth to salt-water mark on air line 294.6 feet.
121	Missouri Pacific Railroad Co.	Dec. 21, 1932	172 feet below pipe clamp.	Well obstructed at 250 feet.
121	do.	Mar. 24, 1933	169 feet below top of casing.	Well obstructed at 200 feet.
123	F. D. Yeary	Dec. 21, 1932	50 feet below pipe clamp.	One leak only.
139	Mrs. J. G. Olson	Feb. 13, 1933	262 feet below top of casing.	One leak only.
193	B. Gillespie	Mar. 22, 1933	25, 292, and 335 feet below top of casing.	Three leaks.
258	Wilbur Bartlett	Feb. 22, 1933	307 feet below top of casing.	One leak only.
269	F. D. Yeary	Feb. 16, 1933	40 feet below top of casing.	Very salty. Well had been idle too long to permit location of leaks below 40 feet.
372	Laureles ranch (Caesar well)	Mar. 22, 1933	30-60 and 265 feet below top of casing.	Many holes between 30 and 60 feet.

Graphs showing the milliammeter readings in four of the wells tested are shown in plate 21. The position of the leaks indicated by the tests shows that salty water is entering the wells from beds above the fresh-water sands. It is believed that in all the wells tested the leaks are very small, amounting perhaps to less than 1 gallon a minute of very highly mineralized water.

The graph for well 193 shows that salt water enters the well at depths of 25, 292, and 335 feet below the top of the casing. The graph for well 88 shows that salt water enters the well at 58, 141, and 198 feet below the top of the pipe clamp. The graph for well 139 shows a single salt-water leak at 262 feet below the top of the well casing. The graph for well 123 shows a substantial salt-water leak at 50 feet below the top of the pipe clamp. The water in all four of these wells becomes salty when the wells stand idle for a time and is materially freshened when the wells are pumped with a windmill.

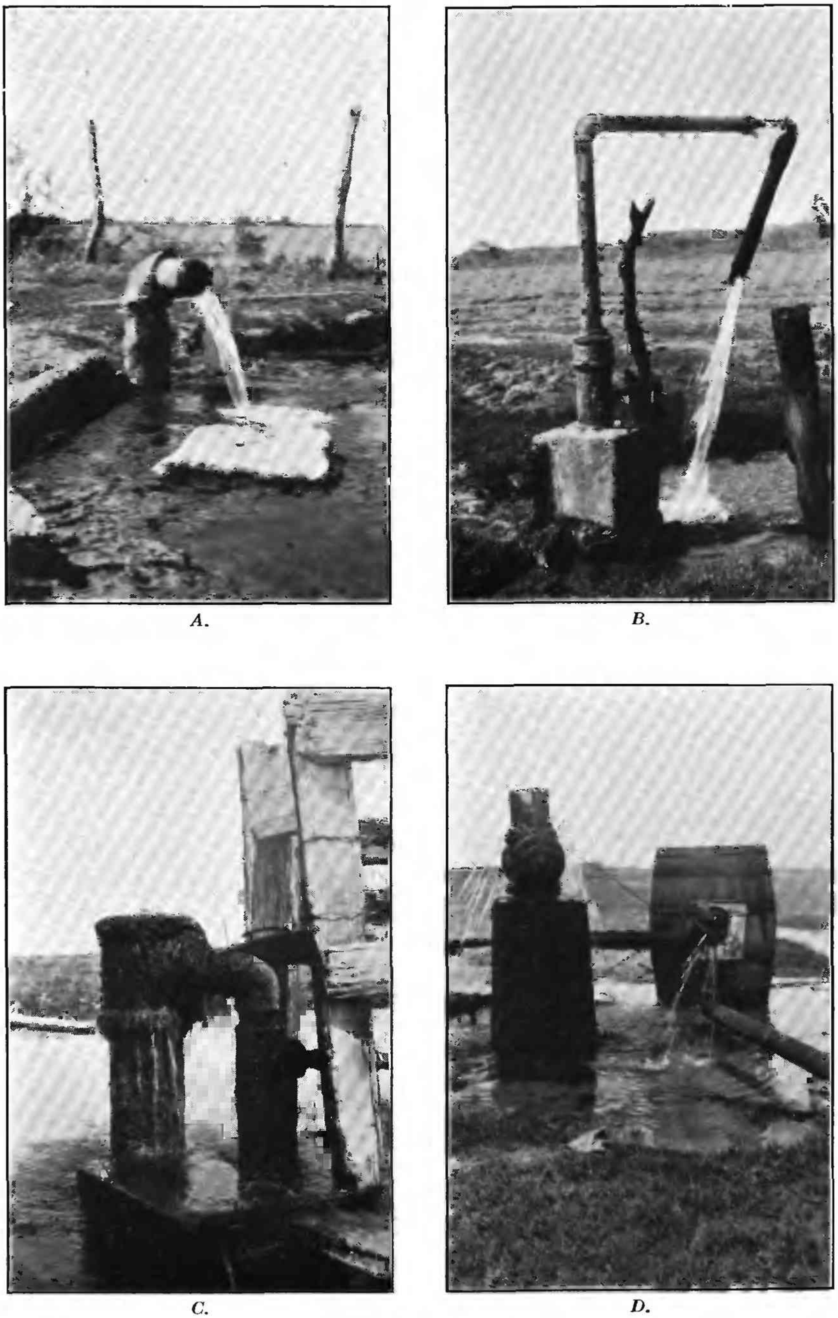
WASTE OF WATER

In earlier years, when the artesian pressure in the fresh-water sands was higher than at present, considerable quantities of fresh water probably escaped through defective wells and flowed into salt-water zones of less pressure. Now, however, conditions are reversed. The pressure in the salt-water sands is higher, and salt water tends to move into the fresh-water sands. Most of the flowing wells are kept under control, and relatively little water is wasted from them. Some of the wells, however, are allowed to flow all the time, and water from them is largely lost. Plate 19 shows views of a flowing well on the Laureles ranch, the discharge of which has been reduced but is still partly wasted. The discharges from most of the other wells on the ranch are controlled by floats on the tank, and no water is wasted from them. The greatest observed waste was in the flowing-well area east of Riviera. Views of typical flowing wells in that area from which water is partly wasted are shown in plate 20.

The supply of fresh water in the underground reservoir in Kleberg County is not very great, and although the waste of water is not large, it is sufficient to deplete the supply to some extent. Every man who has a well should realize that he and his neighbor -- in fact the whole community -- are drawing from a common reservoir and that any depletion of this reservoir is suffered by all. The waste of water from artesian

A. WELL 433 AND CONCRETE WATERING TANK ON LAURELES RANCH.

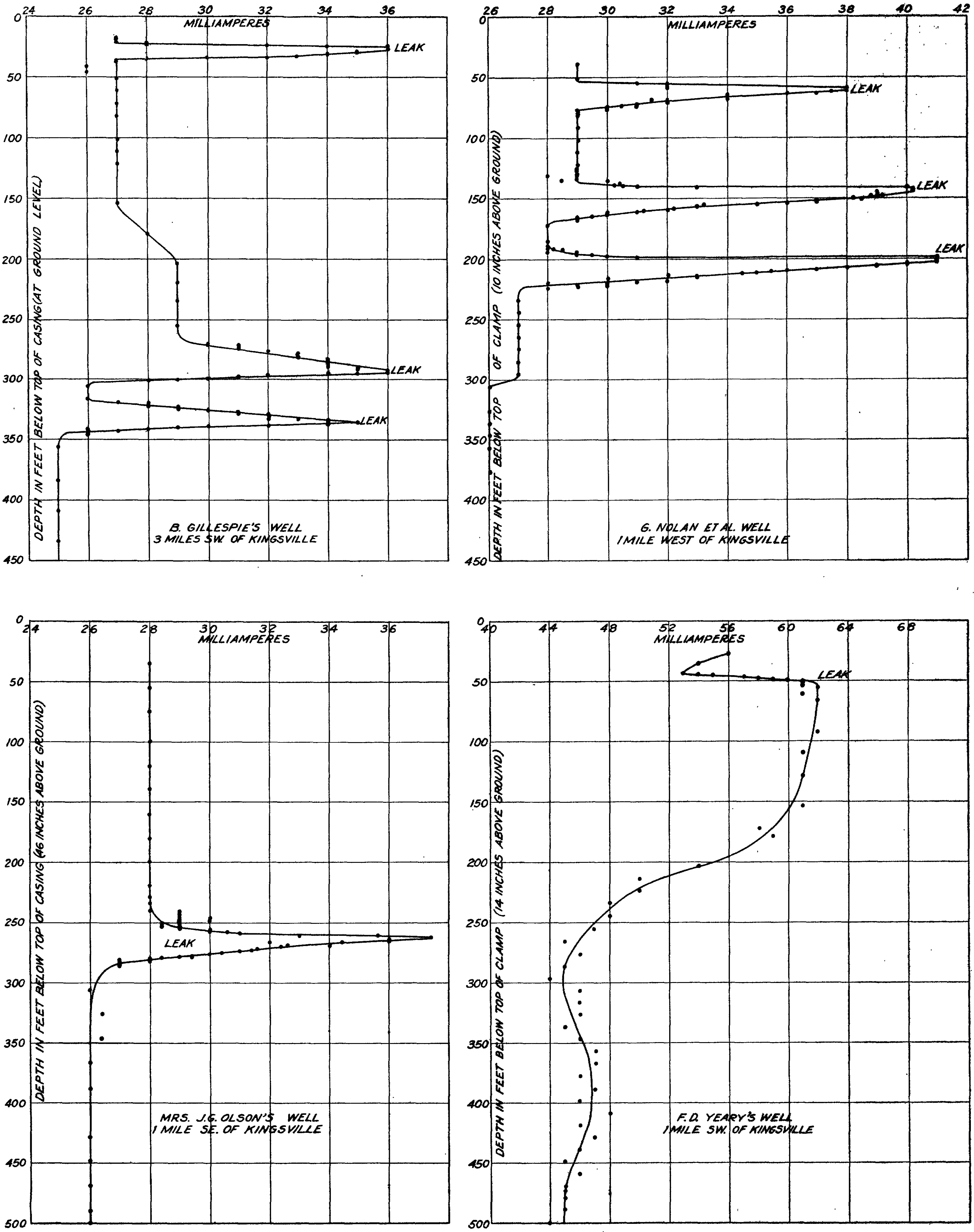
B. WELL 433 SHOWING EQUIPMENT FOR REDUCING DISCHARGE.



A. B.

C. D.

TYPICAL FLOWING WELLS FROM WHICH WATER IS PARTLY WASTED, KLEBERG COUNTY, TEX.



DIAGRAMS SHOWING LOCATION OF SALT-WATER LEAKS IN WATER WELLS AS DETERMINED BY ELECTRODES.

wells is prohibited by law in Texas (Revised Civil Statutes of Texas, vol. 2, 1925, pp. 2198-2200, articles 7600-7605, 7613-7615), and a penalty is provided for violation of the law. Every citizen should feel that it is his public duty to support this law. Moreover, the citizens should organize to prevent unwise overdevelopment in the future, either by means of existing laws or by new legislation.

WELL-DRILLING METHODS

The life of any well in this area depends upon the manner in which it was drilled, the kind of casing used in it, and the method employed in seating the casing. A properly constructed well provided with a casing of good grade should yield good water almost indefinitely. The corrosive action of salty water causes most of the leaks that develop in the casing. It follows, therefore, that when the well is constructed provision should be made to prevent salt water from coming into contact with the casing, so far as this is possible.

The following method of construction is suggested for protecting and cementing the casing. The well should be drilled nearly through the clay overlying the fresh-water sand with rotary tools at least 2 inches larger than the outside diameter of the casing collars. During the drilling the circulating mud should be kept as heavy as possible, and if it is necessary to lighten it, fresh water should be used. Before the casing is lowered into the well it should be cleaned with a wire brush and painted with a heavy asphaltic paint. Then it should be given three spiral wrappings with strips of light canvas, each wrapping followed by a coat of asphaltic paint. This is to prevent rocks from scratching through the asphaltic paint as the casing is lowered into the hole. It will be necessary at first to leave a small uncovered space at the ends of each length of pipe, so that it can be manipulated with the elevators and pipe tongs, but after the pipe is connected with the string and is ready to be lowered into the hole each joint should be carefully wrapped and painted.

The casing should be lowered in one solid string and suspended about 10 feet above the bottom of the hole while neat cement is pumped in at the bottom through a small pipe. After the cementing pipe has been removed the casing should be tightly capped and lowered to the bottom, thus forcing the cement around the outside of the casing. After the cement has set, the mud on the inside of the casing may be pumped out and the well drilled into the water-bearing sands. The screen may be placed in position separately so as to extend from the bottom of the water sand upward into the casing.

The use of cast-iron casing, which was introduced in this county a few years ago, is believed to represent a forward step. Cast-iron casing should add a great many years to the life of a well. In any event only first-class casing should be used, and the casing should be protected with paint, wrapping, and mud.

ACKNOWLEDGMENTS

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WELL RECORDS

The information concerning individual wells obtained during the studies in Kleberg County is presented in the following table. Nearly all the wells here listed obtain water from sands that belong either to the upper part of the Goliad sand or the lower part of the Lissie formation. The Goliad sand was formerly called the "Reynosa formation." Wells 28, 42, 69, 134, 406, 414, 416, 418, 419, 420, 421, and 424 derive water from wind-blown sand or the Beaumont formation.

The information regarding the depth of the well and size of the casing at different depths was obtained from many sources and for a few of the wells may be in error.

Records of wells in Kleberg County, Tex.

Wells on Santa Gertrudis ranch at King estate

[Year in which the well was completed; altitude of the measuring point (generally the top of the casing or top of the pump-pipe clamp); depth and diameter of the well; pressure head or level of the water, expressed in feet above or below the measuring point; date of measurement; method of lift; estimated yield, in gallons a minute; use that is made of the water; and chloride content and hardness, in parts per million as determined by field tests. The hardness was determined by the soap method and is expressed as calcium carbonate. See notes following this table for information as to the name or owner and the location of the well, the driller, and remarks. Abbreviations: H, hand pump; W, windmill; A, air lift; G, gas engine; D, domestic; S, stock; P, public supply; I, irrigation; Ind., industrial; R.R., railroad; N, not used.]

No.	Year	Altitude (feet)	Depth (feet)	Diameter (inches)	Water level: Feet	Water level: Date	Method of lift	Yield	Use	Chloride	Hardness
1	1931	......	490	1/ 7	-75.00	Feb. 7, 1933	W	.....	S	240	220
2	1931	......	505	5 3/16	-63.08	Dec. 9, 1932	W	10	S	210	190
3	....	......	...	1/ 7 1/2	.....	....	W	.....	S	490	310
4	....	......	...	1/ 5 3/8	-62.08	Dec. 9, 1932	W	5	S	560	420
5	....	......	...	6 3/4	-47.00	Dec. 8, 1932	W	10	S	510	350
6	....	......	480	......	.....	....	W	.....	S	...	...
7	....	......	506	......	.....	....	W	.....	S	...	...
8	....	......	...	6 3/4	-31.56	Dec. 8, 1932	W	10	S	280	190
9	....	......	614	12	-38.08	do.	W	10	S	250	170
10	....	......	...	10	-48.58	do.	W	10	S	280	210
11	....	......	480	5 3/16	-42.64	Feb. 7, 1933	W	.....	S	510	380
12	1924	......	625±	1/ 6 3/4	-51.41	Dec. 9, 1932	W	5	S	400	390
13	....	134.20	427	1/ 7 5/16	-45.16	do.	W	.....	S	230	290
14	....	......	587	5 3/16	-56.62	do.	W	5	S	430	380
15	....	113.89	567	1/ 7 5/16	-40.27	do.	W	5	S	270	200
16	1905	......	550	1/ 7	-42.69	do.	W	.....	S	280	220
17	....	100.00	...	6 5/8	.....	....	W	.....	D,S	280	170
18	1916	......	630	5 3/16	-42.24	Dec. 8, 1932	W	10	D,S	210	150
19	1914	98.57	663	6 5/8	-52.67	Jan. 5, 1933	W	.....	D,S	...	...
20	1916	......	680	6	.....	....	10 h.p. electric	45	D,S	280	150
21	1927	......	625	8	-49.20	Jan. 5, 1933	W	.....	D,S	...	...
22	1915	......	608	7 1/16	-48.16	do.	W	.....	D,S	...	...
23	1915	......	652	5 3/16	-47.44	do.	W	.....	S	240	150
24	1911	......	532	6 3/4	-28.08	Dec. 9, 1932	W	.....	S	200	150
25	....	......	575	5 3/16	-34.81	do.	W	5	S	220	280
26	1906	......	477	5 5/8	-31.24	Jan. 7, 1933	W	.....	S	150	190
27	....	......	...	1/ 9	-33.79	do.	W	.....	S	170	200
28	....	......	52±	1/ 5 1/2	-39.07	do.	W	.....	D,S	180	320
29	....	......	...	1/ 8 7/8	-32.11	do.	W	.....	S	210	190
30	....	......	...	7 1/4	-30.29	do.	W	.....	S	240	190
31	....	......	508	4 1/2	-30.55	Jan. 5, 1933	W	1	S	250	200
32	....	......	...	8 11/16	.....	....	W	3	S	250	160
33	....	......	...	6 1/2	.....	....	W	4	D,S	250	160
34	1906	93.21	727	30	-55.94	Dec. 7, 1932	W	.....	S	...	...
35	....	......	...	1/ 7	-31.53	Jan. 10, 1933	W	3	S	240	160
36	....	......	...	5 5/8	-27.24	do.	W	.....	S	210	190
37	1905	......	588	1/ 5 1/2	-13.80	do.	W	.....	S	190	210
38	....	......	1,203	5 3/4	-25.65	Jan. 7, 1933	W	.....	S	230	320
39	1906	......	608	1/ 5 5/8	-12.84	Jan. 10, 1933	W	5	S	220	260
40	....	......	...	1/ 5 1/2	-16.18	Jan. 9, 1933	W	.....	S	170	220
41	1914	......	465	1/ 7 1/4	-20.05	do.	W	.....	S	180	240
42	....	......	100	1/ 5 7/8	-21.37	do.	W	.....	D,S	430	920
43	....	......	...	1/ 4 5/8	-19.39	do.	W	.....	S	160	240
44	1904	......	475	1/ 7 1/4	-38.37	Jan. 7, 1933	W	.....	S	170	220
45	1904	......	410	1/ 5 3/4	-28.27	do.	W	.....	S	230	240
46	....	......	397	1/ 8 3/4	-30.72	do.	W	.....	D,S	240	250
47	....	......	402	1/ 7	-26.30	do.	W	.....	S	220	260
48	....	......	...	1/ 5 3/4	-30.55	Jan. 9, 1933	W	.....	S	190	240
49	....	......	630	1/ 7 1/8	-22.75	do.	W	.....	S	180	230
50	1906	......	474	1/ 7	-14.45	do.	W	.....	S	210	270
51	....	......	...	1/ 5 1/2	-17.30	do.	W	.....	S	190	200
52	....	......	619	5 3/16	-13.20	do.	W	.....	S	190	200
53	....	......	495	1/ 7 1/8	-14.70	do.	W	.....	S	170	240
54	....	......	...	1/ 5 5/8	-17.5	Jan. 10, 1933	W	.....	S	130	220
55	....	......	525	1/ 5 3/4	-12.30	do.	W	5	S	150	270
56	....	......	...	1/ 5 5/8	-15.84	do.	W	5	S	160	260
57	1917	......	707	1/ 5 1/2	- 2.62	do.	W	.....	S	200	240
58	....	......	591	1/ 7	-13.61	do.	W	.....	S	240	270
59	....	......	...	1/ 7 1/4	- 8.95	do.	W	.....	S	230	160
60	1904	......	685	1/ 7	.....	....	W	2/ 11	S	200	260
61	....	......	...	1/ 5 1/2	- 3.68	Jan. 10, 1933	W	.....	S	170	240
62	....	47.94	...	1/ 6 3/4	- 9.42	Jan. 11, 1933	W	.....	S	430	280
63	....	......	615	1/ 5 1/2	- 5.13	Jan. 10, 1933	W	.....	S	170	230
64	....	......	...	5 1/2	- 1.06	Jan. 11, 1933	...	.....	S	160	190
65	....	......	...	......	+ 7.0	do.	Flow	2/ 38	S	150	180
					Miscellaneous farm and town wells						
66	....	......	750±	1/ 5 1/2	.....	....	W	5	D,S	220	160
67	....	......	760±	6	.....	....	...	.....	N	...	...
68	....	......	...	1/ 5 3/4	.....	....	W	10	D,S	230	150
69	1928	......	32	6	.....	....	H	.....	D,S	25	270
70	About 1920	......	720±	4 1/2	-38.18	Dec. 15, 1932	W	5	D,S	250	180

1/ Outside diameter.
2/ Measured.

Records of wells in Kleberg County, Tex. - Continued

No.	Year	Altitude (feet)	Depth (feet)	Diameter (inches)	Water level: Feet	Water level: Date	Method of lift	Yield	Use	Chloride	Hardness
				Miscellaneous farm and town wells - Continued							
71	About 1905	.....	745	6	-43	Dec. 15, 1932	W	5	D,S	2,400	1,300
72	About 1904	.....	805	1/ 5 3/4	.....	....	A	.....	D,S	260	150
73	....	64.1	...	1/ 6 5/8	-33.26	Dec. 15, 1932	W	5	D,S	330	170
74	....	65.2	...	1/ 4 3/4	-31.96	do.	W	10	S	740	420
75	....	.....	805±	6	-34.50	do.	W	.....	D,S	280	150
76	....	.....	...	......	-23.00	Dec. 17, 1932	W	.....	S	280	110
77	About 1914	.....	600±	1/ 4 1/2	-26.22	do.	W	.....	D,S	700	800
78	....	.....	...	......	.....	....	W	.....	D,S	280	140
79	1904	71.6	630	8 1/4	-42.62	Dec. 15, 1932	W	8	D,S	230	150
80	1932	.....	634	1/ 5	-40.10	do.	W	10	D,S	230	150
81	....	.....	...	1/ 5 1/2	.....	....	...	.....	N	...	...
82	About 1903	.....	620	6	.....	....	...	.....	N	...	...
83	1926	.....	600±	6	-40.81	Dec. 7, 1932	...	.....	N	...	...
84	....	.....	...	5 3/16	-44.15	do.	W	.....	D,S	...	...
85	....	.....	626	......	.....	....	...	.....	N	...	...
86	....	.....	...	60	.....	....	...	.....	N	...	...
87	About 1901	.....	625	......	.....	....	...	.....	N	...	...
88	....	.....	...	......	-39.89	Dec. 18, 1932	W	10	D,S	790	480
89	About 1903	.....	...	......	.....	....	...	.....	N	...	...
90	1906	.....	...	......	.....	....	A	40	Ind.	450	270
91	1910	67.05	721	8 1/4	-46.9	Oct. 26, 1932	A	.....	P	240	230
92	1926	67.15	736	16	-47.6	do.	A	2/ 260	N	310	200
93	....	66.19	810	......	-48.72	do.	A	.....	P	240	220
94	....	.....	609	......	.....	....	...	.....	N	...	...
95	About 1925	.....	...	8	.....	....	...	400	R.R.	240	190
96	About 1918	.....	650±	......	-24.11	Dec. 7, 1932	...	.....	N	...	...
97	1909	.....	669	......	.....	....	...	.....	N	...	...
98	....	.....	600±	......	.....	....	...	.....	N	...	...
99	About 1906	.....	750±	1/ 5 1/2	.....	....	...	.....	N	...	...
100	....	.....	800±	1/ 5 1/2	-29.95	Dec. 16, 1932	W	.....	D,S	210	180
101	....	.....	610	......	.....	....	...	.....	N	...	...
102	....	.....	...	1/ 5 1/2	-32.62	Dec. 17, 1932	W	.....	D,S	500	740
103	....	.....	...	1/ 4 1/2	-28.76	do.	...	.....	N	...	...
104	About 1905	.....	628	1/ 5 1/2	.....	....	H	.....	D,S	850	950
105	....	55.64	...	1/ 5 1/2	-35	Dec. 16, 1932	W	5	D,S	500	440
106	....	51.85	640	1/ 5 1/2	-25.14	do.	W	.....	S	2,900	2,200
107	....	.....	...	1/ 5 3/4	......	....	W	.....	D,S	270	170
108	....	.....	760±	1/ 5 1/2	-23	Dec. 17, 1932	W	5	S	290	140
109	....	.....	...	4	-15.95	do.	W	1	D,S	270	180
110	About 1905	47.15	630	5	-18.44	do.	W	5	D,S	260	220
111	About 1905	50.70	640	5 3/4	-23.14	do.	W	.....	S	1,150	1,200
112	....	.....	800±	1/ 5 5/8	-32.08	Dec. 18, 1932	W	5	D,S	230	200
113	....	.....	760±	5 1/2	-33.18	Dec. 16, 1932	H	.....	D,S	800	870
114	....	.....	760±	1/ 5 1/2	.....	....	...	.....	N	...	...
115	....	.....	626	1/ 5 1/2	.....	....	...	.....	N	...	...
116	....	.....	...	1/ 5 1/2	.....	....	...	.....	N	...	...
117	....	.....	...	1/ 5 1/2	-36.70	Dec. 18, 1932	W	.....	I	250	150
118	....	.....	...	1/ 4 5/8	.....	....	W	5	D,S	260	210
119	....	.....	650±	1/ 5	-29.22	Dec. 18, 1932	W	5	D,S	4,000	4,000
120	....	.....	...	5 3/4	.....	....	W	.....	D,S	240	190
121	....	.....	780±	6	-36.29	Oct. 26, 1932	W	.....	D,S	510	410
122	....	.....	...	1/ 8 7/8	-23.54	Dec. 18, 1932	W	5	S	1,350	1,590
123	1913	.....	800±	1/ 5 5/8	-34.42	do.	W	.....	D,S	1,400	1,380
124	....	.....	...	.....	.....	do.	W	.....	D,S	320	200
125	....	.....	800±	.....	-29.86	Dec. 8, 1932	W	.....	D,S	400	360
126	1906	.....	...	.....	.....	....	W	.....	D,S	520	430
127	1932	58.0	661	4	-24.45	Nov. 30, 1932	W	.....	D,S	210	190
128	....	60.3	...	6	-36.10	Dec. 15, 1932	W	.....	N	7,500	4,700
129	....	.....	632	.....	-30	Jan. 4, 1933	W	5	D,S	3,000	6,800
130	....	.....	...	5 5/8	-31.72	do.	H	.....	S	10	80
131	....	.....	780±	7 1/4	-33.33	do.	W	.....	D,S	310	190
132	....	.....	...	4 1/2	-29.32	do.	W	.....	D,S	240	200
133	....	.....	780±	.....	-27.69	do.	W	.....	S	1,050	2,000
134	....	.....	650	5	.....	....	W	.....	D,S	340	300
135	....	.....	720±	5 1/2	-33.00	Jan. 4, 1933	...	2/ 2	D,S	760	2,300
136	....	.....	600±	5 1/2	- 8.48	Feb. 16, 1933	W	.....	D,S	310	240
137	....	.....	840±	6	-12.91	Jan. 4, 1933	W	.....	D,S	330	220
138	About 1909	.....	800±	1/ 5 1/2	-24.20	do.	A	.....	D,S,I	510	890
139	About 1907	.....	...	1/ 5 1/2	-34.28	Dec. 17, 1932	W	5	D,S	730	720
140	About 1906	.....	800±	1/ 5 1/2	.....	....	W	.....	D,S	220	190
141	About 1906	.....	800±	1/ 6	-29.84	Dec. 16, 1932	W	.....	D,S	210	190
142	1907	.....	800±	1/ 5 1/2	-24	Jan. 4, 1933	W	10	D,S	240	180
143	1912	.....	800±	1/ 5 1/2	.....	....	W	5	S	1,400	1,400
144	About 1912	.....	786±	1/ 5 3/4	-23.42	Dec. 16, 1932	W	2	D,S	210	190
145	About 1928	.....	600±	4	.....	....	W	.....	D,S	230	240
146	....	.....	780±	.....	.....	....	W	.....	D,S	25	120
147	....	.....	720±	1/ 5 1/2	-21.48	Jan. 4, 1933	W	.....	D,S	230	160
148	About 1920	.....	...	.....	.....	....	W	.....	D,S	250	180
149	....	.....	...	1/ 5 1/2	-14.99	Jan. 6, 1933	W	.....	D,S	230	160
150	....	.....	...	1/ 5 5/8	- 7.32	do.	W	.....	D,S	350	200

1/ Outside diameter.
2/ Measured.

Records of wells in Kleberg County, Tex. - Continued

No.	Year	Altitude (feet)	Depth (feet)	Diameter (inches)	Water level Feet	Water level Date	Method of lift	Yield	Use	Chlo-ride	Hard-ness
						Miscellaneous farm and town wells - Continued					
151	....	.....	...	5 1/4	-16.83	Jan. 6, 1933	W	.....	D,S	230	140
152	1908	.....	702	1/5 3/4	.....	....	W	.....	D,S	260	210
153	....	.....	520	6	-21.00	Dec. 20, 1932	W	.....	D,S	...	...
154	....	.....	700±	1/4 5/8	-19.80	Jan. 6, 1933	W	.....	D,S	270	200
155	About 1917	.....	625±	1/4	-17.95	do.	W	.....	D,S	270	230
156	....	.....	...	1/5 3/4	-21.41	Dec. 17, 1932	H	.....	N	...	...
157	....	.....	800±	......	.....	....	...	.....	N	...	...
158	....	.....	712±	1/5 3/4	.....	....	W	.....	D,S	220	200
159	....	.....	800±	1/5 5/8	-17.17	Jan. 6, 1933	W	.....	S	260	130
160	....	.....	804	5 3/16	.....	....	W	.....	S	160	150
161	....	.....	712±	5	.....	....	W	.....	D,S	230	240
162	1908	.....	709	5 3/16	.....	....	...	.....	N	...	...
163	....	.....	...	6	-15.33	Dec. 20, 1932	W	.....	D,S	230	200
164	About 1914	.....	800±	5	.....	....	...	.....	N	...	...
165	1911	.....	616	1/6 1/4	-14.95	Jan. 6, 1933	W	.....	D,S	270	180
166	....	.....	...	.....	.....	....	...	.....	N	...	...
167	....	.....	...	7 1/2	-10.20	Jan. 6, 1933	H	.....	D,S	340	180
168	....	.....	711	.....	-16.15	do.	W	.....	D,S	260	170
169	1929	.....	580	1/4 1/2	-28.40	do.	W	.....	D,S	240	200
170	About 1916	.....	600±	1/5 3/4	-27.20	do.	W	.....	D,S	290	140
171	About 1910	.....	750±	1/5 1/4	-17.55	do.	W	.....	D,S	540	180
172	....	.....	...	1/5 3/8	-15.14	Feb. 4, 1933	W	.....	D,S	250	200
173	1928	.....	810	1/4 1/2	- 1.27	do.	...	.....	N	...	...
174	About 1928	.....	362	1/5 3/4	-13.77	do.	W	.....	D,S	230	210
175	....	.....	...	1/5 3/4	+	Jan. 6, 1933	G,flow	2/18	Ind.	430	120
176	About 1926	.....	570±	1/4 3/4	-16.54	do.	W	.....	D,S	270	180
177	1912	.....	711	5	-16.85	Feb. 4, 1933	W	.....	D,S	250	200
178	....	.....	700±	.....	.....	....	W	.....	D,S	240	200
179	....	.....	600±	1/7 3/4	-14.75	Feb. 4, 1933	H	.....	D,S	240	160
180	....	.....	500±	5	+	Oct. 26, 1933	Flow	50	D,S	250	180
181	1909	.....	804	5 3/16	+	Jan. 5, 1933	Flow	.....	D,S	380	240
182	1930	.....	656	4	-14.04	Oct. 26, 1933	W	.....	D,S	200	170
183	....	.....	804	5 1/2	-12.00	Jan. 5, 1933	W	.....	D,S	230	140
184	....	.....	...	......	.....	....	W	.....	D,S	220	200
185	....	.....	...	4 3/4	+	Jan. 5, 1933	Flow	14	D,S	220	160
186	....	.....	650±	1/4 5/8	-17.90	Jan. 4, 1933	W	.....	D,S	230	170
187	....	.....	...	......	.....	....	A	.....	D,S,I	250	180
188	....	58.20	...	......	-18.92	Dec. 8, 1932	W	.....	D,S	220	210
189	....	.....	780±	......	.....	....	W	.....	D,S	210	220
190	1927	55.68	600±	5 1/4	-15.20	Feb. 25, 1933	W	.....	D,S	190	160
191	1912	.....	800±	......	.....	....	E	.....	...	210	190
192	1928	.....	850±	......	.....	....	W	.....	S	230	190
193	1912	.....	900±	4 1/2	-18.0	Mar. 22, 1933	W	.....	D,S	1,100	1,390
194	....	.....	780±	......	.....	....	W	.....	D,S	320	310
195	....	.....	712	......	.....	....	W	.....	D,S	200	190
196	1906	.....	893	......	.....	....	W	.....	D,S	170	170
197	1928	.....	685	4 1/2	.....	....	W	.....	D,S	670	870
198	1915	.....	900±	5 3/16	-33.50	Dec. 9, 1932	W	.....	S	7,000	8,200
199	1924	.....	700±	4 1/2	.....	....	W	.....	D,S	160	150
200	1925	.....	606	4	.....	....	W	.....	D,S	210	220
201	1929	.....	583	4 1/2	-27.62	Dec. 9, 1932	W	.....	D,S	440	360
202	....	.....	...	......	-18.73	do.	W	.....	D,S	240	340
203	1924	.....	576	4 1/4	.....	....	W	.....	D,S	4,000	2,900
204	1914	.....	600±	5 1/2	.....	....	W	.....	D,S	250	330
205	....	.....	600±	5	.....	....	W	.....	D,S	400	330
206	....	.....	...	6 5/8	.....	....	W	.....	D,S	160	200
207	1925	.....	611	4 1/2	-16.14	Dec. 16, 1932	W	.....	D,S	2,300	1,400
208	1924	.....	600±	5 1/2	.....	....	W	.....	D,S	850	900
209	1915	.....	640±	5 9/16	.....	....	W	.....	S	1,000	950
210	1926	.....	300±	4	-13.73	Feb. 14, 1933	W	.....	S	2,900	3,600
211	1929	.....	608	4 1/2	.....	....	H	.....	D,S	150	140
212	....	.....	...	4 1/2	.....	....	W	.....	S	270	150
213	1929	.....	620	4 1/2	.....	....	W	.....	S	170	190
214	1920	.....	...	4 1/2	.....	....	W	.....	S	850	890
215	1912	.....	600±	......	.....	....	W	.....	S	170	170
216	....	.....	...	5 3/4	.....	....	H	.....	S	210	170
217	....	54.2	812	6	-12.50	Jan. 5, 1933	H	.....	S	290	110
218	1925	.....	600±	4 1/2	-10.74	do.	W	.....	S	230	150
219	About 1910	51.6	700±	5 1/2	-10.34	do.	G	.....	D,S,I	260	150
220	1928	.....	600-	4 1/2	.....	....	...	.....	N	...	...
221	....	.....	...	6	-13.08	Jan. 4, 1933	W	.....	D	250	160
222	....	.....	...	......	-22.05	Jan. 6, 1933	H	.....	N	...	...
223	1908	.....	800±	......	.....	....	...	.....	N	...	...
224	....	.....	...	4 1/2	-16.76	Dec. 18, 1932	W	.....	D,S	250	140
225	....	.....	800±	7	-31	Jan. 4, 1933	W	.....	S	220	160

1/ Outside diameter.
2/ Measured.

Records of wells in Kleberg County, Tex. - Continued

No.	Year	Altitude (feet)	Depth (feet)	Diameter (inches)	Water level Feet	Water level Date	Method of lift	Yield	Use	Chlo-ride	Hard-ness
						Miscellaneous farm and town wells - Continued					
226	1925	.....	818	4 1/2	-35.80	Jan. 4, 1933	W	.....	S	390	190
227	....	.....	700±	4 1/2	-22	do.	W	.....	S	250	160
228	....	59.9	...	5 3/4	-17.75	Dec. 20, 1932	W	.....	S	250	220
229	1912	.....	800±	5 3/16	.....	....	W	.....	S	1,000	1,900
230	....	.....	780±	5 1/2	-14.52	Jan. 6, 1933	W	.....	S	220	140
231	....	.....	...	4 1/2	.....	....	W	.....	S	230	140
232	1930	.....	665	4 1/2	-14.83	Jan. 7, 1933	W	.....	S	260	170
233	....	.....	...	5 1/2	.....	....	W	.....	S	260	140
234	....	.....	900±	5 1/2	-35.52	Jan. 5, 1933	W	.....	D,S	230	190
235	....	.....	800±	.....	-22.20	Jan. 7, 1933	H	.....	D,S	250	120
236	....	.....	800±	.....	-30.90	do.	H	.....	D,S	230	120
237	1914	.....	800±	.....	-21.43	Jan. 6, 1933	W	.....	D,S	250	140
238	1931	.....	607	5	- 3.62	do.	W	.....	D,S	240	70
239	1924	.....	600±	4 1/2	-29.18	do.	W	.....	D,S	240	120
240	1932	.....	710	4 1/2	.....	do.	W	.....	D,S	220	130
241	....	.....	800+	4 1/2	.....	....	W	.....	D,S	220	130
242	....	.....	...	5 1/2	+ 8.1	Jan. 10, 1932	Flow	2/ 43	D,S	220	190
243	....	.....	620±	.....	.....	....	W	.....	D,S	250	100
244	....	.....	760±	.....	- 9.62	Jan. 6, 1933	W	.....	D,S	310	110
245	....	.....	780±	5 1/2	- 1.79	Jan. 9, 1933	W	.....	D,S	240	130
246	....	.....	...	4 1/2	- 2.05	do.	W	.....	D,S	350	130
247	....	.....	...	.....	.....	....	W	.....	D,S	700	240
248	....	.....	600±	4 1/2	.....	....	W	.....	D,S	230	180
249	....	.....	665	5 1/4	.....	....	W	.....	D,S	460	130
250	....	.....	880±	4 1/2	+ 5.8	Jan. 10, 1933	Flow	2/ 19	D,S	220	190
251	1910	.....	835	6	+	Jan. 9, 1933	W,Flow	2	D,S	240	220
252	1912	.....	...	6	+ 3.5	do.	W,Flow	2/ 12	D,S	190	130
253	....	.....	...	4 1/2	- .54	Jan. 7, 1933	W	.....	D,S	270	160
254	1920	.....	863	4 1/2	- 4.68	do.	W	.....	D,S	250	170
255	1930	.....	715	5	- 6.07	do.	H	.....	D,S	210	140
256	....	52.9	800±	5 1/2	-12	do.	W	.....	D,S	210	200
257	1917	53.2	800±	5 1/2	-10.70	Dec. 17, 1933	W	.....	D,S	1,300	800
258	1925	.....	576	4 1/2	-11.67	Dec. 17, 1932	W	.....	D,S	390	270
259	1906	.....	643	5 9/16	.....	....	W	.....	D,S	3,400	4,000
260	....	.....	...	5 1/2	-10.48	Dec. 17, 1932	W	.....	D,S	230	280
261	1924	.....	574	4 1/2	-14.45	Dec. 16, 1932	W	.....	D,S	190	210
262	1929	.....	608	5	-12.50	do.	W	.....	D,S	150	200
263	....	.....	...	5 3/4	.....	....	W	.....	D,S	140	220
264	....	.....	...	4 3/4	- 9.58	Dec. 17, 1932	W	.....	D,S	290	240
265	....	.....	950±	5 3/4	.....	....	W	.....	D,S	470	350
266	....	.....	...	5 1/2	.....	....	W	.....	D,S	180	240
267	....	.....	...	5 3/4	.....	....	W	.....	D,S	440	260
268	....	.....	...	.....	.....	....	W	.....	D,S	370	240
269	....	.....	960±	.....	- 8.63	Feb. 16, 1933	W	.....	D,S	1,100	800
270	....	.....	...	5 9/16	.....	....	W	.....	D,S	280	200
271	1913	48.81	808	5 1/2	- 3.05	Dec. 20, 1932	W	.....	D,S	360	320
272	....	47.12	...	5	- 5.12	do.	W	.....	D,S	210	280
273	....	44.87	...	5 1/2	- 3.47	do.	H	.....	D,S	250	230
274	....	.....	...	5 1/2	.....	do.	W	.....	D,S	200	200
275	1912	42.4	900±	6	- 2.00	Jan. 7, 1933	W	.....	D,S	180	220
276	....	.....	...	5 1/2	+	do.	W,Flow	.....	D,S	200	170
277	1910	.....	800±	6	+	Jan. 9, 1932	W,Flow	.....	D,S	350	190
278	....	47.7	...	5	- 7.53	Jan. 11, 1933	W	.....	D,S	800	350
279	....	43.5	670±	1/ 5 3/4	-14.98	do.	W	.....	D,S	6,700	6,800
280	1928	46.1	600±	1/ 4 1/2	- 6.77	do.	W	.....	D,S	250	190
281	....	40.3	680	1/ 7	- 1.65	do.	W	.....	D,S	250	220
282	....	39.75	520±	1/ 7	- .85	do.	W	.....	D,S	310	230
283	1929	41.35	688±	1/ 4 3/4	- 2.17	do.	W	.....	D,S	360	200
284	....	.....	...	.....	+	Jan. 17, 1932	H,Flow	1	D,S	210	240
285	....	.....	...	5 1/2	+	do.	Flow	5	D,S	220	200
286	....	.....	...	5 1/2	+	do.	H	1	D,S	430	320
287	1913	.....	745±	3 1/2	+	do.	Flow	4	D,S	460	260
288	1914	.....	750	.....	+	do.	Flow	5	D,S	230	160
289	1927	.....	700±	4	+	do.	W	1	D,S	440	240
290	1913	.....	819	4 1/2	- 4.48	Jan. 16, 1933	W	.....	D,S	230	200
291	....	.....	...	7	+	Jan. 15, 1933	Flow	2	S	210	200
292	....	.....	900±	5	+ 2.2	Jan. 16, 1933	Flow	2/ 7	D,S	250	190
293	1915	.....	850±	4 1/2	+ 2.7	Jan. 17, 1933	Flow	4	D,S	270	160
294	1909	.....	...	6	- 4.52	do.	G	.....	D,S	210	160
295	....	.....	...	4 1/2	- .03	Jan. 16, 1933	H	1	D,S	280	190
296	1914	.....	860±	4 1/4	.....	do.	W	.....	D,S	260	200
297	1914	.....	884	4 1/2	- 6.30	Jan. 10, 1933	W	.....	D,S	220	200
298	1916	.....	800±	7	- 2.90	do.	W	.....	D,S	240	240
299	1915	.....	900±	4 1/2	-11.10	do.	W	.....	D,S	240	200
300	1913	.....	886	4 1/2	+	do.	Flow	10	D,S	270	170

1/ Outside diameter.
2/ Measured.

Records of wells in Kleberg County, Tex. - Continued

No.	Year	Altitude (feet)	Depth (feet)	Diameter (inches)	Water level: Feet	Water level: Date	Method of lift	Yield	Use	Chloride	Hardness
					Miscellaneous farm and town wells - Continued						
301	1914	.....	882	4 1/4	+	Jan. 10, 1933	Flow	2/ 33	D,S	280	200
302	1914	.....	875±	.....	- 2.44	do.	H	.....	D,S	320	270
303	1914	.....	900±	4 1/4	+ 1.5	do.	Flow	2/ 16	D,S	270	200
304	1913	.....	900±	5	+	Jan. 15, 1933	W,Flow	.....	D,S	270	240
305	....	.....	...	5 1/2	- 3.74	Jan. 16, 1933	H	.....	N	450	140
306	....	.....	...	.....	.....	....	W	.....	D,S	280	200
307	....	.....	800+	4 1/2	- 4.38	Jan. 16, 1933	H	.....	S	1,300	800
308	....	.....	...	5 1/2	+ 6.0	Jan. 15, 1933	Flow	2/ 38	D,S	260	230
309	....	.....	...	.....	+ 7.5	Jan. 11, 1933	Flow	.....	D,S	280	220
310	1915	.....	854	4 1/2	+ 8.2	Feb. 20, 1933	Flow	2/ 50	D,S	280	150
311	....	.....	850±	4 1/2	+	Jan. 1, 1933	Flow	2/ 19	D,S	300	200
312	....	.....	850±	.....	+ 7.0	do.	Flow	2/ 38	D,S	370	240
313	1919	.....	800±	4 1/2	+ 9.0	Jan. 15, 1933	Flow	.....	D,S	290	190
314	....	.....	...	5 1/2	+ 4.0	do.	Flow	2/ 15	D,S	300	170
315	1915	.....	910±	7	.....	....	W	.....	D,S	310	200
316	1915	.....	859±	5 1/2	+ 7.6	Jan. 11, 1933	Flow	2/ 33	D,S	310	210
317	1914	.....	865	4 1/2	+ 5.3	Jan. 15, 1933	Flow	2/ 20	D,S	260	140
318	1912	.....	875	.....	.....	....	W	.....	D,S	290	180
319	1914	.....	905	4 1/4	.....	....	W	.....	D,S	340	250
320	....	.....	...	.....	-21.20	Jan. 16, 1933	W	.....	D,S	490	240
321	1912	.....	800±	4 1/2	.....	....	W	.....	D,S	250	180
322	....	.....	...	6	- .86	Jan. 16, 1933	W	.....	D,S	270	210
323	....	.....	...	.....	.....	....	W	.....	S	260	140
324	....	.....	...	6	- 2.20	Jan. 17, 1933	W	.....	D,S	230	200
325	....	.....	...	5	- 4.23	Jan. 19, 1933	...	.....	N	...	...
326	1910	.....	...	5 1/2	+	Jan. 17, 1933	W,Flow	2	D,S	240	200
327	....	.....	...	5 1/2	+	Jan. 19, 1933	Flow	10	D,S	200	120
328	....	.....	...	.....	.....	....	H	.....	D,S	210	140
329	....	.....	...	.....	.....	....	W	.....	D,S	220	220
330	....	.....	...	5	.....	....	H	.....	D,S	240	120
331	....	.....	700±	.....	.....	....	H	.....	D,S	210	140
332	....	.....	...	53	-17.45	Jan. 19, 1933	...	.....	N	...	...
333	....	.....	599	4 1/2	+ 1.2	do.	Flow	4	D,S	190	160
334	....	.....	...	.....	.....	....	W	.....	D,S	190	180
335	About 1926	.....	710±	1/ 4 1/2	- .70	Jan. 11, 1933	W	.....	D,S	350	240
336	....	.....	...	5	.....	....	...	.....	N	...	...
337	....	46.8	...	1/ 5 3/4	-10.71	Jan. 11, 1933	H	.....	D,S	190	180
338	1928	44.26	676	1/ 5 1/8	- 3.55	do.	W	.....	D,S	330	240
339	1907	42.10	717	1/ 7	- 4	do.	W	.....	D,S	190	160
340	About 1916	39.82	783	5 3/16	.....	....	W	.....	P	410	230
341	....	.....	...	.....	.....	....	W	.....	D,S	170	180
341a	1906	.....	600	4 1/4	+	Mar. 22, 1933	Flow	2/ 47	S	120	170
341b	1927	.....	650±	5 3/16	+ 2.4	do.	W	.....	D,S	150	140
341c	1926	.....	652	5 3/16	+	....	Flow	5	S	...	...
342	....	.....	...	.....	.....	....	W	.....	D,S	210	170
343	....	.....	...	.....	- 3.00	Jan. 20, 1933	H	.....	S	200	110
344	....	.....	...	4 1/2	+	do.	Flow	2/ 5	D,S	190	140
345	....	.....	...	5	+	Jan. 19, 1933	W	.....	D,S	190	130
346	1915	.....	900±	6	.....	....	H	.....	D,S	210	120
347	....	.....	800±	6	.....	....	W	.....	D,S	210	150
348	....	.....	...	.....	+	Jan. 19, 1933	W,Flow	.....	D,S	200	140
349	....	.....	720	4 1/2	+	do.	Flow	2	D,S	200	130
350	....	.....	...	5 1/4	+	Jan. 20, 1933	Flow	6	D,S	200	130
351	....	.....	...	4 1/4	+	do.	Flow	12	D,S	210	120
352	....	.....	...	4 1/4	+	....	Flow	.....	D,S	200	130
353	....	.....	813	5 3/16	+	Jan. 20, 1933	W,Flow	.....	D,S	220	120
354	....	.....	760±	4 1/2	+	do.	Flow	11	D,S	210	120
355	....	.....	...	5 1/2	+	do.	Flow	.....	D,S	440	540
356	....	.....	...	4 1/2	+	do.	W,Flow	.....	D,S	250	140
357	....	.....	...	5 3/4	.....	....	H	.....	D,S	250	160
358	....	.....	...	8	+	Feb. 4, 1933	Flow	.....	D,S	950	480
359	1913	.....	800±	4 1/4	+	do.	Flow	.....	D,S	240	160
360	1913	.....	800±	4 1/2	- 9.56	do.	W	.....	D,S	270	180
361	1912	.....	945	4 1/2	+	do.	Flow	4	D,S	330	200
362	1910	.....	900±	5 3/16	-16.08	do.	W	.....	D,S	270	190
363	....	.....	...	.....	.....	....	...	.....	N	...	...
364	....	.....	1,000±	.....	-10.65	Feb. 4, 1933	W	.....	D,S	330	330
365	1929	.....	1,000±	4 1/4	+ 5.8	do.	Flow	2/ 11	D,S	710	410
366	1910	.....	...	5 3/16	+ 7.0	do.	Flow	2/ 17	D,S	290	200
367	....	.....	764	6 1/2	+	Feb. 6, 1933	Flow	.....	D,S	290	160
368	....	.....	...	4 1/4	+	do.	Flow	2/ 12	D,S	300	160
369	....	.....	...	.....	+	Feb. 4, 1933	Flow	25	D,S	300	160
370	....	.....	...	6	+	Feb. 6, 1933	Flow	.....	D,S	310	180
371	....	.....	...	5 3/16	.....	....	...	.....	D,S	320	160

1/ Outside diameter.
2/ Measured.

Records of wells in Kleberg County, Tex. - Continued

No.	Year	Altitude (feet)	Depth (feet)	Diameter (inches)	Water level		Method of lift	Yield	Use	Chloride	Hardness
					Feet	Date					
					Wells on Laureles ranch						
372	1927	53.90	750	5 3/16	-22.37	Dec. 15, 1932	W	10	S	920	480
373	....	.....	...	1/ 5 5/8	-21.26	Jan. 12, 1933	W	5	S	300	130
374	....	53.46	852	1/ 10 1/2	-30.89	do.	W	2/ 20	S	330	200
375	....	37.87	1,035	1/ 7	- 7.52	do.	W	.....	S	340	170
376	....	.....	1,050	6 5/8	-21	do.	W	.....	D,S	310	200
377	....	.....	...	7	-19	Jan. 13, 1933	W	.....	S	330	110
378	....	.....	...	5 5/8	-12.87	do.	W	5	S	290	130
379	....	.....	...	1/ 7	+	do.	W,Flow	3	S	370	130
380	....	.....	...	6 3/4	-13.44	do.	W	.....	S	270	120
381	1913	.....	945	6 5/8	-18.64	do.	W	.....	S	310	160
382	....	.....	...	1/ 8 3/4	- 4.42	do.	W	.....	S	330	120
383	....	.....	...	7	- 5.24	Jan. 27, 1933	W	.....	S	410	170
384	....	34.64	...	7 1/4	-17.98	Jan. 19, 1933	W	.....	S	520	700
385	1917	34.32	909	6 5/8	- 2.96	do.	W	.....	S	400	140
386	....	34.99	945	7 1/4	.....	do.	W	.....	S	450	80
387	....	.....	928	1/ 5 5/8	+ 4.35	Jan. 27, 1933	Flow	.....	S	450	100
388	....	.....	...	7	+	....	W,Flow	5	S	370	100
389	....	.....	...	5	- 2.49	Jan. 13, 1933	W	.....	S	370	100
390	....	.....	913±	6	-10.34	do.	W	.....	S	340	160
391	1911	.....	982	1/ 7 1/4	+	Jan. 19, 1933	W,Flow	5	S	270	40
392	....	.....	982±	1/ 7 1/8	+ 1.61	do.	Flow	5	S	310	120
393	....	.....	913	1/ 5 1/2	- 2	Jan. 20, 1933	W	8	S	460	460
394	1916	.....	1,063	1/ 7	+	do.	W,Flow	8	D,S	400	120
395	....	.....	...	1/ 5 1/2	- 3.55	do.	W	.....	S	510	330
396	....	.....	...	5 3/16	+ 8.5	Jan. 26, 1933	Flow	2/ 26	S	370	120
397	....	.....	...	1/ 4 3/4	+11.5	Jan. 20, 1933	Flow	2/ 23	S	380	110
398	....	.....	1,051	1/ 4 1/2	+ 4.08	Jan. 26, 1933	Flow	.....	S	590	300
399	1916	.....	1,206	1/ 7	+ 4.08	do.	Flow	2/ 14	S	460	100
400	....	.....	...	1/ 6	- 2.50	do.	W	.....	S	530	120
401	....	.....	1,290	1/ 5 3/4	+10.8	do.	Flow	2/ 19	S	560	120
402	....	.....	1,206	1/ 7 3/8	+ 5.05	Jan. 20, 1933	Flow	.....	S	440	90
403	....	.....	...	1/ 5 1/2	+ 8.50	Jan. 27, 1933	Flow	.....	S	560	130
404	....	.....	1,240	1/ 7	- 2.42	do.	W	.....	S	660	120
405	....	.....	1,020	1/ 5 1/2	+ 3.75	do.	Flow	.....	S	720	130
406	....	.....	100-	1/ 5 3/8	-23.30	Jan. 28, 1933	W	.....	D,S	310	4,000
407	....	14.56	1,200±	.....	+ 9.79	Jan. 19, 1933	Flow	2/ 27	S	440	70
408	....	.....	...	1/ 7	+ 5.45	Jan. 27, 1933	Flow	5	S	480	80
409	1900	.....	998	7	+	....	W,Flow	.....	D,S	550	90
410	....	.....	...	5 1/2	+ 4.35	Jan. 27, 1933	Flow	.....	S	750	120
411	....	.....	...	.....	.....	....	W,Flow	.....	S	700	120
412	....	.....	1,185	1/ 5 1/2	+ 4.21	Jan. 18, 1933	Flow	.....	S	800	150
413	....	22.96	1,150	5 5/16	+ 2.75	Jan. 17, 1933	Flow	.....	S	950	240
414	....	.....	40±	1/ 6 3/4	-13.15	do.	W	10	S	1,100	320
415	....	.....	140±	1/ 6	-35	do.	W	10	S	1,000	280
416	....	.....	46±	1/ 5	- 3	do.	W	.....	S	2,700	1,600
417	....	.....	150±	1/ 6 5/8	.....	....	W	.....	S	1,200	480
418	....	.....	90±	1/ 6 7/8	-35.45	Jan. 18, 1933	W	2	S	1,900	1,400
419	....	.....	50±	1/ 6 5/8	- 9	do.	W	.....	S	230	320
420	....	.....	100±	1/ 6 1/2	-20	do.	W	2	S	320	450
421	....	.....	...	1/ 5 3/4	.....	....	W	.....	S	750	1,040
422	1929	.....	1,276	6 5/8	.....	....	W	.....	S	810	250
423	1927	.....	1,310	5 3/16	+	....	W,Flow	.....	S	960	1,080
424	....	.....	50±	1/ 5 5/8	-21.18	Jan. 18, 1933	W	.....	S	300	330
425	....	.....	...	6	+ 8.58	do.	Flow	.....	S	830	180
426	1915	.....	1,240	6	+13.90	do.	Flow	.....	S	700	240
427	1929	.....	1,331	8 1/4	+15.25	Jan. 25, 1933	Flow	2/ 43	S	640	130
428	....	.....	...	7	+	....	Flow	.....	S	...	...
429	1929	26.19	1,435	8 1/2	+ 1.98	Jan. 25, 1933	Flow	2/ 7	S	1,000	240
430	1930	15.38	1,475	6 5/8	+ 9.1	do.	Flow	2/ 17	S	850	130
431	1915	.....	1,396	7	+13.6	do.	Flow	.....	S	700	90
432	....	.....	...	1/ 5 1/2	+	do.	Flow	.....	S	1,800	2,100
433	1929	.....	1,295	8 1/4	+15.4	do.	Flow	2/ 43	S	560	80
434	1928	.....	1,212	6 5/8	+12.45	do.	Flow	2/ 33	S	490	100

1/ Outside diameter.
2/ Measured.

Name or owner and the location of the well, the driller, and remarks

Wells on Santa Gertrudis ranch of King estate

1. El Burro, 10 miles northwest of ranch headquarters. R. J. Mills, driller. Casing: 394 feet of 7-inch, 86 feet of smaller size.
2. Chivo, 10½ miles northwest of ranch headquarters. R. J. Mills, driller.
3. Presa del Rio (?), 9¼ miles northwest of ranch headquarters. R. J. Mills, driller.
4. Palo Lobo, 7½ miles northwest of ranch headquarters. R. J. Mills, driller.
5. Morgan, 8 miles northwest of ranch headquarters. Morgan-Miller, drillers.
6. Creek Pasture, 7¼ miles north-northwest of ranch headquarters. A. B. Fuller, driller.
7. Homer, 6½ miles north of ranch headquarters. A. B. Fuller, driller. Formerly known as "Homer well"; reported flow (prior to 1907) 50 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
8. Cola Blanco, 6 miles north-northeast of ranch headquarters. H. C. McGavit, driller.
9. Lower Little Pasture, 3¼ miles north-northeast of ranch headquarters. R. J. Mills, driller.

Records of wells in Kleberg County, Tex. - Continued

Name or owner and the location of the well, the driller, and remarks - Continued

Wells on Santa Gertrudis ranch of King estate - Continued

10. Little Mill, 4 miles north-northwest of ranch headquarters. R. J. Mills, driller.
11. Los Cerritos, 4½ miles northwest of ranch headquarters. Tom Leary, driller. Formerly known as "Indios well"; reported flow (prior to 1907) 100 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
12. Papalote Blanco, 8 3/4 miles northwest of ranch headquarter. R. J. Mills, driller.
13. Tamales, 8 miles west-northwest of ranch headquarters. King Machine Co., driller. Formerly known as "Conchas well"; reported flow (prior to 1907) 30 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
14. Mota Negros, 6½ miles northwest of ranch headquarters. R. J. Mills, driller. Casing: 403 feet of 5 3/16-inch, 200 feet of 4¼-inch.
15. Pureta, 5 miles northwest of ranch headquarters. R. J. Mills, driller.
16. Murta, 2 miles north-northwest of ranch headquarters. R. J. Mills, driller.
17. Austin, 1 mile northwest of ranch headquarters. R. J. Mills, driller.
18. Douglas, 1 3/4 miles northeast of ranch headquarters. R. J. Mills, driller. Casing: 470 feet of 5 3/16-inch, 185 feet of 4¼-inch.
19. Headquarters. R. J. Mills, driller. 452 feet of casing.
20. Headquarters. R. J. Mills, driller. Casing: 505 feet of 6-inch, 190 feet of 5 3/16-inch.
21. Dairy No. 1, 1 mile west of ranch headquarters. Geo. Hollimon, driller. Principal water-bearing bed at 520 to 525 feet.
22. Dairy No. 2, 1 mile west of ranch headquarters. R. J. Mills, driller.
23. Caldero, 2¼ miles west-southwest of ranch headquarters. Casing: 480 feet of 5 3/16-inch, 172 feet of 4½-inch.
24. Tulosa, 4¼ miles west-southwest of ranch headquarters. R. J. Mills, driller.
25. Los Maronos (?), 7 3/4 miles west of ranch headquarters. R. J. Mills, driller. Casing: 405 feet of 5 3/16-inch, 205 feet of 4¼-inch.
26. Cabeza Chica, 8½ miles west-southwest of ranch headquarters. R. J. Mills, driller.
27. Cabeza Center, 9 miles southwest of ranch headquarters. R. J. Mills, driller. Also 7½-inch casing.
28. Rawlinson, 8 3/4 miles southwest of ranch headquarters.
29. Anagua, 6¼ miles southwest of ranch headquarters. R. J. Mills, driller.
30. Cowell, 3 3/4 miles southwest of ranch headquarters. R. J. Mills, driller. Also 5 5/8-inch casing.
31. Liberty, 2 miles south of ranch headquarters. R. J. Mills, driller.
32. Plomo No. 1, 1 mile southeast of ranch headquarters. H. C. McGavit, driller. Also 5 3/4-inch casing.
33. Plomo No. 2, 1 mile southeast of ranch headquarters. R. J. Mills, driller.
34. Yoakum Hill, 1¼ miles east of ranch headquarters. Layne Texas, driller. Also 9 5/8-inch casing. Principal water-bearing bed at 603 to 727 feet.
35. Silo, 1½ miles southeast of ranch headquarters. R. J. Mills, driller.
36. Pita, 3¼ miles south of ranch headquarters. R. J. Mills, driller.
37. Mesquite, 5¼ miles south-southwest of ranch headquarters. R. J. Mills, driller.
38. Escondido, 5 miles southwest of ranch headquarters. Also 4¼-inch and 3¼-inch casing. Cased to depth of 1,183 feet. Top of principal water-bearing bed at 680 feet. Geo. Hollimon, driller.
39. Media Luna, 7½ miles south of ranch headquarters. R. J. Mills, driller.
40. Rincon, 8½ miles south-southwest of ranch headquarters. R. J. Mills, driller.
41. Alazan, 9½ miles southwest of ranch headquarters. R. J. Mills, driller. Formerly known as "Alazan well No. 2"; reported flow (prior to 1907) 90 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
42. Bob Hill, 10 miles southwest of ranch headquarters.
43. Bancero, 10½ miles southwest of ranch headquarters. R. J. Mills, driller.
44. Media, 8½ miles southwest of ranch headquarters. R. J. Mills, driller.
45. Big Cabeza, 12½ miles southwest of ranch headquarters. R. J. Mills, driller. Formerly known as "Cabeza well"; reported flow (prior to 1907) 60 gallons a minute.
46. Ebonito, 12 miles southwest of ranch headquarters.
47. Jenson, 14 miles southwest of ranch headquarters. T. L. Herring, driller. Formerly known as "Jensen well"; reported flow (prior to 1907) 225 gallons a minute.
48. Valligos, 13 miles southwest of ranch headquarters. T. L. Herring, driller. Formerly known as "Jensen well"; reported flow (prior to 1907) 225 gallons a minute.
49. Balancin, 14½ miles southwest of ranch headquarters. R. J. Mills, driller. Casing: 454 feet of 5 3/4-inch, 210 feet of 4 1/4-inch.
50. Paisano, 18 miles southwest of ranch headquarters. R. J. Mills, driller.
51. Laguna Larga, 16 miles south-southwest of ranch headquarters. R. J. Mills, driller.
52. Sarpanion, 17 miles south-southwest of ranch headquarters. R. J. Mills, driller. Casing: 440 feet of 5 3/16-inch, 211 feet of 4 1/4-inch.
53. Canelo, 15 miles south-southwest of ranch headquarters. T. L. Herring, driller. Reported to have had a flow of 250 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
54. Sanz, 15½ miles south of ranch headquarters.
55. Lamposoga, 12 miles south of ranch headquarters. R. J. Mills, driller. Formerly known as "Santa Clara well"; reported to have had a flow of 400 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
56. Chanza, 12½ miles south of ranch headquarters. R. J. Mills, driller.
57. Noria Charra, 16 miles south of ranch headquarters. Casing: 503 feet of 5 3/16-inch, 239 feet of 2 1/4-inch.
58. Valdera, 11 miles south-southeast of ranch headquarters. Tom Leary, driller. Formerly known as "Valderas well"; reported to have had a flow of 400 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
59. Nota Corpus, 11 miles south-southeast of ranch headquarters.
60. Dick, 12½ miles south-southeast of ranch headquarters. R. J. Mills, driller. Formerly known as "Presta well"; reported to have had a flow of 100 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
61. Santa Cruz, 14½ miles south-southeast of ranch headquarters. Rose Mosley, driller.
62. Spohn, 18 miles southeast of ranch headquarters. R. J. Mills, driller.
63. Rincon Pancho, 16 miles south-southeast of ranch headquarters. King Machine Co., driller. Formerly known as "Rincon Tio Pancho well"; reported to have had a flow of 400 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
64. Rincon Caesar, 18 miles south-southeast of ranch headquarters. Rose Mosley, driller. Also 4½-inch casing.
65. Olmos Creek, 17½ miles south-southeast of ranch headquarters. H. C. McGavit, driller. Temperature 85° F.

Miscellaneous farm and town wells

66. Mrs. J. B. Wright, 2 miles northwest of Kingsville. Frank Honse, driller.
67. Mrs. J. B. Wright, 2 miles northwest of Kingsville. Frank Honse, driller. Also 4-inch casing.
68. O. M. Wilson, 1½ miles north of Kingsville. Frank Honse, driller.
69. J. W. Base, 2 miles north of Kingsville.
70. J. W. Base, 2 miles north of Kingsville. Frank Honse, driller.

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Records of wells in Kleberg County, Tex. - Continued

Name or owner and the location of the well, the driller, and remarks - Continued

Miscellaneous farm and town wells - Continued

71. J. J. Bevers, 2 miles north of Kingsville. R. J. Mills, driller. Also 4½- and 3½-inch casing.
72. L. M. Smith, 2 miles north of Kingsville. T. L. Herring, driller. Formerly owned by T. Herring; reported flow (prior to 1907) 20 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
73. Joe Stelzig, 2 miles north-northeast of Kingsville. George Hollimon, driller.
74. O. S. Crook, 2½ miles north-northeast of Kingsville.
75. C. H. Flato et al., 2¼ miles northeast of Kingsville. George Hollimon, driller. Also 4-inch casing.
76. Mrs. M. Flato et al., 2½ miles northeast of Kingsville. Frank Honse, driller.
77. Anton Bueler estate, 2½ miles northeast of Kingsville. Peter Christensen, driller.
78. Joseph M. Nash estate, 1½ miles northeast of Kingsville. Harper & Parker, driller.
79. W. H. Young, 1¼ miles north of Kingsville. J. P. Morris, driller. Reported flow (prior to 1907) 50 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
80. W. H. McCraken et al.,1½ miles northwest of Kingsville. R. J. Mills, driller.
81. W. H. McCraken et al.,1½ miles northwest of Kingsville. T. L. Herring, driller.
82. College of Arts and Industries, 1½ miles northwest of Kingsville. T. L. Herring, driller. Formerly known as "Taylor well"; reported flow (prior to 1907) 40 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
83. College of Arts and Industries, 1¼ miles northwest of Kingsville. T. L. Herring, driller.
84. College of Arts and Industries, 1¼ miles northwest of Kingsville.
85. Kingsville Commission Co., 1 mile northwest of Kingsville. Formerly known as "Johnson well"; reported flow (prior to 1907) 40 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
86. Elkabeas Co., Inc., 1¼ miles northwest of Kingsville.
87. J. W. Schlenke et al.,1 mile northwest of Kingsville. R. J. Mills, driller. Formerly known as "Harper well"; reported flow (prior to 1907) 100 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
88. G. Nolan et al.,1¼ miles southwest of Kingsville.
89. Mrs. Miller, 3/4 mile northwest of Kingsville. T. L. Herring, driller.
90. Central Light & Power Co., Kingsville. Layne Texas, driller.
91. City of Kingsville, Kingsville. R. J. Mills, driller. Also 6 5/8-inch casing.
92. City of Kingsville, Kingsville. Layne Texas, driller. Also 8-inch casing. Principal water-bearing bed at 590-734 feet. Draw-down during pumping is about 24 feet.
93. City of Kingsville, Kingsville. George Hollimon, driller.
94. Missouri Pacific R. R., Kingsville. R. Robertson, driller.
95. Missouri Pacific R. R., Kingsville.
96. Missouri Pacific R. R., Kingsville.
97. Missouri Pacific R. R., Kingsville.
98. B. O. Sims, 3/4 mile east of Kingsville. Frank Honse, driller. Reported flow (prior to 1907) 34 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
99. Minor Hall, 1 mile southeast of Kingsville.
100. J. H. Watson, 1½ miles east of Kingsville. Honse & Hollimon, drillers. Principal water-bearing bed at 600-800 feet.
101. Collins et al.,1½ miles southeast of Kingsville. T. L. Herring, driller. Formerly known as "McNeil well"; reported flow (prior to 1907) 75 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
102. Fred Yeary, 1¼ miles east of Kingsville. Otto Custer, driller.
103. E. V. Boggan, 1 3/4 miles east of Kingsville. W. J. Honse, driller.
104. Frank Laza, 1 3/4 miles east of Kingsville. A. B. Fuller, driller. Formerly known as "Warren well"; reported flow (prior to 1907) 110 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
105. R. F. Watt, 1 3/4 miles southeast of Kingsville. A. B. Fuller, driller.
106. George Graul, 3 miles east-southeast of Kingsville. Tom Leary, driller. Formerly known as "Tranquietos well"; reported flow (prior to 1907) 150 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
107. Mrs. I. A. Wright, 3 miles east-northeast of Kingsville. Frank Honse, driller.
108. J. I. Kubicek, 4 miles east-northeast of Kingsville. Honse & Hollimon, drillers.
109. H. Andrews, 4 miles east-southeast of Kingsville. Frank Honse, driller.
110. A. Kieschnick, 3½ miles east-southeast of Kingsville. T. L. Herring, driller. Formerly known as "Huffman well"; reported flow (prior to 1907) 66 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
111. E. A. Jesse, 3 miles east-southeast of Kingsville. J. P. Morris, driller. Also 4¼-inch and 3¼-inch casing.
112. W. H. Parmley, 1½ miles southeast of Kingsville. George Hollimon, driller.
113. Robert Skipworth, 1 mile southeast of Kingsville. Honse & Hollimon, drillers. Also 3-inch casing.
114. W. H. Parmley, 1¼ miles southeast of Kingsville. W. J. Honse, driller.
115. Geo. C. Hoffman, 3/4 mile southeast of Kingsville. T. L. Herring, driller. Formerly known as "Hoffman well"; reported flow (prior to 1907) 75 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
116. Southmore Acres, 1 mile south of Kingsville.
117. King estate cemetery, 1 mile southwest of Kingsville. Frank Honse, driller.
118. Aug. Richter, 1¼ miles southwest of Kingsville.
119. B. O. Sims, 1½ miles southwest of Kingsville. Pete Christensen, driller.
120. Grace Whitmon, 2 miles southwest of Kingsville.
121. Missouri Pacific R. R., 1¼ miles south of Kingsville. George Hollimon, driller.
122. Joseph Stelzig, 1½ miles south of Kingsville. Frank Honse, driller.
123. F. D. Yeary, 1 3/4 miles south of Kingsville. Frank Honse, driller.
124. H. Andrews, 2½ miles southwest of Kingsville. Frank Honse, driller.
125. T. H. Lawrence, 2¼ miles south of Kingsville. Frank Honse, driller.
126. R. F. Preait etal., 2½ miles south of Kingsville. Honse & Hollimon, drillers.
127. R. F. Preait etal., 2½ miles south of Kingsville. R. J. Mills, driller. Principal water-bearing bed at 600-661 feet.
128. Dr. J. V. Chandler etal., 1 3/4 miles south of Kingsville. W. J. Honse, driller.
129. Dr. J. V. Chandler etal., 1 3/4 miles south of Kingsville. T. L. Herring, driller. Formerly known as "Harvey well"; reported flow (prior to 1907) 100 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
130. W. H. Parmley, 1½ miles south of Kingsville. T. L. Herring, driller.
131. Stella Miller, 1¼ miles south of Kingsville. Honse & Hollimon, drillers.
132. Mrs. C. C. Kirk, 1 3/4 miles south-southeast of Kingsville. Andy Fergerson, driller.
133. W. A. Patillo, 2 miles south-southeast of Kingsville. Frank Honse, driller.
134. Henry Ondrey, 2¼ miles south-southeast of Kingsville. W. J. Honse, driller. Formerly known as "Penn well"; reported flow (prior to 1907) 150 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
135. A. M. Barry etal., 2 3/4 miles south-southeast of Kingsville. Frank Honse, driller.
136. King Bros., 3½ miles south-southeast of Kingsville. George Hollimon, driller.
137. G. Arnst, 3 3/4 miles south-southeast of Kingsville.
138. Mrs. W. K. Cumberland, 2½ miles southeast of Kingsville. Andy Fergerson, driller.

Records of wells in Kleberg County, Tex. - Continued

Name or owner and the location of the well, the driller, and remarks - Continued

Miscellaneous farm and town wells - Continued

139. Mrs. J. G. Olson, 2 miles southeast of Kingsville. Andy Fergerson, driller.
140. Martin Christopher, 2 miles southeast of Kingsville. A. B. Fuller, driller.
141. Mrs. J. G. Olson, 2½ miles southeast of Kingsville. W. J. Honse, driller.
142. A. Paulson, 2½ miles southeast of Kingsville. Frank Honse, driller.
143. H. B. Gaskell, 2½ miles east-southeast of Kingsville. Andy Fergerson, driller.
144. Joe Elsik, 3 miles southeast of Kingsville. Frank Honse, driller.
145. W. A. Boggan, 3 miles southeast of Kingsville. Pete Christensen, driller.
146. E. E. Mullan, 3 miles southeast of Kingsville. Honse & Hollimon, drillers.
147. W. M. Freeman, 3 miles southeast of Kingsville. W. J. Honse, driller.
148. Y. J. Fling, 3 miles southeast of Kingsville.
149. Fosselman & Anderson, 3½ miles southeast of Kingsville. W. J. Honse, driller. Stopped flowing in 1914.
160. A. Robinson, 4 miles southeast of Kingsville. Andy Fergerson, driller.
151. W. M. Olson, 4 miles southeast of Kingsville.
152. John Johnson, 4 miles southeast of Kingsville. R. J. Mills, driller.
153. B. O. Sims, 3½ miles southeast of Kingsville. Peter Christensen, driller.
154. B. O. Sims, 3½ miles southeast of Kingsville. W. J. Honse, driller.
155. John Hansvick, 4 miles southeast of Kingsville. George Hollimon, driller.
156. Honse Bros., 3 miles east-southeast of Kingsville. W. J. Honse, driller.
157. Honse Bros., 3 miles east-southeast of Kingsville. Honse & Hollimon, drillers.
158. Honse Bros., 4 miles east-southeast of Kingsville. Frank Honse, driller.
159. Honse Bros., 4 miles east-southeast of Kingsville. R. J. Mills, driller.
160. L. D. Nix, 4½ miles east-southeast of Kingsville. R. J. Mills, driller.
161. Martin Hansen, 4½ miles southeast of Kingsville. Honse & Hollimon, drillers.
162. Ludvik Hasek, 4½ miles southeast of Kingsville. R. J. Mills, driller. Also 3½-inch casing.
163. Ludvik Hasek, 5 miles southeast of Kingsville. Frank Honse, driller.
164. Alfred Ploug, 5 miles southeast of Kingsville. Frank Honse, driller.
165. J. M. Reed, 5 miles east-southeast of Kingsville. T. L. Herring, driller. Formerly known as "Reed well"; reported flow (prior to 1907) 70 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
166. B. C. Brookshire, 5 miles east-southeast of Kingsville. A. B. Fuller, driller.
167. B. C. Brookshire, 5½ miles east-southeast of Kingsville. Frank Honse, driller. Also 5-inch casing.
168. J. T. Mork, 5 miles east-southeast of Kingsville. R. J. Mills, driller.
169. Alfred Ploug, 5 miles southeast of Kingsville. George Hollimon, driller.
170. L. Bareis, 5½ miles east-southeast of Kingsville. Frank Honse, driller.
171. W. M. Bareis, 5½ miles east-southeast of Kingsville. George Hollimon, driller.
172. Modista Garza, 6 miles east-southeast of Kingsville. Pete Christensen, driller.
173. C. Brigido, 6½ miles southeast of Kingsville. T. L. Herring, driller.
174. C. Brigido, 6½ miles southeast of Kingsville. T. L. Herring, driller.
175. H. C. Dennett et al., 6½ miles southeast of Kingsville. Frank Honse, driller. Temperature 86° F.
176. L. Bareis, 6 miles southeast of Kingsville. Pete Christensen, driller.
177. George Jensen, 5½ miles southeast of Kingsville. R. J. Mills, driller.
178. Christ Wiedman, 5½ miles southeast of Kingsville. George Hollimon, driller.
179. N. E. Selstad, 5 miles southeast of Kingsville. Andy Fergerson, driller.
180. Honse Bros., 5½ miles southeast of Kingsville. Frank Honse, driller. Temperature 85° F.
181. John Johnson, 4½ miles southeast of Kingsville. R. J. Mills, driller.
182. V. H. Mudd, 5 miles southeast of Kingsville. George Hollimon, driller.
183. R. L. Nix, 5 miles south-southeast of Kingsville. R. J. Mills, driller.
184. H. A. Scharlach, 5 miles south-southeast of Kingsville. A. B. Fuller, driller.
185. J. E. Foster, 4½ miles south-southeast of Kingsville. Frank Honse, driller.
186. E. W. Flynt, 3½ miles south-southeast of Kingsville. George Hollimon, driller.
187. Kingsville Country Club, 3½ miles south of Kingsville. R. J. Mills, driller.
188. J. R. Trussell, 3½ miles south of Kingsville. Frank Honse, driller.
189. B. A. Kempe, 4 miles south of Kingsville. W. J. Honse, driller.
190. L. E. Flato et al., 4½ miles south of Kingsville. Pete Christensen, driller.
191. Texas Mexican School, 4½ miles south of Kingsville. Frank Honse, driller.
192. Texas Mexican School, 5 miles south of Kingsville. Pete Christensen, driller.
193. B. Gillespie, 3½ miles south of Kingsville. Frank Honse, driller.
194. Joe H. Keepers, 5½ miles south of Kingsville. Honse & Hollimon, drillers.
195. Gilberto Diaz, 4 miles south of Kingsville. Honse & Hollimon, drillers.
196. Glazener-Fels, 4½ miles south of Kingsville. Frank Honse, driller.
197. L. W. Stieren, 4½ miles south-southwest of Kingsville. George Hollimon, driller.
198. M. W. Moore, 5 miles south-southwest of Kingsville. Frank Honse, driller.
199. Honse Bros., 5 miles south-southwest of Kingsville.
200. W. G. Bippert, 4½ miles southwest of Kingsville. Pete Christensen, driller.
201. M. T. Strange, 5½ miles southwest of Kingsville. T. L. Herring, driller.
202. R. G. Flato (trustee), 6 miles south-southwest of Kingsville. Stoops Bros., drillers.
203. H. Broderhouser, 6 miles south-southwest of Kingsville. Pete Christensen, driller.
204. Mrs. G. A. Dawson, 6 miles south-southwest of Kingsville. Frank Honse, driller.
205. D. Cavazos, 3½ miles south-southwest of Kingsville. Pete Christensen, driller.
206. H. D. Ligon, 6 miles south-southwest of Kingsville. Also 5-inch casing.
207. L. T. Hawlowetz, 7 miles south-southwest of Kingsville. Pete Christensen, driller.
208. A. A. Nix, 8½ miles south-southwest of Kingsville. Pete Christensen, driller.
209. R. H. Simmons, 7½ miles south-southwest of Kingsville. Stoops Bros., drillers.
210. J. L. Shelton, 7½ miles south of Kingsville. Pete Christensen, driller.
211. F. B. Duke, 7½ miles south of Kingsville. T. L. Herring, driller.
212. Nettie Will, 7 miles south of Kingsville. George Hollimon, driller.
213. Josef Horak, 5½ miles south of Kingsville. Pete Christensen, driller.
214. A. Flores, 5½ miles south of Kingsville. Frank Honse, driller.
215. Mrs. H. M. King estate, 5½ miles south of Kingsville.
216. J. R. Trussell, 6 miles south of Kingsville. Honse & Hollimon, drillers.
217. J. R. Trussell, 6 miles south of Kingsville. Frank Honse, driller.
218. Mrs. J. B. Craft, 6 miles south of Kingsville. Pete Christensen, driller.
219. A. J. Williams, 6½ miles south of Kingsville. George Hollimon, driller.
220. Ricardo School, 6½ miles south of Kingsville. T. L. Herring, driller.
221. Bob Muel, 6½ miles south of Kingsville. Honse & Hollimon, drillers.
222. J. R. Trussell, 6½ miles south of Kingsville. Frank Honse, driller.
223. F. Fromme, 6½ miles south of Kingsville. Frank Honse, driller.
224. Pedro Canales, 7 miles south of Kingsville.
225. Kemper Updike, 7 miles south of Kingsville. George Hollimon, driller.
226. J. W. Livergood, 7 miles south of Kingsville. Pete Christensen, driller.
227. B. O. Sims, 7 miles south of Kingsville. Pete Christensen, driller.
228. Jose M. Cisneros, 7 miles south of Kingsville.
229. A. P. Williams, 7½ miles south of Kingsville. Frank Honse, driller.
230. G. L. Murphy, 6½ miles south-southeast of Kingsville. Honse & Hollimon, drillers.
231. Mrs. J. H. Nix, 6½ miles south-southeast of Kingsville. Pete Christensen, driller.
232. Waldo Garcia, 7 miles south-southeast of Kingsville. A. Travino, driller.

Records of wells in Kleberg County, Tex. - Continued

Name or owner and the location of the well, the driller, and remarks - Continued

Miscellaneous farm and town wells - Continued

233. State Bank of Kingsville, 7 miles south-southeast of Kingsville. Frank Honse, driller.
234. Jorge G. Pena, 6 miles south-southeast of Kingsville. George Hollimon, driller.
235. M. C. Taylor et al., 6 miles south-southeast of Kingsville.
236. T. M. S. Spencer, 7 miles south-southeast of Kingsville. Honse & Hollimon, drillers.
237. W. W. Hawks, 7 miles south-southeast of Kingsville. Frank Honse, driller.
238. C. W. Rosse, 6½ miles southeast of Kingsville. W. Zimmerman, driller.
239. Jergen Meyer, 8 miles south-southeast of Kingsville. Pete Christensen, driller.
240. Anton Dietz, 8 miles south-southeast of Kingsville. George Hollimon, driller.
241. C. H. Flato, 8 miles southeast of Kingsville. W. J. Honse, driller.
242. C. H. Flato, 9 miles southeast of Kingsville. Frank Honse, driller. Temperature 86° F.
243. V. J. Kivlin, 9 miles southeast of Kingsville. Pete Christensen, driller.
244. Honse Bros., 9½ miles southeast of Kingsville. George Hollimon, driller.
245. L. L. Radford et al., 11 miles southeast of Kingsville. George Hollimon, driller.
246. B. Cabrera, 11 miles southeast of Kingsville.
247. R. S. Muil, 11 miles southeast of Kingsville. Pete Christensen, driller.
248. A. J. Filla, 10½ miles southeast of Kingsville. Pete Christensen, driller.
249. E. L. Sanders, 11 miles southeast of Kingsville. Pete Christensen, driller.
250. Pat Cady, 12 miles southeast of Kingsville. Pete Christensen, driller. Temperature 86° F. Also 2-inch casing.
251. C. A. Ford, 9½ miles south-southeast of Kingsville. Pete Christensen, driller. Temperature 84° F.
252. Ed. Ramirez, 9½ miles south-southeast of Kingsville. Temperature 82° F.
253. E. Leos, 8½ miles south-southeast of Kingsville. Pete Christensen, driller.
254. W. I. Trant, 8½ miles south-southeast of Kingsville. Frank Honse, driller.
255. E. S. Phillips, 8 miles south-southeast of Kingsville.
256. J. D. Finnegan, 8 miles south of Kingsville. Honse & Hollimon, drillers.
257. Mrs. J. Talty, 7½ miles south of Kingsville. Frank Honse, driller.
258. Wilbur Bartlett, 7½ miles south of Kingsville. Pete Christensen, driller.
259. Emma White, 7½ miles south of Kingsville. R. J. Mills, driller.
260. A. M. Forsgard, 9 miles south-southwest of Kingsville.
261. J. C. Fergerson, 9 miles south-southwest of Kingsville. Pete Christensen, driller.
262. L. E. Trant, 9 miles south-southwest of Kingsville. T. L. Herring, driller. Principal water-bearing bed at 600-608 feet.
263. R. G. Flato (trustee), 9 miles south-southwest of Kingsville. Honse & Hollimon, drillers.
264. H. A. Nix, 8½ miles south of Kingsville.
265. J. W. Nix, 8½ miles south of Kingsville. Frank Honse, driller.
266. R. G. Flato, 8½ miles south of Kingsville. Frank Honse, driller.
267. J. W. Nix, 9 miles south of Kingsville. Frank Honse, driller. Also 2-inch casing.
268. Dunn-Stelzig, 8½ miles south of Kingsville. Frank Honse, driller.
269. F. D. Yeary, 9 miles south of Kingsville.
270. J. H. White, 9 miles south of Kingsville. Frank Honse, driller.
271. A. Thormaehlen, 8½ miles south of Kingsville. Frank Honse, driller.
272. J. K. Northway, 9 miles south of Kingsville. Frank Honse, driller.
273. J. K. Northway, 9 miles south of Kingsville. Frank Honse, driller.
274. N. M. Ragland, 9 miles south-southeast of Kingsville. Frank Honse, driller.
275. C. N. Ford, 9 miles south-southeast of Kingsville. Honse & Hollimon, drillers.
276. Dr. Northway et al., 9 miles south-southeast of Kingsville.
277. E. A. Ford, 9 miles south-southeast of Kingsville. Temperature 84° F.
278. H. Andrews, 6 miles north of Riviera. Frank Honse, driller.
279. H. Andrews, 4½ miles north of Riviera. T. L. Herring, driller.
280. Fay Whitlow, 4½ miles north of Riviera. Pete Christensen, driller.
281. Pete Christensen, 3½ miles north of Riviera. Tom Leary, driller. Formerly known as "Rediche well"; reported flow (prior to 1907) 200 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
282. Pete Christensen, 3 miles north of Riviera. Pete Christensen, driller.
283. W. H. Bensman, 3 miles north of Riviera. Pete Christensen, driller.
284. J. Eisenhower, 3 miles north of Riviera. Stoops Bros., drillers.
285. W. E. Hopkins, 3 miles north of Riviera.
286. J. O. Martin, 2½ miles north of Riviera.
287. John Remlinger, 3 miles north of Riviera. John Remlinger, driller. Temperature 86° F.
288. C. A. Taylor, 3 miles northeast of Riviera. Stoops Bros., drillers.
289. Sam Skaggs, 3 miles northeast of Riviera. Pete Christensen, driller.
290. H. F. Elling, 4 miles northeast of Riviera. Stoops Bros., drillers.
291. J. H. Keepers, 5 miles northeast of Riviera. Temperature 86° F.
292. G. T. Andress, 4 miles northeast of Riviera. George Hollimon, driller. Temperature 86° F.
293. Mrs. F. Schneider, 3½ miles northeast of Riviera. George Hollimon, driller.
294. O. L. Underbrink, 3 miles northeast of Riviera.
295. C. E. Goodman, 4 miles northeast of Riviera.
296. H. J. Schneider, 4 miles northeast of Riviera.
297. J. A. Hubert, 6 miles northeast of Riviera. George Hollimon, driller.
298. T. W. Yaklin, 6 miles northeast of Riviera. George Hollimon, driller.
299. L. L. Huff, 6 miles northeast of Riviera. George Hollimon, driller.
300. Aug. Boensch, 6½ miles northeast of Riviera. George Hollimon, driller. Temperature 88° F.
301. Henry Schonefeld, 6 miles northeast of Riviera. George Hollimon, driller. Temperature 86° F.
302. Carl Pildeau, 8 miles northeast of Riviera. George Hollimon, driller.
303. Carl Pildeau, 7½ miles northeast of Riviera. Stoops Bros., drillers. Temperature 90° F.
304. R. O. Moss, 5½ miles northeast of Riviera. Sutter & Remlinger, drillers. Temperature 88° F.
305. C. E. Goodman, 4½ miles northeast of Riviera.
306. Vattmann Town, 4½ miles northeast of Riviera.
307. Vattmann Town, 4½ miles northeast of Riviera. George Hollimon, driller.
308. N. T. Durbin, 6 miles east-northeast of Riviera. Temperature 88° F.
309. J. T. Whitley, 7 miles east-northeast of Riviera. Temperature 88° F.
310. Leo Yaklin, 8 miles east-northeast of Riviera. George Hollimon, driller. Temperature 85° F.
311. Martin Prailes, 8 miles east-northeast of Riviera. Andy Fergerson, driller. Temperature 88° F.
312. Pete Christensen, 8 miles east-northeast of Riviera. Stoops Bros., drillers. Temperature 88° F.
313. J. F. Mitchell, 7½ miles east of Riviera. Temperature 87° F.
314. E. A. Miller, 7½ miles east of Riviera. Temperature 87° F.
315. Anton Dietz, 7½ miles east of Riviera. George Hollimon, driller.
316. Anton Dietz, 6½ miles east of Riviera. George Hollimon, driller. Temperature 88° F.
317. Mrs. H. Boeker, 6 miles east of Riviera. Joe Stutter, driller. Temperature 87° F.
318. N. T. Durbin, 5½ miles northeast of Riviera. Stoops Bros., drillers. Also 3-inch casing.
319. J. H. Forsthoff, 4½ miles east-northeast of Riviera. George Hollimon, driller.
320. H. N. Harrison, 4½ miles east-northeast of Riviera.
321. S. P. Vitzthum, 4½ miles east-northeast of Riviera. Joe Sutter, driller.
322. Joe Russell, 4½ miles east-northeast of Riviera.
323. L. A. Rubert, 4 miles east-northeast of Riviera.
324. Mrs. N. Harrison, 3½ miles east-northeast of Riviera.
325. J. W. Clarkson, 3 miles east-northeast of Riviera.

Records of wells in Kleberg County, Tex. - Continued

Name or owner and the location of the well, the driller, and remarks - Continued

Miscellaneous farm and town wells - Continued

326. P. G. Basden, 3½ miles east-northeast of Riviera. Morgan Miller, driller.
327. J. H. Hammer, 2 miles east of Riviera. Temperature 84° F.
328. Francis Park, 1½ miles east of Riviera.
329. G. T. Andress, 2 miles northeast of Riviera.
330. T. Stenau, 1½ miles northeast of Riviera.
331. Mrs. K. McClanahan, 1½ miles northeast of Riviera.
332. G. M. Sheppard, 1½ miles northeast of Riviera.
333. G. A. Risken, 1 mile northeast of Riviera.
334. J. D. Hallmark, 1/2 mile northeast of Riviera.
335. Ed Lopez, 1½ miles north of Riviera. Pete Christensen, driller.
336. Reitsch Farm Lots, 1½ miles north of Riviera.
337. Reitsch Farm Lots, 1/2 mile north of Riviera.
338. D. M. Warner, Riviera. Pete Christensen, driller.
339. H. O. Rundle, Riviera. R. J. Mills, driller.
340. B. A. Whitcomb, Riviera. W. Zimmerman, driller.
341. J. R. Self, 1½ miles southeast of Riviera.
341a. D. J. Sullivan, 11 miles west-southwest of Riviera. Brown, driller. Temperature 84° F. Puente well.
341b. D. J. Sullivan, 8½ miles west-southwest of Riviera. Ruppard Schrock, driller. Salto well.
341c. McGill Bros., 6½ miles southwest of Riviera. Chester Downs, driller. Creek well.
342. Leo Kaufer, 1½ miles southeast of Riviera.
343. E. R. Reitsch, 1 mile southeast of Riviera.
344. John Dickinson, 1½ miles southeast of Riviera. Temperature 85° F.
345. V. E. Mately, 1 mile east of Riviera.
346. H. G. Gardner, 1½ miles east of Riviera. Stoops Bros., drillers.
347. F. A. Aiken, 2 miles east of Riviera.
348. Mrs. E. A. Cole, 2 miles east of Riviera. Temperature 85° F.
349. Whitcomb estate, 1½ miles east of Riviera. King Machine Co., driller. Temperature 84° F. Formerly known as "Bovida well"; reported flow (prior to 1907) 300 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
350. Jewell, 1½ miles southeast of Riviera. Temperature 86° F.
351. Comhaire, 2½ miles east-southeast of Riviera.
352. H. C. Everson, 3 miles east-southeast of Riviera.
353. Koch et al., 3 miles east of Riviera. Stoops Bros., drillers. Depth to top of principal water-bearing bed 742 feet.
354. D. Alvarado, 3 miles east of Riviera. Temperature 86° F.
355. F. C. Duck, 3½ miles east of Riviera.
356. Nugent et al., 4 miles east-southeast of Riviera.
357. Mrs. H. Northrup, 4 miles east of Riviera.
358. C. A. Robbins, 4½ miles east of Riviera.
359. P. J. Mixon, 4½ miles east of Riviera. Stoops Bros., drillers.
360. E. M. Sears, 4½ miles east of Riviera. Stoops Bros., drillers.
361. W. A. Wright, 5½ miles east of Riviera. Stoops Bros., drillers. Temperature 86° F.
362. A. L. Ray, 5 miles east of Riviera. Fergerson & Miller, drillers.
363. James McIntyre, 5 miles east-southeast of Riviera.
364. James McIntyre, 6 miles east-southeast of Riviera.
365. J. C. Nanny, 6 miles east of Riviera. Pete Christensen, driller. Temperature 86° F.
366. F. D. Lewis, 6½ miles east of Riviera. Stoops Bros., drillers. Temperature 86° F.
367. Pete Christensen, 6½ miles east of Riviera. King Machine Co., driller. Temperature 86° F. Formerly known as "Rincon de los Cabellos well"; reported flow (prior to 1907) 400 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
368. J. L. Runnels, 7 miles east of Riviera. Temperature 86° F.
369. H. C. Travers, 7 miles east of Riviera. Temperature 86° F.
370. George Cunningham, 8 miles east of Riviera. Temperature 87° F.
371. Riviera Beach, 9 miles east of Riviera. Andy Fergersen, driller.

Wells on Laureles ranch

372. Caesar, 20 miles west of ranch headquarters (3 miles northeast of Kingsville). George Hollimon, driller. Also 4¼-inch casing; principal water-bearing bed at 662-750 feet.
373. Cuatro Esquinas, 19 miles west of ranch headquarters (3½ miles northeast of Kingsville). R. J. Mills, driller.
374. Palo Marcado, 15 miles west of ranch headquarters. R. J. Mills, driller.
375. Noria Honda No. 1, 12 miles west of ranch headquarters. T. L. Herring, driller.
376. Leoncitos ranch No. 1, 15 miles west-southwest of ranch headquarters. R. J. Mills, driller.
377. Mesquite, 14 miles west-southwest of ranch headquarters. R. J. Mills, driller.
378. Vinotero, 16 miles west-southwest of ranch headquarters. R. J. Mills, driller.
379. Pinto No. 1, 14 miles southwest of ranch headquarters. R. J. Mills, driller.
380. Telephone No. 1, 13 miles southwest of ranch headquarters. T. L. Herring, driller. Also 4½-inch casing.
381. Telephone No. 2, 13 miles southwest of ranch headquarters. R. J. Mills, driller. Casing: 211 feet of 6 5/8-inch, 661 feet of 5 5/16-inch, 100 feet of 4 1/2-inch.
382. Tres Esquinas, 10 miles west-southwest of ranch headquarters. R. J. Mills, driller. Also 5-inch casing (outside diameter).
383. Quantitos, 8½ miles west-southwest of ranch headquarters. J. MacAlister, driller.
384. Aljibres, 7 miles west of ranch headquarters. R. J. Mills, driller.
385. Palacios, 8 miles west of ranch headquarters. R. J. Mills, driller. Casing: 513 feet of 6 5/8-inch, 399 feet of 5 3/16-inch, 84 feet of 4 1/4-inch.
386. Chiltipin, 5 miles west of ranch headquarters. R. J. Mills, driller.
387. Burro, 3½ miles south-southwest of ranch headquarters. T. L. Herring, driller. Reported flow (prior to 1907) 300 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
388. Huisache, 7 miles southwest of ranch headquarters. T. L. Herring, driller.
389. Guallacon, 8 miles southwest of ranch headquarters. T. L. Herring, driller.
390. Gallito, 9½ miles southwest of ranch headquarters. R. J. Mills, driller.
391. Paso, 15 miles southwest of ranch headquarters. R. J. Mills, driller. Also 4 3/4-inch casing (outside diameter).
392. Madero, 12 miles southwest of ranch headquarters. R. J. Mills, driller.
393. Visnaga, 14 miles southwest of ranch headquarters. T. L. Herring, driller. Formerly known as "Visnaga well"; reported flow (prior to 1907) 40 gallons a minute.
394. Jaboncillo, 11 miles southwest of ranch headquarters. R. J. Mills, driller.
395. Jaboncillo Rincon, 11 miles southwest of ranch headquarters. R. J. Mills, driller.
396. Camiseta, 16 miles southwest of ranch headquarters. R. J. Mills, driller. Temperature 90° F.
397. Infernillo, 18 miles south-southwest of ranch headquarters. T. L. Herring, driller. Temperature 90° F.
398. Vivoras, 13 miles south-southwest of ranch headquarters. Curry, driller. Formerly known as "Vivoris well"; reported flow (prior to 1907) 10 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)

Records of wells in Kleberg County, Tex. - Continued

Name or owner and the location of the well, the driller, and remarks - Continued

Wells on Laureles ranch - Continued

399. Aceitera, 13½ miles south of ranch headquarters. R. J. Mills, driller.
400. Portales, 10½ miles south-southwest of ranch headquarters. R. J. Mills, driller.
401. Alazan, 10½ miles south of ranch headquarters. R. J. Mills, driller.
402. Zacahuistle, 8 miles southwest of ranch headquarters. R. J. Mills, driller.
403. Hinojaseno, 5½ miles south of ranch headquarters. R. J. Mills, driller.
404. Beserra, 5 miles southeast of ranch headquarters. J. McAlester, driller. Formerly known as "Rincon La Salle"; reported flow (prior to 1907) 240 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
405. Mujeres, 2 miles south of ranch headquarters. J. McAlester, driller. Reported flow (prior to 1907) 120 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
406. Mujeres Chiquito, 1/2 mile south of ranch headquarters.
407. Coyote, 1½ miles west of ranch headquarters. R. J. Mills, driller. Temperature 88° F.
408. Lobo Artesian, 2 3/4 miles northwest of ranch headquarters. R. J. Mills, driller.
409. Headquarters, Laureles headquarters.. J. McAlester, driller. Reported flow (prior to 1907) 80 gallons a minute. (Record from Water-Supply Paper 190, pp. 10, 11.)
410. Bordo, 3 miles northeast of ranch headquarters. Caldwell, driller.
411. Flacuache, 3 miles southeast of ranch headquarters. A. C. Downs, driller.
412. Palomas, 5½ miles southeast of ranch headquarters. J. McAlester, driller.
413. Garcias, 5½ miles east of ranch headquarters. J. McAlester, driller.
414. Coyotes No. 2, 7½ miles east of ranch headquarters. T. L. Herring, driller.
415. Coyotes No. 1, 7½ miles east of ranch headquarters. T. L. Herring, driller.
416. Cideras, 11 miles east of ranch headquarters. H. C. McGavit, driller.
417. Patos, 9 miles east of ranch headquarters. T. L. Herring, driller.
418. Mateo, 9 miles southeast of ranch headquarters. William Cody, driller.
419. Lobo, 10 miles southeast of ranch headquarters. William Cody, driller.
420. Novillo, 10 miles southeast of ranch headquarters. William Cody, driller.
421. Estrello, 8½ miles southeast of ranch headquarters. William Cody, driller.
422. Augustin, 7½ miles southeast of ranch headquarters. R. J. Mills, driller. Also 5 3/16-inch casing; principal water-bearing bed at 1,250-1,276 feet.
423. Ojo del Agua, 8½ miles southeast of ranch headquarters. A. C. Downs, driller. Also 3½-inch casing; principal water-bearing bed at 1,216-1,230 feet.
424. Sordo, 11 miles southeast of ranch headquarters. William Cody, driller.
425. Cabeza, 10 miles southeast of ranch headquarters. H. C. McGavit, driller.
426. Pera, 9 miles southeast of ranch headquarters. R. J. Mills, driller.
427. Mota Mesquite, 12 miles south of ranch headquarters. R. J. Mills, driller. Also 5 3/16-inch casing; principal water-bearing bed at 1,300-1,331 feet. Temperature 94° F.
428. Patricio, 12 miles south-southeast of ranch headquarters. H. C. McGavit, driller.
429. Alta Prieta, 13 miles southeast of ranch headquarters. R. J. Mills, driller. Also 6 5/8-, 5 3/16-, 4 1/4-, and 3 1/4-inch casing; principal water-bearing bed at 1,425-1,435 feet.
430. Devisadero, 15 miles southeast of ranch headquarters. R. J. Mills, driller. Also 5 3/16-, 4 1/4-, and 3 1/4-inch casing; depth to top of principal water-bearing bed 1,375 feet.
431. Martillo, 14 miles south-southeast of ranch headquarters. R. J. Mills, driller. Also 3 1/4-inch casing; cased to depth of 1,050 feet.
432. Salt No. 1, 15 miles south-southeast of ranch headquarters.
433. Tule, 16 miles south of ranch headquarters. R. J. Mills, driller. Also 5 3/16-inch and 4 1/4-inch casing; principal water-bearing bed at 1,260-1,295 feet. Temperature 94° F.
434. Rincon, 17 miles south of ranch headquarters. R. J. Mills, driller. Also 5 3/16-inch casing; depth to top of principal water-bearing bed 1,167 feet.