STATE OF ARKANSAS

Arkansas Geological and Conservation Commission

Norman F. Williams, Geologist-Director

WATER RESOURCES CIRCULAR NO. 6

GEOLOGY AND GROUND-WATER RESOURCES OF DESHA AND LINCOLN COUNTIES, ARKANSAS

By

M. S. Bedinger and J. E. Reed

U. S. GEOLOGICAL SURVEY

Prepared in cooperation with the United States Geological Survey

Little Rock, Ark.

1 9 6 1

STATE OF ARKANSAS

Orval E. Faubus, Governor

ARKANSAS GEOLOGICAL AND CONSERVATION COMMISSION

Norman F. Williams, Geologist-Director

COMMISSIONERS

Jack Pickens, Chairman - - - - - - - - - - - - - - - Little Rock

W. A. East - Amity

Wm. Freeze, Jr. - - - - - - - - - - - - - - - - - - - Jonesboro

Abbott F. Kinney - - - - - - - - - - - - - - - - - - - Dermott

John P. Morrow - - - - - - - - - - - - - - - - - - - Batesville

V. S. Parham - Magnolia

Dr. G. Allen Robinson - - - - - - - - - - - - - - - - - Harrison

CONTENTS

Page

Summary 1
Introduction 3
Acknowledgments 4
Previous investigations 4
Location, topography, and drainage 5
Climate 5
Well-numbering system 7
Geology 9
Structure 9
Stratigraphy 9
Rocks of Paleozoic and Mesozoic age 9
Rocks of Cenozoic age 9
Tertiary system 9
Midway group 15
Wilcox group 15
Claiborne group 15
Cane River formation 16
Sparta sand 16
Cook Mountain formation 17
Cockfield formation 17
Jackson group 17
Pliocene (?) deposits 18
Quaternary system 19
Terrace deposits 19
Alluvium 23
Hydrology 29
Occurrence of ground water 29
Hydrologic properties of the water-bearing materials 29
Pumping tests 30
City of Dumas 31
Hudson 31
Holtoff 31
Pinchback Planting Co. 31
D-5 32
G. E. Rice 32
Missouri Pacific 32
Recharge, movement, and discharge of ground water 32
Relation between the ground water and water in the river 34

CONTENTS—(Continued)

Page

Water-level fluctuations 35
Utilization of ground water 37
Public supplies 42
Dumas 43
McGehee 43
Arkansas City 43
Pickens 43
Watson 43
Star City 43
Gould 43
Grady 43
Cummins State Penal Farm 43
Domestic supplies 43
Irrigation supplies 44
Recovery of ground water 44
Chemical quality of the ground water 45
Chemical character in relation to source 45
Rocks older than the Sparta sand 45
Sparta sand and Cockfield formation of the Claiborne group . . 47
Jackson group 48
Pliocene (?) deposits 48
Quaternary terrace deposits 49
Quaternary alluvium 49
Chemical character in relation to use 49
Industrial use 49
Domestic use 49
Irrigation use 52
References cited 53

ILLUSTRATIONS

Page

Plate 1. Generalized geologic section A-A′ across Lincoln County, showing deposits of Tertiary and Quaternary age . . . 107

2. Generalized geologic section B-B′ across Lincoln County, showing deposits of Tertiary and Quaternary age . . . 109

3. Generalized geologic section K-K′ across Desha County, showing deposits of Tertiary and Quaternary age . . . 111

4. Geologic sections G-G′ and F-F′ across Lincoln County, showing the Quaternary deposits 113

5. Geologic map of Desha County, showing locations of cross sections 115

6. Geologic map of Lincoln County, showing locations of cross sections 116

7. Map of Desha County showing the piezometric surface in the Quaternary alluvium for December 1956 117

8. Map of Desha County showing the piezometric surface in the Quaternary alluvium for February 1957 118

9. Map of Desha County showing the piezometric surface in the Quaternary alluvium for April 1957 119

10. Map of Desha County showing the piezometric surface in the Quaternary alluvium for December 1957 120

11. Map of Desha County showing the piezometric surface in the Quaternary alluvium for April 1958 121

12. Map of Lincoln County showing the piezometric surface in the Quaternary alluvium for December 1955 122

13. Map of Lincoln County showing the piezometric surface in the Quaternary alluvium for February 1956 123

14. Map of Lincoln County showing the Piezometric surface in the Quaternary alluvium for October 1956 124

15. Map of Lincoln County showing the piezometric surface in the Quaternary alluvium for April 1957 125

16. Map of Lincoln County showing the piezometric surface in the Quaternary alluvium for December 1957 126

17. Map of Lincoln County showing the piezometric surface of the Quaternary alluvium for April 1958 127

18. Map of Desha County showing location of wells 128

19. Map of Lincoln County showing location of wells and springs 129

Figure 1. Map of Arkansas showing areas in which ground-water studies have been made under the State cooperative program 3

2. Sketch illustrating well-numbering system 7

3. Outline map showing major structural features and relations of Cretaceous and Tertiary rocks of the Mississippi embayment 10

4. Structural contours on top of the Cretaceous system in a part of southeastern Arkansas 11

ILLUSTRATIONS—(Continued)

Page

5. Structural contours on top of the Midway group in a part of southeastern Arkansas 12

6. Structural contours on top of the Wilcox group in a part of southeastern Arkansas 13

7. Structural contours on top of the Cane River formation in a part of southeastern Arkansas 14

8. Geologic section E-E′ showing the relations between the Jackson group and the Quaternary deposits west of Monticello Ridge in Lincoln County 20

9. Geologic section C-C′ showing the relations between the lowest terrace deposits and the alluvium east of Monticello Ridge in Lincoln County 21

10. Geologic section D-D′ showing the relations between the lowest terrace deposits and the alluvium east of Monticello Ridge in Lincoln County 22

11. Geologic section H-H′ through Desha County showing the Quaternary alluvium 24

12. Geologic section I-I′ through Desha County showing the Quaternary alluvium 25

13. Geologic section J-J′ through Desha County showing the Quaternary alluvium 26

14. Diagram illustrating drawdown at a distance from a well of constant discharge 31

15. Hydrographs of well 11S-2W-3cca in the Claiborne group and well 10S-8W-4bcc in Quaternary terrace deposits and daily precipitation at Star City, Ark. 36

16. Hydrographs of wells 8S-6W-29dcc and 9S-4W-5dad in Quaternary alluvium and daily precipitation at Cummins Farm and Dumas, Ark. 38-39

17. Hydrographs of wells 12S-1W-20ddd, 12S-2W-13adal, and 12S-3W-29dba in Quaternary alluvium and daily precipitation at Arkansas City, Ark. 40

18. Hydrographs of wells 9S-4W-6bbc, 9S-4W-6daa, 10S-4W-2bab, and 8S-5W-8bda in Quaternary alluvium and cumulative departure from normal precipitation at Dumas, Ark. 41

19. Relation between average depth to water in the Quaternary alluvium in the spring from 1953 through 1958, yearly pumpage, and cumulative departure from normal precipitation at Dumas, Ark. 42

20. Graphic representation of selected chemical analyses of ground water from the several aquifiers 46

21. Relation between dissolved solids and depth of waters from the Claiborne group 48

22. Areal distribution of chloride in water from the Quaternary alluvium 50

23. Classification of ground water for irrigation use in Desha and Lincoln Counties (after Wilcox) 51

TABLES

Page

Table 1. Normal monthly and yearly temperature at Dumas, Desha County, Ark. 6

2. Annual precipitation at Arkansas City and Dumas, Desha County 6

3. Normal monthly, seasonal, and annual precipitation at Arkansas City and Dumas 6

4. Generalized geologic section for Desha and Lincoln Counties 8

5. Summary of aquifer tests 30

6. Specific capacity of some of the irrigation wells screened in the alluvium of Quaternary age 45

7. Records of wells and springs 54

Desha County 54

Lincoln County 66

8. Water levels in wells 77

Desha County 77

Lincoln County 84

9. Logs of test holes and wells 89

Desha County 89

Lincoln County 99

10. Chemical analyses of water from wells and springs in Desha and Lincoln Counties 101

Desha County 101

Lincoln County 103

GEOLOGY AND GROUND-WATER RESOURCES OF DESHA AND LINCOLN COUNTIES, ARKANSAS

By M. S. Bedinger and J. E. Reed

SUMMARY

More than 85 percent of the water used for all purposes in Desha and Lincoln Counties, Ark., comes from wells, and the total pumpage in 1956 amounted to more than 17 billion gallons. Most of this was used during the summer season for the irrigation of rice, but averaged over the year it amounted to about 47½ mgd (million gallons per day). About 1 mgd was used for municipal supply and perhaps 1 mgd for other domestic supplies and about 0.5 mgd for industrial uses. Thus, the natural underground reservoirs are presently playing an important role in the economy of the area, and they have the capacity to supply more water to future users if wisely developed.

A study of the ground-water resources of the area was made to determine the occurrence, availability, movement, recharge, discharge, and chemical quality of the ground water in these counties, where nearly all the approximately 400 large-production wells now in use have been drilled since 1946. The present report should be useful to cities and towns, farmers, well drillers, and others who now operate or wish to drill wells, by helping them to determine, for any given location, the depth to water, the character of the materials that will be penetrated by the drill, the chemical quality of the water, and the quantity of water available. In short, it should aid the citizens in making the most economical development of their ground-water resources and in preventing overdevelopment.

In spite of an average annual precipitation of about 50 inches, summer deficiencies in rainfall make it profitable to irrigate normally dry-farmed crops in about 3 out of every 4 years.

Some of the geologic formations serve as storage reservoirs and conduits through which the ground water is moving slowly and from which it may be extracted by wells. Where these permeable formations are exposed at the surface they serve as media of natural recharge or natural discharge. Other less permeable formations serve as confining beds to the movement of the ground water. The cross sections shown in plates 1, 2, 3, and 4 illustrate the positions of the several aquifers and the relationships of the different formations to one another in vertical planes as the geological maps (pls. 5 and 6) illustrate the relationships in a horizontal plane. By use of the sections and the maps in connection with the table of well records (table 7), one may determine the probable ground-water conditions at the site of his well.

Everywhere in the "delta" area, which includes all of Desha County and which is delimited by the eastern margin of the lowest terrace deposits in Lincoln County (Qt_3 on pl. 6), wells yielding 400 to 3,000 gpm (gallons per minute) can be obtained in Quaternary alluvium at depths of about 75 to 200 feet. Such wells also can be obtained beneath part of the lowest terrace itself, where test drilling has disclosed that the terrace deposits may be sufficiently thick and permeable to yield enough water for irrigation. However, these deposits become progressively thinner and less permeable toward the western boundary of the terrace (figs. 9 and 10).

The surficial geology of the Quaternary alluvium seems to bear little relation to the character of the underlying aquifer materials. However, it largely controls the amount of recharge to the aquifer by direct penetration of rainfall. Considerable recharge occurs through point-bar and natural-levee deposits but very little through backswamp deposits (pls. 6 and 7). Some recharge to the ground-water body from the Arkansas and Mississippi Rivers occurs during high stages of the rivers, but throughout most of the year the rivers function as drains and receive water from the ground-water body. The generally low chloride content of the ground water even from wells near the Arkansas River, as compared to the river water, indicates that little or none of the ground water comes from the river.

Water levels measured in the spring in wells tapping the Quaternary alluvium declined from 1953 to 1955 and generally rose from 1956 to 1958. The decline was the result of increased pumping for irrigation and below-normal precipitation in the year 1954. The rise in water levels in 1956 through 1958 is attributed to reduced pumping for irrigation and above-normal precipitation in 1957.

Water, generally soft and of excellent quality for most domestic uses, can be obtained everywhere in the area from the Sparta sand or the Cockfield formation, or both, at depths of about 300 to 1,600 feet. The maximum depth at which fresh water is likely to occur can be found by adding the surface elevation at any location, except in north-

information about the occurrence, availability, movement, recharge, discharge, and mineral quality of the ground water in Desha and Lincoln Counties in such a way as to aid the citizens of the counties in making the most economical development of their ground-water resources and in preventing overdevelopment. The investigation on which this report is based was begun in July 1955. The report incorporates information on irrigation wells obtained by J. H. Criner in 1952, on municipal wells obtained by H. B. Counts in 1949, and on the geology of the ridge area obtained by F. E. Onellion in 1954. An inventory of existing irrigation, public-supply, industrial, and deep domestic wells was completed during 1955, 1956, and 1957. The surface geology was studied and mapped chiefly during the summers of 1954, 1955, and 1956. Samples of water from representative wells were collected for chemical analysis and were analyzed by the Quality of Water Laboratory of the U. S. Geological Survey at Fayetteville, Ark., and Merle E. Schroeder, District Chemist, reviewed the section of the report on quality of the ground water. The geologic mapping was done on maps prepared by the State Highway Commission and on topographic maps supplemented by stereoscopic study of aerial photographs. The subsurface geology was studied by means of electric logs, logs and samples furnished by drillers, and test drilling. Water-level fluctuations were determined from periodic measurements in selected wells and from the charts of water-level recorders in four wells.

In Desha and Lincoln Counties there are large areas that are practically inaccessible and virtually uninhabited. These areas include the larger backswamps and the area between the artificial levees along the Arkansas, White, and Mississippi Rivers. In these areas there is, unavoidably, a lack of information on the ground-water conditions.

ACKNOWLEDGMENTS

The writers wish to acknowledge the help and cooperation received from many people during this investigation, including well owners, water-well drillers, representatives of various Government agencies, and others. Mr. R. W. Schroeder, Lincoln County Agricultural Agent, furnished information and field office space; Mr. A. C. Smith, Desha County Agricultural Agent, assisted in locating water wells and estimating pumpage for irrigation; Messrs. J. E. Gammil of the Soil Conservation Service in Star City and H. W. Hill of the Soil Conservation Service in McGehee furnished information on well locations and provided other assistance.

Messrs. George Ryland and G. E. Rice assisted in making pumping tests and furnished unused wells for water-level recorders. Messrs. C. F. Hudson, and J. E. Gober assisted in making pumping tests. Messrs. J. L. McKennon, R. A. Adcock, C. D. Kennedy, and E. S. Kennedy furnished unused wells for water-level recorders.

Information on pumpage from public-supply water wells was furnished by Messrs. M. H. Wood of Dumas, W. E. Patrick of McGehee, Noel Garling of Arkansas City, and R. A. Pickens of Pickens. Logs of water wells were made available by the Layne-Arkansas Co., M. E. McDonald Irrigation Co., H. S. Ragland Co., Star City Water Well Co., W. B. Loyd and Sons Co., and Hardin Bros. Mr. J. B. Baker furnished information on many deep water wells in Desha County.

Logs of test borings of the U. S. Corps of Engineers, Vicksburg District, records of water wells, and geophysical test-hole logs in their files were made available. Mr. George Whittaker, of the Corps' Discharge Section, made periodic water-level measurements in an observation well.

PREVIOUS INVESTIGATIONS

A short discussion of the ground-water features of Desha and Lincoln Counties was included in Veatch's report (1906) dealing with the geology and ground-water resources of northern Louisiana and southern Arkansas. It seems that at the time of Veatch's investigation there were no wells in Desha or Lincoln Counties penetrating the aquifers in the Tertiary rocks, nor any large-capacity wells tapping the Quaternary deposits. However, Veatch predicted accurately that wells of large capacity could be obtained in the deposits of Quaternary age and that water of good quality for domestic use could be obtained from the Tertiary rocks.

A list of existing water wells in Desha and Lincoln Counties was included in a report by Branner (1937). Branner's report shows that until 1937 few large wells had been made in Desha and Lincoln Counties. The report lists 3 wells in Desha County and 1 well in Lincoln County tapping the aquifer of Tertiary age and 1 large-capacity well in each county tapping the aquifer of Quaternary age.

The subsurface geology of Desha and Lincoln Counties has been described in the reports of Spooner (1935) and Caplan (1954). These reports include discussions of the stratigraphy of the region and structure maps of the Desha basin.

The reports of the U. S. Corps of Engineers (Fisk, 1944 and 1947; Waterways Experiment Station, 1951) deal almost entirely with the alluvial geology of the region.

LOCATION, TOPOGRAPHY, AND DRAINAGE

Desha and Lincoln Counties are in the Gulf Coastal Plain in southeastern Arkansas. They are bordered on the north by Arkansas, Jefferson, and Phillips Counties; on the east by the Mississippi River and the State of Mississippi; on the south by Chicot and Drew Counties; and on the west by Cleveland County. The Mississippi River forms a natural boundary on the east side, and the Arkansas and White Rivers form a partial boundary on the north, separating the two counties from Arkansas County and Lincoln County from Jefferson County. Desha County has an area of 805 square miles, Lincoln County an area of 570 square miles.

The report area includes two distinct topographic units: (1) an upland in western Lincoln County known as the Monticello Ridge; and (2) a flat area including eastern Lincoln County and all of Desha County, referred to locally as the "delta," which is a part of the alluvial plain of the Arkansas and Mississippi Rivers.

The Monticello Ridge, trending northwest, is about 9 miles wide in the vicinity of Star City and about 12 miles wide near the Drew County line. It consists of highly dissected upland, the core of which is shown on the geologic map (pl. 6) by the outcrop areas of the Jackson group capped in part by Pliocene(?) gravel. The relatively resistant gravel beds of Pliocene(?) age form flat-topped surfaces at similar elevations on the ridge summits. They are similar to gravel beds that cap Crowleys Ridge in northeastern Arkansas, and it seems likely that the eroded Tertiary surface with its gravel cap was once continuous across the intervening area.

Flanking the Monticello Ridge on either side are dissected Pleistocene terrace deposits that range in width from 0 to 5 miles. East of the ridge the terrace deposits rise in a prominent escarpment 20 to 30 feet above the Mississippi alluvial plain. West of the ridge they rise 10 to 50 feet above the stream flood plains.

The surface features of the alluvial plain are typical of flood-plain topography. The larger bayous draining the area have well-developed natural levees, and the areas between them are generally occupied by backswamps. Oxbow lakes and brakes (both formerly segments of stream courses) and meander scrolls or point-bar deposits are common along the larger bayous and along the rivers. The streams draining Desha County and eastern Lincoln County are of two general types: (1) large bayous having well-developed meanders and natural levees and (2) smaller bayous having relatively straight courses and draining the backswamp areas. According to Fisk (1944) many of the large bayous follow courses previously occupied by the Arkansas River.

The total relief of Desha County is about 65 feet from the lowest point (elevation 105 feet above mean sea level), where the Mississippi River leaves the county, to the highest point (170 feet), west of Dumas. In Lincoln County the total relief is 275 feet from the lowest point (135 feet), where Bayou Bartholomew leaves the county, to the highest point (410 feet), on the Monticello Ridge about 2 miles northwest of Star City. On the Mississippi alluvial plain the local relief from the crests of the natural levees to the adjacent backswamps is about 10 to 15 feet, whereas in the more highly dissected parts of the Monticello Ridge the local relief is about 100 feet.

CLIMATE

The climate of Desha and Lincoln Counties is characterized by usually short and mild winters, with occasional cold periods of a few days' duration, and long hot summers when temperatures above 100°F are not uncommon. The normal monthly and yearly temperature at Dumas is given in table 1. The average rainfall is abundant and normally well distributed throughout the area; however, periods of excessive or deficient rainfall frequently occur. The average annual precipitation at Arkansas City and Dumas is 49.57 and 51.47 inches, respectively. Annual precipitation at Arkansas City and Dumas from 1886 to 1957 is given in table 2. Extremes in annual precipitation in the area range from a low of 26.56 inches recorded at Arkansas City in 1901 to a high of 73.30 inches at the same station in 1950. Precipitation records show several periods of drought lasting 2 years or more,

TABLE 1

Normal monthly and yearly temperature at Dumas, Desha County, Ark.

Month	Temperature (°F)
January	44.5
February	47.9
March	55.6
April	63.0
May	71.4
June	79.2
July	82.4
August	82.0
September	76.1
October	65.2
November	53.5
December	46.3
Annual	63.9

TABLE 2

Annual precipitation at Arkansas City and Dumas, Desha County.

Year	Precipitation (inches)	
	Arkansas City	Dumas[1]
1886	49.86	--------
1887	41.54	--------
1888	--------	--------
1889	38.18	--------
1890	59.13	--------
1891	48.26	--------
1892	50.24	--------
1893	45.44	--------
1894	43.46	--------
1895	33.35	--------
1896	42.25	--------
1897	48.71	--------
1898	52.78	--------
1899	38.19	--------
1900	41.78	--------
1901	26.56	37.96
1902	46.57	64.14
1903	43.69	43.29
1904	47.43	46.41
1905	60.71	60.70
1906	62.33	56.49
1907	52.94	--------
1908	63.74	--------
1909	52.82	--------
1910	51.38	--------
1911	70.00	--------
1912	53.46	55.91
1913	61.10	62.80
1914	52.76	52.07
1915	50.67	50.75
1916	53.47	41.98
1917	45.32	47.96
1918	33.79	36.74
1919	56.73	62.52
1920	65.11	67.61
1921	48.66	52.88
1922	61.31	61.91
1923	63.25	61.10
1924	32.58	40.53
1925	41.63	51.26
1926	48.47	46.96
1927	55.31	73.22
1928	41.24	48.58
1929	40.38	40.13
1930	48.83	49.91
1931	50.35	57.54
1932	62.27	64.30
1933	48.50	52.01
1934	50.57	49.03
1935	48.03	47.71
1936	37.71	41.08
1937	66.10	57.44
1938	36.38	43.57
1939	57.14	55.08
1940	59.60	53.47
1941	43.52	42.52
1942	40.45	37.38
1943	36.36	35.90
1944	71.88	55.69
1945	68.46	61.08
1946	63.00	59.90
1947	56.09	47.72
1948	54.23	58.11
1949	60.36	61.76
1950	73.30	70.35
1951	54.77	56.05
1952	38.92	38.99
1953	56.70	56.08
1954	39.78	37.72
1955	50.57	48.08
1956	42.43	43.67
1957	70.24	72.93

[1] The values for 1901-06 are for Winchester, 7½ miles south of Dumas.

separated by years of above-normal precipitation.

The normal monthly and seasonal precipitation at Dumas and Arkansas City is given in table 3. Monthly and seasonal precipitation frequently deviates considerably from normal. For example, although the total precipitation in 1953 was above normal, it was poorly distributed throughout the year and drought conditions persisted from the closing days of May until September.

Poor distribution of rainfall, especially during the growing season, may seriously affect the agricultural economy of the area. James L. Gattis (1950), Extension Agricultural Engi-

TABLE 3

Normal monthly, seasonal, and annual precipitation at Arkansas City and Dumas.

	Arkansas City	Dumas
December	5.28	6.04
January	4.83	4.98
February	4.40	4.11
Winter	14.51	15.13
March	5.59	5.83
April	4.81	4.76
May	4.52	4.66
Spring	14.92	15.25
June	3.70	3.61
July	3.61	3.98
August	3.52	3.27
Summer	10.83	10.86
September	2.81	2.97
October	2.47	3.03
November	4.03	4.23
Fall	9.31	10.23
Year	49.57	51.47

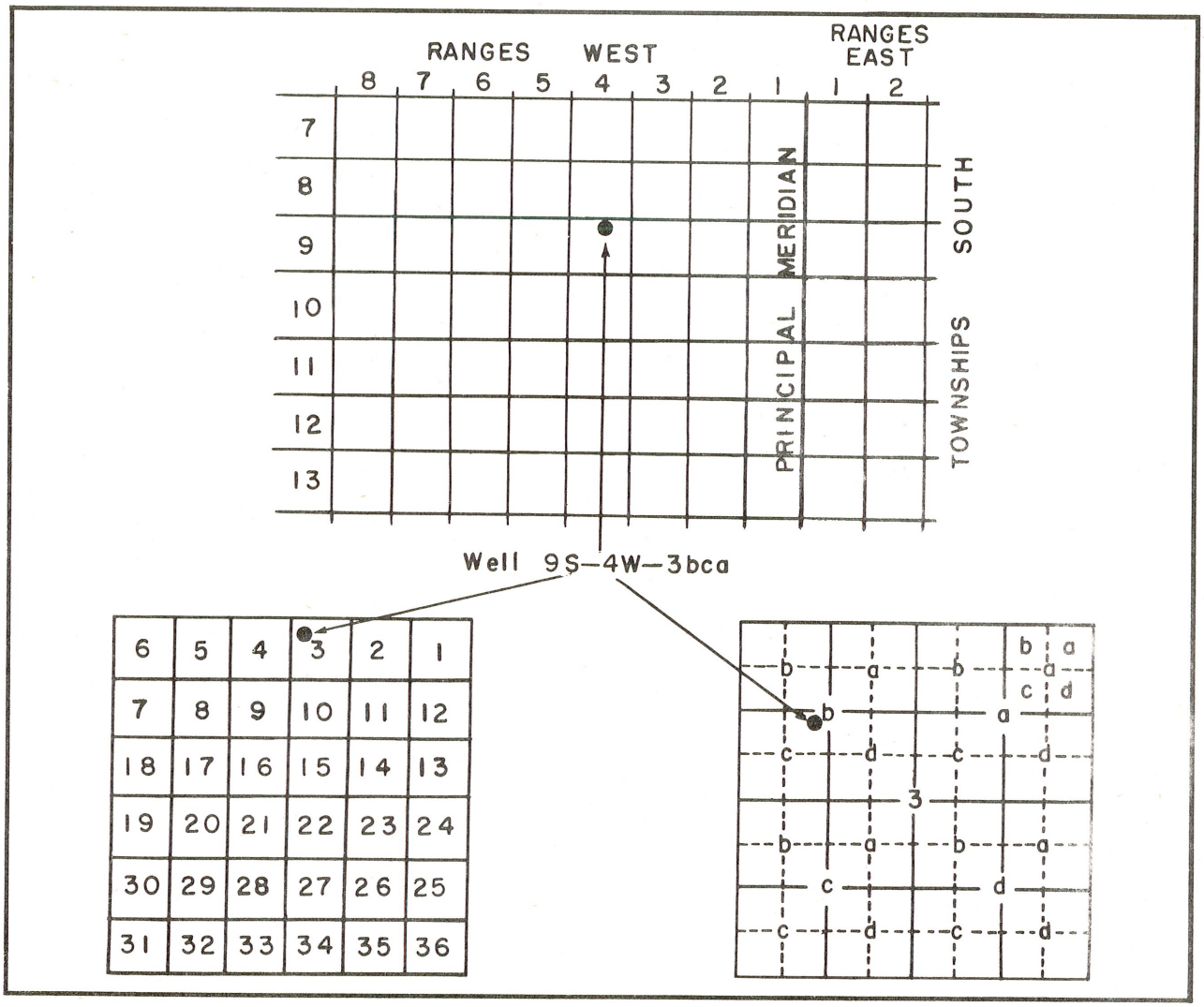


Figure 2. Sketch illustrating well-numbering system.

neer of the University of Arkansas, has defined a drought as any period of 20 days or more, each 10 days of which has less than half an inch of rainfall. He reports that in Arkansas during a 33-year period "There have been three droughts of more than 50 days' duration. Droughts of 40 to 49 days have occurred four times, or about once every eight years. Much more frequent are droughts of 30 to 39 days, which occurred 10 times, or an average of about once every three years. Droughts of 20 to 29 days were the most frequent of those recorded. They occurred 30 times in 33 years, an average of almost one a year. Less frequent were droughts of 15 to 29 days, which occurred 17 times, or about every other year." He concludes, "From these records, it can be seen that lack of moisture is a limiting factor in Arkansas' agricultural production in certain years." It would seem that irrigation of dry crops by ground and surface water may be used profitably to counterbalance the deficiency in rainfall in about 3 out of every 4 years.

WELL-NUMBERING SYSTEM

The well-numbering system used in this report is based upon the location of the wells with respect to the Federal land-survey system used in Arkansas (fig. 2). The component parts of a well number are the township number, the range number, the section number, and three lowercase letters which indicate, respectively, the quarter section, the quarter-quarter section, and the quarter-quarter-quarter section in which the well is located. Serial numbers are appended when more than one well is listed within the quarter-quarter-quarter section.

TABLE 4

Generalized geologic section for Desha and Lincoln Counties.

Era	System	Series	Group	Subdivision	Thickness (feet)	Character of materials	Water Supply
Cenozoic	Quaternary	Recent and Pleistocene(?)		Alluvium	0-195	Sand and gravel in basal part, usually overlain by fine sand, silt, and clay. Basal unit may be Pleistocene.	Basal part is most important aquifer in the area; yields up to 3,000 gpm of water to irrigation wells.
		Pleistocene(?)		Terrace deposits	0-140	Sand, gravel, silt, and clay, in a variety of colors.	Furnish water to domestic wells; capable of yielding 1,000 gpm where sufficiently thick and permeable.
	Tertiary	Pliocene(?)		Deposits of Pliocene(?) age	0-80	Sand and gravel, reddish-brown; some interbedded varicolored clay.	Yield water of good quality to shallow domestic wells and to numerous springs.
		Eocene	Jackson		100(?)-420	Clay, brown and gray; and gray silt and sand.	Yields small quantities of water of generally poor quality to shallow domestic wells.
			Claiborne	Upper (undifferentiated)	1,000-1,300	Sand, light to medium-gray; and brown sandy lignitic clay.	Yields up to 225 gpm of soft water to deep wells. Probably will yield more than 1,000 gpm in places.
				Cane River formation	700-900	Clay, gray and brown, glauconitic; sand unit at base.	Sand unit at base probably contains only salty water except in northeastern Desha County.
			Wilcox		800-1000	Clay, chocolate-brown, lignitic, sandy; lignitic sands, and lignite.	Probably contains only salty water.
		Paleocene	Midway		655-790	Clay, dark-gray to blue-gray, calcareous near its base.	Too fine grained to be an aquifer.
Mesozoic	Cretaceous					Shale, marl, sandstone, limestone, and chalk.	Probably contains only salty water.

GEOLOGY

Desha and Lincoln Counties are underlain by rocks ranging in age from Paleozoic to Recent. The following generalized section (table 4) gives the name, age, and character of the geologic units of Mesozoic and later age in the report area. The cross sections (figs. 8-13 and pls. 1-4) show the relationships of the units to one another in the subsurface. The geologic maps (pls. 5 and 6) show the distribution of the units exposed at the surface.

The Jackson group of Eocene age crops out along the Monticello Ridge except at the highest elevations where it is overlain by Pliocene(?) deposits. Deposits of clay, silt, sand, and gravel of Quaternary age form the surface materials of the alluvial plain.

STRUCTURE

The structure of the region is dominated by the Mississippi trough, whose axis generally follows the course of the Mississippi River south of a point near Cairo, Ill. (fig. 3). The axis trends southwestward to a point near the confluence of the Mississippi and Arkansas Rivers, where it meets the southeastward-trending axis of a subsidiary structure, the Desha basin, and then trends southeastward and southward through Mississippi. The Desha basin trends southeastward through Lincoln and Desha Counties, where it attains its maximum development. The basin is bounded on the north in Arkansas County by a southeastward-plunging anticline and on the south by the Monroe uplift, which is a structural high in southern Arkansas and northern Louisiana.

Structural maps of the report area are shown in figures 4-7. The maps show the Desha basin during a part of the period when it was being filled with Tertiary deposits, and the basin therefore becomes less pronounced with each succeeding map.

STRATIGRAPHY

Rocks of Paleozoic and Mesozoic Age

Rocks of Paleozoic age make up the basement complex in Desha and Lincoln Counties. These rocks are encountered in the subsurface at depths ranging from 4,200 feet in southwestern Lincoln County to 4,800 feet in east-central Desha County. Little is known of these rocks in Desha and Lincoln Counties, but their general character may be inferred from their exposure in the Interior Highlands of western Arkansas. According to Caplan (1954, p. 12-14), the Paleozoic rocks of Lincoln and Desha County are an extension of the rocks of the Ouachita Mountain and Arkansas Valley provinces. In the outcrop area these rocks consist predominantly of quartzite, sandstone, shale, and novaculite. No important aquifers occur in the outcrop area and none are likely in the subsurface. The rocks of Paleozoic age are unconformably overlain by rocks of Mesozoic age.

Upper Cretaceous rocks are the oldest rocks identified with certainty overlying the basement rocks of Paleozoic age. According to Caplan (1954, p. 30), however, the possibility exists that Mesozoic rocks older than Late Cretaceous are present in the deeper part of the Desha basin. Rocks of Jurassic and Early Cretaceous age have been encountered in oil tests south of the report area.

Rocks of Late Cretaceous age crop out in southwestern Arkansas and have been traced into the subsurface of the Gulf Coastal Plain, where they are penetrated by many oil test holes. In Desha and Lincoln Counties the Upper Cretaceous consists of shale, marl, sandstone, limestone, and chalk of the Tokio, Ozan, Annona, Marlbrook, and Saratoga formations (Caplan, 1954, p. 84-89).

Electric logs indicate that any water contained in Upper Cretaceous or older Mesozoic rocks in Lincoln and Desha Counties is likely to be salty.

Rocks of Cenozoic Age

The rocks of Cenozoic age in Arkansas consist largely of unconsolidated deposits of Tertiary and Quaternary age. The Tertiary is represented by several units of Paleocene and Eocene age and by deposits of probable Pliocene age. The Quaternary consists of alluvial materials almost certainly of both Pleistocene and Recent age but not yet definitely distinguishable one from the other.

Tertiary System

The Tertiary system in Desha and Lincoln Counties is represented in the subsurface by the Midway group of Paleocene age, the Wilcox group of early Eocene age, and the Claiborne group of middle Eocene age, which includes the Cane River formation, the Sparta sand, the Cook Mountain formation, and the Cockfield formation. The Jackson group of late Eocene age crops out in the highland area of the Monticello Ridge in west-central Lincoln County and is probably present in the subsurface throughout the rest of the report area. The Jackson group on the Monticello Ridge is

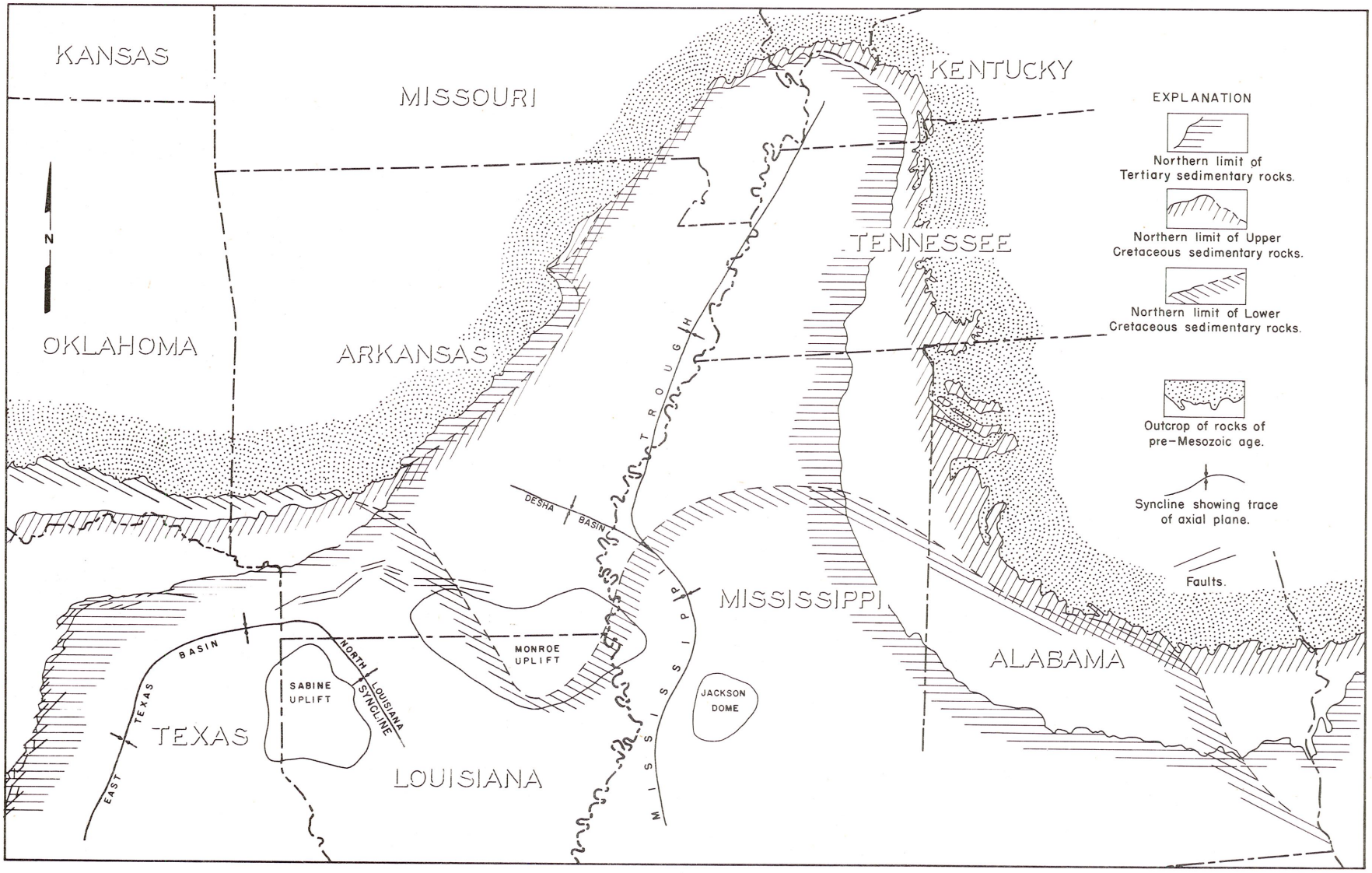


Figure 3. Outline map showing major structural features and relations of Cretaceous and Teritiary rocks of the Mississippi embayment.

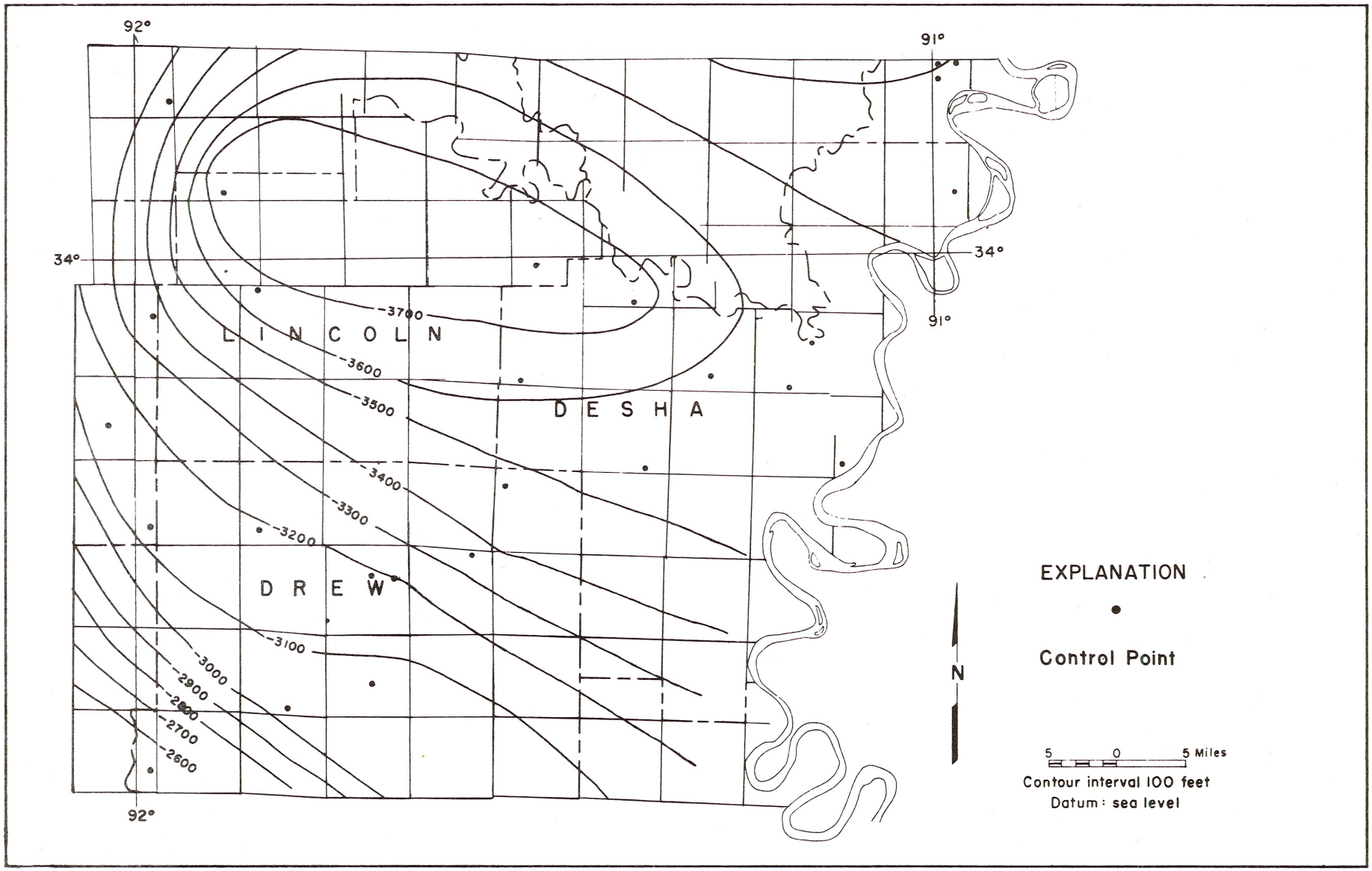


Figure 4.—Structural contours on top of the Cretaceous system in a part of southeastern Arkansas.

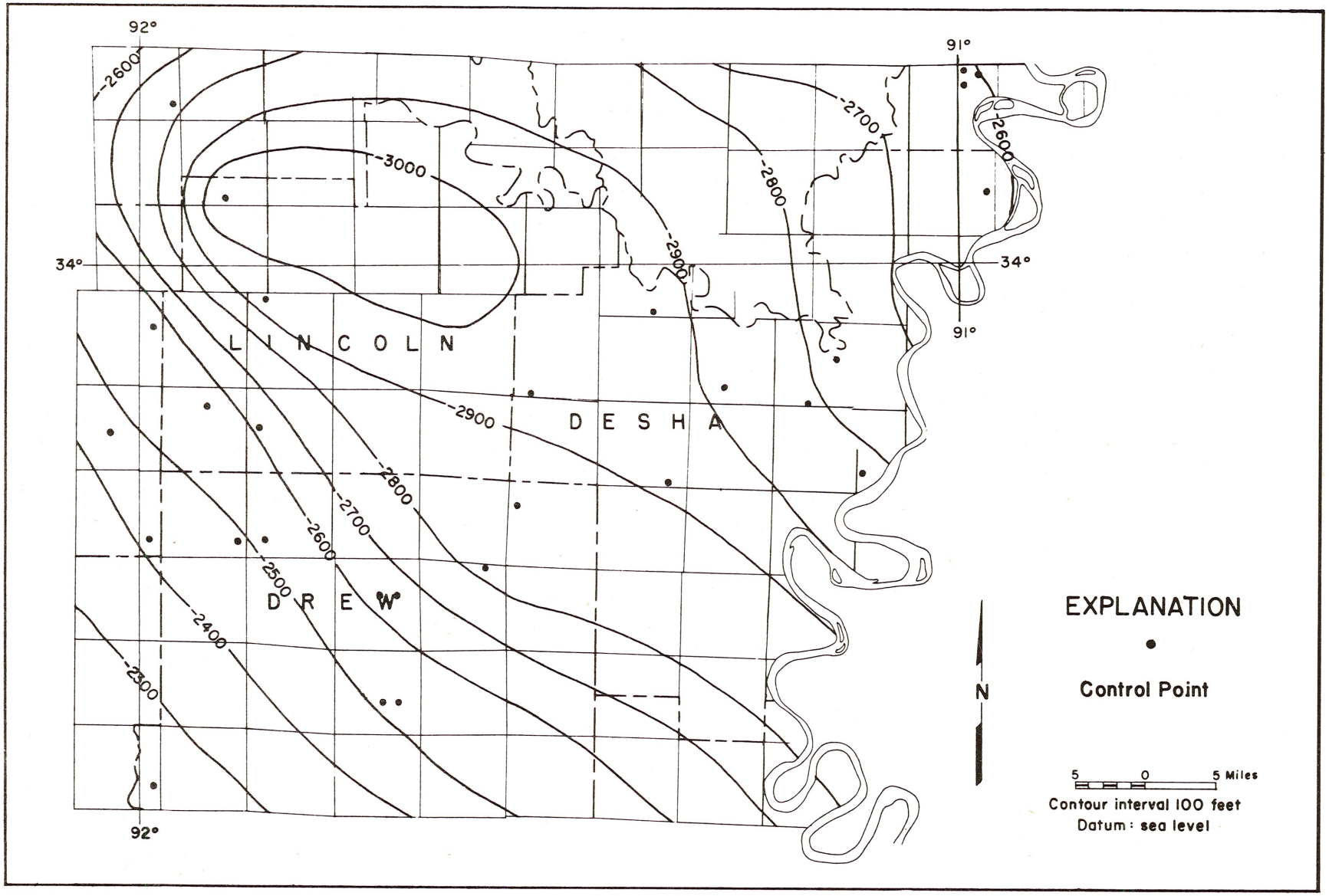


Figure 5.—Structural contours on top of the Midway group in a part of southeastern Arkansas.

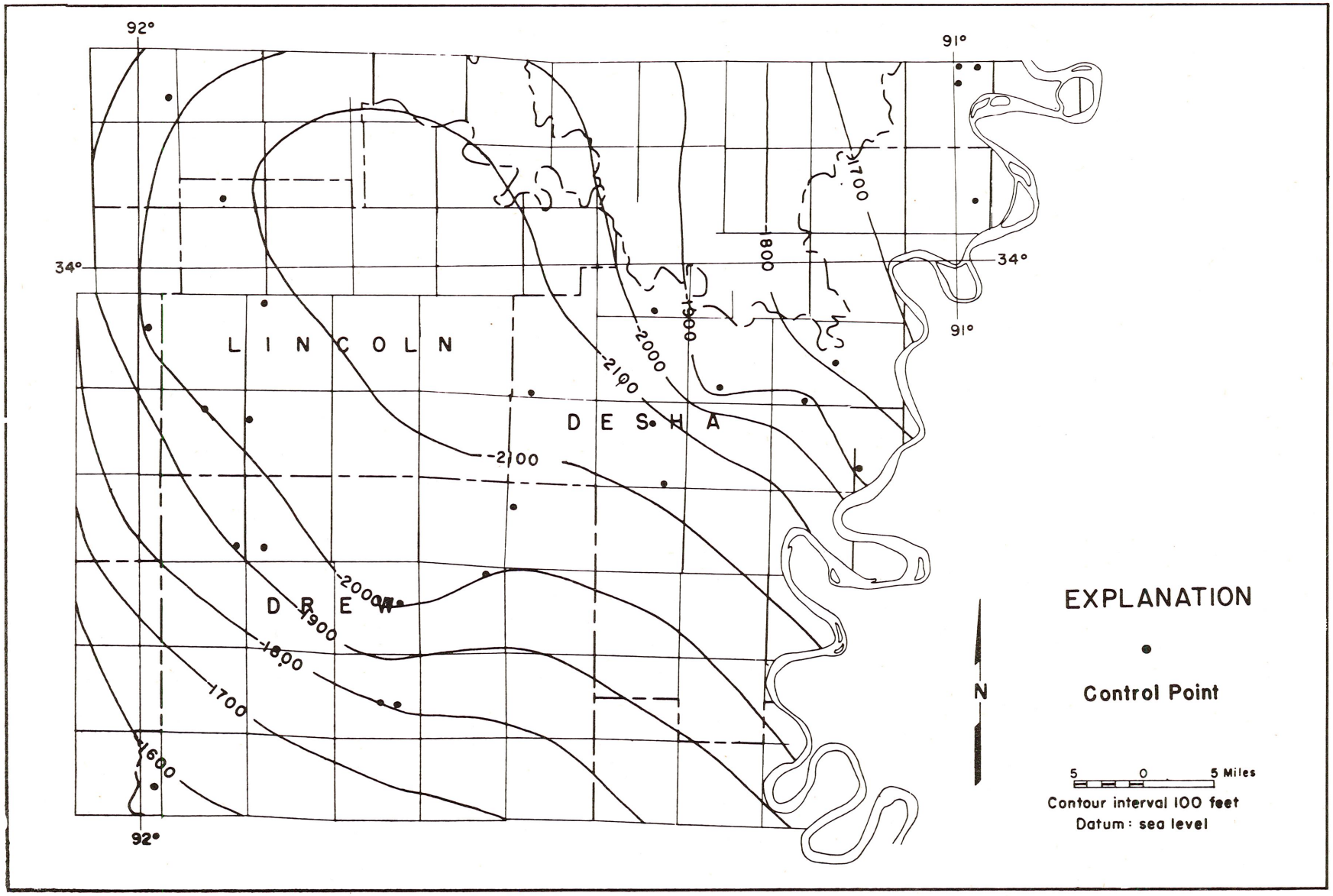


Figure 6.—Structural contours on top of the Wilcox group in a part of southeastern Arkansas.

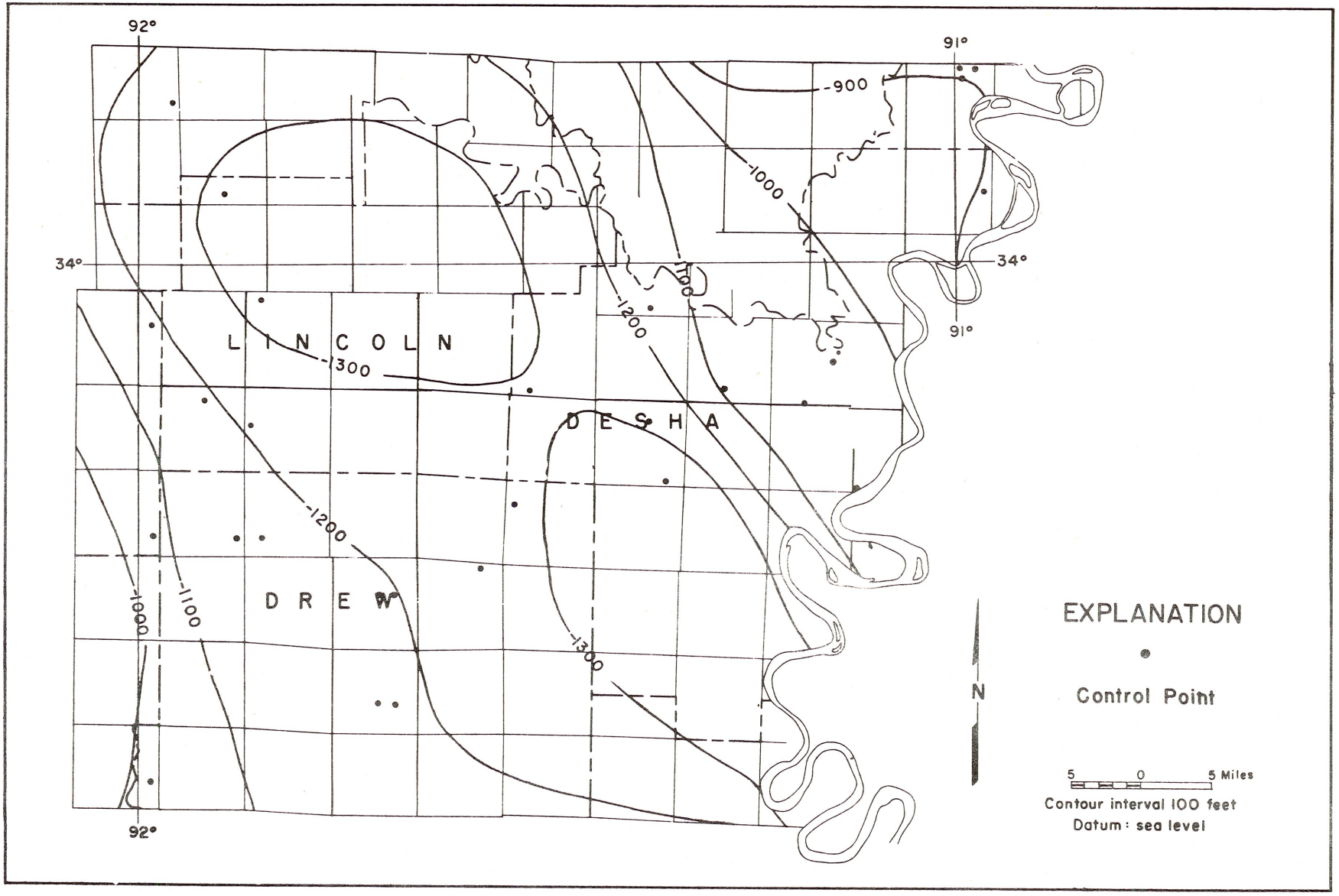


Figure 7.—Structural contours on top of the Cane River formation in a part of southeastern Arkansas.

capped by sand and gravel of Pliocene(?) age. In the subsurface the Tertiary system in Desha and Lincoln Counties is known from drillers' logs and electric logs of oil tests. The correlations presented in the cross sections (pls. 1-3) are based on lithologies only and therefore are tentative and subject to revision.

Midway group

The Midway group, of Paleocene age, crops out nearly continuously in southwestern Arkansas from the vicinity of Texarkana to Little Rock. Isolated outcrops also occur along the Fall Line (Counts, 1957, p. 8; Caplan, 1954, p. 94) northeast of Little Rock in the vicinities of Cabot, Bradford, and Grandglaise. It occurs continuously in the subsurface in Arkansas south and east of its outcrop area. The Midway deposits overlap the Cretaceous deposits and rest directly upon rocks of Paleozoic age from the vicinity of Malvern northeastward to Grandglaise. In southwestern Arkansas where the Midway directly overlies deposits of Cretaceous age, the base of the Midway is marked by a horizon of phosphatic nodules (Dane, 1929, p. 154-157). Principally, on the basis of paleontologic evidence, Dane (1929, p. 159) and Harris and Jobe (1951, p. 80) conclude that the Upper Cretaceous and Midway in Arkansas are separated by a hiatus of long duration.

The Midway group in the subsurface of Desha and Lincoln Counties has a dip of about 25 feet per mile toward the axis of the Desha basin. It generally ranges in thickness from 650 to 850 feet.

The Midway consists principally of dark-gray to bluish-gray clay, generally more calcareous and fossiliferous near its base than higher up. Limestone beds are present at some places in the lower calcareous portion. The clay is compact, with a pronounced bedding fissility. The formation contains a marine fauna, well represented in the lower part. The upper part is sparsely fossiliferous, faunal elements usually being arenaceous Foraminifera. Caplan (1954, p. 94) and others have differentiated the Midway into (1) the Porters Creek formation, the upper unit, which consists generally of noncalcareous clays; and (2) the Clayton formation, the basal unit, which consists of calcareous and fossiliferous clay and limestone beds.

The Midway in Lincoln and Desha Counties is too fine grained to be an aquifer.

Wilcox group

The Wilcox group crops out in southwestern Arkansas from Miller County to Pulaski County and on Crowleys Ridge in northeastern Arkansas. It is continuous in the subsurface south and east of its area of outcrop.

A transitional zone between the Midway and the Wilcox usually occurs in both surface exposures and subsurface sections. The Wilcox formation in Desha and Lincoln Counties dips toward the axis of the Desha basin at 15 to 35 feet per mile. Its thickness ranges from a little less than 800 feet in southwestern Lincoln County to more than 1,000 feet in northwestern Lincoln County. The Wilcox consists of fine- to medium-grained sand and sandy clay which are lignitic in places, carbonaceous clay, and lignite beds. The sands range from yellow brown to gray in color and vary in their degree of sorting. Chocolate brown is a common color in the clays, which generally contain impurities of sand or carbonaceous material. The individual beds of the Wilcox are extremely lenticular and complexly interfingered. Marine fossils are not known to be present in the Wilcox in Arkansas; however, fossil plants are present, indicating a nonmarine environment of deposition.

Some of the sand beds of the Wilcox are important aquifers in other parts of Arkansas, but no well in the report area is known to obtain water from the formation. From available electric logs, the water in the Wilcox appears to be too mineralized for most uses.

Claiborne group

The Claiborne group, of middle Eocene age, crops out in large areas of southern Arkansas and on Crowleys Ridge in northeastern Arkansas and is extensive in the subsurface in the Mississippi embayment. According to Tait and others (1953, p. 6), the contact between the Claiborne and the underlying Wilcox is unconformable.

The rocks of the Claiborne group range in thickness from 1,700 to 1,900 feet, being thickest in the Desha basin. In Arkansas the group generally is divided into four formations as follows, beginning with the oldest: Cane River formation, mostly marine; Sparta sand, mostly nonmarine; Cook Mountain formation, mostly marine; and Cockfield formation, mostly nonmarine. The absence of well-defined and continuous key beds above the Cane River and the variable lateral gradations in lithology make the identification of the upper forma-

tions of the group difficult in the report area. The formational divisions are useful from a hydrologic aspect, because the Sparta sand and Cockfield formation generally contain aquifers. Water of good quality can be obtained from one or both of these formations everywhere in the area, and they are important ground-water reservoirs. On the other hand, the Cane River formation generally and the Cook Mountain formation locally act as confining beds.

Cane River formation.—The Cane River formation consists of sand, clay, and sandy clay. The formation ranges in thickness from 700 to 900 feet. The upper contact is placed at the top of a clay unit that is persistent in the subsurface throughout the report area and is readily identifiable by a characteristic "kick" on electric logs. According to Tait and others (1953, p. 6), there is a local unconformity at the top of the Cane River formation in Columbia County.

The basal unit of the Cane River is composed of coarse sand that is similar in lithology to the sands of the underlying Wilcox, from which the sand was supposedly derived (Brown, 1947, p. 38). It probably is equivalent to the Meridian sand member of the Tallahatta formation in Mississippi as used by Brown. This sand is continuous throughout the area and averages 250 feet in thickness. The evidence for considering this sand as the base of the Claiborne group is given by Brown (1947, p. 37). In other areas in Arkansas it has been placed in both the Wilcox (Klein, Baker, and Billingsley, 1950, p. 9; Onellion, 1956, p. 9) and in the Cane River formation (Tait, Baker, and Billingsley, 1953, p. 7).

In contrast to the basal unit, the sands of the upper part of the formation are fine grained, lenticular, and light gray or light green in color. The clays of the formation are brown, fossiliferous, calcareous, and glauconitic, and some near the top are lignitic.

The Meridian sand member is an important aquifer in Mississippi but has not been tapped by wells in Arkansas. Studies of electric logs indicate that over most of the report area the water in the unit probably is too mineralized for most uses. However, in the northeastern part of Desha County this unit may contain fresh water. The materials of the remainder of the formation generally are too fine grained to be important aquifers, and electric logs indicate that the water contained in the sand beds is likely to be too salty for most uses.

Sparta sand.—The Sparta sand overlies conformably the Cane River formation. It consists predominantly of light-gray sand but contains some beds of gray and brown sandy lignitic clay. The sands are fine to medium grained, subrounded, and generally well sorted. The beds are massive, but vary laterally in thickness and stratigraphic position. Electric logs of oil tests in the area show sands up to 700 or 800 feet in thickness and thin interbeds of clay and sandy clay. Sample logs show the interbedded clays to be thin, well compacted, and somewhat fissile. They commonly contain lignitic plant material. Beds of sandy clay are more common in the lower part of the formation, where they may attain a thickness of 100 feet or more.

In spite of their occurrence at variable depths in wells, the sand beds of the Sparta are believed to be generally in contact with each other and hydraulically interconnected throughout the area. Where test holes have been closely spaced, as in the El Dorado area, the sand beds are found to be lenticular, overlapping, and interfingered. In Lincoln and Desha Counties, the water levels in wells tapping the Sparta sand seem to indicate a single piezometric surface. Collectively, the beds constitute one of the most important aquifers in the area and furnish water to most of the public-supply wells and several domestic wells. The wells range in depth from about 700 to 1,400 feet and in yield from 3 to 225 gpm. These yields represent pump and well capacities, and the Sparta probably is capable of yielding greater quantities to larger wells. An irrigation well in Drew County, only a few miles south of the Lincoln County line, has a yield of 2,000 gpm from the Sparta sand. Two wells in Desha County, 11S-2W-3bcd and 11S-2W-3cca, which are not now in use, were reported to yield about 1,000 gpm each when drilled. The water is confined beneath relatively impermeable clay beds and rises in the wells to points generally from 5 to 127 feet below the land surface.

The bottom of the Sparta sand marks the maximum depth at which fresh water can be obtained over the entire area except in the northeastern part of Desha County, where, as pointed out previously, the Cane River formation may contain fresh water. The maximum depth of fresh water at any location can be estimated by adding the surface elevation at the location to the depth below sea level of the top of the Cane River formation. The depth below sea level of the top of the Cane River formation is shown in figure 7.

Cook Mountain formation. — The Cook Mountain formation overlies the Sparta sand with apparent conformity in the report area. It ranges in thickness from about 50 to 150 feet. It consists of gray compact fossiliferous clay and many thin to very thin lenses of light-gray fine sand. A marine fauna consisting mostly of gastropods, pelecypods, and microfossils generally is present in the formation in southern Arkansas. However, samples were available from only one well in the report area, and elsewhere the identification of the formation is of necessity based on electric logs. As in Drew County, the Cook Mountain formation is tentatively identified as a sequence of clay and silt beds (Onellion, 1956, p. 10). The selection of this unit in logs is arbitrary, however, because several units of this lithology may be present in the same location.

The Cook Mountain formation is too fine grained to yield water to wells, and it acts as a confining bed in retarding the movement of water between the Sparta sand and the Cockfield formation.

Cockfield formation. — The Cockfield formation, the uppermost formation of the Claiborne group, is generally gradational with and, on the basis of available logs, not sharply distinguishable from the underlying Cook Mountain formation. In Desha and Lincoln Counties the Cockfield formation apparently ranges from about 300 to 450 feet in thickness.

The Cockfield consists chiefly of fine- to medium-grained gray sand, in part lignitic, interbedded with light- to dark-gray lignitic clay. The individual beds are extremely lenticular, varying greatly in thickness from place to place. According to Onellion (1956, p. 10) the basal part of the formation usually consists of well-developed beds of gray sand 15 to 45 feet thick interbedded with a few thin beds of lignitic clay; the middle part consists of lignitic clay 30 to 100 feet thick interbedded with thin beds of lignitic sand; and the upper part consists of alternating beds of sand, in part lignitic, and lignitic clay.

Water of good quality can be obtained from the Cockfield formation at most places in the area; but, locally, drillers have reported the sand beds of the formation to be too thin or not sufficiently permeable to allow well development. Many domestic wells obtain water from this formation at depths ranging from 280 to 690 feet. Yields are adequate for most domestic supplies, although generally less than those obtained from the Sparta sand, because the sand beds of the Cockfield generally are thinner and finer grained than those of the Sparta.

Jackson group

The Jackson group, of late Eocene age, crops out in southeastern Arkansas and on the south end of Crowleys Ridge. It is present in the subsurface of southeastern Arkansas, the outcrops marking the western and northwestern limits of its occurrence. It is present at the surface in the Monticello Ridge in Lincoln County and probably underlies younger deposits throughout the remainder of Desha and Lincoln Counties.

At the surface in Lincoln County the Jackson appears to be approximately flat lying; farther north, in Jefferson County, it has a noticeable southerly dip. The thickness of the Jackson in the Monticello Ridge may be as much as 500 feet. Underneath the Quaternary alluvium, where most of the Jackson has been removed by erosion, the thickness is approximately 100 to 300 feet. Information on the thickness of the Jackson was derived from the interpretation of electric logs of oil tests (pls. 1 and 2). The base of the formation was picked at the contact of two units, the upper a relatively homogeneous clay section and the lower an interbedded sand and clay section. This contact was used for the purposes of this report, although possibly the contact is somewhere in the clay section at a higher stratigraphic position.

The exposures of the Jackson in Lincoln County are sparsely fossiliferous. Specimens of *Venericardia planicosta* were found at two localities (sec. 32, T. 10 S., R. 8 W., and sec. 6, T. 9 S., R. 7 W.) where marine tongues occur in the predominantly continental deposits. According to Wilbert (1953, p. 86 and 87) plant fossils are found in the continental phase of the Jackson, but no identifiable plant fossils were found in Lincoln County, although lignitic material is common.

Wilbert (1953, p. 23 and 24) has treated the Jackson as a stage and divided the rocks of Jackson age into two formations, the marine White Bluff formation and the continental Redfield formation. In Lincoln County the Redfield formation is exposed at the surface and overlies the White Bluff, the marine unit, which is generally present only in the subsurface. The Jackson rests unconformably upon the Cockfield formation but the contact is not exposed in Lincoln County. Exposures of the Jackson consist predominantly of clay beds, usually sandy and silty, in a variety of colors,

light chocolate brown, gray, and light greenish gray being most common. The clays generally are fissile, locally are blocky, and commonly contain ironstone concretions. Joints are common in fresh exposures. Interbedded with the clays are light-gray and greenish-gray silts and sands. The sands generally are fine grained and are clayey or silty.

The following section of the Jackson was observed on the east side of the road about half a mile north of Cornerville, Lincoln County, in sec. 9, T. 10 S., R. 8 W.

	Feet
Clay, mottled red and gray; contains ironstone concretions	8
Clay, brownish-gray, with yellow splotches	24
Clay, sandy, gray, with yellow splotches	3
	35

The Jackson is chiefly clay, and the few sand beds it contains are very fine grained. In the outcrop area in Lincoln County the Jackson yields water in small quantities to dug and bored wells, but in some areas it yields virtually no water. The water is of fair to poor quality and is not as highly mineralized as is the water from the same formation farther south in Drew County. The waters from the Jackson group are referred to locally as "alum waters." The "alum" taste of the water is probably due to the high iron content.

Pliocene(?) deposits

Pliocene(?) deposits cap the highest parts of the Monticello Ridge at elevations of 320 to 400 feet above mean sea level. In Lincoln County these deposits unconformably overlie the Jackson group of Eocene age. The unconformity is expressed chiefly in the weathered character of the Jackson below the contact, where it is irregularly mottled and streaked with iron oxides; and in the difference in altitude of the contact from place to place. The eroded surface of the Jackson group upon which the Pliocene(?) beds were deposited appears to have 30 to 40 feet of relief in the area.

Deposits similar in lithology and in topographic and stratigraphic position occur in adjacent areas in southern Arkansas and on Crowleys Ridge in northeastern Arkansas. These deposits may be remnants of a regionally extensive blanket of fluvial material certainly deposited after development of a weathered surface in the Jackson and probably prior to Pleistocene time. The absence from these gravels of pebbles derived from the glacial drift, as contrasted to their presence in the gravels in the Quaternary alluvium, suggests a pre-Pleistocene age for these deposits (Stephenson and Crider, 1916, p. 98-100). Because the age of these deposits is inconclusive, they are here designated as Pliocene(?), after the usage of Onellion (1956, p. 11).

The Pliocene(?) deposits consist of interbedded sand, gravel, and clay. The sand is fine to coarse, very poorly sorted, and yellowish to reddish brown in color; it usually contains some pebbles and is massively bedded. The gravels consist predominantly of chert, quartz being the only other important constituent. The gravel is typically crossbedded and most of the pebbles are well rounded and have medium sphericity. Fossils are common in the chert pebbles and include chain and horn corals, crinoid stalks, brachiopods, bryozoans, and others. They are similar to the fossils found in cherty limestone of the Ozark uplands of northern Arkansas and southern Missouri. The clay beds have a blocky fracture, are variegated in color, and are thin. Iron-cemented zones usually occur in the sand and gravel at their contact with the clay. The sands and clays are fairly well compacted; the gravel generally is less compact. Some of the sections observed in the field are described below.

Section exposed north of county road in sec. 29, T. 9 S., R. 7 W.

	Feet
Pliocene(?) deposits:	
Sand, gravelly to silty, yellow-brown	3
Sand, gravelly, reddish- brown	14
Gravel bed, lenticular, cemented at base	0.5 to 3
Clay, variegated purple, yellow, and gray	5
Sand, massive, orange, with irregular gray splotches and streaks	5
	30

Section exposed in gravel pit west of State Highway 11 in sec. 35, T. 9 S., R. 8 W.

	Feet
Pliocene(?) deposits:	
Sand, gravelly, reddish-brown	1
Gravel, massive, reddish-brown	4
Gravel, crossbedded, reddish-brown, and coarse sand	22
Ironstone cemented layer	0.1
	27.1
Jackson group:	
Clay, sandy, yellow and gray	8

The deposits have been deeply dissected and have been completely removed from some parts of the ridge. They vary greatly in thickness, partly because of the original relief at the base of the deposits but mostly because of subsequent

erosion of the deposits. The Pliocene(?) deposits reach a maximum thickness of about 80 feet in Lincoln County and average about 25 to 40 feet in thickness.

Because they occur on the highest elevations and are relatively thin, these deposits generally contain only a thin saturated section. Well yields commonly are sufficient for a single farmhouse or stock pasture. Springs and seeps occur at many places where the contact of the Pliocene(?) deposits with the Jackson group crops out.

Quaternary System

Deposits of Quaternary age uncomformably overlie the Jackson group in the northeastern and southwestern portions of Lincoln County and in all of Desha County. These deposits include alluvial-terrace deposits and alluvium of the Arkansas and Mississippi Rivers and smaller streams of the area.

Terrace deposits

On the flanks of the Monticello Ridge in Lincoln County are deposits of gravel, sand, and clay that are lithologically different from the Jackson group and occur at elevations below the base of the Pliocene (?) deposits. They are thought to be alluvial-terrace deposits, formed by streams whose base levels were higher than those of present-day streams. By means of available topographic data and elevations from instrumental leveling, three terrace deposits were distinguished east of the ridge and two west of the ridge.

The terraces west of the ridge are of two types: (1) a higher terrace (or terraces), much dissected and now consisting of hills mantled chiefly with sand and gravel, and (2) a low terrace bordering the flood plains of streams flowing from the ridge, and generally underlain by fine-grained materials.

The deposits of the higher terrace west of Monticello Ridge are mapped as Quaternary terrace deposits undifferentiated (Qtu) on the geologic map, plate 6. The deposits have been dissected to such an extent that they occur as outliers, completely surrounded by surface exposures of the Jackson group. They consist of poorly sorted sand and gravel, silt, and clay and have a maximum thickness of at least 25 feet. The gravel consists predominantly of brown chert and probably is reworked material from the Pliocene(?) deposits. Many of these chert pebbles have a white outer layer but retain their brown color on the inside. This white outer layer may be a coating acquired during the period of reworking. It is suspected that the deposits may be the dissected remnants of two alluvial-terrace deposits such as are found on the east side of the ridge, but topographic maps are not available for this area and the large amount of work involved in differentiating them without maps seemed not to be warranted at the present time.

A low terrace about 10 feet above the stream flood plain is present west of the ridge. The material underlying this low terrace consists of clay and clayey sand and gravel. It resembles very closely the flood-plain alluvium and for convenience is mapped with the alluvium (Qal). Figure 8 is a cross section showing a typical relationship between the flood-plain alluvium, the alluvial-terrace deposits, and the Jackson group, west of Monticello Ridge.

The lowest terrace, Qt_1 on the geologic map, occurs as a semicontinuous band from the northwestern corner to the southeastern corner of Lincoln County. It is not present in the area east of Star City, where the flood-plain alluvium abuts directly against the Jackson group. The boundary between the lowest terrace and the flood plain is marked by an escarpment about 20 feet high. This escarpment has many concave notches in it, apparently formed by the meandering of Bayou Bartholomew. This terrace is relatively flat except where streams have entrenched their courses into it. It slopes to the southeast at approximately the same rate as the flood-plain alluvium (1 foot per mile). The lithology of the deposits beneath it, as revealed by test drilling, resembles that of the flood-plain alluvium. The same sequence of clay, fine sand, and then coarser sand and occasional gravel beds was found in test holes on the terrace as is usually penetrated in irrigation wells in the flood-plain alluvium. Figures 9 and 10 are cross sections showing the relations of the lowest terrace deposits and the deposits of the alluvial plain.

East of Monticello Ridge, where partial coverage by topographic maps was available, three terrace deposits were distinguished. The topographically highest deposit (Qt_3) consists of an isolated remnant, as shown on the geologic map. The elevation of the base of this deposit is about 235 feet, and the elevation of its eroded surface reaches as high as 265 feet. The deposits consist of tan, yellow, and orange-red clayey sand up to a maximum thickness of 30 feet. A section exposed in a gully in the

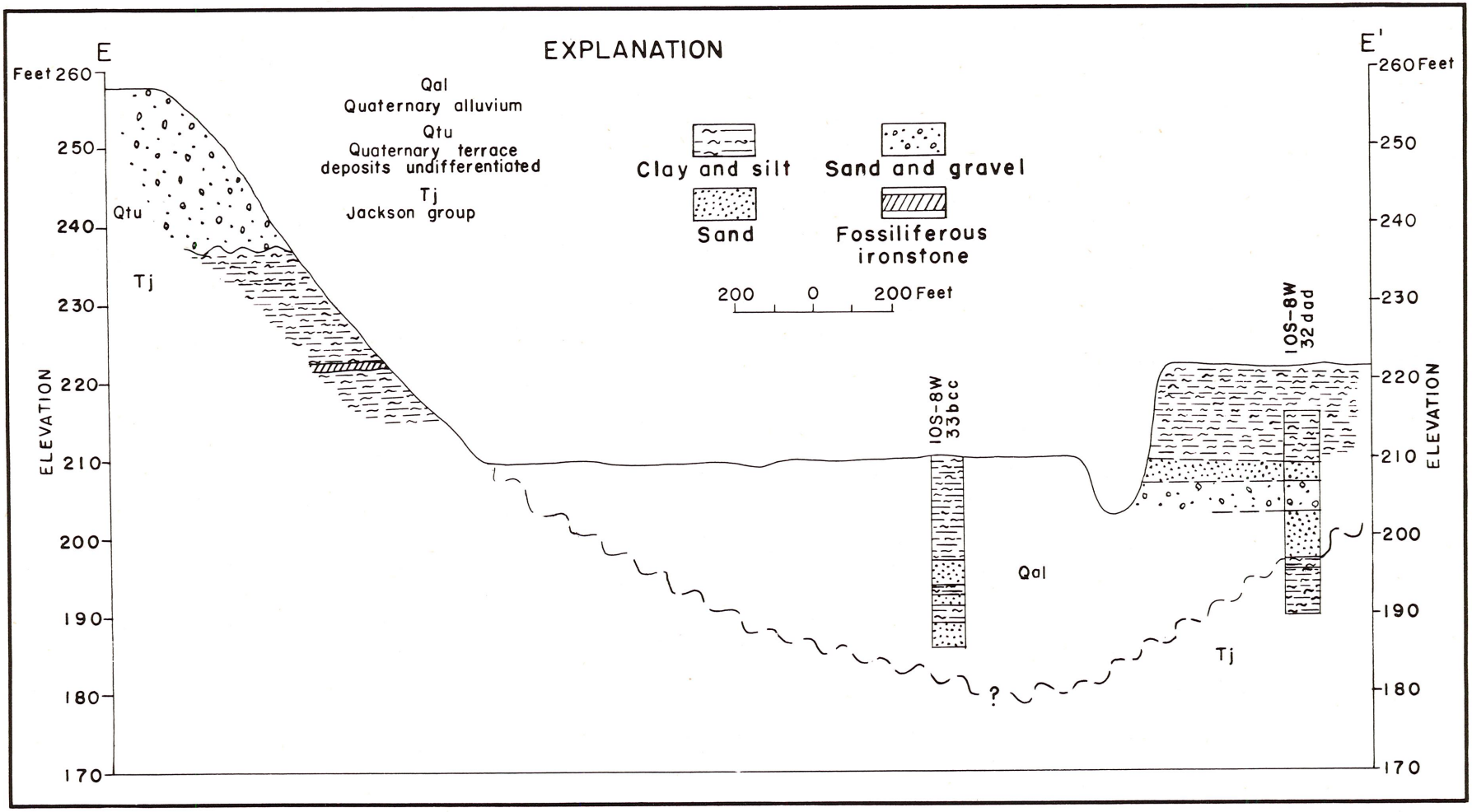


Figure 8.—Geologic section E-E′ showing the relations between the Jackson group and the Quaternary deposits west of Monticello Ridge in Lincoln County.

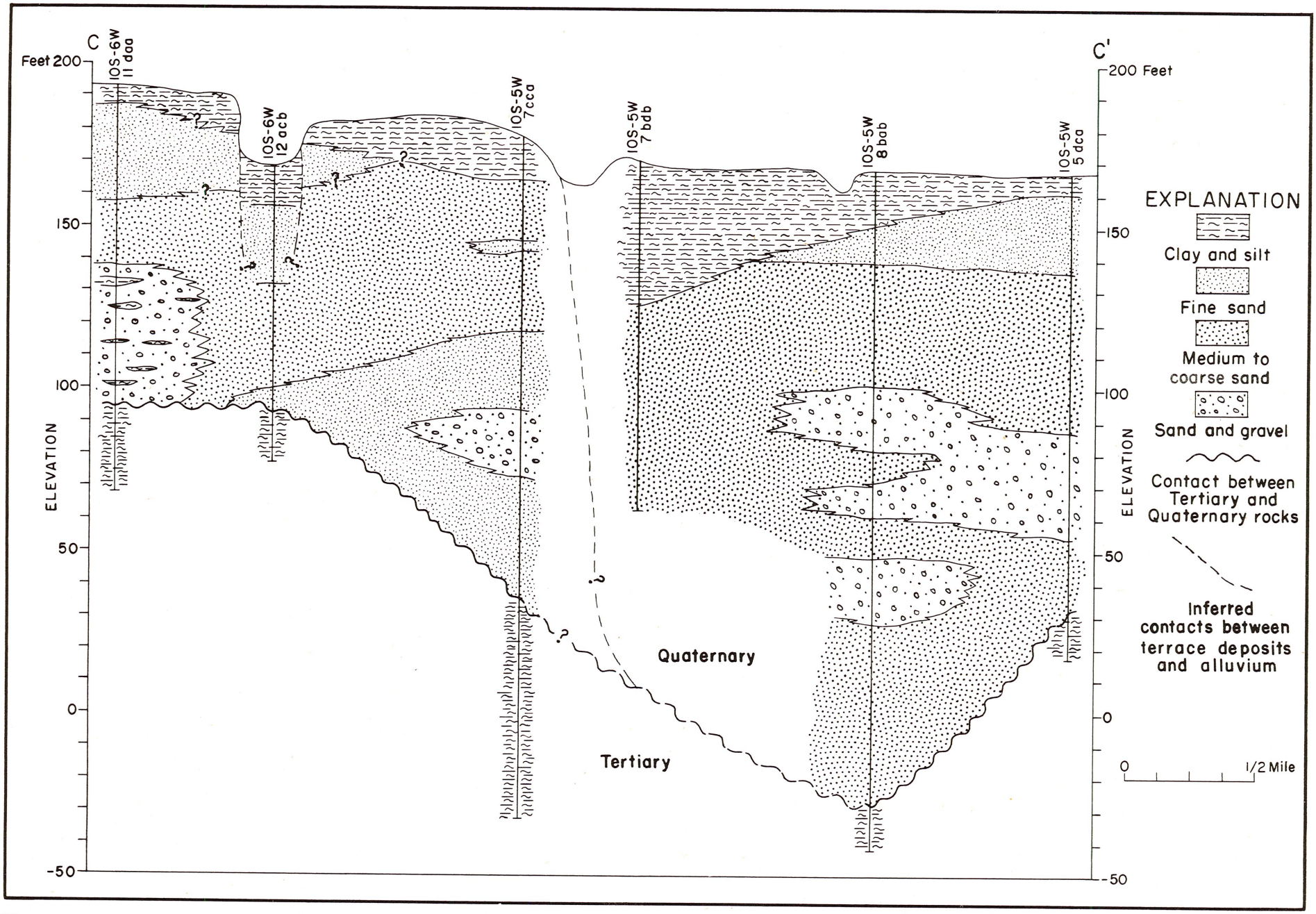


Figure 9.—Geologic section C-C′ showing the relations between the lowest terrace deposits and the alluvium east of Monticello Ridge in Lincoln County.

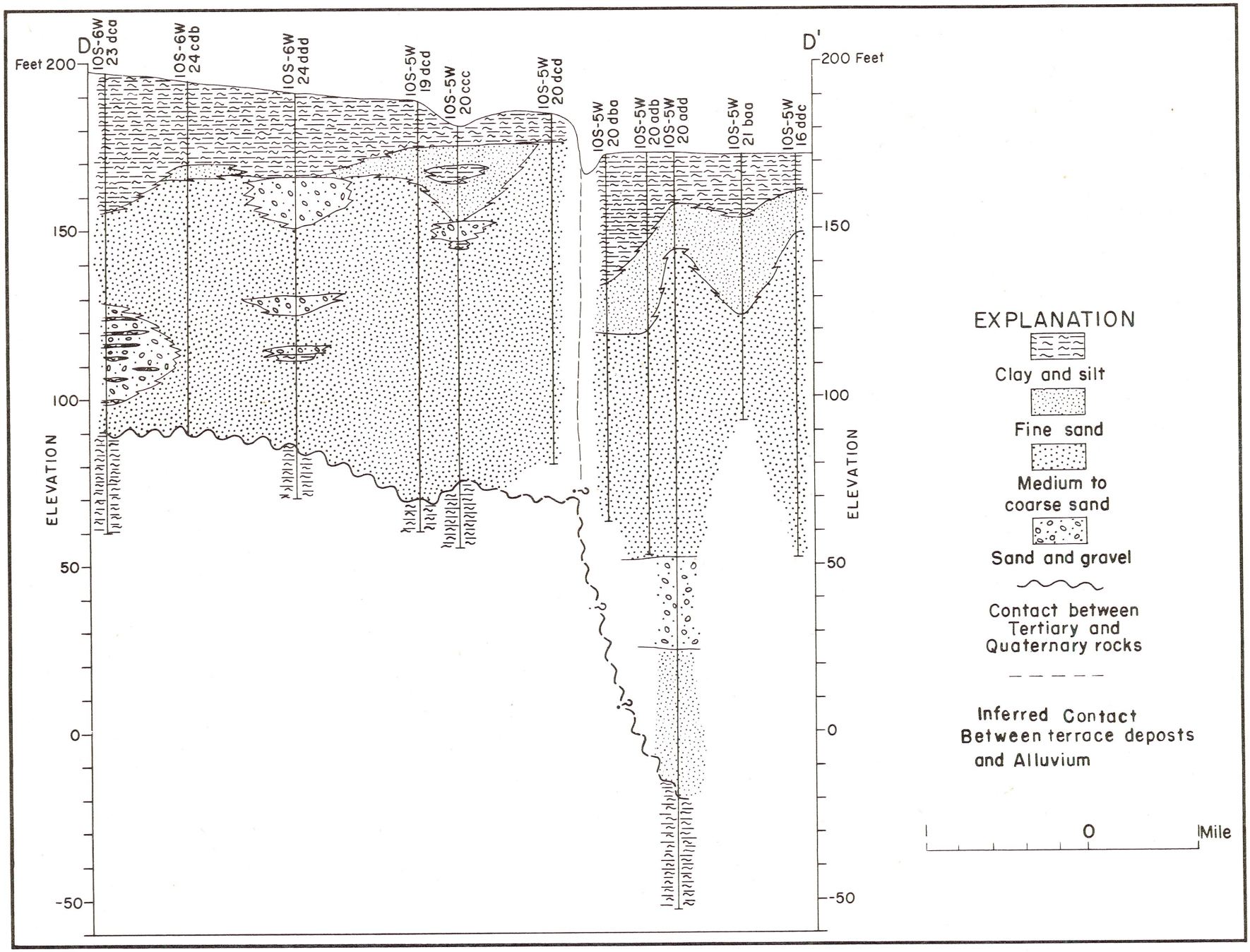


Figure 10—Geologic section D-D′ showing the relations between the lowest terrace deposits and the alluvium east of Monticello Ridge in Lincoln County.

NW¼SW¼NE¼ sec. 21, T. 10 S., R. 6 W., is as follows:

	Feet
Clay, silty, tan	3
Sand, clayey, mottled, red, yellow, and gray	8
Sand, crossbedded, tan; scattered small gray reduction areas and a few gray clay interbeds	11
	22

The intermediate-level terrace, shown as Qt_2 on the geologic map, is present only in a small area in northern Lincoln County. Lithologically, as shown by surface exposures and shallow test holes, it consists of orange-brown sand and red and gray sandy clay. Its eroded surface has an elevation ranging from 235 to 245 feet. The maximum thickness of this terrace deposit is not known.

Two test holes (10S-6W-11daa and 10S-6W-23dca) in the lowest terrace deposits penetrated deposits of gravel containing numerous clay interbeds. These clay interbeds in gravel are not common in the Quaternary alluvial deposits; they indicate a different mode of deposition for the terrace deposits, possibly by small streams, with poor sorting ability, flowing eastward from the Monticello Ridge. Penetrated in test hole 10S-5W-7cca was a fine to very fine dark-gray sand, apparently somewhat clayey. Intercalated in this sand was a gravel bed. Immediately across the terrace escarpment, in test hole 10S-5W-7bdb, this gravel bed was not present, and brown medium to coarse sand was penetrated. Apparently, the terrace escarpment marks an erosional interval in the Quaternary deposits as shown by the dashed line in Section C-C′, figure 9. The nonequivalence of beds across the escarpment along cross section C-C′ indicates that the terrace deposits were completely removed and that new materials were deposited. On cross section D-D′ (fig. 10) a similar discontinuity can be seen. The contact between an upper fine-grained unit of silt, clay, and fine sand and the lower coarse sand unit occurs abruptly 50 feet lower on the flood-plain side of the escarpment. Also, the base of the alluvium is at a markedly lower level east of the escarpment. These two features suggest erosion and redeposition.

The low unnamed terrace west of the ridge and the terrace shown on the map as Qt_1 east of the ridge are the first terraces above the stream flood plains. Both are underlain by materials similar to the flood-plain alluvium. These two terraces are probably equivalent, at least in part. The highest terraces on either side of the ridge, Qtu and Qt_3, respectively, occur at similar maximum elevations, the tops of each reaching a maximum elevation of about 265 feet in Lincoln County. Also, they share the characteristics of being highly dissected and occurring as outliers. The deposit underlying Qt_3 is 30 feet thick and has a basal elevation of 235 feet, whereas Qtu has a maximum known thickness of 25 feet and a basal elevation of 200 to 250 feet. Since the elevation of the base of Qtu ranges so widely, Qtu may include two different terrace deposits. Tentatively, Qtu is thought possibly to be the equivalent of both Qt_3 and Qt_2.

The water from wells in the Quaternary terrace deposits generally is highly variable in mineral quality, although never highly mineralized. The yield from these deposits generally is small except in some parts of the lower terrace (Qt_1), where yields of a few hundred gallons per minute probably can be obtained. Where the terrace deposits occur as outliers surrounded by the Jackson group (Qtu and Qt_3), their basal contact with the Jackson usually is characterized by seeps and springs.

Alluvium

The Quaternary alluvium denotes alluvial deposits underlying stream flood plains. It includes both the "main body of alluvium," or river deposits underlying the delta region, and the thin deposits formed by streams draining the Monticello Ridge. The flood plains of streams flowing from the ridge generally are veneered with deposits of gravel, sand, silt, and clay, typically poorly sorted and light in color, having a maximum thickness of approximately 15 feet. Their width normal to the streams' course generally is 1,000 feet or less. The lower half of these deposits generally is saturated with water.

A relatively thick sequence of alluvium underlies the "delta" region of the area, which is between Bayou Bartholomew and the Mississippi River. The alluvium is part of an extensive fluvial deposit of the Mississippi River and its tributaries which blankets much of the eastern half of Arkansas and adjacent states. Cross sections through the Quaternary alluvium in Lincoln County are shown in figures 9 and 10 and plate 4. Cross sections through the Quaternary alluvium in Desha County are shown in figures 11, 12, and 13.

In Desha and Lincoln Counties the alluvium unconformably overlies the eroded surface of the Tertiary rocks. The contact of the alluvium with the Tertiary rocks is commonly marked by a thin bed of conglomerate overly-

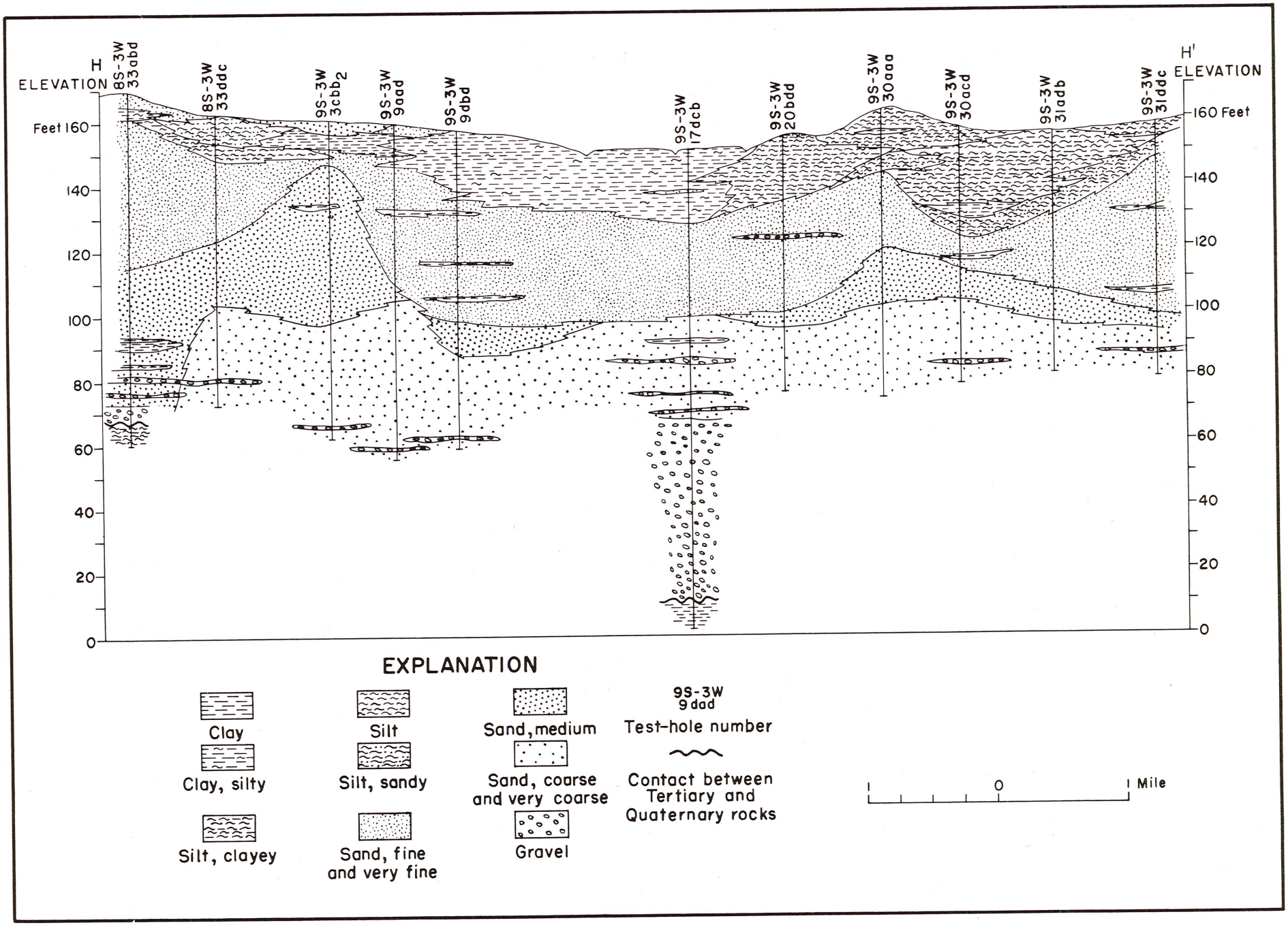


Figure 11.—Geologic Section H-H through Desha County showing the Quaternary alluvium.

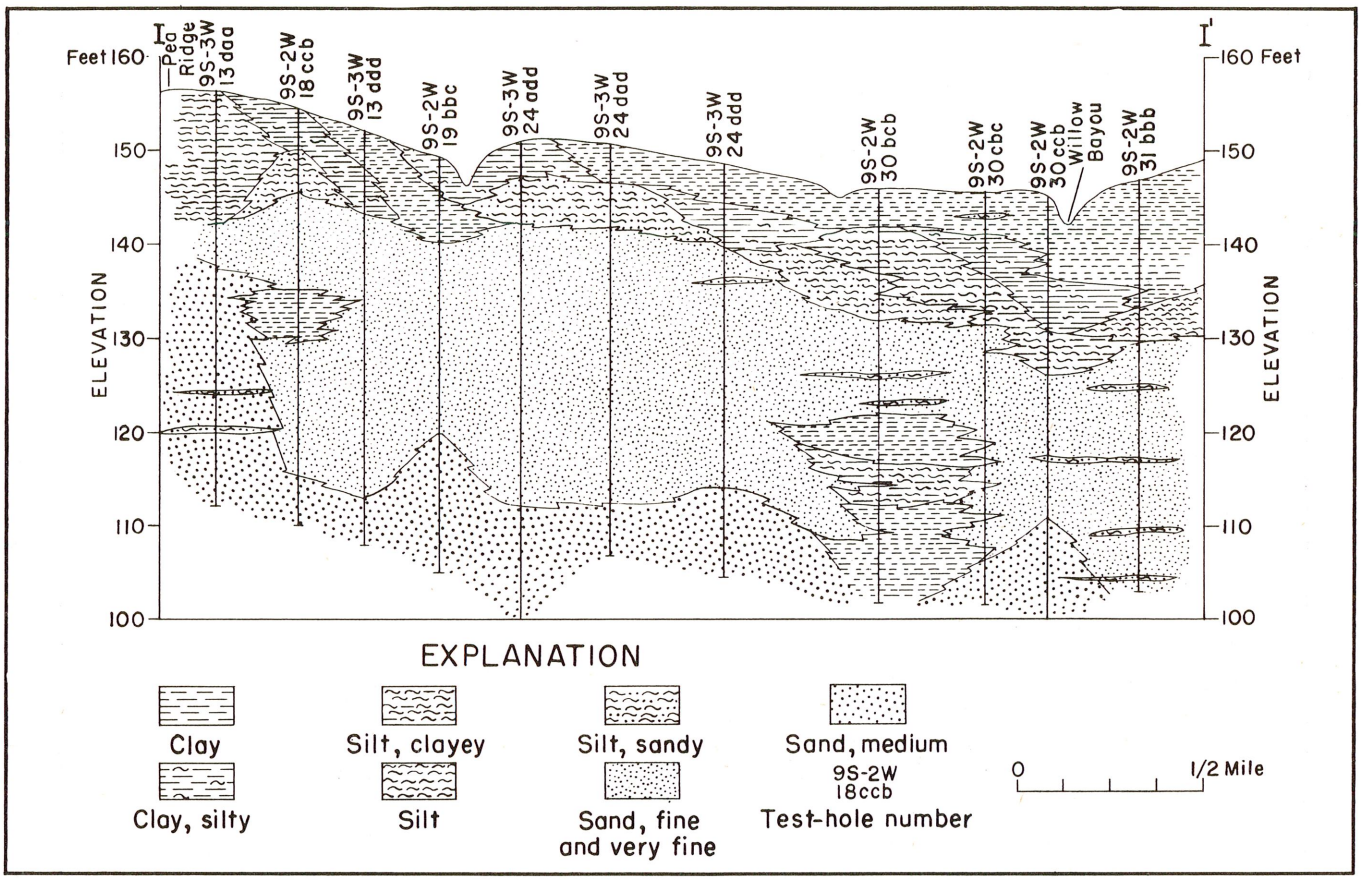


Figure 12.—Geologic section I-I' through Desha County showing the Quaternary alluvium.

ing greenish-gray clay or silt of the Jackson group. Known elevations on the top of the Tertiary range from about 30 feet below mean sea level a few miles east of the west edge of the allvuium at test hole 10S-5W-8bbb in Lincoln County to about 100 feet above mean sea level at well 9S-6W-6cbb in Lincoln County near the western limits of the Quaternary alluvium and well 9S-4W-9cad1 in Desha County. Locally the relief of the Tertiary surface varies as much as 50 feet between test holes about 1 mile apart. Contours have been drawn on the surface of the Tertiary rocks by Fisk (1944, pl. 3), who shows the surface to have had an integrated drainage pattern with relatively straight stream courses in deep channels separated by comparatively wide, flat interstream areas. He shows in his plate 10 the Jackson as being absent along an entrenched channel at the base of the Quaternary alluvium in Lincoln County. However, drillers' logs of irrigation wells and electric logs of oil tests furnished no evidence of absence of the Jackson group. The deepest known channel in the area of the present report is near the eastern edge of Monticello Ridge and the present course of Bayou Bartholomew. Cross sections of the buried channel are shown in figures 9 and 10.

The relief on the surface of the Tertiary rocks largely controls the thickness of the alluvium because the surface of the aluvium is relatively flat. The alluvium is known to range in thickness from 76 feet at well 9S-4W-9cad in Desha County to 195 feet at test hole 10S-5W-8bbb in Lincoln County. The average thickness is about 100 feet.

The predominant characteristic of the alluvium is the generally progressive change from gravel or coarse sand at the base to fine-grained material at the top. Generally, the alluvium may be divided into two parts, a lower part including the gravel and sand and minor amounts of silt and clay, and an upper part consisting of silt and clay and minor amounts of sand.

The lower part commonly grades upward from gravel and interbedded coarse and very coarse sand to coarse sand containing a few small lenses of gravel, clay, or silt. The coarse

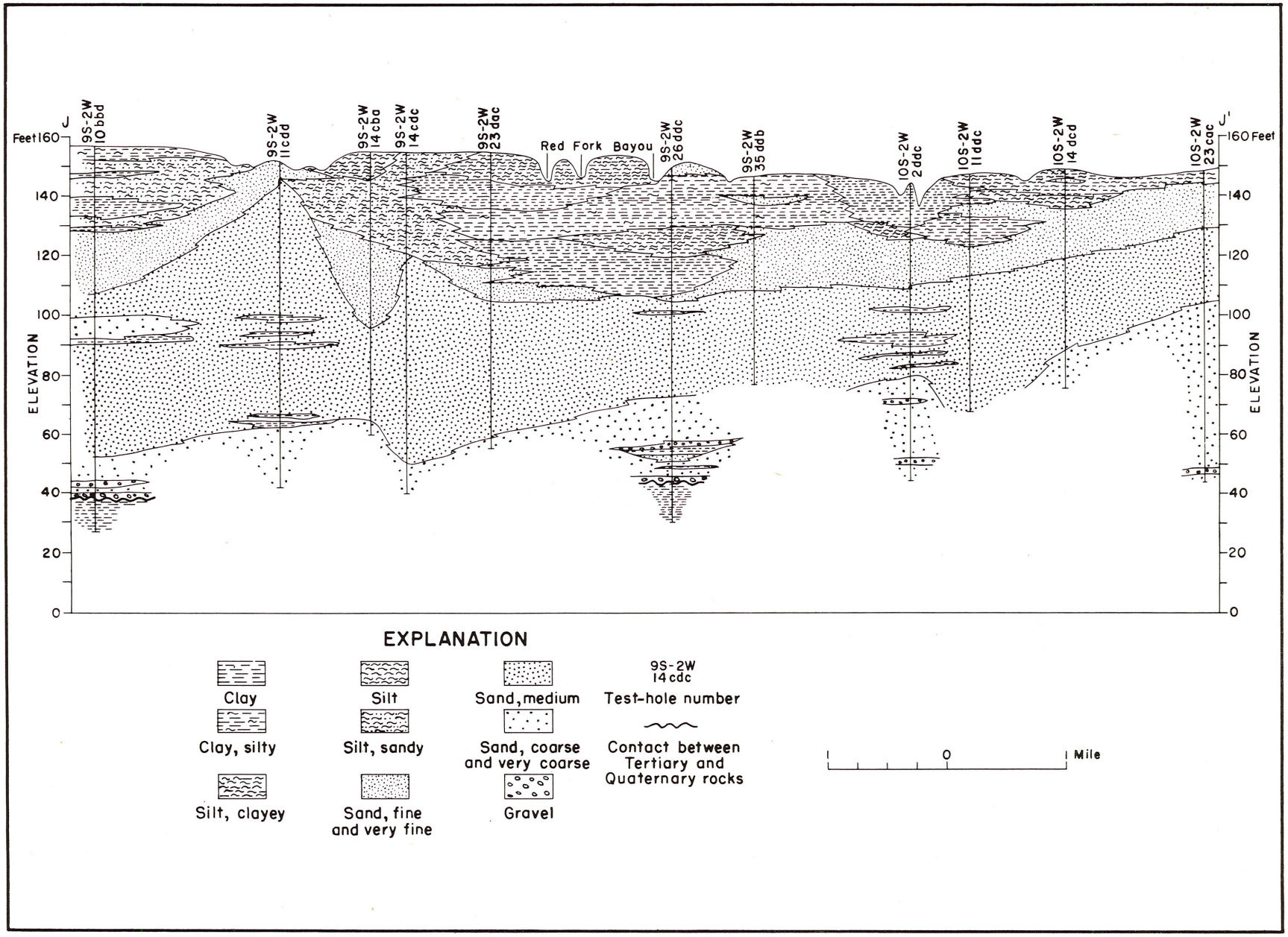


Figure 13.—Geologic section J-J' through Desha County showing the Quaternary alluvium.

sand grades upward into medium to very fine sand containing clay and silt lenses and rare lenses of gravel. The color of the sand in the lower part is generally olive gray. The silt and clay lenses are commonly yellowish brown, olive gray, or greenish gray. The gravel is subangular to rounded and is composed predominantly of chert and some quartz and sandstone pebbles and a few pebbles of igneous rock. The pebbles are commonly half an inch to an inch in diameter, but some up to 3 inches in diameter were collected in test hole 9S-2W-10bbd.

There is no sharp break between the lower and upper parts of the alluvium, the very fine sand of the lower part grading upward into the clay and silt of the upper part. The beds within the upper unit interfinger complexly, and individual beds cannot be traced with certainty even between closely spaced test holes. The upper part reaches a maximum of 40 feet in thickness and averages about 20 feet. The color of the clay and silt is commonly brown, yellowish brown, or gray.

At the surface the alluvium may be divided into several types of flood-plain deposits on the basis of mode of deposition, topographic expression, and lithologic character. These deposits include natural-levee, backswamp, point-bar, swale, and channel-fill deposits. The surface deposits were differentiated primarily because of their differences in permeability and importance as sites of recharge to the aquifer of Quaternary age. The geologic maps, plates 5 and 6, show the areal distribution of the various alluvial surface materials in Desha and Lincoln Counties.

"Point bars" are formed on the convex bank or inside of stream meanders by lateral accretion as the meander curve increases in radius and tends to migrate downstream. "Deposition is related to the existence of circulatory motion or heliocoidal flow associated with the channel bend. Deposition on the convex bank and the concomitant erosion of the concave bank both tend to be the greatest just downstream from the position of maximum curvature" (Wolman and Leopold, 1957, p. 91 and 92). The bars are usually crescent shaped, generally conforming to the curvature of the stream channel. The point bars are separated by swales which may become filled with clay and silt, or less commonly are occupied by lakes or marshes. In plates 5 and 6 only the larger swales have been mapped. The crescent-shaped pattern of ridges separated by swales is readily distinguished on topographic maps and aerial photographs. The local relief of the point-bar topography ranges from a few feet to 15 feet. In Desha and Lincoln Counties the point-bar deposits are most common along the major streams. These deposits crop out in a band about 3 miles wide along Bayou Bartholomew and generally occupy the area between the artificial levees and the Arkansas and Mississippi Rivers.

At the surface the point-bar deposits consist mainly of fine and very fine sand and silt which generally grade downward into coarser grained material. In some places the point bars are covered with natural-levee deposits. These areas are mapped as point-bar deposits where the characteristic point-bar topography has not been completely obscured by the natural-levee material.

The point-bar deposits are the most permeable of the surface materials in the alluvial plain and are important as areas of recharge in their outcrop areas. The swale deposits are less permeable, are restricted in size, and cover a relatively small area.

The convex sides of the point-bar deposits are frequently bordered by abandoned segments of stream channels which have become filled or partially filled with sediments. The traces of these segments are arcuate and when occupied by water form the familiar oxbow lakes. Channel-fill deposits cover a relatively small portion of the area. They are most common along the larger rivers and bayous. The concave side of the channel fill is usually occupied by point-bar deposits and the convex side by natural-levee deposits.

During the early stages of filling the channel may receive sandy material during normal stages of the river, the deposits commonly being coarser in the upstream part or upper arm of the abandoned channel (Waterways Experiment Station, 1951, p. 14). After its complete isolation the channel is occupied by a lake which is slowly filled with clays and silts from occasional floods and minor amounts of plant material. Filled channels are commonly called "clay plugs," because the deposits, being composed largely of clay and silt, are relatively impermeable.

Natural levees are formed along the channel during times of flood. When the water leaves the stream channel its velocity is checked and it is unable to carry the full suspended load. The coarser particles are deposited typically along the crest of the natural levee, the finer

particles being carried into the adjacent backswamps.

Natural levees are the features of highest elevation in the flood plain. They are assymetrical in profile, sloping gently landward from the crests and more steeply toward the depositing streams. The crests of the natural levees are usually about 10 to 15 feet above the adjacent backswamps. Natural levees, being well drained and composed of sandy and silty material, are well suited for agriculture and are characterized on aerial photographs as bands of cultivated land bordering the larger streams.

The natural-levee deposits are areally extensive, occupying much of the area adjacent to the larger streams. They are composed of silt and very fine sand containing a variable amount of clay. They are gradational with and merge gradually into the finer grained material of the adjacent backswamps, and the boundary between these types of deposits is, therefore, more or less arbitrary.

Natural-levee deposits are relatively permeable, though generally less permeable than point-bar deposits. Their permeability and areal extensiveness make them important as areas of recharge to the aquifers in the Quaternary alluvium.

Backswamps include the low areas of the flood plain away from the main streams and natural levees and commonly are inundated during times of flood. They may be flooded by overflow of the master stream or by inundation from tributary streams when their waters are backed up by high stages in the master stream. Clay and silt are added to the backswamp deposits during such periods of flooding.

Backswamps have been divided by Murray (1948, p. 11) into interlevee basins, rim swamps, and marginal basins. Interlevee basins are enclosed on all sides by natural levees. The backswamps of Desha and most of Lincoln County are of this type. Rim swamps include lowland areas flanking the flood plain and abutting the valley walls of the flood plain. Backswamps of this type are present in Lincoln County between the natural levee of Bayou Bartholomew and the terraces flanking Monticello Ridge. Marginal basins are created by alluviation across the lower part of tributary valleys. Examples of this type of backswamp are present in Lincoln County along the lower courses of streams draining Monticello Ridge. Backswamps cover large areas of the flood plains within both counties and usually are heavily wooded. The drainage system of backswamps is an intricate pattern of small, closely spaced ephemeral streams which carry floodwaters into the generally perennial main backswamp stream. The main backswamp stream commonly is smaller and straighter than streams having natural levees. The heavy soils of the backswamps are not well suited for agricultural pursuits except rice and fish culture. The deposits range in thickness from about 15 to 25 feet. They consist of clay, silty clay, clayey silt, and minor amounts of silty and clayey sands, locally containing much organic matter. The backswamp deposits are commonly brown, reddish brown, or gray. When dry they commonly contain many small ironstone concretions that make up the typical "buckshot" clay.

The following section of a backswamp deposit was exposed in a drainage ditch, 30 feet south of a bridge in the NW¼ sec. 27, T. 12 S., R. 2 W., Desha County, Ark.

	Feet
Clay, dark-reddish-brown	2
Clay, silty, medium-gray and brownish-gray	6
Clay, dark-reddish-brown	4
Clay, silty, medium-gray, with some reddish-brown iron stain	9.2
	21.2

The backswamp deposits are relatively impermeable and therefore are not important as areas of recharge.

The sand and gravel in the lower part of the alluvium constitutes the most important aquifer in the area. The aquifer yields water to about 400 irrigation wells and many domestic wells. Irrigation wells in the alluvium yield 50 to 3,000 gpm and average about 1,400 gpm.

The surficial geology of the alluvial plain seems to have little relationship to the character of the underlying aquifer material and generally cannot be used in the location of large-capacity irrigation wells. In southern Arkansas and Louisiana it is reported that channel-fill deposits, sometimes referred to as "clay plugs," generally are avoided in drilling because of their fine-grained character. No wells in the report area are known to have been drilled in channel-fill deposits. Logs of test holes of the U. S. Corps of Engineers (Waterways Experiment Station, 1951) that penetrate channel-fill deposits near the Arkansas River show an average thickness of about 40 feet for the "clay plug," below which lies the normal aquifer material. Because the upper 40 feet ordinarily consists of clay and fine sand even

where the "clay plugs" are not present, they would seem to impose no major restrictions to the aquifer in this area. On the other hand, logs of U. S. Corps of Engineers' borings along the Mississippi River (Fisk, 1947) show the channel fill to attain a thickness of 60 to 80 feet, and the aquifer is correspondingly reduced in thickness in this part of Desha County. Other types of surface deposits seem to have little or no effect on the ability of the aquifer below to yield water to wells. Difficulty in obtaining large-capacity wells in "Coon Bayou swamp" has been reported by several drillers. The area is underlain by back-swamp deposits. However, drillers have reported no difficulty in obtaining large-capacity wells in other areas underlain by back-swamp deposits.

HYDROLOGY

OCCURRENCE OF GROUND WATER

Ground water is that supplying wells and springs. It occurs below the land surface in the zone in which all the voids or interstices between the rock particles are filled with water under hydrostatic pressure. The property of containing voids is called "porosity." Porosity, usually expressed as a percentage of the volume of voids to the total rock volume, determines the amount of water a rock can contain. Porosity may range from 15 percent in gravel to well above 50 percent in clay. However, in order for a rock to yield water to a well the interstices must be interconnected and large enough to allow water to flow rather freely through the voids. Thus, a saturated clay, even of high porosity, will yield little or no water, because the voids are small. A saturated gravel having a porosity of 15 percent and large interconnected voids, however, will yield water readily to wells. The capacity of a rock to transmit water under pressure is called "permeability." A rock unit, such as gravel or sand, that will yield water to wells in sufficient quantity to be a source of supply is called an "aquifer." Beds of fine-grained material, such as clay, transmit water so slowly that they are called "confining beds," or "aquicludes."

Aquifers are commonly divided into confined (artesian) aquifers and unconfined (water-table) aquifers. Under artesian conditions the water in the aquifer is confined between two relatively impermeable beds. Water will rise in a well tapping an artesian aquifer above the point where the aquifer is tapped. The water level in a well tapping a water-table aquifer is at approximately the same level as the surface of the zone of saturation within the aquifer. The surface that would be represented by the water levels in an infinite number of wells tapping an unconfined aquifer is called the "water table." The same surface for an artesian aquifer is commonly called the "piezometric surface," although the term piezometric (literally "measure of pressure") may be applied to both confined and unconfined aquifers. The aquifers of the Claiborne group in Desha and Lincoln Counties are artesian. The water level in a well tapping any one of these aquifers will rise tens or hundreds of feet above the point where the aquifer is tapped in the well. Both water-table and artesian conditions exist in the aquifer of the Quaternary alluvium. In many places the upper part of the alluvium consists of clay and silt, and artesian conditions generally are present. In other places the upper part consists of sand, and typical water-table conditions exist. In some areas where artesian conditions originally existed the water levels have been lowered beneath the confining beds by pumping. In still other areas the water levels are lowered beneath the confining beds during the pumping season and rise into the confining beds after pumping ceases. The term "piezometric surface" is used in this report to denote the surface represented by the water levels in an infinite number of wells tapping any single aquifer whether artesian, water-table, or both.

HYDROLOGIC PROPERTIES OF THE WATER-BEARING MATERIALS

Two fundamental properties of an aquifer are its capacities to transmit and to store water. These properties are commonly measured in terms of the coefficients of permeability and storage.

Meinzer and Wenzel (1942, p. 452-454) discuss permeability as follows: "The hydraulic permeability of a porous material is its characteristic property of transmitting water through its interstices. The degree of this property has been designated by different names and has been expressed by various combinations of units of space and time. It is now rather widely called the coefficient of permeability.

"The standard coefficient of permeability used in the hydrologic work of the United States Geological Survey is defined as the rate of flow of water at 60°F, in gallons a day, through a cross section of 1 square foot, under a hydraulic gradient of 100 percent. A related coefficient, which may be called the 'field coef-

The coefficient of transmissibility was found to be about 300,000 gpd per foot. For an aquifer thickness of 125 feet, the coefficient of permeability is 2,400 gpd per square foot. However, it is not known whether the well penetrates the full thickness of the aquifer and, therefore, the true coefficient of permeability may be smaller. The coefficient of storage was found to be 5.1×10^{-4}.

The static water level in the pumped well was 23.94 feet below the pump base. The drawdown was 7.81 feet, and the observed specific capacity thus was 173 gpm per foot of drawdown.

D-5 Pumping Test

A pumping test was made on a test well (9S-2W-10bbd1) constructed for a recorder well of the Arkansas River valley project and screened in deposits of Quaternary age. The well was pumped at an average rate of 97 gpm from 3:02 p. m. on January 27, 1958, until 9:02 a.m. on January 29, 1958. Water-level measurements were made in the pumped well and in five observation wells during the period of pumping and for 48 hours after pumping ceased. Two of the observation wells were at a radius of 60.6 feet; the others had radii of 164 feet, 246 feet, and 437 feet. The test data indicated a transmissibility of 90,000 gpd per foot and a coefficient of storage of 3×10^{-3}. The well had a specific capacity of 7.2 gpm per foot of drawdown.

G. E. Rice Pumping Test

Well 12S-2W-13ada2, screened in deposits of Quaternary age, was pumped at a rate of 1,800 gpm from 1:23 p.m., June 10, 1957, until 10:00 a.m., June 11, 1957. Water-level measurements were made in two observation wells at distances of 381 and 584 feet from the pumped well. The transmissibility was determined to be 180,000 gpd per foot, and the coefficient of storage was 2.9×10^{-3}.

Missouri Pacific Pumping Test

Well 12S-3W-27caa2 was pumped at 505 gpm from 8:28 a.m. until 12:28 p.m., June 28, 1957. Water-level measurements were made in an observation well 325 feet away from the pumped well during the period of pumping and for 3 hours after pumping ceased. Recovery measurements also were made in the pumped well. Analysis of the data gave a coefficient of transmissibility of 20,000 gpd per foot and a coefficient of storage of 2.4×10^{-3}. The well is screened in the Sparta sand.

RECHARGE, MOVEMENT, AND DISCHARGE OF GROUND WATER

The ultimate source of ground water in Desha and Lincoln Counties is the precipitation that falls within the counties and upon adjacent areas. Although the total precipitation averages about 50 inches a year, only a small part of it reaches the water table and becomes ground water. Part of the precipitation runs off into streams, part is evaporated from the surface or transpired from the soil by vegetation, and the small remainder seeps downward through the irregular openings between the rock particles until it reaches the ground-water reservoir.

Ground water is slowly moving from areas of recharge to areas of discharge. Although the movement cannot be observed directly, it can be determined from maps showing the configuration of the piezometric surface. The water moves downslope normal to the contour lines at rates, in this area, of about one-fourth to one-third foot per day. Combined with a knowledge of the transmissibility of the aquifer, the slope of the piezometric surface can be used to determine the quantity of water moving through the aquifer. From the change in the piezometric surface with time and the coefficient of storage, the amount of water gained or lost from the aquifer can be computed. The piezometric surface in Desha and Lincoln Counties at different times is shown in plates 7-17.

Ground water may move also through confining beds from one aquifer to another. This movement occurs where there is a vertical head difference between the two aquifers. The amount of this cross-bed leakage is expressed by $Q = PIA$, where P is the vertical permeability of the confining bed, I is the gradient (head difference divided by the thickness of the confining bed), and A is the area over which the leakage occurs. The vertical gradient may be large compared with the horizontal gradients commonly encountered; but, since the permeability of the confining bed is very low, the quantity of leakage becomes significant only when it occurs over a large area.

Water may be discharged from the zone of saturation by direct evaporation where the water table is near the surface or more commonly by transpiration from plants whose roots penetrate the capillary fringe or the saturated zone itself. Hydraulic discharge of ground water occurs in the form of seeps and springs and also by direct flow of water into streams

and lakes below the water surface. Artificial discharge through wells is discussed in the section on recovery of ground water.

The aquifers of the Claiborne group receive recharge from precipitation in their outcrop areas to the west and northwest in Grant, Dallas, Bradley, and Calhoun Counties. Northeast of the outcrop area the Claiborne group is overlain by alluvium of Quaternary age (Counts, 1957). Here the aquifers of the Claiborne group are recharged by water in the alluvium.

A piezometric map cannot be constructed on the aquifers in the Claiborne group because there are too few wells in which the water level can be measured. Nevertheless, the general dip of the beds is known; and the water levels in wells that have been drilled to the aquifers indicate that the movement of the ground water is down the dip of the beds, which in the report area is from the west and northwest to the east and southeast.

A possible vertical exchange of water between the aquifers of the Claiborne group and the Quaternary alluvium through the Jackson group has been considered for the report area. However, the reported and measured water levels in the Claiborne group differ by only a few feet from water levels in the Quaternary deposits, being sometimes lower and sometimes higher. With this small difference in head, it is likely that the amount of leakage through the Jackson group is small.

Discharge from the aquifers of the Claiborne group occurs chiefly by underflow out of the area and pumping from wells.

Recharge to the Jackson group, to the Pliocene(?) deposits, and to the Quaternary terrace deposits occurs chiefly by direct penetration of rainfall within the report area. The amount of recharge varies seasonally with the amount and distribution of rainfall and the amount of water lost by evaporation and transpiration. Recharge is greatest during the winter and early spring when precipitation is generally highest and when the amount lost by evaporation and transpiration is lowest.

It is not possible to draw piezometric maps on the water surface of the shallow aquifers in the Jackson group, the Pliocene(?) deposits, and the Quaternary terrace deposits because there are too few wells in which points on the surface can be obtained. The movement in the fine-grained deposits of the Jackson probably is very slow and in a downdip direction toward the east and southeast. The movement in the Pliocene(?) deposits is radially outward from the central part of each outlying mass toward the exposed formational contacts with the underlying clay of the Jackson. Therefore, the piezometric surface is highest in the central part of each mass, and natural discharge occurs through springs and seeps at the exposed formational contacts. The movement in the terrace deposits is generally westerly in the terraces on the west side of the ridge and easterly in the terraces on the east side of the ridge.

The Pliocene(?) deposits and the uppermost terrace deposits east and west of the Ridge (Qt_3 and Qtu) furnish hydraulic discharge to seeps and springs. Ground water is discharged from the two lower terrace deposits east of the Ridge (Qt_2 and Qt_1) by underflow into the Quaternary alluvium. Some natural discharge probably occurs also by evaporation and transpiration. Minor amounts of water are discharged from these deposits through wells.

Recharge to the Quaternary alluvium varies not only seasonally but areally with the different types of surface materials. The recharge is greatest in areas underlain by the more permeable surface materials, which are the natural-levee and point-bar deposits. The distribution of the several types of surface materials is shown in plates 5 and 6. The natural-levee deposits are composed chiefly of silt, and the point-bar deposits chiefly of sand and silt. That these more permeable surface materials facilitate recharge is indicated by the piezometric surface in Desha and Lincoln Counties (pls. 7-17), in that the areas of higher water-level elevations generally coincide with areas underlain by the more permeable materials. Conversely, areas of lower water-level elevations generally coincide with areas underlain by the less permeable materials.

One area of high water-level elevations is along Bayou Bartholomew adjacent to the terrace escarpment in Lincoln County where the contour lines are parallel to the escarpment. The area bordering Bayou Bartholomew is generally underlain by point-bar deposits, which facilitate recharge. Also, low mineralization of waters in the adjacent terrace deposits (Qt_1) suggests direct infiltration of rain water. This aquifer is hydraulically connected with the aquifer of the floodplain alluvium, and water moves from the terrace deposits into the alluvium.

Another area of generally high water levels is shown by a "nose" on the piezometric maps

south and southwest of the Arkansas River (pls. 12, 14, and 16). In this area the configuration of the piezometric surface is affected by the stages of the Arkansas and Mississippi Rivers. During periods of high water the gradient of the piezometric surface is to the south and southwest, indicating that water is flowing from the rivers into the aquifer. During low river stages there is a ground-water divide in the form of a nose or ridge south and west of the rivers. The ground-water ridge may be in part residual, caused by the drainage-ditch effect of the low-stage Arkansas River on the northeast and by withdrawals from irrigation wells on the southwest. However, evidence from water-level fluctuations and from the chemical quality of the waters indicates that considerable recharge occurs from direct penetration of rainfall along the ground-water divide. Figure 22 is a sketch map showing the distribution of chloride in water samples from the Quaternary alluvium. A map based on specific conductance of the samples instead of chloride content did not differ significantly from that shown in figure 22. It is evident from this map that recharge from direct penetration of rainfall occurs near the river, because the ground water contains less than 50 ppm of chloride whereas the weighted average chloride content of the river water is about 135 ppm and is below 50 ppm only for short periods of time during flood stages (Dover and Guerin, 1955, p. 13). Thus, the divide on the water table, the low chloride content of the ground water in the divide area, and the generally sandy character of the water-bearing materials in the divide area suggest that important quantities of recharge water are added to the ground-water body in that area.

The effect of surface materials of low permeability on the piezometric surface is shown in southeastern Desha County (pls. 9 and 11). The low on the piezometric surface coincides with a large area of backswamp deposits in T. 11 S., Rs. 2 and 3 W., and Tps. 12 and 13 S., R. 2 W. (See pl. 5). The backswamp deposits, being relatively impermeable, would transmit negligible quantities of recharge to the aquifer. The map shows that the ground water is flowing into this low from areas to the west and north that are underlain largely by natural-levee deposits.

South of the ground-water ridge in Lincoln County is a ground-water trough, or enclosed depression. Within this trough in north-central Lincoln County, T. 8 S., R. 6 W., is an area of concentrated pumping. In this area the wells are closely spaced and most of them are high-capacity wells used for rice irrigation. Thus, the trough probably is created by heavy pumping and preserved by the presence of fine-grained deposits at the surface that retard recharge by infiltration from rainfall. It is the presence of this relatively impermeable top stratum that makes this land more suitable for rice culture than adjacent lands underlain by more permeable materials. Thus, the trough has developed to induce underflow from other areas that receive more recharge.

The smaller streams in the report area seem to have little or no influence on the movement of ground water. The explanation for this probably lies in the low permeability of the underlying deposits and the small area of the stream bottoms. Vertical leakage across the beds becomes significant only when it occurs over a large area. Where streams are separated from the aquifer by materials of low permeability the additions to or removals from the aquifer will be small, because the area of the stream channel is small.

Recharge to the area occurs also by underflow from Jefferson County. By use of an average hydraulic gradient of 2.5 feet per mile, from the piezometric maps at the Jefferson-Lincoln County border, and an assumed average transmissibility of 160,000 gpd per foot from pumping tests, it is estimated that the underflow across the 10 miles of county boundary averages 4 mgd, or about 4,300 acre-feet per year.

Discharge of ground water in Desha and Lincoln Counties occurs chiefly by effluent seepage into the Arkansas and Mississippi Rivers, evapotranspiration, underflow into Chicot County, and pumping from wells.

The quantity of ground water discharged by evaporation and transpiration from the Quaternary alluvium is not known, but it is probably large. Dense growths of plants, many species of which are known to draw water from the zone of saturation or capillary fringe (Meinzer, 1927; Robinson, 1958), are present in the area, especially along the meander belts of the Arkansas and Mississippi Rivers and in many backswamp areas.

Relation Between the Ground Water And the Water in the Rivers

The relation between the ground water in Lincoln and Desha Counties and the water in the Arkansas and Mississippi Rivers is clearly

indicated in the series of 6 piezometric maps for Lincoln County and 5 for Desha County (pls. 7-17).

The earliest piezometric map for Lincoln County (pl. 12) shows the ground-water conditions in December, 1955. This map shows that the water levels in wells near the Arkansas River were higher than the water levels in the adjacent parts of the river and that the river was acting as a drain and being fed by ground water. The ground-water ridge that forms a divide between the water moving into the river and that moving southwestward to the heavily pumped area is prominently shown on this map. However, in February 1956 (pl. 13) the stage of the Arkansas River was much higher and the ground-water ridge southwest of the river had largely disappeared. During such high stages of the river there is some movement of water from the river into the ground-water body. The map for October 1956 (pl. 14) is very similar to that for December 1955, and the direction of movement of the water was the same—that is, from the ground-water body to the river. The maps for April 1957 (pl. 15), December 1957 (pl. 16), and April 1958 (pl. 17) show a similar sequence of changes in the movement of ground water. In December 1957 the river was receiving water from the ground-water bcdy, and in each April the high stages of the river had reversed the gradient and ground water was moving from the river into the ground-water body.

The earliest map for Desha County (pl. 7) shows the ground-water conditions for December 1956. Both the Arkansas and Mississippi Rivers were effluent; that is, they were receiving water from the ground-water body. The ground-water ridge which bordered the rivers was similar to the ridge in Lincoln County. In February 1957 (pl. 8) this ridge was even more pronounced and the rivers were strongly effluent. During the high river stages in April of 1957 (pl. 9) the ridge was less pronounced. Near-equilibrium conditions between the ground water and the river existed in the northwestern part of the county. This near equilibrium was a transition between the influent conditions in Lincoln County and effluent conditions to the southeast in Desha County. The Mississippi River was influent in the southeast part of the county; that is, some water was moving from the river into the ground-water body. The map for December 1957 (pl. 10) is similar to that for February 1957. The map for April 1958 (pl. 11) is similar to the one for April 1957 except that the Arkansas River was influent throughout Desha County.

WATER-LEVEL FLUCTUATIONS

The water level in a well is not stationary but fluctuates almost constantly. The most significant fluctuations are those caused by changes in the amount of water in storage, which are the net effect of recharge to and discharge from the aquifer. Changes in barometric pressure and other influences which change the load on the aquifer cause water-level fluctuations in an artesian well.

Water levels in some of the Quaternary terrace deposits (Qt_3 east of the ridge and Qtu west of the ridge), in the Pliocene(?) deposits, and in the Jackson group fluctuate almost entirely in response to natural forces because little water is pumped from these deposits. The hydrograph of well 10S-8W-4bcc shown in figure 15 is representative of this group.

Recharge generally occurs in the first part of the year, and water levels reach their maximum heights in the spring; natural discharge by evapotranspiration and discharge from springs reduces the water levels during the rest of the year to their lowest point in the early winter. The total annual range of the water-level fluctuations in the terrace and Pliocene(?) deposits and Jackson group may be 14 or 15 feet as it is in well 10S-8W-4bcc. Domestic and stock wells must be dug or bored below the level of lowest fluctuation or they will go dry during the fall and early winter months.

Water levels in wells tapping the aquifers of the Claiborne group also fluctuate in response to natural recharge and discharge, but near areas of withdrawal the fluctuations result largely from pumping. In areas not affected by pumping, the fluctuations are small because the areas of natural recharge and discharge are many miles away. Well 11S-2W-3caa is more than half a mile from any other well in the Claiborne group, and the hydrograph of its water-level fluctuations shown in figure 15 is little affected by pumping of wells. The minor fluctuations result from barometric and other pressure changes, but the 1- to 1½-foot longer term changes probably reflect changes in storage.

Water-level fluctuations in the Quaternary alluvium reflect the natural recharge and discharge but are influenced strongly by the yearly pumping cycle. The pumping season

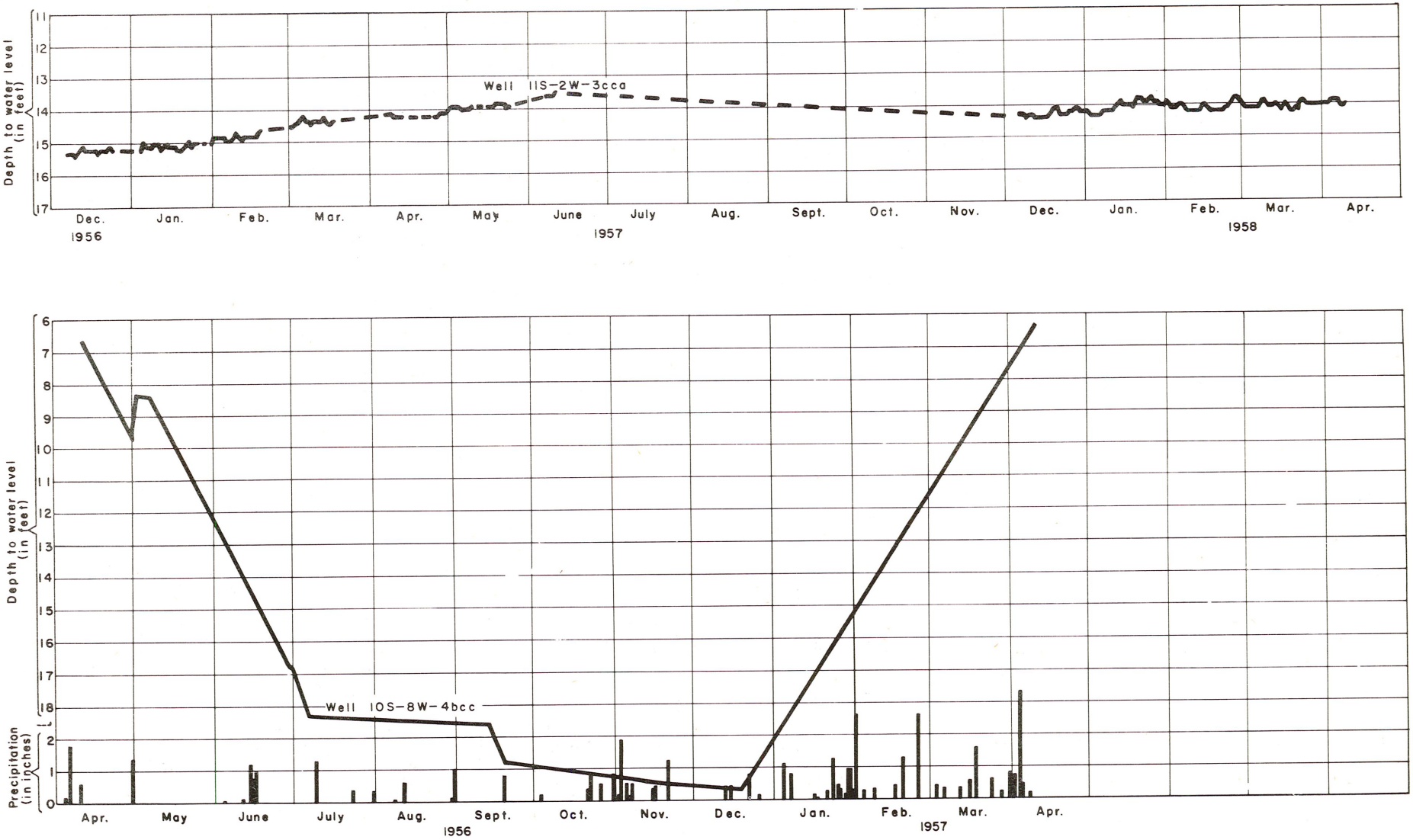


Figure 15.—Hydrographs of well 11S-2W-3cca in the Claiborne group and well 10S-8W-4bcc in Quaternary terrace deposits and daily precipitation at Star City, Ark.

usually begins in the early part of May, and the water levels show a general decline from this time until October when most of the pumps are shut off. After pumping stops, the water levels begin to rise as water flows in from adjacent areas to fill the cone of depression caused by pumping. The water levels are at their highest points in the spring immediately before the pumping season. Artesian wells in the Quaternary alluvium fluctuate as a result of changes in barometric pressure. The amount of fluctuation is dependent upon the physical characteristics of the aquifer and the confining bed and the amplitude of the change in barometric pressure. Figures 16, 17, and 18 are hydrographs of water-level fluctuations in wells in the Quaternary alluvium. They illustrate the yearly pumping and recovery cycle.

Figure 16 shows water-level fluctuations obtained with continuous water-level recorders in two unused irrigation wells. The hydrograph of well 8S-6W-29dcc shows an initial rapid rise of water level of about 1 foot when pumping stopped, at the end of September in 1955 and about the middle of September in 1956. Then follows a gradual rise until the succeeding spring when the new pumping season begins. The fluctuations apparently have no direct correlation with rainfall. The water level in well 9S-4W-5dad shows an initial rapid rise of several feet at the end of each pumping season in September. Water levels continue to rise and reach a high stage in winter or early spring and remain relatively stable until a new pumping season begins. At the beginning of each pumping season the water level drops rapidly at first and then more gradually until the end of the pumping season. Some rises in water level seem to have some correlation with heavy rainfall, notably in late January and early February 1956, early and late January 1957, and October and November 1958.

Minor fluctuations caused by barometric changes are shown on both hydrographs of figure 16.

Figure 17 shows hydrographs of three wells tapping the Quaternary alluvium. The water levels show a general rise in the winter and spring of 1956-57 similar to the rise shown on the hydrographs of figure 16. Well 12S-2W-13ada1 shows an abrupt decline in water level at the beginning of the pumping season. This well is near a rice-irrigation well in an area of moderate pumping.

Figure 18 shows water-level fluctuations in 4 irrigation wells measured monthly over a period of about 5 years. These hydrographs show the yearly pumping and recovery cycle and indicate changes in ground-water storage when successive spring water levels are compared. There was a decline in spring water levels from 1953 to 1954. During 1955 and 1956 the spring water levels remained at about the low point reached in 1954. In 1958 there was a rise, bringing the spring levels almost up to the point reached in 1953. The low water levels in 1954 through 1957 coincide with a low in the curve showing cumulative departure from normal precipitation. However, the water levels are also greatly affected by, and may be correlated with, pumping. (See fig. 19.)

Yearly water-level measurements have been made since 1953 in a network of wells tapping the Quaternary alluvium in Desha and Lincoln Counties. The annual changes in water levels measured in the spring, when water levels generally are at their highest point, are caused primarily by changes in storage. A composite hydrograph of water levels in about 30 wells showing average depth to water each spring since 1953 is given in figure 19, together with the cumulative departure from normal precipitation and total pumpage in the area.

The decline of water levels in the springs of 1954 and 1955 clearly was the result of increased pumping for irrigation, although precipitation fell off in these years, especially in 1955. The rise in water levels in 1956 was the result of decreased pumping during the previous pumping season, resulting from a decrease in rice acreage. Water levels in the spring of 1957 were slightly lower than those of 1956 in Desha County and slightly higher than those of 1956 in Lincoln. The decline in Desha County and rise in Lincoln County are correlated with, and are thought to be the result of, differences in pumping in the two counties. The rise in water levels in 1958 is associated with another reduction in total pumpage and a considerable increase in precipitation.

UTILIZATION OF GROUND WATER

In 1956 ground water was used at an average rate of about 27½ mgd in Desha County and about 20 mgd in Lincoln County. Of the total amount used in both counties, about 45 mgd was used for irrigation and came from wells in the Quaternary alluvium. About 1½ mgd was pumped from wells in the Claiborne

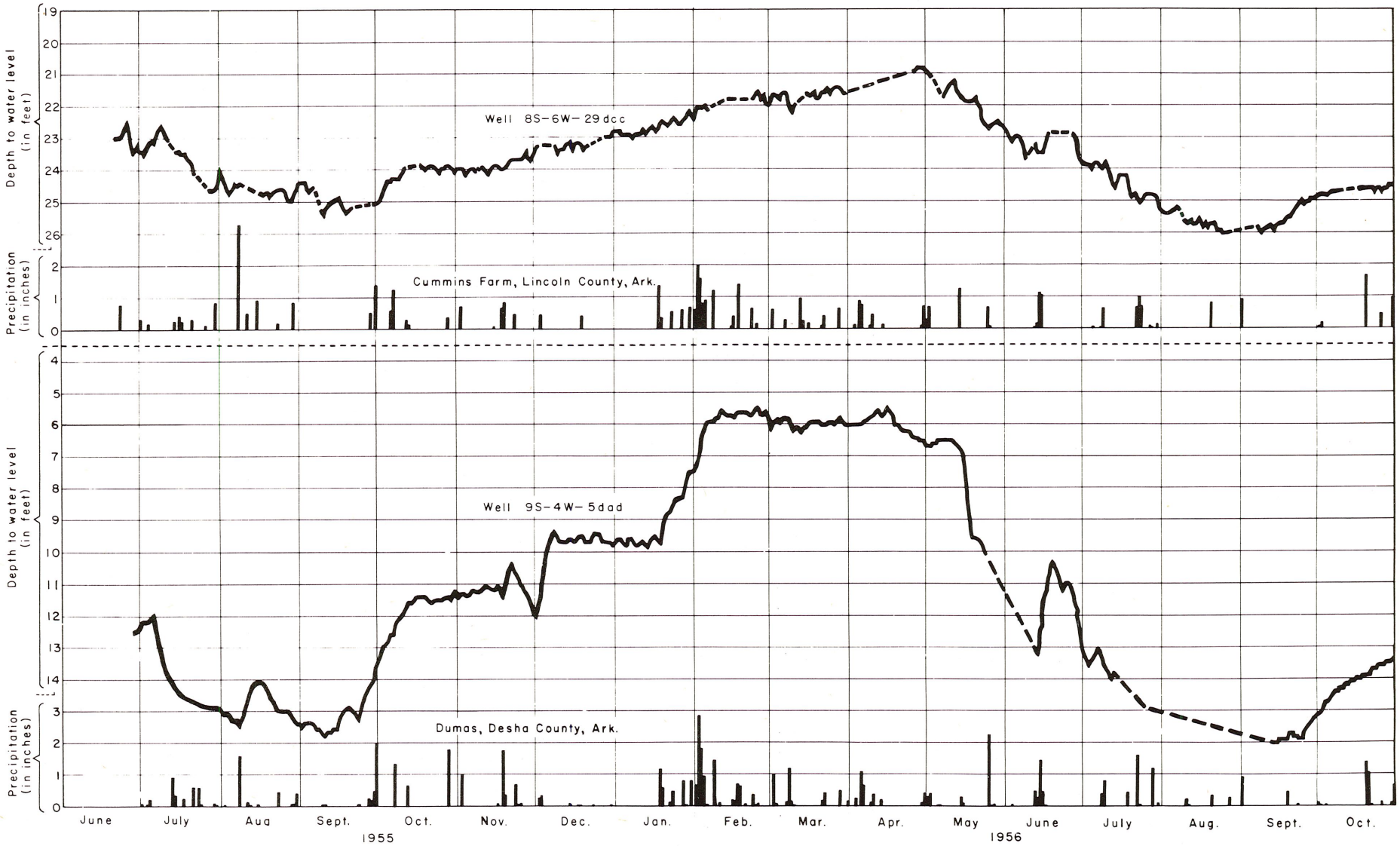


Figure 16.—Hydrographs of wells 8S-6W-29dcc and 9S-4W-5dad in Quaternary alluvium and daily precipitation at Cummins Farm and Dumas, Ark.

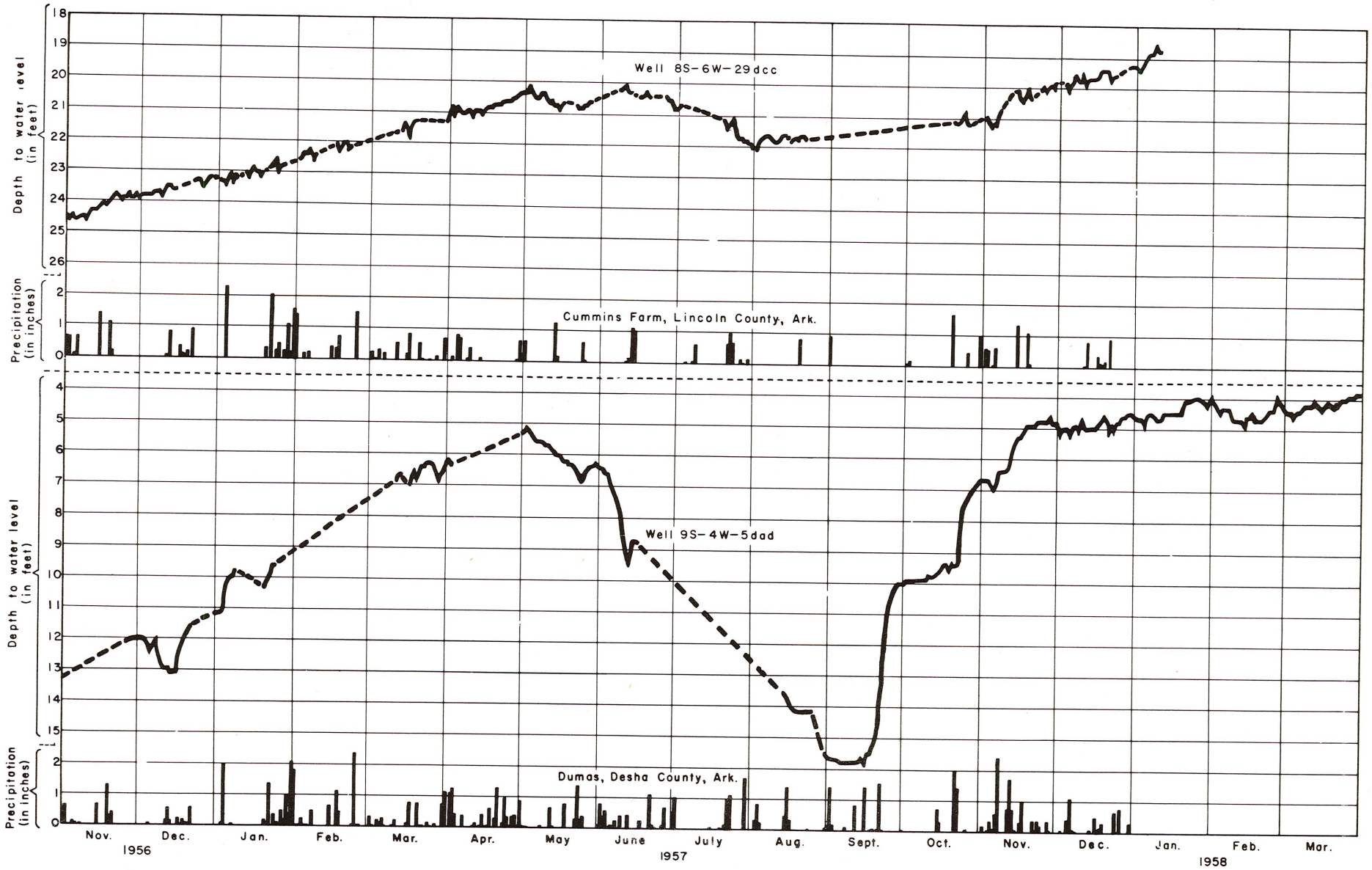


Figure 16.—Hydrographs of wells 8S-6W-29dcc and 9S-4W-5dad in Quaternary alluvium and daily precipitation at Cummins Farm and Dumas, Ark.

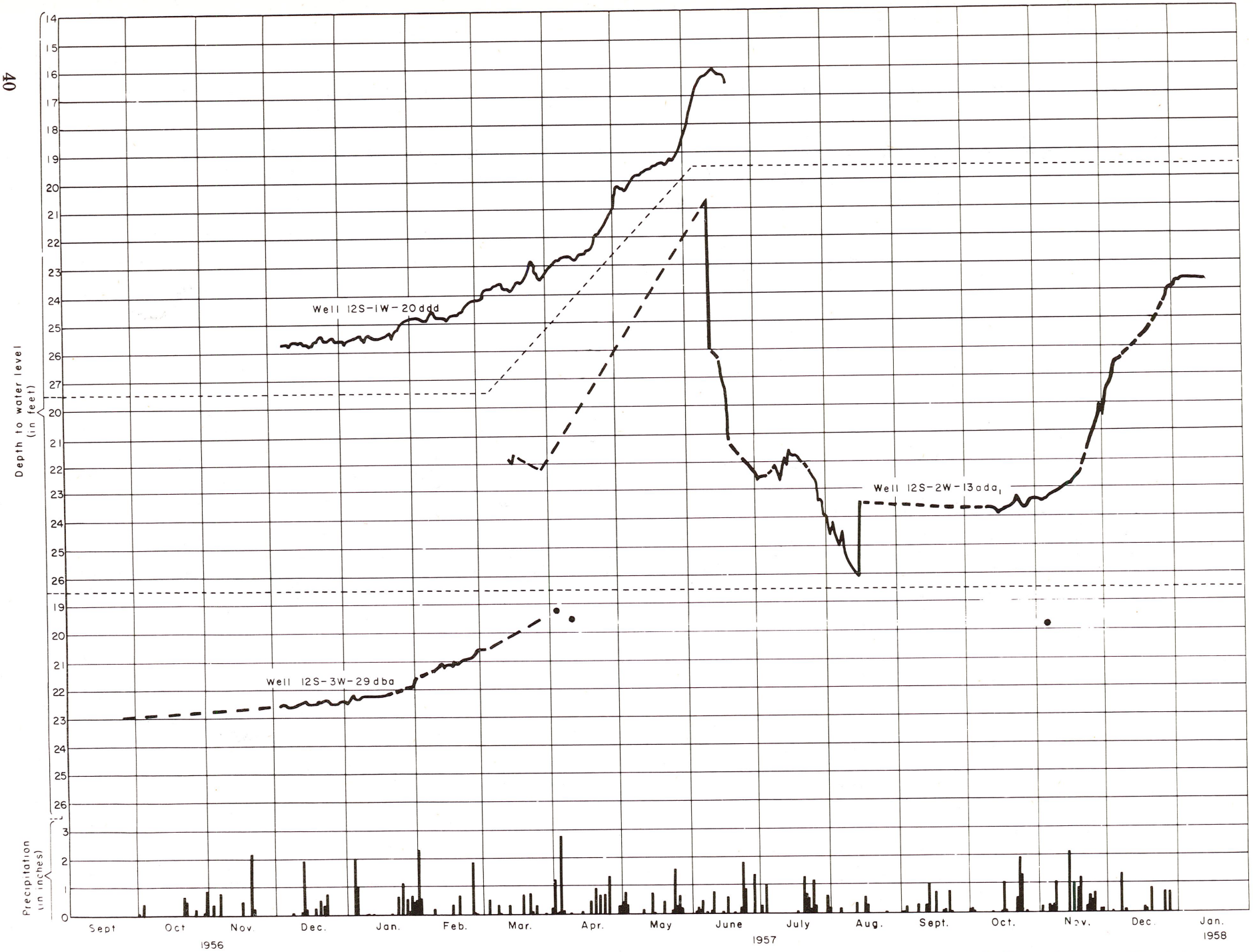


Figure 17.—Hydrographs of wells 12S-1W-20ddd, 12S-2W-13adal, and 12S-3W-29dba in Quaternary alluvium and daily precipitation at Arkansas City, Ark.

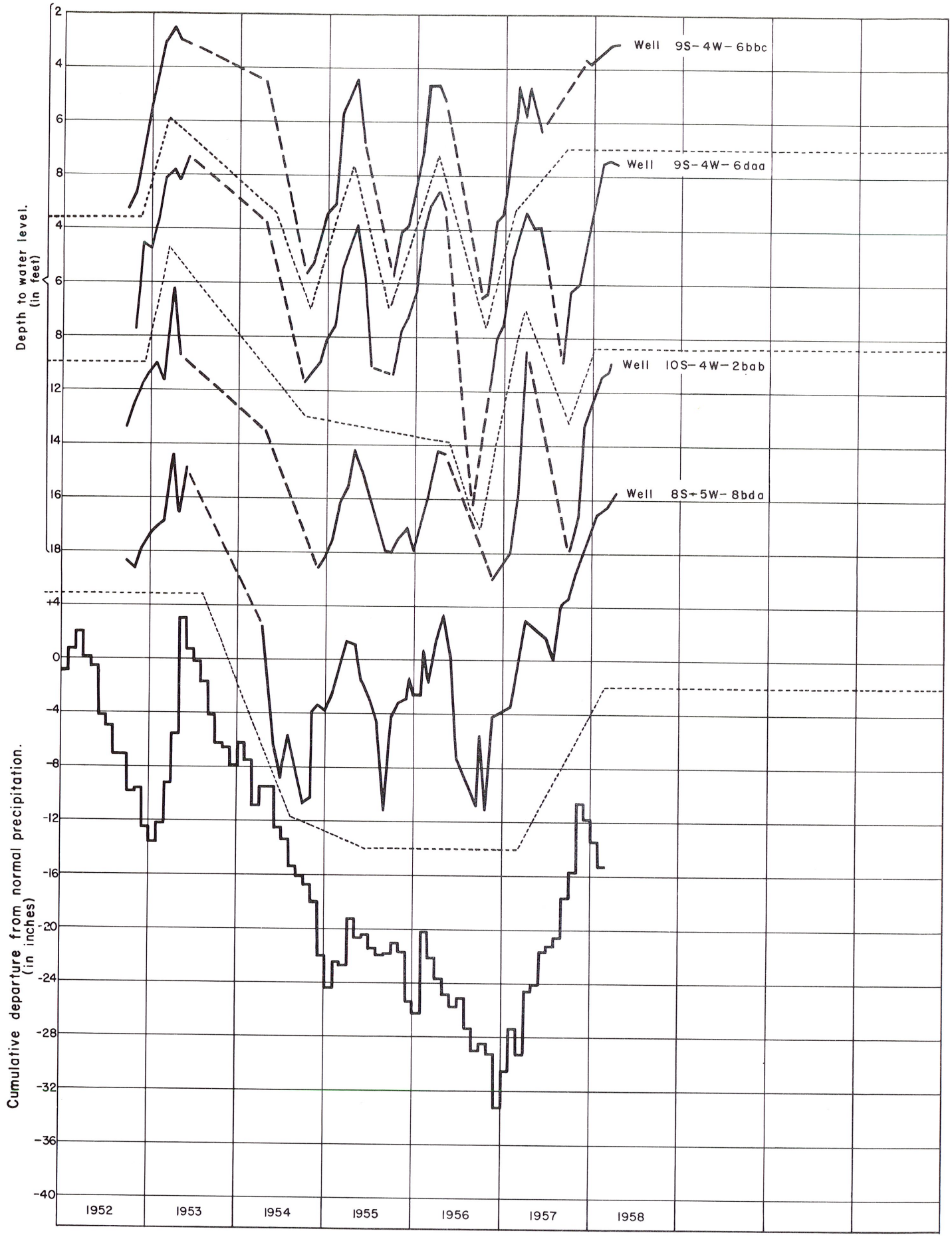


Figure 18.—Hydrographs of wells 9S-4W-6bbc, 9S-4W-6daa, 10S-4W-2bab, and 8S-5W-8bda in Quaternary alluvium and cumulative departure from normal precipitation at Dumas, Ark.

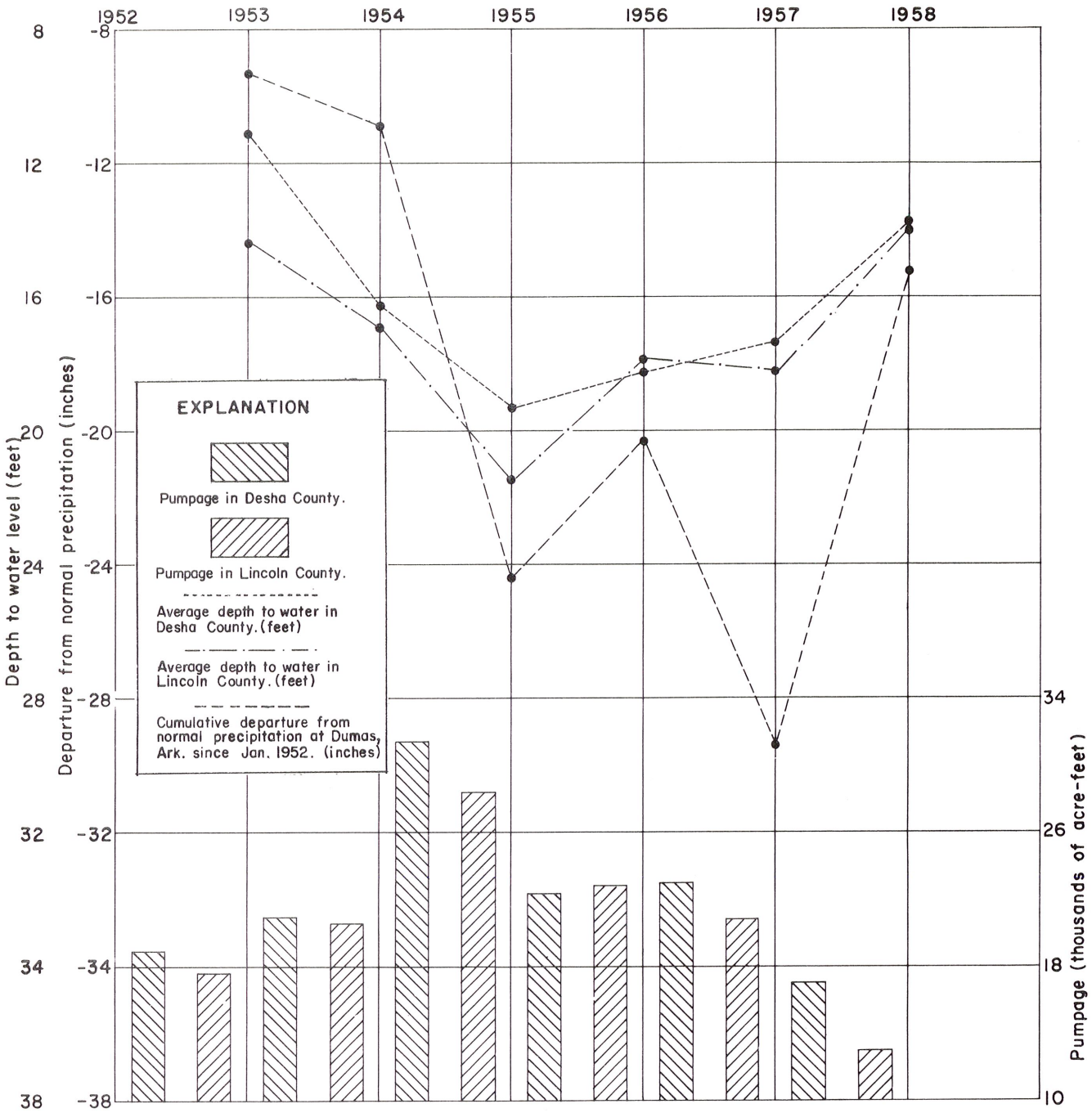


Figure 19.—Relation between average depth to water in the Quaternary alluvium in the spring from 1953 through 1958, yearly pumpage, and cumulative departure from normal precipitation at Dumas, Ark.

group, of which about two-thirds was used for public supplies and about one-third by industry. Domestic use from all aquifers was probably 1 mgd or less.

Nearly all this development has occurred in less than 10 years, for it is reported that there were no more than half a dozen irrigation wells in both counties in 1946, compared to about 400 in 1956. Most of the deep wells for domestic use also have been drilled in the past 10 years.

Public Supplies

There are 4 municipalities and 1 community in Desha County and 3 municipalities and 1 State Institution in Lincoln County that obtain public water supplies from wells. These wells obtain water from sands in the upper part of the Claiborne group. The water is only mod-

erately mineralized and very soft. The principal constituents in solution are sodium and bicarbonate. The water is excellent for public use. Chemical analyses of the water from public-supply wells are included in table 10.

Dumas

Dumas, a city of about 3,000 people in the northwestern part of Desha County, obtains its water from two wells (9S-4W-27dab1 and 9S-4W-27dab2) tapping a sand of the Claiborne group. Water is pumped from the wells by electrically driven turbine pumps to an elevated storage tank with a reported capacity of 70,000 gallons. Measured pumpage from the city wells averaged about 219,000 gpd during the period January 1, 1956, through December 31, 1956.

McGehee

McGehee, a city of about 4,000 inhabitants, is in the southwestern part of Desha County. It is supplied with water from two wells. One well (12S-3W-27bbb2) is owned by the city. This well obtains water from the Sparta sand and Cockfield formation of the Claiborne group. The second well (12S-3W-27bbb3), which taps the Cockfield formation, is owned by the Delta Ice Co. Well 12S-3W-27caa2 owned by the Missouri Pacific Railroad, tapping the Sparta sand and Cockfield formation, is connected to the city water mains and is available for city use in case of emergency. Water is pumped from the two city supply wells by electrically driven turbine pumps into a ground reservoir of 300,000-gallon capacity, then to an elevated storage tank of 100,000-gallon capacity. The water is of good quality and is not treated. The measured pumpage during 1956 was about 154,000,000 gallons, or an average of about 421,000 gpd.

Arkansas City

Arkansas City, with a population of about 1,000, is supplied with water from two wells (12S-1W-33cda1 and 12S-1W-33cda2) tapping the Cockfield formation. The wells are equipped with electrically driven turbine pumps. The water is stored in an elevated tank having a reported capacity of 45,000 gallons. The average daily use is reported to be about 100,000 gallons.

Pickens

About 34 families in the community of Pickens, which is about 3 miles south of Dumas, are supplied with water from well 9S-4W-35bbd, owned by R. A. Pickens and Son, tapping the aquifers of the Claiborne group. The well is equipped with an electrically driven turbine pump. Water is stored in an elevated tank having a reported capacity of 23,000 gallons. The daily average use is reported to be about 30,000 gallons. The water is not treated.

Watson

Watson, a town of about 300 inhabitants, is supplied with water from one municipally owned well (9S-2W-26aaa) tapping an aquifer of the Claiborne group. Water is pumped from the well by an electrically driven turbine pump to two pressure tanks of 1,000- and 1,200-gallon capacity. The daily use is reported to be about 7,000 gallons.

Star City

Star City, population 1,300, is supplied with water from a surface reservoir and one well (9S-7W-8caa), which is used when demand is greater than the available surface supply. The well, 1,028 feet deep, has a reported yield of 200 gpm and obtains its water from the Sparta sand. The water is pumped from the well by a turbine pump driven by a butane-powered motor.

Gould

Gould, a city of more than 1,000 people, is supplied by one well (8S-5W-35bda) 827 feet deep. The well derives its water from the Sparta sand and has a reported yield of 350 gpm. The water is pumped from the well by an electrically driven turbine pump into a 55,000-gallon elevated storage tank.

Grady

Grady, population about 500, is supplied by one well (7S-6W-33baa) 816 feet deep. It has a reported yield of 550 gpm and derives its water from the Sparta sand. The water is pumped from the well by an electrically driven turbine pump. A 50,000-gallon elevated tank and a 55,000-gallon ground reservoir store the pumped water.

Cummins State Penal Farm

The Cummins State Penal Farm, in the northern part of T. 8 S., R. 5 W., and southern part of T. 7 S., R. 5 W., in Lincoln County, is supplied by two wells (8S-5W-3bcd and 8S-5W-3cca) 802 and 816 feet deep, respectively, which obtain water from the Sparta sand. The wells are pumped by electrically driven turbine pumps into a 15,000-gallon elevated storage tank.

Domestic Supplies

Many domestic wells in the area are screened in the Cockfield formation and a few are

believed to draw water from the Sparta sand. The wells tapping these aquifers range in depth from about 300 to 1,400 feet. The average depth is between 500 and 600 feet. The wells are drilled, are 2 to 4 inches in diameter, usually are cased with galvanized-iron pipe, and generally have 5 to 15 feet of 2-inch screen. They are equipped with electrically driven jet pumps and many of them yield sufficient water for several families. The water is soft, relatively low in dissolved solids, and excellent for domestic use.

Numerous domestic wells obtain water from the alluvium of Quaternary age. They are usually driven pipes and well points, 1¼ inches in diameter, and are usually equipped with electrically driven jet pumps or hand-operated pitcher pumps. Over most of the area, water from the Quaternary alluvium is not well suited for domestic use because of the high iron and calcium bicarbonate content. Many of the domestic water-supply systems are equipped with water softeners.

Shallow wells in the upland area of Lincoln County obtain their water from the Jackson group, deposits of Pliocene(?) age, and Quaternary terrace deposits. These wells are usually dug or bored, although some are driven. The dug wells generally are curbed with brick or wood, but many have large-diameter concrete casing and some are uncased. The bored wells usually are cased with 6- or 8-inch tile, although wood curbing is common. Water is pumped from some of the dug, bored, and driven wells by centrifugal and jet pumps; however, the method of lift in most of the dug and bored wells is by rope and bucket. The driven wells are equipped with cylinder or pitcher pumps, according to the depth to water.

Irrigation Supplies

There are about 400 irrigation wells in the area, all of which draw water from the alluvium of Quaternary age. The yields of the wells range from 50 to 3,000 gpm, and average about 1,400 gpm. During 1956 these wells were pumped at an average rate of about 40 mgd (seasonal average rate of about 160 mgd) for the irrigation of rice and other crops. The estimated yearly pumpage for irrigation, in thousands of acre-feet for 1953 through 1957, in Desha and Lincoln Counties is shown graphically in figure 19.

Rice irrigation accounts for about 90 percent of the water used for irrigation in Desha County and about 80 percent of the water used for irrigation in Lincoln County. About three-fourths of the rice produced in Desha County is irrigated by ground water, and virtually all the rice grown in Lincoln County is irrigated by ground water. Although the amount of irrigation water required varies to some degree with the amount of rainfall, the rice acreage is a rough indication of the magnitude of pumpage in Desha and Lincoln Counties.

Rice was first produced commercially in Desha County in 1945 and in Lincoln County in 1947. The first irrigation wells in the area were drilled in response to the need for water for rice irrigation. Approximately 2.6 acre-feet of water is required to produce 1 acre of rice. Of this amount, an average of about 1.8 acre-feet of water must be supplied by irrigation in the Grand Prairie region and probably at least 2.0 acre-feet is required in other rice-growing areas in Arkansas. The remainder of water required is supplied by rainfall (Engler and others, 1945, p. 4; Engler and others, 1951, p. 6).

Supplemental irrigation of crops other than rice in Desha and Lincoln Counties closely followed the advent of rice production in the area. The average rainfall is about 50 inches; however, droughts are frequent, especially during the growing season. This erratic distribution of rainfall often materially reduces crop yields. Supplemental irrigation of so-called dry crops can play an important part in providing the moisture required to obtain high crop yields. Bartholomew and others (1945, p. 17) report that during one of the driest summers (1943) only a little more than 1 acre-foot per acre was required for the supplemental irrigation of such crops as cotton, corn, soybeans, and lespedeza. During most summers the supplemental-irrigation requirements for these crops are about 0.5 to 0.8 acre-foot per acre.

RECOVERY OF GROUND-WATER

When water is withdrawn from a well the water level in the vicinity of the well declines and assumes a form similar to that of an inverted cone, called the "cone of depression." Formation of this cone is necessary to furnish a hydraulic gradient to move the water to the well. The greater the rate of pumping of the well, the greater the drawdown (difference between static and pumping levels) and the deeper the cone of depression. This follows from Darcy's law, which states that the rate of flow is proportional to the hydraulic gradient. As time increases, the cone of water-

table depression extends to greater and greater distances, so that water levels in wells several hundred feet to a mile or more from the pumped well may be lowered.

The "specific capacity" of a well is the yield per unit drawdown and is usually expressed in gallons per minute per foot of drawdown. For a given yield the drawdown in a well is inversely proportional to the transmissibility of the aquifer. Thus, the specific capacity of a well, the ratio of yield to drawdown, affords a measure of the ability of the aquifer to transmit water. However, the specific capacity of a well is affected also by the efficiency of the well and the duration of pumping.

Generally, the more efficient the well the less will be the cost of pumping. Several factors of well construction affect the efficiency of a well, such as thickness of aquifer screened, size and shape of screen openings, diameter of the screen, and development of the well. Post-constructional factors, such as clogging of the screen by sand grains and chemical incrustations, also will affect the well efficiency.

The specific capacities reported in table 6 are only a rough measure of the ability of the aquifer to transmit water because of the differences in well construction and differences in duration of the specific-capacity tests.

TABLE 6

Specific capacity of some of the irrigation wells screened in the alluvium of Quaternary age.

Well	Yield (gpm)	Specific capacity
8S-4W-32bcc	1,100	50
9S-2W-23abc	1,390	139
9S-2W-36ccc	1,590	79
9S-3W-6dab	1,500	83
9S-3W-9cab	1,310	65
9S-3W-18ddd	1,790	85
9S-3W-23aaa	1,330	48
9S-3W-27bcc	1,080	34
9S-3W-29baa	1,310	100
9S-3W-30aaa	1,380	71
9S-4W-2acd	1,440	36
9S-4W-6bbc	1,760	61
9S-4W-16daa	780	39
9S-4W-25acd	970	39
9S-4W-30baa	1,100	100
10S-2W-2dbb	1,310	119
10S-2W-24caa	1,390	107
10S-3W-22cdc	1,470	92
10S-3W-25cbb	860	96
10S-3W-30dbd	1,150	105
10S-4W-7bda	630	70
10S-4W-12cab	860	66
11S-3W-21bbb	1,140	76
11S-3W-34dab	680	112
12S-2W-13ada2	1,510	108
12S-2W-25daa	1,200	75
12S-2W-34ccc	900	23
12S-3W-18baa	820	103
13S-2W-17dcc	490	29
13S-3W-14add	1,100	55

CHEMICAL QUALITY OF THE GROUND WATER

In this section is discussed the general chemical quality of ground water in Desha and Lincoln Counties in relation to the geologic source of the water and its suitability for irrigation, domestic, and industrial uses. The basic data for the discussion are to be found chiefly in table 10, which presents analyses of samples of water from 116 wells in Desha County and 124 wells in Lincoln County. The analyses relate to the dissolved mineral constituents that determine the fitness of the water for municipal, industrial, agricultural, and domestic uses, without reference to the sanitary quality of the water. A single sample from a well generally is regarded as being representative of the chemical quality of the water, because under prevailing conditions the concentration of most of the dissolved constituents is not likely to change appreciably with time.

Some idea of the chemical character of the water from aquifers in basal Claiborne, Wilcox, and Cretaceous strata not penetrated by wells in the report area was gained from its character in adjacent parts of Mississippi and from studies of electric logs of oil tests within the area.

Chemical Character in Relation to Source

Both the type and the amount of the mineral content of any ground water are determined by the kind and amount of soluble minerals in the rocks through which the water has traveled and the length of time it has been in contact with those minerals. Therefore, a close correlation exists between the mineral character and content of the ground water and the aquifer in which it occurs, the direction and rate of movement of the water in the aquifer, the character of recharge and discharge and the places where they occur, and the places where contaminating or diluting water enters from other aquifers or confining beds. Some of the relations are shown graphically on the bar diagram (fig. 20) and others are pointed out in the following paragraphs describing the mineral quality of the water in each of the important aquifers.

Rocks Older Than the Sparta Sand

The deepest water wells in Lincoln and Desha Counties penetrate sands of the Claiborne group. Consequently, samples of water are not available from any deeper aquifer. Studies of electric logs of oil tests indicate that the water in these older rocks is generally too

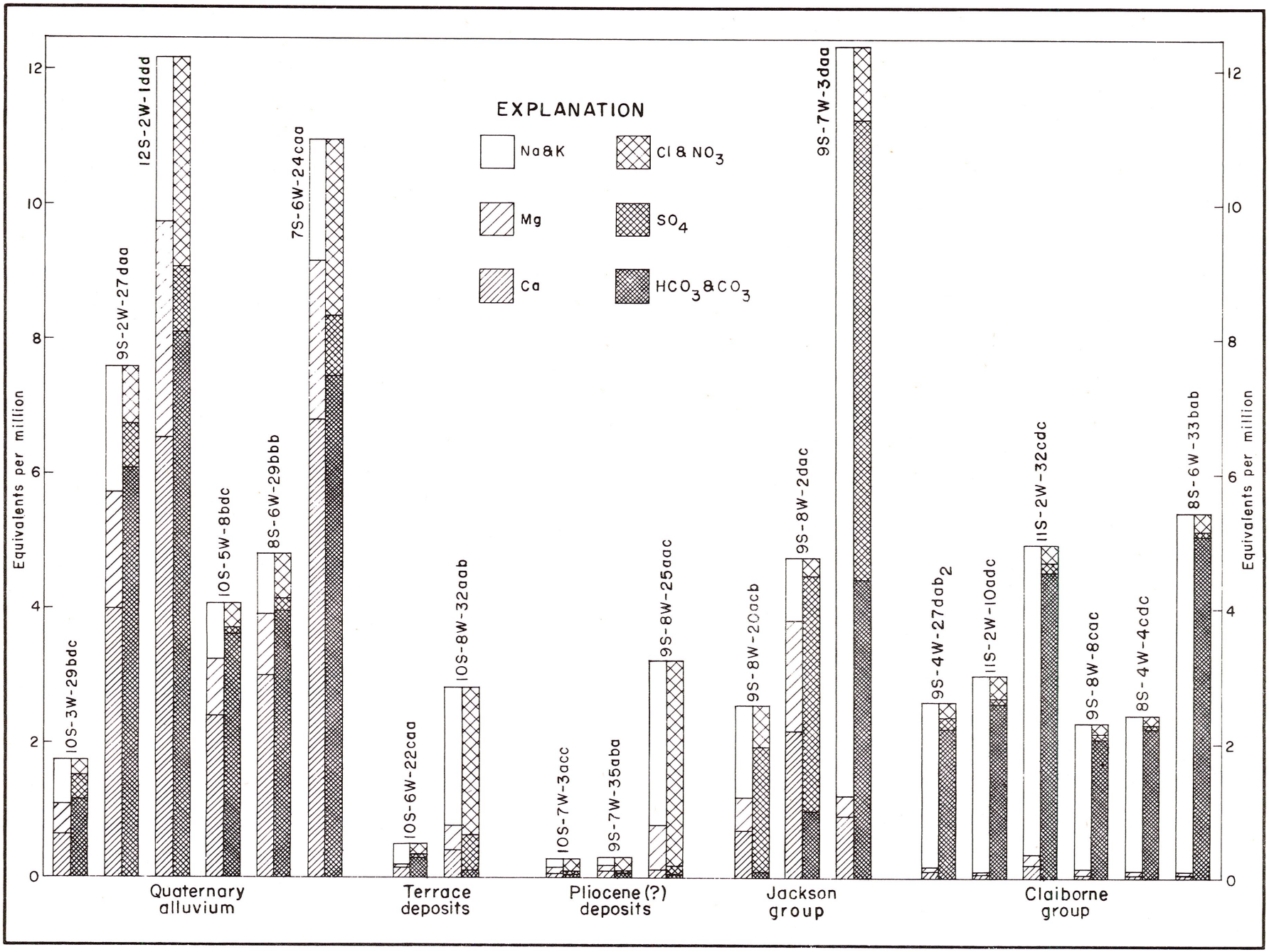


Figure 20.—Graphic representation of selected chemical analyses of ground water from the several aquifers.

highly mineralized for most uses. However, the lower sand unit of the Cane River formation, which is equivalent to the Meridian sand member of the Tallahatta formation of Mississippi, may be a potential source of relatively fresh water in northeastern Desha County, although it probably is brackish or salty elsewhere in the area. The Meridian sand member is utilized as a source of water supply in Mississippi. Chemical analyses of water from the Meridian in Bolivar County, Miss. (Brown, 1947, p. 66-67), which is adjacent to Desha County, indicates that the water is of the sodium bicarbonate type. In percentage composition of the several constituents it is similar to water from the Cockfield and Sparta formations in Desha County. However, it is generally higher in total mineralization.

Sparta Sand and Cockfield Formation of the Claiborne Group

Waters from two formations in the Claiborne group, the Sparta sand and the Cockfield formation, will be discussed together for convenience. The formations are difficult to differentiate and locally are probably connected hydraulically. The waters are similar in chemical character, and some of the wells drawing water from the Sparta are also screened in the Cockfield. Analyses of samples of water from 95 wells in the Claiborne group are given in table 10.

The analyses show the water to be of the sodium bicarbonate type. Dissolved solids generally are relatively low, ranging from 124 to 574 ppm (parts per million) and averaging about 200 ppm. Hardness ranges from 1 to 43 ppm and is generally less than 10 ppm. The total iron content ranges from 0.00 to 1.4 ppm. The waters were alkaline when analyzed in the laboratory, as indicated by a pH range from 7.9 to 8.6. However, the waters may have contained carbon dioxide and other dissolved gases, so the pH was probably not as high at the time they were withdrawn from the aquifer.

The principal cation in solution in water from the Claiborne group in Desha County is sodium, the percent sodium ranging from 87 to 99. This high sodium content of the ground water probably results from an ion-exchange reaction whereby calcium and magnesium in the ground water are exchanged for sodium in the enclosing rocks (Renick, 1924, p. 53-72). This softening process is most likely to occur where glauconite and other minerals having a high ion-exchange capacity occur in the water-bearing formations. That such ion exchange does occur as the water moves downdip in the formations is suggested by the fact that the percent sodium increases in that direction. In Jefferson County, which is nearer the recharge area, the percent sodium ranges from 31 to 73, but downdip in Desha County it ranges from 87 to 99.

Another change in the chemical character of the water of the Claiborne group between Jefferson County and Desha County is the increase in the bicarbonate-to-sulfate ratio. This increase may be attributed in part to sulfate reduction. This reaction goes on commonly in the waters of sediments that contain organic matter and has the effect of a molecule-for-molecule substitution of bicarbonate for sulfate in the water (Piper, Garrett, and others, 1953, p. 90). The bicarbonate-to-sulfate ratio in water from the Claiborne group in Jefferson County is commonly about 14 to 1, whereas in water from the Claiborne group in Desha County the bicarbonate-to-sulfate ratio is commonly about 68 to 1. That this increased ratio may be caused in part by sulfate reduction is indicated by the fact that sulfate averaged 5 ppm in 20 samples from Jefferson County and 2.6 ppm in 58 samples from Desha County.

The percent chloride content in water samples analyzed from the Claiborne group in Jefferson and Desha Counties is substantially the same, and apparently the increase in chloride content is in proportion to the increase in dissolved solids.

The relation between dissolved-solids content and depth is shown in figure 21. Throughout the area, wells more than 600 feet deep generally yield water that is less mineralized than do those less than 600 feet deep. However, the correlation between depth and dissolved solids becomes more striking when the shallow and deep wells in the same area are compared with one another. Within each local area the deeper wells yield water lower in dissolved solids than the shallower wells. The reason for this decreased mineralization with depth is not known. The reverse situation might be expected, since the waters in the deeper aquifers generally have had to travel through more sediment than those from the shallower aquifers. So far as is known, there is nothing in the lithologies of the aquifers in the Claiborne group to indicate that the shallower aquifers have more soluble material than the deeper ones. The evidence for base exchange and other chemical reactions as the

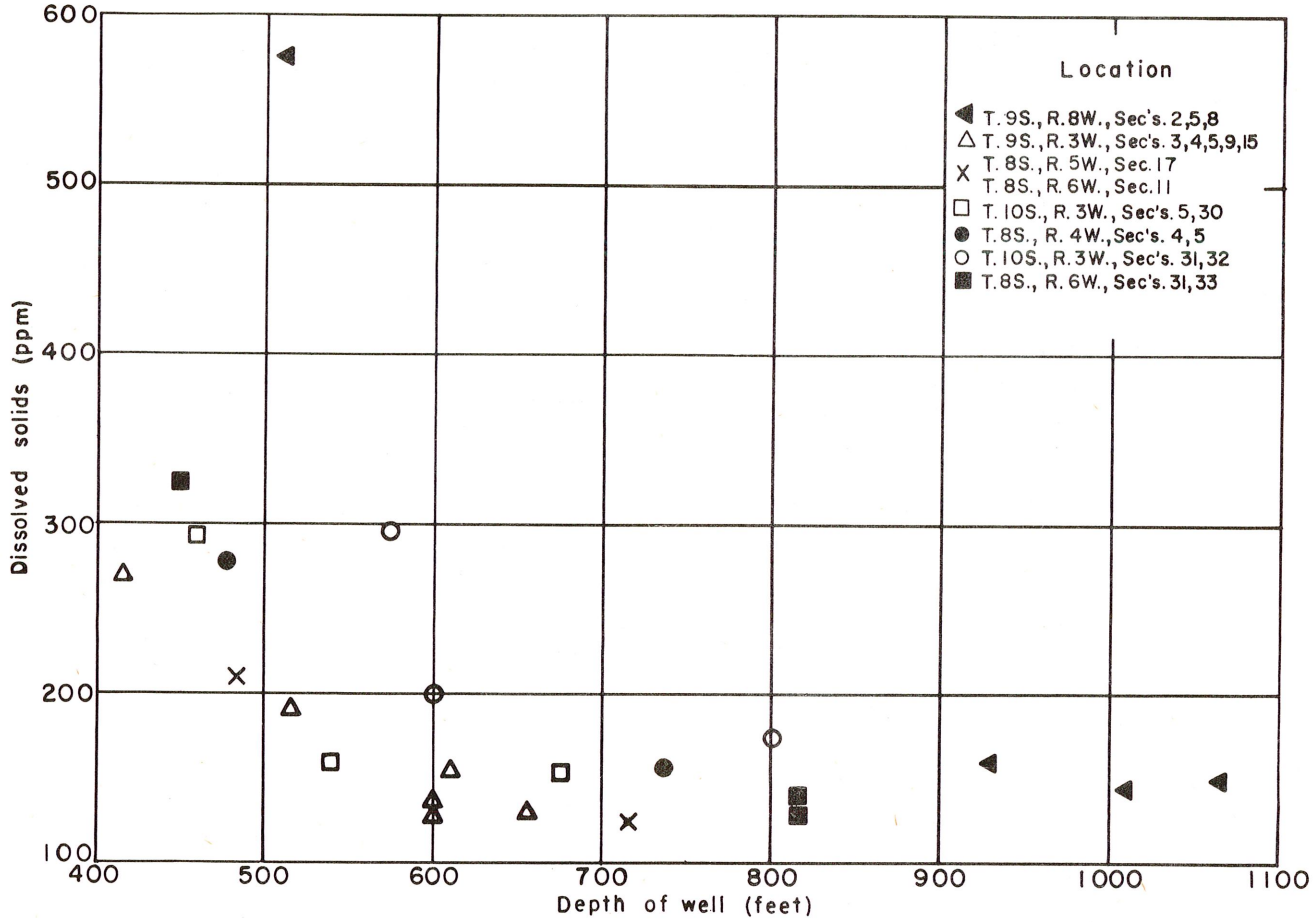


Figure 21.—Relation between dissolved solids and depth of waters from the Claiborne group.

water passes down dip in the aquifers has been outlined above. Perhaps these reactions result in a reduction of dissolved solids.

Jackson Group

The most notable features of water from wells in the Jackson group, as compared to water from the other formations (table 10), are the high sulfate content and relatively low pH. Most of the samples could be classed as sulfate waters because sulfate makes up more than half the total anion concentration, although chloride and (or) bicarbonate are commonly present in appreciable amounts.

Although dissolved solids were determined for only 4 samples, the specific conductance of the other samples indicates that waters from the Jackson group vary greatly in their dissolved mineral content but are likely to be moderately to highly mineralized. The specific conductance of the 19 samples analyzed ranged from 119 to 4,840 micromhos at 25°C. The analyses also show a wide range in hardness, from 19 to 2,560 ppm, and most of the hardness is of the noncarbonate type. In total iron content the samples ranged from 0.03 to 40 ppm, but more than half the samples contained less than 0.5 ppm. The pH ranges from 2.9 to 7.8, 10 of the 19 samples having a pH of 6.8 or less. In the 4 samples analyzed for cations, sodium is dominant in 3 and calcium in 1.

Pliocene(?) Deposits

The seven samples of water from wells in the Pliocene(?) deposits show a considerable range in the character of the mineralization but are generally low in total mineralization. The dissolved solids ranged from 42 to 315 ppm, the hardness from 11 to 126 ppm, the iron from 0.04 to 1.6 ppm, and the nitrate from 0.7 to 94 ppm. The high nitrate in 3 of the 7 samples is noteworthy and probably is to be explained by pollution from barnyard wastes or from fertilizer. The waters from these deposits are generally slightly acidic, as indicated by the range of pH from 5.6 to 7.6; of the 7 samples, 6 had a pH of 6.5 or less.

Quaternary Terrace Deposits

Waters from the Quaternary terrace deposits are of low to moderate mineralization. In 20 samples the specific conductance ranged from 50.8 to 1,510 and averaged 379 micromhos. Chloride was the dominant anion in 9 samples and bicarbonate in 8 samples; in 3 samples they were about equal. The nitrate ranged from 0.1 to 117 ppm and averaged 32 ppm in the 19 samples analyzed, which is very much more than the amount generally found in natural waters. Since the wells are shallow, the source of this large amount of nitrate is probably barnyard wastes or fertilizer. The samples were low in total iron, which ranged from 0.00 to 1.6 ppm. These waters are variable in hardness and pH, the hardness ranging from 10 to 392 ppm and pH from 4.3 to 8.3.

Quaternary Alluvium

Water from the Quaternary alluvium is uniformly of the calcium bicarbonate type, although total mineralization of the water may vary considerably, as indicated by the specific conductance which ranged from 325 to 1,620 micromhos in the samples analyzed. Hardness is generally more than 200 ppm, but locally may be relatively low (51 ppm in a sample from well 10S-4W-18cdd in Desha County). The total iron content of the samples ranged from 0.00 to 62 ppm, but in most of the samples was in the range from 5 to 20 ppm. The waters generally were about neutral or slightly alkaline (pH 6.6 to 8.7) when they reached the laboratory. However, the water in the ground probably had a lower pH, for bicarbonate water may lose carbon dioxide to the air and thus become more alkaline. But even alkaline water may have a high concentration of iron if it occurs in a reducing environment and the iron is in the ferrous state.

The chloride content, which ranges from 3.2 to 182 ppm, is greater in some areas than in others, as shown in figure 22. It is lowest (less than 50 ppm) in water from wells along the western edge of the alluvial plain and along a belt 6 to 8 miles wide south of the Arkansas River. Between these two areas is a belt 4 to 10 miles wide in which the water has a chloride concentration between 50 and 100 ppm. The greatest concentration of chloride (more than 100 ppm) occurs in four patches within this belt. The northernmost of these patches is close enough to the Arkansas River to receive influent seepage from the river. The weighted average chloride content of Arkansas River water in 1952 was about 131 ppm (Dover and Geurin, 1955, p. 13).

Chemical Character in Relation to Use

In this section the waters from the several aquifers are discussed with respect to their suitability for industrial, domestic, and irrigational use. The waters from the Jackson group, the Pliocene(?) deposits, and the Quaternary terrace deposits are discussed under domestic use only because, in general, these aquifers are not capable of high-enough yields for irrigation or for most industries.

Industrial Use

Generalizations concerning the suitability of water for industrial use are difficult to make because quality-of-water requirements vary greatly with the type of industry. Interested users are referred to a publication by Lohr and Love (1954). The waters from the Claiborne group are suitable for most industrial uses with respect to hardness and dissolved solids; the silica content also is reported to be moderate. The iron content is usually below the suggested tolerances for most industrial uses.

Water from the Quaternary alluvium is not well suited for many industrial uses. The water is high in calcium and magnesium (fig. 20), which contribute to the formation of boiler scale. It is very hard, averaging about 350 to 400 ppm in hardness, and high in dissolved solids and iron. For cooling purposes, water from the Quaternary alluvium at a temperature of 64° or 65°F is preferred to water from the Claiborne group, the temperature of which is commonly 71° to 75°F.

Domestic Use

Water from the Claiborne group is well suited for use as public and domestic supplies. The water is soft, ranging from 1 to 9 ppm in hardness, and is relatively low in dissolved solids and iron.

The Jackson group contains water that tends to be unsuitable for domestic use. The dissolved solids, hardness, and iron content are relatively high and the water frequently has an objectionable taste and is referred to locally as "alum water." Many domestic users in the outcrop area of the Jackson group either construct cisterns to catch rainwater or drill deeper wells into the Claiborne.

Water from the Pliocene(?) deposits is excellent for domestic use in regard to mineralization (fig. 20). It is low in dissolved solids, hardness, and iron content. However, the water generally is acidic and may corrode pipes and plumbing fixtures.

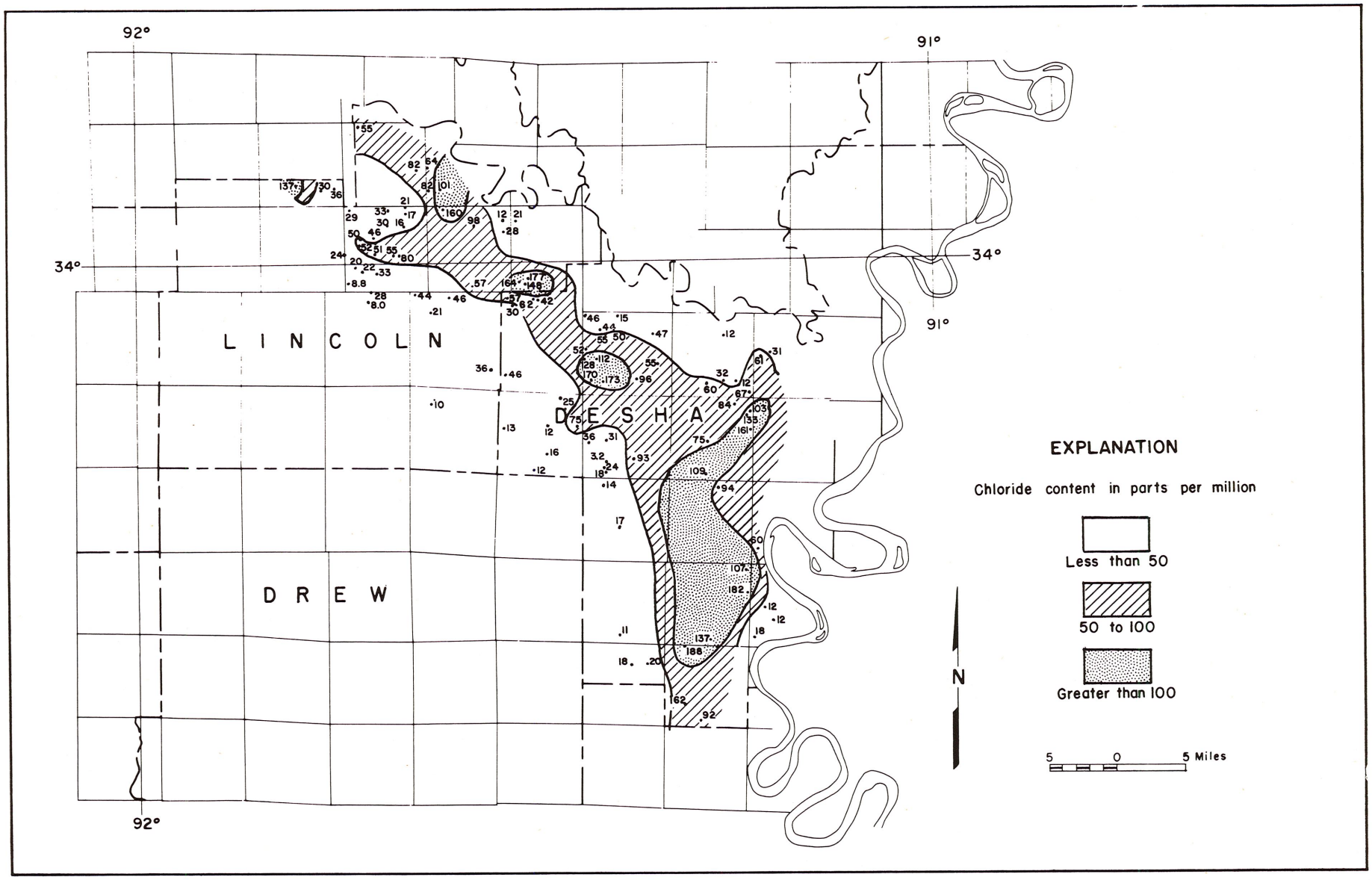


Figure 22.—Areal distribution of chloride in water from the Quaternary alluvium.

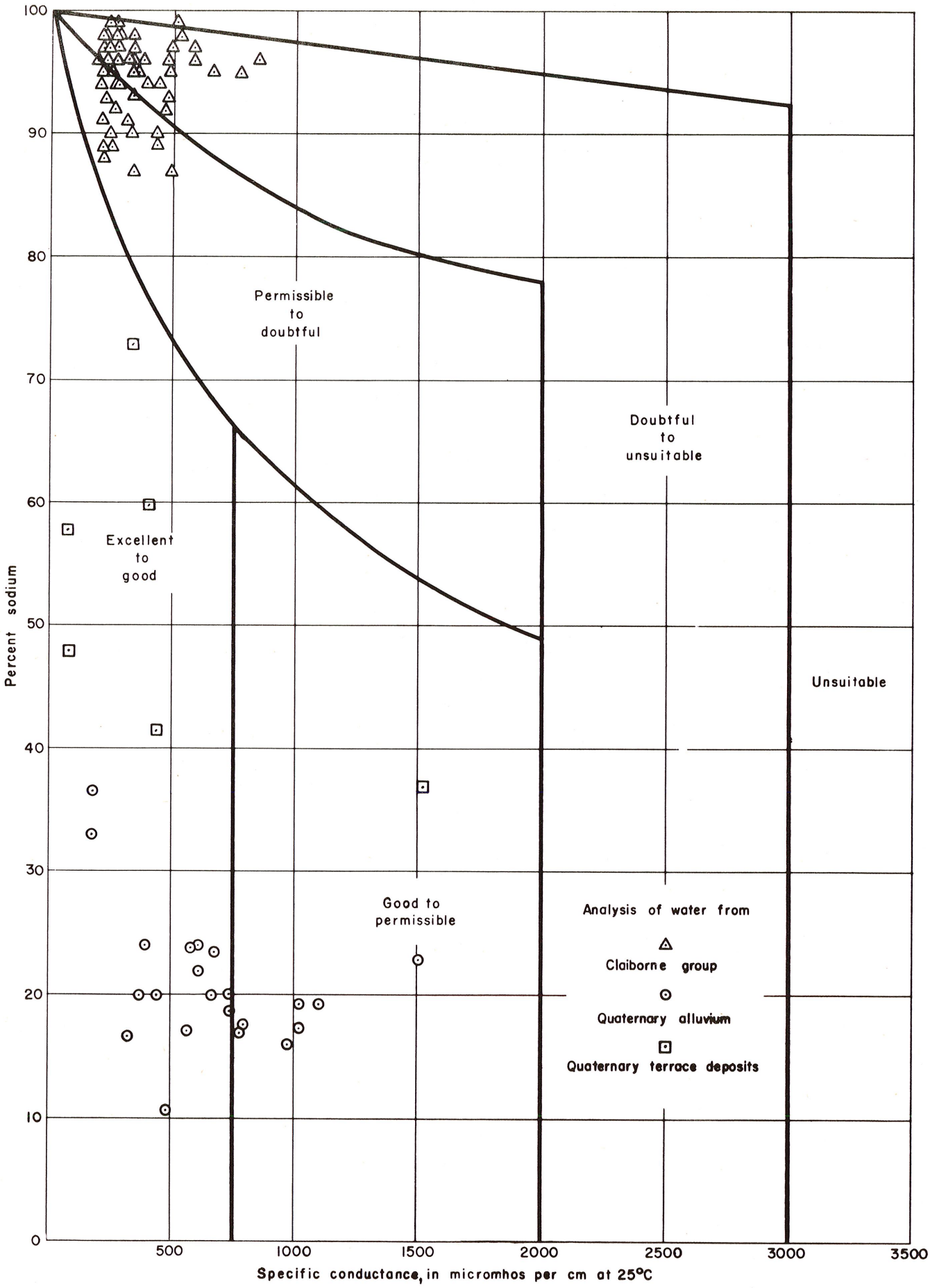


Figure 23.—Classification of ground water for irrigation use in Desha and Lincoln Counties (after Wilcox).

The suitability for domestic use of water from the Quaternary terrace deposits varies with the locality. The water is commonly acidic and might be corrosive. Its hardness and dissolved-solids content vary from place to place, ranging from low to relatively high.

The water from the alluvium of Quaternary age is, in general, poorly suited for domestic and public use without treatment. The total iron content of the water is high, averaging about 12 ppm. Water containing appreciable iron may produce reddish-brown stains on white porcelain enameled ware and fixtures and on clothing or other fabrics. The U. S. Public Health Service's drinking-water standards suggest a maximum concentration of 0.3 ppm of iron and manganese together in drinking water for use on interstate carriers. Iron is readily removed from most waters by aeration, followed by settling and filtration.

Calcium is the chief cation in the water from the Quaternary alluvium. Calcium and magnesium are the principal constituents causing hardness in water. Calcium and magnesium ions react with soap to form an objectionable scum that interferes with lather formation, and they contribute to the formation of deposits in hot-water heaters and pipes. The hardness of water samples analyzed from the alluvium of Quaternary age ranged from 51 to 789 ppm. Water having a hardness greater than 200 ppm needs softening to make it satisfactory for most uses.

Irrigation Use

Wilcox (1948) developed a diagram for rating irrigation waters in terms of percent sodium and electrical conductivity. Figure 23 is a diagram after Wilcox, with chemical analyses of ground waters from Desha and Lincoln Counties plotted upon it. The diagram indicates that water from the Quaternary alluvium is suitable for irrigation but that water from the Claiborne group generally is not suitable for irrigation because of its high percentage of sodium. Analyses of water from Quaternary terrace deposits indicate that this water also is suitable for irrigation.

Other factors, such as soil properties and irrigation practices, must be considered in evaluating the suitability of water for irrigation (Wilcox, 1948; U. S. Salinity Laboratory Staff, 1954).

REFERENCES CITED

Baker, R. C., Hewitt, F. A., and Billingsley, G. A., 1948, Ground-water resources of the El Dorado area, Union County, Arkansas: Arkansas Univ. Bur. Research, Research Ser. 14, 39 p.

Bartholomew, R. P., Kapp, L. C., and Nelson, Martin, 1945, Irrigation of arable crops on a rice soil: Arkansas Univ. Agr. Expt. Sta. Bull. 455, 32 p.

Branner, G. C., 1937, List of Arkansas water wells: Arkansas Geol. Survey Inf. Circ. 11, 142 p.

Brown, G. F., 1947, Geology and artesian water of the alluvial plain in northeastern Mississippi: Mississippi Geol. Survey Bull. 65, 424 p.

Caplan, W. M., 1954, Subsurface geology and related oil and gas possibilities of northeastern Arkansas: Arkansas Resources and Devel. Comm., Div. Geology Bull. 20, 124 p.

Counts, H. B., Tait, D. B., Klein, Howard, and Billingsley, G. A., 1955, Ground-water resources in a part of southwestern Arkansas: Arkansas Geol. and Conserv. Comm., Water Resources Circ. 2, 35 p.

Dane, C. H., 1929, Upper Cretaceous formations of southwestern Arkansas: Arkansas Geol. Survey Bull. 1, 215 p.

Dover, T. B., and Geurin, J. W., 1955, Summary of annual records of chemical quality of water of the Arkansas River in Oklahoma and Arkansas, 1945-52: U. S. Geol. Survey Circ. 361, 20 p.

Engler, Kyle, Thompson, D. G., and Kazmann, R. G., 1945, Ground-water supplies for rice irrigation in the Grand Prairie region, Arkansas: Arkansas Univ. Agr. Expt. Sta. Bull. 457, 56 p.

Engler, Kyle, and others, 1951, Survey of present irrigation development and potentially irrigable areas: Irrig. Rept., Arkansas-White-Red River Basins, State of Arkansas, mimeographed rept., 9 p.

Fisk, H. N., 1944, Geological investigation of the alluvial valley of the lower Mississippi River: War Dept., U. S. Army, Corps of Engineers, 78 p.

---------- 1947, Fine grained alluvial deposits and their effect on Mississippi River activity: War Dept., Corps of Engineers, Mississippi River Comm., Waterways Expt. Sta., 82 p.

Gattis, J. L., 1950, Supplemental irrigation in Arkansas: Arkansas Univ. Ext. Service, Leaflet No. 130.

Harris, R. W., and Jobe, B. I., 1951, Microfauna of basal Midway outcrops near Hope, Arkansas: Norman, Okla., The Transcript Press, 113 p.

Hewitt, F. A., Baker, R. C., and Billingsley, G. A., 1949, Ground-water resources of Ashley County, Arkansas: Arkansas Univ. Inst. Science and Technology, Research Ser. 16, 35 p.

Klein, Howard, Baker, R. C., and Billingsley, G. A., 1950, Ground-water resources of Jefferson County, Arkansas: Arkansas Univ. Inst. Science and Technology, Research Ser. 19, 44 p.

Lohr, E. W., and Love, S. K., 1954, The industrial utility of public water supplies in the United States, 1952, pt. 2, States west of the Mississippi River: U. S. Geol. Survey Water-Supply Paper 1300, 462 p.

Meinzer, O. E., and Wenzel, L. K., 1942, Movement of ground water and its relation to head, permeability, and storage, in Physics of the earth—IX, Hydrology: New York, McGraw-Hill, p. 444-477.

Murray, Grover E., 1948, Geology of De Soto and Red River Parishes: Louisiana Dept. Conserv., Geol. Bull. 25, 312 p.

National Research Council, Division of Geology and Geography, The Committee on Tectonics, 1944, Tectonic map of the United States: Am. Assoc. Petroleum Geologists, map.

Onellion, F. E., and Criner, J. H., Jr., 1955, Ground-water resources of Chicot County, Arkansas: Arkansas Geol. and Conserv. Comm., Water Resources Circ. 3, 27 p.

Onellion, F. E., 1956, Geology and ground-water resources of Drew County, Arkansas: Arkansas Geol. and Conserv. Comm., Water Resources Circ. 4, 32 p.

Piper, A. M., Garrett, A. A., and others, 1953, Native and contaminated ground waters in the Long Beach-Santa Ana Area, California: U. S. Geol. Survey Water-Supply Paper 1136, 320 p.

Renick, B. C., 1924, Base exchange in ground water by silicates as illustrated in Montana: U. S. Geol. Survey Water-Supply Paper 520-D, p. 53-72.

Sniegocki, R. T., 1954, Progress report on studies of artificial recharge in the Grand Prairie region, Arkansas: U. S. Geol. Survey open-file rept., Little Rock, Ark., 157 p.

---------- 1956, Progress report on studies of artificial recharge in the Grand Prairie region, Arkansas: U. S. Geol. Survey open-file rept., Little Rock, Ark., 207 p.

Spooner, W. C., 1935, Oil and gas geology of the Gulf Coastal Plain in Arkansas: Arkansas Geol. Survey Bull. 2, 516 p.

Tait, D. B., Baker, R. C., and Billingsley, G. A., 1953, The ground-water resources of Columbia County, Arkansas, a reconnaissance: U. S. Geol. Survey Circ. 241, 25 p.

Theis, C. V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: Am. Geophys. Union Trans., v. 16, p. 519-524.

U. S. Salinity Laboratory Staff, 1954, Diagnosis and improvement of saline and alkali soils: U. S. Dept. Agriculture, Agriculture Handb. 60, 160 p.

Veatch, A. C., 1906, Geology and underground water resources of northern Louisiana and southern Arkansas: U. S. Geol. Survey Prof. Paper 46, 422 p.

Waterways Experiment Station, 1951, Geology of the lower Arkansas River alluvial valley, Pine Bluff, Arkansas, to mouth: U. S. Army, Corps of Engineers, Tech. Memo. 3-332, 32 p.

Wilbert, L. J., 1953, The Jacksonian stage in southeastern Arkansas: Arkansas Resources and Devel. Comm., Div. Geology Bull. 20, 125 p.

Wilcox, L. V., 1948, The quality of water for irrigation use: U. S. Dept. Agriculture Tech. Bull. 962, 40 p.

Wolman, Gordon M., and Leopold, Luna B., 1957, River flood plains: Some observations on their formation: U. S. Geol. Survey Prof. Paper 282-C, p. 87-109.

TABLE 7

Records of wells and springs

Well or spring number: See text for description of well-numbering system.

Elevation above sea level: Elevation is given to nearest foot where estimated from topographic map; elevation is given to nearest tenth or hundredth of a foot where known from instrumental leveling.

Depth of well: Measured depths are given in feet and tenths below surface; reported depths are given to the nearest foot below land surface.

Stratigraphic unit: Tc, Claiborne group; Tj, Jackson group; Tp, Pliocene(?) deposits; Qt, Terrace deposits; Qal, Quaternary alluvium.

Water level: Measured depth to water is given to nearest hundredth of a foot; reported depth to water is given to nearest foot.

Yield: R, reported; M, measured; E, estimated.

Use: Irr, irrigation; P S, public supply; Dom, domestic; N, not used; S, stock only; Obs, observation.

Remarks: Ca, chemical analysis of water given in table 10; L, log of well or test hole at well site given in table 9; data given refers to a well unless "spring" is written in remarks column.

DESHA COUNTY

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
7S-1E												
23abd	J. P. Thornton	-------	------	30	1¼	Qal	12.38	2-26-58	Pitcher	------	D	Ca
23cac	do	-------	------	27.8	1¼	do	7.33	2-26-58	do	------	N	
24ccb	-------	-------	------	28.2	1¼	do	10.22	2-26-58	do	------	N	
25dab	Rayder Bros.	Foster White	------	------	------	do	9.31	2-26-58	Turbine	------	Irr	
26bdc	Brooks & Pickard	J. J. Victory	------	140	14	do	------	-------	do	1000R	do	
27ddd	do	do	------	140	12	do	4.65	2-26-58	do	1000R	do	
35bca	do	do	------	170	14	do	10.46	2-26-58	None	------	N	
36bdb	Rayder Bros	Foster White	159	132	18-12	do	4.73	2-26-58	Turbine	------	Irr	L
36ccb	do	do	155	120	24-12	do	15.39	2-26-58	do	------	do	L
8S-3W												
27acc1	Floyd Christman	-------	172.21	61.7	1¼	do	23.26	4- 2-57	None	------	N	
27acc2	U S G S	Dick Jones	172	72	1¼	do	24.42	12- 5-57	do	------	Obs	
27ccc	do	do	------	71.5	1¼	do	5.62	12- 5-57	do	------	do	
27dcd	-------	-------	167.27	34.6	1¼	do	14.14	4-29-57	do	------	N	
29cdd	-------	-------	164.20	31.5	1¼	do	14.33	4- 1-57	do	------	N	
30aab	Wylie Reynolds	-------	167	450	2	Tc	------	-------	Jet	------	Dom	
30aba	do	-------	165.30	40	1¼	Qal	12.72	4- 1-57	None	------	N	
30bbb	W. F. Wilson	M. E. McDonald	163.77	102	18-12	do	11.86	4- 1-57	Turbine	------	Irr	L
33abd	U S G S	U. S. Corps Eng.	165.04	70.0	5-4	do	8.10	12- 5-57	None	------	Obs	L
33bad	-------	-------	166.27	39.5	1¼	do	17.27	4- 1-57	Pitcher	------	N	
33ddc2	U S G S	Dick Jones	157	71.9	1¼	do	13.91	12- 5-57	None	------	Obs	
9S-1W												
14ccc	U S G S	Dick Jones	150	83.7	¾	Qal	8.69	12-10-57	None	------	Obs	L
16dbc	-------	-------	154.55	------	1¼	do	7.98	12-10-57	do	------	N	
17acc	J. J. Adams	M. E. McDonald	154.27	102	18-12	do	7.19	12-10-57	Turbine	------	Irr	L
18cac	T. Prewitt, Jr.	H. S. Ragland	153.04	100	18-12	do	5.97	12-10-57	do	1630M	do	Ca
18cbd	V. O. Johnson	H. S. Ragland	------	96	18-12	do	------	-------	do	1400R	do	Ca
27cbc	C. Simpson	H. S. Ragland	153.58	116	18-12	do	19.79	3-28-57	None	------	N	
28daa	do	M. E. McDonald	------	105	18-12	do	13	6-24-56	Turbine	3000R	Irr	
34bdb	C. Simpson	J. F. Mellor	------	440	2½	Tc	------	------	Jet	------	Dom	

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
9S-2W												
1dbc	-------	-------	153.31	26.5	1¼	Qal	6.70	12-10-57	Pitcher	------	N	
4abd	U S G S	Dick Jones	155	51.0	1¼	do	14.10	12- 4-57	None	------	Obs	
4add	do	do	155	51.0	1¼	do	21.57	12- 4-57	do	------	do	
4bbc	-------	-------	159.51	62.8	1¼	do	20.66	3-28-57	Pitcher	------	N	
8abc	-------	-------	158.77	42.5	1¼	do	17.05	3-28-57	do	------	N	
9cbb	-------	-------	154	36.5	1¼	do	18.75	12-17-56	do	------	N	
10bbc	Meador	-------	155	19.8	1¼	do	14.24	3-28-57	None	------	N	
10bbd	U S G S	U. S. Corps Eng.	156.1	111.0	5-4	do	9.18	3-26-58	do	------	Obs	L
10dab	Merle Peterson	M .E. McDonald	158.09	114	18-12	do	19.09	3-28-57	Turbine	1200R	Irr	L
11bbc	U S G S	Dick Jones	155	42.5	1¼	do	12.90	12- 4-57	None	------	Obs	
11cdd	Mabel Ferguson	-------	150	------	1¼	do	11.23	12- 4-57	do	------	do	
14cba	U S G S	Dick Jones	150	42.5	1¼	do	12.13	12- 4-57	do	------	do	
14cdc	do	do	151	50.1	1¼	do	10.73	12- 4-57	do	------	do	
16cdd	Earl Cox	J. F. Mellor	------	600	------	Tc	------	------	Jet	------	Dom	Ca
17ddd	Rubin Bryant	-------	------	650	2	do	------	------	do	------	do	Ca
18cad	L. L. Rana	-------	------	------	[1]	Qal	------	-------	Centrif.	315M	Irr	
20abd	-------	-------	154.26	24.0	1¼	do	14.80	3-28-57	Pitcher	------	N	
20ccb	A. C. Duckworth	J. F. Mellor	------	474	3	Tc	------	------	Jet	------	Dom	Ca
20ccc	-------	-------	150	33.0	1¼	Qal	11.58	3-29-57	Pitcher	------	N	
21aad	-------	-------	154.38	23.0	1¼	do	14.40	3-28-57	do	------	N	
23abc	J. H. Gill	M. E. McDonald	155.71	121	18-12	do	16.38	3-27-57	Turbine	1390M	Irr	L
23dac	-------	-------	154.32	48.4	1¼	do	15.16	3-27-57	None	------	Obs	
23dcd	J. H. Gill	J. F. Mellor	------	------	2	Tc	------	------	Jet	------	Dom	
26aaa	City of Watson	Lexington Lbr. Co.	150	612	4-3	do	------	-------	Turbine	50R	PS	Ca, L
26aba	Kathryn Howe	-------	------	------	2½	do	------	-------	Jet	------	Dom	
26aca	J. C. Stroud	J. F. Mellor	------	420	2	do	------	-------	do	------	do	
26dcd	G. W. Horn	do	------	495	3	do	------	-------	do	------	do	Ca
27daa	Cox Bros.	H. S. Ragland	150.58	96	18-12	Qal	11.33	3-27-57	None	------	N	Ca
28bbb	R. S. Cooke	do	------	97	18-12	do	11.20	3-28-57	Turbine	2100M	Irr	Ca
28dcc	L. Patton	do	148.66	95	24-14	do	9.83	3-28-57	do	1600R	do	L
30bcb	-------	-------	146.63	35.3	1¼	do	9.73	3-29-57	Pitcher	------	N	
32ccc	H. McGregor	M. E. McDonald	152	92	6	do	17	10-27-55	Turbine	500R	Irr	L
34abd	Cox Bros.	T. C. Hardin	148.50	124	16	do	10.77	3-29-57	do	------	do	
35aab	G. H. Smith	J. F. Mellor	------	------	2	Tc	------	-------	Jet	------	Dom	
35aac	U S G S	U. S. Corps. Eng.	149.27	97.0	5-2	Qal	11.63	10-21-57	None	------	Obs	L
35ccd	Pat Douthit	M. E. McDonald	147	------	------	do	3.67	3-28-58	Turbine	------	Irr	
35ddb1	U S G S	Dick Jones	147	50.0	1¼	do	4.36	12- 4-57	None	------	Obs	
35ddb2	B. S. Ussery	-------	147.39	54.0	1¼	do	10.84	2-14-57	Pitcher	------	N	
35ddc	do	------	------	------	2	Tc	------	-------	Jet	------	Dom	
36aac	U S G S	Dick Jones	146	62.3	¾	Qal	9.50	12-10-57	None	------	Obs	L
36ccc	Hugh Cox	Layne-Ark.	146	105	20-12	do	7.51	3-27-57	Turbine	1590M	Irr	Ca, L
9S-3W												
2acd	-------	-------	160.91	41.5	1¼	do	18.27	4- 2-57	Pitcher	------	N	
3bab	T. F. Cross	F. McWhorter	160	600	2	Tc	------	-------	Jet	------	Dom	

[1] Sixteen 2 inch driven wells

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
9S-3W												
3cbb	Cox Bros.	-------	163.0	34.9	1¼	Qal	16.83	4- 1-57	None	------	Obs	
4bab	Clay Cross	H. S. Ragland	162	109	------	do	15.54	4- 2-57	do	------	N	Ca, L
4caa	A. Singleton	F. McWhorter	------	416	3	Tc	------	-------	Jet	------	Dom	Ca
5ada	R. Lambert	J. F. Mellor	------	513	2½-2	do	------	-------	do	------	do	Ca
5adc	G. V. Aldrich	do	------	666	------	do	------	-------	do	------	do	Ca
6dab	H. M. Pittman	H. S. Ragland	160	99	18-12	Qal	11.86	4- 2-57	Turbine	1500M	Irr	Ca
6ddd	-------	-------	156	29.8	1¼	do	9.39	4- 2-57	Pitcher	------	N	
7bbb	-------	-------	159	34.6	1¼	do	10.60	2-12-57	do	------	N	
8baa	Adams & Haymaker	H. S. Ragland	157	100	12	do	15.24	10-17-56	None	------	N	Ca, L
8ddc	Richard Hill	H. S. Ragland	------	108	18-12	do	16.86	10-16-56	Turbine	1600R	Irr	Ca
9aad	U S G S	Dick Jones	159	42.5	1¼	do	6.63	6- 4-58	None	------	Obs	
9ada	-------	-------	159.90	28.8	1¼	do	14.03	4- 2-57	Pitcher	------	N	Ca
9cab	T. F. Cross	M. E. McDonald	157	100	18-12	do	12.27	4- 2-57	Turbine	1310M	Irr	L
9dad	-------	-------	157	60.8	1¼	do	7.28	12- 4-57	None	------	Obs	
9dbc	Eric Ross	J. F. Mellor	------	610	2	Tc	------	-------	Jet	------	Dom	Ca
9dda	Mabel Daniels	do		617	------	do	------	-------	do	------	do	
10abb	-------	-------	161.05	26.8	1¼	Qal	16.23	4- 2-57	Pitcher	------	N	
10dcd	B. F. Daniel	J. F. Mellor	156	570(?)		Tc	------	-------	Jet	------	Dom	Ca
10ddd	Baxter Gladden	do			3	do	20	1952	do	------	do	
11cdd	G. C. Jones	M. E. McDonald	157.25	110	18-12	Qal	14.35	4- 2-57	None	------	N	Ca
13aad	Eunice Rana	J. F. Mellor	------	546	2	Tc	------	-------	Jet	------	Dom	Ca
13abb	G. C. Jones	do	156	420	2	do	------	-------	do	------	do	Ca
13add	C. E. Covey	-------	156.31	25.0	1¼	Qal	15.60	3-29-57	None	------	Obs	
14aba	W. F. Rana	-------	------	412	4-3	Tc	------	-------	Jet	------	Dom	Ca
14abc	-------	-------	151	30.5	1¼	Qal	14.83	10-17-57	Pitcher	------	N	
14dac	-------	-------	154	------	1¼	do	10.84	4- 2-57	do	------	N	
15baa	J. W. Morton	-------	------	499	2	Tc	------	-------	Jet	------	Dom	Ca
17ccc	-------	-------	------		1¼	Qal	15.74	12-17-56	None	------	N	
17cdb	Brigham	W. B. Loyd & Sons	152	88	6	do	------	-------	Turbine	470M	Irr	L
17daa	R. W. Roberts	J. F. Mellor		592	3¼-2¼	Tc	------	-------	Jet	------	Dom	
17dcb	F. Christman	F. McWhorter	151	697	4	do	------	-------	do	------	do	Ca, L
17dcc	U S G S	U. S. Corps Eng.	155.08	129	5-2	Qal	9.60	10-30-57	None	------	Obs	L
18ddd	F. Freeman	H. S. Ragland	155.32	104	18-12	do	9.34	4- 1-57	Turbine	2130M	Irr	Ca, L
19bac	J. C. Kennedy	do	158	88	18-12	do	------	-------	do	1050M	do	Ca, L
20bdd	U S G S	Dick Jones	156	67.5	1¼	do	8.60	12- 5-57	None	------	Obs	
20cac	Johnson	H. S. Ragland	157.67	97	18-12	do	------	-------	Turbine	1570M	Irr	Ca
20cbb	T. F. Cross	M. E. McDonald	161	------	------	do			do	820M	do	
22baa	J. Dante	do	147	89	16-10	do	5.02	12-10-57	do	1300R	do	L
22bbb	do	do	151	88	16-10	do	9.59	8-13-57	do	1300R	Irr	L
22dda	-------	-------	149	31.0	1¼	do	5.13	4- 1-57	Pitcher	------	N	
23aaa	Clay Cross	M. E. McDonald	152	101	18-12	do	11.18	4- 2-57	Turbine	1330M	Irr	Ca, L
24aad	-------		152.31	25.7	1¼	do	12.58	3-29-57	Pitcher		S	
27bcc	Jack Stearns	H. S. Ragland	148	88	18-12	do	7.99	4- 1-57	Turbine	1080M	Irr	Ca, L
28abb	-------	-------	149.50	22.0	1¼	do	5.16	4- 1-57	Pitcher	------	N	
29baa	Stimson	H. S. Ragland	157	96	18	do	10.51	4- 1-57	Turbine	1310M	Irr	Ca
30aaa	do	do	159.08	93	------	do	14.29	4- 1-57	do	1380M	do	Ca

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
9S-3W												
30acc1	First Delta Church of God	-------	157	45.5	1¼	Qal	10.89	12- 4-57	None	------	Obs	
30acc2	Glenn Lambert	F. McWhorter	157	540	4	Tc	------	-------	Jet	------	Dom	Ca, L
31adb	Geo. Minor	T. C. Hardin	156.11	------	10	Qal	13.75	3-29-57	Turbine	------	Irr	
31ddc	-------	-------	157.78	------	1¼	do	16.26	3-29-57	None	------	Obs	
35cca	-------	T. C. Hardin	147.0	------	12-?	do	14.78	12- 4-57	Turbine	------	Irr	
35cda	W. W. Ward	do	156	123	14-?	do	18.59	3-29-57	do	2000R	do	
36add	U. C. Hopmann	do	------	315	3	Tc	------	-------	Jet	------	Dom	
36cdd	do	do	------	94	18	Qal	------	-------	Turbine	1600R	Irr	
9S-4W												
1ccb	M. L. Walt	Layne-Ark.	165	87	8	Qal	------	-------	Turbine	830M	Irr	L
2acd	do	H. S. Ragland	167.6	90	18-12	do	16.92	4- 1-57	do	2000R	do	
2adc	-------	-------	166	49.5	1¼	do	14.74	4- 1-57	Pitcher	------	N	
2bad	C. H. Holtoff	M. E. McDonald	166.50	------	18-?	Qal	9.51	3-25-58	Turbine	------	Irr	
3aba	J. Singleton	-------	------	------	14-?	do	------	-------	do	------	do	
4dcc	J. L. McKennon	H. S. Ragland	159	96	18-12	do	12.14	4- 1-57	do	------	do	Ca, L
5dad	do	-------	160.4	------	12	do	------	-------	None	------	Obs	
6bbc	A. G. Bauer	H. S. Ragland	162.25	102	18-12	do	4.78	4-12-57	Turbine	------	Irr	Ca, L
6daa	Lee Kemp	Whittenauer	159.62	85	18-?	do	11.11	10-11-56	do	1775M	do	Ca
9acb	J. L. McKennon	M. E. McDonald	161.34	103	18-12	do	9.10	4- 1-57	do	1800R	do	L
9cad1	do	do	163.21	76	12-8	do	17.72	10- 4-56	do	1200R	do	
9cad2	do	J. F. Mellor	------	700	2½	Tc	------	-------	Jet	------	Dom	Ca
11ada	-------	-------	157.52	47.5	1¼	Qal	7.80	4- 1-57	Pitcher	------	N	
13aad	-------	-------	164	46.5	1¼	do	17.59	4- 1-57	do	------	do	
14bcc	Jack Dante	-------	156	------	10	do	------	-------	Turbine	------	Irr	
15add1	do	-------	156	------	12	do	15.70	10- 4-56	do	1070M	do	
15add2	do	-------	------	------	1¼	do	7.86	4- 1-57	Pitcher	------	N	
16daa	F. Freeman	M. E. McDonald	161.64	92	12-8	do	12.79	4- 1-57	Turbine	780M	Irr	L
17bda	-------	-------	163.67	31.4	1¼	do	12.51	4- 1-57	Pitcher	------	N	
20acc	S. A. Banks	M. E. McDonald	165	92	18-12	do	16.40	10- 4-56	Turbine	------	Irr	L
20bac	O. L. Puryear	T. C. Hardin	169.03	------	14	do	18.41	4- 1-57	do	------	do	
21abb	-------	-------	160.94	------	1¼	do	10.63	4- 1-57	Pitcher	------	Dom	
21add	Rice Growers Coop.	T. C. Hardin	------	448	4-2	Tc	------	-------	Jet	------	do	Ca
21dbb	S. A. Banks	W.B.Lloyd & Sons	163.18	80	12	Qal	17.09	4- 1-57	Turbine	1600R	Irr	L
22bcc	John Mitchel	T. C. Hardin	------	426	4	Tc	------	-------	Jet	------	Dom	
22dcd	C. A. Farmer	M. E. McDonald	163	108	16-10	Qal	14.85	4- 1-57	Turbine	1500R	Irr	L
23acc	E. R. Henry	H. S. Ragland	157	96	------	do	8.94	4- 1-57	do	1210M	do	
23cad	S. A. Banks	W.B.Loyd & Sons	159	96	10	do	------	-------	do	------	do	L
24cab	H. C. Brasfield	M. E. McDonald	------	84	18-12	do	18.44	10- 5-56	do	------	do	
25acd	A. Brasfield	do	156	84	16-10	do	8.66	4-11-57	do	970M	do	L
25ccc	F. Williams	-------	------	------	2	Tc	------	-------	Jet	------	Dom	
26acb	J. E. Allman	Layne-Ark.	160	96	8	Qal	17	1954	Turbine	700R	Irr	L
26bcc	E. N. Kendricks	Lewis-Diesel	------	------	------	do	23.54	10- 5-56	do	------	do	
26dcb	Burk Holmes	M. E. McDonald	163	79	14-10	do	13.20	12-10-57	do	------	do	L
27dab1	City of Dumas	Layne-Ark.	165	796	8	Tc	30.55	1-24-50	do	370R	PS	Ca

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
9S-4W												
27dab2	City of Dumas	Layne-Ark.	165	809	8	Tc	29.78	1-24-50	Turbine	390R	PS	Ca
28cbb	Jack Dante	M. E. McDonald	167.32	91	18-12	Qal	18.55	4- 1-57	do	------	Irr	L
30baa	J. M. & C. F. Hudson	Layne-Ark.	167.47	121	20-12	do	16.62	4- 1-57	do	1850M	do	Ca, L
33dbb	--------	--------	165	33.7	1¼	do	20.77	2-13-57	Pitcher	------	N	
34adc	Georgia Pac. Corp.	W. F. Corliss	------	800	4	Tc	------	--------	Air Lift	------	N	Ca
34bdd	Stimson Gin	do	------	781	4	do	32	1951	Jet	------	Ind	Ca
34cbc	R. A. Pickens	M. E. McDonald	168.43	------	18-12	Qal	22.00	4- 8-57	Turbine	------	Irr	
35bbd	do	Layne-Ark.	------	760	4-2	Tc	60	1956	Jet	25R	PS	
36aac	Jack Dante	M. E. McDonald	161	92	14-10	Qal	15.46	4-11-57	Turbine	1300R	Irr	L
10S-1W												
3ddc	--------	--------	149.69	37.2	1¼	Qal	14.24	3-28-57	------	------	N	
5bbd	Roy Jones	J. F. Mellor	------	478	2½	Tc	------	--------	Jet	------	Dom	
5cac	J. C. Gould	Stillwell	148.69	100	------	Qal	12.48	3-28-57	Turbine	------	Irr	
5dbc	do	J. F. Mellor	------	500	2	Tc	------	--------	Jet	------	Dom	
9bba	L. C. Howell	Lewis Diesel	143.49	114	12	Qal	8.71	3-28-57	Turbine	------	Irr	
11dbc	U S G S	Dick Jones	150	83.5	¾	do	9.28	12-10-57	None	------	Obs	L
17aaa	--------	--------	148.90	60.0	1¼	do	13.79	3-28-57	do	------	N	
20bdc1	U S G S	Dick Jones	140	62.0	¾	do	8.81	12-11-57	do	------	Obs	L
20bdc2	John Baxter	--------	------	------	------	Tc	------	--------	Jet	------	Dom	
21daa	U S G S	Dick Jones	141	43.0	¾	Qal	5.00	7-10-57	None	------	Obs	L
23aba	Percy Wargo	J. F. Mellor	------	477	3	Tc	------	--------	Jet	------	Dom	
23abd1	U S G S	Dick Jones	145	72.5	¾	Qal	12.72	12-10-57	None	------	Obs	L
23abd2	Tim Wargo	J. F. Mellor	------	------	2	Tc	------	--------	Jet	------	Dom	
23aca	G. L. Stuart	J. O. Pickler	------	397	6	do	18	1945	Jet	------	Dom	
27acc	Tim Wargo	Floyd Jones	146.00	110	14-?	Qal	4.38	12-10-57	Turbine	------	Irr	
27adb	L. C. Howell	J. F. Mellor	------	490	3-2	Tc	------	--------	Jet	------	Dom	
27bdd	--------	--------	144.90	58.2	1¼	Qal	10.43	3-28-57	None	------	N	
27cbc	G. L. Stuart	J. F. Mellor	------	440	2	Tc	------	--------	Jet	------	Dom	
28ccb	U S G S	Dick Jones	145	53.0	¾	Qal	1.12	12-10-57	None	------	Obs	L
31aab	J. H. Fehr	J. F. Mellor	------	490	2	Tc	------	--------	Jet	------	Dom	
31acb	--------	--------	144	87.5	1¼	Qal	12.57	3-28-57	Pitcher	------	N	
31ccc	W. J. Burnett	J. F. Mellor	------	------	2	Tc	------	--------	Jet	------	Dom	
32bbb	D. W. Howell	do	------	483	2	do	------	--------	do	------	do	
10S-2W												
2dab	C. C. Stuart	J. F. Mellor	------	375	4-2	Tc	9	1947	Jet	------	Dom	Ca
2dbb	do	M. E. McDonald	146	100	18-12	Qal	8.52	3-27-57	Turbine	1310M	Irr	Ca
2ddc	U S G S	Dick Jones	140	50.3	1¼	do	7.56	12- 4-57	None	------	Obs	
4ccc	--------	--------	145	34.0	1¼	Qal	14.49	3-29-57	Pitcher	------	N	
5ddd	H. S. Martin	Layne-Ark.	------	120	6	do	------	--------	Turbine	------	Irr	
6aaa	Frank Norris	T. C. Hardin	151	338	2½	Tc	------	--------	Jet	------	Dom	
6aab	do	do	154.43	115	10	Qal	18.17	3-29-57	Turbine	------	Irr	
8bdd	--------	--------	150.48	38.4	1¼	do	15.71	4-11-57	Pitcher	------	N	
11ddc	U S G S	Dick Jones	145	52.9	1¼	do	10.70	12- 4-57	None	------	Obs	
12cdd1	J. C. Gould	M. E. McDonald	146.96	108	18-12	do	------	--------	Turbine	1350M	Irr	L
12cdd2	do	Sitzer	147	100	14-10	do	10.73	3-27-57	None	------	N	Ca

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
10S-2W												
12daa	J. C. Gould	Layne-Ark.	146.58	113	20-16	Qal	10.63	3-27-57	Turbine	1500R	Irr	Ca, L
13dcb	Baxter Land Co.	M. E. McDonald	138	105	18-12	do	18.52	10-10-56	Turbine	2000R	do	Ca, L
14dcd	U S G S	Dick Jones	145	51.0	1¼	do	16.82	12- 4-57	None	------	Obs	
15abd	-------	-------	152	44.8	1¼	do	21.17	3-27-57	do	------	N	
15adb	L. Fortenberry	J. F. Mellor	------	294	2	Tc	------	-------	Jet	------	Dom	
18dbc	L. Weatherly	H. S. Ragland	151	118	18-12	Qal	18.20	4- 2-57	Turbine	------	Irr	
19dcd	Dillard Brazil	J. F. Mellor	------	470	3	Tc	------	-------	Jet	------	Dom	Ca
20cbc	-------	-------	154.52	56.3	1¼	Qal	22.98	4- 2-57	None	------	N	
20cca	Joe N. Cosby	-------	------	70	[1]	do	------	-------	Centrif.	------	Irr	
21bca	Baxter Land Co.	Floyd Jones	146.87	117	18	do	15.96	4- 2-57	Turbine	2000R	do	Ca, L
21dcb	Ernie Ingram	M. E. McDonald	145	96	12-8	do	13.06	12-11-57	do	675M	do	L
23cac1	U S G S	Dick Jones	144	46.5	1¼	do	17.92	12- 4-57	None	------	Obs	Ca
23cac2	C. Fortenberry	J. F. Mellor	------	315	2	Tc	------	-------	Jet	------	Dom	
23dac	L. Fortenberry	do	------	420	2	do	------	-------	do	------	do	
23dcd	Baxter Land Co.	H. S. Ragland	152	106	18	Qal	------	-------	Turbine	2000R	Irr	Ca, L
24cca	do	M. E. McDonald	149.44	104	18-12	do	17.85	3-27-57	do	1390M	do	L
25ddc	do	do	145	104	18-12	do	12.85	4-11-57	do	------	do	
26acb	do	W. B. Loyd & Sons	148	110	2	do	------	-------	Jet	------	S	L
26bbb	Univ. of Ark.	do	146	630	4-2½	Tc	21	1- 58	do	------	Dom	L
26ccc	Baxter Land Co.	J. F. Mellor	------	450	4	do	------	-------	do	------	Dom	Ca
27aaa	do	M. E. McDonald	146.09	108	------	Qal	------	-------	------	2500R	Irr	L
27bbc	W. E. Treadwell	J. F. Mellor	------	520	3-2	Tc	------	-------	Jet	------	Dom	Ca
27ddd	Baxter Land Co.	H. S. Ragland	141.36	100	18	Qal	12.17	3-27-57	Turbine	1010M	Irr	
28baa	Ernie Ingram	J. F. Mellor	------	552	2	Tc	------	-------	Jet	------	Dom	
28bad	Alvia Morman	do	------	325	2	do	------	-------	do	------	do	
30bab	R. W. Dunn	do	------	360	3	do	------	-------	do	------	do	
33add	E. A. Boch	------	------	------	18-?	Qal	15.10	10-10-56	Turbine	2000E	Irr	Ca
34add	J. G. McIntire	J. F. Mellor	------	620	2	Tc	------	-------	Jet	------	Dom	Ca
34ddd	C. L. Moss	do	------	------	2½	do	------	-------	do	------	do	
10S-3W												
4ada	-------	-------	155.18	41.3	1¼	Qal	14.24	12- 4-57	Pitcher	------	N	
4dad	C. M. Brassfield	M. E. McDonald	155.10	94	16-10	do	20.95	10- 9-56	Turbine	------	Irr	L
5dad	Bob Stimson	T. C. Hardin	------	90	------	do	------	-------	do	------	do	
12bad	U S G S	Dick Jones	142	51.8	¾	do	9.59	7- 9-57	None	------	Obs	L
14aac	C. E. Hopmann	T. C. Hardin	150.11	93	------	do	14.54	4-11-57	Turbine	------	Irr	
15caa	do	do	148	117	------	do	14.47	4-11-57	do	2500R	do	
17cdc	Miles Ayecock	-------	154.60	------	18	do	16.09	4- 2-57	do	------	do	
19cbb	J. C. Holloway	Layne-Ark.	------	------	10	do	------	-------	do	------	do	
19dab	S. O. Abston	do	157	95	18	do	10.06	4- 2-57	do	1450M	do	Ca, L
19dac	do	Lilly Bros.	158	100	------	do	21.42	4- 2-57	do	1000R	do	
20acd	O. Fleming	W. B. Loyd & Sons	153.32	85	6	do	------	-------	do	------	do	L
20dcb	Bickham Bros.	Tuthill	------	104	------	do	------	-------	do	1800R	do	Ca
21ccc	J. Appleberry	W. B. Loyd & Sons	157	92	18-12	do	------	-------	do	------	do	L
21dcb	-------	-------	156.65	45.40	1¼	do	20.64	4- 2-57	do	------	N	

[1] Three 2 inch wells

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
10S-3W												
22cdc	Bickham Bros.	Lilly Bros.	157.39	104	18	Qal	23.28	4- 2-57	Turbine	2000R	Irr	
23dcc	do	do	158	------	18	do	25.13	4-12-57	do	------	do	
24add	Cloyce Stevens	J. F. Mellor	------	500	2½	Tc	------	--------	Jet	------	Dom	
24caa	Ruth Brazil	do	------	365	2½	do	------	--------	do	------	do	
25acd	C. W. Moss	do	------	388	2	do	------	--------	do	------	do	Ca
25ada	J. M. Stratton	do	------	462	2	do	22	1951	do	------	do	
25cbb	Paul Teeter	Lilly Bros.	155.21	107	18-?	Qal	22.76	4- 2-57	Turbine	1200R	Irr	
26acc	do	J. F. Mellor	------	570	2	Tc	------	--------	Jet	------	Dom	Ca
26ccb	do	Lilly Bros.	152	103	18-?	Qal	17.54	4-11-57	Turbine	------	Irr	
26dac1	do	do	156.33	100	20-?	do	22.98	4- 2-57	do	------	do	L
26dac2	do	do	------	101	18-?	do	------	--------	None	------	N	
27aca	O. E. Price	Lewis Diesel	157	102	8	do	27.08	10-12-56	Turbine	450R	Irr	
27bbd	Bickham Bros.	Lilly Bros.	157.68	98	24-?	do	23.78	4- 2-57	do	------	do	
27bdd	do	do	153	97	18- ?	do	------	--------	do	------	N	Ca, L
27cad	Arnold Smart	M. E. McDonald	152	84	12-8	do	------	--------	do	------	Irr	L
27dba	Bickham Bros.	J. F. Mellor	------	540	2	Tc	14	1942	Jet	------	Dom	Ca
27dbc	do	Lilly Bros.	158.04	106	18-?	Qal	22.56	4- 2-57	Turbine	1800E	Irr	
28acd	Geo. & Gus Wasson	W. B. Loyd & Sons	154	91	8	do	18.20	4-24-57	do	------	do	L
28bbb	Ollie Donley	Lilly Bros.	157.98	93	18-?	do	20.70	4- 2-57	do	1000R	do	L
29aaa	Miles Ayecock	J. F. Mellor	157	------	------	Tc	------	--------	Jet	------	Dom	
29abb	do	Lilly Bros.	155	99	18-?	Qal	------	--------	Turbine	1600R	Irr	L
29bab	Virgil Abston	do	------	------	------	do	------	--------	do	------	do	
29bdc	do	------	------	------	1¼	do	------	--------	Jet	------	Dom	Ca
29cda	W. R. Johnson	W. B. Loyd & Sons	158	91	8	do	21.82	4-12-57	Turbine	750R	Irr	L
30aad1	C. L. Tillman	do	------	93	------	do	------	--------	do	------	do	
30aad2	do	J. F. Mellor	------	540	2½-1	Tc	30	1956	Jet	------	Dom	Ca
30adb	W. W. Douglas	do	------	675	2	do	------	--------	do	------	do	Ca
30baa	S. O. Abston	do	------	462	2½-2	do	------	--------	do	------	do	Ca
30dbd	do	Lilly Bros.	156	96	18-?	Qal	23.06	4- 2-57	Turbine	1150M	Irr	Ca
30dca	do	J. F. Mellor	156	700	2½-?	Tc	------	--------	Jet	------	Dom	
31cca	J. C. Holloway	do	------	567	2½- ?	do	------	--------	do	------	do	Ca
31ccc	do	W. B. Loyd & Sons	157	106	10	Qal	18.94	4-12-57	Turbine	------	Irr	L
31cdb	J. P. Herrington	F. McWhorter	------	800	3-2	Tc	------	--------	Jet	------	Dom	Ca
31dca	Justin Newton	Layne-Ark.	156	88	6	Qal	20.96	4- 2-57	Turbine	------	Irr	
31dcc	do	J. F. Mellor	------	708	2½-2	Tc	------	--------	Jet	------	Dom	
32baa	L. Herrington	F. McWhorter	------	600	3	do	------	--------	do	------	do	Ca
32bac	J. P. Herrington	Layne-Ark.	157	107	8-6	Qal	------	--------	Turbine	700R	Irr	Ca, L
32cba	do	do	156	80	8-6	do	------	--------	do	600R	do	Ca, L
32ccb	C. Pascal	Etheridge	------	824	2	Tc	30	1953	Jet	------	Dom	
33bbc	Aaron Zeno	--------	------	100	------	Qal	------	--------	Turbine	900R	Irr	
34bab	J. S. Smart	M. E. McDonald	148	------	------	do	7.05	4- 1-58	do	------	do	
35abb1	Paul Teeter	Lilly Bros.	147	98	18-?	do	------	--------	do	2000R	do	
35abb2	do	do	146	97	20-?	do	12.96	4-11-57	do	2000R	do	
35bab	Bickham Bros.	do	------	97	------	do	17.88	10-10-56	do	1500R	do	
35ccc	--------	--------	143	26.1	1¼	do	5.78	4-11-57	Pitcher	------	N	

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
10S-3W												
36bbb	T. C. Tremble	Lilly Bros.	148.70	------	------	Qal	17.00	4-11-57	Turbine	------	Irr	
10S-4W												
1aab	Jack Dante	H. S. Ragland	------	------	24-12	do	16.18	10- 5-56	None	------	N	
2bab	R. A. Pickens	M. E. McDonald	156	94	18-12	do	14.51	4- 8-57	Turbine	1350M	Irr	Ca, L
2bda	do	do	158		18-12	do	25.05	4- 8-57	do	------	do	
4bba	Andy Stimson	T. C. Hardin	------	125	16-10	do	------	------	do	625M	do	
6bab	------	------	163	47.6	1¼	do	14.49	4- 8-57	Pitcher	------	N	
6bca	Jack Dante	------	------	------	14	do	16.62	10- 4-56	None	------	N	
7bda	Stimson	M. E. McDonald	163	133	18-12	do	15.08	4- 8-57	Turbine	630M	Irr	L
8bdd	T. S. Sparks	do	162	107	14-10	do	16.18	4- 8-57	do	1200R	do	L
10caa	------	------	165	25.5	1¼	do	20.61	4- 8-57	Pitcher	------	Dom	
11ccb	R. A. Pickens	Layne-Ark.	------	794	8-4	Tc	25	1949	Turbine	133R	PS	Ca
12cab	do	M. E. McDonald	151	94	20-12	Qal	11.61	4- 8-57	do	860M	Irr	L
13ccc	do	H. S. Ragland	155	99	18- ?	do	14.03	4- 2-57	do	1530M	do	Ca
15ccd	do	do	160	109	18- ?	do	------	------	do	1830M	do	Ca, L
18cdd	John Poole	------	------	30+	1¼	do	------	------	Jet	------	Dom	Ca
23bac	R. A. Pickens	M. E. McDonald	163	------	18- ?	do	24.56	4- 8-57	Turbine	1720M	Irr	
24aca	Ben Chatham	Ben Chatham	155	------	10	do	16.35	4-12-57	do	610M	do	
24dcb	H. G. Leak	M. E. McDonald	162	101	16-10	do	19.59	3-26-58	do	------	do	L
27cab	R. D. Sanford	H. S. Ragland	157	------	18-12	do	21.72	4- 8-57	do	------	do	Ca
27dac	do	do	157	------	18-12	do	21.28	4- 8-57	do	------	do	
30abb	------	------	161	31.0	1¼	do	19.75	4- 8-57	Pitcher	------	Dom	
33acc	R. D. Sanford	H. S. Ragland	------	116	18-12	do	19.56	4- 8-57	Turbine	1380M	Irr	Ca
36bac	H. Martin	M. E. McDonald	157	86	6	do	22	7- -56	do	------	do	L
36bcc	------	------	152	24.0	1¼	do	13.21	4- 3-57	Pitcher	------	N	
11S-1W												
30cba1	O. O. Kemp	H. S. Ragland	138	102	18- ?	Qal	17.52	3-28-57	None	------	N	L
30cba2	do	Lilly Bros.	------	------	18- ?	do	25.20	12-10-57	Turbine	------	Irr	Ca
11S-2W												
1abd	Mattie Cook	J. F. Mellor	------	440±	2	Tc	------	------	Jet	------	Dom	
1cdb	------	------	143	17.5	1¼	Qal	13.88	3-28-57	Pitcher	------	N	
2acb	Joe Burnett	J. F. Mellor	------	677	2	Tc	------	------	Jet	------	Dom	
2ccc	C. Simpson	do	------	------	2	do	------	------	do	------	do	
3abc	Desha School Dist.	do	------	524	3	do	------	------	do	------	PS	Ca
3bca	R. A. Adcock	H. S. Ragland	139	97	18- ?	Qal	11.93	3-29-57	Turbine	1000E	Irr	Ca, L
3bcd	Desha School Dist.	Layne-Ark.	142	750	12-8	Tc	13	1942	None	------	N	
3cca	R. A. Adcock	do	142	754	12-8	do	14.00	4- 9-58	do	------	Obs	
3daa	------	------	145	42.8	1¼	Qal	16.43	3-29-57	do	------	do	
10acd	A. L. Landers	J. F. Mellor	------	504	2	Tc	------	------	Jet	------	Dom	
10adc	O. O. Kemp	do	------	565	2	do	------	------	do	------	do	Ca
10add	J. C. Gould	J. G. Morton	------	650	2½-	do	------	------	do	------	do	Ca
11bcb	Willie Scott	J. F. Mellor	------	417	2	do	------	------	do	------	do	
11bcc	J. H. Kemp	do	137	425	2	do	------	------	do	------	do	Ca
13bbc	------	------	141	29.2	1¼	Qal	10.84	3-28-57	None	------	N	
13cb	J. C. Gould	J. F. Mellor	------	400±	2	Tc	------	------	Jet	------	Dom	

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
11S-2W												
18ccc	Lester Banfield	C. Sitzer	133	------	16	Qal	7.56	4-11-57	Turbine	------	Irr	
25caa	Ralph Inman	D. Carnahan	135	------	------	do	17.24	3-28-57	do	------	do	
30abc	M. Henderson	-------	133	------	14	do	7.79	4-11-57	do	340M	do	
31cdb	E. Johnson	W. B. Loyd & Sons	142.64	95	8	do	------	-------	do	450R	do	L
31dca	Ed Warington	-------	142.19	100	------	do	------	-------	do	------	do	
32cdc	T. R. & C. E. Snow	J. F. Mellor	------	380	2	Tc	------	-------	Jet	------	Dom	Ca
11S-3W												
2adc	Lester Banfield	Layne-Ark.	140	80	------	Qal	6.35	4-11-57	Turbine	800R	N	
3bbb	J. C. Holloway	do	147	------	------	do	7.10	4- 1-58	do	------	Irr	
4bac	H. Newton	do	147	96	18-12	do	------	-------	do	1200R	do	L
4cba	do	H. S. Ragland	145	84	18-12	do	11.08	4- 2-57	do	------	do	
5adb	Howard Newton	Layne-Ark.	148	98	18-12	do	14.36	4- 2-57	Turbine	1630R	Irr	L
5bcc	E. Terrell	H. S. Ragland	155	96	18-?	do	20.32	4- 2-57	None	------	N	Ca
6abc	C. Holloway	W. B. Loyd & Sons	157	91	------	do	17.00	4- 1-58	Turbine	------	Irr	L
7aac	C. W. Day	-------	------	500±	2	Tc	------	-------	Jet	------	Dom	
7adb	Jessie Prewitt	J. F. Mellor	------	480±	3	do	------	-------	do	------	do	Ca
7ccc	T. C. Holloway	-------	155	------	12	Qal	17.11	4-12-57	Turbine	------	Irr	
8bbc	C. W. Day	W. B. Loyd & Sons	153	------	------	do	19.02	4- 2-57	do	------	do	
8bcc	do	H. S. Ragland	154	82	18	do	21.48	4- 2-57	do	------	do	
9abb	T. A. Prewitt	do	144	92	------	do	10.77	4- 2-57	do	------	do	
16bcd	Tillar & Co.	Layne-Ark.	148	------	18	do	21.59	10-12-56	do	1800M	do	
17dba	Prewitt & Collins	H. S. Ragland	152	------	------	do	24.54	10-12-56	do	------	do	
19adb	Jessie Prewitt	do	152	------	18	do	18.60	4- 2-57	do	------	do	
21baa	Tillar & Co.	do	148	88	18-12	do	11.59	4- 2-57	do	2000R	do	Ca
21bbb	do	do	148	------	------	do	15.08	4- 2-57	do	1140M	do	
26cdd	Coon Bayou Farms	do	135	82	18-12	do	------	-------	do	700M	do	L
31bdd	-------	-------	145	39.0	1¼	do	13.89	4- 3-57	Pitcher	------	N	
32aca	-------	-------	------	36.8	1¼	do	20.43	2-13-57	None	------	N	
33bac	-------	Foster White	151	------	18-12	do	19.06	4- 1-58	Turbine	------	Irr	
33cdb	H. Newton	Layne-Ark.	------	------	------	do	9.62	4- 1-58	do	------	do	
34cba	-------	-------	------	42.2	1¼	do	20.94	2-19-57	Pitcher	------	N	
34dab	Prewitt & Collins	H. S. Ragland	148	------	16-?	do	20.74	4- 3-57	Turbine	680M	Irr	
36dad	N. D. Waldrup	W. B. Loyd & Sons	143.38	86	8	do	------	-------	do	670M	do	
12S-1W												
18bcb	G. E. Rice	-------	136.46	37	1¼	Qal	21.43	3-22-57	Pitcher	------	Obs	
19add	-------	-------	137.23	31.7	1¼	do	26.33	12-10-56	None	------	N	
19cbb	-------	-------	134.54	45.4	1¼	do	21.48	3-28-57	Pitcher	------	N	
20bdc	C. W. McCauley	-------	137.77	------	------	do	23.14	3-28-57	Turbine	------	Irr	
20ddd	C. D. & E. S. Kennedy	H. S. Ragland	139.81	97	18-?	do	23.49	3-28-57	None	------	Obs	Ca
28cdc	do	do	138.32	------	------	do	23.47	3-28-57	Turbine	1450M	Irr	Ca
31aac	W. W. Wren	do	135.22	94	18-12	do	20.88	3-28-57	do	------	do	Ca
32bca	do	do	137.10	------	------	do	22.34	3-28-57	do	------	do	
33bab	C. D. & E. S. Kennedy	do	137.16	------	------	do	23.73	3-28-57	do	------	do	
33cda1	Arkansas City	J. F. Mellor	135	548	6	Tc	18	1944	Turbine	350R	PS	L
33cda2	do	do	135	496	------	do	31	1952	do	420R	do	

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
12S-2W												
1ddd	Lewis Harper	H. S. Ragland	135.69	102	18-12	Qal	14.89	3-28-57	Turbine	1000E	Irr	Ca
5cac	-------	-------	143.64	34.7	1¼	do	27.54	3-27-57	None	------	N	
5cdb	J. H. Stroud	J. F. Mellor	------	465	2	Tc	------	-------	Jet	------	Dom	Ca
6aab	J. W. Coulter	do	------	667	2	do	------	-------	do	------	do	
6abd	E. B. Warrington	do	------	664	2	do	------	-------	do	------	do	Ca
6acd	J. L. Keaton	do	------	600+	2	do	------	-------	do	------	do	
6dca1	J. C. Rapp	Lilly Bros.	141.36	------	18-?	Qal	27.87	11-28-56	Turbine	------	Irr	
6dca2	do	-------	------	600+	2	Tc	------	-------	Jet	------	Dom	
7aaa	J. F. Wallace	-------	139.66	88	18-12	Qal	25.09	3-27-57	Turbine	------	Irr	
7adc	Geo. Vardaman	J. F. Mellor	------	525	2	Tc	------	-------	Jet	------	Dom	
7dbc	J. A. Orrell	-------	145	------	12	Qal	20.36	4- 2-58	Turbine	------	Irr	
13ada1	G. E. Rice	H. S. Ragland	136.69	102	18-12	do	22.36	3-28-57	None	------	N	Ca
13ada2	do	do	136.74	110	18-12	do	21.89	3-22-57	Turbine	1350M	Irr	
13caa	J. A. Riggs	do	136.39	98	------	do	22.97	3-28-57	do	------	do	
13daa	do	do	------	98	18-12	do	23.84	3-28-57	do	------	do	
14daa	do	do	135.62	92	------	do	22.03	3-28-57	do	------	do	
18dab	L. Orrell	W. B. Loyd & Sons	143	92	10	do	23.33	4- 2-58	do	------	do	L
20bdb	R. L. McClendon	-------	143	93	18-12	do	27.61	3-28-57	do	------	do	L
21bdb	A. H. Sims	-------	------	598	2	Tc	------	-------	Jet	------	Dom	
21dbb	-------	-------	142	38.0	1¼	Qal	25.94	3-28-57	Pitcher	------	N	
25dbb	Sam Abowitz	H. S. Ragland	134.54	96	18-12	do	21.02	3-28-57	Turbine	------	Irr	
26daa	do	-------	132.23	92	16-10	do	24.34	3-28-57	do	1200M	do	
27bad	-------	-------	132	36	1¼	do	17.09	3-28-57	Pitcher	------	N	
27daa	C. D. & E. S. Kennedy	H. S. Ragland	------	------	------	do	21.66	11-27-57	Turbine	------	Irr	
32ccc	R. A. Sirmon	do	------	93	------	do	------	-------	do	------	do	
34ccc1	E. E. Hobson	Layne-Ark.	136.48	96	18	do	20.70	3-21-57	do	900R	do	Ca, L
34ccc2	do	-------	140.87	------	18	do	25.21	3-21-57	None	------	N	
35dac	C. D. & E. S. Kennedy	H. S. Ragland	------	101	16	do	26.56	4-12-57	Turbine	------	Irr	
35ddc	do	J. F. Mellor	------	481	3-2	Tc	------	-------	Jet	------	Dom	Ca
36dcc	-------	-------	132	35.9	1¼	Qal	17.53	3-21-57	Pitcher	------	N	
12S-3W												
3ccb	-------	-------	151	43.2	1¼	Qal	18.91	4- 3-57	Pitcher	------	N	
4aac	V. Harrell	-------	152	------	18-?	do	17.68	4- 2-58	Turbine	------	Irr	
4cad	do	M. Johnson	147	------	18-?	do	12.43	4- 2-58	do	------	do	
6baa	R. C. Williams	W. B. Loyd & Sons	148	83	8	do	13.66	4- 2-58	do	------	do	L
9aba	Bonnie Zook	-------	------	------	10	do	------	-------	do	------	do	
14aba	Desha County	J. F. Mellor	------	470+	3-2	Tc	------	-------	Jet	------	PS	
14cba	Cecil King	do	------	------	10	Qal	------	-------	Turbine	------	Irr	
14cdc	do	do	------	400+	2	Tc	------	-------	Jet	------	Dom	
15ddd	Lee Buford	do	------	440	2	do	------	-------	do	------	do	
18baa	John Maier	H. S. Ragland	147	92	16-?	Qal	19.40	4-12-57	Turbine	820M	Irr	
18dad	Sam Farrell	do	148	93	14-8	do	19.77	4- 3-57	do	------	do	
20baa	Harold Gosup	-------	------	400−	2	Tc	------	-------	Jet	------	Dom	
20bdd	H. J. Hargis	J. F. Mellor	------	440	2	do	------	-------	do	------	do	Ca
20cda	A. C. Smith	-------	------	400±	2	do	------	-------	do	------	do	

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
10S-3W												
21bab	J. L. Maier	H. S. Ragland	148	------	16-?	Qal	20.21	4- 3-57	Turbine	------	Irr	
23adb	-------	-------	140	34.0	1¼	do	14.39	3-27-57	Pitcher	------	N	
27aca	W. A. McGehee	Layne-Ark.	143	102	16-12	do	11.30	4- 3-57	Turbine	1760R	Irr	L
27baa	Federal Compress	do	142	99	8-6	do	------	-------	do	------	Ind	L
27bbb1	Delta Ice Co.	National Well Co.	145	550	18-8	Tc	------	-------	None	------	N	Ca
27bbb2	McGehee Water Co.	Layne-Ark.	145	778	16-8	do	41	12-18-57	Turbine	500R	PS	Ca
27bbb3	Delta Ice Co.	do	------	525	8	do	45	1952	do	350R	Ind, PS	
27caa1	Mo. Pac. R. R.	do	150	794?	8	do	40.37	12-16-57	do	580R	N	
27caa2	do	do	------	826	8	do	37.35	12-16-57	do	------	Ind	
28cba1	H. G. Loyd	J. F. Mellor	------	518	2	do	------	-------	Jet	------	Dom	
28cba2	McGehee Hatchery	do	------	532	3-2	do	------	-------	do	------	S	
29bad	Joe Cobb	do	------	493	2	do	------	-------	do	------	Dom	
29dba	A. S. Rogers	M. E. McDonald	145	103	18-12	Qal	19.25	4- 3-57	Turbine	2500R	Irr	
29dbb	do	-------	------	480±	2	Tc	------	-------	Jet	------	Dom	
30acc	-------	-------	146	50.8	1¼	Qal	17.05	4- 3-57	Pitcher	------	N	
30adc	Bobby Mays	J. F. Mellor	------	280	2	Tc	------	-------	Jet	------	Dom	Ca
30add	Norman Dollar	do	------	360	2	do	------	-------	do	------	do	
30cdd	Jack Dowden	Layne-Ark.	145	101	8	Qal	------	-------	Turbine	700R	Irr	L
33bad1	Ross Robinson	do	142	98	6	do	------	-------	do	350R	do	L
33bad2	do	J. F. Mellor	------	465	2½-2	Tc	------	-------	Jet	------	Dom	
33bad3	do	-------	142	65	1¼	Qal	20.64	4-12-57	None	------	N	
33daa	B. C. Castleberry	H. S. Ragland	142	88	18-12	do	20.50	9-26-56	Turbine	2500R	Irr	Ca
33dcc	do	J. F. Mellor	------	565	4-3	Tc	------	-------	Jet	------	Dom	Ca
36cdc	Delbert Creek	do	------	560	3-2	do	------	-------	do	------	do	
13S-1W												
5bdb	-------	-------	135.12	33.1	1¼	Qal	19.26	3-21-57	None	------	N	
6abb	Robert Moore	-------	------	------	2	Tc	------	-------	Jet	------	Dom	
7cbc	Texas Eastern	J. F. Mellor	132	862	6-4	do	25	1951	Turbine	------	Ind	Ca, L
13S-2W												
1aad	-------	-------	134.87	36.5	1¼	Qal	17.48	3-21-57	Pitcher	------	N	
1abb	Joe Wilson	J. F. Mellor	------	620±	2½-2	Tc	------	-------	Jet	------	Dom	
1dda	Texas Eastern	do	133	651	3	do	------	-------	do	------	do	L
2aaa	-------	-------	130.82	28.0	1¼	Qal	16.69	3-21-57	Pitcher	------	N	
5bbc	R. A. Sirmon	-------	------	525	2	Tc	------	-------	Jet	------	Dom	
5bcd	Ben Cartwright	Layne-Ark.	138	83	18	Qal	19.38	3-21-57	Turbine	1750R	Irr	
5cbc	-------	-------	142	38.2	1¼	do	28.19	12-11-56	Pitcher	------	N	
6ddb	Jimmy Orrell	W. B. Loyd & Sons	139	94	10	do	------	-------	Turbine	------	Irr	L
8acc	G. M. Biggs	J. F. Mellor	------	470±	2	Tc	------	-------	Jet	------	Dom	
8caa	Chas. Thomas	do	------	515	2	do	------	-------	do	------	do	Ca
8ddd	-------	-------	------	24.3	1¼	Qal	21.78	12-11-56	Pitcher	------	N	
10bac	Tom Johnson	Layne-Ark.	142.57	101	18-12	do	27.75	3-21-57	Turbine	1700R	Irr	L
10bdb	-------	-------	141.28	46.5	1¼	do	27.24	3-21-57	Pitcher	------	N	
12aad	-------	-------	136	32.4	1¼	do	20.61	3-21-57	do	------	N	
12ddc	-------	-------	130	32.9	1¼	do	17.85	3-21-57	do	------	Dom	
17abc	Ollie Mason	J. F. Mellor	------	500±	2	Tc	------	-------	Jet	------	do	Ca

DESHA COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
13S-2W												
17dbd	-------	-------	141	60.3	1¼	Qal	25.89	3-21-57	Pitcher	------	N	
17dcc	T. C. Gibbs	H. S. Ragland	142	81	16-10	do	25.55	3-21-57	Turbine	1100R	Irr	
20dcc	-------	-------	141	44.7	1¼	do	24.56	3-21-57	Pitcher	------	N	
21abb	-------	-------	140	46.4	1¼	do	26.11	3-21-57	do	------	Dom	
24add	-------	-------	131.55	30.8	1¼	do	17.35	3-21-57	do	------	N	
26adb	-------	-------	130	27.5	1¼	do	18.77	4-12-57	None	------	N	
27bdc	-------	-------	140	52.3	1¼	do	25.76	3-21-57	Pitcher	------	N	
29cdb	C. L. Cox	-------	------	------	1¼	do	------	-------	Jet	------	Dom	Ca
29dcb	Desha County	-------	138	61.2	2	do	24.89	3-21-57	None	------	N	
32acb	-------	-------	137	41.2	1¼	do	25.17	3-21-57	Pitcher	------	N	
33caa	E. M. Phillips	-------	------	20	1¼	do	------	-------	Jet	------	Dom	Ca
33dad	-------	-------	137	43.1	1¼	do	19.74	3-21-57	Pitcher	------	N	
13S-3W												
1aba	E. C. Dorman	J. F. Mellor	------	525	2½-2	Tc	------	-------	Jet	------	Dom	
1adc	Delta Country Club	-------	------	------	3	do	------	-------	do	------	do	
1bcd	Dale Mosely	-------	------	364	2	do	------	-------	do	------	do	
2aad	Reynolds	H. S. Ragland	------	102	6	Qal	------	-------	Turbine	------	Irr	
3add	Ruth McDonald	F. Brewer	136	86	16	do	17.33	4-12-57	do	------	do	L
3cda	Kaufman Bros.	H. S. Ragland	140	89	18-?	do	21.04	4-12-57	do	------	do	
3ddd	do	J. F. Mellor	------	400	4-3	Tc	------	-------	Jet	------	Dom	Ca
7aab	R. L. Beck	W. B. Loyd & Sons	138	86	10	Qal	------	-------	Turbine	------	Irr	L
10daa	J. D. McDonald	H. S. Ragland	140	80?	18-?	do	19.19	4- 3-57	do	1100M	do	Ca
11cab	do	do	------	86	18-?	do	------	-------	None	------	N	Ca
11dcd	do	J. F. Mellor	------	580	2	Tc	------	-------	Jet	------	Dom	
14acd	do	Layne- Ark.	------	------	18	Qal	------	-------	Turbine	800R	Irr	
14add	do	-------	142	------	18-?	do	23.91	4- 3-57	do	1100M	do	
14bcb	do	-------	137	37.6	1¼	do	17.05	4- 3-57	None	------	N	
16bdc	B. C. Castleberry	H. S. Ragland	138	90	18-?	do	16.33	4- 3-57	Turbine	2500R	Irr	

LINCOLN COUNTY

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
7S-5W												
18bdc	H. R. Wood	H. S. Ragland	182.5	96	18-10	Qal	21.71	12-22-55	Turbine	1400R	Irr	
19aad	Cummins St. Pen. Farm	Layne-Ark.	179.5	92	?-12	do	------	--------	do	2300R	do	
19bbb	H. R. Wood	--------	179.3	------	18-10	do	16.85	12-22-55	do	1750R	do	
19dbd	Cummins St. Pen. Farm	M. E. Argo	176.2	103	24-10	do	18.62	12-12-55	do	1500R	do	Ca, L
29cac	do	Layne-Ark.	178.2	100±	?-12	do	------	--------	do	1800R	do	
29ddd	do	M. E. Argo	175.3	104	24-10	do	19.52	12-12-55	do	2400R	do	Ca, L
30aac	do	do	176.4	do	24-12	do	19.59	12-12-55	do	1800R	do	Ca
30dbc	do	Layne-Ark.	176.0	100±	?-12	do	------	--------	do	2500R	do	
33bdc	H. McGeorge	H. S. Ragland	176.4	104	?-12	do	------	--------	do	------	do	
34caa	Cummins St. Pen. Farm	--------	181.7	100±	------	do	------	----	do	------	do	
36dad	H. W. Balloue	Ethridge	177	700±	2	Tc	5±	1953	Jet	------	Dom	Ca
7S-6W												
3cca	Mrs. K. Woods	J. F. Mellor	186	580	2	do	------	--------	Jet	------	Dom	Ca
3cda	R. E. Dreher	T. C. Hardin	186	577	4-3	do	60	1955	do	10R	do	Ca
5bab	M. H. Bitely	M. E. McDonald	190.5	109	18-?	Qal	22.57	11-16-55	Turbine	1900R	Irr	Ca, L
10bcc	D. Eifling	--------	183.3	------	18-?	do	18.23	11-16-55	do	1400R	do	
13bbc	L. Mazzanti	T. C. Hardin	------	483	2	Tc	------	----	Jet	------	Dom	Ca
14aba	do	Layne-Ark.	186.1	126	6	Qal	20	1956	Turbine	------	Irr	
15aba	H. R. Wood	--------	184.3	------	18-?	do	20.55	11-16-55	do	------	do	
16aac	do	M. E. Argo	188.3	86	18-?	do	27	1955	do	1300R	do	
21abc	N. Hardin	--------	177.8	------	18-?	do	14.32	11- 1-55	do	1400R	do	
24caa	M. E. Argo	M. E. Argo	175.9	104	24-10	do	16.10	12-22-55	do	1300R	do	Ca
26bdd	do	--------	176.5	------	?- 8	do	14.21	11- 9-56	do	------	do	
27ddd	do	--------	180.3	------	?-10	do	20.31	2-16-56	do	------	do	
28cbb	R. Keahey	M. E. Argo	181	90	10- 6	do	25.10	9-21-56	do	1000R	do	
29dda	E. Hall	do	------	------	8	do	------	--------	do	------	do	
32aba	J. C. Hardin	--------	------	------	18-10	do	35.57	9-21-56	do	2500R	do	
33baa	Town of Grady	W. F. Moody	182	816	4	Tc	23	1930	do	550R	PS	Ca
33ddb	Burford	H. S. Ragland	181.9	100±	18-10	Qal	22.86	12- 8-55	do	------	Irr	
34aad	H. Venable	Lewis-Diesel	186.0	96	8-6	do	27.23	12-16-57	do	1000R	Irr	
35cca	E. C. Hardin Jr.	M. E. Argo	185.1	100±	6	do	30.09	9-21-56	do	------	do	
36abc	G. P. Russell	Layne-Ark.	182.9	------	do	do	17.74	4- 7-58	do	------	do	
36add	Cummins St. Pen. Farm	--------	177.7	100±	?-12	do	21.31	12-12-55	do	1650R	do	
7S-7W												
25bac	F. Fletcher	Stut'gt Mch. Wks.	186.7	130	?-10	do	20.78	12- 8-55	do	2000R	do	L
25dbc	do	do	186.0	90	6	do	20.68	4- 9-57	do	750R	do	Ca
26dcb	W. A. Baker	--------	185.3	------	10	do	20.33	12- 7-55	do	2900R	do	Ca
28abb	R. L. Brown	J. E. Wittenauer	187.9	129	24-10	do	14.85	12- 8-55	do	2500R	do	Ca, L
30cac	C. H. Cloud & Co.	--------	------	45	8	Qt	35.16	4-27-56	Manual	------	Dom	Ca
30ccd	Shady Grove Church	--------	203.7	36	6	do	28.80	5-17-56	do	------	PS	
31abd	C. H. Flowers Farms	--------	188.1	40	1.5	Qal	13.60	5-17-56	Pitcher	------	N	
31baa	do	C. Lyle	210	1364	3-2	Tc	70	1956	Jet	------	Dom	Ca
34adb	W. A. Baker	--------	185.9	------	18-?	Qal	20.12	12- 8-56	None	------	N	
34bbb	do	--------	186.3	------	18- 8	do	18.01	12- 8-56	Turbine	1600R	Irr	
35bbc	do	--------	185.1	------	?-10	do	16.63	5-23-58	do	1000R	do	

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
7S-8W												
25dcc	--------	--------	------	------	8	Qt	32.43	10-18-55	Manual	------	N	
30aba	--------	--------	209	35.5	6	do	32.32	10-18-55	do	------	do	
32aaa	B. D. Norton	Layne-Ark.	194	88	22-12	Qal	14.76	6- 7-55	Turbine	1000R	Irr	
33acd	do	do	192	106	18-12	do	15	1955	do	900R	do	
34adc	Dr. J. H. Taliaferro	--------	191	------	6	do	------	--------	Centrif.	------	do	
35acc	M. M. Taliaferro	M. E. Argo	193.7	106	18-12	do	15.12	6- 7-55	Turbine	960R	do	
35bdc	Dr. J. H. Taliaferro	--------	194.3	------	8	do	------	--------	Centrif.	------	do	
8S-4W												
3cad	A. Mathews	--------	171.7	------	10	do	15.54	12-15-55	Turbine	------	do	
4cdc	R. L. Rogers	--------	172	735	3-2	Tc	18	1953	Jet	7R	Dom	Ca
5ccc	H. Jones	--------	------	474	------	do	------	--------	do	------	do	Ca
6dab	A. Mathews	--------	173.2	------	6	Qal	16.07	12-15-55	Turbine	------	Irr	
7cda	T. J. Collins	H. S. Ragland	172.7	97	18-10	do	16.15	11-15-55	Turbine	1000R	Irr	Ca
8bbb	H. Jones	do	173.4	102	14-10	do	16.43	12-15-55	do	2500R	do	
9bba	R. L. Rogers	Rinehart	173.2	108	18-10	do	14.29	5-17-55	do	1800R	do	
18dba	T. J. Collins	H. S. Ragland	167.0	97	18-10	do	12.50	11-15-55	do	1850R	do	
20dba	J. C. Polk	M. E. McDonald	161	86	12-6	do	16.88	12-15-55	do	1400R	do	
20ddc	S. Pearson	F. White	170.1	------	6	do	17.91	11-14-55	do	------	do	
22aaa	K. W. Bitely	Lyle Bros.	166	812	3-2	Tc	29	1955	Jet	19R	Dom	Ca
28dbd	J. L. Bradshaw	Layne-Ark.	170.0	93	8-6	Qal	9.56	4- 8-58	Turbine	600R	Irr	L
31cba	C. H. Holtoff	H. S. Ragland	161.9	99	18-10	do	9.82	11-14-55	do	1400R	do	Ca
32baa	C. H. Holtoff, Jr.	do	165.5	84	18-6	do	12.73	11-15-55	do	1100R	do	Ca
32bcc	do	M. E. McDonald	162.0	89	6	do	6.00	5-10-56	do	1100R	do	L
32cbb	do	--------	------	42.5	1½	do	5.69	5-10-56	Pitcher	------	Dom	
32dbb	A. L. Nuckols	H. S. Ragland	162.4	82	18-10	do	11.09	11-14-55	Turbine	1550R	Irr	Ca
33ada	W. J. Bradshaw	M. E. McDonald	169.0	97	14-6	do	19.47	11-14-55	do	1000R	do	L
34cbc	O. Railey	Layne-Ark.	169.2	------	14-8	do	20.01	11-14-55	do	2000R	do	
8S-5W												
1adc	R. Venable	M. E. McDonald	175.8	100±	8	do	16.69	1-10-56	do	2200R	do	
3bcd	Cummins St. Pen. Farm	Layne-Ark.	177	802	------	Tc	40.40	5-22-58	do	------	PS, Ind	Ca
3cca	do	do	175	816	4	do	37.92	5-22-58	do	150R	PS	
3dba	do	do	178.5	100±	12	Qal	------	--------	do	2100R	Irr	
4adc	H. McGeorge	H. S. Ragland	176.8	100	12	do	19.27	12-12-55	do	1650R	do	
5dcc	do	do	172	100±	18-10	do	11.04	1- 7-53	do	2150R	do	Ca
6cbc	V. H. Knight	Layne-Ark.	184.3	97	8-6	do	------	--------	do	700R	do	L
6cdb	W. O. Wilson	do	182.7	108	4	do	24	1955	do	350R	do	
8bda	Cummins St. Pen. Farm	M. E. Argo	180.4	97	18-6	do	23.90	11- 4-54	do	1500R	do	L
8ccb	H. Labelle	J. F. Mellor	180	580	2	Tc	30	1956	Jet	------	Dom	Ca
9cba	Cummins St. Pen. Farm	H. S. Ragland	173.5	100±	12	Qal	------	--------	Turbine	2500R	Irr	
10bcb	do	do	172.5	95	12	do	18.62	5-17-55	do	3000R	do	
10cbd	do	do	172.9	100±	12	do	14.99	12-12-55	do	2600R	do	Ca
10dcd	Cummins St. Pen. Farm	Layne-Ark.	171.3	100±	12	do	------	--------	Turbine	2300R	Irr	
12abd	R. L. Rogers	H. S. Ragland	173.7	93	18-10	do	15.84	11-15-55	do	2000R	do	Ca

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
8S-5W												
13aad	Dr. Dickson	Newman	169.1	92	12-8	Qal	12.74	11-15-55	Turbine	1600R	N	Ca
16dcb1	-------	-------	172	13.2	1¼	do	11.06	4-30-57	None	------	N	
17dab	T. Free, Jr.	J. F. Mellor	173	700	2	Tc	18	1951	Jet	------	Dom	Ca
18cac	R. Norton	-------	------	------	6	Qal	25.58	9-21-56	Turbine	------	Irr	
20dbc1	J. E. West	Layne-Ark.	178.5	90±	8-6	do	14.59	4- 8-58	do	800R	do	
20dbc2	do	-------	------	700	2	Tc	------	-------	do	5R	Dom	Ca
22bcc	W. C. Shepard	J. F. Mellor	172	485	2	do	25	1946	Jet	------	do	Ca
22cbb	J. O. Knight	do	------	466	2	do	25	1946	do	5R	do	Ca
23dbb	H. L. Butcher	Layne-Ark.	172.1	74	6-4	Qal	16	1954	Turbine	437R	S	
24cdb	do	M. E. McDonald	171.0	91	12-8	do	14.30	6- 3-55	do	1300R	Irr	
25abb	C. H. Holtoff, Jr.	M. E. Argo	------	------	6-4	do	11.77	5-10-56	do	------	do	
25bbd	H. L. Butcher	Layne-Ark.	169.8	74	6	do	16	1954	Centrif.	200R	do	
25cbc	-------	-------	------	36	1¼	do	7.46	1-30-57	None	------	N	
25dab	C. H. Holtoff Est.	-------	168.6	------	10-6	do	14.31	1-11-56	Turbine	------	Irr	
27ccc	W. E. Wilkins	M. E. McDonald	169.5	101	14-10	do	10.83	4-20-55	do	1260R	do	L
29acc	J. E. West	Layne-Ark.	180.3	95±	8-6	do	17.40	4- 8-58	do	800R	do	
32dbb	C. H. Holtoff Est.	-------	178.4	------	18	do	------	-------	do	1400R	do	
32dca	J. O. Knight	Layne-Ark.	176.6	112	8-6	do	20.5	1955	do	700R	do	
33bcd	B. H. Webb	-------	------	65	[1]	do	18	1955	Centrif.	150R	do	
34cac	C. H. Holtoff	-------	170.8	93	8	do	6.37	4-20-55	Turbine	1575R	do	Ca
35bda	Town of Gould	-------	167	827	4	Tc	32	1924	do	350R	PS	Ca
8S-6W												
1bbd	R. C. Johnson, Sr.	M. E. McDonald	181	82	6-4	Qal	26.09	5-10-56	do	450R	Irr	L
1cca1	Mrs. T. L. Whitener	H. S. Ragland	182.4	95	10	do	27.66	12- 8-55	do	1500R	do	
1cca2	R. D. Robertson	T. C. Hardin	------	714	3-2	Tc	------	-------	Jet	10R	Dom	Ca
2bdb	W. H. Venable	M. E. McDonald	185.1	99	16-8	Qal	26.29	4-20-55	Turbine	1675R	Irr	L
2dcd	R. D. Robertson	H. S. Ragland	181.7	93	6	do	28.37	12- 7-55	do	775R	do	Ca
3ccc	Mrs. T. L. Whitener	do	182.2	97	18-10	do	21.81	4-30-53	do	1975R	do	Ca
6aaa	H. R. Wood	do	184.9	96	18	do	24.49	11-21-55	do	1800R	do	Ca
8bdd	G. Lovett	E. Stillwell	180.0	112	18-10	do	25.87	11- 1-55	Turbine	1800R	Irr	
9aab	E. Robinson	-------	183.5	------	18	do	28.01	5-17-55	do	------	do	
9bbc	do	H. S. Ragland	182.7	95	18-10	do	24.17	2-16-56	do	1800R	do	
10bac	A. Harshaw	-------	181.8	------	------	do	28.79	10-31-55	do	------	do	
10bbd	W. E. Robertson	H. S. Ragland	183.6	142	18-10	do	27.72	1- 5-56	do	2000R	do	Ca, L
11bcc	G. Ryland	-------	182.3	------	10	do	29.87	10-31-55	do	------	do	
11cbb	G. Ryland	-------	180.6	------	10	do	26.57	12-22-55	do	1650R	do	
11daa	C. F. McLemore, Jr.	T. C. Hardin	175	483	3-2	Tc	40	-------	Jet	------	Dom	Ca
11dca1	Bell, Johnson, & McLemore	H. S. Ragland	177	98	20-8	Qal	29.84	12- 8-55	Turbine	1150R	Irr	
11dca2	do	do	180.1	96	20-10	do	15.52	5-22-58	do	1400R	do	Ca
11ddd	do	do	176.2	125	20-8	do	23.29	1- 5-55	do	1800R	do	
16bbc1	H. R. Wood	do	179	100	18-10	do	25.70	11-17-55	do	1280R	do	Ca
16bbc2	H. R. Wood, Jr.	-------	178.7	------	?-10	do	19.48	4- 9-58	do	------	do	
17add	P. Farrell	H. S. Ragland	179.0	102	18-10	do	12.07	4-30-53	do	1650R	do	Ca

[1] Battery of 3 two inch Wells

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
8S-6W												
17ddd	G. Lovett	H. S. Ragland	178.5	110	18-10	Qal	12.72	4-30-53	Turbine	1700R	Irr	Ca, L
19dcb	P. Farrell	do	185.6	100	12	do	29.40	11- 1-55	do	1800R	do	L
19ddb	G. Lovett	Layne-Ark.	183.8	140	18	do	------	--------	do	2200R	do	
19ddd	do	H. S. Ragland	180.2	101	18-10	do	25.86	6- 8-55	do	1750R	do	Ca
20bba	do	do	181.7	do	18	do	12	1950	do	1700R	do	
21bbc	C. Harris	do	178.6	105	18-10	do	27.87	11-17-55	do	1040R	do	Ca
21bdd	do	do	177.5	100±	24	do	11	1950	do	2500R	do	
22caa	G. Ryland	M. E. Argo	179.0	100	18-10	do	15	1948	do	1375R	do	Ca
22cbb	C. Harris	H. S. Ragland	177.3	108	24	do	11	1950	do	2300R	do	Ca
22dca	G. Ryland	M. E. Argo	178.7	102	18-10	do	15	1948	do	1100R	do	Ca
23bda	do	H. S. Ragland	------	100±	18-10	do	------	--------	do	1000R	do	
24daa	T. Free, Jr.	J. F. Mellor	175	650	2	Tc	18	1952	do	------	Dom	Ca
25cba	E. Stewart	--------	------	50	2	Qal	------	--------	------	------	Irr	
28cca	Pinchback Planting Co.	H. S. Ragland	177.9	110	18-10	do	14	1947	do	1875R	do	
28cdc	do	do	177.9	109	------	do	24.21	12-22-55	------	1400R	do	
29abb	do	Layne-Ark.	181.5	152	18	do	25.18	2-16-57	Turbine	2050R	Irr	
29bbb	do	do	181.2	149	18-12	do	26.73	11- 1-55	do	2000R	do	Ca
29dcc	do	H. S. Ragland	177.8	108	18-10	do	14	1949	do	2200R	do	Ca
30cca	B. Maddox	--------	------	46.3	1¼	do	27.27	9-11-56	None	------	N	
31bdb	Mrs. V. Austin	J. F. Mellor	------	817	2	Tc	------	--------	Jet	------	Dom	Ca
31dbc	J. B. Jackson	Lilly Bros.	176	101	18-10	Qal	21.29	4- 9-58	Turbine	2300R	Irr	Ca, L
31dcc	do	J. F. Mellor	------	819	2	Tc	------	--------	Jet	------	Dom	Ca
33bab	G. Ryland	do	176	450	2	do	31	1955	do	5R	do	Ca
8S-7W												
2baa	--------	--------	182	26.5	1¼	Qal	21.18	10-30-56	None	------	do	
2bad	--------	--------	182	23.7	1¼	do	22.38	10-30-56	Pitcher	------	do	
4cac	J. Hooker	--------	188.8	------	------	do	14.93	4- 8-58	Turbine	------	Irr	
8dac	Raley	--------	189.8	------	8-6	do	19.61	10-30-56	do	------	do	
9bbd	Baugh Bros.	--------	189.8	------	------	do	19.95	12-14-55	do	------	do	
11aca	Lavender Hunting Club	--------	183.7	------	18-10	do	20.50	12-21-55	do	------	Recreation	
13cdd	G. Morgan	Layne-Ark.	184.2	102±	12-8	do	19.74	4-10-58	do	900R	Irr	
14cdc	--------	--------	179	26.5	1¼	do	17.00	10-30-56	None	------	------	
16baa	--------	--------	180	29	1¼	do	20.47	10-30-56	------	------	------	
18bbd	G. B. Spencer	Layne-Ark.	185	106	8-6	do	9	1955	Turbine	700R	Irr	L
20abb	J. Bradshaw	do	176	105±	10-8	do	------	--------	do	2300R	do	
20cac	H. Harrison	do	180	90	8-6	do	------	--------	do	600R	do	
22acd	N. M. Ryall	--------	182	------	18-10	do	23.44	11- 2-55	do	2000R	do	
27bca	E. Moore	Layne-Ark.	185	90±	8-6	do	------	--------	do	600R	do	
29ddd	T. B. Waters	--------	200	------	8	Qt	25.23	5-17-56	None	------	N	
35dbb	--------	--------	190	36.5	------	do	30.15	10-30-56	Pitcher	------	do	
8S-8W												
10ccc	M. Jacobs	H. Jacobs	203.4	32	8	Qt	22.12	7- 5-56	None	------	Dom	
12daa	New Macedonia Church	--------	------	38	8	do	33.26	10-18-55	do	------	N	
12dac	G. B. Spencer	--------	206	55	8	do	33.30	5-17-56	do	------	Dom	Ca

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
8S-8W												
16abc	H. L. Webb	-------	207.7	37	8	Qt	24.56	5-17-56	None	------	Dom	Ca
17acb	C. Harris	-------	215.6	80	8	do	28.67	5-17-56	do	------	do	
17acc	H. F. Shumoke	-------	221.6	52.5	------	do	30.53	5-17-56	do	------	do	
20bdd	G. C. Hollaway	-------	246.4	16	48	do	6.68	5-17-56	do	------	do	Ca
22abd	B. Bly	-------	------	51	6	do	13.98	5-17-56	do	------	do	
29abb	C. Newman	-------	223.7	17.5	36	do	4.96	-------	do	------	do	Ca
29add	do	-------	------	22.5	36	do	8.75	5-17-56	do	------	do	
32aad	G. P. Harris	-------	------	25.5	8	Tj	14.00	5-17-56	do	------	do	
32ccc	A. Case	-------	------	20	7	do	12.51	9-13-56	do	------	do	
32cdc	Raley	-------	------	52	7	do	15	1956	------	------	do	
33cab	J. B. Cromler	-------	236.4	35	8	do	16.32	5-17-56	None	------	do	
33ccc	W. Harper	McWhorter	------	254	3- ?	do	------	-------	Jet	------	do	
33cda	J. T. Harper	-------	------	41	6	do	17.19	5-17-56	None	------	do	
35bbb	D. Farmer	-------	240.0	40	8	do	22.64	10-18-55	do	------	N	
9S-5W												
1adb	E. Warren	J. Deere (P.B.)	165	128	4	Qal	8.68	12-14-55	Centrif.	600R	Irr	
1bba	P. Fallio	-------	------	------	3	do	------	-------	do	------	do	
1bbd1	do	-------	------	------	2	do	------	-------	------	------	do	
1bbd2	do	-------	------	------	2	do	------	-------	------	------	do	
2ccd	R. Gasoway	Matthews	160	85	4	do	11.05	12-16-55	------	150R	do	
3aad	H. Holtoff	-------	171	------	1¼	do	18.39	9-26-56	None	------	N	
3add	M. P. Price	J. F. Mellor	175	682	2	Tc	15	1956	Jet	------	Dom	Ca
3baa	L. D. Sperlock	-------	178.7	------	12-6	Qal	23.00	9-20-56	Turbine	------	Irr	
3dac	Mrs. J. Holtoff	J. F. Mellor	------	650	2	Tc	------	-------	Jet	------	Dom	Ca
3ddd	L. Mathews	-------	178.9	------	8-6	Qal	------	-------	Turbine	700R	Irr	
4aad	C. H. Holtoff	H. S. Ragland	173.8	107	18-10	do	17.16	12- 7-55	do	1775R	do	Ca
4bac	-------	-------	168	------	1¼	do	15.10	1-30-57	Pitcher	------	N	
6caa	W. Richards	H. S. Ragland	176	104	18-10	do	------	-------	Turbine	1200R	Irr	Ca, L
8ccb	V. O. Johnson, Jr.	-------	171	97	18-10	do	------	-------	do	1150R	do	Ca
10aab	R. Hoover	Lewis-Diesel	178.9	96	6	do	17	1953	Centrif.	300R	do	
10bcd	J. H. Wilkins	do	173.5	100	4-3	do	13	1955	do	250R	do	
10cab	J. C. Jinks	do	177.3	106	8-6	do	16.11	4- 8-58	Turbine	600R	do	
11bbd	M. Price	M. E. McDonald	177.0	85	4	do	15	1955	do	600R	do	
13cdb	C. F. Hudson	Layne-Ark.	174.8	133	10	do	22.41	11- 3-55	do	3000R	do	
14abc	L. E. Branson	Lewis-Diesel	172.5	98	8-6	do	17.26	11- 3-55	do	720R	do	
14bad	do	J. F. Mellor	168	836	2	Tc	30	1951	Jet	10R	Dom	Ca
14bdb	do	Lewis-Diesel	177.4	114	4	Qal	18	1954	Centrif.	375R	Irr	
14bdc	do	-------	------	80	2	do	19.90	1- 6-55	None	------	N	
16bdc	J. W. Smith	M. E. McDonald	171	88	14-6	do	16.74	11- 2-55	Turbine	930R	Irr	L
16bdd	Wells Bayou School Dist	-------	------	710	2	Tc	------	-------	Jet	------	PS	Ca
17bcb1	V. O. Johnson, Jr.	-------	173	------	18	Qal	17.47	6- 8-55	None	1200R	N	
17bcb2	do	Baker Hdw. Co.	------	500±	2	Tc	------	-------	Jet	------	Dom	Ca
17ddb	J. W. Smith	R. Carnahan	174	96	18-10	Qal	16.10	11- 3-55	Turbine	1350R	Irr	
20aab	J. A. Smith	M. E. McDonald	170	85	6-4½	do	------	-------	do	525R	do	L

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
9S-5W												
22caa	H. D. Stephenson	J. F. Mellor	171	710	2	Tc	30	1952	Jet	5R	Dom	Ca
24abd	C. F. Hudson	Layne-Ark.	173.5	124	18-10	Qal	------	--------	Turbine	3000R	Irr	
24baa	do	J. F. Mellor	------	630	3-2	Tc	------	--------	Jet	------	Dom	Ca
25bac	C. H. Holtoff Est.	H. S. Ragland	166	132	18-10	Qal	15.99	11- 3-55	Turbine	2000R	Irr	Ca, L
28bda	--------	--------	167	30.5	1¼	do	15.25	4-25-57	Pitcher	------	N	
30cbc	Norton	--------	172	29	1¼	do	19.61	9-11-56	None	------	do	
30cca	--------	--------	171	------	1¼	do	17.42	4-25-57	------	------	do	
34bba	F. W. Haygood	M. E. McDonald	172	98	18-6	do	19.42	11- 3-55	Turbine	800R	Irr	L
9S-6W												
3bad	B. F. McGraw	H. S. Ragland	176	101	18-10	Qal	11	1952	do	1640R	do	Ca
3cba	J. E. Freeman	M. E. McDonald	177	90	do	do	19.05	5-16-55	do	2000R	do	Ca
4bbc	T. C. Cogbill	--------	------	564	2	Tc	------	--------	Jet	------	Dom	Ca
4dcb	J. E. Freeman	--------	------	25	18	Qal	14.02	5-16-55	None	------	do	
6cbb	W. B. Harrison	Layne-Ark.	180	78	8-6	do	20	1955	Turbine	600R	Irr	L
6dbd	C. Erwin	do	182	87	8-4	do	21.24	12- 9-55	do	400R	do	L
12cdb	P. Jarvis	do	177	134	12-8	do	------	--------	do	2650R	do	
16ccc	Collins	--------	------	42	8	Qt	36.65	9-19-56	Manual	------	Dom	
19ccc	Logue	--------	------	19	8	Tj	14.00	9-19-56	do	------	do	
22aac	C. King	C. King	------	35	[1]	Qal	17	1954	Centrif.	250R	Irr	
23cdc	--------	--------	170	25	1¼	do	16.06	9-27-56	None	------	N	
23dbc	--------	--------	170	39	do	do	22.24	9-26-56	do	------	do	
24bca	--------	--------	172	37	do	do	20.34	9-27-56	Manual	------	do	
27cbb	--------	--------	172	22	do	do	15.98	9-27-56	None	------	do	
9S-7W												
1bca	J. Walls	--------	195	------	8	Qt	34.84	12- 4-55	Manual	------	Dom	
3cca	L. Cogwell	--------	------	40	8	Tj	37	1956	None	------	do	Ca
3daa	J. Goots	--------	------	170	3	do	------	--------	Cylinder	------	do	Ca
6bac	T. M. Burns	--------	------	35	30	Tp	32	1956	Jet	------	do	Ca
7acc	Bess	--------	------	35	8	do	31.60	9-20-56	None	------	do	
7dbb	C. L. Johnson	--------	------	36	8	Tj	17.46	9-20-56	do	------	do	Ca
8caa	City of Star City	Layne-Ark.	------	1100	10-8	Tc	140.06	5-23-58	Turbine	200R	PS	
8cbd	S. Brown	--------	------	------	14	Tj	8.84	9-20-56	None	------	?	
9cba	R. Long	R. Matthews	------	365	2	do	------	--------	------	------	Dom	
10cbc	P. McFalls	--------	------	31	8	do	20.80	9-19-56	------	------	do	
17cbd	M. C. Harrison	--------	300.0	8	------	do	2.64	4-26-56	None	------	do	Ca
18bbd	E. Owens	--------	------			Tp		--------		0.1R	do	Spring
18ddd	J. Owens	--------	377.5	15	8	do	5.07	4-26-56	None	------	do	
19aca	M. Peterson	--------	348.0	18	30	Tj	5.02	4-26-56	do	------	S	
19adb	R. A. Goin	--------	342.0	14	8	do	5.89	4-26-56	do	------	N	Ca
19cbd	Horn Est.	--------	321.5	do	48	do	9.16	4-26-56	do	------	?	
19ccb	J. C. Haddox	--------	317.0	21	24	do	12.04	10-18-55	do	------	Dom	
20caa1	F. Bailey	--------	------	36	36-2	Tp	25.89	5- 1-56	do	------	N	
20caa2	Scott	--------	------	------	----	do	------	--------	Jet	------	Dom	
20cdd	Q. Lyles	--------	------	25	36	do	19.13	5- 1-56	None	------	do	

[1] Battery of 4 two inch Wells

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
9S-7W												
21aba	E. A. Harris	-------	------	36	5	Tj	26.05	9-19-56	None	------	N	
22bac	V. Okey	-------	------	30	8	do	17.75	9-19-56	do	------	Dom	
22bdc	R. Edmonds	Johnson	------	40	8	do	16.87	9-18-56	do	------	N	
23abc	H. H. Robinson	-------	------	27	6	do	22.00	9-19-56	do	------	Dom	
26aca	O. Deweese	-------	------	35	8	Tp	24.90	9-19-56	do	------	do	
27dda	R. L. Edmonds	-------	------	29	36	do	26.42	9-18-56	do	------	do	
28dad	O. Brockman	-------	------	28	8	do	24.90	9-18-56	None	------	N	
29bab	State Forestry Comm.	-------	409.1	50	8	do	44.04	5- 1-56	do	------	do	Ca
29bca	Horn	-------	390.6	29	------	do	23.38	4-30-56	do	------	S	
29cab	-------	-------	361.6	22	------	do	11.64	4-30-56	do	------	N	
29ddb	C. McGregor	-------	331.0	------	------	do	------	-------	Jet	5R	Dom	Spring
29ddd	J. Womack	-------	362.0	24	36	do	10.34	5- 1-56	None	------	do	
32aaa	T. C. Hackney	-------	309.3	14	48	Tj	5.84	5- 1-56	do	------	do	
32bab	J. S. Whitten	-------	384.9	43	36	Tp	34.39	4-30-56	do	------	do	
32bbd	J. W. Bostiom	-------	318.0	18	48	do	10.55	5- 1-56	do	------	do	
32ccc	L. V. Chambliss	-------	------	48	36	do	18	1956	Jet	------	do	
33bdb	-------	-------	343.2	18	8	do	9.03	5- 1-56	None	------	do	
35aad1	C. Rotterrie	-------	------	------	8	do	35.35	9-18-56	do	------	do	
35aad2	do	Lyle Bros.	------	500+	2	Tc	230	1956	Turbine	------	do	
35aba	E. Johnson	-------	------	60	8	Tp	35.02	8-30-56	None	------	do	Ca
35dcb	E. Rotterrie	-------	------	21	30	Tj	17.77	9-18-56	do	------	do	
9S-8W												
1acc	F. Harper	-------	------	12	48	Tp	9	1956	None	------	do	
1bad	J. Pickins	-------	------	26	36	Tj	18.37	9-20-56	Jet	------	do	
1dda	N. B. Dobbs	-------	------	------	------	Tp	20.00	9-18-56	do	------	do	Ca
1ddb	J. F. Smith	-------	------	20	8	Tj	13.47	9-18-56	None	------	S	Ca
2bda	S. J. Newman	-------	------	190	3-2	do	------	-------	Jet	------	Dom	
2cad	E. McGuff	Lyle Bros.	------	510	2	Tc	------	-------	do	------	do	Ca
2dac	C. M. Moran	do	------	147	2	Tj	------	-------	do	------	do	Ca
2dbd	F. McGee	-------	------	15	36	do	11.90	9-18-56	do	------	do	
3dbd	O. C. Blassingame	-------	------	28	6	do	16.29	9-18-56	do	------	do	
4cab	W. D. Culpepper	-------	------	29	18	do	24.02	9-18-56	do	------	do	
4dda	R. Case	-------	------	28	36	do	22.89	9-18-56	do	------	do	
5bab	C. H. Hankins	C. H. Hankins	------	50	8	do	39.16	7-12-56	Manual	------	do	Ca
5cba	Miss. River Fuel Corp.	I. D. White Co.	------	1141	10-8	Tc	87	1956	Airlift	42R	Ind	
5cbb1	Glendale School Dist.	Craig	------	375	2	do	------	-------	Jet	------	PS	
5cbb2	do	Layne-Ark.	------	1066	4-3	do	------	-------	Turbine	------	do	Ca
5cbc	Miss. River Fuel Corp.	do	------	930	10-6	do	127	1948	do	223R	Ind	Ca
5cbd1	do	I. B. White	------	967	6	do	------	-------	None	------	N	
5cbd2	do	do	------	1057	6	do	127	-------	Airlift	27R	Ind	
5dcb	W. C. Searcy	-------	------	13	48	Tj	7.15	9-18-56	Jet	------	Dom	
8cac	C. E. Stone	J. F. Mellor	------	1012	3-2	Tc	------	-------	do	5R	do	Ca
14cdb	F. McBryde	-------	------	25	------	Tj	19	9-20-56	do	------	do	
15baa	R. Owen	-------	------	24	------	do	16.74	9-20-56	Piston	------	do	
15dcd	-------	-------	------	20	36	do	16.91	9-20-56	None	------	do	

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
9S-8W												
16bcd	G. N. Raney	-------	------	21	8	TJ	17.28	9-20-56	None	------	N	
17bab	J. H. Mann	J. F. Mellor	------	690	3-2	Tc	110	1953	Jet	------	Dom	Ca
17cda	T. C. McClelland	-------	------	27	8	Tj	19	1956	Centrif.	------	do	
17dcb	C. C. McBride	C. Melton	------	22	8	do	4.64	4-10-56	None	------	do	
18ada	T. R. Culpepper	T. R. Culpepper	------	21	9	do	18	1956	Jet	5R	do	
18caa	A. Owens	A. Owens	------	14	6	do	1.95	4-10-56	None	------	do	
19ddb	T. Owens	-------	------	20	36	Qt	10	1956	do	------	do	
20acb	T. A. Fisher	-------	------	16	36	Tj	2	1956	do	------	do	Ca
21abb	G. L. Linzy	-------	------	31	8	do	25	1956	Jet	------	do	
22abb	O. McGriff	-------	------	20	8	do	8	1956	do	------	do	
24ddc	H. Green	-------	350.5	20	48	Tp	5.94	4-26-56	None	------	do	
25aac	do	-------	385.5	36	8	do	21.00	4-26-56	do	------	do	
25aca	R. Whitten	-------	------	------	------	do	------	-------	do	6/Hr., R	do	Spring
25acc	E. R. Yarbrough	Lyle Bros.	------	501	3	Tc	------	-------	Jet	6R	do	Ca
25ccd	R. Webb	-------	293.0	14	32	Tj	12.46	10-18-55	None	------	Dom	
26ada	T. Owen	-------	------	------	------	Tp	------	-------	------	1/Hr., R	S	Spring
26adb	do	-------	------	------	------	do	------	-------	------	1/Hr., R	Dom	Spring
27cbd	M. Smith	-------	------	18	36	Tj	13.69	9-20-56	Centrif.	------	do	
28baa	M. E. Level	-------	------	19	36	do	15.19	9-20-56	None	------	do	
28bbb	B. Level	-------	------	22	6	do	4.83	4-11-56	do	------	do	
29add	E. F. Owen	-------	------	20	30	do	3.73	4-11-56	do	------	do	
30adc	F. L. Collins	-------	------	30	8	Qt	0.50	4-10-56	do	------	do	
30ddc1	S. C. Menell	-------	------	16	------	do	------	-------	Pitcher	------	do	
30ddc2	do	-------	------	32	8	do	1	4-10-56	None	------	do	
31bca	C. L. Hankins	-------	------	30	48	Tj	12	1955	do	------	do	
31cba	do	-------	------	32	8	do	12	1955	Recip.	5R	do	
32aad	-------	-------	------	20	36	Qt	10.85	4-11-56	None	------	N	
32bdd1	R. C. Collins	-------	------	16	24	do	6.57	4-11-56	do	------	Dom	
32bdd2	do	-------	------	16	28	do	2.74	4-11-56	do	------	S	
32dbb	do	-------	------	27	------	do	------	-------	do	------	Dom	
34aaa	G. Jacks	-------	------	22	8	Tj	13.02	9-20-56	do	------	do	
35dbb	R. Wynn	-------	290	------	36	do	1.5	1956	Turbine	------	do	
10S-5W												
1ddb	-------	-------	166	37.25	1¼	Qal	16.09	4-30-57	Pitcher	------	N	
4bba	-------	-------	169	29.5+	1¼	do	16.61	4-25-57	do	------	S	
5dca	U S G S	H. L. Brown	167	100	1¼	do	------	-------	None	------	Obs	
6ccd	Garett Bridge Assembly of God Church	-------	------	56	10	Qt	46.80	5- 8-56	do	------	Dom, Ps	Ca
7adc	J. S. Calhoun	M. E. McDonald	------	120	18-8	Qal	20.96	9-27-56	Turbine	1600R	Irr	
7bac	E. Farmer	-------	------	46	8	Qt	42.09	5- 8-56	None	------	N	
7ccd	do	-------	------	44	8	do	37.45	5- 8-56	do	------	Dom	Ca
8bab	U S G S	H. L. Brown	168	100	¾	Qal	------	-------	do	------	Obs	
8dbc	E. Farmer	M .E. McDonald	167	135	30-10	do	16.96	11- 3-55	Turbine	1550R	Irr	Ca
10bbc	-------	-------	168	22 ?	1¼	do	17.34	4-30-57	Pitcher	------	N	
15acc	-------	-------	171	33	1¼	do	19.07	4-30-56	do	------	do	

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
10S-5W												
18cac	A. C. Blunt	--------	------	38	8	Qt	30.67	5- 8-56	None	------	Dom	Ca
19cbc	--------	--------	------	27	8	do	25.71	5- 9-56	do	------	do	
21baa	--------	--------	168	35.4	1¼	Qal	16.56	4-30-57	Pitcher	------	N	
23adb	--------	--------	166	51.5	1¼	do	18.66	4-30-57	do	------	N	
27cbd	N. Stimpson	--------	------	------	14-10	do	17.70	9-20-56	Turbine	------	Irr	
10S-6W												
1dbb	R. Lay	Lewis-Diesel	167	99	18-8	do	14.67	11- 3-55	do	1600R	do	
11cdb	Mrs. G. M. Breedlove	--------	------	40	------	Qt	------	--------	Pitcher	------	Dom	Ca
12adb	C. Farmer	McDonald	167	70	18	do	17.23	5- 9-56	None	------	N	
12add	E. Farmer	M. E. McDonald	167	95	30-10	do	17.82	11- 3-53	Turbine	1000R	Irr	Ca
15acb	King	--------	------	49	8	Tj	26.90	5- 8-56	None	------	Dom	
16dbb	--------	--------	------	33	8	do	28.50	5-18-56	------	------	------	
16ddc	H. H. Rose	--------	------	40	8	Qt	28.75	5- 9-56	None	------	Dom	Ca
19dbd	Project 5, Pipeline	--------	------	1053	4-2	Tc	100±	1956	Jet	25R	Dom, Ind	Ca
22bbc	F. H. Collins	--------	------	35	4	Qt	31.59	5- 9-56	None	------	Dom	
22caa	do	--------	------	------	------	do	------	--------	Jet	2R	do	Ca
22dca	J. Moore	--------	------	49	4	Tj	27.78	5- 9-56	None	------	N	
23cbc	--------	--------	------	38	4	do	28.59	5- 9-56	do	------	do	
23cca	C. Hall	--------	------	40	------	Qt	29.20	5- 1-56	do	------	Dom	
23cda	A. French	--------	------	48	6	do	36.52	4-27-56	do	------	do	Ca
32cbb	M. A. Johnson	--------	------	15	24	Tj	10.08	9-18-56	do	------	do	Ca
10S-7W												
2bac	--------	--------	------	41	------	do	33.60	9-18-56	do	------	do	
2cbc	R. Carr	T. Carr	------	27	24	do	23.25	9-18-56	do	------	do	
3acc	L. L. Vick	--------	325.0	------	------	Tp	------	--------	------	20R	do	Ca
3bcb	E. Roupe	--------	335.0	------	------	do	------	--------	------	2R	do	Spring
3bcc	E. Smart	--------	398.0	60	8	do	50.69	5- 1-56	None	------	do	
3cab1	L. L. Vick	--------	379.0	50	8	do	41.98	5- 1-56	do	------	do	
3cab2	G. Vick	--------	382.0	52	8	do	44.41	5- 1-56	do	------	do	
3dca	B. E. Fowler	--------	349.0	15	48	do	11.35	5- 1-56	do	------	do	
3dcc	do	--------	369.5	22	48	do	19.38	5- 1-56	do	------	S	
3ddc	Mrs. Henley	--------	395.0	42	8	do	37.48	5- 1-56	do	------	N	
4bda	B. N. Robertson	--------	------	28	48	do	25.06	8-29-56	do	------	------	
5cab	--------	--------	389.4	24	10	do	14.59	4-30-56	do	------	------	
7cda	J. R. Johnson	--------	------	20	30	Tj	5.00	8-24-56	Cylinder	35/Hr., R	Dom	
7ddc	Mrs. Moran	--------	------	22	48	do	13.99	8-24-56	do	------	do	Ca
8bda	W. D. Roswell	--------	------	22	------	Tp	16	1956	None	------	do	
8cac	P. Moran	--------	------	11	42	Tj	8.92	8-24-56	do	------	N	
8dcc	Mrs. N. Hamilton	--------	289.9	20	36	do	6.91	4-30-56	do	------	Dom	
8dda	do	--------	------	27	36	Tp	22.94	8-29-56	Jet	------	do	Ca
10aaa	Mrs. A. D. Ciphers	--------	388.5	49	8	do	38.64	5- 1-56	None	------	do	
10cdc	H. T. Ferguson	--------	------	12	36	Tj	8.73	8-29-56	do	------	do	Ca
11cca	W. Carr, Sr.	--------	------	35	8	Tp	17.74	8-29-56	Jet	------	do	Ca
13bca	Davison	--------	------	27	8	Tj	20.80	9-18-56	None	------	do	
14bab	H. Robinson	--------	------	27	36	do	10.5	1956	Jet	------	do	Ca

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
10S-7W												
14bdc	O. Donaldson	-------	------	23	36	Tj	19.50	8-29-56	Jet	------	Dom	
17bcc	A. J. Pharr	-------	------	40	8	do	15	1956	do	------	do	Ca
19cda1	S. Calhoun	-------	------	40	48	Qt	24.34	8-24-56	None	------	do	
19cda2	do	-------	------	30	8	do	18.88	8-24-56	Cylinder	------	do	
19dbb	R. Thomas	G. Majors	------	20	8	do	13.63	8-23-56	None	------	do	Ca
22aaa	G. W. Robertson	-------	------	13	48	Tj	11.30	8-29-56	do	------	do	
23acb	E. E. McConkey	-------	------	20	36	do	18.75	8-29-56	Jet	------	do	
26bac	P. Mullis	-------	------	12	36	do	11.15	8-29-56	None	------	do	
27caa1	C. W. Lyle	-------	------	------	36	do	------	------	Jet	------	do	
27caa2	do	-------	------	20	36	do	12.01	8-29-56	None	------	do	
29cac	-------	-------	------	22	41	do	16.11	8-23-56	do	------	N	
29dcc	A. V. Carrington	-------	------	16	8	do	1.98	4- 3-56	do	------	Dom	
29dcd	do	-------	245.9	16	8	do	1.98	4-30-56	do	------	do	
30adb	Dr. R. L. Johnson	-------	------	25	36	do	23.70	8-23-56	Centrif.	------	do	
30add	W. J. Milton	-------	------	38	8	do	24.63	10-18-55	None	------	do	
30bbb	R. Ross	-------	------	------	36	Qt	17.45	8-24-56	do	------	do	Ca
32aac	T. Calhoun	-------	268.4	13	36	Tj	6.34	4-30-56	do	------	do	
32dad	W. S. Caldwell	-------	281.8	16	8	do	6.20	4-30-56	do	------	do	
35adc1	G. G. Kersh	Ethridge	------	167	2	do	130	1954	Jet	10R	do	
35adc2	do	-------	------	32	42	do	13.94	8-29-56	None	------	N	
35dda	G. W. Kersh	-------	------	18	36	do	15.92	8-29-56	do	------	Dom	
10S-8W												
2abd	B. C. Mullikin	-------	------	30	36	Tj	20.20	9-18-56	Jet	------	do	
4bcc	-------	-------	------	19	24	Qt	3.14	4-11-56	None	------	N	
5bac	-------	-------	------	17	48	do	2.67	4-11-56	do	------	do	
5cbc1	J. N. Smith	-------	------	26	6	do	8.29	4-11-56	Piston	------	Dom	
5cbc2	do	-------	------	12	------	do	4.64	4-11-56	None	------	S	
5cbc3	do	-------	------	20	24	do	8.56	4-11-56	None	------	Dom	Ca
9bbd	Morgan	-------	------	18	30	do	6	1956	do	------	do	
9ccd	R. E. Newton	-------	------	38	8	Tj	10	1956	Jet	------	do	
11cac	T. Newton	-------	243.0	16	36	do	1.30	4-26-56	None	------	do	
11cad	do	Craig	------	105	3	do	30	4-26-56	Recip.	------	S	
11ccd	G. C. Poss	-------	248.0	25	38	Qt	7.05	4-30-56	------	------	Dom	
13cba	A. W. Boyd	-------	------	19	36	Tj	13.58	8-23-56	None	------	N	
13dbc1	W. L. Robinson	J. Gentry	------	50	6	do	45.10	8-23-56	do	------	S	
13dbc2	do	-------	------	25	36	do	23.94	8-23-56	do	------	do	
14aac	N. Clark	J. Gentry	------	42	6	Qt	23.20	8-23-56	do	------	Dom	Ca
15ccd	Mrs. N. L. Boyd	-------	------	42	10	Tj	23.90	8-28-56	do	------	do	Ca
16abc	A. Jorden	-------	245.5	33	8	Qt	14.85	10-18-55	do	------	S	Ca
16aca	L. Peavey	-------	238.0	16	8	do	8.08	4-30-56	do	------	Dom	
16ccd	W. J. Hanley	-------	------	20	8	do	17.15	4-11-56	do	------	do	
17dbb	Mrs. Stevens	-------	------	18	36	do	3.21	4-13-56	do	------	do	
17dcd1	Mrs. Lawson	-------	------	17	24	do	7.03	4-13-56	do	------	do	
17dcd2	do	-------	------	16	8	do	8.21	4-13-56	do	------	do	
18dbc	J. Gigger	-------	------	19	48	Tj	15.09	10-18-55	do	------	do	Ca

LINCOLN COUNTY—Continued

Well number	Owner or tenant	Driller	Elevation above sea level (feet)	Depth of well (feet)	Diameter of well (inches)	Stratigraphic unit	Water level: Below land surface (feet)	Water level: Date of measurement	Type of pump	Yield (gpm)	Use	Remarks
10S-8W												
20bda	R. G. Winningham	--------	------	20	30	Qt	6.67	4-13-56	None	------	Dom	Ca
21bab	G. Johnson	--------	------	17	8	Tj	9.88	4-11-56	do	------	do	
21dbc	E. Ritchie	--------	------	25	8	Qt	1.98	4-11-56	do	------	do	
22dad1	C. M. Jordan	--------	------	40	8	do	14.01	8-28-56	None	------	do	
22dad2	do	--------	------	25	36	do	14.10	8-28-56	do	------	S	
24aaa	H. Donaldson	--------	------	24	30	Tj	16.80	10-18-55	do	------	Dom	
24aad	do	--------	------	24	36	Qt	14.78	8-23-56	do	------	N	
24cdc	J. Williams	--------	------	20	36	do	18.32	8-24-56	do	------	Dom	
25abd	W. McGee	--------	------	19	36	Tj	16.75	8-24-56	do	------	do	
27dba	J. Collins	--------	------	21	24	do	3.13	4-11-56	do	------	do	Ca
29acc1	Mrs. E. Morton	--------	------	18	8	Qt	5.22	4-13-56	do	------	do	
29acc2	do	--------	------	14	48	do	1.22	4-13-56	do	------	S	
29dbd	V. Spencer	--------	------	15	8	do	8.03	4-13-56	do	------	Dom	
32aab	T. P. Bostian	--------	------	------	------	do	------	--------	------	------	do	Ca
32dad	--------	--------	------	19	8	Qal	7.91	4-12-56	do	------	N	Spring
33bbb	G. Dailey	--------	------	17	48	Qt	6.24	4-12-56	------	------	Dom	
34aad	F. Harris	--------	------	------	------	Tj	------	--------	------	------		Ca
35bdb	L. S. Harris	--------	------	22	------	do	9.34	4-11-56	None	------	Dom	Ca
35cad	W. Gragg	--------	------	------	36	Qt	6.67	4-11-56	do	------	do	

TABLE 8

Water levels in wells—Desha County
(Feet below land-surface datum)

8S-3W-27acc1

Date	Water Level
Dec. 10, 1956	32.53
Jan. 3, 1957	31.00
Feb. 12	21.95
Mar. 12	24.83
Mar. 21	25.34
Apr. 2	23.26

8S-3W-27dcd

Oct. 18, 1956	26.15
Dec. 17	27.38
Feb. 12, 1957	25.46
Apr. 2	21.81
Apr. 29	14.16
Mar. 25, 1958	14.65

8S-3W-29cdd

Oct. 18, 1956	13.82
Dec. 17	15.22
Feb. 13, 1957	13.67
Apr. 1	12.33
Dec. 11	6.37
Mar. 25, 1958	5.50

8S-3W-30aba

Oct. 18, 1956	14.98
Dec. 17	15.12
Feb. 13, 1957	14.05
Apr. 1	12.72
Dec. 11	6.94
Mar. 25, 1958	4.97

8S-3W-30bbb

May 10, 1956	10.15
Oct. 18	15.70
Dec. 17	14.98
Feb. 13, 1957	13.69
Apr. 1	11.86
Dec. 11	5.88
Mar. 25, 1958	3.68

8S-3W-33bad

Jan. 3, 1957	20.06
Feb. 13	18.86
Apr. 1	17.27
Oct. 8	11.36

9S-1W-16dbc

Date	Water Level
Dec. 19, 1956	25.56
Feb. 14, 1957	22.92
Mar. 28	21.00
Dec. 10	7.98
Mar. 27, 1958	7.86

9S-1W-17acc

Apr. 11, 1955	17.02
Feb. 14, 1957	20.71
Mar. 28	19.28
Dec. 10	7.19
Mar. 27, 1958	6.20

9S-1W-18cac

Oct. 23, 1956	19.37
Dec. 19	18.95
Feb. 14, 1957	17.55
Mar. 28	16.34
Dec. 10	6.97

9S-1W-27cbc

Apr. 11, 1955	17.96
Mar. 28, 1957	19.79
Mar. 27, 1958	7.57

9S-2W-1dbc

Oct. 23, 1956	17.53
Dec. 17	18.43
Feb. 14, 1957	17.01
Mar. 28	15.48
Dec. 10	6.70

9S-2W-4bbc

Dec. 17, 1956	24.63
Feb. 13, 1957	22.63
Mar. 28	20.66
Dec. 11	14.37

9S-2W-8abc

Oct. 23, 1956	18.42
Dec. 17	19.16
Feb. 13, 1957	18.32
Mar. 28	17.05
Oct. 8	13.43
Dec. 11	10.71
Mar. 27, 1958	9.52

9S-2W-10bbc

Oct. 9, 1956	17.58
Dec. 17	18.60
Feb. 13, 1957	17.27
Mar. 28	16.54
Nov. 27	10.28
Dec. 4	10.40
Mar. 27, 1958	9.48

9S-2W-10dab

Oct. 9, 1956	20.14
Dec. 17	20.97
Feb. 13, 1957	19.82
Mar. 28	19.09
Dec. 10	12.80
Mar. 27, 1958	11.58

9S-2W-11bbc

Nov. 21, 1957	13.46
Nov. 27	12.84
Dec. 4	12.90

9S-2W-20abd

Oct. 24, 1956	15.93
Dec. 17	15.96
Feb. 13, 1957	15.42
Mar. 28	14.80
Dec. 10	12.13
Mar. 27, 1958	9.02

9S-2W-20ccc

Oct. 24, 1956	13.79
Mar. 3, 1957	11.58
Dec. 10	8.40
Mar. 27, 1958	5.94

9S-2W-21aad

Oct. 23, 1956	16.59
Dec. 17	16.80
Feb. 13, 1957	15.33
Mar. 28	14.40
Dec. 10	10.27
Mar. 27, 1958	8.08

TABLE 8—Continued

Water levels in wells—Desha County—Continued

9S-2W-23abc

Date	Water Level
Oct. 9, 1956	20.05
Dec. 17	19.74
Feb. 5, 1957	15.96
Mar. 8	16.69
Mar. 27	16.38
Nov. 27	11.03
Dec. 4	11.02

9S-2W-23dac

Oct. 9, 1956	19.45
Dec. 17	18.87
Mar. 27, 1957	15.16
Nov. 27	9.84
Dec. 2	8.5

9S-2W-27daa

Oct. 9, 1956	17.50
Dec. 17	15.90
Feb. 14, 1957	12.87
Mar. 27	11.33
Dec. 10	5.92
Mar. 27, 1958	4.32

9S-2W-28dcc

Oct. 23, 1956	14.22
Mar. 28, 1957	9.83
Dec. 10	6.55
Mar. 27, 1958	5.38

9S-2W-30bcb

Oct. 17, 1956	12.10
Dec. 17	11.58
Feb. 13, 1957	10.07
Mar. 29	9.73

9S-2W-34abd

Oct. 9, 1956	18.19
Mar. 29, 1957	10.77
Mar. 27, 1958	4.39

9S-2W-35ddb

Nov. 26, 1957	5.35
Nov. 27	4.66
Dec. 2	4.38
Dec. 4	4.36

9S-2W-36ccc

Oct. 9, 1956	16.08
Feb. 14, 1957	9.10
Mar. 27	7.51

9S-3W-2acd

Jan. 3, 1957	22.92
Feb. 12	20.69
Apr. 2	18.27
Mar. 25, 1958	10.78

9S-3W-3cbb

Oct. 17, 1956	17.07
Dec. 17	18.12
Feb. 12, 1957	16.69
Apr. 1	15.83
Nov. 27	6.79
Dec. 3	6.90

9S-3W-4bab

Date	Water Level
Apr. 13, 1954	14.90
Oct. 16, 1956	17.82
Nov. 7	18.74
Apr. 2, 1957	16.04
Mar. 25, 1958	5.88

9S-3W-6dab

Oct. 17, 1956	15.25
Apr. 2, 1957	11.86
Mar. 25, 1958	3.74

9S-3W-9ada

Oct. 17, 1956	15.36
Dec. 17	15.93
Feb. 12, 1957	15.24
Apr. 2	14.03
Nov. 27	5.62

9S-3W-9cab

Oct. 5, 1956	15.50
Feb. 12, 1957	13.39
Apr. 2	12.27

9S-3W-10abb

Jan. 3, 1957	18.05
Feb. 12	17.71
Apr. 2	16.23
Mar. 25, 1958	6.20

9S-3W-11cdd

Apr. 13, 1954	12.38
Oct. 17, 1956	15.10
Dec. 17	15.61
Feb. 5, 1957	15.37
Mar. 8	14.69
Apr. 2	14.35
Nov. 25	8.07
Dec. 10	7.14
Mar. 26, 1958	4.99

9S-3W-13add

Oct. 17, 1956	15.82
Dec. 17	16.06
Feb. 13, 1957	15.93
Mar. 29	15.60
Dec. 3	12.15
Mar. 26, 1958	9.07

9S-3W-18ddd

Apr. 13, 1954	2.59
Oct. 16, 1956	18.95
Dec. 17	15.07
Feb. 12, 1957	11.43
Apr. 1	9.34
Nov. 26	6.44
Dec. 11	5.92
Mar. 25, 1958	3.58

9S-3W-20cac

Apr. 1, 1957	11.63
Nov. 27	2.26
Dec. 4	2.10

9S-3W-22baa

Aug. 13, 1957	10.58
Dec. 10	5.02
Mar. 25, 1958	3.34

TABLE 8—Continued

Water levels in wells—Desha County—Continued

9S-3W-22dda

Date	Water Level
Oct. 18, 1956	12.48
Apr. 1, 1957	5.13
Dec. 10	4.40
Mar. 26, 1958	6.97

9S-3W-28abb

Oct. 18, 1956	12.37
Dec. 17	10.79
Feb. 12, 1957	7.29
Apr. 1	5.16
Dec. 3	2.92
Mar. 25, 1958	0.75

9S-3W-29baa

Oct. 16, 1956	20.96
Apr. 1, 1957	10.51
Dec. 10	8.15
Mar. 25, 1958	6.05

9S-3W-30aaa

Apr. 13, 1954	10.95
Mar. 16, 1956	12.63
Apr. 1, 1957	14.29
Nov. 27	12.52
Dec. 4	12.38
Mar. 26, 1958	8.58

9S-3W-31adb

Mar. 14, 1957	14.06
Mar. 29	13.75
Nov. 27	12.30
Dec. 5	11.99

9S-3W-31ddc

Oct. 9, 1956	20.80
Dec. 17	19.88
Feb. 13, 1957	17.54
Mar. 29	16.26
Nov. 27	14.44
Dec. 3	17.20

9S-4W-2acd

Oct. 4, 1956	23.40
Apr. 1, 1957	16.92
Dec. 11	13.91
Mar. 25, 1958	11.15

9S-4W-2adc

Jan. 3, 1957	18.66
Feb. 13	16.22
Apr. 1	14.74

9S-4W-4dcc

Oct. 18, 1956	18.38
Apr. 1, 1957	12.14
Dec. 12	9.60
Mar. 25, 1958	8.46

9S-4W-6bbc

Oct. 11, 1956	12.27
Dec. 17	9.85
Jan. 2, 1957	9.52
Feb. 14	5.89
Mar. 11	5.24
Apr. 12	4.78
Nov. 27	3.65
Dec. 12	3.80
Mar. 25, 1958	2.77

9S-4W-9acb

Date	Water Level
Apr. 20, 1955	8.54
Oct. 18, 1956	16.08
Apr. 1, 1957	9.10
Dec. 12	7.64
Mar. 25, 1958	6.45

9S-4W-11ada

Jan. 3, 1957	12.02
Feb. 12	9.34
Apr. 1	7.80
Mar. 25, 1958	3.76

9S-4W-13aad

Oct. 18, 1956	24.90
Dec. 17	22.80
Feb. 12, 1957	19.53
Apr. 1	17.59

9S-4W-16daa

Oct. 4, 1956	19.35
Apr. 1, 1957	12.79
Dec. 12	11.12
Mar. 25, 1958	9.27

9S-4W-17bda

Oct. 19, 1956	14.23
Feb. 13, 1957	13.60
Apr. 1	12.51
Dec. 12	11.26
Mar. 25, 1958	9.63

9S-4W-20bac

Oct. 4, 1956	19.83
Apr. 1, 1957	18.41
Dec. 12	17.50
Mar. 25, 1958	16.14

9S-4W-21abb

Oct. 19, 1956	15.67
Dec. 17	14.54
Feb. 13, 1957	12.52
Apr. 1	10.63
Dec. 12	9.39
Mar. 25, 1958	7.60

9S-4W-21dbb

Oct. 5, 1956	18.75
Apr. 1, 1957	17.09
Mar. 25, 1958	11.16

9S-4W-22dcd

Mar. 19, 1957	15.35
Apr. 1	14.85
Dec. 12	13.06
Mar. 25, 1958	11.02

9S-4W-23acc

Oct. 4, 1956	17.14
Apr. 1, 1957	8.94
Dec. 12	7.23

9S-4W-25acd

Apr. 11, 1957	8.67
Dec. 10	7.43
Apr. 3, 1958	4.49

TABLE 8—Continued

Water levels in wells—Desha County—Continued

9S-4W-26bcc

Date	Water Level
Oct. 5, 1956	23.54
Apr. 1, 1957	16.63
Mar. 26, 1958	12.35

9S-4W-28cbb

Oct. 4, 1956	19.83
Feb. 14, 1957	19.60
Apr. 1	18.55
Dec. 12	18.14

9S-4W-34cbc

Oct. 19, 1956	24.15
Apr. 8, 1957	22.00
Dec. 12	21.23
Mar. 26, 1958	18.95

10S-1W-3ddc

Oct. 23, 1956	21.06
Dec. 19	21.53
Feb. 14, 1957	17.90
Mar. 28	14.24

10S-1W-5cac

Oct. 24, 1956	19.27
Mar. 28, 1957	12.48
Dec. 11	7.50
Mar. 28, 1958	6.69

10S-1W-17aaa

Oct. 26, 1956	20.36
Dec. 19	19.44
Feb. 14, 1957	15.48
Mar. 28	13.79
Dec. 11	8.39
Mar. 28, 1958	8.32

10S-1W-27acc

Mar. 28, 1957	9.49
Dec. 10	3.18
Mar. 27, 1958	3.29

10S-1W-27bdd

Feb. 13, 1957	12.87
Mar. 28	10.43
Dec. 10	3.39

10S-1W-31acb

Oct. 26, 1956	17.23
Dec. 19	16.84
Feb. 14, 1957	13.49
Mar. 28	12.57
Dec. 10	7.60
Mar. 27, 1958	8.13

10S-2W-4ccc

Oct. 24, 1956	18.50
Dec. 17	17.55
Feb. 13, 1957	15.53
Mar. 29	14.49
Dec. 10	10.77
Mar. 27, 1958	8.57

10S-2W-6aab

Mar. 29, 1957	18.17
Dec. 10	15.16
Mar. 27, 1958	13.08

10S-2W-12cdd2

Date	Water Level
Oct. 10, 1956	17.36
Feb. 14, 1957	11.87
Mar. 27	10.73
Mar. 27, 1958	6.08

10S-2W-12daa

Oct. 10, 1956	20.94
Mar. 27, 1957	10.63
Mar. 28, 1958	6.10

10S-2W-18dbc

Oct. 10, 1956	20.58
Apr. 2, 1957	18.20
Mar. 28, 1958	14.50

10S-2W-20cbc

Nov. 8, 1956	25.20
Dec. 18	24.97
Apr. 2, 1957	22.98
Dec. 11	20.63
Mar. 28, 1958	19.28

10S-2W-21bca

Apr. 14, 1954	24.70
Mar. 16, 1956	15.98
Oct. 10	18.00
Apr. 2, 1957	15.96
Dec. 11	13.54
Mar. 28, 1958	11.56

10S-2W-24cca

Oct. 10, 1956	21.78
Mar. 27, 1957	17.85
Dec. 11	14.87
Mar. 28, 1958	13.17

10S-2W-27ddd

Oct. 10, 1956	14.84
Feb. 14, 1957	13.06
Mar. 27	12.16
Nov. 27	9.07
Dec. 4	8.85

10S-3W-14aac

Apr. 11, 1957	14.54
Dec. 4	12.94
Apr. 3, 1958	11.46

10S-3W-15caa

Oct. 9, 1956	19.18
Apr. 11, 1957	14.47
Apr. 3, 1958	10.52

10S-3W-17cdc

Oct. 11, 1956	18.33
Apr. 2, 1957	16.09
Apr. 1, 1958	11.70

10S-3W-19dab

Oct. 11, 1956	7.42
Apr. 2, 1957	10.06
Dec. 11	11.37
Apr. 1, 1958	12.77

10S-3W-19dac

Oct. 11, 1956	23.55
Apr. 2, 1957	21.42
Apr. 1, 1958	17.28

TABLE 8—Continued

Water levels in wells—Desha County—Continued

10S-3W-21dcb

Date	Water Level
Oct. 15, 1956	22.90
Dec. 18	22.52
Feb. 14, 1957	21.45
Apr. 2	20.64
Dec. 11	18.30
Apr. 1, 1958	16.40

10S-3W-22cdc

Oct. 12, 1956	25.85
Apr. 2, 1957	23.28
Apr. 1, 1958	18.65

10S-3W-23dcc

Apr. 12, 1957	25.03
June 27	23.72
Mar. 28, 1958	21.06

10S-3W-26ccb

Apr. 11, 1957	17.74
Dec. 11	16.00
Mar. 28, 1958	14.26

10S-3W-26dac1

Mar. 16, 1956	23.22
Oct. 10	26.20
Dec. 18	25.63
Feb. 14, 1957	24.01
Apr. 2	22.98
Mar. 28, 1958	19.98

10S-3W-27bbd

Oct. 12, 1956	25.99
Apr. 2, 1957	22.78
Mar. 28, 1958	18.79

10S-3W-27dbc

Oct. 12, 1956	26.02
Feb. 14, 1957	23.86
Apr. 2	22.56
Dec. 11	20.20
Mar. 28, 1958	18.35

10S-3W-30dbd

Oct. 11, 1956	24.21
Apr. 2, 1957	23.06
Dec. 11	21.26
Apr. 1, 1958	18.97

10S-3W-35abb2

Oct. 10, 1956	17.62
Apr. 11, 1957	13.16
Apr. 1, 1958	10.51

10S-4W-2bda

Nov. 23, 1954	17.47
Apr. 8, 1957	25.05
Mar. 25, 1958	9.83

10S-4W-6bab

Dec. 18, 1956	15.94
Feb. 13, 1957	15.35
Apr. 8	14.49
Dec. 12	13.33

10S-4W-8bdd

Date	Water Level
May 16, 1955	16.05
Oct. 4, 1956	17.69
Apr. 8, 1957	16.18
Dec. 12	15.46

10S-4W-10caa

Oct. 19, 1956	20.76
Dec. 18	20.93
Apr. 8, 1957	20.61

10S-4W-12cab

Oct. 11, 1956	15.35
Dec. 18	14.98
Feb. 12, 1957	14.09
Apr. 8	11.61
Dec. 11	10.22

10S-4W-13ccc

Oct. 11, 1956	15.85
Dec. 18	15.48
Feb. 12, 1957	14.59
Apr. 2	14.03
Dec. 11	13.27
Mar. 26, 1958	11.03

10S-4W-23bac

Oct. 15, 1956	26.10
Feb. 13, 1957	25.19
Apr. 8	24.56
Dec. 11	24.39
Mar. 26, 1958	22.04

10S-4W-27cab

Oct. 15, 1956	24.50
Apr. 8, 1957	21.72
Mar. 26, 1958	18.63

10S-4W-27dac

Oct. 15, 1956	23.34
Feb. 13, 1957	21.68
Apr. 8	21.28
Dec. 11	19.26
Mar. 26, 1958	17.71

10S-4W-30abb

Dec. 18, 1956	21.25
Feb. 13, 1957	20.44
Apr. 8	19.75
Mar. 26, 1958	17.47

10S-4W-36bcc

Nov. 19, 1956	15.08
Dec. 18	14.81
Feb. 13, 1957	14.12
Apr. 3	13.21
Dec. 11	11.77

11S-1W-30cba1

Dec. 10, 1956	24.93
Dec. 18	25.03
Feb. 11, 1957	20.65
Mar. 12	16.90
Mar. 18	16.80
Mar. 28	17.52
Apr. 2, 1958	10.36

11S-2W-3bca

Nov. 28, 1956	15.88
Feb. 14, 1957	13.15
Mar. 29	11.93
Mar. 28, 1958	3.88

TABLE 8—Continued

Water levels in wells—Desha County—Continued

11S-2W-3daa

Date	Water Level
Dec. 10, 1956	18.99
Dec. 18	19.00
Feb. 14, 1957	18.50
Mar. 29	16.43
Nov. 27	12.86
Dec. 4	12.94

11S-2W-13bbc

Dec. 19, 1956	14.83
Feb. 14, 1957	12.48
Mar. 28	10.87
Apr. 3, 1958	6.55

11S-2W-25caa

Dec. 18, 1956	20.87
Feb. 11, 1957	19.48
Mar. 28	17.24
Apr. 2, 1958	9.71

11S-3W-4cba

Oct. 12, 1956	17.88
Apr. 2, 1957	11.08
Apr. 1, 1958	7.98

11S-3W-5adb

Oct. 12, 1956	20.13
Apr. 2, 1957	14.36
Dec. 11	11.99
Apr. 1, 1958	10.97

11S-3W-8bbc

Oct. 11, 1956	23.78
Apr. 2, 1957	19.05
Apr. 1, 1958	14.52

11S-3W-9abb

Oct. 16, 1956	19.06
Apr. 2, 1957	10.77
Apr. 1, 1958	6.88

11S-3W-17dba

Oct. 12, 1956	24.54
Apr. 2, 1957	18.97
Apr. 1, 1958	15.05

11S-3W-19adb

Oct. 12, 1956	23.05
Feb. 12, 1957	20.01
Apr. 2	18.60
Apr. 1, 1958	18.46

11S-3W-21bbb

Oct. 12, 1956	21.59
Feb. 12, 1957	17.11
Apr. 2	15.08
Apr. 1, 1958	13.24

11S-3W-31bdd

Nov. 9, 1956	16.93
Dec. 8	16.75
Feb. 13, 1957	15.53
Apr. 3	13.89
Apr. 1, 1958	19.60

11S-3W-34dab

Nov. 9, 1956	23.27
Apr. 3, 1957	20.34
Apr. 1, 1958	15.67

12S-1W-19cbb

Date	Water Level
Dec. 18, 1956	23.14
Feb. 11, 1957	22.41
Mar. 28	21.48
Apr. 2, 1958	13.96

12S-1W-20bdc

Dec. 10, 1956	27.21
Mar. 28, 1957	23.14
Apr. 2, 1958	12.77

12S-1W-28cdc

Dec. 10, 1956	26.08
Mar. 28, 1957	23.47
Apr. 2, 1958	9.81

12S-1W-32bca

Nov. 30, 1956	24.05
Mar. 28, 1957	22.34
Apr. 2, 1958	13.38

12S-1W-33bab

Dec. 10, 1956	26.52
Mar. 28, 1957	23.73
Apr. 2, 1958	11.72

12S-2W-1ddd

Dec. 18, 1956	28.63
Feb. 11, 1957	23.42
Mar. 12	17.96
Mar. 28	14.89
Apr. 2, 1958	8.46

12S-2W-5cac

Dec. 19, 1956	28.36
Feb. 11, 1957	27.41
Mar. 27	27.54
Apr. 2, 1958	24.89

12S-2W-7aaa

Nov. 28, 1956	27.05
Dec. 19	26.80
Mar. 27, 1957	25.09
Aug. 14	23.28
Apr. 2, 1958	22.65

12S-2W-20bdb

Nov. 26, 1956	28.56
Mar. 28, 1957	27.61
Apr. 2, 1958	24.37

12S-2W-21dbb

Dec. 18, 1956	27.33
Feb. 12, 1957	26.00
Mar. 28	25.94
Nov. 5	25.47

12S-2W-27bad

Nov. 26, 1956	18.37
Mar. 28, 1957	17.09
Apr. 2, 1958	15.01

12S-2W-34ccc1

Nov. 30, 1956	21.77
Mar. 21, 1957	20.70
Nov. 5	21.13
Nov. 14	20.64
Apr. 2, 1958	18.65

TABLE 8—Continued

Water levels in wells—Desha County—Continued

12S-2W-34ccc2

Date	Water Level
Nov. 30, 1956	26.77
Dec. 3	26.87
Jan. 2, 1957	26.48
Feb. 11	25.71
Mar. 12	25.40
Apr. 12	25.11
Apr. 2, 1958	22.56

12S-2W-36dcc

Dec. 11, 1956	18.84
Mar. 21, 1957	17.53
Apr. 2, 1958	13.12

12S-3W-3ccb

Nov. 9, 1956	22.04
Apr. 3, 1957	18.91
Apr. 2, 1958	14.07

12S-3W-18baa

Nov. 9, 1956	23.23
Apr. 12, 1957	19.40
Apr. 1, 1958	15.27

12S-3W-18dad

Nov. 9, 1956	22.49
Apr. 3, 1957	19.77
Apr. 2, 1958	15.14

12S-3W-21bab

Apr. 20, 1955	19.61
Nov. 8, 1956	23.86
Apr. 3, 1957	20.21
Apr. 2, 1958	15.24

12S-3W-23adb

Nov. 9, 1956	17.55
Dec. 19	17.23
Feb. 14, 1957	15.74
Mar. 27	14.39
Apr. 2, 1958	9.09

12S-3W-27aca

Mar. 2, 1955	15.15
Apr. 3, 1957	11.30
Apr. 2, 1958	8.71

12S-3W-30acc

Nov. 30, 1956	19.48
Dec. 11	19.45
Dec. 19	19.46
Jan. 2, 1957	19.34
Apr. 3	17.05

12S-3W-33bad3

Sept. 26, 1956	24.44
Apr. 4, 1957	20.64
Nov. 5	21.07

13S-1W-5bdb

Nov. 30, 1956	22.07
Dec. 18	22.29
Feb. 12, 1957	20.89
Mar. 21	19.26
Nov. 5	17.32

13S-2W-1aad

Date	Water Level
Nov. 30, 1956	19.49
Dec. 18	19.54
Feb. 12, 1957	18.99
Mar. 21	17.48

13S-2W-2aaa

Nov. 30, 1956	17.76
Dec. 3	17.85
Dec. 11	17.83
Mar. 21, 1957	16.69
Nov. 5	15.49
Apr. 2, 1958	13.09

13S-2W-5bcd

Nov. 26, 1956	24.20
Feb. 12, 1957	21.70
Mar. 8	21.01
Mar. 21	19.38
Nov. 5	21.14
Apr. 2, 1958	15.75

13S-2W-10bac

Dec. 11, 1956	29.06
Mar. 21, 1957	27.75
Nov. 14	27.35
Apr. 2, 1958	25.79

13S-2W-10bdb

Dec. 11, 1956	28.42
Mar. 21, 1957	27.24
Apr. 2, 1958	25.05

13S-2W-12aad

Dec. 11, 1956	22.34
Feb. 12, 1957	21.88
Mar. 8	21.10
Mar. 21	20.61
Nov. 5	19.11
Apr. 2, 1958	15.98

13S-2W-12ddc

Dec. 11, 1956	21.59
Feb. 12, 1957	20.28
Mar. 21	17.85
Nov. 5	18.43

13S-2W-17dcc

Dec. 11, 1956	27.42
Mar. 21, 1957	25.55
Nov. 5	26.23
Apr. 2, 1958	23.28

13S-2W-21abb

Dec. 11, 1956	27.11
Mar. 21, 1957	26.11
Apr. 2, 1958	24.51

13S-2W-24add

Dec. 11, 1956	27.05
Mar. 21, 1957	17.35
Apr. 2, 1958	12.38

13S-2W-26adb

Dec. 11, 1956	20.18
Feb. 12, 1957	19.69
Apr. 12	18.77
Apr. 2, 1958	15.83

TABLE 8—Continued

Water levels in wells—Desha County—Continued

13S-2W-27bdc

Date	Water Level
Dec. 11, 1956	26.70
Feb. 12, 1957	25.69
Mar. 21	25.76
Apr. 2, 1958	25.27

13S-2W-29dcb

Dec. 11, 1956	25.89
Feb. 12, 1957	25.13
Mar. 21	24.39
Nov. 5	26.32
Apr. 2, 1958	23.08

13S-2W-32acb

Dec. 11, 1956	26.30
Mar. 21, 1957	25.17
Nov. 5	26.12
Apr. 2, 1958	24.10

13S-3W-3add

Nov. 27, 1956	21.60
Apr. 12, 1957	17.33
Apr. 2, 1958	12.88

13S-3W-10daa

Nov. 26, 1956	23.82
Dec. 19	22.68
Feb. 11, 1957	21.08
Apr. 3	19.19
Nov. 5	21.57
Apr. 2, 1958	16.14

13S-3W-14add

Nov. 27, 1956	27.00
Apr. 3, 1957	23.91
Apr. 2, 1958	20.93

13S-3W-14bcb

Dec. 19, 1956	19.85
Feb. 12, 1957	18.53
Apr. 3	17.05
Nov. 5	18.98
Apr. 2, 1958	15.15

13S-3W-16bdc

Nov. 26, 1956	19.23
Apr. 3, 1957	16.33
Apr. 2, 1958	15.84

TABLE 8

Water levels in wells—Lincoln County

7S-5W-19bbb

Date	Water Level
Dec. 12, 1955	16.85
Jan. 24, 1956	17.73
Feb. 14	14.89
Nov. 9	20.15
Apr. 9, 1957	12.28
Dec. 16	12.73
Apr. 7, 1958	8.36

7S-6W-5bab

Nov. 16, 1955	22.57
Feb. 14, 1956	21.44
Nov. 9	24.23
Apr. 9, 1957	20.23
Dec. 16	15.09
Apr. 7, 1958	14.20

7S-6W-10bcc

Nov. 16, 1955	18.23
Jan. 24, 1956	19.27
Feb. 14	17.93
Dec. 16, 1957	9.85
Apr. 7, 1958	9.10

7S-6W-15aba

Nov. 16, 1955	20.55
Jan. 24, 1956	21.21
Feb. 14	19.82
Nov. 9	24.39
Apr. 9, 1957	16.74
Dec. 16	12.40
Apr. 7, 1958	11.15

7S-6W-21abc

Nov. 1, 1955	14.32
Jan. 24, 1956	14.30
Feb. 14	13.77
Nov. 9	16.04
Apr. 9, 1957	13.20
Dec. 16	9.93
Apr. 7, 1958	8.99

7S-6W-24caa

Dec. 22, 1955	16.10
Feb. 16, 1956	14.15
Nov. 9	19.19
Apr. 9, 1957	11.30
Dec. 16	11.32
Apr. 7, 1958	6.40

7S-6W-28cbb

Sept. 21, 1956	25.10
Jan. 30, 1957	24.43
Feb. 26	24.05
Mar. 29	23.95
May 1	23.47
May 23	23.78
Jul. 24	23.00
Aug. 22	23.27
Sept. 26	22.48
Oct. 31	22.68
Nov. 25	22.35
Jan. 31, 1958	21.16
Mar. 4	21.03
Apr. 9	20.34

TABLE 8—Continued

Water levels in wells—Lincoln County—Continued

7S-6W-33ddb

Date	Water Level
Aug. 26, 1952	16.11
Apr. 30, 1953	12.04
Apr. 13, 1954	18.74
Feb. 17, 1955	24.46
Dec. 8	22.86
Feb. 15, 1956	22.03
Mar. 15	20.85
Oct. 30	24.10
Apr. 9, 1957	20.52
Dec. 13	19.87
Apr. 9, 1958	16.93

7S-6W-36add

Dec. 12, 1955	21.31
Feb. 16, 1956	19.96
Apr. 9, 1957	18.64
Apr. 7, 1958	13.99

7S-7W-25bac

Dec. 8, 1955	20.78
Feb. 15, 1956	19.65
Oct. 30	24.21
Apr. 9, 1957	18.99

7S-7W-26dcb

Dec. 7, 1955	20.33
Oct. 30, 1956	22.95
Apr. 9, 1957	15.27

7S-7W-28abb

Dec. 8, 1955	14.85
Feb. 14, 1956	14.02
Oct. 30	20.08
Apr. 9, 1957	13.93
Apr. 10, 1958	12.95

7S-7W-34adb

Dec. 8, 1955	20.12
Oct. 30, 1956	22.06
May 23, 1958	13.30

7S-8W-32aaa

June 17, 1955	14.56
Nov. 17	16.69
Feb. 14, 1956	15.24
Oct. 30	17.21
Apr. 9, 1957	13.50
Dec. 13	12.94
Apr. 10, 1958	11.86

7S-8W-35acc

June 7, 1955	15.12
Nov. 17	16.99
Feb. 14, 1956	16.46
Oct. 30	18.69
Apr. 9, 1957	15.19
Dec. 13	15.16

8S-4W-3cad

Dec. 15, 1955	15.54
Jan. 24, 1956	15.40
Feb. 15	15.82
Nov. 14	16.80
Apr. 8, 1957	14.04
Dec. 12	5.79
Apr. 8, 1958	5.69

8S-4W-6dab

Date	Water Level
Dec. 15, 1955	16.07
Nov. 14, 1956	16.96
Apr. 8, 1958	5.19

8S-4W-7cda

Apr. 29, 1953	7.59
Apr. 13, 1954	10.70
Feb. 17, 1955	14.23
Nov. 15	16.15
Feb. 15, 1956	12.55
Mar. 15	11.73
Nov. 14	16.92
Apr. 8, 1957	10.55
Dec. 12	7.00
Apr. 8, 1958	6.83

8S-4W-8bbb

Dec. 15, 1955	16.43
Jan. 24, 1956	16.19
Feb. 15	15.12
Nov. 14	17.69
Apr. 8, 1957	13.34
Dec. 12	6.56
Apr. 8, 1958	6.73

8S-4W-9bba

May 17, 1955	14.29
Nov. 15	16.83
Jan. 24, 1956	16.75
Feb. 15	15.30
Nov. 14	17.88
Apr. 8, 1957	14.17
Dec. 12	6.80
Apr. 8, 1958	7.39

8S-4W-18dba

Nov. 15, 1955	12.50
Nov. 14, 1956	12.17
Apr. 8, 1958	3.52

8S-4W-20ddc

Nov. 14, 1955	17.91
Feb. 15, 1956	13.54
Nov. 14	20.33
Apr. 8, 1957	12.50
Dec. 12	8.51
Apr. 8, 1958	8.45

8S-4W-31cba

Apr. 29, 1953	2.07
Apr. 13, 1954	4.32
Feb. 17, 1955	6.30
Nov. 14	9.82
Feb. 15, 1956	4.38
Mar. 15	4.28
Nov. 14	10.97
Apr. 8, 1957	3.86
Dec. 12	3.10
Apr. 8, 1958	2.44

8S-4W-32baa

Apr. 29, 1953	3.99
Nov. 15, 1955	12.73
Mar. 15, 1956	7.99
Nov. 14	14.02

8S-4W-32dbb

Apr. 29, 1953	8.03
Nov. 14, 1955	11.09
Feb. 15, 1956	5.34
Mar. 15	5.48
Nov. 14	12.54
Apr. 8, 1957	5.58
Dec. 12	3.45
Apr. 8, 1958	3.39

TABLE 8—Continued

Water levels in wells—Lincoln County—Continued

8S-4W-33ada

Date	Water Level
Nov. 14, 1955	19.47
Feb. 15, 1956	15.17
Nov. 14	20.37
Apr. 8, 1957	14.32
Apr. 8, 1958	9.67

8S-4W-34cbc

Nov. 14, 1955	20.01
Nov. 14, 1956	21.19
Apr. 8, 1957	15.36
Dec. 12	12.33
Apr. 8, 1958	10.87

8S-5W-1adc

Jan. 10, 1956	16.69
Feb. 14	15.81
Nov. 14	17.90
Apr. 8, 1957	13.93
Dec. 12	5.87
Apr. 8, 1958	6.78

8S-5W-4adc

Dec. 12, 1955	19.27
Feb. 29, 1956	15.29
Sept. 14	22.42
Apr. 8, 1957	14.24
Dec. 16	10.40

8S-5W-5dcc

Jan. 7, 1953	11.04
Apr. 30	15.47
Apr. 13, 1954	16.02
Nov. 4	18.51
Feb. 17, 1955	16.25
Dec. 12	17.33
Mar. 15, 1956	14.85
Nov. 15	18.67
Apr. 8, 1957	13.79
Dec. 16	11.39

8S-5W-10bcb

May 17, 1955	18.62
Dec. 12	14.41
Feb. 29, 1956	10.13
Apr. 10, 1958	6.09

8S-5W-12abd

May 17, 1955	27.18
Nov. 15	15.84
Mar. 15, 1956	11.00
Nov. 14	16.04
Apr. 8, 1958	5.80

8S-5W-13aad

Nov. 15, 1955	12.74
Nov. 14, 1956	16.65
Apr. 8, 1957	5.80
Dec. 12	3.21
Apr. 8, 1958	3.62

8S-5W-24cdb

June 3, 1955	14.30
Nov. 15	16.82
Apr. 8, 1958	8.55

8S-5W-25dab

Jan. 11, 1956	14.31
Nov. 14	17.83
Apr. 30, 1957	8.97
Apr. 8, 1958	7.65

8S-5W-27ccc

Date	Water Level
Apr. 20, 1955	10.83
Dec. 7	14.60
Dec. 12, 1957	9.94
Apr. 8, 1958	8.42

8S-5W-34cac

Apr. 20, 1955	6.37
Nov. 23	12.82
Nov. 8, 1956	14.58
Apr. 9, 1957	11.39
Dec. 12	10.24
Apr. 8, 1958	8.68

8S-6W-1cca1

Dec. 8, 1955	27.66
Jan. 24, 1956	29.96
Oct. 30	29.01
Apr. 10, 1957	25.44
Dec. 16	23.78
Apr. 7, 1958	21.30

8S-6W-2dcd

Dec. 7, 1955	28.37
Nov. 13, 1956	28.17
Dec. 16	24.44
Apr. 7, 1958	21.30

8S-6W-3ccc

Apr. 30, 1953	21.81
Apr. 13, 1954	20.27
Feb. 17, 1955	24.50
Nov. 21	27.51
Jan. 24, 1956	25.44
Feb. 16	24.54
Mar. 15	24.08
Nov. 9	29.16
Apr. 10, 1957	23.02
Apr. 9, 1958	19.27

8S-6W-6aaa

Apr. 30, 1953	21.30
Apr. 13, 1954	18.76
Feb. 17, 1955	22.75
Nov. 21	24.49
Feb. 15, 1956	22.85
Mar. 5	22.43
Oct. 30	25.47
Apr. 9, 1957	22.58
Dec. 13	20.96
Apr. 9, 1958	18.78

8S-6W-9aab

May 17, 1955	28.01
Nov. 21	28.66
Jan. 24, 1956	26.72
Feb. 16	25.77
Nov. 9	30.32
Apr. 10, 1957	24.25
Dec. 13	23.67
Apr. 9, 1958	19.57

8S-6W-9bbc

Feb. 16, 1956	24.17
Nov. 9	27.89
Apr. 9, 1957	22.72
Dec. 13	21.92
Apr. 9, 1958	19.16

8S-6W-10bbd

Jan. 5, 1956	27.72
Feb. 16	26.15
Nov. 9	31.10
Apr. 10, 1957	24.55
Apr. 9, 1958	20.77

TABLE 8—Continued

Water levels in wells—Lincoln County—Continued

8S-6W-10bac

Date	Water Level
Oct. 31, 1955	28.79
Feb. 16, 1956	22.73
Nov. 9	29.69
Apr. 10, 1957	20.18
Apr. 9, 1958	17.12

8S-6W-11bcc

Oct. 31, 1955	29.87
Jan. 24, 1956	27.05
Feb. 16	26.10
Nov. 13	31.65
Apr. 10, 1957	24.25
Dec. 16	24.17
Apr. 9, 1958	20.39

8S-6W-11cbb

Dec. 22, 1955	26.57
Jan. 24, 1956	24.99
Feb. 16	24.28
Oct. 30	29.70
Apr. 10, 1957	22.19
Dec. 16	22.26
Apr. 9, 1958	18.69

8S-6W-11ddd

Jan. 5, 1956	23.29
Nov. 13	25.55
Apr. 10, 1957	20.22
Apr. 10, 1958	15.53

8S-6W-16bbc1

Apr. 30, 1953	12.07
Apr. 13, 1954	17.91
Feb. 17, 1955	22.60
May 17	22.02
Nov. 1	25.70
Jan. 24, 1956	20.35
Feb. 15	21.87
Mar. 15	22.27
Nov. 9	27.20
Apr. 9, 1957	20.38

8S-6W-17add

Apr. 30, 1953	12.07
Feb. 17, 1955	22.65
Nov. 17	26.68
Jan. 24, 1956	21.73
Feb. 15	21.87
Nov. 9	27.41
Apr. 9, 1957	20.78

8S-6W-17ddd

Apr. 30, 1953	12.72
Apr. 13, 1954	20.45
Feb. 17, 1955	22.65
Mar. 15, 1956	22.88
Nov. 9	27.40
Apr. 9, 1957	22.24
Dec. 13	21.38

8S-6W-19dcb

Nov. 1, 1955	29.40
Feb. 16, 1956	27.60
Oct. 30	29.43
Apr. 9, 1957	26.25
Apr. 9, 1958	22.73

8S-6W-19ddd

Date	Water Level
June 8, 1955	25.86
Dec. 10	24.70
May 21, 1956	22.68
Oct. 30	25.74
Apr. 9, 1957	22.16
Apr. 9, 1958	18.14

8S-6W-21bbc

Nov. 17, 1955	27.87
Jan. 24, 1956	25.09
Feb. 15	24.17
Mar. 15	23.38
Nov. 9	27.72
Apr. 9, 1957	23.25
Apr. 9, 1958	18.34

8S-6W-28cdc

Dec. 22, 1955	24.21
Feb. 16, 1956	23.11
Mar. 15	23.07
Oct. 30	25.84
Apr. 9, 1957	22.26
Apr. 9, 1958	17.27

8S-6W-29bbb

Nov. 1, 1955	26.73
May 21, 1956	23.94
Oct. 30	27.36
Apr. 9, 1957	23.47
Apr. 9, 1958	21.46

8S-7W-8dac

Oct. 30, 1956	19.61
Jan. 30, 1957	19.40
May 1	18.63
May 24	16.84
Sept. 27	20.87
Oct. 31	20.09
Nov. 25	19.88
Jan. 31, 1958	16.82
Mar. 4	16.69

8S-7W-11aca

Dec. 21, 1955	20.50
Feb. 15, 1956	19.95
Oct. 30	21.65
Apr. 9, 1957	25.21
Dec. 13	18.55
Apr. 9, 1958	17.22

8S-7W-22acd

Nov. 2, 1955	23.44
Feb. 15, 1956	22.71
Oct. 30	24.03
Apr. 9, 1957	24.90
Apr. 9, 1958	20.41

9S-5W-4aad

Apr. 30, 1953	17.21
Feb. 17, 1955	15.94
Dec. 7	17.16
Mar. 15, 1956	16.07
Nov. 8	17.74
Dec. 12, 1957	14.93

9S-5W-13cdb

Nov. 3, 1955	22.41
Nov. 8, 1956	24.01
Apr. 9, 1957	22.08
Dec. 12	20.89
Apr. 8, 1958	19.98

TABLE 8—Continued

Water levels in wells—Lincoln County—Continued

9S-5W-14abc

Date	Water Level
Nov. 3, 1955	17.26
Nov. 8, 1956	18.03
Apr. 9, 1957	17.68
Dec. 12	15.60
Apr. 8, 1958	13.64

9S-5W-16bdc

Nov. 2, 1955	16.74
Feb. 15, 1956	15.79
Nov. 23	17.24
Apr. 8, 1958	11.99

9S-5W-17bcb

June 8, 1955	17.47
Nov. 3	18.37
Feb. 15, 1956	21.93
Nov. 23	18.16
Dec. 12, 1957	13.51
Apr. 8, 1958	15.38

9S-5W-25bac

Nov. 3, 1955	15.99
Nov. 8, 1956	16.91
Apr. 9, 1957	14.94
Apr. 8, 1958	12.10

9S-5W-34bba

Nov. 3, 1955	19.42
Feb. 15, 1956	18.84
Nov. 8	19.96
Apr. 9, 1957	18.38
Dec. 12	16.86
Apr. 8, 1958	15.59

9S-6W-3bad

Jan. 30, 1957	23.70
May 1	23.01
May 24	20.24
June 21	20.45
Sept. 27	22.97
Oct. 31	21.83
Nov. 25	19.61
Jan. 31, 1958	17.82
Mar. 4	17.73
Apr. 9	17.26

9S-6W-3cba

Apr. 30, 1953	12.72
Feb. 17, 1955	24.48
May 16	19.05
Nov. 23	19.33
Feb. 14, 1956	17.01
Mar. 15	18.00
Oct. 30	20.52
Apr. 9, 1957	21.40
Dec. 13	16.20
Apr. 9, 1958	12.94

9S-7W-1bca

Dec. 9, 1955	34.84
Feb. 14, 1956	33.20
Apr. 12	33.16
May 16	33.20
Sept. 11	34.49
Oct. 30	34.73
Dec. 13, 1957	31.54
Apr. 9, 1958	31.76

10S-6W-12add

Date	Water Level
Nov. 3, 1955	17.82
Apr. 9, 1957	16.40
Apr. 8, 1958	14.85

10S-5W-8dbc

Nov. 3, 1955	16.96
May 7, 1956	15.82
Nov. 8	17.10
Apr. 9, 1957	15.72

TABLE 9

Logs of Test Holes and Wells

Selected logs of test holes and wells in Desha and Lincoln Counties are given here. Logs of test holes prepared by U. S. Geological Survey personnel were made on the basis of field examination of samples. Logs prepared by drillers of wells and test holes are given essentially as reported. The age designations of the materials were added by the authors. Terms such as "good sand," "good formation," and "extra good formation," are drillers' terms and refer to the water-yielding capacity of the deposits. Silt and very fine sand are usually referred to as "clay" by drillers. Test holes logged by the U. S. Geological Survey and not given in the following pages are shown graphically in figures 8, 9, 10, 11, 12, and 13.

TABLE 9

Logs of Test Holes and Wells—Desha County

7S-1E-36bdb. Driller's log of irrigation well. Owner, Rayder Bros. Driller, Foster White. Surface elevation, 159 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Sand, dry	25	25
Sand, fine	35	60
Sand, coarse	10	70
Sand and gravel	62	132

7S-1E-36ccb. Driller's log of irrigation well. Owner, Rayder Bros. Driller, Foster White. Surface elevation, 155 ft.

Quaternary deposits:		
Sand	25	25
Sand, medium	35	60
Sand, gray	10	70
Sand, medium, and gravel	50	120

8S-3W-30bbb. Driller's log of irrigation well. Owner, W. F. Wilson. Driller, M. E. McDonald. Surface elevation, 163.8 ft.

Quaternary deposits:		
Top soil and clay	7	7
Clay	11	18
Sand, fine	32	50
Good formation	50	100
Rock	2	102
Jackson group:		
Clay at 102 ft.		

8S-3W-33abd. Log by U. S. Geological Survey of observation well. Driller, U. S. Corps of Engineers. Surface elevation, 165.0 ft.

Quaternary deposits:		
Silt, very fine, sandy, moderate-brown	1.2	1.2
Sand, very fine, light-brown	3.8	5
Clay, silty, moderate-brown	3	8
Sand, very fine, well-sorted, light-brown	27	35
Sand, fine, well-sorted, light-olive-brown	10	45
Sand, fine to medium, well-sorted, light-olive-gray	10	55
Sand, medium, olive-gray; scattered gravel; streaks of dark-greenish-gray and dark-olive-gray clay and light-gray clay from 55 to 59 ft.	13	68
Sand, medium to coarse, olive-gray; scattered gravel	2.5	70.5
Clay, dark-greenish-gray and dusky-yellowish-brown	2	72.5
Sand, medium to coarse, gravelly, olive-gray	2.5	75
Clay, silty, olive-gray	0.5	75.5
Sand, medium to coarse, gravelly, olive-gray; streaks of dark-greenish-gray concretionary clay	3.5	79
Clay, silty, dusky-yellowish- brown	1	80
Sand, medium, olive-gray, gravelly; streaks of brown, gray, and greenish-gray clay	3.5	83.5
Clay, silty, concretionary, dark-yellowish-brown and dark-greenish-gray	1.5	85
Sand, medium to coarse, gravelly, olive-gray	3	88
Gravel, sandy	1	89
Sand, fine, well-sorted, olive-gray	7	96
Sand, fine, gravelly, olive-gray	1.5	97.5
Gravel, coarse, sandy	5	102.5
Jackson group:		
Silt, clayey, sandy, dark-greenish-gray	7	109.5

9S-1W-14ccc. Log by U. S. Geological Survey of observation well. Surface elevation, 150 ft.

Quaternary deposits:		
Clay, silty, dark-reddish-brown	19	19
Clay, silty, light-reddish-brown	5	24
Silt, clayey, some very fine sand, reddish-brown	20	44
Silt and fine and very fine sand, light-reddish-brown	20	64
Sand, medium, some fine and very fine sand, silty, light-reddish-brown	15	79
Sand, medium and coarse, some very coarse, gray	10	89

9S-1W-17acc. Driller's log of irrigation well. Owner, J. J. Adams. Driller, H. S. Ragland. Surface elevation, 154.3 ft.

Quaternary deposits:		
Top soil and clay	30	30
Quicksand	20	50
Sand, fine	10	60
Sand, medium	30	90
Good sand	10	100
Rocks and sand	2	102

9S-1W-28daa. Driller's log of irrigation well. Owner, C. Simpson. Driller, M. E. McDonald. Surface elevation, 147 ft.

Quaternary deposits:		
Top soil	8	8
Clay	24	32
Sand, fine, and clay balls	38	70
Extra good formation	35	105
Jackson group:		
Clay, blue at 105 ft.		

9S-2W-10bbd. Log by U. S. Geological Survey of observation well. Driller, U. S. Corps of Engineers. Surface elevation, 156.1 ft.

Quaternary deposits:		
Clay, silty, moderate-brown	1.5	1.5
Clay, moderate-brown	1.5	3
Silt, clayey, moderate-brown	1	4
Clay, silty, moderate-brown	0.8	4.8
Silt with very fine sand, moderate-brown	3.2	8
Clay, silty, moderate-brown mottled with dusky-brown	1.5	9.5

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

	Thickness (feet)	Depth (feet)
Silt with very fine sand, clayey, moderate-brown with streaks of moderate-yellowish-brown	4	13.5
Silt with very fine sand, grayish-brown	2.5	16
Clay, silty, olive-gray	7	23
Clay, silty, moderate-brown; silt streaks	2	25
Silt with very fine sand, dark-yellowish-brown; moderate-brown clay streaks	3	28
Clay, moderate-brown	1	29
Sand, very fine, olive-gray	1	30
Clay, moderate-brown; silt; very fine sand, olive-gray	7	37
Sand, fine, olive-gray with streaks of olive-gray clayey silt	11	48
Sand, fine, olive-gray	2	50
Sand, medium, olive-gray	8	58
Sand, coarse, gravelly; includes hard mudballs	6.5	64.5
Clay, silty, dark-greenish-gray	2.5	67
Sand, fine to medium, granule-bearing, dark-greenish-gray	5	72
Sand, very fine to fine, well-sorted	2	74
Sand, very fine, gray	10	84
Sand, fine, gray	6	90
Sand, very fine, gray	0.5	90.5
Sand, fine, gray	1.5	92
Sand, medium, well-sorted, gravelly, olive-gray	12	104
Sand, coarse to very coarse, gravelly, olive-gray; includes rare clay-balls to 1½ inches with fine sand streaks	4	108
Silt	0.5	108.5
Sand, very coarse, gravelly, olive-gray; includes pale-yellowish-brown clayballs; wood fragments	3.5	112
Gravel to 3 inches, sandy	3	115
Sand, medium, olive-gray	2	117
Gravel to 2 inches, sandy	1.5	118.5
Sand, coarse, well-sorted, olive-gray	0.3	118.8
Sand, fine to medium, olive-gray	0.5	119.3
Jackson group:		
Clay, grayish-olive-green	10.7	130

9S-2W-26aaa. Driller's log of public supply well. Owner, Town of Watson. Driller, Lexington Lumber Company. Surface elevation, 150 ft.

Quaternary deposits:		
Clay	17	17
Sand	55	72
Sand and gravel	28	100
Tertiary deposits, undifferentiated:		
Gumbo	104	204
Rocks	4	208
Clay hardpan	8	216
Rock	1	217
Clay	3	220
Clay and rocks	16	236
Clay and gumbo	82	318
Sand and clay	72	390
Clay	122	512
Sand	28	540
Clay	8	548
Hardpan	6	554
Sand	62	616

9S-2W-28dcc. Driller's log of irrigation well. Owner, Lawrence Patton. Driller, H. S. Ragland. Surface elevation, 148.7 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and clay	13	13
Sand, coarse, yellow	27	40
Good sand, gray	20	60
Good sand, coarse	35	95

9S-2W-32ccc. Log by U. S. Geological Survey of irrigation well. Owner, H. McGregor. Driller, M. E. McDonald. Surface elevation, 152 ft.

Quaternary deposits:		
Clay and top soil	3	3
Sand, medium to coarse, red	2	5
Sand, very fine to medium, pink	3	8
Sand, coarse, red, with streaks of red clay	2	10
Clay, reddish-brown	3	13
Clay, reddish-brown, with streaks of gray clay	3	16
Clay, gray	2	18
Clay, gray, some very fine gray sand	2	20
Sand, medium, dark-bluish-gray	5	25
Sand, medium to fine, light-brown	8	33
Sand, medium to coarse, gray-brown	7	40
Sand, coarse, light-gray	8	48
Sand, medium, light-gray, gravelly, contains wood fragments from 56 to 61	13	61
Sand, medium, bluish-gray, gravelly, contains wood fragments	11	72
Sand, fine to medium, bluish-gray, gravelly; few clay balls from 72 to 86	16	88
Clay, bluish-gray	1	89
Sand, medium to coarse, bluish-gray, gravelly	2	91
Sand, coarse to very coarse, bluish-gray, gravelly	5	96
Clay	0.5	96.5

9S-2W-35aac. Log by U. S. Geological Survey of observation well. Driller, U. S. Corps of Engineers. Surface elevation, 149.3 ft.

Quaternary deposits:		
Sand, very fine, silty, dark-yellowish-brown	1.9	1.9
Clay, silty, moderate-yellowish-brown	18.6	20.5
Silt, clayey, sandy, moderate-yellowish-brown	10.5	31
Clay, olive-gray	13	44
Sand, very fine to fine, silty, gray	1	45
Sand, medium to coarse, ill-sorted	4	49
Sand, coarse, gravelly	5	54
Clay, olive-gray	0.5	54.5
Sand, fine, well-sorted, gray	4.5	59
Sand, medium, well-sorted, interbedded fine sand	18	77
Sand, very coarse, gravelly	5	82
Sand, coarse to very coarse	3	85
Sand, medium	8	93
Gravel, sandy	2	95
Clay, light-gray	2	97
Sand, very fine, silty	2	99
Sand, medium, with clayballs	6	105
Conglomerate	1.5	106.5
Clay, hard	1.5	108
Conglomerate	0.5	108.5
Jackson group:		
Clay, dark-greenish-gray	11.5	120

9S-2W-36aac. Log by U. S. Geological Survey of observation well. Surface elevation, 146 ft.

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Silt, some fine sand, reddish-brown	9	9
Silt and very fine sand, clayey, dark-reddish-brown	5	14
Silt and very fine sand, clayey, dark-brown	15	29
Sand, very fine, some fine sand and silt, dark-brown	10	39
Sand, fine and very fine, silty, dark-brown	5	44
Sand, fine and medium, silty, dark-brown	10	54
Sand, medium, silty	15	69
Sand, medium and coarse, very little silt	10	79
Sand, coarse and very coarse	15	94
Sand, very coarse and coarse, gravelly	5	99

9S-2W-36ccc. Driller's log of irrigation well. Owner, H. Cox. Driller, Layne-Arkansas. Surface elevation, 146 ft.

Quaternary deposits:		
Clay	20	20
Sand, fine	3	23
Sand, coarse, and some fine gravel	18	41
Sand, coarse	26	67
Clay, blue	3	70
Sand, coarse	35	105

9S-3W-4bab. Driller's log of irrigation well. Owner, Clay Cross. Driller, H. S. Ragland. Surface elevation, 162 ft .

Quaternary deposits:		
Top soil and sand	4	4
Clay	10	14
Sand, fine	26	40
Sand, medium	20	60
Good average sand	27	87
Clay, soft	0.5	87.5
Good sand	12.5	100
Jackson group:		
Clay, blue at 100 ft.		

9S-3W-8baa. Driller's log of irrigation well. Owner, Adams and Haymaker. Driller, H. S. Ragland. Surface elevation, 157 ft.

Quaternary deposits:		
Clay	7	7
Sand, fine	33	40
Sand, medium	8	48
Good sand and gravel	52	100

9S-3W-9cab. Driller's log of irrigation well. Owner, T. F. Cross. Driller, H. S. Ragland. Surface elevation, 157 ft.

Quaternary deposits:		
Clay	8	8
Sand, fine	12	20
Sand, fine, gray	15	35
Sand and gravel	65	100

9S-3W-17cdb. Driller's log of irrigation well. Owner, Brigham. Driller, W. B. Loyd and Son. Surface elevation, 152 ft.

Quaternary deposits:		
Clay	24	24
Sand, fine to medium, yellow	38	62
Sand, coarse, yellow	16	78
Sand, coarse, and gravel	10	88
Jackson group:		
Clay, at 88 ft.		

9S-3W-17dcb. Driller's log of domestic well. Owner, Floyd Christman. Driller, Fred McWhorter. Surface elevation, 151 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Sand	50	50
Sand and gumbo	104	154
Tertiary deposits, undifferentiated:		
Gumbo	154	308
Rock	7	315
Gumbo	165	480
Rock	1	481
Shale, hard	129	610
Sandy	22	632
Sand, fine	20	652
Sand	38	690

9S-3W-17dcc. Log by U. S. Geological Survey of observation well. Driller, U .S. Corps of Engineers. Surface elevation, 155.1 ft.

Quaternary deposits:		
Clay, silty, moderate-brown and moderate-yellowish-brown, mottled	4	4
Clay, silty, greenish-gray	3	7
Clay, sandy, moderate-brown	1.5	8.5
Sand, clayey, ill-sorted	7.5	16
Clay, silty, light-brown	2	18
Clay, silty, olive-gray, streaks of light-brown	6	24
Sand, fine to medium, well-sorted, light-olive-gray; streaks of olive-gray clay	5	29
Sand, fine, light-olive-gray	3	32
Sand, fine to medium, olive-gray; wood fragments from 32 to 35 feet	19.5	51.5
Sand, coarse	7.1	58.6
Clay, dark-olive-gray	0.9	59.5
Sand, gravelly	5	64.5
Gravel, sandy	1.5	66
Sand, coarse, gravelly, ill-sorted, olive-gray	18	84
Gravel, sandy	56	140
Jackson group:		
Clay, dark-olive-gray to dark-greenish-gray	9.4	149.4

9S-3W-18ddd. Driller's log of irrigation well. Owner, Forrest Freeman. Driller, H. S. Ragland. Surface elevation, 155.3 ft.

Quaternary deposits:		
Clay	12	12
Sand and clay	23	35
Sand, fine, gray	20	55
Sand, medium, and small gravel	5	60
Clay, rocks and gravel	2	62
Sand, coarse, white	18	80
Good sand	22	102

9S-3W-19bac. Driller's log of test hole at site of irrigation well. Owner, J. C. Kennedy. Driller, M. E. McDonald. Surface elevation, 158 ft.

Quaternary deposits:		
Sand, fine	15	15
Clay, red	5	20
Sand, becoming coarser towards bottom	68	88
Jackson group:		
Clay, with some sand	20	108

9S-3W-22baa. Driller's log of irrigation well. Owner, Jack Dante. Driller, M. E. McDonald. Surface elevation, 147 ft.

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil	2	2
Clay	13	15
Sand	3	18
Sand, fine	22	40
Average sand	30	70
Clay balls	2	72
Good formation	16	88
Jackson group:		
Rocks and clay	1	89
Clay at 89 ft.		

9S-3W-22bbb. Driller's log of irrigation well. Owner, Jack Dante. Driller, M. E. McDonald. Surface elevation, 151 ft.

Quaternary deposits:		
Top soil	2	2
Clay, buckshot, black	8	10
Clay	14	24
Sand, fine, white	6	30
Average formation	20	50
Good formation	20	70
Extra good formation	18	88
Jackson group:		
Clay, blue at 88 ft.		

9S-3W-23aaa. Driller's log of irrigation well. Owner, Clay Cross. Driller, H. S. Ragland. Surface elevation, 152 ft.

Quaternary deposits:		
Clay	60	60
Sand and gravel	28	88
Clay	2	90
Sand and gravel	20	110

9S-3W-27bcc. Driller's log of irrigation well. Owner, Jack Stearns. Driller, H. S. Ragland. Surface elevation, 148 ft.

Quaternary deposits:		
Soil and clay	15	15
Sand, fine	20	35
Sand, medium	20	55
Sand, coarse, and gravel	32	87
Jackson group:		
Clay, blue at 87 ft.		

9S-3W-30acc2. Driller's log of domestic well. Owner, Glen Lambert. Driller, Fred McWhorter. Surface elevation, 157 ft.

Quaternary deposits:		
Surface clay	34	34
Sand, white	33	67
Gravel, sandy	13	80
Log	8	88
Gravel and sand	23	111
Tertiary deposits, undifferentiated:		
Gumbo	61	172
Rock	101	273
Hard rock	6	279
Shale, sandy	21	300
Sand, coarse	103	403
Sand, fine	17	420
Shale, hard	4	424
Shale	55	479
Sand, coarse	50	529

9S-4W-1ccb. Driller's log of irrigation well. Owner, M. L. Walt. Driller, Layne-Arkansas. Surface elevation, 165 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil	1	1
Fine sandy loam	5	6
Clay	28	34
Sand, coarse	16	50
Sand, coarse, and gravel	37	87
Jackson group:		
Clay at 87 ft.		

9S-4W-6bbc. Driller's log of irrigation well. Owner, Gus Bauer. Driller, H. S. Ragland. Surface elevation, 162.3 ft.

Quaternary deposits:		
Clay	37	37
Good sand	33	70
Clay	1	71
Sand, medium	9	80
Average sand	29	109

9S-4W-9acb. Driller's log of irrigation well. Owner, J. L. McKennon. Driller, M. E. McDonald. Surface elevation, 161.3 ft.

Quaternary deposits:		
Top soil and sand	20	20
Clay	20	40
Sand, medium	20	60
Average sand and gravel	43	103
Jackson group:		
Clay, blue at 103 ft.		

9S-4W-9cad1. Driller's log of irrigation well. Owner, J. L. McKennon. Driller, M. E. McDonald. Surface elevation, 163.2 ft.

Quaternary deposits:		
Top soil and clay	28	28
Sand, medium	12	40
Good formation	36	76
Jackson group:		
Clay, blue at 76 ft.		

9S-4W-16daa. Driller's log of irrigation well. Owner, F. Freeman. Driller, M. E. McDonald. Surface elevation, 161.6 ft.

Quaternary deposits:		
Top soil and clay	28	28
Sand, fine	10	38
Fair sand	12	50
Average sand	28	78
Clay	2	80
Average sand	12	92

9S-4W-20acc. Driller's log of irrigation well. Owner, S. A. Banks. Driller, H. S. Ragland. Surface elevation, 165 ft.

Quaternary deposits:		
Clay	21	21
Sand, fine	23	44
Clay	14	58
Good sand	34	92

9S-4W-21dbb. Driller's log of irrigation well. Owner, S. A. Banks, Jr. Driller, W. B. Loyd and Sons. Surface elevation, 163.2 ft.

Quaternary deposits:		
Top soil and clay	45	45
Sand, medium, yellow	18	63
Sand, coarse, and gravel	17	80
Jackson group:		
Clay, blue at 80 ft.		

9S-4W-22dcd. Driller's log of irrigation well. Owner, C. A. Farmer. Driller, M. E. McDonald. Surface elevation, 163 ft.

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and sand	10	10
Clay	15	25
Sand, fine	30	55
Good formation	29	84
Clay	1	85
Good formation	23	108

9S-4W-23cad. Driller's log of irrigation well. Owner, S. A. Banks, Jr. Driller, W. B. Loyd and Sons. Surface elevation, 159 ft.

Quaternary deposits:		
Clay	21	21
Sand, fine to medium, yellow	24	45
Sand, coarse	13	58
Sand, coarse, and gravel	12	70
Gravel and rock	22	92
Boulders	4	96
Jackson group:		
Clay, blue at 96 ft.		

9S-4W-25acd. Driller's log of irrigation well. Owner, A. Brasfield. Driller, M. E. McDonald. Surface elevation, 156 ft.

Quaternary deposits:		
Top soil	6	6
Clay	30	36
Fair sand	14	50
Good formation	34	84

9S-4W-26acb. Driller's log of irrigation well. Owner, J. E. Allman. Driller, Layne-Arkansas. Surface elevation, 160 ft.

Quaternary deposits:		
Top soil	2	2
Sandy loam	10	12
Clay	12	24
Sand, fine	40	64
Sand, coarse, and gravel	31	95

9S-4W-26dcb. Driller's log of irrigation well. Owner, Burk Holmes. Driller, M. E. McDonald. Surface elevation, 163 ft.

Quaternary deposits:		
Top soil and clay	6	6
Clay	19	25
Sand, fine	15	40
Sand, medium	20	60
Average sand	19	79
Jackson group:		
Clay, blue at 79 ft.		

9S-4W-28cbb. Driller's log of irrigation well. Owner, Jack Dante. Driller, M. E. McDonald. Surface elevation, 167.3 ft.

Quaternary deposits:		
Top soil and clay	8	8
Sand, fine, red	12	20
Quicksand	35	55
Medium formation	23	78
Clay	2	80
Good formation	11	91
Jackson group:		
Clay, blue at 91 ft.		

9S-4W-30baa. Driller's log of irrigation well. Owner, J. M. and C. F. Hudson. Driller, Layne-Arkansas. Surface elevation, 167.5 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Soil	1	1
Clay, soft, red	19	20
Gumbo, blue	14	34
Sand, fine	8	42
Sand, coarse	26	68
Sand, coarse with little gravel	30	98
Sand, coarse, and gravel	23	121
Jackson group:		
Gumbo	3	124

9S-4W-36aac. Driller's log of irrigation well. Owner, Jack Dante. Driller, M. E. McDonald. Surface elevation, 161 ft.

Quaternary deposits:		
Top soil and sand	6	6
Clay	21	27
Sand, fine	13	40
Good formation	49	89
Big rock	3	92
Jackson group:		
Clay, blue at 92 ft.		

10S-1W-11dbc. Log by U. S. Geological Survey of observation well. Surface elevation, 150 ft.

Quaternary deposits:		
Sand, very fine, clayey, reddish-brown	9	9
Clay, some very fine sand, brown	15	24
Clay, reddish-brown	10	34
Clay and very fine sand, reddish-brown	5	39
Sand, fine, some very fine sand, gray	10	49
Sand, medium and fine, gray	15	64
Sand, medium, gray	10	74
Sand, medium, some coarse sand, gray	5	79
Sand, coarse and medium, gray	10	89
Sand, very coarse and coarse, gravelly, gray	10	99

10S-1W-20bdc1. Log by U. S. Geological Survey of observation well. Surface elevation, 140 ft.

Quaternary deposits:		
Silt and very fine sand, reddish-brown	4	4
Silt and very fine sand, some clay, reddish-brown	10	14
Silt, clayey, brown	20	34
Sand, fine and very fine, silty, dark-gray	25	59
Sand, coarse, some very coarse, silty, dark-gray	10	69
Sand, coarse and very coarse, gravelly, dark-gray	25	94
Gravel and coarse and very coarse sand	10	104

10S-1W-21daa. Log by U. S. Geological Survey of observation well. Surface elevation, 141 ft.

Quaternary deposits:		
Clay, red-brown	5	5
Sand, fine and very fine, silty, medium-brown	13	18
Sand, fine, some medium sand, gray	15	33
Sand, medium, some fine sand, gray	30	63
Sand, medium, trace of coarse sand, gray	5	68
Sand, coarse, some fine sand	15	83
Sand, coarse, trace of very coarse sand, gray	15	98

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

10S-1W-23abd1. Log by U. S. Geological Survey of observation well. Surface elevation, 145 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Sand, fine and very fine, some silt, reddish-brown	9	9
Silt, some very fine sand, reddish-brown	6	15
Clay, dark-gray	35	50
Sand, fine and very fine, silty, dark-gray	14	64
Sand, fine and very fine, gray	15	79
Sand, medium and fine, gray	15	94
Sand, medium, gray	5	99

10S-1W-28ccb. Log by U. S. Geological Survey of observation well. Surface elevation, 145 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay, reddish-brown	9	9
Clay, dark-gray	5	14
Silt, some very fine sand, dark-gray	25	39
Sand, very fine and fine, some medium sand, clay and silt, gray	5	44
Sand, medium and fine, some very fine sand, gray	10	54
Sand, medium, some coarse sand, gray	5	59
Sand, coarse, some very coarse sand and gravel, gray	26	85

10S-2W-12cdd1. Driller's log of irrigation well. Owner, J. C. Gould. Driller, M. E. McDonald. Surface elevation, 147.0 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top Soil	6	6
Sand	2	8
Clay	20	28
Sand, fine, white	37	65
Fair formation	20	85
Average to good formation	21	106
Big rocks	2	108
Jackson group:		
Clay, blue at 108 ft.		

10S-2W-12daa. Driller's log of irrigation well. Owner, J. C. Gould. Driller, Layne-Arkansas. Surface elevation, 146.6 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Gumbo	1	1
Clay, sandy, red	12	13
Gumbo	11	24
Sand, fine	22	46
Sand, coarse	8	54
Sand, coarse, and little fine gravel	59	113
Jackson group:		
Gumbo	4	117

10S-2W-13dcb. Driller's log of irrigation well. Owner, Baxter Land Co. Driller, M. E. McDonald. Surface elevation, 138 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	17	17
Sand, fine	43	60
Sand, coarse	25	85
Sand and gravel	11	96
Gravel and boulders	9	105
Jackson group:		
Gumbo at 105 ft.		

10S-2W-21bca. Driller's log of irrigation well. Owner, Baxter Land Co. Driller, Floyd Jones. Surface elevation, 146.9 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	20	20
Sand, fine	45	65
Sand, coarse	22	87
Sand and gravel	15	102
Gravel and boulders	15	117
Jackson group:		
Gumbo at 117 ft.		

10S-2W-21dcb. Driller's log of irrigation well. Owner, Ernie Ingram. Driller, M. E. McDonald. Surface elevation, 145 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and clay	25	25
Sand, fine	35	60
Sand, medium	15	75
Good formation	21	96

10S-2W-23dcd. Driller's log of irrigation well. Owner, Baxter Land Co. Driller, H. S. Ragland. Surface elevation, 152 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	17	17
Sand, fine	43	60
Sand, coarse	23	83
Sand and gravel	13	96
Gravel and boulders	10	106
Jackson group:		
Gumbo at 106 ft.		

10S-2W-24cca. Driller's log of irrigation well. Owner, Baxter Land Co. Driller, M. E. McDonald. Surface elevation, 149.4 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil	5	5
Clay	3	8
Sand	3	11
Clay	13	24
Sand, fine	50	74
Average formation	26	100
Clay	1	101
Average formation	3	104
Jackson group:		
Clay at 104 ft.		

10S-2W-26acb. Driller's log of irrigation well. Owner, Baxter Land Co. Driller, W. B. Loyd and Sons. Surface elevation, 148 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	30	30
Sand, fine	30	60
Sand, coarse	28	88
Sand with clay strips	22	110
Jackson group:		
Clay, blue	1	111

10S-2W-26bbb. Driller's log of deep well. Owner, University of Arkansas. Driller, W. B. Loyd and Sons, Surface elevation, 146 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	30	30
Sand, fine to medium	55	85
Sand, medium, and some gravel	25	110
Tertiary deposits, undifferentiated:		
Clay, blue	75	185
Clay, gray, and shale	105	290
Sand, fine, and gravel, mixed	25	315
Clay, green	20	335
Sand, fine, and some rock	50	385
Clay, hard, and shale	105	490
Fine to medium water sand	25	515
Clay and shale	55	570
Medium water sand	60	630
Clay, blue at 630 ft.		

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

	Thickness (feet)	Depth (feet)
10S-2W-27aaa. Driller's log of irrigation well. Owner, Baxter Land Co. Driller, H. S. Ragland. Surface elevation, 146.1 ft.		
Quaternary deposits:		
Clay	19	19
Sand, fine	43	62
Sand, coarse	23	85
Sand and gravel	13	98
Gravel and boulders	11	109
Jackson group:		
Gumbo	2	111
10S-3W-4dad. Driller's log of irrigation well. Owner, C. M. Brasfield. Driller, M. E. McDonald. Surface elevation, 155.1 ft.		
Quaternary deposits:		
Top soil and sand	5	5
Clay and sand	13	18
Sand	7	25
Clay	25	50
Sand, fine	15	65
Good formation	29	94
Jackson group:		
Clay at 94 ft.		
10S-3W-12bad. Log by U. S. Geological Survey of observation well. Surface elevation, 142 ft.		
Quaternary deposits:		
Clay, some silt, medium-gray	4	4
Sand, fine and very fine, some medium sand, silty, medium-brown	7	11
Clay, reddish-brown	3	14
Clay, silty, light-gray	5	19
Silt and very fine sand, medium-gray	5	24
Silt and fine and very fine sand, medium-gray	5	29
Sand, medium and fine, silty, medium-gray	10	39
Sand, medium, some coarse sand and silt, medium-gray	10	49
10S-3W-19dab. Driller's log of irrigation well. Owner, S. O. Abston. Driller, Layne-Arkansas. Surface elevation, 157 ft.		
Quaternary deposits:		
Clay	10	10
Silt	19	29
Sand, fine	22	51
Sand, coarse, and gravel	44	95
Jackson group:		
Clay, soft at 95 ft.		
10S-3W-20acd. Driller's log of irrigation well. Owner, Olin Fleming. Driller, W. B. Loyd and Son. Surface elevation, 153.3 ft.		
Quaternary deposits:		
Clay	28	28
Sand, coarse, red	24	52
Sand, gray, and gravel	33	85
Jackson group:		
Clay, blue at 85 ft.		
10S-3W-21ccc. Driller's log of irrigation well. Owner, Junior Appleberry. Driller, W. B. Loyd and Sons. Surface elevation, 157 ft.		
Quaternary deposits:		
Clay	24	24
Sand, fine	34	58
Sand, medium	10	68
Sand, coarse, and gravel	24	92
Jackson group:		
Clay, blue at 92 ft.		

	Thickness (feet)	Depth (feet)
10S-3W-26dac1. Driller's log of irrigation well. Owner, Paul Teeter. Driller, Lilly Bros. Surface elevation, 156.3 ft.		
Quaternary deposits:		
Surface clay	10	10
Clay, red, and sand, mixed	15	25
Clay, blue	16	41
Sand, light-blue, coarser at bottom	19	60
Sand, medium, light-blue	23	83
Rotten logs	2	85
Sand, coarse, blue, and some gravel	15	100
10S-3W-27bdd. Driller's log of irrigation well. Owner, Bickham Bros. Driller, Lilly Bros. Surface elevation, 153 ft.		
Quaternary deposits:		
Surface clay	10	10
Clay, red, and sand	15	25
Pack sand, blue, and clay	25	50
Sand, blue; gravel and rotten limbs	10	60
Sand, blue, and some gravel	20	80
Sand, blue, and gravel	17	97
10S-3W-27cad. Driller's log of irrigation well. Owner, A. Smart. Driller, M. E. McDonald. Surface elevation, 152 ft.		
Quaternary deposits:		
Top soil and clay	10	10
Clay and mud	25	35
Sand, fine	25	60
Average formation	23	83
Jackson group:		
Clay, blue	1	84
10S-3W-28acd. Driller's log of irrigation well. Owner, Wasson Bros. Driller, W. B. Loyd and Sons. Surface elevation, 154 ft.		
Quaternary deposits:		
Clay	46	46
Sand, medium	17	63
Sand, coarse, and gravel	28	91
Jackson group:		
Clay, blue at 91 ft.		
10S-3W-28bbb. Driller's log of irrigation well. Owner, Ollie Donley. Driller, Lilly Bros. Surface elevation, 158.0 ft.		
Quaternary deposits:		
Surface clay	10	10
Sand, yellow	45	55
Sand, light-yellow, and gravel	5	60
Sand, coarse, light-yellow, and gravel	20	80
Sand, coarse, light-blue, and gravel	13	93
10S-3W-29abb. Driller's log of irrigation well. Owner, Myles Ayecock. Driller, Lilly Bros. Surface elevation, 155 ft.		
Quaternary deposits:		
Clay	10	10
Clay mixed with some yellow packed sand	15	25
Sand, yellow	25	50
Sand, light-yellow, and gravel	10	60
Sand, coarse, light-yellow, and gravel	25	85
Sand, coarse, light-blue, and gravel	14	99
10S-3W-29cda. Driller's log of irrigation well. Owner, W. R. Johnson. Driller, W. B. Loyd and Sons. Surface elevation, 158 ft.		
Quaternary deposits:		
Clay and top soil	35	35
Sand, medium, white	23	58
Sand, medium, and some gravel	23	81
Sand, coarse, and rock	10	91

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

10S-3W-31ccc. Driller's log of irrigation well. Owner, J. C. Holloway. Driller, W. B. Loyd and Sons. Surface elevation, 157 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil, silt, and clay	24	24
Clay, hard, gray	11	35
Sand, coarse	28	63
Sand and gravel	21	84
Gravel	22	106
Jackson group:		
Clay, blue at 106 ft.		

10S-3W-32bac. Driller's log of test hole at site of irrigation well. Owner, J. P. Herrington. Driller, Layne-Arkansas. Surface elevation, 157 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Soil and clay	8	8
Silt and sand	17	25
Sand, fine	29	54
Sand, coarse	10	64
Sand, coarse, and fine gravel	20	84
Sand, coarse, and gravel	23	107

10S-3W-32cba. Driller's log of test hole at site of irrigation well. Owner, J. P. Herrington. Driller, Layne-Arkansas. Surface elevation, 156 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Soil and clay	18	18
Silt and clay	7	25
Sand, fine	15	40
Sand, medium	10	50
Sand, coarse	7	57
Sand, coarse, and gravel	21	78
Sand, coarse, and gravel, and gumbo	6	84
Sand, medium	13	97
Sand, coarse, and gravel, streaked with gumbo	13	110
Jackson group:		
Gumbo	4	114

10S-4W-2bab. Driller's log of irrigation well. Owner, R. A. Pickens. Driller, H. S. Ragland. Surface elevation, 156 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	40	40
Sand, medium, and scattered medium gravel	10	50
Average sand and gravel	26	76
Clay, rocks and gravel	1	77
Good sand and gravel	17	94
Jackson group:		
Clay, blue at 94 ft.		

10S-4W-7bda. Driller's log of irrigation well. Owner, A. Stimson. Driller, M. E. McDonald. Surface elevation, 163 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and clay	20	20
Sand, fine	30	50
Sand, medium	20	70
Average formation	26	96
Silty material	21	117
Jackson group:		
Clay at 117 ft.		

10S-4W-8bdd. Driller's log of irrigation well. Owner, T. Shelby Sparks. Driller, M. E. McDonald. Surface elevation, 162 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and clay	42	42
Sand, fine	15	57
Sand, medium	13	70
Clay	1	71
Sand, medium	10	81
Average sand	26	107
Jackson group:		
Clay, blue at 107 ft.		

10S-4W-12cab. Driller's log of destroyed irrigation well. Owner, R. A. Pickens. Driller, Layne-Arkansas. Surface elevation, 151 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Gumbo	23	23
Sand, fine	17	40
Sand, fine, loose	13	53
Sand, coarse	7	60
Sand, coarse, and gravel	13	73
Clay, soft	3	76
Sand, coarse, and gravel	4	80
Sand, fine, hard	10	90
Jackson group:		
Gumbo	5	95

10S-4W-15ccd. Driller's log of irrigation well. Owner, R. A. Pickens. Driller, H. S. Ragland. Surface elevation, 160 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil	3	3
Sand, red, some clay	11	14
Sand, fine	4	18
Clay, soft, red	22	40
Sand, fine	10	50
Good sand and gravel	59	109
Jackson group:		
Clay, blue at 109 ft.		

10S-4W-24dcb. Driller's log of irrigation well. Owner, H. G. Leak, Jr. Driller, M. E. McDonald. Surface elevation, 162 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and clay	8	8
Sand	15	23
Sand, fine	5	28
Clay	4	32
Sand, fine	23	55
Good formation	45	100
Jackson group:		
Clay	1	101

10S-4W-36bac. Driller's log of irrigation well. Owner, Harris Martin. Driller, M. E. McDonald. Surface elevation, 157 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and sand	4	4
Clay	20	24
Clay and sand mixed	31	55
Good formation	31	86

11S-1W-30cba1. Driller's log of irrigation well. Owner, O. O. Kemp and Son. Driller, H. S. Ragland. Surface elevation, 138 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Surface clay	10	10
Clay, red	10	20
Clay, blue	10	30
Sand, blue, a little coarse at bottom	39	69
Sand, blue	17	86
Sand, coarse, blue, and some gravel	15	101

11S-2W-3bca. Driller's log of irrigation well. Owner, R. A. Adcock. Driller, H. S. Ragland. Surface elevation, 139 ft.

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and blue clay	30	30
Quicksand	20	50
Fair water sand	10	60
Good water sand	20	80
Good sand and gravel	17	97
Jackson group:		
Clay, blue at 97 ft.		

11S-2W-31cdb. Driller's log of irrigation well. Owner, D. E. Johnson. Driller, W. B. Loyd and Sons. Surface elevation, 142.6 ft.

Quaternary deposits:		
Clay	25	25
Sand, fine	15	40
Sand, medium	18	58
Sand, coarse	20	78
Sand, coarse, and gravel	15	93
Jackson group:		
Clay, blue	2	95

11S-3W-4bac. Driller's log of irrigation well. Owner, Howard Newton. Driller, Layne-Arkansas. Surface elevation, 147 ft.

Quaternary deposits:		
Sand	1	1
Clay	3	4
Sand, fine, brown	11	15
Gumbo	15	30
Sand, fine, gray	12	42
Sand, coarse, gray	20	62
Sand, coarse, and gravel	10	72
Sand, medium, and gravel	24	96

11S-3W-5adb. Driller's log of irrigation well. Owner, Howard Newton. Driller, Layne-Arkansas. Surface elevation, 146 ft.

Quaternary deposits:		
Soil and silt	1	1
Clay, red	11	12
Clay, blue	22	34
Sand, fine	6	40
Sand, medium	10	50
Sand, coarse	10	60
Sand, coarse, and some gravel	38	98

11S-3W-6abc. Driller's log of irrigation well. Owner, Aaron Zeno. Driller, W. B. Loyd and Sons. Surface elevation, 157 ft.

Quaternary deposits:		
Clay	43	43
Sand, medium, gray	13	56
Sand, coarse	10	66
Sand, coarse, and gravel	25	91
Jackson group:		
Clay, blue at 91 ft.		

11S-3W-26cdd. Driller's log of irrigation well. Owner, Coon Bayou Farms. Driller, H. S. Ragland. Surface elevation, 135 ft.

Quaternary deposits:		
Clay	28	28
Sand, fine	32	60
Sand, medium	21	81
Rocks	1	82
Jackson group:		
Clay, blue at 82 ft.		

12S-1W-33cda1. Driller's log of public supply well. Owner, City of Arkansas City. Driller, J. F. Mellor, Jr. Surface elevation, 135 ft.

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Clay	12	12
Sand	6	18
Clay	17	35
Sand	20	55
Clay	5	60
Sand and gravel	43	103
Tertiary deposits, undifferentiated:		
Clay, blue	7	110
Clay, sandy	60	170
Hard spot	2	172
Shale	18	190
Rock	1	191
Shale, sandy	29	220
Gumbo	5	225
Shale, sandy	35	260
Gumbo	50	310
Shale	20	330
Gumbo	25	355
Soft shale	25	380
Gumbo	10	390
Gumbo	10	400
Good water sand	148	548

12S-2W-18dab. Driller's log of irrigation well. Owner, Lewis Orell. Driller, W. B. Loyd and Sons. Surface elevation, 143 ft.

Quaternary deposits:		
Clay	28	28
Sand, fine	15	43
Sand, medium	15	58
Sand, fine	8	66
Sand, medium to coarse	26	92
Jackson group:		
Clay, blue at 92 ft.		

12S-2W-20bdb. Driller's log of irrigation well. Owner, R. L. McClendon. Driller, H. S. Ragland. Surface elevation, 143 ft.

Quaternary deposits:		
Clay and sand	20	20
Sand, fine	20	40
Sand, coarse, and some gravel	20	60
Sand, medium	33	93

12S-2W-34ccc1. Driller's log of irrigation well. Owner, E. E. Hobson. Driller, Layne-Arkansas. Surface elevation, 136.5 ft.

Quaternary deposits:		
Clay, sandy	10	10
Sand, fine	71	81
Sand, coarse	7	88
Sand, fine	6	94
Sand, coarse	2	96

12S-3W-6baa. Driller's log of irrigation well. Owner, R. C. Williams. Driller, W. B. Loyd and Sons. Surface elevation, 148 ft.

Quaternary deposits:		
Clay	33	33
Sand, medium	22	55
Sand, coarse	17	72
Sand, coarse, and gravel	11	83
Jackson group:		
Clay, blue	2	85

12S-3W-27aca. Driller's log of irrigation well. Owner, W. A. McGehee and Son. Driller, Layne-Arkansas. Surface elevation, 143 ft.

Quaternary deposits:		
Gumbo	28	28
Sand, fine	17	45
Sand, medium	11	56
Sand, coarse, and gravel	46	102
Jackson group:		
Gumbo at 102 ft .		

TABLE 9—Continued

Logs of Test Holes and Wells—Desha County

	Thickness (feet)	Depth (feet)
12S-3W-27baa. Driller's log of irrigation well. Owner, Federal Compress Warehouse. Driller, Layne-Arkansas. Surface elevation, 142 ft.		
Quaternary deposits:		
Top soil	2	2
Clay, red	32	34
Sand, fine, muddy	16	50
Sand, coarse	26	76
Sand, coarse, and boulders	23	99
Jackson group:		
Gumbo at 99 ft.		
12S-3W-30cdd. Driller's log of irrigation well. Owner, Jack Dowden. Driller, Layne-Arkansas. Surface elevation, 145 ft.		
Quaternary deposits:		
Soil	1	1
Clay	19	20
Sand, fine, red	38	58
Sand, coarse	13	71
Sand, coarse, and some fine gravel	11	82
Sand, coarse, and gravel	19	101
12S-3W-33bad1. Driller's log of irrigation well. Owner, Ross Robinson. Driller, Layne-Arkansas. Surface elevation, 142 ft.		
Quaternary deposits:		
Silt and red clay	13	13
Clay, blue	20	33
Sand, fine, white	19	52
Medium water sand	8	60
Sand, coarse	30	90
Sand, coarse, and some fine gravel	8	98
12S-3W-33daa. Driller's log of irrigation well. Owner, B. C. Castleberry. Driller, H. S. Ragland. Surface elevation, 142 ft.		
Quaternary deposits:		
Top soil	3	3
Clay	30	33
Sand, fine	17	50
Sand, coarse, and little gravel	38	88
13S-1W-7cbc. Driller's log of industrial well. Owner, Texas Eastern Transmission Corporation. Driller, J. F. Mellor. Surface elevation, 132 ft.		
Quaternary deposits:		
Buckshot	40	40
Sand and gravel	54	94
Tertiary deposits, undifferentiated:		
Shale	17	111
Rock	1	112
Shale, sandy	10	122
Shale	33	155
Shale, sandy	5	160
Shale	30	190
Shale, sandy	18	208
Rock	3	211
Shale	29	240
Sand	23	263
Shale, sandy	17	280
Shale, hard	51	331
Shale	59	390
Shale, sandy	30	420
Shale	40	460
Sand	4	464
Shale	11	475
Sand, fine	8	483
Shale	63	546
Shale, sandy	44	590
Shale	30	620
Sand, fine	10	630
Shale	10	640
Sand	12	652
Shale	160	812
Fine water sand	50	862
13S-2W-1dda. Driller's log of domestic well. Owner, Texas Eastern Transmission Corporation. Driller, J. F. Mellor. Surface elevation, 133 ft.		
Quaternary deposits:		
Buckshot	34	34
Sand and pea gravel	58	92
Tertiary deposits, undifferentiated:		
Shale	24	116
Rock	1	117
Shale	43	160
Shale, sandy	32	192
Shale	26	218
Rock	1	219
Shale, sandy	35	254
Rock	2	256
Shale, hard	84	340
Shale, sandy	12	352
Shale	68	420
Shale, sandy	66	486
Rock	1	487
Shale, sandy	48	535
Shale	57	592
Shale, sandy	18	610
Rock	2	612
Shale, hard	8	620
Water sand	30	650
13S-2W-6ddb. Driller's log of irrigation well. Owner, Jimmy Orrell. Driller, W. B. Loyd and Sons. Surface elevation, 139 ft.		
Quaternary deposits:		
Silt	18	18
Clay, hard, red	11	29
Sand, medium	23	52
Sand, coarse	6	58
Sand, coarse, and some gravel	20	78
Sand, medium	16	94
Jackson group:		
Clay, blue at 94 ft.		
13S-2W-10bac. Driller's log of irrigation well. Owner, Tom Johnson. Driller, Layne-Arkansas. Surface elevation, 142.6 ft.		
Quaternary deposits:		
Silt and clay	18	18
Sand, fine	37	55
Sand, coarse	19	74
Sand, coarse, and gravel	27	101
13S-3W-3add. Driller's log of irrigation well. Owner, Ruth McDonald. Driller, Frank Brewer. Surface elevation, 136 ft.		
Quaternary deposits:		
Silt and clay	15	15
Sand, muddy	16	31
Sand	25	56
Sand, medium	9	65
Sand, coarse, and fine gravel	21	86
Jackson group:		
Gumbo	15	101
13S-3W-7aab. Driller's log of irrigation well. Owner, R. L. Beck. Driller, W. B. Loyd and Sons. Surface elevation, 138 ft.		
Quaternary deposits:		
Soil and clay	28	28
Sand, fine to medium	40	68
Sand and gravel	18	86
Jackson group:		
Clay, blue at 86 ft.		

TABLE 9—Continued

Logs of Test Holes and Wells—Lincoln County

7S-5W-19dbd. Driller's log of irrigation well. Owner, Arkansas State Penal Farm. Driller, M. E. Argo. Surface elevation, 176 ft.

	(feet) Thickness	(feet) Depth
Quaternary deposits:		
Clay	28	28
Sand, very fine	15	43
Sand, coarse	37	80
Clay	1	81
Sand, fine	2	83
Gravel and sand	20	103
Jackson group:		
Clay at 103 ft.		

7S-5W-29ddd. Driller's log of irrigation well. Owner, Arkansas State Penal Farm. Driller, M. E. Argo. Surface elevation, 175 ft.

Quaternary deposits:		
Clay	35	35
Sand, medium	25	60
Sand, coarse, and gravel	44	104
Jackson group:		
Clay at 104 ft.		

7S-6W-5bab. Driller's log of irrigation well. Owner, M. H. Bitely. Driller, M .E. McDonald. Surface elevation, 190 ft.

Quaternary deposits:		
Sand, dry	20	20
Sand, fine, red	20	40
Sand, medium	10	50
Good formation	59	109

7S-7W-25bac. Driller's log of irrigation well. Owner, F. Fletcher. Driller, Stuttgart Machine Works. Surface elevation, 187 ft.

Quaternary deposits:		
Top soil and sand	20	20
Sand, muddy, fine	20	40
Sand, medium	10	50
Good formation	80	130

7S-7W-28abb. Driller's log of irrigation well. Owner, R. L. Brown. Driller, J. E. Wittenauer. Surface elevation, 188 ft.

Quaternary deposits:		
Sand and clay	7	7
Sand	30	37
Soil, heavy, black	27	64
Water-bearing sand and gravel	65	129

8S-4W-28dbd. Driller's log of irrigation well. Owner, J. L. Bradshaw. Driller, Layne-Arkansas. Surface elevation, 170 ft.

Quaternary deposits:		
Soil and clay	32	32
Sand, fine	13	45
Sand, medium	9	54
Sand, coarse	9	63
Sand, coarse, and fine gravel	30	93
Jackson group:		
Gumbo at 93 ft.		

8S-4W-32bcc. Driller's log of irrigation well. Owner, C. H. Holtoff, Jr. Driller, M. E. McDonald. Surface elevation, 162 ft.

Quaternary deposits:		
Top soil and sand	5	5
Clay	13	18
Sand, fine, red	27	45
Good formation	35	80
Good sand and lots of gravel	9	89
Rock at 89 ft.		

8S-4W-33ada. Driller's log of irrigation well. Owner, W. J. Bradshaw. Driller, M. E. McDonald. Surface elevation, 169 ft .

	Thickness (feet)	Depth (feet)
Quaternary deposits:		
Top soil and sand	12	12
Clay	26	38
Sand, fine	12	50
Average sand	10	60
Extra good formation	37	97

8S-5W-6cbc. Driller's log of irrigation well. Owner, V. H. Knight. Driller, Layne-Arkansas. Surface elevation, 184 ft.

Quaternary deposits:		
Silt and fine sand	20	20
Sand, fine	10	30
Sand, medium	10	40
Sand, coarse	18	58
Clay	2	60
Sand, coarse, and fine gravel	37	97
Jackson group:		
Clay	4	101

8S-5W-8bda. Driller's log of irrigation well. Owner, Arkansas State Penal Farm. Driller, M. E. Argo. Surface elevation, 180 ft.

Quaternary deposits:		
Clay, sandy	15	15
Sand, fine	40	55
Sand, coarse, and gravel	42	97
Gravel at 97 feet		

8S-5W-27ccc. Driller's log of irrigation well. Owner, W. F. Wilkins. Driller, M. E. McDonald. Surface elevation, 170 ft.

Quaternary deposits:		
Top soil and clay	25	25
Sand, fine	25	50
Sand, medium	20	70
Extra good formation	31	101

8S-6W-1bbd. Driller's log of irrigation well. Owner, R. C. Johnson, Sr. Driller, M. E. McDonald. Surface elevation, 181 ft.

Quaternary deposits:		
Top soil and clay	30	30
Sand, fine	20	50
Sand, gray, and clay	10	60
Extra good formation	22	82

8S-6W-2bdb. Driller's log of irrigation well. Owner, W. H. Venable. Driller, M. E. McDonald. Surface elevation, 185 ft.

Quaternary deposits:		
Top soil and sand	26	26
Sand, medium	34	60
Good formation	39	99
Jackson group:		
Clay, blue at 99 ft.		

8S-6W-10bbd. Driller's log of irrigation well. Owner, W. E. Robertson. Driller, H. S. Ragland. Surface elevation, 184 ft.

Quaternary deposits:		
Clay	6	6
Sand and clay mixture	29	35
Clay, blue	10	45
Good sand and coarse gravel	27	72
Good sand and pea gravel	70	142

8S-6W-17ddd. Driller's log of irrigation well. Owner, G. Lovett. Driller, H. S. Ragland. Surface elevation, 178 ft.

TABLE 10—Continued

Chemical analyses of water from wells and springs in Desha and Lincoln Counties
(Analyses in parts per million except as indicated)

LINCOLN COUNTY—Continued

Well number	Date of collection	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Non-Carbonate	Percent sodium	Specific conductance (micromhoe at 25°C)	pH
							JACKSON GROUP										
9S-7W																	
3cca	10-17-56	----	0.81	----	----	----	16	0	23	101	4.5	----	39	26		60.9	7.0
3daa	10-17-56	----	----	18	3.5	258	272	0	326	34	5.3	873	60	0	----	1,260	7.8
7dbb	9-20-56	----	.21	----	----	----	0	0	171	20	----	----	106	106	----	459	4.5
17cbd	8-26-56	----	.37	----	----	----	46	0	25	10	.9	----	60	22	----	223	7.5
19adb	4-26-56	60	.48	4.1	2.1	15	10	0	24	17	1.4	104	19	11	----	146	5.5
9S-8W																	
1ddb	9-18-56	----	1.0	----	----	----	0	0	2,360	345	1.3	----	2,560	2,560	----	4,230	3.6
2dac	5-16-56	----	.0	44	20	20	64	0	170	9.0	.4	400	192	140	----	476	6.5
5bab	11-30-56	----	.10	----	----	----	10	0	138	32	2.1	----	56	48	----	436	7.0
20acb	4-26-56	----	.03	14	6.3	28	5	0	88	22	2.5	194	61	57	----	351	5.2
10S-6W																	
32cbb	11-30-56	----	.07	----	----	----	1	0	110	28	2.1	----	103	102	----	394	4.7
10S-7W																	
7ddc	8-24-56	----	12	----	----	----	132	0	479	52	2.3	----	389	281	----	1,070	6.8
10cdc	8-29-56	----	3.8	----	----	----	58	0	7	11	4.7	----	51	3	----	160	7.8
14bab	8-29-56	----	2.1	----	----	----	5	0	18	36	8.0	----	27	23	----	201	7.0
17bcc	8-24-56	----	.37	----	----	----	34	0	85	88	170	----	114	86	----	815	7.5
10S-8W																	
15ccd	8-26-56	----	40	----	----	----	0	0	2,330	392	2.0	----	2,160	2,160	----	4,840	2.9
18dbc	11-30-56	----	.40	----	----	----	51	0	240	150	1.9	----	186	144	----	1,100	7.8
27dba	11-30-56	----	6.7	----	----	----	4	0	100	97	2.4	----	80	77	----	594	5.4
34aad	11-30-56	----	.10	----	----	----	1	0	18	7.0	4.3	----	19	18	----	119	4.7
35bdb	11-30-56	----	.24	----	----	----	23	0	565	54	----	----	432	413	----	1,300	7.0
							PLIOCENE(?) DEPOSITS										
9S-7W																	
6bac	9-13-56	----	.08	21	18	35	56	0	1.4	60	94	315	126	80	----	461	6.1
29bab	8-28-56	----	.04	2.1	1.1	2.3	16	0	1.0	2.5	0.7	38	10	0	----	40.1	6.1
35aba	8-30-56	----	.26	2.5	1.1	2.7	6	0	0.6	6.0	2.1	37	11	6	----	35.8	6.5
9S-8W																	
1dda	9-18-56	----	1.6	----	----	----	25	0	16	16	9.6	----	42	22	----	200	6.5
10S-7W																	
3acc	7-30-56	----	.04	1.6	.6	1.9	4	0	1.0	4.5	4.5	42	6	3	----	32.5	5.6
8dda	8-29-56	----	.29	----	----	----	73	0	3	26	45	----	102	42	----	320	7.6
11cca	8-29-56	----	.37	----	----	----	6	0	12	18	18	----	33	28	----	136	6.5
							QUATERNARY TERRACE DEPOSITS										
7S-7W																	
30cac	4-27-56	64.5	.16	93	39	119	171	0	46	295	100	950	392	252	37	1,510	6.9
8S-8W																	
12dac	11-30-56	----	.51	----	----	----	84	0	17	20	34	----	25	0	----	329	8.0
16abc	11-30-56	----	.00	----	----	----	3	0	17	55	72	----	102	100	----	469	7.3
20bdd	11-30-56	----	.07	----	----	----	14	0	8	5.0	2.2	----	10	0	----	50.8	7.1
29abb	11-30-56	----	.00	----	----	----	142	0	85	75	20	----	113	0	----	686	8.2
10S-5W																	
6ccd	11-30-56	----	1.6	----	----	----	165	3	4	35	1.1	----	118	0	----	394	8.3
7ccd	11-30-56	----	.11	----	----	----	69	0	1	22	0.1	----	47	0	----	185	7.9
18cac	11-30-56	----	.05	----	----	----	34	0	2	5.0	0.6	----	19	0	----	83.8	7.5
10S-6W																	
11cdb	11-30-56	----	.56	----	----	----	28	0	2	84	16	----	122	99	----	383	7.0
12add	6-11-56	65	.02	4.3	1.0	7.5	30	0	3.2	5.2	1.0	80	15	0	48	79.6	6.2
16ddc	11-30-56	----	.77	----	----	----	32	0	2	25	8.6	----	19	0	----	163	7.4
22caa	11- 7-56	----	.57	3.6	.4	6.7	20	0	1.6	5.2	.9	79	11	0	58	64.9	7.3
23cda	4-27-56	64.5	.71	16	14	32	7	0	23	41	117	330	97	92	42	441	5.4
10S-7W																	
19dbb	8-23-56	----	.07	----	----	----	8	0	2	8.0	16	----	14	7	----	728	6.8
30bbb	8-24-56	----	.12	----	----	----	10	0	17	62	----	----	54	46	----	289	7.0
10S-8W																	
5cbc	10- 4-56	----	.05	9.4	7.9	38	5	0	13	42	96	268	56	52	60	357	6.1
14aac	8-23-56	----	1.4	----	----	----	0	0	15	83	68	----	49	49	----	571	4.3
16abc	11-30-56	----	.08	----	----	----	0	0	3	26	23	----	27	27	----	170	4.5
20bda	11- 7-56	----	.12	----	----	----	41	0	1	37	14	----	72	38	----	275	7.6
32aab	11- 7-56	----	.29	8.1	4.5	48	7	0	25	72	11	214	39	33	73	346	5.6
							QUATERNARY ALLUVIUM										
7S-5W																	
19dbd	8-19-52	64	19	----	----	----	322	8	18	64	1.5	----	245	0	----	714	8.2
29ddd	8-19-52	64	18	----	----	----	357	0	36	101	1.2	----	322	29	----	887	8.0
30aac	8-19-52	64	5.1	----	----	----	305	0	30	82	.0	----	311	61	----	748	8.0

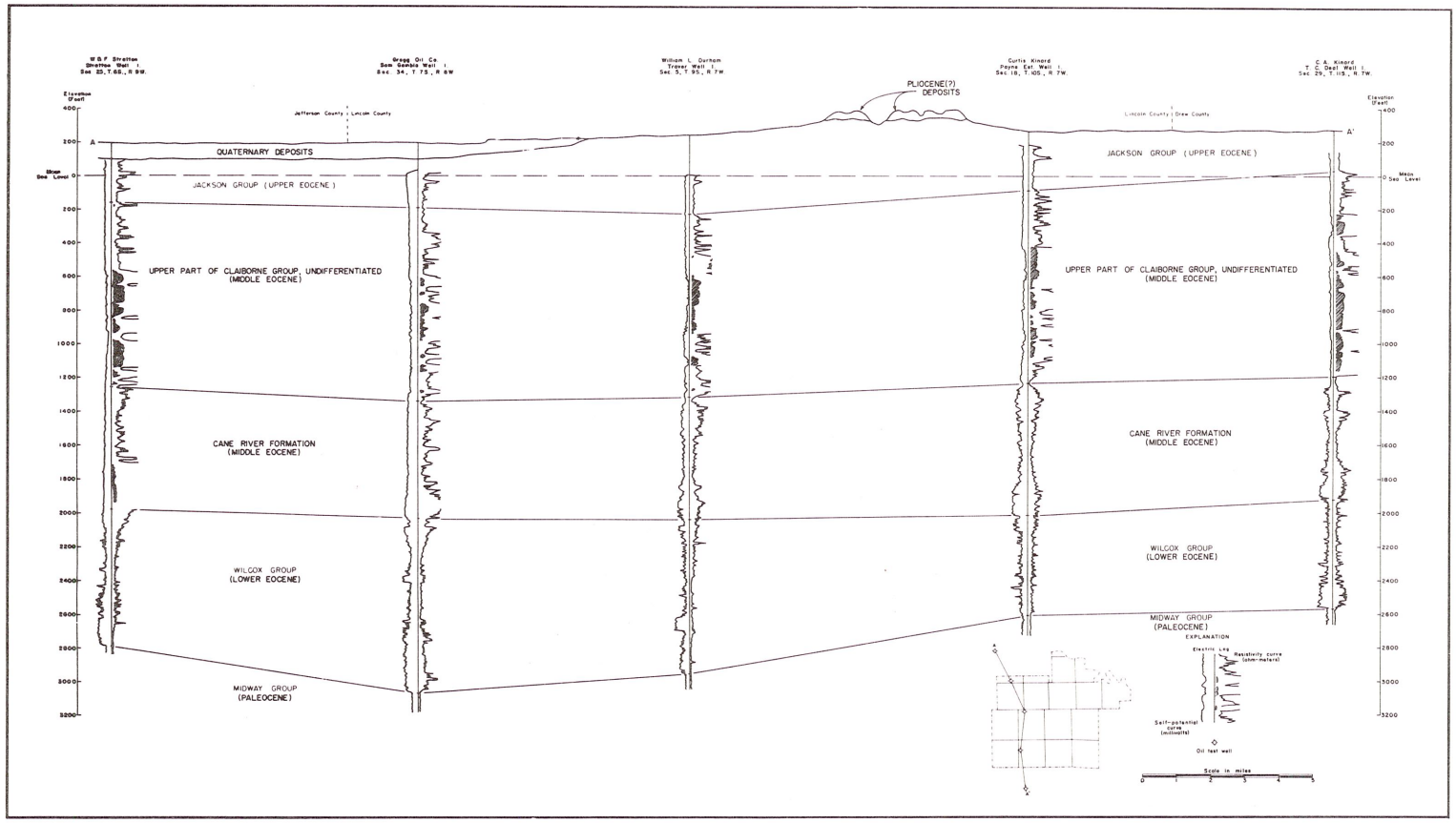
TABLE 10—Continued

Chemical analyses of water from wells and springs in Desha and Lincoln Counties
(Analyses in parts per million except as indicated)

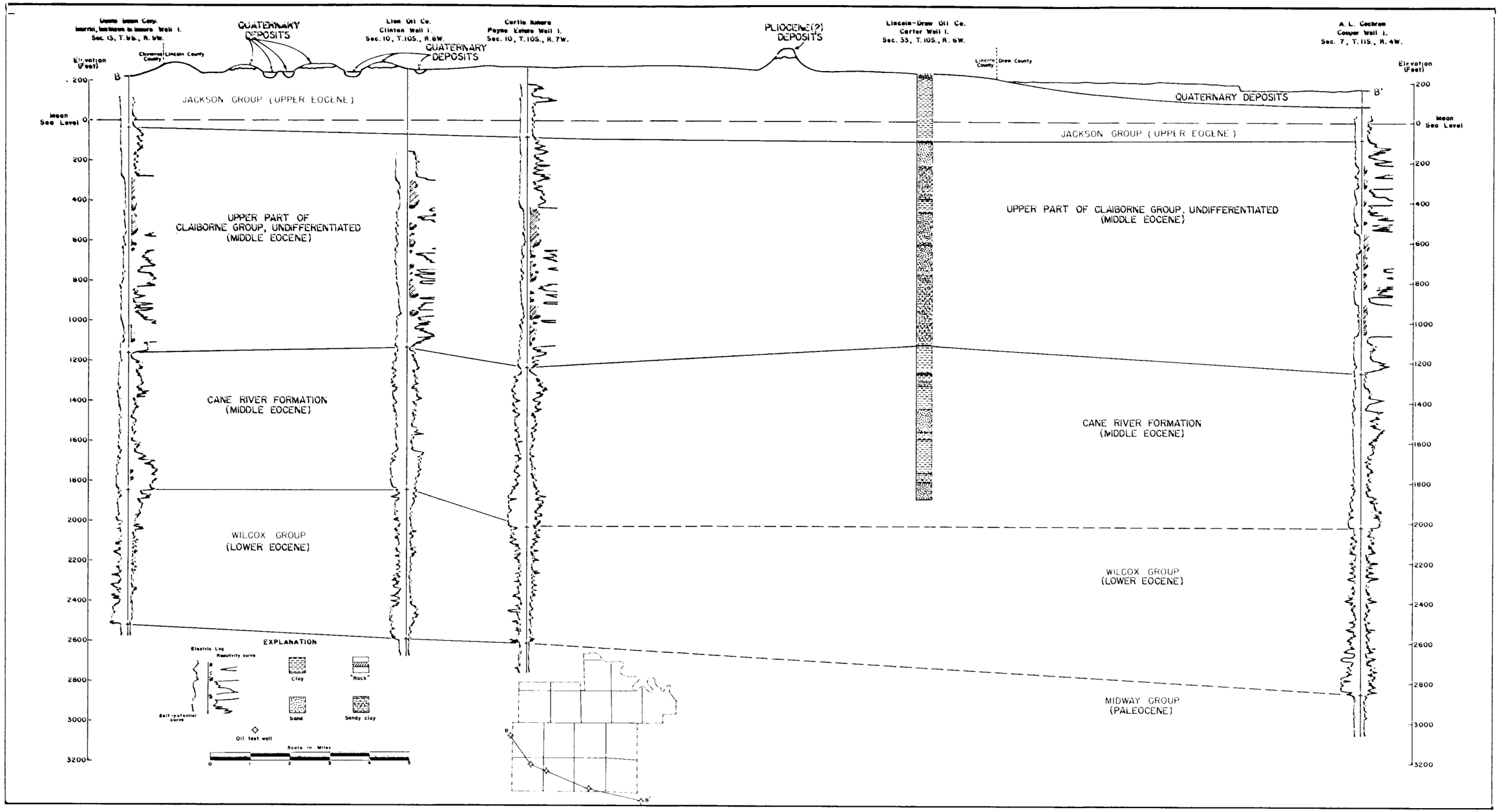
LINCOLN COUNTY—Continued

Well number	Date of collection	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Non-Carbonate	Percent sodium	Specific conductance (micromhoe at 25°C)	pH
							QUATERNARY ALLUVIUM—Continued										
7S-6W																	
5bab	6- 5-56	65	6.7	104	28	35	456	0	1.2	55	0.2	460	374	1	17	772	7.3
24caa	8-19-52	64	8.1	136	29	39	454	0	43	82	1.3	610	458	86	16	972	7.0
7S-7W																	
25dbc	6- 5-56	65	4.0	82	15	34	341	0	8.6	36	1.7	375	266	0	22	615	7.2
26dcb	9- 3-52	65	7.1	97	23	39	457	0	5.6	30	.0	445	336	0	20	749	6.9
28abb	9- 3-52	65	7.0	----	----	----	244	17	82	137	.0	----	357	129	----	944	8.5
8S-4W																	
7cda	8-20-52	65	11	----	----	----	212	10	12	21	.1	----	180	0	----	448	8.3
31cba	8-26-52	65	22	----	----	----	248	16	20	164	.0	----	378	148	----	1,070	8.4
32baa	8-26-52	65	14	----	----	----	192	7	24	178	.0	----	333	158	----	1,050	8.2
32dbb	8-26-52	65	15	----	----	----	255	22	17	148	1.2	----	352	107	----	1,040	8.4
8S-5W																	
5dcc	7-27-53	65	21	----	----	----	287	6	55	160	.2	----	394	149	----	1,010	8.4
10cbd	8-19-52	64	11	----	----	----	330	11	44	98	.0	----	379	90	----	869	8.3
12abd	8-20-52	64	32	75	19	25	336	0	15	12	2.2	335	265	0	17	561	6.5
13aad	8-20-52	65	11	----	----	----	262	8	18	28	.0	----	199	0	----	542	8.2
34cac	6- 1-56	----	18	67	17	34	271	0	1.6	57	.2	349	237	15	24	586	8.2
8S-6W																	
2dcd	8-26-52	64	8.7	----	----	----	272	24	2.0	17	.0	----	247	47	----	527	8.6
3ccc	8-21-52	65	6.7	----	----	----	286	8	3.0	33	.0	----	231	0	----	551	8.3
6aaa	8-26-52	64	6.9	84	21	35	383	0	10	29	.3	393	296	0	20	667	6.9
10bbd	8-21-52	65	4.7	----	----	----	242	16	2.0	30	.0	----	201	0	----	496	8.3
11dca2	8-26-52	64	8.0	----	----	----	234	14	6.0	16	.0	----	200	0	----	463	8.5
16bbc	8-21-52	65	17	----	----	----	286	9	12	46	1.1	----	253	4	----	607	8.3
17add	8-21-52	65	5.9	----	----	----	266	7	16	50	.0	----	226	0	----	592	8.3
17ddd	8-21-52	65	4.2	----	----	----	266	4	12	52	.1	----	247	22	----	592	8.2
19ddd	8-21-52	65	13	----	----	----	254	0	7	24	.0	----	220	12	----	480	7.6
21bbc	8-26-52	64	3.2	----	----	----	302	22	10	51	1.2	----	309	25	----	707	8.4
22caa	7-27-53	65	4.3	----	----	----	260	0	8	64	1.5	----	218	5	----	603	8.2
22cbb	8-26-52	64	7.1	----	----	----	290	23	6	55	1.4	----	292	0	----	691	8.5
22dca	7-27-53	65	4.7	----	----	----	277	2	20	80	.4	----	270	40	----	683	8.3
28cca	8-26-52	65	6.9	----	----	----	185	12	6.0	33	.0	----	188	17	----	429	8.4
29bbb	6- 1-56	65	.11	60	11	22	242	0	9.6	20	.9	275	195	0	20	447	7.1
29dcc	8-26-52	65	6.5	----	----	----	218	12	6.0	22	1.0	----	214	16	----	452	8.4
31dbc	8-21-52	65	13	----	----	----	188	3	1.0	8.8	.9	----	149	0	----	329	8.1
9S-5W																	
4aad	8-22-52	65	13	----	----	----	174	6	3	46	.1	----	147	0	----	427	8.3
6caa	7-24-53	65	9.6	69	18	36	301	0	16	44	.2	360	246	0	24	606	6.9
8ccb	8-20-52	64	16	42	13	23	204	0	11	21	.0	239	158	0	24	390	6.6
25bac	8-22-52	65	13	----	----	----	258	6	18	36	.1	----	225	4	----	532	8.2
9S-6W																	
3bad	8-21-52	65	9.4	----	----	----	204	7	7.0	28	.0	----	188	9	----	424	8.3
3cba	8-12-52	65	4.2	----	----	----	203	11	3.0	8.0	1.0	----	171	0	----	366	8.4
10S-5W																	
8dbc	6-11-56	65	7.1	47	11	19	222	0	4.0	10	.3	238	162	0	20	364	7.3

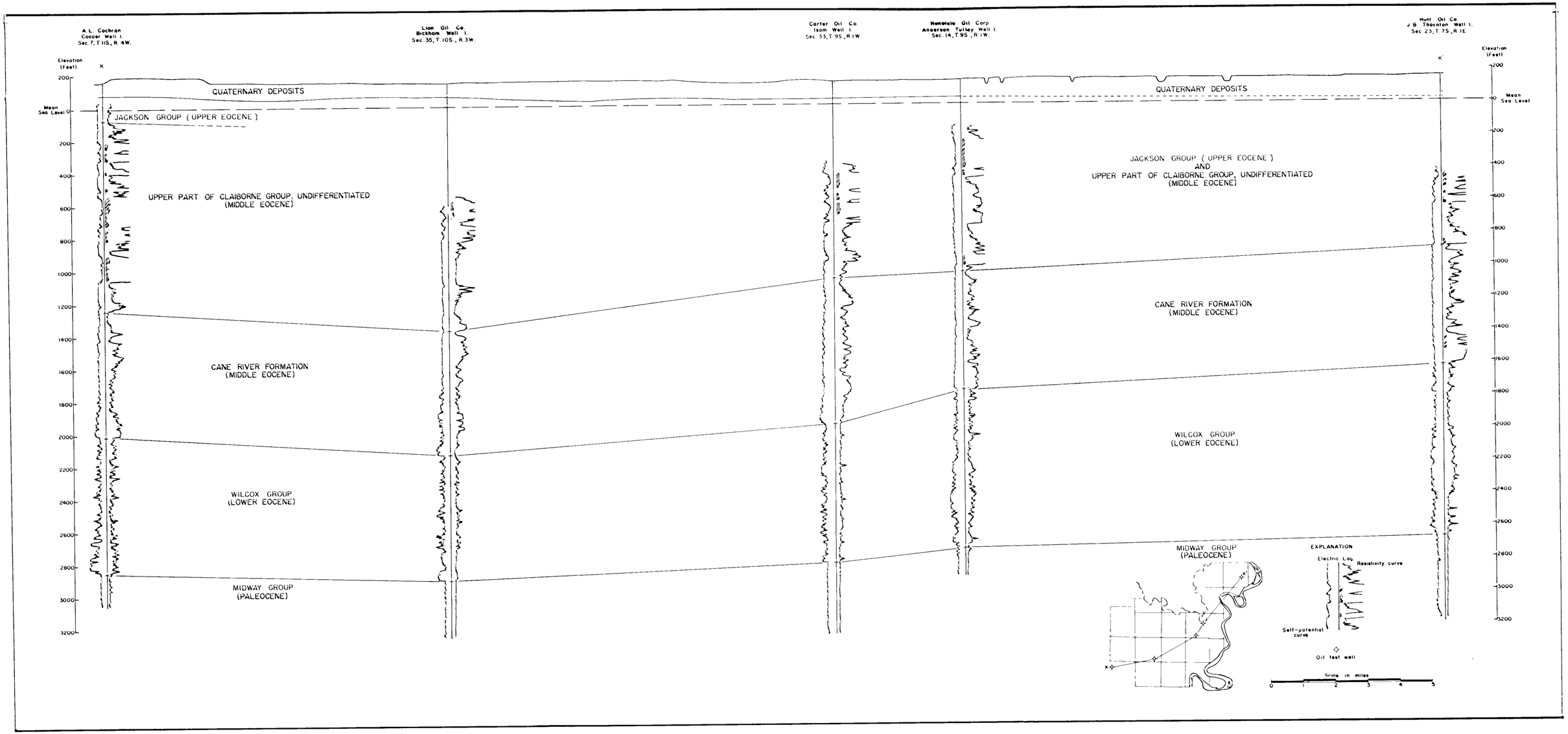
PLATE 1.



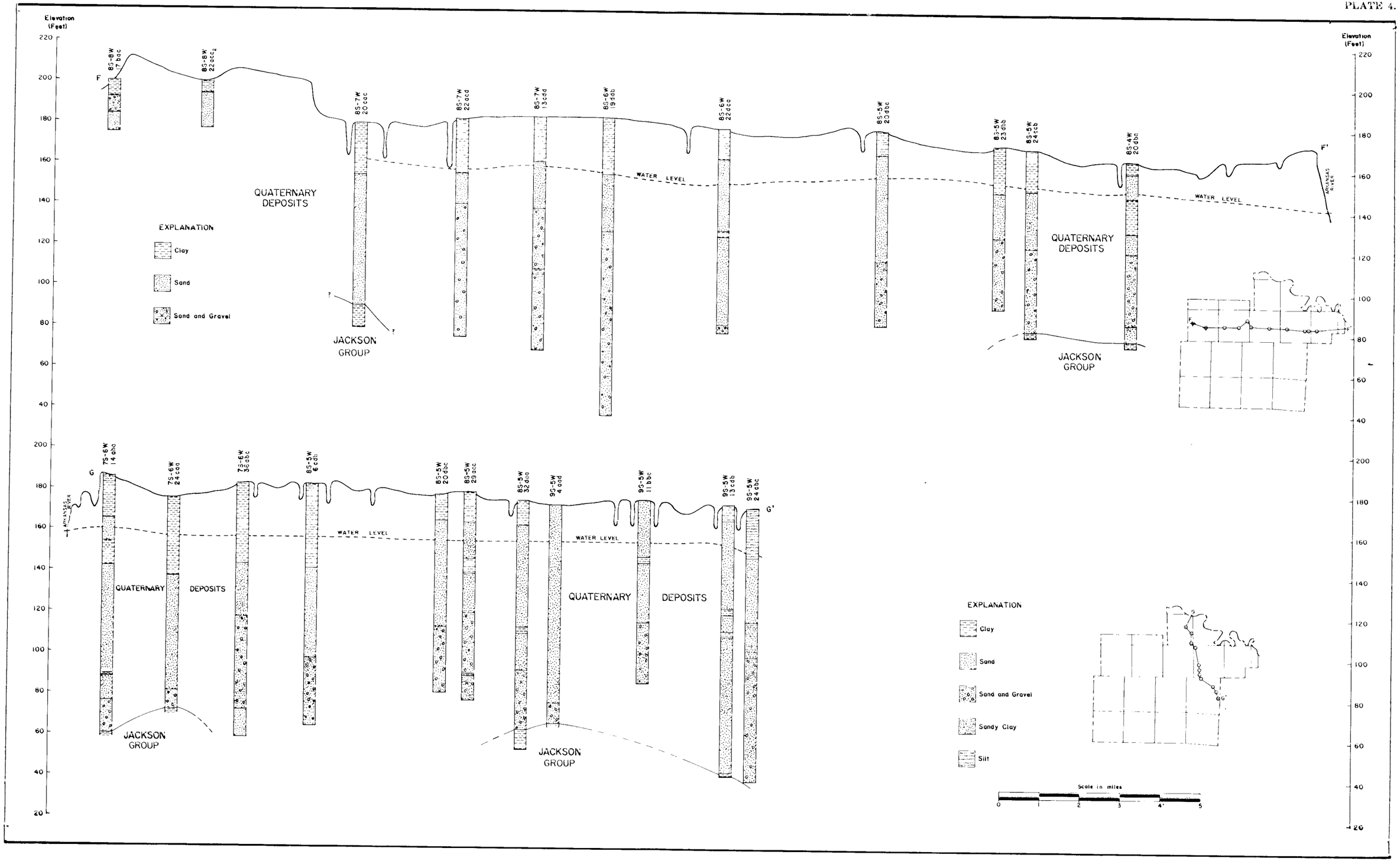
GENERALIZED GEOLOGIC SECTION A-A' ACROSS LINCOLN COUNTY, SHOWING DEPOSITS OF TERTIARY AND QUATERNARY AGE



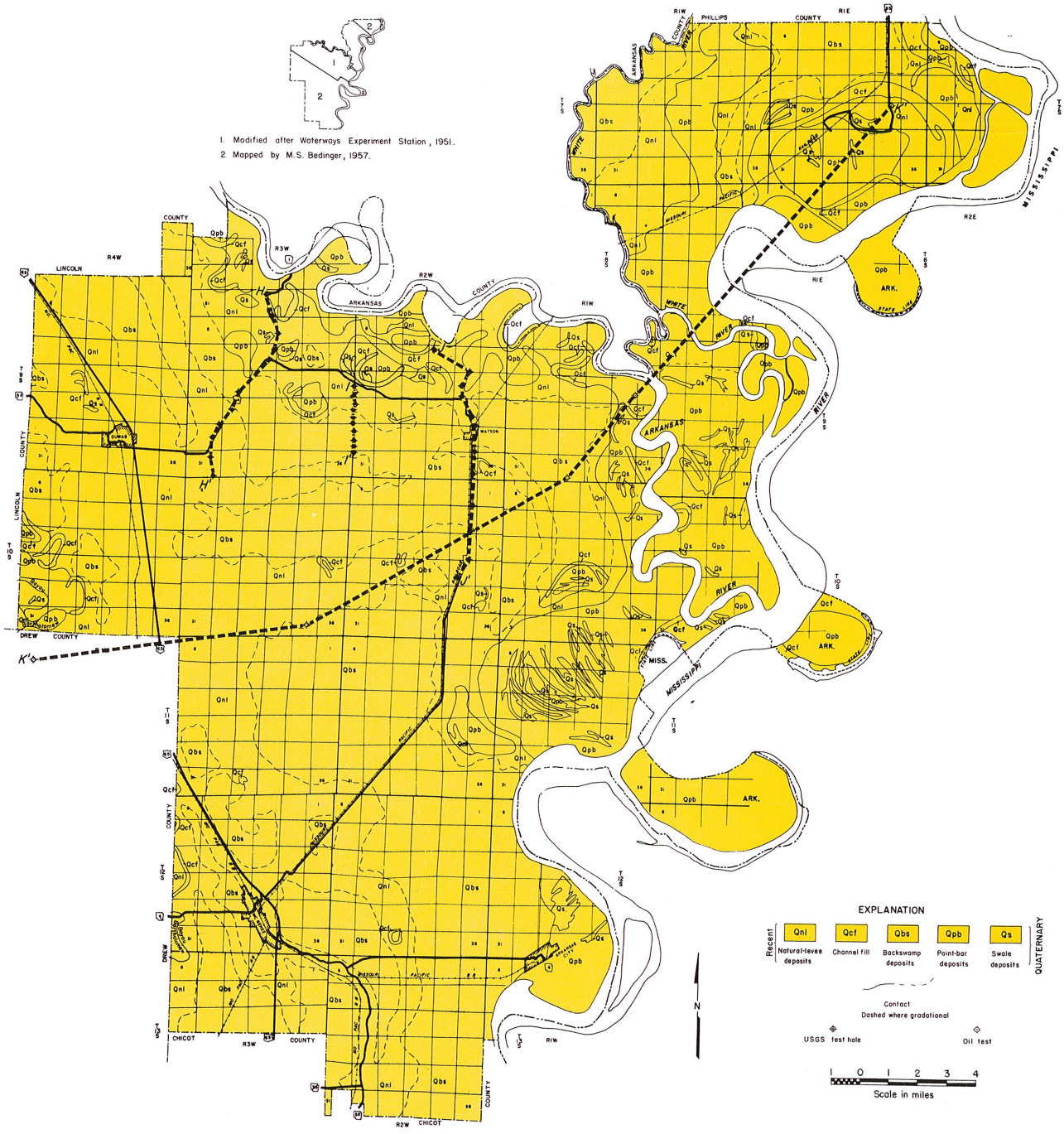
GENERALIZED GEOLOGIC SECTION B-B' ACROSS LINCOLN COUNTY, SHOWING DEPOSITS OF TERTIARY AND QUATERNARY AGE.



GENERALIZED GEOLOGIC SECTION K-K' ACROSS DESHA COUNTY, SHOWING DEPOSITS OF TERTIARY AND QUATERNARY AGE.



GEOLOGIC SECTIONS G-G' AND F-F' ACROSS LINCOLN COUNTY, SHOWING THE QUATERNARY DEPOSITS.



GEOLOGIC MAP OF DESHA COUNTY, SHOWING LOCATIONS OF CROSS SECTIONS.

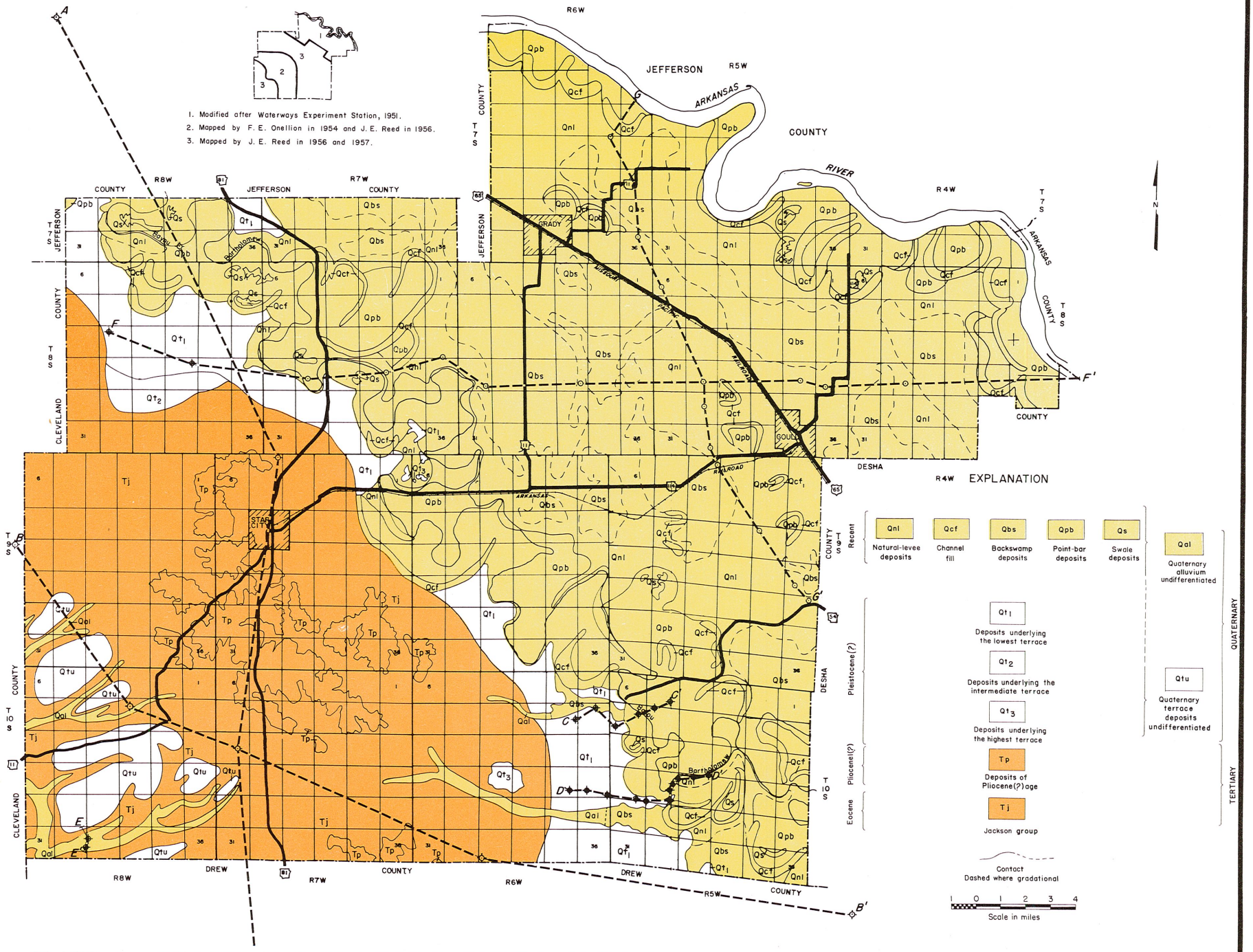
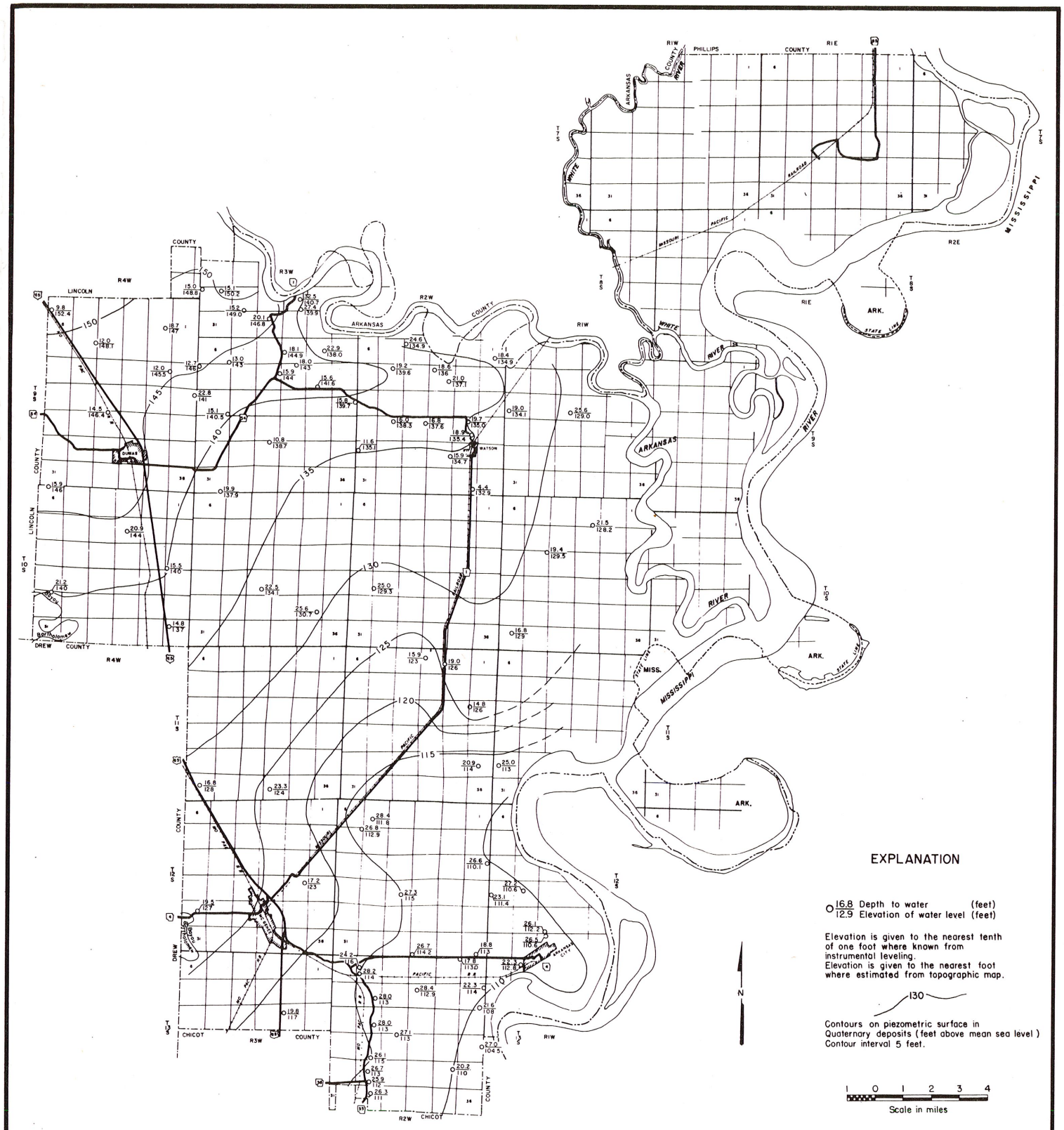
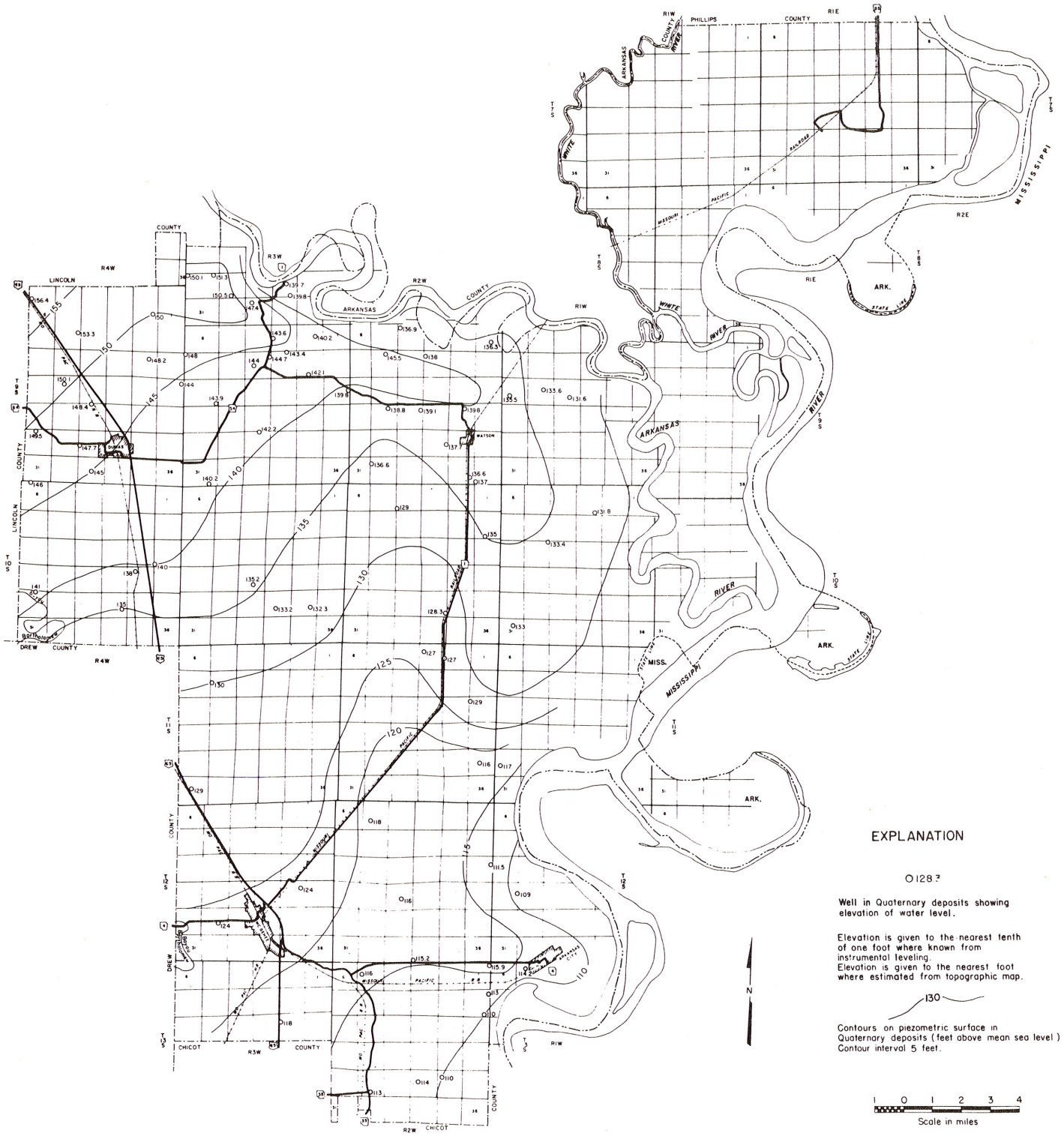


PLATE 6. GEOLOGIC MAP OF LINCOLN COUNTY, SHOWING LOCATIONS OF CROSS SECTIONS.

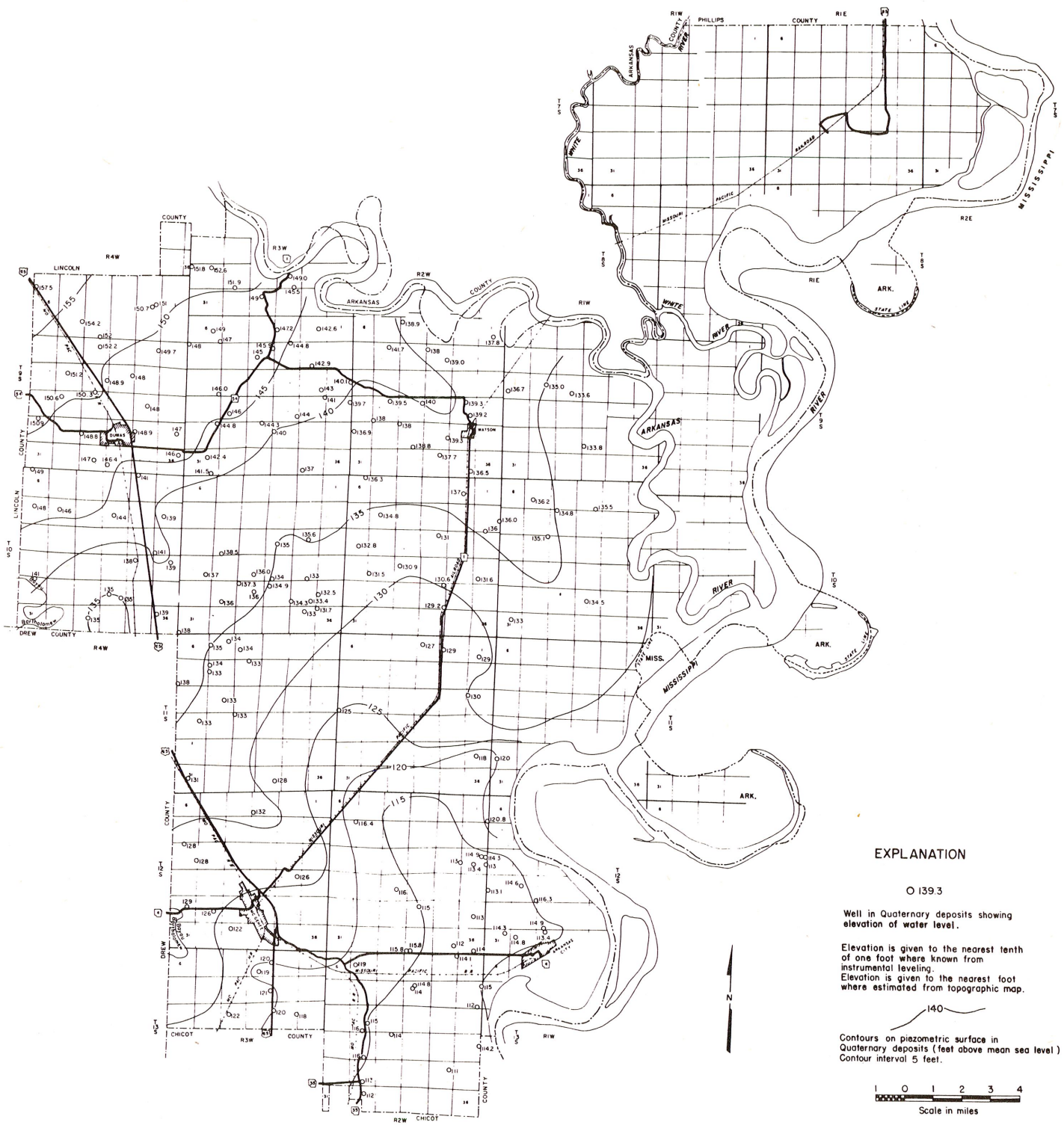


MAP OF DESHA COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR DECEMBER 1956.

PLATE 8.

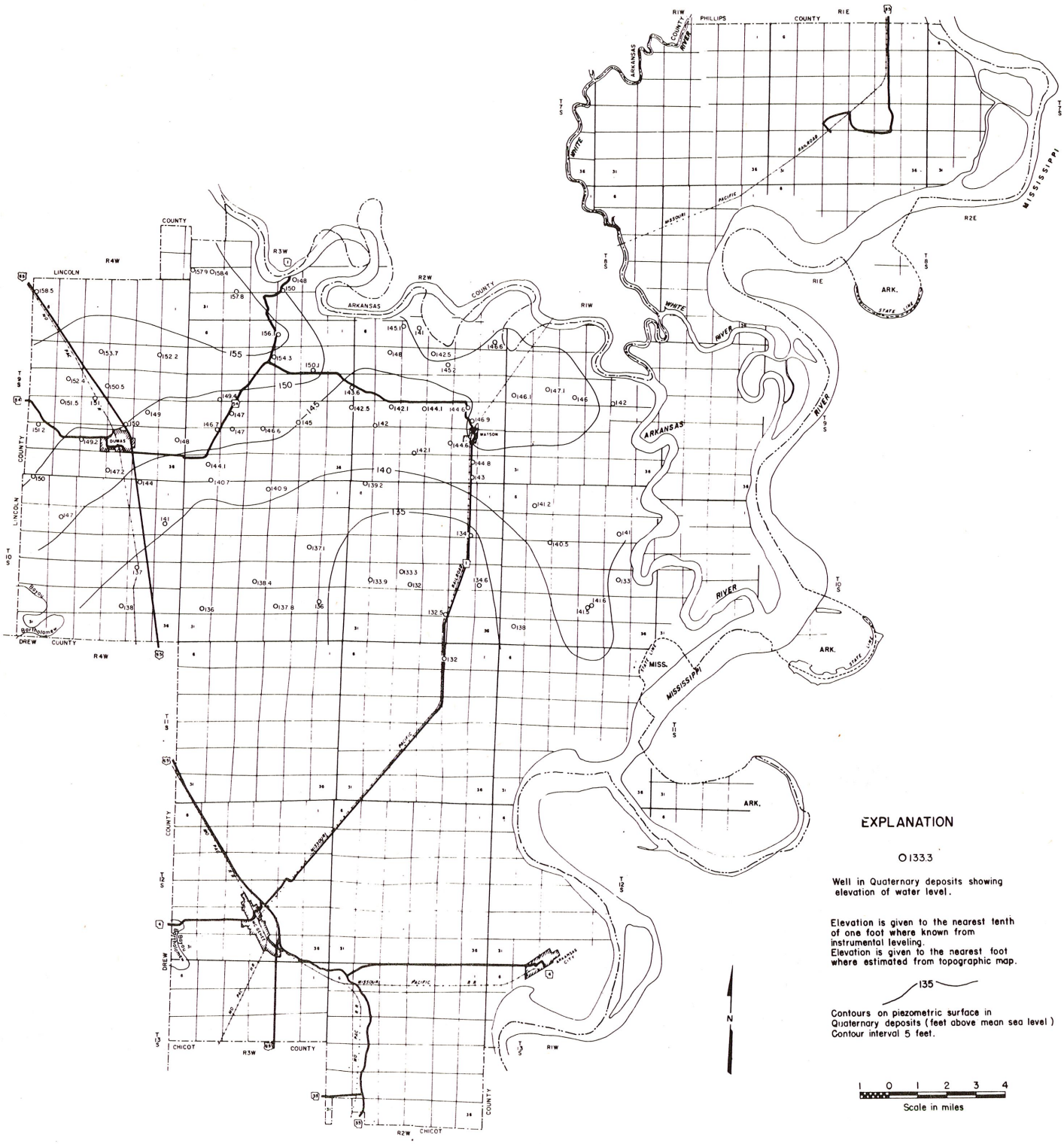


MAP OF DESHA COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR FEBRUARY 1957

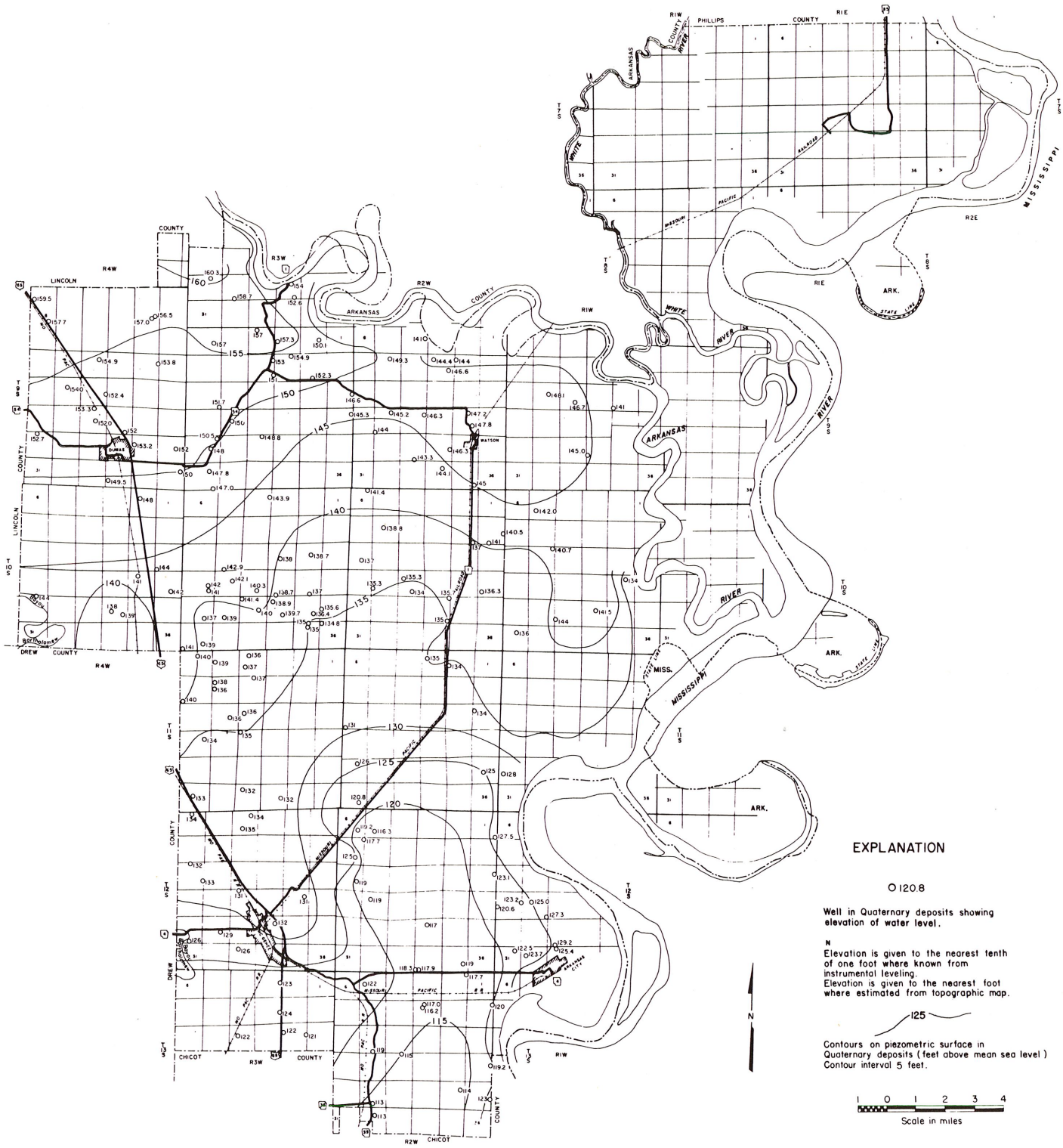


MAP OF DESHA COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR APRIL 1957.

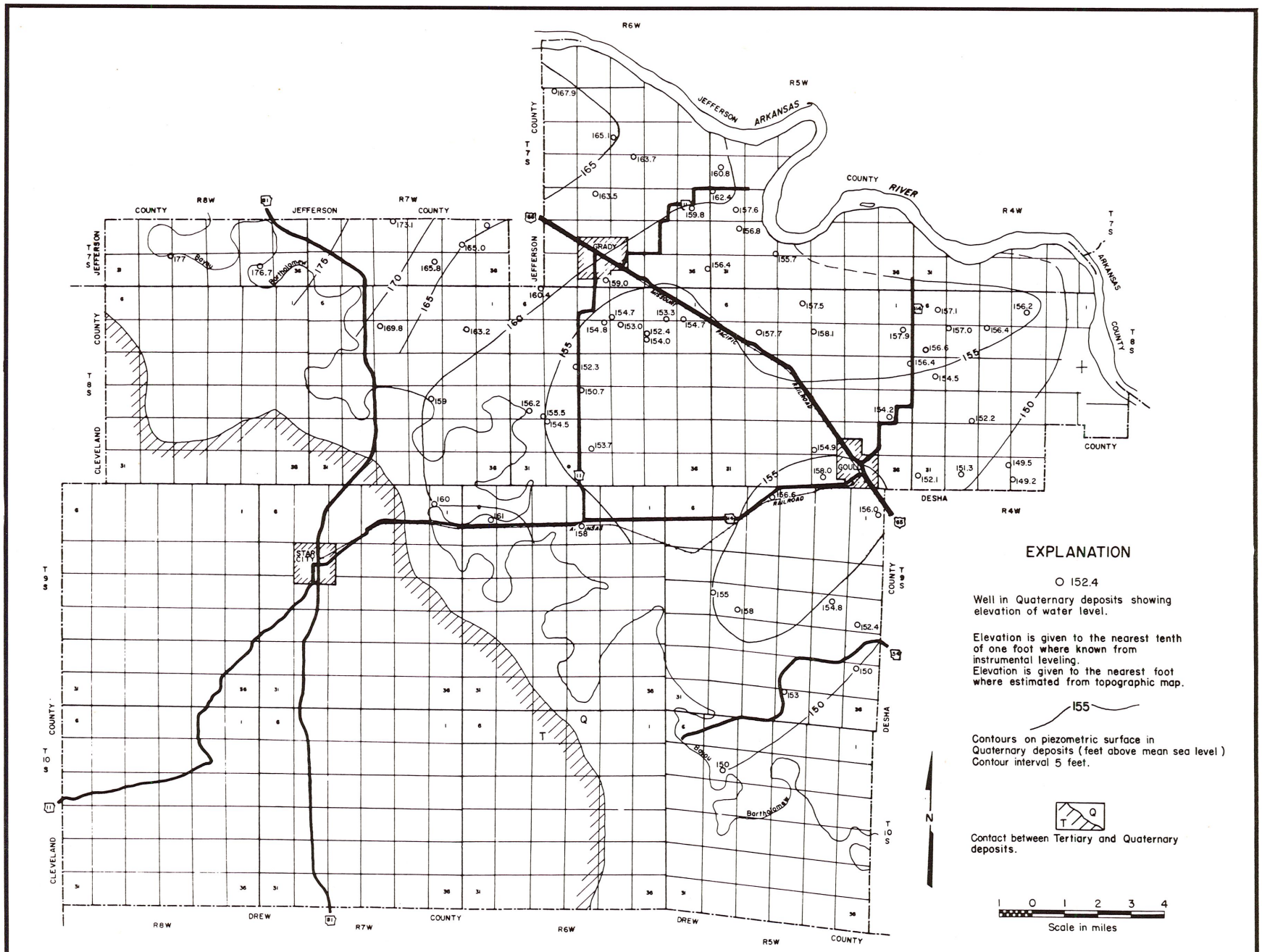
PLATE 10.



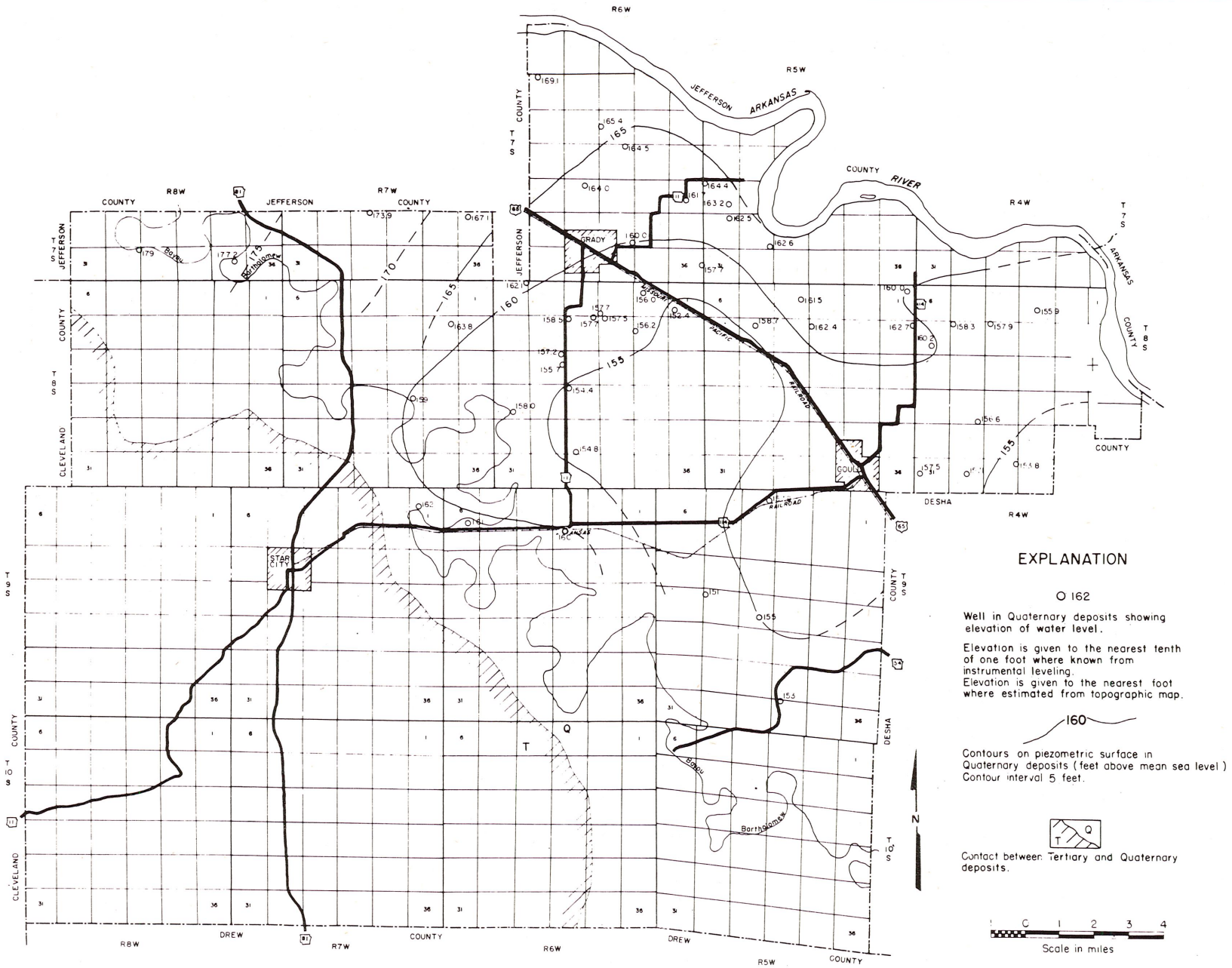
MAP OF DESHA COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR DECEMBER 1957.



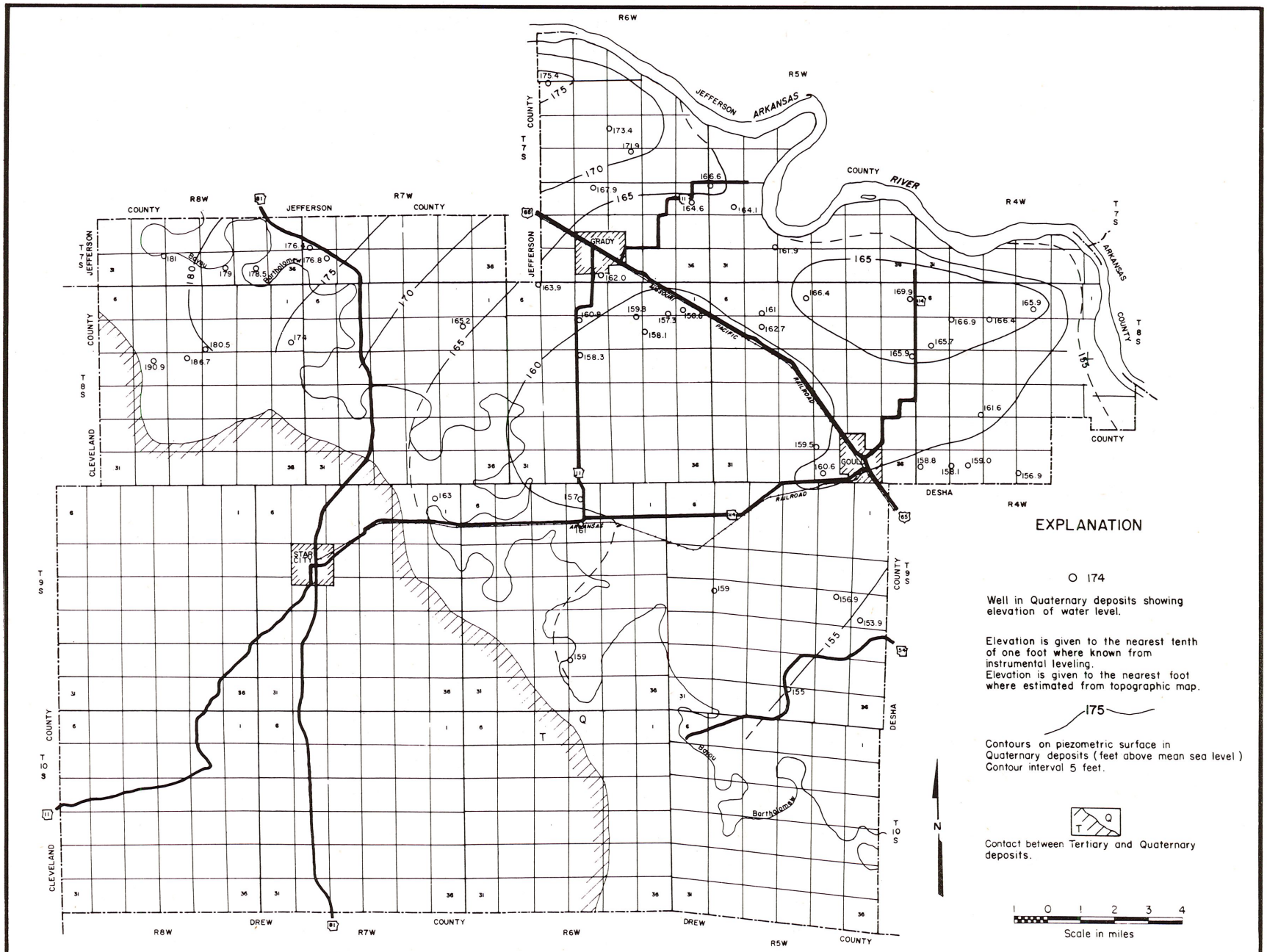
MAP OF DESHA COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR APRIL 1958.



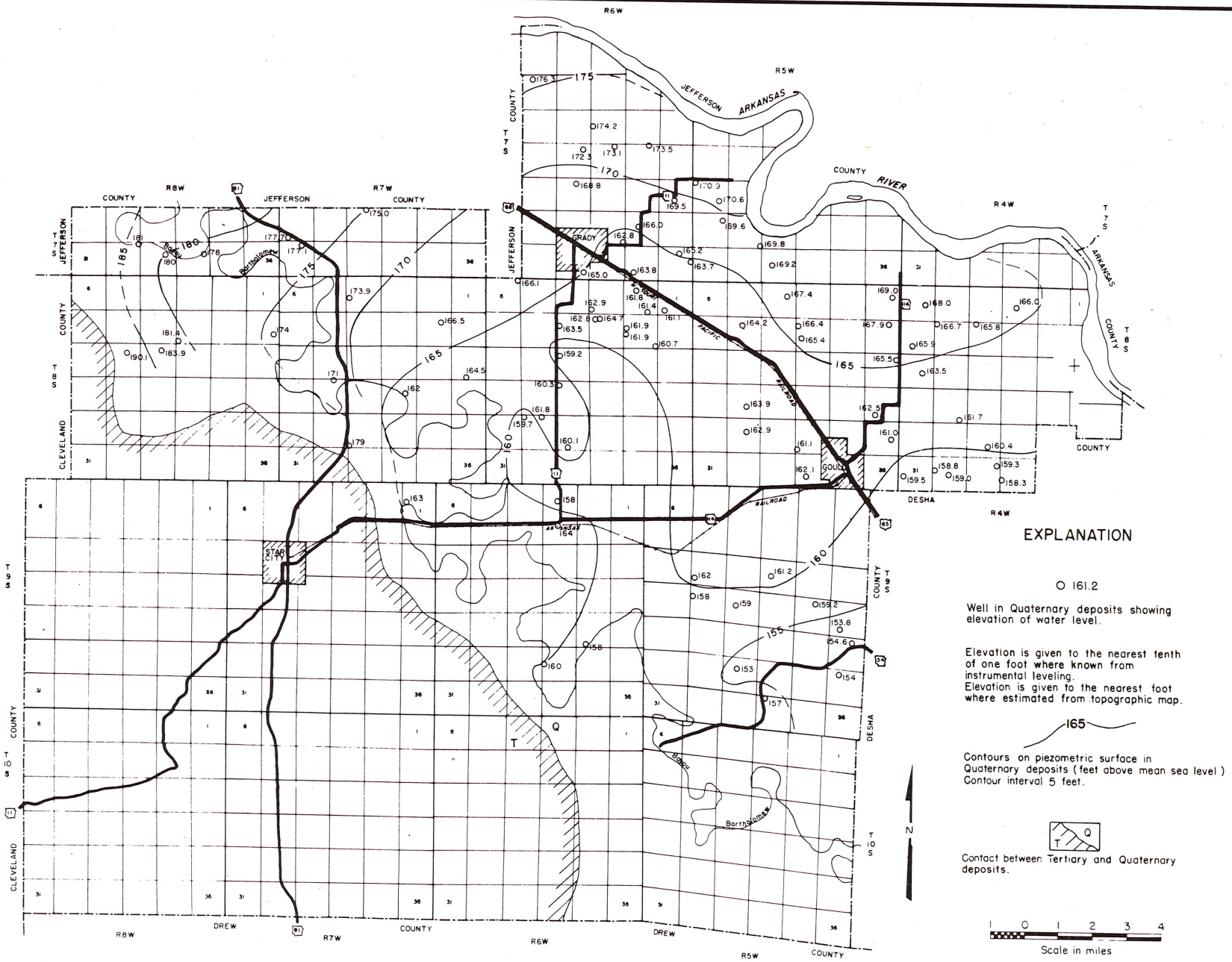
MAP OF LINCOLN COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR DECEMBER 1955.



MAP OF LINCOLN COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR FEBRUARY 1956.

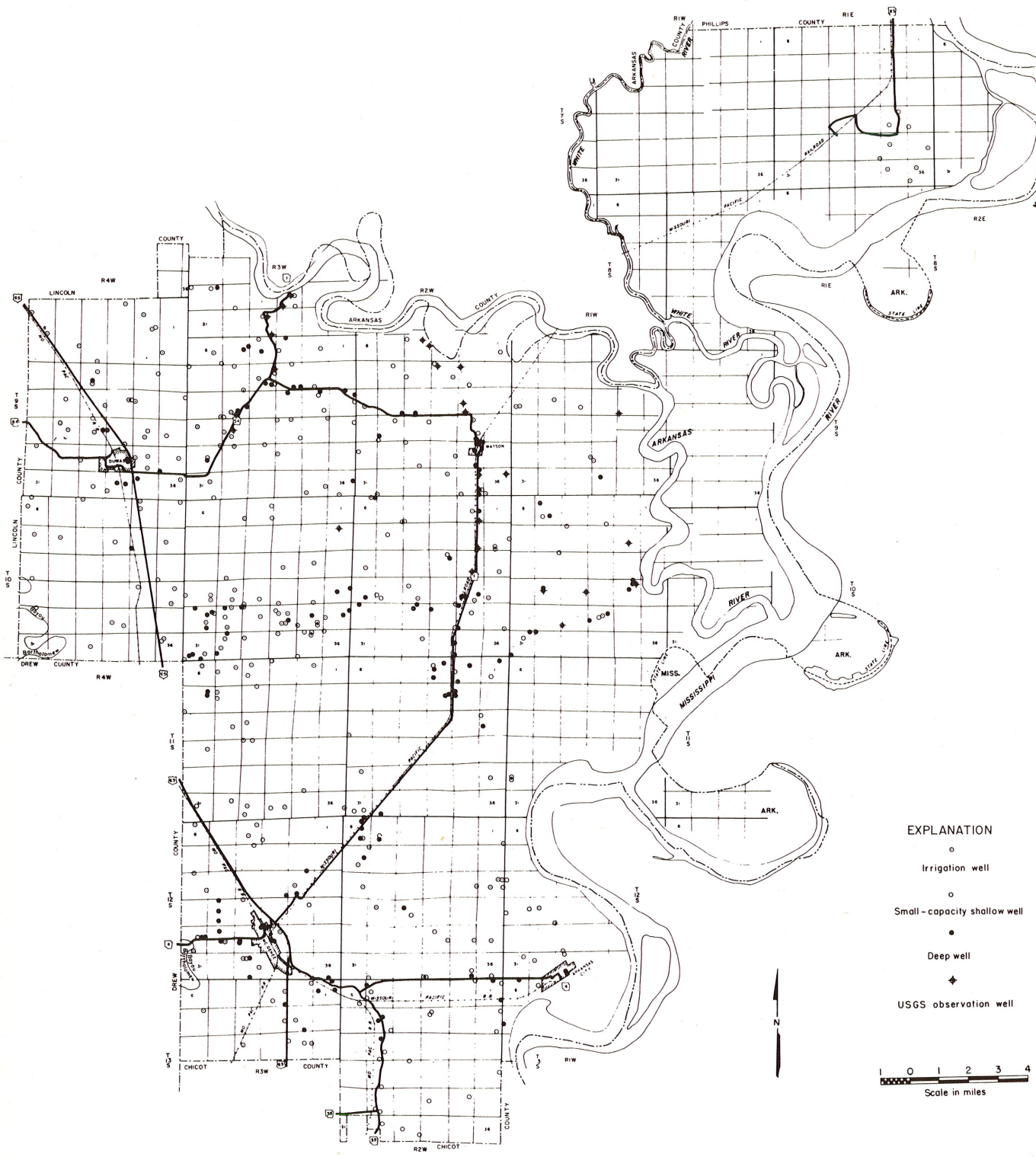


MAP OF LINCOLN COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR DECEMBER 1957.

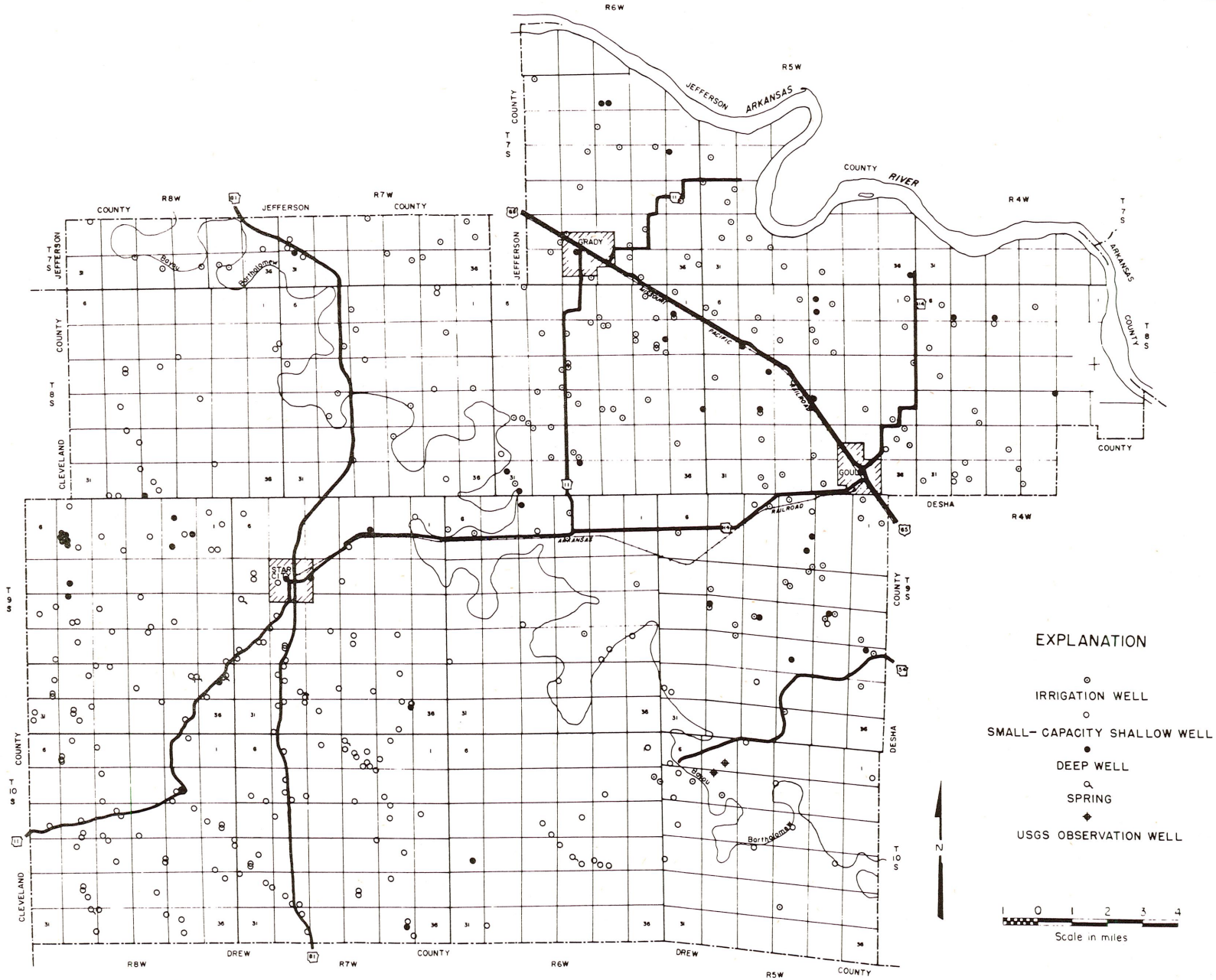


MAP OF LINCOLN COUNTY SHOWING THE PIEZOMETRIC SURFACE IN THE QUATERNARY ALLUVIUM FOR APRIL 1958.

PLATE 18.



MAP OF DESHA COUNTY SHOWING LOCATION OF WELLS.



MAP OF LINCOLN COUNTY SHOWING LOCATION OF WELLS AND SPRINGS.