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DIVISION OF WATER RESOURCES

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GROUND-WATER RESOURCES OF NORTHWESTERN INDIANA

Preliminary Report: Newton County

Prepared by the

GEOLOGICAL SURVEY

UNITED STATES DEPARTMENT OF THE INTERIOR

In cooperation with the

DIVISION OF WATER RESOURCES

INDIANA DEPARTMENT OF CONSERVATION

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Donald E. Foltz, Director

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Charles H. Bechert, Director

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BY

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GEOLOGISTS, U. S. GEOLOGICAL SURVEY

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CONTENTS

ILLUSTRATIONS

(All plates in pocket)

TABLES

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ABSTRACT

Newton County, in northwestern Indiana, has an area of about 413 square miles. Glaciofluvial sand and gravel of Pleistocene age is the chief source of ground water in much of the county. Wells that tap this source generally are less than 120 feet deep and yield as much as 600 gpm (gallons per minute). The dolomitic limestone of Devonian age is used extensively in the central and extreme southeastern parts of the county. Wells that tap this source generally are less than 250 feet deep and yield as much as 500 gpm. Water from the rocks of Devonian and Pleistocene age varies somewhat in chemical quality. Field chemical analyses show the hardness of water from rocks of Devonian age generally is greater than 60 and less than 250 ppm (parts per million). The hardness of water from rocks of Pleistocene age generally is greater than 100 and less than 300 ppm.

This preliminary report contains tabulated records of about 280 wells and test holes giving information about well construction, water level, condition of occurrence, and characteristics of water-bearing material; selected logs for about 80 wells and test holes giving driller's description of material penetrated and authors' interpretation of their geologic age; results of about 240 field chemical analyses giving hardness of water and the bicarbonate, chloride, iron, and sulfate contents; and water levels in 4 observation wells indicating the magnitude of short-term and long-term water-level fluctuations in the consolidated and unconsolidated rocks. These basic data include much of the material to be used in an interpretive report on the ground-water resources and geology of the area.

A base map of Newton County shows the location of each well or test hole listed in this report. Additional maps show the availability of ground water in the county and the areal distribution of hardness of water from the consolidated rocks of Devonian age and the unconsolidated rocks of Pleistocene age.

INTRODUCTION

Purpose and Scope

An investigation of the ground-water resources and geology of 10 counties in northwestern Indiana has been in progress since June 1954. This investigation is being made by the U. S. Geological Survey in cooperation with the Division of Water Resources, Indiana Department of Conservation, as a part of a broad program of these agencies to inventory and evaluate the ground-water resources of Indiana.

This report is the tenth of a series of 10 preliminary reports to be published on the ground-water resources and geology of northwestern Indiana. The purpose of the report is to make the basic data collected during the investigation available to the public and to provide a preliminary evaluation of the ground-water conditions and geology as an aid to development of ground-water resources. A more detailed and comprehensive analysis is in progress and will be published in an interpretive report on the ground-water resources and geology of the area.

The investigation was made under the immediate supervision of C. M. Roberts, district geologist for Indiana.

Location and Areal Extent

Newton County is in the northwestern part of Indiana (fig. 1). The county is roughly rectangular and includes about 413 square miles. It is bounded on the north by Lake County, on the south by Benton County, on the west by Illinois, and on the east by Jasper County.

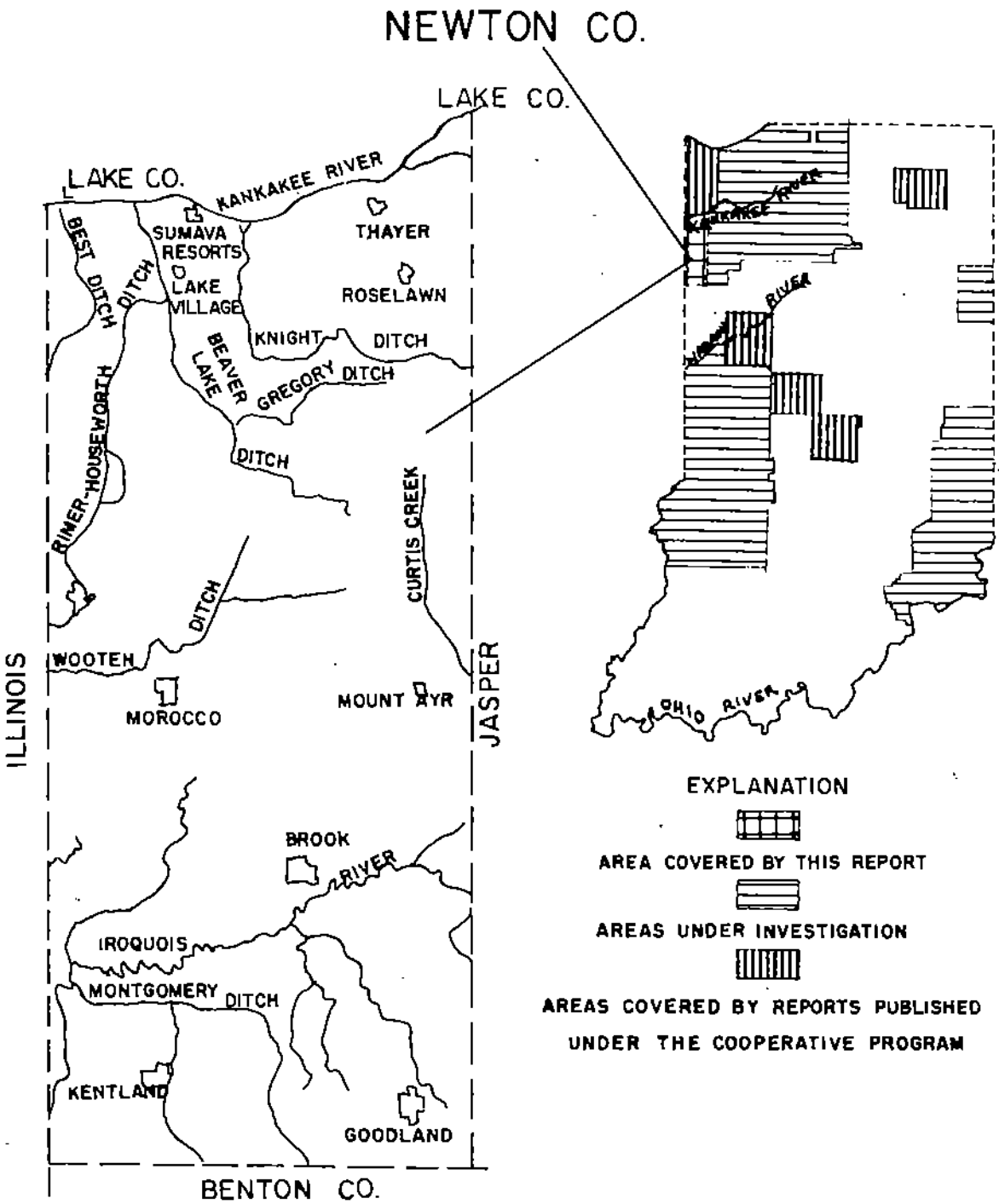

FIGURE 1. -- Map of Indiana, showing area covered by this report, areas under investigation, and areas covered by reports published under the cooperative program.

Well-Numbering System

A numbering system is used to locate and identify the wells and test holes in this report. The number that is assigned each well or test hole indicates its location according to the official rectangular public-land survey. For example, in the number for well 29/8W-36H1, the numbers preceding the hyphen indicate that the well is in T. 29 N., R. 8 W. The first number after the hyphen indicates the section in which the well is located. Each quarter-quarter section (40-acre tract) within a section is assigned a letter symbol as shown on figure 2. Within the quarter-quarter section the wells and test holes are numbered consecutively. Therefore, well 36H1 is the first well listed in SE¼NE¼ sec. 36, T. 29 N., R. 8 W.

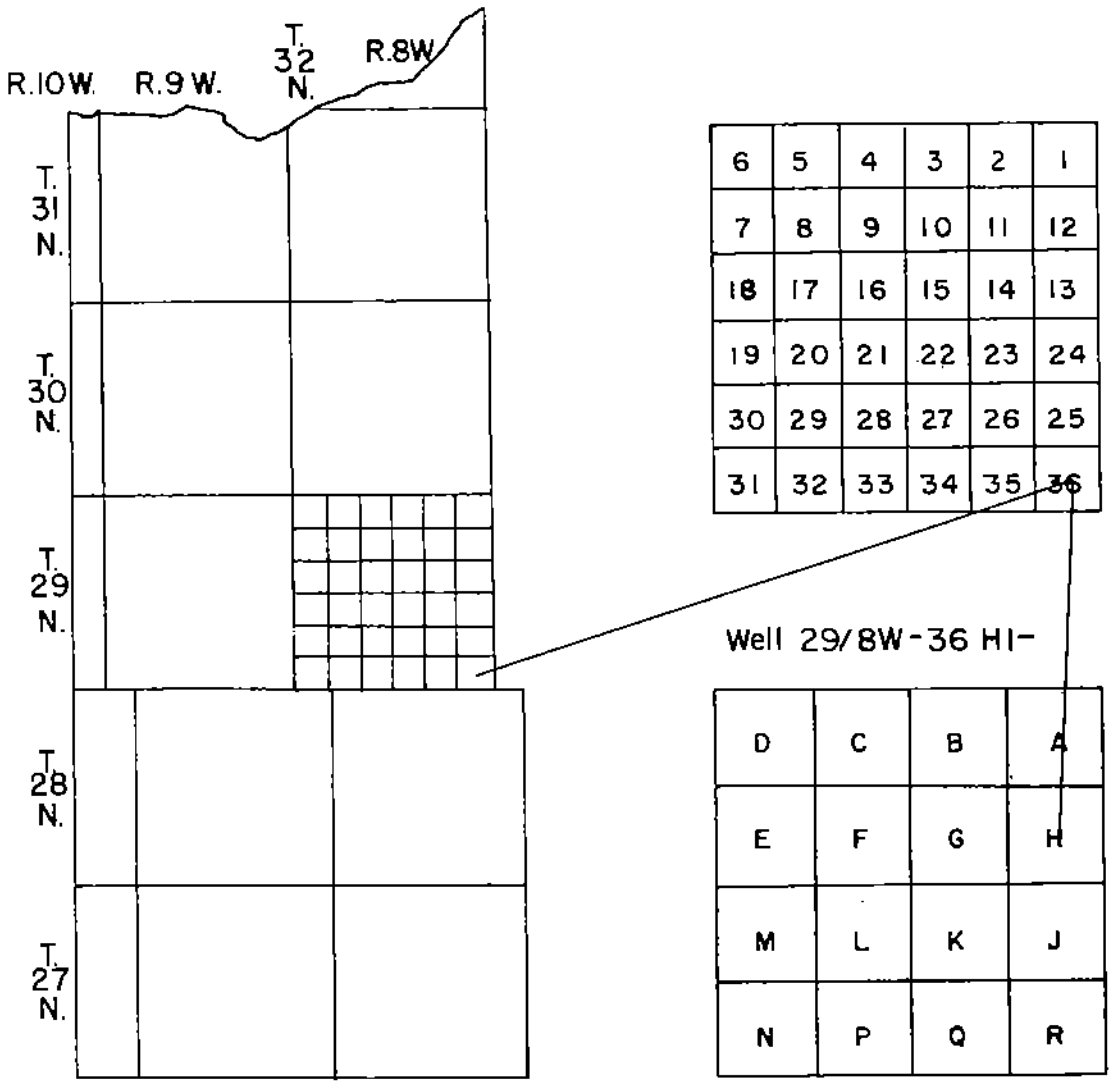

FIGURE 2.- Sketch showing well-numbering system

Acknowledgments

The authors thank all persons who contributed time, information, and assistance during the collection, tabulation, and processing of data for this report. R. J. Vig, formerly of the Geological Survey, and H. C. Kost of the Indiana Department of Conservation assisted in processing the data in the field. Well drillers, whose names are listed in the table of well records, furnished information summarized in tables 3 and 4.

The authors also thank the following government agencies which provided information for the report: Divisions of Oil and Gas and Water Resources, Indiana Department of Conservation and Indiana State Board of Health.

DATA COLLECTION AND PROCESSING

The well data were collected principally from drillers, water-works superintendents, and owners. The well records obtained from the drillers were of two types--written records and reports from memory. Tentative driller's locations were checked against the property records in the County Courthouse to verify the location, to locate the property, and to obtain the name of the current property owner. The locations of wells were checked further in the field if major discrepancies existed between the reported location and the property record in the plat books, if the location given could not be verified from county records, or if the verified location was not sufficiently accurate to be used.

Plate 1 shows the location of water wells and test holes and test holes drilled for purposes other than water supply. Most of these locations are shown to the nearest 10 acres. The basic data for these wells and test holes are summarized in table 3. In addition, selected driller's logs of wells and test holes are given in table 4.

Samples of water were collected at the time well sites were visited. These water samples were analyzed in the field office for hardness of water and alkalinity (expressed as bicarbonate) and chloride and sulfate contents by standard titration methods. The iron content of the water was determined at the well site immediately after the sample was collected. A visual method was used to determine the iron concentration in parts per million by matching the color of the treated sample to that of a liquid-color standard having a known iron concentration. The results of the field chemical analyses (table 5) were used to select sites for collecting larger water samples for more comprehensive chemical analyses by the laboratory of the U. S. Geological Survey.

Observation wells were established prior to and during the investigation in order to obtain relative changes in storage in the ground-water reservoir. Table 6 contains the water-level data collected from these wells. The observation wells were chosen so as to obtain water-level information from artesian and water-table aquifers. Wherever possible, the wells were established at sites where the factors affecting the water levels in the aquifer were due chiefly to natural causes.

GENERAL GEOLOGY AND SOURCES OF GROUND WATER

The oldest known consolidated rocks underlying Newton County are of Cambrian and Ordovician age. These rocks consist of dolomite, dolomitic limestone, sandstone, shale, and siltstone. The rocks of Cambrian and Ordovician age are not used as a source of water because they generally lie more than 1,300 and 600 feet respectively below the surface, and the water they contain is probably highly mineralized.

The rocks of Ordovician age are overlain by dolomitic limestone, shale, and dolomite of Middle Silurian age. These rocks are used locally in the northern half of the county as a source of water for some domestic, stock, and public supplies. Wells that tap this aquifer are generally less than 200 feet deep and yield as much as 30 gpm (gallons per minute). Much of the material of Silurian age listed in table 3 as limestone or limestone (?) is either dolomitic limestone or dolomite.

The rocks of Silurian age are overlain by dolomitic limestone and dolomite of Middle Devonian age. These rocks underlie blue-black bituminous shale of Devonian age (Logan, 1932) or Devonian and Mississippian age (Patton, 1956). The dolomitic limestone of Middle Devonian age is used extensively in the central and extreme southeastern part of the county for domestic, stock, and public supplies. Wells that tap this aquifer are generally less than 250 feet deep and yield as much as 500 gpm. The shale of Devonian and Mississippian(?) age is used as a source of water locally in the southeastern part of the county and wells that tap this source yield from less than 1 to 15 gpm.

The shale of Devonian and Mississippian age is overlain by limestone and sandstone of Mississippian age. These rocks are used as a source of water in a small area in the extreme southeastern part of the county.

The bedrock is overlain by unconsolidated glacial drift of Pleistocene age. The drift forms several topographic features in the county (Leverett and Taylor, 1915, pl. 6; Wayne, 1958) such as the Marsailles moraine in the central part; the ground moraine in the central and southern parts; the glaciolacustrine plains in the southern part; and the sand-covered glaciofluvial plains in the northern part.

The unconsolidated rocks of Pleistocene age range in thickness from less than 10 to more than 125 feet. The rocks consist chiefly of clayey till, glaciofluvial sand and gravel, some glaciolacustrine clay and silt, and some wind-blown sand. The glaciofluvial sand and gravel is the chief source of ground water in much of the county. Wells that tap this aquifer are generally less than 120 feet deep and yield as much as 600 gpm.

The unconsolidated rocks of Pleistocene age are overlain locally by thin alluvium, wind-blown sand, and organically rich sand, silt, and clay of Recent age. The deposits of Recent age are generally too thin to be a source of ground water.

Plate 2 shows the availability of ground water in the consolidated and unconsolidated rocks underlying the county. Plates 3 and 4 show the areal distribution of hardness of water from the rocks of Devonian and Pleistocene age. Table 1 indicates the significance of the various constituents and properties of the water that are listed in table 5.

Water from the various sources in Newton County differs greatly in quality. The water from the rocks of Silurian age is moderately hard to very hard. The hardness is generally greater than 120 and less than 260 ppm (parts per million). The range in concentration of selected constituents and properties is summarized in the table below. This table shows the minimum, mode, and maximum concentration of various constituents and properties of water from rocks of Silurian age.

Constituent or property	Minimum (ppm)	Mode (ppm)	Maximum (ppm)
Iron (Fe)	<0.1	---	5
Bicarbonate (HCO_3)	156	---	561
Sulfate (SO_4)	<5	8	85
Chloride (Cl)	<4	---	96
Hardness as $CaCO_3$	88	---	356

Table 1.--Significance of selected dissolved mineral constituents and properties of ground water a/

Constituent or property	Significance
Iron (Fe)	Oxidizes to reddish-brown sediment upon exposure to air. More than about 0.3 ppm stains laundry and utensils reddish-brown. More than 0.5 to 1.0 ppm imparts objectionable taste to water. Larger quantities favor growth of iron bacteria. Objectionable for food processing, textile processing, beverages, ice manufacturing, brewing, and other purposes.
Bicarbonate (HCO_3)	Bicarbonate in conjunction with carbonate (CO_3) produces alkalinity. Bicarbonate of calcium and magnesium decomposes in steam boilers and hot water facilities to form scale and release corrosive carbon-dioxide gas.
Sulfate (SO_4)	Sulfate in water containing calcium forms hard scale in steam boilers. In large amounts sulfate in combination with other ions gives bitter taste to water. Some calcium sulfate is considered beneficial in the brewing process.
Chloride (Cl)	Gives salty taste to drinking water when present in large amounts in combination with sodium. Increases the corrosiveness of water when present in large amounts.
Hardness as $CaCO_3$ (Calcium and magnesium)	Hard water increases amount of soap needed to make lather. Forms scale in boilers, water heaters, and pipes. Leaves curdy film on bathtubs and other fixtures and on materials washed in the water.

a/ Adapted in part from Palmquist and Hall (1961), p. 34-36.

The water from the rocks of Devonian age is soft to very hard. The hardness is generally greater than 60 and less than 250 ppm. The range in concentration of selected constituents and properties from this source is summarized in the table below.

Constituent or property	Minimum (ppm)	Mode (ppm)	Maximum (ppm)
Iron (Fe)	<0.1	---	>7.5
Bicarbonate (HCO_3)	278	367	791
Sulfate (SO_4)	5	---	210
Chloride (Cl)	<4	8	124
Hardness as $CaCO_3$)	32	92	324

The water from shale of Devonian and Mississippian(?) age is moderately hard to very hard. The hardness is generally greater than 120 and less than 250 ppm. The range in concentration of selected constituents and properties from this source is summarized in the table below.

Constituent or property	Minimum (ppm)	Mode (ppm)	Maximum (ppm)
Iron (Fe)	<0.1	---	4
Bicarbonate (HCO_3)	264	368	659
Sulfate (SO_4)	5	11	400
Chloride (Cl)	<4	7	64
Hardness as $CaCO_3$	76	136	596

The water from the rocks of Pleistocene age is soft to very hard. The hardness is generally greater than 100 and less than 300 ppm. The range in concentration of selected constituents and properties is summarized below.

Constituent or property	Minimum (ppm)	Mode (ppm)	Maximum (ppm)
Iron (Fe)	<0.1	---	>7.5
Bicarbonate (HCO_3)	93	161	532
Sulfate (SO_4)	5	---	255
Chloride (Cl)	<4	6	96
Hardness as $CaCO_3$	20	184	640

CONFINED AND UNCONFINED CONDITIONS

Ground water occurs in the consolidated and unconsolidated rocks of Newton County under confined (artesian) conditions or under unconfined (water-table) conditions. Under confined conditions the aquifer (water-yielding material) is overlain directly by relatively impervious material, and the water will rise above the level at which it is encountered in the aquifer. Under unconfined

conditions the aquifer is overlain directly by permeable unsaturated material, and the water will not rise above the level at which it is encountered.

TYPES OF WELLS

Drilled, driven, and jetted wells are the principal types of water wells used in Newton County. Most water wells 3-inches or more in diameter are constructed by the cable-tool or percussion method. Where the water-bearing material is sand and gravel, the well is generally finished with a well screen set in the aquifer below the bottom of the well casing. (See Rosenshein and Cosner, 1956, p. 6, for a detailed description of a well screen). A modification of this type of well, the gravel-packed well, has a gravel lining inserted between the well screen and the water-bearing material. Where the water-bearing material is consolidated rock, the well casing is generally driven a short distance into the rock, and the well is finished as an open hole. However, a few wells drilled in shale have been finished with a screen and a gravel pack in order to prevent the shale from caving into the hole after completion of the well.

Water wells less than 3-inches in diameter are constructed in unconsolidated material by driving or jetting. The driven well consists of a small-diameter pipe having a drive point attached to the end, which is driven into shallow water-bearing material. The jetted well is constructed by forcing water under pressure out of a hollow-rod or small-diameter drill pipe that is fitted with a jetting bit. As the material is washed out of the hole ahead of the casing, the casing is driven down into the hole. After the water-bearing material is penetrated the well is generally finished with a well-point screen set in the water-bearing material below the bottom of the casing. Table 2 relates the grain-size in inches and millimeters to the slot and the gauze size of screens commonly used in water wells.

Table 2.--Grain size and equivalent screen openings

Grain size: After Wentworth (1922).
Equivalent screen openings: From commercial catalogs for water-well supplies.
Slot size: In thousandths (0.001) of an inch.
Gauze size: Number of wire strands per lineal inch.

Material	Grain size		Equivalent screen opening	
	Inches	Millimeters	Slot size	Gauze size
Gravel	>0.08	> 2	> 80	
Very coarse sand	.04 - .08	1 - 2	40 - 80	<20
Coarse sand	.02 - .04	.50 - 1	20 - 40	40 - 20
Medium sand	.01 - .02	.25 - .50	10 - 20	60 - 40
Fine sand	.005 - .01	.125 - .25	6 - 10	90 - 60
Very fine sand	.002 - .005	.062 - .125	- - - -	- - - -
Silt	.00015 - .002	.004 - .062	- - - -	- - - -
Clay	<.00015	- <.004	- - - -	- - - -

SUMMARY

Preliminary evaluation of the basic data shows that adequate quantities of ground water are available in most of the county for domestic, stock, and locally for public and some types of industrial supplies from the rocks of Devonian and Pleistocene age. The rocks of Devonian age are used extensively as a source of water in the central and extreme southeastern parts of the county and the rocks of Pleistocene age in much of the rest of the county. The water from these two sources is soft to very hard.

RECORDS

The records of about 280 wells and test holes are given in table 3. The table contains information about well construction, water levels, yields and drawdowns, conditions of occurrence, thickness and characteristics of water-bearing materials, type of pump, and other data. The altitude of the land surface at wells and test holes was interpolated from topographic maps.

Table 4 contains the selected logs of about 80 wells and test holes. This table gives the driller's description of the material encountered, pertinent remarks with regard to the material, and authors' interpretation of the geologic age of the material.

The results of about 240 partial chemical analyses of water are given in table 5. The analyses were determined in the field office of the Geological Survey. This table gives information about geologic source, temperature, concentration in parts per million of iron, bicarbonate, sulfate, chloride, and hardness (calcium, magnesium) of water. The U. S. Public Health Service standards for drinking water are given in the table headnotes for iron and manganese together, sulfate and chloride. No official standards have been established for hardness of water. However, water with respect to hardness generally is classified (Lamar, 1942, p. 25-26) as follows: 0-60 ppm soft; 61-120 ppm moderately hard; 121-200 ppm hard; more than 200 ppm very hard.

Table 6 contains the records of four observation wells of which three were established during the investigation and one prior to the investigation. The water levels in the observation wells were measured either by recording gages installed on the well or by manual measurements made with an engineer's steel tape graduated to a hundredth of a foot. The water levels are in feet below land-surface datum. Daily water levels are given for the observation wells equipped with recording gages, and periodic water levels are given for the observation wells measured manually. Factors affecting the water levels in the observation wells are also indicated. For additional water levels see water-supply papers listed under U. S. Geological Survey in selected bibliography. The location of the observation wells is shown on plate 1.

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Table 3.--Records of wells and test holes in Newton County, Indiana

Well: See text for description of well-numbering system.
Altitude: Altitude of land-surface datum from topographic map.
Type of well: Bn, driven; Du, dug; Dr, drilled; J, jetted.
Finish: Gp, gravel pack; Co, open end; Oh, open hole; S, screen; dia, diameter in inches; G, gauze size; sl, slot size.
Character: G, gravel; Ls, limestone; Sd, sand; Sh, shale; Ss, sandstone.
Geologic Age: D, Devonian; M, Mississippian; Pl, Pleistocene; S, Silurian.
Conditions of occurrence: C, confined; U, unconfined; see text for definition.

Water level: In feet below land-surface datum on date of completion of well, except where otherwise note.
Use: D, domestic; I, industrial; Ir, irrigation; N, not used; O, observation; P, public supply; S, stock; T, test.
Type of pump and horsepower: C, centrifugal; J, jet; L, lift; P, pitcher; S, submersible; T, turbine; numeral indicates rated horsepower of electric motor.
Remarks: Ca, field chemical analysis in table 5; dd, drawdown; E, electric log available; G, gamma-ray log available; gpm, gallons per minute; L, log of well in table 4; S, samples available.

Well	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter of well (inches)	Finish	Water-bearing zone					Water level (feet)	Use	Type of pump and horsepower	Remarks
									Depth to top (feet)	Thickness (feet)	Character	Geologic age	Conditions of occurrence				
27/8N- 1A1	R. Miller	----------	--------	672	Dr	280	---	Oh	----	------	Ls	D	C	--	D,S	J	Ca.
3H1	R. Spurlock	----------	--------	662	Dr	85	3	Oh	----	------	Sh?	D,M	C	--	D,S	C	Ca.
5R1	G. Shepard	C. E. Moshier	1-30-48	662	Dr	80	4	Oh	40	40	Sh	D,M	C	--	D,S	LJ/4	Bedrock at 40 ft; water has odor, hydrogen sulfide gas; Ca.
6R1	G. McCarty	Moshier and Denton	12-15-55	664	Dr	98	4	Oh	70	28	Sh	D,M	C	0	D,S	-------	Yield 15 gpm; bedrock at 70 ft; Ca, L.
10E1	G. Shepard	Hofstetter Bros.	Fall 1959	667	Dr	114	4	Oh	98	16	Ls	D	C	12	S	J	Dd 13 ft after 5 hr pumping 10 gpm; bedrock at 44 ft; water has strong odor, hydrogen sulfide gas; Ca, L.
10E2	----do----------	----do----------	Winter 1960	667	Dr	40	7	S; 8ft, dia 3	----	------	Sd	Pl	C	5	D	-------	Dd 15 ft after 10 hr pumping 10 gpm; Ca.
12E1	K. Butler	----do----------	--------	675	Dr	142	4	Oh	130	12	Ls	D	C	--	D,S	S1/2	Bedrock at 35 ft; limestone overlain by 95 ft shale; Ca.
12H1	E. Farrell	----------	--------	678	Dr	52	3	----------	----	------	Sh	D,M	C	--	D	J1/4	Well can be pumped dry; Ca.
14C1	Town of Goodland	Layne-Northern Co., Inc.	3-31-59	682	Dr	185	12	Oh	107	78	Ls	D	C	34	P	-------	Bedrock at 32 ft; crevice in limestone from 130-130 ft; L.
14C2	----do----------	----do----------	8- 9-59	681	Dr	175	12	----------	98	77	Ls	D	C	34	T	-------	Bedrock at 32 ft; see well log 14C1.
14C3	----do----------	----do----------	5-22-59	679	Dr	255	12	----------	117	138	Ls	D	C	31	T	-------	Bedrock at 30 ft; L.
14C4	----do----------	----do----------	10- 5-59	681	Dr	190	12	Oh	124	38	Ls	D	C	34	P	-------	Dd 52 ft pumping 300 gpm; bedrock at 34 ft; L.
14C5	----do----------	----do----------	10- 2-58	682	Dr	185	12	----------	135	50	Ls	D	C	--	T	-------	Bedrock at 40 ft; L.
14D1	----do----------	----do----------	9-58	681	Dr	177	8	----------	109	64	Ls	D	C	34	T	-------	Bedrock at 38 ft; L.
17A1	G. Bigger	Hofstetter Bros.	Spring 1960	680	Dr	64	7	Oh	55	9	Ls	D	C	10	D,S	S	Dd 10 ft after 8 hr pumping 6 gpm; bedrock at 55 ft; Ca, L.
17Q1	J. McGraw	Moshier and Denton	3- 6-55	678	Dr	230	4	Oh	----	------	Ss?	M?	C	8	D,S	L	Yield 4 gpm; bedrock at 53 ft; water has odor, hydrogen sulfide gas; Ca.
18D1	D. Dick	----do----------	1959	672	Dr	151	8	Oh	----	------	Ls	D	C	--	D,S	S	Ca.
19E1	A. C. Hartel	----do----------	3-10-55	683	Dr	110	4	Oh	50	60	Ls	D	C	40	D,S	J	Bedrock at 50 ft; Ca, L.
20J1	L. D. Espenshade	----------	--------	680	Dr	48	3	----------	----	------	Sd,G	Pl	C	+3	D	-------	Flows 2 gpm; Ca.
21E1	Trustees, Nichols Estate	----------	--------	684	Dr	98	4	----------	----	------	Sd,G	Pl	C	--	S	-------	Flows; discharge measured 2.5 gpm, 11-13-58; water level measured 2.8 ft above lsd, 11-13-58; Ca.
23F1	Mr. Dudrach	Hofstetter Bros.	--------	706	Dr	70	6	Oh	13	57	Ls,Sh?	D,M	C	5	S	L1/2	Dd 25 ft pumping 6 gpm; bedrock at 13 ft; Ca, L.
23H1	Town of Goodland	Layne-Northern Co., Inc.	Fall 1958	685	Dr	208	6	----------	189	19	Ls	D	C	34	T	-------	Bedrock at 10 ft; L.

27/8W-23J1	----do----------	----do----------	8- 5-56	702	Dr	65	8	----------	10	40	Ss,Ls	W?	C	3.5	T	--------	Bedrock at 10 ft; L.
23N1	----do----------	----------	8-22-38	714	Dr	17	--	----------	---	------	------	---	--	---	T	--------	Bedrock at 18 ft; shale overlain by 16 ft soil and clay.
23N2	D. Shepard	Hofstetter Bros.	6-14-57	713	Dr	45	4	Oh	15	20	Ls	W	C	5	P	J1/3	Dd 25 ft pumping 6 gpm; bedrock at 15 ft; see log well 23P1; Ca.
23P1	P. Hafty	----do----------	Spring 1960	718	Dr	50	7	Oh	17	13	Ls	W	C	5	P	--------	Dd 2 ft after 8 hr pumping 10 gpm; bedrock at 17 ft; Ca, L.
24P1	Town of Goodland	----------	8-22-38	702	Dr	9	--	----------	---	------	------	---	---	---	T	--------	Bedrock at 8 ft; shale overlain by 8 ft clay.
26A1	----do----------	----------	8-22-38	710	Dr	13	--	----------	---	------	------	---	---	---	T	--------	Bedrock at 12 ft; shale overlain by 12 ft soil and clay.
26D1	P. Schrader	Moshier and Donton	8-57	718	Dr	30	4	Oh	---	------	Ls,Sd	W,Pl	C	15	D	S1/2	Dd 2 ft after 0.5 hr bailing 15 gpm; bedrock at 20 ft; Ca, L.
26F1	----do----------	Hofstetter Bros.	Winter 1951	737	Dr	70	7	Oh	---	------	Sh,Ls	D,M	---	21	N	--------	Dd 35 ft after 2 hr bailing 5 gpm; bedrock at 17 ft; water level measured 13.7 ft below lsd, 5-61; L.
26G1	Town of Goodland	Layne-Northern Co., Inc.	8-22-38	725	Dr	22	--	----------	---	------	------	---	---	---	T	--------	Bedrock at 17 ft; shale overlain by 17 ft clay.
26G2	----do----------	----do----------	1-10-30	715	Dr	527	10	----------	202	318	Ls	S,D	C	11	T	--------	Bedrock at 12 ft; see log well 26H1.
26G3	----do----------	----do----------	3-31-38	715	Dr	500	10-8	Oh	202	298	Ls	S,D	C	---	P	T15	Dd 119 ft pumping 65 gpm; see log well 26H1.
26G4	----do----------	----do----------	12-30-38	717	Dr	525	---	Oh	191	334	Ls	S,D	C	12	N	--------	Bedrock at 16 ft; see log well 26H1.
26H1	----do----------	----do----------	11-14-38	723	Dr	542	--	Oh	202	340	Ls	S,D	C	22	N	--------	Bedrock at 22 ft; L.
27D1	H. Holmold	Hofstetter Bros.	5-26-55	708	Dr	266	8	Oh	153	113	Ls	D	C	103	S	S	Yield 3 gpm; bedrock at 20 ft; Ca, L, S.
28A1	P. Schrader	----do----------	3-27-58	715	Dr	70	4	----------	30	40	Sh	D,M	C	---	S	C5	Dd 15 ft pumping 5 gpm; bedrock at 30 ft; Ca, L.
28M1	M. Dickinson	----do----------	Summer 1950	702	Dr	60	7	S; 10ft, 20sl, dia 4	50	10	Sd	Pl	C	2	D,S	J	Dd 10 ft after 5 hr pumping 40 gpm; Ca, L.
32C1	W. Limp	C. E. Moshier	About 1940	711	Dr	45	6	Oh	---	------	Sh?	D,M	C	8	D,S	C1/2	Ca.
33R1	W. Constable	----------	Before 1900	761	Dr	60	--	----------	---	------	Sh?	D,M	C	---	D,S	J3	Ca.
35L1	J. D. Boyles	----------	--------	764	Dr	80	3	Oh	---	------	Ls,Sh?	D,M	C	---	S	L	Ca.
36K1	F. Linback	Hofstetter Bros.	--------	757	Dr	96	4	Oh	---	------	Ls	M	---	8	D,S	J1/2	Ca.
27/9W-3D1	J. Deffendall	----------	--------	641	J	80	2	S	---	------	Sd,G	Pl	C	---	D,S	L	Ca.
3H1	S. Cold	W. Hogen	--------	647	J	80	2	S	---	------	G	Pl	C	15	D,S	J1/2	Ca.
5L1	H. Goff	Printy and Bingham	8-53	650	Dr	75	4	S; 5ft, 80g	70	5	G	Pl	C	8	D,S	J	Dd 8 ft after 3 hr pumping 7 gpm; Ca, L.
8P1	E. Dill	C. E. Moshier	About 1941	656	Dr	78	3	S; 3ft	---	------	G	Pl	C	---	D,S	J1/2	
8R1	----do----------	----do----------	About 1941	658	Dr	78	3	----do----------	---	------	G	Pl	C	---	D,S	L1/2	Ca.
7P1	Robertson Bros.	----------	Before 1925	656	Dr	90	4	S	---	------	G,Sd	Pl	C	20	D,S	J1	Ca.
12P1	M. Stevens	----------	Before 1921	688	Dr	------	3	----------	---	------	Sh?	D,M	C	---	D	L3/4	Ca.
13J1	P. East	Moshier and Donton	4-22-55	678	Dr	108	4	Oh	52	58	Ls	D	C	20	D,S	S	Yield 20 gpm; bedrock at 52 ft; Ca, L.
13M1	W. Unger	Moshier and Sons	8- 2-39	671	Dr	95	4	Oh	60	35	Ls	D	C	37	S	J3/4	Dd 15 ft pumping 20 gpm; bedrock at 60 ft; Ca, L.
13N2	----do----------	----do----------	--------	671	Dr	296	4	----------	---	------	------	---	---	---	T	--------	No water reported; bedrock at 54 ft; L.
14A1	D. Cannon	C. E. Moshier	8-21-48	687	Dr	80	4	S; 3ft, 40sl	---	------	G	Pl	C	---	D	--------	Ca.
15R1	R. Reed	----do----------	1951	665	Dr	56	4	S; 4ft	---	------	Sd,G	Pl	C	18	D,S	L1/3	
18L1	E. J. Funk and Sons	----------	--------	668	Dr	103	10	S	93	27	G,Sd	Pl	C	---	O	--------	Observation well Newton 3; water level measured 33.85 ft below lsd, 11-8-54; E, G.
10P1	Pal Pac Co., Inc.	D. Donton	9-58	671	Dr	97	4	S; 4ft, 25sl, dia 4	87	10	Sd,G	Pl	C	40	I	J1/2	Ca, L.
10P2	E. J. Funk and Sons	----------	--------	687	Dr	91	10	S; 8ft, 10sl, dia 8	---	------	Sd,G	Pl	C'	---	I	--------	Dd 22ft pumping 70 gpm; formerly observation well Newton 2; water level measured 44.28 ft below lsd, 5-25-44; Ca.
21D1	Town of Kentland	----------	--------	674	Dr	120	12	S	---	------	Sd,G	Pl	C	---	P	T20	Dd 9 ft after 24 hr pumping 800 gpm; Ca.
21R2	----do----------	----------	--------	674	Dr	120	12	S	---	------	Sd,G	Pl	C	49	P	T20	Do.
22P1	S. Dright	C. E. Moshier	3- 5-49	682	Dr	84	4	S; 18sl, dia 3	62	2	G	Pl	C	30	D,S	J1	Gravel overlain by 62 ft soil and blue clay; Ca.
23K1	H. Simons	----do----------	3-30-47	678	Dr	81	4	S; 10 ft, dia 3	50	11	G	Pl	C	---	N	L3/4	Gravel overlain by 50 ft blue clay.

Table 3.--Records of wells and test holes in Newton County, Ind.--Cont.

Well	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter of well (inches)	Finish	Water-bearing zone					Water level (feet)	Use	Type of pump and horsepower	Remarks
									Depth to top (feet)	Thickness (feet)	Character	Geologic age	Conditions of occurrence				
27/9W-24P1	R. Zell	Moshier and Denton	10-14-54	679	Dr	117	4	Oh	68	49	Ls	D	C	40	D,S	L	Dd 20 ft pumping 10 gpm; bedrock at 68 ft; Ca, L.
24M1	G. Van Kirk	C. E. Moshier	1-20-49	686	Dr	70	4-3	Oh	30	40	Ls	D	-----	---	D,S	J1	Bedrock at 30 ft; limestone overlain by 30 ft black soil and clay; Ca.
24Q1	Newton County Stone Co., Inc.	Newton County Stone Co., Inc.	--------	697	Dr	110	4	Oh	80	30	Ls	---	----	---	P	--------	Limestone overlain by shale; Ca.
25R1	C. Potts	----------	--------	711	Dr	180	4	Oh	----	------	Ls	D?	C	---	D,S	L	Water has odor, hydrogen sulfide gas; Ca.
28D1	C. Simons	C. E. Moshier	11-15-46	696	Dr	75	4	S; 3ft, 10sl, dia 3	----	------	G	Pl	C	---	D,S	J1	Yield 2 gpm; Ca.
27R1	M. Roe	----do----------	12-46	711	Dr	77	3	Co	----	------	G	Pl	C	21	D,S	J3/4	Ca.
28Q1	Kentland Church	----do----------	9-23-53	704	Dr	120	4	Oh	----	------	Sh,Sd	D,M, Pl	C	---	P	L	Yield about 5 gpm; bedrock at 60 ft; Ca, L.
32A1	D. M. Weldon	----------	--------	696	Du	12	48	----------	----	------	Sd	Pl	----	---	S	J1/3	Water level measured 4.2 ft below lsd, 5-2-61; Ca.
33A1	M. Roe	----------	Before 1898	698	Dr	231	---	----------	----	------	------	---	----	---	--	--------	Bedrock at 100 ft; see G. H. Ashley (1898, p. 187).
33R1	I. G. Dye	Moshier and Denton	3- 8-56	726	Dr	28	4	S; 4ft, 18sl	25	3	Sd,G	Pl	C	8	D,S	--------	Yield 5 gpm; Ca, L.
34C1	M. Gay	----do----------	3-30-55	712	Dr	110	4	----------	80	30	Sd,G	Pl	C	42	D,S	L	Ca.
34D1	W. Ross	Moshier and Sons	10- 4-54	701	Dr	33	4	S; 4ft, dia 3½	30	3	Sd,G	Pl	C	12	D,S	S	Ca, L.
35M1	C. C. Mulligan	----------	Before 1868	717	Dr	150	---	----------	----	------	------	---	----	---	---	--------	Bedrock at 100 ft; see G. H. Ashley (1898, p. 190).
27/10W-12M1	S. E. Molter	C. E. Moshier	About 1948	662	Dr	60	4	S	----	------	Sd	Pl	C	---	D,S	L1/3	Ca.
13R1	A. Washburn	----do----------	Winter 1959	669	Dr	80	6	S	----	------	Sd,G	Pl	C	---	D,S	S1	Bedrock at 80 ft; Ca.
24A1	H. Washburn	----do----------	1958	671	Dr	400	4	----------	----	------	Ls	S?, D	C	---	D,S	S1	
24M1	T. Dowing	----do----------	9-23-46	683	Dr	75	4	S; 3½ft, dia 3	----	------	G	Pl	C	---	S	J3/4	Difficult area to obtain water; has had nine wells drilled for water supply; bedrock wells yielded small quantities of water having odor, hydrogen sulfide gas; Ca.
26N1	H. Hutchinson	----------	About 1820	691	Dr	98	---	----------	----	------	Ls	D	C	6	D,S	L1/3	Ca.
35N1	A. W. Saxton	D. Denton	11-20-59	682	Dr	100	4	Oh	73	27	Ls	D?	C	12	D	--------	Yield 20 gpm; bedrock at 73 ft; water has very strong odor, hydrogen sulfide gas; Ca, L.
28/8W- 2B1	H. Barton	Hofstatter Bros.	1-10-58	682	Dr	135	4	----------	126	9	Sd,G	Pl	C	10	D,S	--------	Dd 10 ft pumping 20 gpm; Ca, L.
2R1	E. Nelson	----------	About 1925	680	Dr	-----	4	----------	----	------	Sh?	D,M	C	---	D,S	L1	Ca.
3P1	F. Ritler	----------	--------	681	Dr	85	---	----------	----	------	Ls	D	C	---	D,S	L1/3	Ca.
7Q1	E. Lyons	----------	--------	656	Dr	80	3	Oh	----	------	Sh?	D,M	C	---	D,S	J1	Ca.
8Q1	E. Lyons	Hofstetter Bros.	12-50	663	Dr	87	4	Oh	79	8	Sd,G	Pl	C	16	S	J	Dd 8 ft after 3 hr pumping 25 gpm; Ca, L.
9K1	O. Herriman	----do----------	Spring 1951	652	Dr	90	4	S	----	------	Sd,G	Pl	C	22	D,S	C1/4	Ca.
13Q1	L. G. Beardroff	----------	--------	660	J	85	2½	S	----	------	Sd	Pl	C	---	D,S	--------	Ca.
15A1	A. A. Kurfess	C. E. Moshier	7-16-46	651	Dr	46	3	S; 3ft	30	12	Sd,G	Pl	C	---	D,S	--------	Ca.
16N1	M. Merchant	Mr. Bentley	About 1900	657	Dr	110	4	Co	----	------	Sh	D,M	C	---	D,S	J1/4	
19A1	Town of Brook	----------	1914	651	Dr	138	10	----------	----	------	Sd,G	Pl	C	---	P	315	Ca.
19A2	Brown Trucking Co.	----------	--------	649	Dr	114	5	----------	----	------	Sd,G	Pl	C	---	O	--------	Observation well Newton 4; water level measured 11.4 ft below lsd, 11-6-54; E, G.

28/8W-10AJ	Town of Brook	A. L. Cox and Sons	1948	649	Dr	135	12	S; 25 ft	---	--------	Sd,G	Pl	C	--	P	T	Ca.
19N1	Brook Conservation Club	----------	--------	648	Dr	54	2½	----------	---	--------	Sd	Pl	C	--	N	--------	Flows; water level measured 1.1 ft above lnd, 11-8-58; Ca.
20N1	H. Dodd	Moshier and Denton	6- 2-58	651	Dr	89	4	S; 4ft, 25sl	61	8	Sd,G	Pl	C	9	D	J3/4	Yield 20 gpm; Ca, L.
22C1	Mr. Wilson	D. Denton	--------	646	Dr	133	4	----do----------	---	--------	Sd,G	Pl	C	5	D	J1/2	Ca.
23B1	L. Wright	Moshier and Denton	4-13-58	653	Dr	61	4	----do----------	58	7	G	Pl	C	15	D,S	--------	Yield 10 gpm; Ca, L.
23E1	W. Lyons	C. E. Moshier	10-13-48	654	Dr	90	3	S; 3ft, 33sl, dia 2	73	23	Sd,G	Pl	C	--	D	L1	Ca, L.
25C1	L. Weiss	Moshier and Denton	10-25-55	659	Dr	83	4	S; 4ft, 25sl	60	3	Sd,G	Pl	C	20	D,S	J	Yield 10 gpm; Ca, L.
26N1	R. Barton	Hofstetter Bros.	About 1942	650	Dr	140	---	Oe	---	--------	Ls	D	C	15	D,S	L1/2	Ca.
28B1	J. Horshman	Moshier and Denton	1-10-58	652	Dr	80	4	S; 4ft, 12sl	40	20	Sd,G	Pl	C	20	D	J	Yield 10 gpm; Ca, L.
29L1	Martin Bros.	R. Kib	0-29-59	657	Dr	64	4	Oe	---	--------	Sd,G	Pl	C	15	D,S	J	Yield 12 gpm; Ca.
31A1	J. Rathbun	D. Denton	--------	651	Dr	142	5	Oe	---	--------	Sd,G	Pl	C	10	D,S	J1/2	Ca, L.
33L1	N. A. Corbett	----------	--------	653	Dr	100	---	----------	---	--------	Sh?	D,M	C	20	D	L1	Ca.
35N1	L. Ornleton	----------	--------	661	Dr	178	4	Oh	---	--------	Ls	D	C	--	D	L3/4	Water has odor, hydrogen sulfide gas; Ca.
28/9W- 1A1	J. Watt	----------	--------	686	Dn	-----	2	----------	---	--------	Sd	Pl	----	8	D	L3/4	Ca.
2C1	C. Cobb	W. Bollinger	--------	693	Dr	30	4	S	---	--------	Sd,G	Pl	----	--	D,S	L1/2	Ca.
5C1	W. Blaney	----------	--------	691	Dn	28	1½	S	---	--------	G	Pl	----	10	D,S	J1/2	Ca.
8C1	G. Bost	Moshier and Denton	8- 8-55	676	Dr	196	4	Oh	149	47	Ls	D	C	70	D	L	Dd 40 ft pumping 10 gpm; bedrock at 105 ft; water has odor, hydrogen sulfide gas; Ca, L.
10G1	H. Fitzgerald	----------	--------	654	Dr	292	4	Oh	---	--------	Ls	D	C	7	D	L1	Ca.
12N1	R. Soll	Hofstetter Bros.	2-61	664	Dr	75	4	S; 2ft, 35sl, dia 4	70	5	Sd,G	Pl	C	12	D,S	J	Dd 8 ft after 2 hr pumping 40 gpm; Ca, L.
15R1	R. Soll	----do----------	8- 7-57	657	Dr	170	4	Oh	130	31	Ls	D	C	30	D,S	J1/2	Dd 55 ft pumping 5 gpm; bedrock at 72 ft; water has slight odor, hydrogen sulfide gas; Ca, L.
16Q1	L. Martin	C. E. Moshier	Before 1940	662	Dr	123	3	Oh	115	8	Ls	D	C	--	D	-------	Bedrock at 65 ft; water has odor, hydrogen sulfide gas; see log well 16Q2; Ca.
16Q2	O. Konoyer	Hofstetter Bros.	Summer 1960	659	Dr	121	4	Oh	110	5	Ls	D	C	23	D	J1/3	Dd 22 ft after 4 hr pumping 8 gpm; bedrock at 60 ft; water has odor, hydrogen sulfide gas; Ca, L.
19R1	W. Whaley	Moshier and Denton	4-30-58	650	Dr	150	4	Oh	119	31	Ls	D	C	35	D,S	S1/2	Dd 40 ft after 10 hr pumping 10 gpm; bedrock at 65 ft; L.
23G1	E. Soll	Hofstetter Bros.	2- 2-57	661	Dr	150	4	Oh	101	49	Ls	D	C	--	D,S	J	Dd 50 ft pumping 8 gpm; bedrock at 71 ft; Ca, L.
24D1	R. Kindig	----do----------	10-30-57	658	Dr	120	6-4	Oh	90	30	Ls	D	C	12	D	-------	Dd 33 ft pumping 9 gpm; bedrock at 78 ft; water has odor, hydrogen sulfide gas; Ca, L.
25P1	C. Anderson	C. Bentley	--------	651	Dn	60	1½	S	---	--------	Sd,G	Pl	C	5	D	J3/4	Ca.
28Q1	C. Strasser	Hofstetter Bros.	4-10-58	663	Dr	95	4	----------	91	4	G	Pl	C	--	D	S	Ca, L.
30K1	A. T. Bussell	G. Bentley	About 1913	650	Dr	120	3	----------	---	--------	Sh	D,M	C	--	D,S	L1	Ca.
32J1	Newton County Farm	Moshier and Denton	9-57	652	Dr	80	6	S; 15ft, 25sl, dia 5½	62	18	Sd,G	Pl	C	20	P	S3	Dd 10 ft after 3 hr pumping 60 gpm; Ca, L.
35N1	K. White	C. E. Moshier	About 1948	650	Dr	-----	4	----------	---	--------	Sh?	D,M	C	--	D,S	J	Ca.
28/10W- 1P1	E. Kussler	----------	Before 1925	697	Dr	110	4	S; 3ft	---	--------	G	Pl	C	50	D,S	L1/2	Ca.
11P1	D. W. Lucas	----------	Before 1882	685	Dr	170	---	----------	162	8	G,Sd	Pl	C	--	N	--------	See John Collect (1882, p. 53); L.
12J1	M. Padgett	Moshier and Denton	8- 2-58	681	Dr	180	4	Oh	152	28	Ls	D	C	80	D,S	L3/4	Yield 20 gpm; bedrock at 104 ft; water has odor, hydrogen sulfide gas; Ca, L.
12N1	W. C. Russell	----------	Before 1882	676	Dr	135	---	----------	---	--------	--------	---	----	--	---	--------	Bedrock at 125 ft; see John Collett (1882, p. 54).
13A1	M. Padgett	Moshier and Sons	8- 4-54	672	Dr	145	4	Oh	142	3	Ls	D	C	42	D	L	Bedrock at 109 ft; water has odor, hydrogen sulfide gas; Ca, L.
23R1	G. McCarty	----do----------	11-16-54	671	Dr	153	4	Oh	149	8	Ls	D	C	80	D	L	Bedrock at 84 ft; water has odor, hydrogen sulfide gas; Ca, L.
24N1	W. Whaley	Hofstetter Bros.	12-60	660	Dr	168	4	Oh	139	27	Ls	D	C	29	D,S	J	Dd 21 ft after 5 hr pumping 10 gpm; bedrock at 81 ft; water has odor, hydrogen sulfide gas; see log well 23R1; Ca.
36D1	C. Whaley	----do----------	4-15-58	656	Dr	175	4	Oh	---	--------	Ls	D	C	--	D,S	--------	Dd 80 ft pumping 4 gpm; bedrock at 73 ft; water has odor, hydrogen sulfide gas; Ca

Table 3.--Records of wells and test holes in Newton County, Ind.--Cont.

Well	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter of well (inches)	Finish	Water-bearing zone: Depth to top (feet)	Water-bearing zone: Thickness (feet)	Water-bearing zone: Character	Water-bearing zone: Geologic age	Water-bearing zone: Conditions of occurrence	Water level (feet)	Use	Type of pump and horsepower	Remarks
29/8W- 6N1	V. Clark	----------	--------	678	Dn	28	1¼	S; 3ft	---	--------	Sd	Pl	----	---	D	J1/3	
5R1	----do----------	----------	--------	663	Dn	28	1¼	S; 4ft	---	--------	Sd	Pl	----	---	D,S	J1/3	Ca.
6M1	A. Luzer	----------	--------	671	Dn	20	1¼	S	---	--------	Sd	Pl	U	11	S	J1/2	Ca.
11K1	C. Shriver	R. Elb	9-38	716	Dr	108	5	----------	---	--------	Ls	D	C	---	S	L1/2	Ca.
12F1	C. Murphy	W. Shaw	--------	678	Dn	18	1¼	S; 3ft	---	--------	Sd	Pl	U	---	D	J1/4	Ca.
12Q1	W. Clouse	----------	--------	702	Dr	90	4	----------	---	--------	Ls	D	C	---	D,S	J3	Bedrock at 70 ft; Ca.
14J1	M. Anderson	Hofstetter Bros.	Winter 1960	703	Dr	126	4	Oh	113	13	Sh	D,M	C	30	D,S	J	Dd 20 ft after 3 hr pumping 10 gpm; bedrock at 113 ft; Ca, L.
18N1	D. Smart	Printy and Bingham	10-54	692	Dr	130	4	Oh	110	20	Ls	D	C	17	D,S	J1/2	Dd 50 ft after 8 hr pumping 25 gpm; bedrock at 110 ft; water has odor, hydrogen sulfide gas; Ca, L.
20J1	G. Chamberlin	----------	--------	728	Dr	155	4	----------	---	--------	Sh?	D,M	C	---	D,S	--------	Ca.
23A1	Trustees, Jackson Township	Hofstetter Bros.	--------	711	Dr	194	8	Oh	175	19	Ls	D	C	45	P	--------	Dd 75 ft pumping 30 gpm; bedrock at 145 ft; water has odor, hydrogen sulfide gas; Ca, L.
25Q1	G. Battleday	A. Potts	1937	673	Dr	88	4	Oh	78	10	Ls	D	C	---	D	L	Bedrock at 78 ft; Ca.
27R1	L. Yoder	----------	--------	687	Dr	-----	4	----------	---	--------	Sh?	D,M	----	30	D,S	L	Ca.
28Q1	M. Borkland	Hofstetter Bros.	1-21-57	684	Dr	130	4	Oh	120	16	Ls	D	C	12	D,S	J1/2	Dd 51 ft pumping 20 gpm; bedrock at 105 ft; water has odor, hydrogen sulfide gas; Ca, L.
30A1	O. Agato and R. Wagner	----do----------	Spring 1960	734	Dr	222	4	Oh	146	78	Ls	D	C	30	D,S	--------	Dd 65 ft after 4 hr pumping 15 gpm; bedrock at 140 ft; Ca, L.
35F1	K. J. Chamberlain	----do----------	7-18-57	676	Dr	151	4	Oh	140	11	Ls	D	C	17	D,S	J1	Dd 68 ft pumping 10 gpm; Ca.
35H1	T. Wooley	A. Potts	1949	668	Dr	82	4	Qu	---	--------	G	Pl	C	---	S	--------	
29/9W- 1E1	F. Willis	----------	--------	695	Dn	25	3	S; 5ft, 80g	---	--------	Sd	Pl	U	---	D,S	L1	Sand from 0-25 ft; Ca.
2H1	----do----------	Wahling Well Works	--------	675	Dr	71	4	----------	---	--------	Sd,G	Pl	U	---	D	--------	L.
3M1	A. Manchester	----------	Summer 1935	671	Dn	30	1¼	S; 3ft, 80g, dia 1½	---	--------	Sd	Pl	----	5	D	L1/3	Ca.
9E1	G. Blann	----------	About 1010	680	Dn	20	1¼	S; 3ft	---	--------	Sd	Pl	----	9	D,S	L	Ca.
10H1	R. Gunz	L. Johnson	6-28-54	685	Dr	250	6	Oh	135	115	Ls	D	C	25	D	J	Ca.
11N1	R. Gunz	----do----------	6-12-54	672	Dr	204	4	Oh	116	88	Ls	D	C	15	D	S1	Ca.
11N2	----do----------	----do----------	7-10-52	675	Dr	275	6	Oh	130	145	Ls	D	C	14	---	J	For mint still; Ca.
15E1	Town of Morocco	Layne-Northern Co., Inc.	5-17-40	667	Dr	51	38	Gp; S; 10ft, 165sl, dia 16	9	42	Sd,G	Pl	U	9	P	T	Dd 6 ft pumping 400 gpm; L.
15E2	----do----------	----do----------	5-14-48	667	Dr	49	16	Gp; S; 20ft, 80sl, dia 8	9	40	G,Sd	Pl	U	9	O	--------	Dd 15 ft pumping 360 gpm; observation well Newton 8; water level measured 7.95 ft below lsd, 7-20-36; L.
15E3	----do----------	----do----------	1-20-52	667	Dr	51	6	----------	9	42	Sd,G	Pl	U	8	T	--------	See log well 15E1.
15E4	----do----------	----do----------	1- 7-39	667	Dr	53	--	----------	9	44	G,Sd	Pl	U	9	T	--------	L.
16E1	G. M. Garrity	----------	--------	675	Dn	12	1¼	S; 2ft	---	--------	Sd	Pl	U	---	D,S	J	Ca.
16H1	H. Merriman	Moshier Well Co.	1-12-61	671	Dr	120	4	Oh	104	16	Ls	D	C	17	D,S	J	Yield 6 gpm; bedrock at 104 ft; Ca, L.
18A1	W. Rowe	Moshier and Denton	6-18-56	675	Dr	35	4	S; 4ft, 18sl, dia 4	8	27	Sd,G	Pl	U	8	D	--------	Yield 5 gpm; blue gravel and sand overlain by 30 ft yellow sand; Ca.
18G1	H. E. Barnett	----------	Spring 1960	673	Dn	12	1¼	S; 3ft	---	-------	Sd,G	Pl	U	---	D	J1/3	Ca.
20Q1	M. Richcreek	D. Denton	8- 3-60	679	Dr	150	4	----------	---	-------	Sh?	D,M	C	---	D	S	Ca.
21R1	Town of Morocco	Layne-Northern Co., Inc.	3- 2-38	701	Dr	131	--	----------	---	------	-------	---	----	---	T	--------	Bedrock at 131 ft; clay from 0-131 ft.
22D1	----do----------	----do----------	1- 7-38	685	Dr	53	--	----------	6	8	Sd	Pl	U	6	T	--------	Yellow fine sand underlain by 41 ft gray soft clay.

22E1	----do----------	----do----------	3- 8-38	675	Dr	109	--	----------	6	14	Sd,G	Pl	U	6	T	-------	See log well 22M1.
22L1	----do----------	----do----------	3- 4-38	678	Dr	102	--	----------	4	26	Sd,G	Pl	C	3	T	-------	Bedrock at 102 ft; see log well 22M1.
22L2	----do----------	----do----------	4- 7-38	678	Dr	29	30	Gp; S; 10ft, dia 13½	---	-----	Sd,G	Pl	----	4	N	-------	Dd 20 ft pumping 190 gpm; L.
22LJ	----do----------	----do----------	12-21-38	677	Dr	40	--	----------	11	10	G,Sd	Pl	U	11	T	-------	L.
22L4	----do----------	----do----------	12-21-38	676	Dr	23	--	----------	12	8	G	Pl	C	11	T	-------	See log well 22LJ.
22M1	----do----------	----do----------	2-25-38	678	Dr	111	--	----------	7	18	Sd,G	Pl	U	7	T	-------	Bedrock at 109 ft; L.
22M2	----do----------	----do----------	2-22-38	678	Dr	27	30	Gp; S; 10ft, 10Ssl, dia 18	16	14	Sd,G	Pl	U	10	N	-------	Dd 12 ft pumping 100 gpm; see log well 22M1.
22MJ	----do----------	----do----------	12-22-38	678	Dr	30	--	----------	---	-----	------	--	----	--	T	-------	Clay from 0-30 ft.
22P1	----do----------	----do----------	12-21-38	681	Dr	33	--	----------	12	10	G	Pl	C	11	T	-------	See well log 22LJ.
22P2	----do----------	----do----------	3-11-38	681	Dr	24	--	----------	4	8	Sd	Pl	U	4	T	-------	L.
22PJ	Cities Service Oil Co.	Hofstetter Bros.	Summer 1939	681	Dr	30	4	S; 2ft, 45sl, dia 4	25	5	G,Sd	Pl	C	8	P	J	Dd 6 ft after 3 hr pumping 50 gpm; gravel and sand overlain by 25 ft clay; Ca.
23D1	G. Storey	W. Bollinger	Fall 1958	703	Dr	160	5	----------	---	-----	Ls	D	C	30	D,S	S	Dd 45 ft pumping 15 gpm; Ca.
27E1	L. Kessler	----------	---------	711	--	150	2	----------	---	-----	Ls?	D	C	30	D,S	LJ/4	Ca.
32E1	W. Blaney	----------	---------	687	Dn	23	1½	S	---	-----	G	Pl	----	--	D,S	J	
33D1	N. Chisholm	----------	---------	718	J	140	2	----------	---	-----	Sh?	D,M	C	--	D,S	L1/2	Ca.
35N1	E. Kessler	Hofstetter Bros.	Summer 1940	682	Dr	130	8	Oh	107	23	Sh	D,M	C	25	D,S	J	Dd 25 ft after 5 hr pumping 10 gpm; bedrock at 107 ft; Ca, L.
20/10W-25S1	B. Smith	Mr. Redwood	About 1935	681	J	125	2	Oh	---	-----	Sh	D,M	C	30	D,S	L1	Bedrock at 123 ft; Ca.
36G1	N. Johnson	W. Bollinger	About 1940	691	Dr	150	8	Oh	---	-----	Sh?	D,M	C	40	D,S	L1/3	Bedrock at 140 ft; Ca.
30/8W- 1F1	Fair Oaks Farm	----------	---------	693	Dn	20	1½	S	---	-----	Sd	Pl	U	--	D	J1/3	Sand from 0-20 ft; Ca.
1H1	----do----------	----------	---------	685	Dn	20	1½	S	---	-----	Sd	Pl	U	--	S	J1/3	Sand from 0-20 ft.
1H2	----do----------	----------	---------	684	Dn	20	1½	S	---	-----	Sd	Pl	U	--	S	J1/3	Do.
1H3	----do----------	----------	---------	687	Dn	20	1½	S	---	-----	Sd	Pl	U	--	S	J1/3	Do.
5A1	H. Viers	----------	Spring 1951	685	Dn	25	1½	S; 4ft	---	-----	Sd	Pl	U	19	D	J3/4	Ca.
5N1	C. Lindahl, Jr.	----------	---------	675	Dn	20	1½	S	---	-----	Sd	Pl	U	3	D,S	L1/3	Ca.
9A1	C. J. Andreatti	Printy and Bingham	8-54	679	Dr	95	4	Oh	90	5	Ls	S	C	5	D	L1/4	Bedrock at 90 ft; Ca, L.
10K1	Fair Oaks Farm	----------	---------	679	Dn	20	1½	S	---	-----	Sd	Pl	U	--	S	J1/3	Sand from 0-20 ft.
10J1	----do----------	----------	---------	687	Dn	25	1½	S	---	-----	Sd	Pl	U	--	S	J1/3	Sand from 0-25 ft; Ca.
15J1	----do----------	----------	---------	679	Dn	28	1½	S	---	-----	Sd	Pl	U	--	S	J1/3	Sand from 0-28 ft; Ca.
18R1	J. Lazzadro	Printy and Bingham	10-53	670	Dr	120	4	Oh	112	6	Ls	S	C	1	D	-------	Yield 20 gpm; bedrock at 112 ft; Ca, L.
19J1	W. Rafferty	----do----------	7-54	680	Dr	120	4	Oh	114	6	Ls	S	C	10	D,S	J1	Dd 40 ft after 5 hr pumping 20 gpm; bedrock at 114 ft; Ca, L.
22C1	Mr. Krosnon	----------	---------	681	Dn	18	1½	S	---	-----	Sd	Pl	U	--	D	-------	Sand from 0-18 ft; Ca.
27N1	L. Sullivan	----------	About 1953	675	Dn	12	1½	S; 3ft	---	-----	Sd	Pl	U	4	D	-------	Ca.
28Q1	J. Lazzadro	Moshier and Denton	8-56	672	Dr	200	8	Oh	90	110	Ls	D	C	5	Fr	T7 1/2	Dd 10 ft pumping 500 gpm; bedrock at 90 ft; L.
33P1	D. Lingner	----------	---------	675	Dn	20	1½	S; 3ft	---	-----	Sd	Pl	---	--	D	L1	Ca.
33R1	O. Geesa	----------	About 1953	682	Dn	11	1½	S	---	-----	Sd	Pl	U	--	D,S	L	Ca.
36Q1	Trustees, A. Prohoski Estate	Hofstetter Bros.	Fall 1939	685	Dr	100	4	Oh	93	7	Ls	D?	C	12	D,S	-------	Dd 12 ft after 5 hr pumping 30 gpm; bedrock at 93 ft; L.
30/8W- 4A1	R. Neighbors	----------	---------	688	Dn	27	1½	S	---	-----	Sd	Pl	----	--	D	J	Ca.
20J1	H. Gibson	----------	Before 1940	689	Dr	103	4	----------	---	-----	Sd	Pl	C	16	D,S	J1/3	Ca.
24J1	G. Sipe	----------	1939	670	Dn	21	1½	S; 5ft, 90g, dia 1½	---	-----	Sd	Pl	----	4	D,S	L1/3	Ca.
26P1	H. Beren	----------	Spring 1957	671	Dn	30	1½	S	---	-----	Sd	Pl	----	8	D,S	L1/4	Ca.
27N1	Trustees, McCollan Township	Printy and Bingham	6-14-57	670	Dr	121	4	Oh	116	5	Ls	D	C	7	P	J	Dd 12 ft after 6 hr pumping 20 gpm; bedrock at 116 ft; Ca, L.
28N1	M. Harris	----do----------	5-53	675	Dr	135	4	Oh	---	-----	Ls,G	D, Pl	C	13	D,S	J	Dd 5 ft after 5 hr pumping 12 gpm; bedrock at 127 ft; Ca, L.
28R1	T. Atkinson	----do----------	10-53	671	Dr	121	4	Oh	116	5	Ls	D	C	7	D	L	Dd 7 ft after 6 hr pumping 17 gpm; bedrock at 116 ft; see log well 27N1; Ca.
33N1	L. Morrison	----------	4-60	684	Dn	28	1½	S; 3ft, 90g	---	-----	Sd	Pl	----	--	D	L	Ca.
34D1	W. H. Bingham	Printy and Bingham	7-10-53	671	Dr	121	4	Oh	116	5	Ls	D	C	7	D,S	J	Dd 7 ft after 5 hr pumping 17 gpm; bedrock at 116 ft; see log well 27N1; Ca.
34K1	R. Gomz	L. Johnson	7-10-55	675	Dr	348	12	Oh	152	196	Ls	S?, D	C	--	Fr	T	Dd 88 ft after 12 hr pumping 220 gpm.
30/10W-12N1	I. Francis	----------	---------	675	Dr	500	0	----------	---	------	Ls	S	C	--	D,S	L	Ca.

Table 3.--Records of wells and test holes in Newton County, Ind.--Cont.

Well	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter of well (inches)	Finish	Water-bearing zone: Depth to top (feet)	Water-bearing zone: Thickness (feet)	Water-bearing zone: Character	Water-bearing zone: Geologic age	Water-bearing zone: Conditions of occurrence	Water level (feet)	Use	Type of pump and horsepower	Remarks
30/10W-24A1	I. Yoder	----------	---------	680	Dn	30	1½	S; 3ft, 80g	---	-------	Sd	Pl	-----	---	D,S	L1/4	Ca.
25Q1	State of Indiana	----------	8-52	666	Dr	36	4	S	---	-------	Sd	Pl	C	---	P	J1/4	Ca.
25R1	----do----------	----------	---------	668	Dn	20	1½	S	---	-------	Sd	Pl	-----	---	P	L	
31/8W- 1H1	J. DeFries	Lowell Well Co.	11-60	683	Dn	28	1½	S; 5ft	---	-------	Sd	Pl	U	22	D	--------	Ca.
2D1	L. Rose	----------	About 1950	647	Dn	25	1½	S	---	-------	Sd	Pl	-----	---	D	C	Well 13 ft deep at barn; Ca.
3M1	J. Hocknoy	----------	1950	649	Dn	18	1½	S; 4ft, 60g	---	-------	Sd	Pl	U	---	I	J1/3	Sand 0-18 ft; Ca.
3M2	----do----------	----------	---------	649	Dn	22	1½	----do----------	---	-------	Sd	Pl	U	---	I	J1/3	Ca.
4N1	L. Nordstrom	----------	---------	647	Dn	22	1½	S; 3ft	---	-------	Sd	Pl	-----	11	D	J1/2	Ca.
5B1	C. Boyle	----------	---------	634	Dr	595	---	----------	---	-------	------	---	----	---	--	--------	Oil test; bedrock at 75 ft; L.
7M1	S. Walmert	----------	1-60	652	Dn	18	2	S; 3ft, 80g, dia 2	---	-------	Sd	Pl	U	12	D	J1	
7M2	----do----------	----------	---------	652	Dn	18	1½	S; 3ft, 80g, dia 1½	---	-------	Sd	Pl	U	---	S	L	Ca.
9P1	V. Vosolak	----------	---------	668	Dn	12	1½	S	---	-------	Sd	Pl	U	---	D	J1/3	Ca.
11D1	S. Stolarz	----------	3-61	662	Dn	16	1½	S; 3ft	---	-------	Sd	Pl	U	---	D,S	L	Ca.
14D1	A. Villanova	----------	---------	688	Dn	20	1½	S	---	-------	Sd	Pl	U	---	P	J1/3	Sand from 0-20 ft; Ca.
15C1	A. Knapp	----------	---------	678	Dn	20	1½	S; 80g	---	-------	Sd	Pl	U	---	P	J1/3	Do.
15G1	----do----------	----------	About 1952	687	J	34	3	S; 4ft	---	-------	Sd	Pl	U	7	--	C1	For swimming pool; sand from 0-34 ft
15H1	Trustees, Lincoln Township	Lowell Well Co.	1955	684	Dr	99	3	Ob	90	9	Ls	S	C	---	P	--------	Bedrock at 84 ft; limestone overlain by 6 ft shale; water has odor, hydrogen sulfide gas; Ca.
21D1	E. Fellman	----------	1959	678	Dn	18	1½	S; 3ft, 60g	---	-------	Sd	Pl	U	---	---	J1/3	For lawn sprinkling; water has unpleasant odor and taste; Ca.
21D2	----do----------	----------	3-61	678	Dn	16	1½	S; 2½ft, 80g	---	-------	Sd	Pl	U	---	D	L	Ca.
21J1	H. Mubony	----------	Summer 1950	678	Dn	30	1½	S; 3ft	---	-------	Sd	Pl	-----	8	D	L1/4	Ca.
24B1	P. Knabb	----------	---------	682	Dn	10	1½	S; 2½ft	---	-------	Sd	Pl	U	3	D	L1/2	Ca.
25C1	R. Sharphanloy	----------	---------	683	Dn	24	1½	S; 4ft	---	-------	Sd	Pl	-----	6	D	--------	Ca.
26D1	E. Lloyd	----------	8-60	674	Dn	16	1½	S; 4ft, 80g	---	-------	Sd	Pl	U	6	D	J	Ca.
28N1	D. W. David	----------	Summer 1952	670	Dn	21	1½	S; 3ft	---	-------	Sd	Pl	U	19	D	L	Ca.
30H1	C. Elschide	J. Bonstra	Summer 1958	672	Dn	26	1½	S	---	-------	Sd	Pl	-----	3	D	L1/4	Ca.
30N1	J. Sobczyk	Lowell Well Co.	---------	680	Dn	18	1½	S	---	-------	Sd	Pl	U	---	D	J1/2	Ca.
31Q1	C. J. Kirsten	----------	---------	680	Dn	21	1½	S; 3ft	---	-------	Sd	Pl	-----	14	S	L1/3	Ca.
34K1	M. Prohosky	Lowell Well Co.	1955	670	Dr	118	3	Ob	109	9	Ls	S	C	---	D	J	Bedrock at 101 ft; limestone overlain by 8 ft shale; water has odor, hydrogen sulfide gas; Ca.
34N1	J. E. Robbins	----------	1961	680	Dn	30	1½	S; 4ft, 60g	---	-------	Sd	Pl	-----	8	S	L	Ca.
34R2	----do----------	----------	1955	679	Dn	30	1½	----do----------	---	-------	Sd	Pl	-----	8	D	J3/4	
36C1	A. Barton	Lowell Well Co.	5- 6-55	688	J	23	2	S; 60g	---	-------	Sd	Pl	-----	10	D	--------	Ca.
31/8W- 3G1	G. Loda	Shoaby Well and Pump Co.	1955	630	Dr	130	4	Ob	---	-------	Ls	S	C	5	D	--------	Ca.
4J1	State of Indiana	Moshier and Denton	2- 8-38	632	Dr	128	4	Ob	85	63	Ls	S	C	12	P	L	Dd 70 ft after 6 hr pumping 30 gpm; bedrock at 85 ft; Ca, L.
7J1	L. M. Hodger	----------	5-59	642	Dn	19	1½	S; 3½ft, 90g	---	-------	Sd	Pl	U	---	D	J1/2	Ca.
12D1	G. Haines	----------	---------	642	Dn	27	1½	S	---	-------	Sd	Pl	-----	6	D	L	Ca.
13D1	A. Thrall	----------	8-57	657	Dn	22	1½	S	---	-------	Sd	Pl	-----	4	D	L	Ca.
14Q1	E. Peters	Lowell Well Co.	3-60	651	Dr	138	4	----------	---	-------	Ls	S	C	---	D	J	Ca.
15A1	C. Sargent	----------	---------	648	Dn	20	2	S; 3ft	---	-------	Sd	Pl	U	3	D	L1/4	Ca.
15A2	----do----------	----------	10-59	648	Dn	18	1½	----do----------	---	-------	Sd	Pl	U	---	N	--------	Water level measured 3.4 ft below lsd, 8-1-61.
15N1	State of Indiana	Moshier and Denton	8-10-56	658	Dr	110	4	Ob	93	17	Ls	S	C	---	P	L	Yield 5 gpm; bedrock at 93 ft Ca, L.
16C1	C. M. Ross	W. Grafnitz	8-47	643	Dn	25	1½	S	---	-------	Sd	Pl	U	20	D	J	Ca.

17E1	H. Davis	----------	About 1945	654	Dn	32	1½	S	----	------	Sd	Pl	----	---	D	J1/3	Ca.
17H1	H. Christenson	C. Prairie	About 1952	648	Dr	04	6	----------	----	------	Ls	S	C	15	D,S	J1/2	
19M1	H. King	----------	-------	657	Dn	20	1½	S; 3ft, 80g	----	------	Sd	Pl	U	---	S	P	
20A1	D. Dawson	----------	About 1950	652	Dn	25	1½	----do----------	----	------	Sd	Pl	U	15	D	C1/3	Ca.
21M1	W. Dulin	----------	About 1940	667	Dn	35	1½	S	----	------	Sd	Pl	----	---	D	L	Ca.
22P1	W. Abbott	----------	-------	665	Dn	42	1½	S; 5ft, 80g	----	------	Sd	Pl	C	---	D	J1/3	Well 25 ft deep at barn; Ca.
25D1	T. Domelle	Lowell Well Co.	1955	688	Dr	117	3	Oh	82	35	Ls	S	C	---	D	J	Ca.
26R1	L. J. Havlicek	----------	1959	675	Dn	22	1½	S; 5ft, 100g	----	------	Sd	Pl	U	9	D	J1/4	Ca.
29R1	R. Robinson	----------	About 1930	667	Dn	31	2	S	----	------	Sd	Pl	----	10	D,S	L	Ca.
31C1	J. Anderson	----------	1950	670	Dn	25	1½	S; 7ft, 80g	----	------	Sd	Pl	----	10	D	L	Ca.
33A1	L. Conrad	----------	-------	680	Dn	40	1½	S; 3ft	----	------	Sd	Pl	----	---	D,S	--------	Ca.
36P1	F. Allen	----------	Spring 1943	680	Dn	27	1½	S; 3ft, 80g	----	------	Sd	Pl	----	---	D	L1/3	Ca.
31/10W-12E1	J. C. Potucek	----------	-------	632	Dn	25	1½	S	----	------	Sd	Pl	----	4	D	L	Well 17 ft deep at barn; Ca.
24M1	A. and M. Brun	----------	3-28	656	Dn	30	1½	S; 3ft, 90g	----	------	Sd	Pl	----	8	D	L	Well 24 ft deep at barn; Ca.
25R1	E. Robinson	L. Johnson	8-20-54	684	Dr	225	8	Oh	130	85	Ls	S	C	42	D	--------	Yield 20 gpm; Ca.
36R1	G. W. Pike	----------	Summer 1958	679	Dn	27	2	S; 5ft	----	------	Sd	Pl	----	12	D	J1/3	Ca.
32/6W-25R1	P. Walstra	----------	-------	661	Dn	15	1½	S; 4ft	----	------	Sd	Pl	U	---	D,S	L3/4	Ca.
33G1	A. Fontanyi	----------	-------	635	Dr	54	4	Oh	----	------	Ls,G	S, Pl	C	7	D	--------	Yield 9 gpm; Ca, L.
33F1	D. C. Grant	H. A. Raider, Jr.	-------	638	Dr	868	10½ -7	----------	----	------	------	---	----	---	---	--------	Oil test; bedrock at 70 ft; L.
33R1	Radion and Yacuk	----do----------	-------	638	Dr	875	10-5½	----------	----	------	------	---	----	---	---	--------	Oil test; bedrock at 78 ft; water-bearing limestone from 83-90 ft, 100-115 ft, 128-140 ft, 415-425 ft, and 685-695 ft; see log well 33P1.
33R2	----do----------	----do----------	5-49	638	Dr	869	10-5½	----------	----	------	------	---	----	---	---	--------	Oil test; bedrock at 55 ft; water-bearing limestone from 100-115 ft and 685-690 ft; see log well 33P1.
34A1	S. Matthewson	---- ----------	About 1954	642	Dn	20	1½	S	----	------	Sd	Pl	U	---	D	L	Ca.
35B1	S. Doezeman, Sr.	----------	About 1950	646	Dn	18	1½	S; 3½ft, 90g	----	------	Sd	Pl	U	11	D	L1/4	Ca.
35E1	G. Bonnema	----------	-------	643	Dr	800	8	Oh	----	------	Ls	S	C	45	D,S	--------	Flows 40 gpm; Ca.

Table 4.--Selected logs of wells and test holes in Newton County, Indiana

Well 27/8W-6R1

Type of record: Driller's log. Altitude: 664 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	15	15	
Clay, blue	25	40	
Gravel and sand	1	41	
Hardpan and blue clay	22	63	
Sand, fine, and gravel	7	70	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Rock, soft, yellow and black	18	88	Shale.
Rock, hard, brown	10	98	Do.

Well 27/8W-10E1

Type of record: Driller's log. Altitude: 667 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	10	10	
Clay, sandy, gray	34	44	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale	54	98	
Devonian System:			
Middle Devonian Series:			
Limestone	16	114	

Well 27/8W-14C1

Type of record: Driller's log. Altitude: 682 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Top soil	1	1	
Sand, yellow	6	7	
Sand and gravel	1	8	
Clay, gray, and gravel	23	31	
Clay, shaly, brown	1	32	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, brown	38	70	
Shale, green	35	105	
Shale, brown	2	107	
Devonian System:			
Middle Devonian Series:			
Limestone and gypsum	23	130	
Crevice, no cuttings	9	139	
Limestone and gypsum	46	185	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 27/8W-14C3

Type of record: Driller's log. Altitude: 679 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Top soil	2	2	
Sand, yellow	7	9	
Sand, muddy, gray	3	12	
Clay, gray, and gravel	18	30	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, brown	50	80	
Shale, green	17	97	
Shale, brown	20	117	
Devonian System:			
Middle Devonian Series:			
Limestone and gypsum	138	255	

Well 27/8W-14C4

Type of record: Driller's log. Altitude: 681 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black	3	3	
Sand and gravel; brown	6	9	
Clay, gray, and gravel	25	34	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, brown	43	77	
Shale, green	27	104	
Shale, brown and green	1	105	
Shale, brown and lime-rock	11	116	
Shale, brown and green	8	124	
Devonian System:			
Middle Devonian Series:			
Limestone and gypsum	21	145	
Rock, coarse, broken	10	155	
Limestone and gypsum	5	160	

Well 27/8W-14C5

Type of record: Driller's log. Altitude: 682 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	1	1	
Sand, muddy	6	7	
Sand and gravel	1	8	
Clay, gray, and gravel	23	31	
Clay, black	12	43	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 27/8W-14C5--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, brown, with some black shale at top	17	60	
Shale, black	9	69	
Shale, black, with streaks of green shale	6	75	
Shale, green	58	133	
Shale, blue	2	135	
Devonian System:			
Middle Devonian Series:			
Limestone	50	185	

Well 27/8W-14D1

Type of record: Sample study by E. J. Wohler, 10-27-58. Altitude: 681 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Silt, tan and brown, with sand	5	5	
Gravel, silty	6	11	
Clay, silty, pebbly, blue-gray	27	38	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, fissile, pyritic, black	7	45	
Shale, clayey, gray	40	85	
Shale, limy, gray	24	109	
Devonian System:			
Middle Devonian Series:			
Limestone, shaly, pyritic, gray	11	120	
Limestone, partly crystalline, pyritic, gray to black	9	129	
Limestone, crystalline, gray to white	5	134	
Limestone, argillaceous, blue-gray, with disseminated calcite crystals	2	136	
Shale, limy, dark-gray	4	140	
Limestone, crystalline, pyritic, white to gray	5	145	
Limestone, argillaceous, gray	5	150	
Limestone, crystalline, gray	23	173	
Record missing	4	177	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 27/8W-17A1

Type of record: Driller's log. Altitude: 669 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	10	10	
Clay, gray	10	20	
Clay, sandy, gray	35	55	
Devonian System:			
Middle Devonian Series:			
Limestone	9	64	

Well 27/8W-19E1

Type of record: Driller's log. Altitude: 683 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil and yellow clay	15	15	
Clay, blue	35	50	
Devonian System:			
Middle Devonian Series:			
Limestone, soft, white	25	75	
Limestone, hard, gray	35	110	

Well 27/8W-23F1

Type of record: Driller's log. Altitude: 706 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt and clay	13	13	
Mississippian System:			
Lower Mississippian Series:			
Limestone	7	20	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate, blue	50	70	Shale.

Well 27/8W-23H1

Type of record: Driller's log. Altitude: 685 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	1	1	
Hardpan	5	6	
Clay, gray	4	10	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Siltstone	11	21	
Shale, green	2	23	
Shale, gray and green	32	55	
Shale, brown and green	85	140	

Well 27/8W-23H1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, green	25	165	
Shale, brown and green	24	189	
Devonian System:			
Middle Devonian Series:			
Limestone, muddy, brown	19	208	

Well 27/8W-23J1

Type of record: Driller's log. Altitude: 702 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	2	2	
Clay, yellow	17	19	
Mississippian System:			
Lower Mississippian? Seriez:			
Sandstone	23	42	
Limestone, brown and white	17	59	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, green	6	65	

Well 27/8W-23P1

Type of record: Driller's log. Altitude: 715 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	10	10	
Clay, gray	7	17	
Mississippian System:			
Lower Mississippian Series:			
Limestone	13	30	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale	20	50	

Well 27/8W-26D1

Type of record: Driller's log. Altitude: 718 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil and drift	6	6	
Clay, yellow	6	12	
Clay, blue	6	18	
Sand, fine	2	20	
Mississippian System:			
Lower Mississippian Series:			
Limestone	20	40	

Well 27/8W-26D1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, gray	10	50	

Well 27/8W-26F1

Type of record: Driller's log. Altitude: 737 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and yellow clay	12	12	
Clay, gray	5	17	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, red	3	20	
Shale, blue	10	30	
Limestone, white	2	32	
Shale, red	2	34	
Shale, blue	3	37	
Limestone, white	10	47	
Shale, blue, with layers of limestone	13	60	
Shale, blue	10	70	

Well 27/8W-26H1

Type of record: Driller's log. Altitude: 723 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay	9	9	
Clay, hard	13	22	
Mississippian System:			
Lower Mississippian Series:			
Limestone	14	36	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale	166	202	
Devonian and Silurian Systems:			
Limestone, white	198	400	Dolomitic limestone or dolomite.
Limestone, creviced	25	425	Do.
Limestone	105	530	Do.
Limestone and shale	12	542	Shale at 542 feet.

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 27/8W-27D1

Type of record: Driller's log. Altitude: 706 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay----------	20	20	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale----------	133	153	
Devonian System:			
Middle Devonian Series:			
Limestone----------	113	266	

Well 27/8W-28A1

Type of record: Driller's log. Altitude: 715 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt and clay----------	26	26	
Clay, sandy, gray----------	4	30	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale----------	40	70	

Well 27/8W-28M1

Type of record: Driller's log. Altitude: 702 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt and yellow clay----------	20	20	
Clay, gray----------	30	50	
Sand with gray clay----------	10	60	

Well 27/9W-5L1

Type of record: Driller's log. Altitude: 650 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow----------	25	25	
Clay, blue----------	45	70	
Gravel----------	5	75	

Well 27/9W-13J1

Type of record: Driller's log. Altitude: 676 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow----------	15	15	
Clay, blue----------	37	52	

Well 27/9W-13J1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Devonian System:			
Middle Devonian Series:			
Limestone, soft----------	5	57	
Limestone, hard, gray and white--	51	108	

Well 27/9W-13M1

Type of record: Driller's log. Altitude: 671 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black, and yellow sand-----	15	15	
Clay, blue----------	45	60	
Devonian System:			
Middle Devonian Series:			
Limestone, brown----------	35	95	

Well 27/9W-13M2

Type of record: Driller's log. Altitude: 671 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black, and yellow clay-----	12	12	
Clay, blue----------	42	54	
Mississippian System:			
Lower Mississippian Series:			
Limestone, white----------	15	69	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate----------	159	228	Shale.
Devonian System:			
Middle Devonian Series:			
Limestone, hard, black and white-	70	298	

Well 27/9W-16P1

Type of record: Driller's log. Altitude: 671 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black, and yellow clay-----	20	20	
Sand, yellow, and gravel---------	2	22	
Clay, blue----------	63	85	
Hardpan----------	2	87	
Sand and gravel----------	10	97	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 27/9W-24F1

Type of record: Driller's log. Altitude: 679 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black, and yellow clay-----	1	1	
Clay, blue----------	67	68	
Devonian System:			
Middle Devonian Series:			
Limestone, brown----------	49	117	

Well 27/9W-28Q1

Type of record: Driller's log. Altitude: 704 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow----------	12	12	
Clay, blue----------	44	56	
Sand, fine----------	4	60	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale----------	60	120	

Well 27/9W-33R1

Type of record: Driller's log. Altitude: 726 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow----------	15	15	
Clay, blue----------	10	25	
Sand, fine, and gravel----------	3	28	Blue clay at 28 feet.

Well 27/9W-34D1

Type of record: Driller's log. Altitude: 701 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow----------	15	15	
Clay, blue----------	15	30	
Sand and gravel----------	3	33	

Well 27/10W-35H1

Type of record: Driller's log. Altitude: 692 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Drift----------	3	3	
Clay----------	25	28	
Gravel and sand----------	4	32	
Clay, blue----------	40	72	
Sand----------	1	73	

Well 27/10W-35H1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Devonian System:			
Middle Devonian Series:			
Limestone, soft, white	2	75	
Limestone, gray	25	100	

Well 28/8W-2B1

Type of record: Driller's log. Altitude: 662 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay	84	84	
Sand	2	86	
Clay, sandy, gray	24	110	
Sand, fine, brown	2	112	
Clay, sandy, brown	7	119	
Sand, fine, brown	1	120	
Clay, brown	6	126	
Conglomerate	9	135	Cemented sand and gravel.

Well 28/8W-8G1

Type of record: Driller's log. Altitude: 663 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil, sandy, black	4	4	
Sand, yellow	6	10	
Clay, sandy, blue	69	79	
Sand, fine	5	84	
Conglomerate	3	87	Cemented sand and gravel.

Well 28/8W-20N1

Type of record: Driller's log. Altitude: 651 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand mixed with yellow clay	12	12	
Clay, blue	40	52	
Hardpan, blue, with gravel	9	61	
Sand, gray, and gravel	8	69	

Well 28/8W-23B1

Type of record: Driller's log. Altitude: 653 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	15	15	
Clay, blue	30	45	
Quicksand, gray	7	52	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 28/8W-23B1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Hardpan	6	58	
Gravel	4	62	
Sand, fine	3	65	

Well 28/8W-23E1

Type of record: Driller's log. Altitude: 654 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow, and gravel	16	16	
Clay, blue, and quicksand	47	63	
Sand, gravel, and blue clay	10	73	
Sand, fine	20	93	
Gravel and sand	3	96	

Well 28/8W-25C1

Type of record: Driller's log. Altitude: 659 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black, and sand	16	16	
Clay, blue	44	60	
Gravel and sand	3	63	

Well 28/8W-28B1

Type of record: Driller's log. Altitude: 652 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	15	15	
Clay, blue	25	40	
Sand, fine	16	56	
Sand and gravel	4	60	
Clay, blue, mixed with gravel	20	80	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 28/8W-31A1

Type of record: Driller's log. Altitude: 651 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	20	20	
Sand, fine	3	23	
Clay, blue	57	80	
Quicksand, fine	15	95	
Sand, medium	25	120	
Clay, mushy, blue	18	138	
Sand and gravel	4	142	Bedrock at 142 feet.

Well 28/9W-8C1

Type of record: Driller's log. Altitude: 676 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Dirt, black, and yellow clay	15	15	
Clay, blue	90	105	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate, black	44	149	
Devonian System:			
Middle Devonian Series:			
Limestone, salt and pepper	47	196	

Well 28/9W-12N1

Type of record: Driller's log. Altitude: 664 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and yellow clay	12	12	
Clay, gray	58	70	
Sand and gravel	5	75	

Well 28/9W-15R1

Type of record: Driller's log. Altitude: 657 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, gray	72	72	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate	67	139	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 28/9W-15R1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Devonian System:			
Middle Devonian Series:			
Limestone----------	31	170	

Well 28/9W-16Q2

Type of record: Driller's log. Altitude: 659 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil----------	3	3	
Clay, yellow----------	5	8	
Clay, gray----------	58	66	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, gray----------	2	68	
Shale, black----------	48	116	
Devonian System:			
Middle Devonian Series:			
Limestone----------	5	121	

Well 28/9W-19R1

Type of record: Driller's log. Altitude: 656 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow----------	15	15	
Clay, blue----------	50	65	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, blue and black----------	54	119	
Devonian System:			
Middle Devonian Series:			
Limestone, salt and pepper-------	31	150	

Well 28/9W-23G1

Type of record: Driller's log. Altitude: 661 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow----------	25	25	
Clay, gray----------	46	71	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 28/9W-23G1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale, slaty	30	101	
Devonian System:			
Middle Devonian Series:			
Limestone	49	150	

Well 28/9W-24D1

Type of record: Driller's log. Altitude: 659 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand	10	10	
Clay, sandy, gray	66	76	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate and soapstone; mixed	14	90	Shale and Siltstone?
Devonian System:			
Middle Devonian Series:			
Limestone	30	120	

Well 28/9W-28Q1

Type of record: Driller's log. Altitude: 663 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, yellow	10	10	
Clay, yellow	15	25	
Clay, smooth, gray	35	60	
Clay, gritty, gray	31	91	
Gravel	4	95	

Well 28/9W-32J1

Type of record: Driller's log. Altitude: 652 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Drift	5	5	
Clay, yellow	5	10	
Clay, blue	13	23	
Sand, fine	11	34	
Clay, blue	8	42	
Quicksand	16	58	
Hardpan	4	62	
Sand and gravel	18	80	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 28/10W-11P1

Type of record: Driller's log. Altitude: 685 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Soil	2	2	
Clay, yellow	6	8	
Clay, blue, with boulders	154	162	
Gravel, fine	6	168	
Sand	2	170	

Well 28/10-12J1

Type of record: Driller's log. Altitude: 681 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand and clay; yellow	30	30	
Clay, blue	74	104	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale	48	152	
Devonian System:			
Middle Devonian Series:			
Limestone, gray	28	180	

Well 28/10W-13A1

Type of record: Driller's log. Altitude: 672 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, yellow	15	15	
Clay, blue, and drift	91	106	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate	36	142	Shale.
Devonian System:			
Middle Devonian Series:			
Limestone, salt and pepper	3	145	

Well 28/10W-23R1

Type of record: Driller's log. Altitude: 671 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	15	15	
Clay, blue	69	84	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate, black and blue	65	149	Shale.
Devonian System:			
Middle Devonian Series:			
Limestone, gray	6	155	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 29/8W-14H1

Type of record: Driller's log. Altitude: 703 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	10	10	
Clay, gray	103	113	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale	13	126	

Well 29/8W-18N1

Type of record: Driller's log. Altitude: 692 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	15	15	
Clay, blue	95	110	
Devonian System:			
Middle Devonian Series:			
Limestone	20	130	

Well 29/8W-23A1

Type of record: Driller's log. Altitude: 711 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay, gritty	145	145	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate	30	175	Shale.
Devonian System:			
Middle Devonian Series:			
Rock, dark	15	190	Limestone.
Rock, light	4	194	Do.

Well 29/8W-28Q1

Type of record: Driller's log. Altitude: 684 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Clay with grit and sand	105	105	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate	15	120	
Devonian System:			
Middle Devonian Series:			
Limestone	16	136	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 29/8W-30A1

Type of record: Driller's log. Altitude: 734 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Clay, yellow	15	15	
Clay, gray	125	140	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Shale	6	146	
Devonian System:			
Middle Devonian Series:			
Limestone	76	222	

Well 29/9W-2H1

Type of record: Driller's log. Altitude: 675 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, fine	43	43	
Sand, fine to medium, with some coarse sand	7	50	
Sand, fine	9	59	
Sand, fine to medium	5	64	
Gravel, pea-sized and smaller	1	65	
Sand, fine	6	71	
Clay, gray-blue	2	73	

Well 29/9W-15E1

Type of record: Driller's log. Altitude: 667 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil, sandy	6	6	
Gravel and sand	7	13	
Sand, gray, and gravel	12	25	
Sand, medium, and gravel	9	34	
Sand, coarse, and gravel	2	36	
Sand, coarse	8	44	
Sand and gravel	8	52	Clay at 52 feet.

Well 29/9W-15E2

Type of record: Driller's log. Altitude: 667 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil	1	1	
Sand, yellow	4	5	
Gravel, yellow, and sand	5	10	
Gravel and coarse sand; gray	30	40	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 29/9W-15E2--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand, muddy, gray, and gravel----	1	41	
Gravel interbedded with sand; coarse, dark-gray----------	8	49	Gray clay at 49 feet.

Well 29/9W-15E4

Type of record: Driller's log. Altitude: 667 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and sand----------	6	6	
Gravel, red, and sand----------	7	13	
Gravel and coarse sand; dark-----	8	21	
Sand, coarse, dark, and fine gravel----------	19	40	
Sand, coarse, dark----------	6	46	
Gravel and dark coarse sand------	7	53	

Well 29/9W-16H1

Type of record: Driller's log. Altitude: 671 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, yellow----------	14	14	
Gravel and yellow sand----------	1	15	
Clay, very tough, blue, with gray sand at base----------	89	104	
Devonian System:			
Middle Devonian Series:			
Limestone, white----------	2	106	
Limestone, soft, shaly, white----	9	115	
Limestone, black and white-------	5	120	

Well 29/9W-22L2

Type of record: Driller's log. Altitude: 678 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and clay----------	4	4	
Sand and gravel----------	17	21	
Clay----------	2	23	
Sand and gravel----------	6	29	Clay at 29 feet.

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 29/9W-22L3

Type of record: Driller's log. Altitude: 677 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Soil, black	2	2	
Clay, gravelly	4	6	
Gravel, dirty	6	12	
Gravel and coarse sand	9	21	
Clay, soft	19	40	

Well 29/9W-22M1

Type of record: Driller's log. Altitude: 678 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Top soil and clay	4	4	
Gravel	3	7	
Sand, muddy	3	10	
Sand and gravel; dirty	15	25	
Clay, soft	55	80	
Clay, hard	29	109	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Rock	2	111	Shale?

Well 29/9W-22P2

Type of record: Driller's log. Altitude: 681 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and clay	2	2	
Sand, muddy	10	12	
Clay	12	24	

Well 29/9W-35N1

Type of record: Driller's log. Altitude: 682 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Soil and yellow clay	16	16	
Clay, gray	91	107	
Mississippian and Devonian Systems:			
Lower Mississippian and Upper Devonian Series:			
Slate	23	130	Shale.

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 30/8W-9A1

Type of record: Driller's log. Altitude: 679 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand	43	43	
Clay, blue	47	90	
Silurian System:			
Middle Silurian Series:			
Limestone	5	95	Dolomitic limestone or dolomite.

Well 30/8W-18R1

Type of record: Driller's log. Altitude: 670 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand	48	48	
Clay, blue	64	112	
Silurian System:			
Middle Silurian Series:			
Limestone	8	120	Dolomitic limestone or dolomite.

Well 30/8W-19J1

Type of record: Driller's log. Altitude: 680 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand	58	58	
Clay, blue	56	114	
Silurian System:			
Middle Silurian Series:			
Limestone, very hard	6	120	Dolomitic limestone or dolomite.

Well 30/8W-28Q1

Type of record: Driller's log. Altitude: 672 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand, dirty, yellow	30	30	
Clay, yellow	5	35	
Clay, blue	20	55	
Hardpan	5	60	
Sand, fine, and gravel	7	67	
Clay, yellow	23	90	
Devonian System:			
Middle Devonian Series:			
Limestone, very porous	110	200	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 30/8W-36Q1

Type of record: Driller's log. Altitude: 685 feet.

Material	Thickness (feet)	Depth (feet)	Remarks
Quaternary System:			
Recent and Pleistocene Series:			
Sand, yellow	2	2	
Clay, yellow	12	14	
Clay, gray, with sand and gravel	4	18	
Clay, gray, no grit	75	93	
Devonian System:			
Middle Devonian? Series:			
Limestone	7	100	

Well 30/9W-27N1

Type of record: Driller's log. Altitude: 670 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand	58	58	
Clay, blue	58	116	
Devonian System:			
Middle Devonian Series:			
Limestone	5	121	

Well 30/9W-28N1

Type of record: Driller's log. Altitude: 675 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand	50	50	
Clay, blue	75	125	
Gravel	2	127	
Devonian System:			
Middle Devonian Series:			
Limestone	8	135	

Well 31/8W-5B1

Type of record: Driller's log. Altitude: 634 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Quicksand, white	37	37	
Clay, soft, blue	33	70	
Gravel	5	75	
Devonian and Silurian Systems:			
Lime, blue-gray	30	105	Dolomitic limestone or dolomite.
Lime, gray	10	115	Do.
Lime, gray and brown	5	120	Do.
Lime, gray	40	160	Do.
Lime, broken, gray	10	170	Do.

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 31/8W-5B1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Devonian and Silurian Systems:			
Lime, soft, gray	10	180	Dolomitic limestone or dolomite.
Lime, gray	10	190	Do.
Lime, green	15	205	Do.
Lime, shaly, green and gray	10	215	Do.
Lime, gray	15	230	Do.
Lime and flint; gray	10	240	Do.
Lime, gray, and white flint	25	265	Do.
Lime, gray	10	275	Do.
Lime, light-gray	10	285	Do.
Lime, dark-gray	5	290	Do.
Flint, blue and white	20	310	
Lime, gray, and blue flint	15	325	Dolomitic limestone or dolomite.
Lime, broken, green	15	340	Do.
Lime, hard, gray	10	350	Do.
Lime, gray	10	360	Do.
Lime, light-gray	20	380	Do.
Lime, dark-gray	10	390	Do.
Lime, light-gray, and flint	10	400	Do.
Lime, hard, light-gray	5	405	Do.
Lime, light-gray	10	415	Do.
Lime, gray, and flint	10	425	Do.
Lime, gray	5	430	Do.
Lime, gray, and flint	15	445	Do.
Lime, dark-gray	15	460	Do.
Lime and flint; white	25	485	Do.
Lime, white, and flint	15	500	Do.
Lime, gray	10	510	Do.
Lime, dark-gray	10	520	Do.
Lime and flint; light-gray	5	525	Do.
Lime and flint; white	5	530	Do.
Lime, gray	15	545	Do.
Lime, brown	10	555	Do.
Lime, gray	25	580	Do.
Lime, broken, gray	10	590	Do.
Ordovician System:			
Upper Ordovician Series:			
Shale, sticky, gray	5	595	

Well 31/9W-4J1

Type of record: Driller's log. Altitude: 632 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, yellow	24	24	
Sand, fine, and gravel	4	28	
Clay, blue	36	64	
Sand, dirty, black	1	65	

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 31/9W-4J1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Silurian System:			
Middle Silurian Series:			
Limestone, soft----------	3	68	Dolomitic limestone or dolomite.
Limestone, hard----------	22	90	Do.
Shale, green----------	10	100	
Limestone, hard, green----------	15	115	Dolomitic limestone or dolomite.
Limestone, hard, gray----------	13	128	Do.

Well 31/9W-15N1

Type of record: Driller's log. Altitude: 658 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand, yellow----------	50	50	
Clay, blue----------	43	93	
Silurian System:			
Middle Silurian Series:			
Limestone----------	17	110	Dolomitic limestone or dolomite.

Well 32/8W-33G1

Type of record: Driller's log. Altitude: 635 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Sand----------	23	23	
Clay----------	17	40	
Gravel----------	3	43	
Silurian System:			
Middle Silurian Series:			
Rock----------	11	54	Dolomitic limestone or dolomite.

Well 32/8W-33P1

Type of record: Driller's log. Altitude: 636 feet.

Quaternary System:			
Recent and Pleistocene Series:			
Drift----------	70	70	
Silurian System:			
Middle Silurian Series:			
Lime, gray----------	25	95	Dolomitic limestone or dolomite.
Lime, hard----------	10	105	Do.
Mud, broken----------	5	110	Shale.
Lime, gray and blue----------	25	135	Dolomitic limestone or dolomite.

Table 4.--Selected logs of wells and test holes in Newton County--Cont.

Well 32/8W-33P1--Cont.

Material	Thickness (feet)	Depth (feet)	Remarks
Silurian System:			
Middle Silurian Series:			
Lime, broken, gray and blue------	45	180	Dolomitic limestone or dolomite.
Lime, broken, gray----------	40	220	Do.
Lime----------	5	225	Do.
Lime, light-gray----------	35	260	Do.
Lime, light-brown----------	15	275	Do.
Lime, light-gray----------	5	280	Do.
Lime, green and gray----------	15	295	Do.
Lime, gray----------	25	320	Do.
Lime, brown----------	5	325	Do.
Lime, gray----------	80	405	Do.
Lime, gray and blue----------	5	410	Do.
Lime, gray----------	25	435	Do.
Record missing----------	5	440	
Lime, brown----------	30	470	Dolomitic limestone or dolomite.
Lime, gray----------	5	475	Do.
Lime, dark-gray----------	5	480	Do.
Lime, gray and green----------	45	525	Do.
Lime, hard, white and gray-------	25	550	Do.
Lime, white and gray----------	15	565	Do.
Lime, gray and green----------	5	570	Do.
Lime, gray----------	10	580	Do.
Ordovician System:			
Upper Ordovician? Series:			
Shale----------	10	590	
Shale, gray, with some lime------	10	600	
Record missing----------	30	630	
Shale----------	30	660	
Lime----------	2	662	
Lime, hard, white----------	6	668	
Lime, hard, gray----------	17	685	
Lime and shale; gray----------	10	695	
Record missing----------	20	715	
Shale, gray----------	125	840	
Shale, black, with shells--------	10	850	
Middle Ordovician Series:			
Lime, hard, brown----------	16	866	

Table 5.--Field chemical analyses of water from wells in Newton County, Indiana
(Results in parts per million. Analyses by U. S. Geological Survey.)

Well: See text for description of well-numbering system.
Material: G, gravel; Ls, limestone; Sd, sand; Sh, shale; Ss, sandstone.
Geologic age: D, Devonian; M, Mississippian; Pl, Pleistocene; S, Silurian.

U. S. Public Health Service drinking-water standards: Iron (Fe) - 0.3 ppm for iron and manganese together; Sulfate (SO_4) - 250 ppm; Chloride (Cl) - 250 ppm.

Well	Material	Geologic Age	Date of Collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium, magnesium)
27/8W- 1A1	Ls	D	5- 1-61	52	0.1	556	55	88	56
3H1	Sh?	D,M	5- 1-61	51	.3	537	10	8	120
5R1	Sh	D,M	4- 1-59	55	.3	405	100	12	252
6R1	Sh	D,M	8-57	54	,5	368	---	4	260
6R1	Sh	D,M	4-26-61	--	.5	425	25	4	232
10E1	Ls	D	4-61	--	.1	464	55	52	172
10E2	Sd	Pl	4-61	58	1.0	322	10	4	120
12E1	Ls	D	4-61	54	1.0	356	5	4	196
12H1	Sh	D,M	5- 1-61	--	.5	366	10	4	76
17A1	Ls	D	4-61	--	1.0	420	50	4	204
17Q1	Ss?	M?	8-57	57	.2	573	---	10	60
17Q1	Ss?	M?	4-26-61	--	.1	610	20	4	52
18B1	Ls	D	5- 1-61	55	.1	420	210	8	156
19E1	Ls	D	8-57	59	.2	368	---	6	68
20J1	Sd,G	Pl	1957	53	1.0	439	---	6	260
20J1	Sd,G	Pl	4-26-61	53	1.0	376	10	<4	196
21E1	Sd,G	Pl	4-26-61	53	1.0	386	10	<4	204
23F1	Ls,Sh?	D,M	4-14-59	51	1.0	264	360	64	564
23F1	Ls,Sh?	D,M	4-26-61	54	3.0	342	400	56	596
23N2	Ls	M	4-16-59	51	.2	366	15	8	168
23P1	Ls	M	4-61	--	.1	434	65	44	308

26D1	Ls,Sd	M,P1	4-27-61	--	.5	459	5	8	224
27D1	Ls	D	4-14-59	53	.1	559	25	84	32
28A1	Sh	D,M	3-31-59	53	1.0	434	5	8	256
28M1	Sd	P1	4-61	54	1.0	395	30	<4	188
32C1	Sh?	D,M	5- 1-61	54	.5	425	10	8	148
33R1	Sh?	D,M	5- 1-61	52	.1	429	90	32	428
35L1	Ls,Sh?	D,M	5- 1-61	50	.1	278	100	16	208
36K1	Ls	M	5- 1-61	--	.1	493	160	92	496
27/9W- 3D1	Sd,G	P1	5- 2-61	52	.1	405	10	4	172
5H1	G	P1	5- 2-61	54	2.0	434	5	8	180
5L1	G	P1	4-26-61	--	1.0	425	5	4	184
6R1	G	P1	5- 2-61	53	1.5	429	5	12	200
7P1	G,Sd	P1	5- 2-61	50	1.0	400	5	16	164
12P1	Sh?	D,M	5- 2-61	--	1.0	395	90	4	220
13J1	Ls	D	4-26-61	58	.1	361	150	4	188
13M1	Ls	D	8-57	57	.2	342	---	4	92
13M1	Ls	D	4-26-61	--	<.1	376	10	4	96
14A1	G	P1	3-31-59	--	.7	381	60	4	220
16P1	Sd,G	P1	4-14-59	56	.3	361	10	8	112
16P2	Sd,G	P1	4-61	54	.1	410	10	4	188
21B1	Sd,G	P1	4-61	54	.1	390	5	<4	132
21B2	Sd,G	P1	4-61	54	<.1	405	10	4	136
22P1	G	P1	3-31-59	--	.7	371	25	12	164
24F1	Ls	D	8-57	56	1.0	388	---	8	312
24F1	Ls	D	4-26-61	54	.5	390	5	<4	256
24N1	Ls	D	3-31-59	--	.2	361	170	8	284
24Q1	Ls	---	4- 3-59	53	.2	449	410	24	800
24Q1	Ls	---	4-26-61	59	7.5	581	960	52	1,470
25R1	Ls	D?	5- 2-61	--	.1	429	15	8	304
26D1	G	P1	3-31-59	50	2.5	332	180	12	264
27R1	G	P1	3-31-59	--	.5	390	45	8	200
28Q1	Sh,Sd	D,M, P1	4-61	54	1.0	659	5	8	124
32A1	Sd	P1	5- 2-61	50	.3	434	35	16	288

Table 5.--Field chemical analyses of water from wells in Newton County--Cont.

Well	Material	Geologic Age	Date of Collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium, magnesium)
27/9W-33R1	Sd,G	Pl	4-61	--	0.1	327	170	52	428
34C1	Sd,G	Pl	8-57	56	.5	295	---	18	272
34C1	Sd,G	Pl	4-61	53	.1	351	175	<4	248
34D1	Sd,G	Pl	4-61	54	.3	400	20	12	240
27/10W-12M1	Sd	Pl	5- 2-61	55	.3	478	5	<4	292
13R1	Sd,G	Pl	5- 2-61	--	.5	312	90	16	308
24M1	G	Pl	4- 1-59	--	.1	366	5	8	76
24M1	G	Pl	4-61	51	1.0	376	5	4	76
26N1	Ls	D	5- 1-61	--	.1	366	50	4	88
35H1	Ls	D?	5-61	58	.1	386	45	4	92
28/8W- 2B1	Sd,G	Pl	4-14-59	56	.8	439	10	16	236
2R1	Sh?	D,M	5- 3-61	51	1.0	390	5	4	184
3P1	Ls	D	5- 3-61	--	.5	459	10	8	196
7Q1	Sh?	D,M	5- 3-61	--	1.0	376	5	4	176
8G1	Sd,G	Pl	4-61	52	.5	434	5	<4	256
9K1	Sd,G	Pl	5- 3-61	--	.3	386	5	4	140
13Q1	Sd	Pl	5- 1-61	--	3.0	425	10	4	256
15A1	Sd,G	Pl	3-31-59	53	1.5	415	75	4	356
19A1	Sd,G	Pl	4-61	54	.8	371	5	4	208
19A3	Sd,G	Pl	4-61	53	.8	410	5	4	268
19H1	Sd	Pl	11- 8-58	56	2.5	351	---	8	196
20N1	Sd,G	Pl	8-57	--	.8	439	---	4	308
20N1	Sd,G	Pl	4-61	51	.8	488	5	<4	288
22C1	Sd,G	Pl	4-61	50	1.0	464	10	4	308
23B1	G	Pl	8-57	58	1.0	422	---	4	312
23B1	G	Pl	4-61	55	.8	439	10	<4	272
23E1	Sd,G	Pl	3-31-59	49	1.5	488	10	<4	324

25C1	Sd,G	P1	8-57	57	1.2	425	---	12	332
25C1	Sd,G	P1	4-61	54	1.0	415	15	8	268
26N1	Ls	D	5- 1-61	53	>7.5	556	5	8	264
28B1	Sd,G	P1	4-27-61	54	2.5	454	25	8	280
29L1	Sd,G	P1	4-61	54	1.0	425	15	4	284
31A1	Sd,G	P1	4-61	57	2.5	425	5	20	196
33L1	Sh?	D,M	5- 1-61	--	1.0	478	10	60	164
35H1	Ls	D	5- 1-61	--	1.0	420	45	84	56
28/9W- 1A1	Sd	P1	5- 3-61	55	3.0	405	5	16	112
2C1	Sd,G	P1	5- 3-61	52	>7.5	395	255	52	532
5C1	G	P1	5- 3-61	--	2.0	332	105	20	336
8C1	Ls	D	5- 9-60	53	.5	590	5	40	80
8C1	Ls	D	5- 9-61	52	.1	600	20	32	80
10G1	Ls	D	5- 2-61	57	.3	791	10	124	112
12N1	Sd,G	P1	4-61	58	.5	390	5	<4	188
15R1	Ls	D	4- 2-59	56	.4	678	10	34	164
16Q1	Ls	D	4- 1-59	54	.5	693	15	84	92
16Q1	Ls	D	5- 8-61	58	.1	712	15	80	92
16Q2	Ls	D	5- 8-61	55	.1	727	25	88	96
23G1	Ls	D	4-61	57	.1	512	5	12	200
24D1	Ls	D	3-31-59	54	.3	517	10	20	264
25P1	Sd,G	P1	5- 2-61	50	1.5	464	5	16	240
28Q1	G	P1	4- 1-59	54	1.0	376	10	12	140
30K1	Sh	D,M	5- 2-61	--	.1	595	5	12	164
32J1	Sd,G	P1	11-57	57	1.3	342	---	12	148
32J1	Sd,G	P1	5- 8-61	57	.8	366	10	12	136
35N1	Sh?	D,M	5- 2-61	--	.5	371	10	<4	188
28/10W- 1F1	G	P1	5- 2-61	55	1.0	366	25	16	108
12J1	Ls	D	5- 9-61	52	.1	449	10	28	144
13A1	Ls	D	5- 9-61	54	1.0	669	15	48	160
25B1	Sh	D,M	5- 2-61	53	.5	303	85	16	132
36G1	Sh?	D,M	5- 2-61	53	.5	351	5	16	144
23R1	Ls	D	5- 9-61	55	.5	630	15	44	180
24N1	Ls	D	4-61	56	<.1	512	10	48	148
36D1	Ls	D	4- 1-59	53	.7	508	10	40	324

Table 5.--Field chemical analyses of water from wells in Newton County--Cont.

Well	Material	Geologic Age	Date of Collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium, magnesium)
29/8W- 5R1	Sd	Pl	5- 4-61	56	1.0	215	55	4	184
6M1	Sd	Pl	5- 3-61	--	1.0	264	245	96	572
11M1	Ls	D	5- 3-61	--	.5	390	45	8	144
12F1	Sd	Pl	5- 3-61	--	.3	234	130	16	256
13Q1	Ls	D	5- 3-61	52	.3	405	25	4	192
14H1	Sh	D,M	4-61	58	<.1	371	15	20	124
18N1	Ls	D	8-22-57	57	.1	278	---	16	236
18N1	Ls	D	4-61	--	.1	288	155	8	180
20J1	Sh?	D,M	5- 4-61	52	1.5	659	5	12	312
23A1	Ls	D	1959	54	.8	444	30	12	260
25Q1	Ls	D	4-61	57	.3	376	50	4	172
27R1	Sh?	D,M	5- 3-61	51	4.0	512	5	12	232
28Q1	Ls	D	11-57	54	.1	395	---	20	230
28Q1	Ls	D	3-31-59	45	.1	425	40	16	240
30A1	Ls	D	4-61	58	<.1	356	15	4	---
35F1	Ls	D	3-31-59	53	.3	390	20	8	172
29/9W- 1E1	Sd	Pl	4- 2-59	53	<.1	224	85	16	240
3M1	Sd	Pl	5- 3-61	--	1.0	298	50	4	240
9E1	Sd	Pl	5- 3-61	54	.1	185	50	28	184
10B1	Ls	D	5- 9-61	58	.3	371	5	20	148
11N1	Ls	D	5- 9-61	58	.1	366	5	16	140
11N2	Ls	D	5- 9-61	54	.1	366	10	16	128
16E1	Sd	Pl	5- 3-61	--	.1	93	55	40	108
16H1	Ls	D	4-61	54	.5	366	5	20	120
18A1	Sd,G	Pl	3-11-58	--	1.0	166	---	12	168
18A1	Sd,G	Pl	5- 9-61	--	.5	195	50	4	168
19G1	Sd,G	Pl	5- 3-61	--	1.0	70	8	156	
20Q1	Sh?	D,M	5- 3-61	56	.1	366	10	20	136
22P3	G,Sd	Pl	4-61	57	2.0	386	120	8	372
25D1	Ls	D	5- 3-61	52	.1	371	10	20	96
27E1	Ls?	D	5- 3-61	52	.5	307	190	12	180
33D1	Sh?	D,M	5- 3-61	52	.3	346	60	4	116

35N1	Sh	D,M	4-61	58	<.1	473	10	20	84
30/8W- 1F1	Sd	P1	4- 2-59	58	.1	161	50	16	208
5A1	Sd	P1	5- 4-61	--	.1	146	40	16	148
5N1	Sd	P1	5- 4-61	--	.5	322	50	8	248
9A1	Ls	S	5- 4-61	54	.3	420	35	12	252
13J1	Sd	P1	4-16-59	--	.1	137	40	8	148
15J1	Sd	P1	4-14-59	--	3.0	146	75	4	192
18R1	Ls	S	4-61	55	.3	410	5	28	184
19J1	Ls	S	10-13-57	54	4.0	405	---	40	216
19J1	Ls	S	5- 4-61	--	1.5	454	<5	32	204
22C1	Sd	P1	4-61	55	.1	146	45	16	112
27N1	Sd	P1	5- 4-61	53	.1	239	65	16	216
33P1	Sd	P1	5- 4-61	55	.1	122	30	4	88
33R1	Sd	P1	5- 4-61	54	1.0	220	45	48	224
30/9W- 4A1	Sd	P1	5-31-61	--	3.0	478	80	12	320
20J1	Sd	P1	5-31-61	56	1.0	415	10	40	188
24J1	Sd	P1	5-31-61	--	3.0	234	75	16	216
26P1	Sd	P1	5-31-61	58	.1	317	95	24	284
27N1	Ls	D	4-61	--	.8	376	5	24	128
28N1	Ls,G	D,P1	11-57	55	.3	317	---	24	108
28N1	Ls,G	D,P1	4-27-61	59	.1	371	5	16	116
28R1	Ls	D	4-61	59	.1	342	5	24	104
33N1	Sd	P1	5-31-61	57	.5	142	25	4	96
34D1	Ls	D	10-30-57	54	.2	322	---	28	116
34D1	Ls	D	4-61	54	.1	361	5	24	116
30/10W-12M1	Ls	S	5- 5-61	54	.7	342	30	8	164
24A1	Sd	P1	5-31-61	53	.1	137	50	12	152
25Q1	Sd	P1	5-31-61	57	.1	185	40	12	176
31/8W- [illegible]	Sd	P1	6- 1-61	59	.1	156	35	4	108
[illegible]1	Sd	P1	6- 1-61	59	1.0	176	75	8	168
3M1,2	Sd	P1	4- 2-59	58	.3	151	65	8	168
3M1,2	Sd	P1	5- 9-61	54	.1	176	75	8	176
4N1	Sd	P1	6- 1-61	59	1.0	181	70	12	176
[illegible]	Sd	P1	6- 1-61	58	.5	181	110	16	228

Table 5.--Field chemical analyses of water from wells in Newton County--Cont.

Well	Material	Geologic Age	Date of Collection	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$ (Calcium, magnesium)
31/8W- 9P1	Sd	P1	6- 1-61	--	.1	166	40	20	140
11D1	Sd	P1	6- 1-61	54	1.0	161	160	10	256
14D1	Sd	P1	4- 2-59	59	<.1	210	80	16	236
14D1	Sd	P1	5-10-61	58	.1	268	50	36	228
15C1	Sd	P1	5-10-61	52	.1	161	20	4	112
15H1	Ls	S	4- 2-59	59	.1	224	10	<4	112
17D1	Sd	P1	6- 1-61	--	1.0	112	65	4	116
21D1	Sd	P1	6- 1-61	59	.1	107	35	24	52
21D2	Sd	P1	6- 1-61	52	.1	117	20	4	20
21J1	Sd	P1	5- 4-61	54	1.5	102	85	12	92
24B1	Sd	P1	6- 1-61	54	.2	220	60	24	192
25C1	Sd	P1	5- 4-61	54	<.1	127	25	4	76
26D1	Sd	P1	5- 4-61	--	>7.5	532	205	60	624
28N1	Sd	P1	5- 4-61	54	<.1	122	35	20	204
30H1	Sd	P1	5- 4-61	--	1.0	215	165	<4	284
30M1	Sd	P1	5-31-61	--	.1	156	40	8	124
31Q1	Sd	P1	5-31-61	--	.1	449	110	56	640
34E1	Ls	S	1957	56	.1	522	---	12	356
34R1	Sd	P1	5- 4-61	52	.1	229	85	8	288
36C1	Sd	P1	1957	--	.4	129	---	14	160
36C1	Sd	P1	5-10-61	54	.3	166	85	8	172
31/9W- 3G1	Ls	S	11-57	--	.5	420	---	96	268
3G1	Ls	S	5-10-61	--	.1	454	15	88	252
4J1	Ls	S	5-10-61	--	5.0	283	60	12	252
7J1	Sd	P1	6- 1-61	57	1.0	176	65	4	156
12D1	Sd	P1	6- 1-61	53	1.0	137	50	4	104
13D1	Sd	P1	6- 1-61	58	.3	190	70	4	188
14Q1	Ls	S	6- 1-61	59	.3	342	5	12	96

15A1	Sd	Pl	6- 1-61	57	.2	146	40	4	104
15N1	Ls	S	4-61	52	<.1	303	5	4	88
16C1	Sd	Pl	6- 1-61	--	1.0	185	95	8	184
17E1	Sd	Pl	6- 1-61	57	.1	122	75	8	144
20A1	Sd	Pl	6- 1-61	59	1.0	185	105	12	208
21M1	Sd	Pl	5- 4-61	55	.1	210	30	4	160
22P1	Sd	Pl	5- 4-61	--	1.5	151	125	12	228
25D1	Ls	S	11-57	56	1.0	288	---	76	220
25D1	Ls	S	5-10-61	58	1.0	332	15	24	148
26R1	Sd	Pl	5-31-61	54	<.1	273	60	16	236
29R1	Sd	Pl	5- 5-61	--	.1	161	40	4	124
31C1	Sd	Pl	5- 5-61	51	<.1	171	40	12	136
33A1	Sd	Pl	5-31-61	55	.7	220	45	<4	172
36P1	Sd	Pl	5-31-61	--	.1	234	35	8	116
31/10W-12E1	Sd	Pl	6- 1-61	52	4.0	171	140	12	248
24H1	Sd	Pl	6- 1-61	57	.5	142	100	12	180
25R1	Ls	S	5-12-61	58	1.0	156	85	8	180
36R1	Sd	Pl	5- 5-61	--	.1	215	70	16	156
32/8W-25R1	Sd	Pl	6- 1-61	57	1.0	156	65	8	144
33G1	Ls,G	S,Pl	1- 9-59	55	.3	371	20	24	172
34A1	Sd	Pl	6- 1-61	52	.5	249	105	24	264
35B1	Sd	Pl	6- 1-61	58	5.0	254	210	32	392
35E1	Ls	S	4- 2-59	55	.1	259	10	8	136