

STATE OF INDIANA
INDIANA DEPARTMENT OF CONSERVATION
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

1964

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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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GROUND-WATER RESOURCES OF NORTHWESTERN INDIANA

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By J. S. Rosenshein and J. D. Hunn

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.

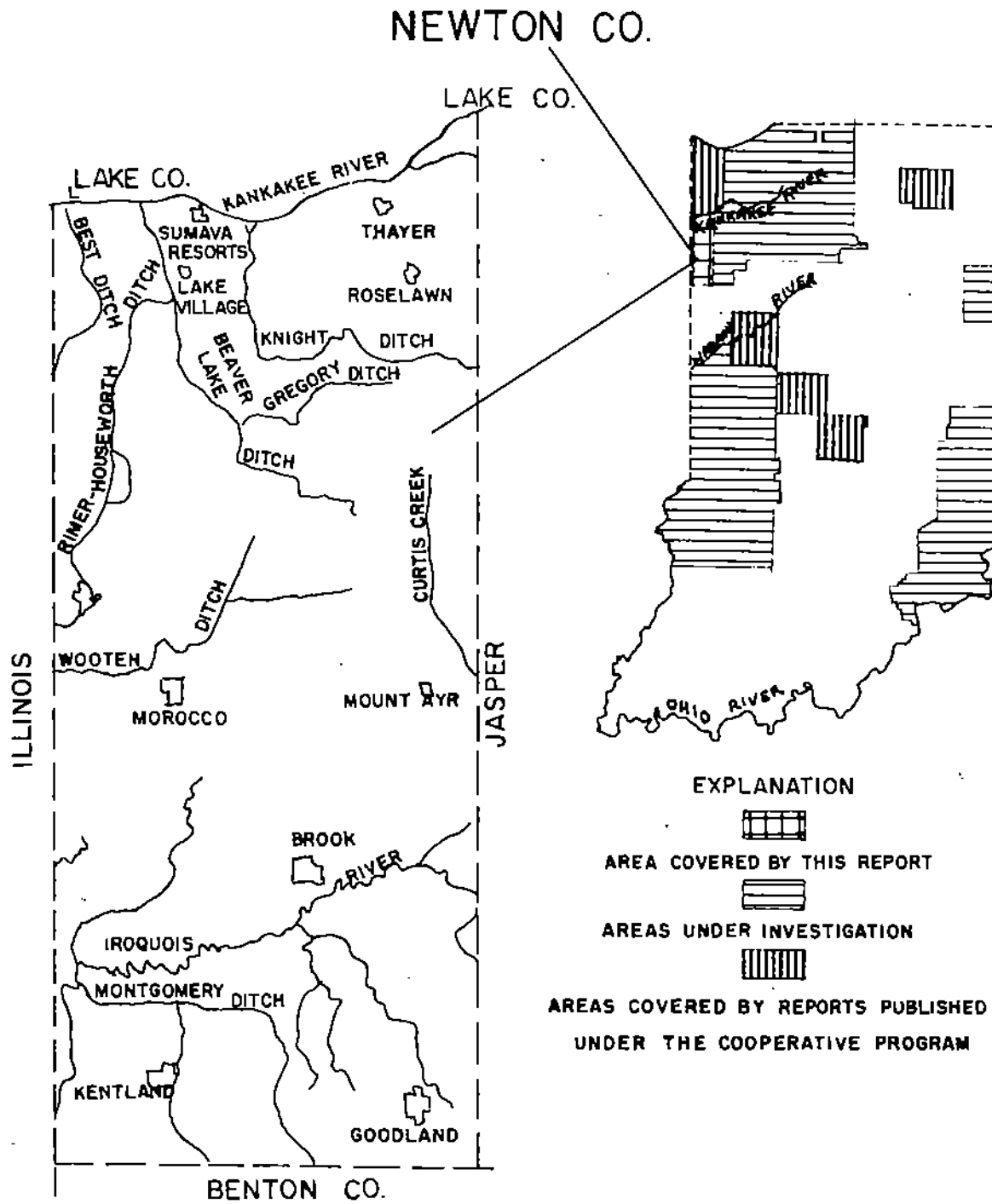


FIGURE 1. -- Map of Indiana, showing area covered by this report, areas under investigation, and areas covered by reports published under the cooperative program.

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 SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 36, T. 29 N., R. 8 W.

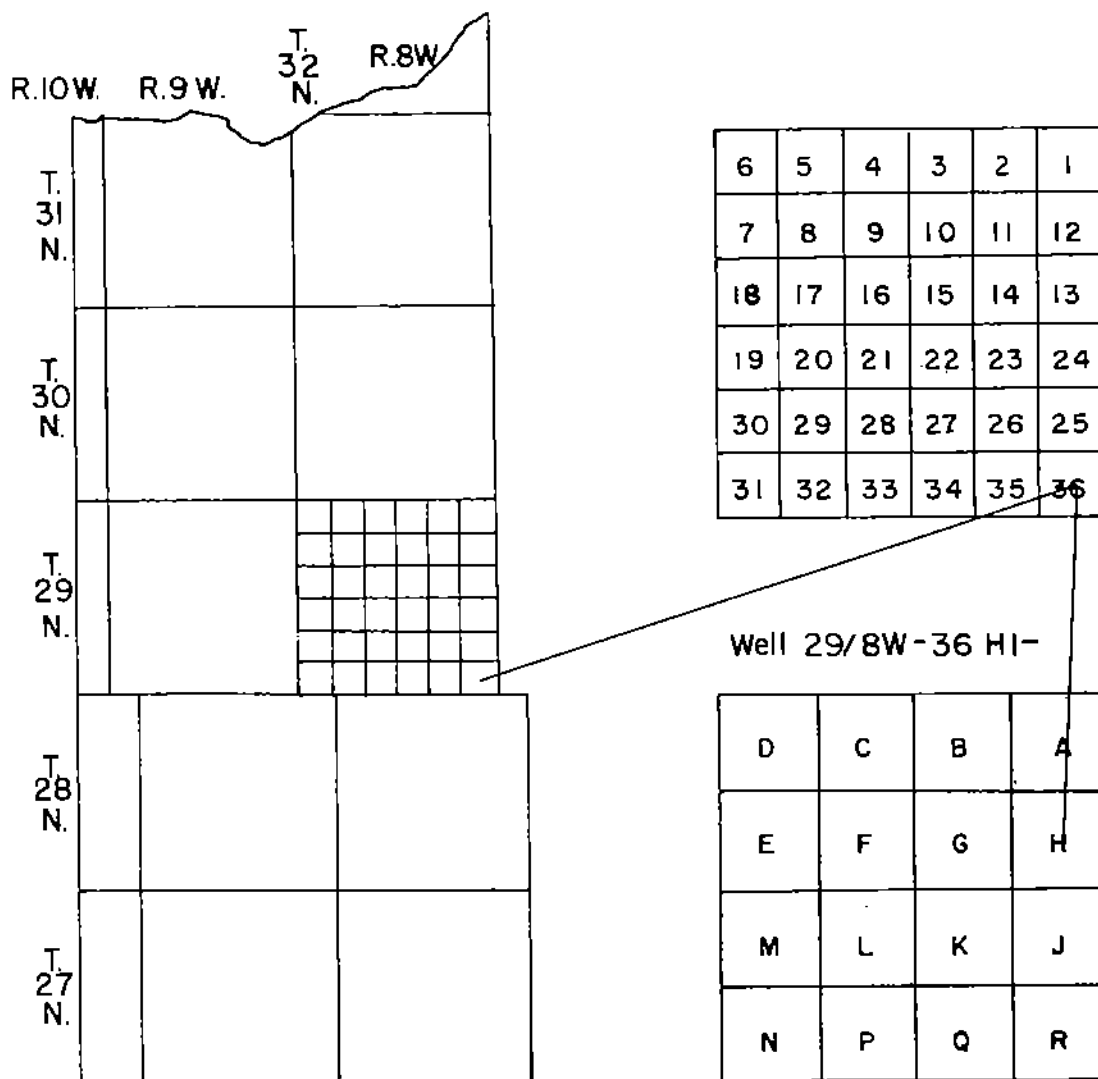


FIGURE 2.- Sketch showing well-numbering system

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). Slot size: In thousandths (0.001) of an inch.
 Equivalent screen openings: From commercial catalogs for water-well supplies. 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: D, domestic; Du, dug; Dr, drilled; J, jetted.
 Finish: Op, gravel pack; Oa, open end; Oa, open end; S, screen;
 dia, diameter in inches; E, gauze wire; E, gauze wire; E, shale;
 Character: C, gravel; Ls, limestone; Sh, sand; Sh, shale;
 Sp, sandstone; D, Devonian; M, Mississippian; Pl, Pleistocene;
 Geologic age: G, gamma-ray log available; gpm, gallons per minute; L, log of well
 S, sulfur.
 Condition of occurrence: C, confined; U, unconfined; see text for definition.

Well	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter of well (inches)	Finish	Water-bearing zones				Water level (feet)	Use	Type of pump and horsepower	Remarks
									Depth to top (feet)	Thickness (feet)	Character	Geologic age				
2787-311	R. Miller			672	Dr	280	4									
311	H. Spurlock			662	Dr	80	4									
311	G. Shepard	C. E. Mosher	1-30-48	662	Dr	80	4									
681	G. McCarty	Moshler and Denton	12-13-55	664	Dr	88	4									
1021	G. Shepard	Hofstetter Bros.	Fall 1959	667	Dr	114	4									
1022	do	do	Winter 1960	667	Dr	40	7	8, 8ft, dia 3								
1221	K. Heller	do		675	Dr	142	4									
1240	E. Farrell	Layne-Northern Co., Inc.	3-31-59	678	Dr	32	3									
1401	do	do		682	Dr	185	12									
1402	do	do		681	Dr	175	12									
1403	do	do		670	Dr	248	12									
1404	do	do		681	Dr	100	12									
1405	do	do		682	Dr	186	12									
1401	do	do		681	Dr	177	6									
1701	G. Hager	Hofstetter Bros.	Spring 1960	680	Dr	64	7									
1701	J. McGraw	Moshler and Denton	3-6-55	678	Dr	230	4									
1801	D. Dick	do	1959	672	Dr	151	6									
1901	A. C. Bartel	do	3-10-55	683	Dr	110	4									
2011	L. D. Espenshade	do		680	Dr	80	4									
2101	Truette, Nichols Estate	do		684	Dr	56	4									
2371	Mr. Drees	Hofstetter Bros.		706	Dr	70	6									
2381	Town of Goodland	Layne-Northern Co., Inc.	Fall 1958	625	Dr	208	6									

Water level: In feet below land-surface datum on date of completion of well, except where otherwise noted.
 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.

Table J.--Records of wells and test holes in Denton County, Ind.--Cont.

Well	Owner	Driller	Date completed	Altitude (feet)	Type of well	Depth of well below land-surface (feet)	Diameter of well (inches)	Zinc	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
27/9E-24F1	R. Zell	Moshier and Denton	10-14-54	679	Dr	117	4	Oh	68	49	Ls	D	C	D, B	L	Yield 20 ft pumping 10 gpm; bedrock at 68 ft; Ca, L.	
28N1	G. Van Kirk	C. E. Moshier	1-20-49	696	Dr	70	4-3	Oh	30	40	Ls	D	---	D, B	J1	Bedrock at 30 ft; limestone overlain by 30 ft black shale and sh. 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.
24R1	C. Potts	---	---	711	Dr	180	4	Oh	---	---	Ls	D7	C	D, B	L	Water has odor, hydrogen sulfide gas; Ca.	
28D1	C. Simons	C. E. Moshier	11-15-46	698	Dr	75	4	S; 3ft, 10in., dia 3	---	---	G	P1	C	D, B	J1	Yield 2 gpm; Ca.	
27R1	M. Roe	---	---	711	Dr	77	3	Oh	---	---	G	P1	C	D, B	J3/4	Yield about 5 gpm; bedrock at 60 ft; Ca, L.	
28Q1	Kentland Church	---	9-23-53	704	Dr	120	4	Oh	---	---	Sh, Sd	D, M, P1	C	P	L	Water level measured 4.2 ft below land surface; Ca, L.	
32A1	D. M. Weldon	---	---	696	Dr	12	4 1/2	---	---	---	Sd	P1	---	S	J1/3	Bedrock at 100 ft; see G. H. Ashley (1899, p. 187).	
33A1	M. Roe	---	Before 1898	698	Dr	231	---	---	---	---	---	---	---	---	---	---	Yield 5 gpm; Ca, L.
33R1	I. G. Dye	Moshier and Denton	3-8-56	726	Dr	28	4	S; 4ft, 18in.	25	3	Sd, G	P1	C	D, B	L	Bedrock at 100 ft; see G. H. Ashley (1899, p. 190).	
34C1	M. Gay	---	3-30-53	712	Dr	110	4	---	60	30	Sd, G	P1	C	D, B	L	Ca, L.	
34D1	W. Ross	Moshier and Boss	10-4-54	701	Dr	33	4	S; 4ft, dia 3 1/2	20	3	Sd, G	P1	C	D, B	S	Ca, L.	
35M1	C. C. Mulligan	---	Before 1898	717	Dr	150	---	---	---	---	---	---	---	---	---	---	Yield 5 gpm; Ca, L.
37/10E-12M1	B. E. Moller	C. E. Moshier	About 1948	662	Dr	60	4	S	---	---	Sd	P1	C	D, B	L1/3	Bedrock at 80 ft; Ca.	
13R1	A. Washburn	---	Winter 1859	669	Dr	80	6	S	---	---	Sd, G	P1	C	D, B	S1	Bedrock at 100 ft; see G. H. Ashley (1899, p. 190).	
24A1	H. Washburn	---	1858	671	Dr	400	4	---	---	---	Ls	S7	C	D, B	S1	Ca, L.	
24M1	T. Dowling	---	8-23-46	683	Dr	75	4	S; 2 1/2ft, dia 3	---	---	G	P1	C	S	J3/4	Ca.	
26X1	H. Batchman	---	About 1820	691	Dr	96	---	---	---	---	Ls	D	C	D, B	L1/3	Yield 20 gpm; bedrock at 73 ft; water has very strong odor, hydrogen sulfide gas; Ca.	
35J1	A. W. Barton	D. Denton	11-20-59	682	Dr	100	4	Oh	73	27	Ls	D7	C	D	---	Yield 10 ft pumping 20 gpm; Ca, L.	
28/9E-201	H. Barton	Mefstetter Bros.	1-10-48	682	Dr	135	4	---	136	9	Sd, G	P1	C	D, B	L1/3	Ca.	
3R1	E. Nelson	---	About 1943	680	Dr	---	4	---	---	---	Sh7	D, M	C	D, B	L1	Ca.	
3P1	F. Atter	---	---	681	Dr	85	3	Oh	---	---	Ls	D	C	D, B	L1/3	Ca.	
7Q1	Z. Lyons	Mefstetter Bros.	12-30	683	Dr	87	4	Oh	78	8	Sd, G	P1	C	D, B	J	Bedrock at 100 ft after 3 hr pumping 25 gpm; Ca, L.	
8Q1	B. Lyons	---	---	683	Dr	87	4	Oh	---	---	Sd, G	P1	C	D, B	J1/4	Ca.	
8K1	O. Morrison	---	Spring 1951	652	Dr	60	4	S	---	---	Sd, G	P1	C	D, B	L1/4	Ca.	
13Q1	I. O. Boardreff	---	---	680	J	85	2 1/2	S	---	---	Sd	P1	C	D, B	---	Ca.	
15A1	A. A. Kurfess	C. E. Moshier	7-16-48	651	Dr	48	3	S; 3ft	30	12	Sd, G	P1	C	D, B	J1/4	Ca.	
18N1	M. Marchant	Mr. Bentley	About 1900	657	Dr	110	4	Oh	---	---	Sh	D, M	C	D, B	J1/4	Ca.	
19A1	Town of Brook	---	1900	651	Dr	139	10	---	---	---	Sd, G	P1	C	P	815	Ca.	
19A2	Brown Trucking Co.	---	1914	649	Dr	114	5	---	---	---	Sd, G	P1	C	O	---	Observation well No. 4; water level measured 11.4 ft below land, 11-8-54; E, G.	

28/8W-1043 19H1	Town of Brook Brook Conservation Club	A. L. Cox and Sons	1948	648 Dr	135	12	3; 25 ft	---	Sd,G	P1	C	--	N	T	Ca.	
20N1	H. Dodd	Moshier and Denton	6- 2-58	651 Dr	69	4	8; 4ft, 25ml	61	Sd,G	P1	C	9	D	J3/4	Yield 20 gpm; Ca, L.	
22C1	Mr. Wilson	D. Denton	4-13-58	653 Dr	135	4	40-	58	Sd,G	P1	C	5	D	J1/2	Yield 10 gpm; Ca, L.	
23B1	L. Wright	Moshier and Denton	10-13-48	654 Dr	61	3	5; 2ft, 33ml, dia 2	73	Sd,G	P1	C	15	D,9	L1	Yield 10 gpm; Ca, L.	
23E1	W. Lyons	C. E. Moshier	10-23-53	654 Dr	80	4	5; 4ft, 25ml	60	Sd,G	P1	C	20	D,9	J	Yield 10 gpm; Ca, L.	
23C1	L. Wolfe	Moshier and Denton	-----	655 Dr	80	4	Ca	140	Ls	D	C	15	D,9	L1/2	Ca.	
20N1	H. Barton	Reisterer Bros.	About 1942	658 Dr	178	4	-----	---	Ls	D	C	20	D	J	Yield 10 gpm; Ca, L.	
28B1	J. Hornbann	Moshier and Denton	1-10-58	652 Dr	80	4	5; 4ft, 12ml	40	Sd,G	P1	C	15	D,9	J1/2	Yield 12 gpm; Ca.	
29B1	Martin Bros.	R. Kib	0-28-59	657 Dr	64	4	Ca	---	Sd,G	P1	C	20	D	L1	Ca, L.	
30B1	F. Atchcroft	D. Denton	-----	651 Dr	142	5	Ca	---	Sd,G	P1	C	20	D	L1	Ca.	
30H1	F. Corbett	-----	-----	653 Dr	100	4	Ca	---	Sh?	D,M	C	20	D	L1/4	Water has odor, hydrogen sul-	
35H1	L. Ormlston	-----	-----	661 Dr	178	4	Ca	---	Ls	D	C	6	D	L2/4	phide gas; Ca.	
28/9W- 1A1	J. Watt	-----	-----	669 Dr	---	2	-----	---	Sd	P1	C	10	D,9	L2/4	Ca.	
28/9W- 2C1	C. Coon	W. Bollinger	-----	693 Dr	30	4	8	---	Sd,G	P1	C	10	D,9	J1/2	Ca.	
5C1	W. Blaney	Moshier and Denton	9- 8-53	676 Dr	198	4	Ca	148	Ls	D	C	70	D	L	Ca.	
8C1	G. Beak	-----	-----	-----	---	4	-----	---	Ls	D	C	70	D	L	Ca.	
10Q1	H. Fitzgerald	-----	-----	654 Dr	292	4	Ca	---	Ls	D	C	7	D	L1	Ca.	
12N1	R. Sell	Mofstetter Bros.	2-61	664 Dr	75	4	8; 2ft, 35ml, dia 4	70	Sd,G	P1	C	12	D,9	J	Ca.	
15R1	R. Sell	-----	-----	657 Dr	170	4	Ca	130	Ls	D	C	30	D,9	J1/2	Ca.	
10Q1	L. Martin	C. E. Moshier	Before 1940	682 Dr	123	3	Ca	115	Ls	D	C	---	D	---	Ca.	
16Q2	O. Konoyer	Reisterer Bros.	Summer 1900	659 Dr	121	4	Ca	110	Ls	D	C	23	D	J1/3	Ca.	
19R1	W. Whaley	Moshier and Denton	4-30-59	656 Dr	150	4	Ca	119	Ls	D	C	35	D,9	S1/2	Ca.	
23Q1	E. Sell	Mofstetter Bros.	2- 2-57	661 Dr	150	4	Ca	101	Ls	D	C	---	D,9	J	Ca.	
24D1	R. Kindig	-----	-----	659 Dr	120	6-4	Ca	90	Ls	D	C	12	D	---	Ca.	
25P1	C. Anderson	C. Bentley Bros.	4-10-58	653 Dr	95	4	9	---	Sd,G	P1	C	3	D	J3/4	Ca.	
28Q1	C. Strasser	O. Bentley	About	656 Dr	120	3	-----	---	Sh	D,M	C	---	D,9	L1	Ca.	
30K1	A. F. Russell	Moshier and Denton	1912	652 Dr	80	6	3; 15ft, 25ml, dia 6 1/2	62	Sd,G	P1	C	20	P	S3	Ca.	
32J1	Norton County Farm	-----	-----	653 Dr	---	4	-----	---	Sh?	D,M	C	---	D,9	J	Ca.	
35N1	X. White	C. E. Moshier	About 1948	656 Dr	---	4	-----	---	G	P1	C	50	D,9	L1/2	Ca.	
28/10W- 1P1	E. Kussler	-----	-----	697 Dr	110	4	8; 2ft	---	G,Sd	P1	C	---	N	---	Ca.	
11P1	D. W. Lucas	Moshier and Denton	Before 1925	685 Dr	170	4	Ca	182	Ls	D	C	80	D,9	L3/4	Ca.	
12J1	M. Padgett	-----	-----	683 Dr	180	4	Ca	152	Ls	D	C	80	D,9	L3/4	Ca.	
12N1	W. C. Russell	-----	-----	678 Dr	135	---	-----	---	---	---	---	---	---	---	---	---
13A1	M. Padgett	Moshier and Sons	Before 1862	672 Dr	145	4	Ca	142	Ls	D	C	42	D	L	Ca.	
23R1	G. McCarty	-----	-----	671 Dr	155	4	Ca	149	Ls	D	C	50	D	L	Ca.	
24N1	W. Whaley	Mofstetter Bros.	12-60	660 Dr	168	4	Ca	139	Ls	D	C	28	D,9	J	Ca.	
30D1	C. Whaley	-----	-----	656 Dr	175	4	Ca	---	Ls	D	C	---	D,9	---	Ca.	

See John Collect (1899, p. 53);

Yield 20 gpm; bedrock at 104 ft; water has odor, hydrogen sulfide gas; Ca, L.
 Bedrock at 122 ft; see John Collect (1899, p. 53)
 Bedrock at 108 ft; water has odor, hydrogen sulfide gas; Ca, L.
 Bedrock at 64 ft; water has odor, hydrogen sulfide gas; Ca, L.
 Bedrock at 81 ft; water has odor, hydrogen sulfide gas; see log well 23H1; Ca.
 Bedrock at 73 ft; water has odor, hydrogen sulfide gas; Ca

Table 3.--Records of wells and test holes in Norton 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				
29/8W-581	V. Clark			878 Dr	Dr	26	1 1/2	8; Jit								
681	do			663 Dr	Dr	20	1 1/2	9; 4ft								Ca.
1141	A. Lutz			671 Dr	Dr	20	1 1/2	5								Ca.
1321	C. Shriver		9-18	716 Dr	Dr	108	5									Ca.
1321	C. Murphy	R. Sib		678 Dr	Dr	18	1 1/2	8; 3ft								Ca.
1411	W. Clouse	W. Shaw		703 Dr	Dr	90	4									Ca.
1411	M. Anderson	Meisteretter Bros.	Winter 1960	703 Dr	Dr	126	4	8								Ca.
1881	D. Smart	Printy and Binghan	10-54	692 Dr	Dr	130	4	8								Ca.
2251	G. Chamberlain			726 Dr	Dr	155	4									Ca.
2351	Truceco, Jackson Township	Meisteretter Bros.		711 Dr	Dr	194	6	8								Ca.
2501	G. Battleday	A. Potts	1937	673 Dr	Dr	66	4	8								Ca.
2761	L. Yoder	Meisteretter Bros.	1-21-57	684 Dr	Dr	130	4	8								Ca.
2801	M. Berkland															Ca.
30A1	O. Agate and R. Wagner		Spring 1960	734 Dr	Dr	222	4	8								Ca.
3571	K. J. Chamberlain			675 Dr	Dr	151	4	8								Ca.
3681	T. Meeley	A. Potts	1949	660 Dr	Dr	82	4	8								Ca.
29/8W-181	P. Willis	Welling Well Works		695 Dr	Dr	24	3	8; 3ft, 80g								Ca.
281	do		Summer	671 Dr	Dr	30	1 1/2	5; Jit, 80g, dia 1 1/2								Ca.
381	A. Manchester		About 1935	660 Dr	Dr	20	1 1/2	8; 3ft								Ca.
921	G. Biann			665 Dr	Dr	250	6	8								Ca.
1081	R. Gutz	L. Johnson	6-25-54	663 Dr	Dr	204	6	8								Ca.
1191	R. Gutz		8-12-54	672 Dr	Dr	204	6	8								Ca.
1192	do		7-10-52	675 Dr	Dr	375	6	8								Ca.
1381	Town of Morocco	Layne-Northers Co., Inc.	8-17-40	667 Dr	Dr	51	38	GPI; B: 10ft, 105m, dia 18								Ca.
1582	do		5-14-48	667 Dr	Dr	49	18	GPI; S: 20ft, 80al, dia 8								Ca.
1583	do															Ca.
1584	do															Ca.
1681	G. M. Garrity		1-20-52	667 Dr	Dr	51	6									Ca.
1681	H. Morrison	Meister Well Co.	1-7-59	697 Dr	Dr	13	1 1/2	9; 2ft								Ca.
1881	V. Row	Kambler and Denton	1-12-61	671 Dr	Dr	120	4	8								Ca.
1881	do		6-18-56	675 Dr	Dr	35	4	8; 4ft, 18al, dia 4								Ca.
1901	R. E. Barumit		Spring 1960	673 Dr	Dr	12	1 1/2	8; 3ft								Ca.
2001	K. Richcreek	D. Denton	8-3-60	679 Dr	Dr	150	4									Ca.
2181	Town of Morocco	Layne-Northers Co., Inc.	3-2-58	701 Dr	Dr	131										Ca.
2201	do		1-7-56	683 Dr	Dr	53										Ca.

Table J. -- 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			Use	Type of pump and horsepower	Remarks
									Depth to top (feet)	Thickness (feet)	Character			
30/10W-2441	I. Yoder	-----	-----	680	Dn	30	14	S; 3ft, 60g	-----	Pl	U	-----	Ca.	
2451	State of Indiana	-----	8-52	666	Dn	36	14	S; 3ft, 60g	-----	Pl	U	-----	Ca.	
2451	-----	-----	-----	668	Dn	20	14	S; 3ft	-----	Pl	U	-----	Ca.	
31/8W-181	J. DeFries	Lowell Well Co.	11-80	683	Dn	28	14	S; 3ft	-----	Pl	U	-----	Ca.	
241	L. Ross	-----	About	647	Dn	25	12	S	-----	Pl	U	-----	Ca.	
3M1	J. Beckney	-----	1930	648	Dn	18	14	S; 4ft, 60g	-----	Pl	U	-----	Ca.	
3M2	-----	-----	1950	649	Dn	22	14	-----	-----	Pl	U	-----	Ca.	
4M1	L. Hardstrom	-----	-----	647	Dn	22	14	S; 3ft	-----	Pl	U	-----	Ca.	
3M1	C. Doyle	-----	-----	647	Dn	22	14	S; 3ft	-----	Pl	U	-----	Ca.	
7M1	B. Belmont	-----	-----	642	Dn	18	14	S; 3ft, 80g, dia 1 1/2	-----	Pl	U	-----	Ca.	
8M2	V. Veseljak	-----	1-60	642	Dn	18	14	S; 3ft, 80g, dia 1 1/2	-----	Pl	U	-----	Ca.	
9M2	-----	-----	-----	642	Dn	18	14	S; 3ft, 80g, dia 1 1/2	-----	Pl	U	-----	Ca.	
11D1	S. Stolarek	-----	3-81	662	Dn	16	14	S; 3ft	-----	Pl	U	-----	Ca.	
14D1	A. Villanova	-----	-----	668	Dn	20	14	S; 3ft	-----	Pl	U	-----	Ca.	
14C1	A. Knapp	-----	-----	678	Dn	20	14	S; 3ft	-----	Pl	U	-----	Ca.	
15G1	-----	-----	About	667	J	34	3	S; 4ft	-----	Pl	U	-----	Ca.	
15M1	Trumaine, Lincoln Township	Lowell Well Co.	1952	665	Dr	89	3	Ob	90	S	C	-----	Ca.	
1003	-----	-----	1033	665	Dr	89	3	Ob	90	S	C	-----	Ca.	
21D1	E. Fellman	-----	1959	678	Dn	18	14	S; 3ft, 60g	-----	Pl	U	-----	Ca.	
21D2	-----	-----	-----	678	Dn	16	14	S; 2 1/2 ft, 60g	-----	Pl	U	-----	Ca.	
21J1	D. Ribony	-----	3-81	678	Dn	16	14	S; 3ft	-----	Pl	U	-----	Ca.	
24B1	P. Knabb	-----	Summer	678	Dn	30	14	S; 3ft	-----	Pl	U	-----	Ca.	
25C1	R. Sharpshooy	-----	1950	682	Dn	10	14	S; 2 1/2 ft	-----	Pl	U	-----	Ca.	
26D1	E. Lloyd	-----	-----	683	Dn	24	14	S; 4ft	-----	Pl	U	-----	Ca.	
28N1	D. W. David	-----	8-60	674	Dn	16	14	S; 4ft, 60g	-----	Pl	U	-----	Ca.	
30M1	C. Elachide	J. Bonstra	Summer	676	Dn	21	14	S; 3ft	-----	Pl	U	-----	Ca.	
30M1	J. Kobayak	-----	1952	672	Dn	26	14	S	-----	Pl	U	-----	Ca.	
32Q1	C. J. Elston	Lowell Well Co.	1938	680	Dn	16	14	S; 3ft	-----	Pl	U	-----	Ca.	
34E1	H. Probstky	Lowell Well Co.	-----	680	Dn	21	14	S; 3ft	-----	Pl	U	-----	Ca.	
34E1	-----	-----	1095	676	Dr	118	3	Ob	109	S	C	-----	Ca.	
34R1	J. E. Rebbias	-----	-----	680	Dn	30	14	S; 4ft, 60g	-----	Pl	U	-----	Ca.	
34R2	-----	-----	1961	680	Dn	30	14	S; 4ft, 60g	-----	Pl	U	-----	Ca.	
36C1	A. Barton	Lowell Well Co.	5-8-55	688	J	22	2	S; 60g	-----	Pl	U	-----	Ca.	
31/8W-301	G. Loda	Sheddy Well and Pump Co.	1935	630	Dr	150	4	Ob	-----	Pl	U	-----	Ca.	
4J1	State of Indiana	Monier and Denton	2-8-30	632	Dr	128	4	Ob	66	S	C	-----	Ca.	
7J1	L. M. Hedger	-----	3-59	642	Dn	19	14	S; 2 1/2 ft, 60g	-----	Pl	U	-----	Ca.	
12D1	G. Isaacs	-----	-----	642	Dn	27	14	S	-----	Pl	U	-----	Ca.	
13D1	A. Thrall	-----	8-57	657	Dn	22	14	S	-----	Pl	U	-----	Ca.	
14Q1	E. Peters	Lowell Well Co.	3-80	651	Dr	138	4	S	-----	Pl	U	-----	Ca.	
15A1	C. Margant	-----	-----	648	Dn	20	2	S; 3ft	-----	Pl	U	-----	Ca.	
15A2	-----	-----	10-59	648	Dn	18	14	-----	-----	Pl	U	-----	Ca.	
15M1	State of Indiana	Monier and Denton	5-10-36	688	Dr	110	4	Ob	93	S	C	-----	Ca.	
16C1	C. M. Bess	W. Grafnitz	6-47	643	Dn	25	14	S	-----	Pl	U	-----	Ca.	

Well No.	Owner	Operator	Year	Well No.	Dr.	J2	J1	3	Notes	Sd	Pl	C	D	J1/2	J1/3	Ca.
1721	H. Davis		About 1945	554	Dr	14	8									Ca.
1781	H. Christenson	C. Prairie	About 1945	848	Dr	6										Ca.
1801	H. King		About 1952	857	Dr	20	3	3ft, 80g								Ca.
2081	D. Dawson		About 1950	892	Dr	25	14	do								Ca.
2181	W. Dullin		About 1950	887	Dr	35	14	9								Ca.
2281	W. Abbott		1946	895	Dr	42	14	9, 5ft, 80g								Well 25 ft deep at barn; Ca.
2521	T. Dornelle	Lovell Well Co.	1955	888	Dr	117	3	6								Ca.
2681	L. J. Havlicek		1959	875	Dr	22	14	9, 5ft, 100g								Ca.
2981	R. Robinson		About 1950	887	Dr	31	2	8								Ca.
3101	J. Anderson		1950	875	Dr	25	14	9, 7ft, 80g								Ca.
3301	L. Conrad		1950	885	Dr	49	14	9, 3ft								Ca.
3681	F. Allen		Spring 1943	890	Dr	27	14	9, 3ft, 80g								Ca.
31/107-1281	J. C. Potucek		1943	832	Dr	25	14	9								Well 17 ft deep at barn; Ca.
2431	A. and M. Brun		3-28	856	Dr	30	14	9, 3ft, 90g								Well 24 ft deep at barn; Ca.
2481	A. Brun		8-20-54	884	Dr	225	0	6								Yield 70 gpm; Ca.
3081	G. R. Ples	L. Johnson	Summer 1958	879	Dr	27	2	9, 5ft								Ca.
32/87-2581	P. Valente			851	Dr	15	14	9, 4ft								Ca.
3301	A. Fontanyl			835	Dr	54	4	6								Yield 9 gpm; Ca, L.
3381	D. C. Grant	H. A. Raider, Jr.		839	Dr	868	19									Oil test: bedrock at 70 ft; L.
3381	Radon and Yacuk			838	Dr	875	10									Oil test: bedrock at 70 ft; L.
3382				838	Dr	875	10									Oil test: bedrock at 70 ft; L.
3382				838	Dr	875	10									Oil test: bedrock at 70 ft; L.
3481	S. Matthews		5-40	838	Dr	869	10									Oil test: bedrock at 70 ft; L.
3581	S. Doersman, Sr.		About 1954	842	Dr	20	14	9								Ca.
3581	S. Doersman, Sr.		About 1950	846	Dr	18	14	9, 3ft, 80g								Ca.
3581	G. Bonoma			843	Dr	800	6	6								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	Thick-ness (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	Thick-ness (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	Thick-ness (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.

Material	Thickness (feet)	Depth (feet)	Remarks
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.

Material	Thickness (feet)	Depth (feet)	Remarks
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	Thick- ness (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 cal- cite 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	Thick-ness (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.	
Material	Thick-ness (feet)	Depth (feet)	Remarks
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.	
Material	Thick-ness (feet)	Depth (feet)	Remarks
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.	
Material	Thick-ness (feet)	Depth (feet)	Remarks
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	

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

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

Material	Thick- ness (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? Series:			
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	

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

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

Material	Thick- ness (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 lime- stone or dol- omite.
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	Thick- ness (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:			
Slate-----	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	

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

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

Material	Thick- ness (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 ³ / ₄ "	12	
Clay, blue-----	42 ¹¹ / ₁₆ "	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	Thick-ness (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	

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

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

Material	Thick-ness (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	Thick- ness (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	Thick-ness (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	Thick- ness (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----- Clay, yellow----- Clay, gray-----	3 5 58	3 8 66	
Mississippian and Devonian Systems: Lower Mississippian and Upper Devonian Series: Shale, gray----- Shale, black-----	2 48	68 116	
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----- Clay, blue-----	15 50	15 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----- Clay, gray-----	25 46	25 71	
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Table 4.--Selected logs of wells and test holes in Newton County--Cont.

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

Material	Thick- ness (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	Thick-ness (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.

Material	Thick-ness (feet)	Depth (feet)	Remarks
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.

Material	Thick-ness (feet)	Depth (feet)	Remarks
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.

Material	Thick-ness (feet)	Depth (feet)	Remarks
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	Thick- ness (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.

Material	Thick- ness (feet)	Depth (feet)	Remarks
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.

Material	Thick- ness (feet)	Depth (feet)	Remarks
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.

Material	Thick- ness (feet)	Depth (feet)	Remarks
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	Thick- ness (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.

Material	Thick- ness (feet)	Depth (feet)	Remarks
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.

Material	Thick- ness (feet)	Depth (feet)	Remarks
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.

Material	Thick- ness (feet)	Depth (feet)	Remarks
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	Thick-ness (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	Thick- ness (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	Thick- ness (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.	
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.	
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.	
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	Thick- ness (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	Thick- ness (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	Thick- ness (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	Thick- ness (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	Ma- teri- al	Geo- logic Age	Date of Collec- tion	Temper- ature (°F)	Iron (Fe)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Hardness as CaCO ₃ (Calcium, magnesium)
27/8W- LAI	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	P1	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	P1	1957	53	1.0	439	---	6	260
20J1	Sd,G	P1	4-26-61	53	1.0	376	10	<4	196
21E1	Sd,G	P1	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

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; P1, Pleisto-
cene; S, Silurian.

U. S. Public Health Service drinking-water stand-
ards: Iron (Fe) - 0.3 ppm for iron and man-
ganese together; Sulfate (SO₄) - 250 ppm;
Chloride (Cl) - 250 ppm.

26D1	Ls, Sd	M, Pl	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	Pl	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	Pl	5- 2-61	52	.1	405	10	4	172
5H1	G	Pl	5- 2-61	54	2.0	434	5	8	180
5L1	G	Pl	4-26-61	--	1.0	425	5	4	184
6R1	G	Pl	5- 2-61	53	1.5	429	5	12	200
7P1	G, Sd	Pl	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	Pl	3-31-59	--	.7	381	60	4	220
16P1	Sd, G	Pl	4-14-59	56	.3	361	10	8	112
16P2	Sd, G	Pl	4-61	54	.1	410	10	4	188
21B1	Sd, G	Pl	4-61	54	.1	390	5	<4	132
21B2	Sd, G	Pl	4-61	54	<.1	405	10	4	136
22P1	G	Pl	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	Pl	3-31-59	50	2.5	332	180	12	264
27R1	G	Pl	3-31-59	--	.5	390	45	8	200
28Q1	Sh, Sd	D, M, Pl	4-61	54	1.0	659	5	8	124
32A1	Sd	Pl	5- 2-61	50	.3	434	35	16	288

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

Well	Ma- teri- al	Geo- logic Age	Date of Collec- tion	Temper- ature (°F)	Iron (Fe)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Hardness as CaCO ₃ (Calcium, magnesium)
27/9W-33R1	Sd,G	P1	4-61	--	0.1	327	170	52	428
34C1	Sd,G	P1	8-57	56	.5	295	---	18	272
34C1	Sd,G	P1	4-61	53	.1	351	175	<4	248
34D1	Sd,G	P1	4-61	54	.3	400	20	12	240
27/10W-12M1	Sd	P1	5- 2-61	55	.3	478	5	<4	292
13R1	Sd,G	P1	5- 2-61	--	.5	312	90	16	308
24M1	G	P1	4- 1-59	--	.1	366	5	8	76
24M1	G	P1	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	P1	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	P1	4-61	52	.5	434	5	<4	256
9K1	Sd,G	P1	5- 3-61	--	.3	386	5	4	140
13Q1	Sd	P1	5- 1-61	--	3.0	425	10	4	256
15A1	Sd,G	P1	3-31-59	53	1.5	415	75	4	356
19A1	Sd,G	P1	4-61	54	.8	371	5	4	208
19A3	Sd,G	P1	4-61	53	.8	410	5	4	268
19H1	Sd	P1	11- 8-58	56	2.5	351	---	8	196
20N1	Sd,G	P1	8-57	--	.8	439	---	4	308
20N1	Sd,G	P1	4-61	51	.8	488	5	<4	288
22C1	Sd,G	P1	4-61	50	1.0	464	10	4	308
23B1	G	P1	8-57	58	1.0	422	---	4	312
23B1	G	P1	4-61	55	.8	439	10	<4	272
23E1	Sd,G	P1	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	P1	5- 4-61	56	1.0	215	55	4	184	
	6M1	P1	5- 3-61	--	1.0	264	245	96	572	
	11M1	D	5- 3-61	--	.5	390	45	8	144	
	12F1	P1	5- 3-61	--	.3	234	130	16	256	
	13Q1	D	5- 3-61	52	.3	405	25	4	192	
	14H1	D,M	4-61	58	<.1	371	15	20	124	
	18N1	D	8-22-57	57	.1	278	---	16	236	
	18N1	D	4-61	--	.1	288	155	8	180	
	20U1	D,M	5- 4-61	52	1.5	659	5	12	312	
	23A1	D	1959	54	.8	444	30	12	260	
	29/9W-	25Q1	D	4-61	57	.3	376	50	4	172
		27R1	D,M	5- 3-61	51	4.0	512	5	12	232
		28Q1	D	11-57	54	.1	395	---	20	230
		28Q1	D	3-31-59	45	.1	425	40	16	240
30A1		D	4-61	58	<.1	356	15	4	---	
35F1		D	3-31-59	53	.3	390	20	8	172	
1E1		P1	4- 2-59	53	<.1	224	85	16	240	
3M1		P1	5- 3-61	--	1.0	298	50	4	240	
9E1		P1	5- 3-61	54	.1	185	50	28	184	
10B1		D	5- 9-61	58	.3	371	5	20	148	
11N1		D	5- 9-61	58	.1	366	5	16	140	
11N2		D	5- 9-61	54	.1	366	10	16	128	
16E1		P1	5- 3-61	--	.1	93	55	40	108	
16H1		D	4-61	54	.5	366	5	20	120	
18A1	18A1	P1	3-11-58	--	1.0	166	---	12	168	
	18A1	P1	5- 9-61	--	.5	195	50	4	168	
	19G1	P1	5- 3-61	--	1.0	70	8	156		
	20Q1	D,M	5- 3-61	56	.1	366	10	20	136	
	22P3	P1	4-61	57	2.0	386	120	8	372	
	25D1	D	5- 3-61	52	.1	371	10	20	96	
	27E1	D	5- 3-61	52	.5	307	190	12	180	
	33D1	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	114
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- 1F1	Sd	P1	6- 1-61	59	.1	156	35	4	108
3M1,2	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
4N1	Sd	P1	5- 9-61	54	.1	176	75	8	176
4N1	Sd	P1	6- 1-61	59	1.0	181	70	12	176
4N1	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	Ma- teri- al	Geo- logic Age	Date of Collec- tion	Tempera- ature (°F)	Iron (Fe)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (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	P1	6- 1-61	57	.2	146	40	4	104
15N1	Ls	S	4-61	52	<.1	303	5	4	88
16C1	Sd	P1	6- 1-61	--	1.0	185	95	8	184
17E1	Sd	P1	6- 1-61	57	.1	122	75	8	144
20A1	Sd	P1	6- 1-61	59	1.0	185	105	12	208
21M1	Sd	P1	5- 4-61	55	.1	210	30	4	160
22P1	Sd	P1	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	P1	5-31-61	54	<.1	273	60	16	236
29R1	Sd	P1	5- 5-61	--	.1	161	40	4	124
31C1	Sd	P1	5- 5-61	51	<.1	171	40	12	136
33A1	Sd	P1	5-31-61	55	.7	220	45	<4	172
36P1	Sd	P1	5-31-61	--	.1	234	35	8	116
31/10W-12E1	Sd	P1	6- 1-61	52	4.0	171	140	12	248
24H1	Sd	P1	6- 1-61	57	.5	142	100	12	180
25R1	Ls	S	5-12-61	58	1.0	156	85	8	180
36R1	Sd	P1	5- 5-61	--	.1	215	70	16	156
32/8W-25R1	Sd	P1	6- 1-61	57	1.0	156	65	8	144
33G1	Ls,G	S,P1	1- 9-59	55	.3	371	20	24	172
34A1	Sd	P1	6- 1-61	52	.5	249	105	24	264
35B1	Sd	P1	6- 1-61	58	5.0	254	210	32	392
35E1	Ls	S	4- 2-59	55	.1	259	10	8	136

Table 6.--Water levels in observation wells in Newton County, Indiana

(In feet below land-surface datum, Water Level:
e, estimated; h, tape measurement)

Newton 2. (27/9W-16P2). E. J. Funk and Sons, formerly Kentland Dairy Products Co., Kentland. SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 16, T. 27 N., R. 9 W. Drilled unused artesian well in sand and gravel, diameter 10 inches, reported depth 91 feet. Highest water level is 44.28 below lsd, May 25, 1944; lowest 51.80 below lsd, Sept. 9, 1944. Records available: 1944.

Date	Water level	Date	Water level	Date	Water level	Date	Water level
1944 May 25	44.28	June 15	46.20	Aug. 26	51.00	Sept. 9	51.80
		Aug. 19	49.83	Sept. 4	50.65	30	50.60
						Oct. 28	50.10

Newton 3. (27/9W-16L1). E. J. Funk and Sons. Kentland NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 16, T. 27 N., R. 9 W. Drilled unused artesian well in gravel and sand, diameter 10 inches, depth 103 feet. Recording gage installed Nov. 5, 1954. Highest water level is 30.70 below lsd, Apr. 3, 1959; lowest 39.85 below lsd, Sept. 6, 1959. Records available: 1954-60. Affected by nearby pumping and by trains.

(Daily highest water level from recorder graph, 1954)

Nov. 6	33.85	Nov. 20	33.40	Dec. 5	33.50	Dec. 19	33.35
7	34.00	21	33.50	6	33.60	20	33.35
8	33.95	22	33.50	7	33.65	21	33.50
9	34.05	23	33.60	8	33.40	22	33.45
10	34.10	24	33.15	9	33.05	23	33.20
11	34.00	25	33.55	10	33.40	24	33.40
12	34.10	26	33.40	11	33.65	25	33.65
13	34.10	28	33.25	12	33.50	26	33.30
14	34.05	29	33.40	13	33.40	27	33.25
15	33.70	30	33.85	14	33.40	28	33.40
16	33.70	Dec. 1	33.65	15	33.25	29	33.35
17	33.60	2	33.65	16	33.50	30	33.25
18	33.50	3	33.60	17	33.30	31	33.35
19	33.40	4	33.50	18	33.25		

(Daily highest water level from recorder graph, 1955)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	33.15	32.90	32.30	31.95	32.20	32.10	----	----	----	----	----	----
2	33.15	32.85	32.40	31.80	31.90	32.40	----	----	----	----	33.00	----
3	33.25	33.15	32.25	31.95	32.05	32.25	----	----	----	----	33.10	----
4	33.20	33.30	32.25	31.90	32.15	32.25	----	----	----	----	33.15	----
5	32.95	32.90	32.30	31.85	32.25	32.25	----	----	----	----	33.00	----
6	32.95	32.70	----	31.95	32.35	32.05	----	----	----	----	32.85	----
7	33.15	32.65	----	31.95	32.25	31.95	----	----	----	----	32.85	----
8	32.90	32.80	----	32.00	32.25	31.80	----	----	----	----	33.05	----
9	32.80	32.50	32.00	32.15	32.15	32.05	----	----	----	----	----	----
10	32.80	32.45	32.05	----	32.05	31.85	----	----	----	----	----	----

Table 6.--Water levels in observation wells in Newton County--Cont.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
11	32.85	32.75	31.90	----	32.05	31.60	----	----	----	----	----	----
12	32.75	32.90	32.25	----	32.00	31.70	----	----	----	----	----	----
13	32.70	33.00	32.40	31.90	31.50	31.50	----	----	----	----	----	----
14	32.90	32.95	32.25	31.85	31.80	31.65	----	----	----	----	----	----
15	32.65	32.70	31.95	31.90	31.95	31.50	----	----	----	----	----	----
16	32.60	32.55	32.00	31.95	32.00	31.65	----	----	----	----	----	----
17	32.60	33.10	32.20	32.20	31.70	31.95	----	----	----	----	----	----
18	32.85	32.80	31.95	31.85	32.05	31.90	----	----	----	----	----	----
19	32.75	32.60	32.10	31.85	31.55	31.90	----	----	----	----	----	----
20	32.55	32.40	32.10	31.90	31.85	31.90	----	----	----	----	----	----
21	32.65	32.50	31.65	31.75	32.05	31.85	----	----	----	----	----	----
22	32.40	32.60	31.55	31.85	32.05	31.95	----	----	----	----	----	----
23	32.60	32.95	31.90	31.80	31.95	31.75	----	----	----	----	----	----
24	32.40	32.70	32.00	31.40	32.30	31.90	----	----	----	----	----	----
25	32.60	32.75	32.05	31.25	----	32.10	----	----	----	----	----	----
26	32.85	32.55	31.90	31.80	----	32.20	----	----	----	----	----	----
27	32.85	32.40	32.25	31.65	----	32.05	----	----	----	----	----	----
28	32.75	32.40	32.00	31.85	----	32.60	----	----	----	----	----	----
29	32.90	----	31.95	31.85	31.75	----	----	----	----	----	----	----
30	32.90	----	32.00	32.05	31.60	----	----	----	----	----	----	----
31	33.00	----	31.90	----	31.95	----	----	----	----	----	----	----

(Daily highest water level from recorder graph, 1956)

1	----	----	----	----	----	----	32.10	33.00	----	33.75	33.65	----
2	----	----	----	----	----	----	32.30	33.25	----	33.60	33.95	----
3	----	----	----	----	----	----	32.45	33.55	----	33.85	33.95	----
4	----	----	----	----	----	----	32.20	33.55	----	----	34.35	----
5	----	----	----	----	----	----	31.90	34.15	----	----	34.05	----
6	----	----	----	----	----	----	31.85	33.70	----	----	----	----
7	----	----	----	----	----	----	32.05	33.85	----	----	----	----
8	----	----	----	----	----	----	----	33.80	----	----	----	----
9	----	----	----	----	----	----	----	33.90	----	----	33.70	----
10	----	----	----	----	----	----	----	33.95	----	----	33.70	----
11	----	----	----	----	----	----	----	34.25	----	----	33.50	----
12	----	----	----	----	----	----	----	----	----	----	33.40	----
13	----	----	----	----	----	32.35	----	----	----	----	33.80	34.05
14	----	----	----	----	----	32.85	----	----	----	----	33.55	33.95
15	----	----	----	30.80	----	32.10	----	----	----	----	34.10	33.90
16	----	----	----	30.75	----	32.30	----	----	----	----	----	34.00
17	----	----	----	31.05	----	32.15	----	----	----	----	----	33.85
18	----	----	----	31.05	----	31.70	----	33.85	----	----	34.15	34.30
19	----	31.65	----	31.20	----	31.85	----	33.90	----	----	33.90	----
20	31.75	31.55	----	31.25	----	----	----	33.40	----	----	34.05	34.75
21	31.95	31.70	----	31.25	----	----	32.15	33.65	----	----	34.05	34.70
22	32.00	31.70	----	----	----	----	32.20	33.60	----	----	34.15	34.50
23	31.90	31.75	----	----	----	----	32.10	33.35	----	----	33.95	34.75
24	31.95	31.25	----	----	----	----	32.20	33.65	----	----	34.10	34.55

Table 6.--Water levels in observation wells in Newton County--Cont.

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
25	32.00	31.05	31.35	-----	-----	-----	32.50	-----	-----	-----	-----	34.50
26	32.25	-----	30.80	-----	-----	-----	32.45	-----	-----	-----	-----	-----
27	-----	-----	31.20	-----	-----	-----	-----	-----	33.85	-----	-----	-----
28	-----	-----	30.85	-----	-----	-----	-----	-----	34.00	-----	-----	33.65
29	-----	-----	31.10	-----	-----	-----	33.25	-----	34.00	-----	-----	33.85
30	-----	-----	31.25	-----	-----	-----	32.70	-----	34.15	33.85	-----	33.85
31	-----	-----	31.45	-----	-----	-----	33.00	-----	-----	33.85	-----	33.55

(Daily highest water level from recorder graph, 1957)

1	34.00	-----	-----	33.35	-----	-----	-----	-----	-----	34.30	33.25	32.45
2	34.15	-----	33.50	33.45	-----	-----	-----	-----	-----	34.00	33.25	32.45
3	34.10	-----	-----	33.60	-----	32.15	-----	-----	-----	33.65	33.05	32.40
4	34.25	-----	-----	33.25	-----	-----	-----	-----	33.35	-----	33.10	32.55
5	34.40	-----	-----	32.95	-----	-----	-----	-----	33.30	-----	33.10	32.50
6	34.10	-----	-----	33.20	-----	-----	-----	32.95	33.25	-----	33.30	32.20
7	34.00	-----	-----	33.15	-----	32.45	-----	32.90	33.25	-----	33.10	32.25
8	33.70	-----	-----	-----	-----	-----	-----	32.95	33.15	-----	32.60	32.50
9	33.80	-----	-----	-----	-----	-----	-----	33.40	33.10	-----	32.90	32.40
10	-----	-----	33.45	-----	-----	-----	-----	33.90	33.10	33.90	33.30	32.25
11	-----	-----	33.35	-----	-----	32.45	-----	33.95	33.20	34.00	33.30	32.30
12	-----	-----	-----	-----	-----	-----	-----	33.45	33.25	34.10	33.25	-----
13	-----	-----	-----	33.40	-----	-----	-----	33.50	33.10	34.00	32.80	-----
14	-----	-----	-----	33.45	-----	-----	-----	33.45	33.25	-----	33.50	-----
15	-----	-----	-----	34.35	-----	-----	-----	33.55	33.25	33.90	33.60	31.90
16	-----	-----	34.35	33.40	-----	-----	-----	33.70	33.20	33.60	33.60	31.70
17	-----	-----	34.15	-----	-----	-----	-----	33.60	33.45	33.50	33.90	32.60
18	-----	-----	33.90	-----	-----	-----	-----	33.70	33.55	33.55	33.40	32.20
19	-----	-----	34.10	-----	31.85	-----	-----	33.40	33.75	33.75	33.30	32.05
20	-----	-----	34.15	-----	31.70	-----	-----	33.60	33.80	33.75	33.50	31.90
21	-----	-----	33.90	-----	31.70	-----	-----	33.65	33.50	33.70	32.55	32.20
22	-----	-----	-----	-----	-----	-----	-----	33.85	33.65	-----	32.80	32.35
23	-----	-----	-----	-----	-----	-----	32.75	33.90	33.50	-----	32.60	32.10
24	-----	-----	-----	-----	-----	-----	33.85	33.75	33.65	33.20	32.50	32.35
25	-----	-----	-----	-----	-----	-----	32.80	33.30	33.45	33.40	32.05	32.15
26	-----	-----	-----	-----	31.90	-----	32.65	33.40	33.85	33.40	32.35	31.70
27	-----	-----	-----	-----	32.85	-----	32.85	33.65	33.90	33.40	32.30	32.05
28	-----	-----	-----	-----	32.45	-----	33.05	30.90	33.95	33.30	32.80	31.80
29	-----	-----	-----	-----	32.30	-----	-----	-----	33.20	33.25	32.30	32.00
30	-----	-----	33.35	-----	32.40	-----	33.30	-----	34.00	33.25	32.05	32.15
31	-----	-----	33.65	-----	32.15	-----	-----	-----	-----	33.10	-----	32.10

Table 6.--Water levels in observation wells in Newton County--Cont.

(Daily highest water level from recorder graph, 1958)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	32.15	31.60	34.50	32.50	32.45	33.15	32.65	32.85	----	----	33.10	32.85
2	32.20	31.70	34.30	32.30	32.55	32.90	32.90	32.95	----	----	32.05	32.70
3	31.45	31.75	34.40	32.25	32.45	32.95	32.90	33.00	----	----	33.05	32.30
4	31.75	----	34.60	32.15	32.35	32.65	33.00	33.10	----	33.55	33.20	32.30
5	32.00	----	34.55	32.25	32.20	32.90	33.15	33.25	----	----	32.95	32.50
6	31.60	----	34.80	31.80	32.30	32.90	33.25	33.55	34.10	33.55	34.25	32.80
7	31.50	----	35.40	31.80	32.50	32.60	33.00	33.10	33.80	----	33.55	----
8	31.60	----	35.70	32.05	32.40	32.85	----	33.40	33.65	----	33.55	----
9	31.80	32.20	35.85	32.30	32.30	32.45	----	33.55	33.65	33.50	33.00	----
10	31.80	32.00	36.30	32.10	32.40	32.40	----	33.60	33.75	33.55	33.15	----
11	32.05	32.20	37.15	32.10	32.80	32.50	----	33.60	33.65	33.45	33.40	----
12	31.80	32.20	37.35	32.00	32.45	32.60	32.65	33.50	33.60	33.75	33.25	----
13	31.55	32.05	37.25	32.10	32.65	33.15	----	33.65	33.60	33.45	33.85	----
14	31.75	32.15	37.30	32.10	32.80	32.50	----	33.50	33.70	33.65	33.15	----
15	31.45	31.90	----	32.30	32.90	32.35	----	33.95	33.95	33.60	33.55	33.15
16	31.45	32.30	37.25	32.20	32.60	32.15	----	33.90	33.75	33.75	33.00	32.60
17	31.45	32.50	37.50	32.35	32.90	32.10	----	33.75	33.45	33.55	32.85	32.50
18	31.65	32.60	34.80	34.35	32.70	32.00	----	33.65	33.50	----	32.85	32.65
19	31.65	32.75	33.95	34.70	32.60	32.00	33.10	33.70	33.50	33.65	33.05	32.85
20	31.90	32.75	----	34.80	32.85	31.70	32.85	33.80	33.55	33.55	32.05	35.15
21	31.70	32.70	----	34.80	32.95	32.05	----	33.85	33.45	33.70	32.90	34.65
22	31.60	32.85	----	34.80	33.05	31.95	32.45	33.60	33.55	33.50	32.90	33.65
23	31.95	33.05	33.10	35.10	32.70	31.70	32.65	33.75	33.65	33.50	32.75	33.00
24	31.85	32.95	32.90	33.95	32.90	31.95	32.90	33.40	33.65	33.15	32.60	33.15
25	31.60	33.20	32.60	33.35	----	31.95	32.95	33.15	33.85	33.70	32.70	33.05
26	31.55	33.80	32.55	33.15	----	31.95	32.95e	33.40	33.90	33.30	32.70	32.75
27	31.50	33.65	32.75	32.85	----	32.15	33.25	33.35	37.20	33.20	33.00	----
28	31.75	34.00	32.40	32.40	----	32.15	32.85	33.40e	37.40	33.35	32.75e	32.95
29	31.75	----	32.40	32.40	33.10	32.50	32.95	----	----	33.40	32.70e	32.75
30	31.60	----	32.45	32.60	32.90	32.45	33.10	34.00	----	33.45	33.15e	32.75
31	31.60	----	32.45	----	33.15	----	32.85	34.40	----	33.35	----	32.80

(Daily highest water level from recorder graph, 1959)

1	e32.30	32.30	34.80	31.10	----	----	----	----	36.40	34.70	34.95	33.95
2	----	32.55	34.65	30.80	----	----	----	----	35.25	34.75	34.80	34.00
3	32.90	31.80	34.65	30.70	----	----	----	----	----	34.80	34.95	33.90
4	32.40	31.50	34.90	31.20	----	----	----	----	e35.60	34.95	34.60	33.80
5	32.70	31.85	----	31.00	----	----	----	----	35.85	35.05	34.65	33.75
6	32.50	32.10	----	31.05	----	----	----	----	e36.25	34.70	34.90	33.65
7	32.20	32.00	----	31.00	----	----	----	----	----	34.95	34.85	33.65
8	32.10	31.75	32.60	31.05	----	----	----	----	----	34.45	34.65	33.70
9	32.30	31.25	31.90	31.05	----	----	----	----	----	34.70	35.10	33.65
10	32.20	32.45	31.90	31.20	----	----	----	----	----	34.50	34.30	33.65

Table 6.--Water levels in observation wells in Newton County--Cont.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
11	32.50	----	31.85	31.20	----	----	----	----	35.85	34.35	34.35	33.50
12	32.30	----	31.60	31.25	----	----	----	----	35.60	34.35	34.35	34.40
13	31.85	----	31.55	31.00	----	----	----	----	----	34.50	34.15	33.65
14	31.70	34.45	31.40	31.10	----	----	----	----	----	34.30	35.40	33.65
15	31.65	33.95	31.15	31.30	----	----	----	----	----	34.35	34.00	33.55
16	31.90	33.65	31.35	31.10	----	----	----	----	----	34.40	34.20	33.45
17	----	33.90	31.50	31.20	----	----	----	----	----	34.50	34.35	33.40
18	----	34.15	31.65	31.10	----	----	----	----	35.10	38.30	33.85	33.35
19	31.60	34.00	31.40	----	----	----	----	----	35.15	36.45	34.10	33.70
20	31.95	34.45	31.35	----	----	----	----	----	35.40	----	34.00	33.50
21	31.85	34.05	31.30	----	----	----	----	----	35.35	----	33.90	33.30
22	31.80	34.35	31.30	----	----	----	----	----	35.15	----	33.45	33.50
23	32.25	34.10	31.15	----	----	----	----	----	35.40	----	33.75	33.45
24	32.40	34.30	31.20	----	----	----	----	----	----	35.70	33.10	33.45
25	32.25	34.20	31.30	----	----	----	----	----	35.05	34.40	33.50	33.50
26	32.00	34.50	31.30	----	----	----	----	----	35.10	35.90	33.90	33.25
27	32.30	34.55	31.10	----	----	----	----	35.75	34.90	34.95	33.80	33.15
28	32.00	34.55	31.50	----	----	----	----	36.35	34.75	----	34.15	33.00
29	32.15	----	31.45	----	----	----	----	36.30	34.95	35.85	34.60	33.00
30	31.95	----	31.10	----	----	----	----	36.55	34.70	34.75	33.95	33.20
31	32.50	----	31.00	----	----	----	----	36.15	----	37.05	----	33.30

(Daily highest water level from recorder graph, 1960)

1	33.35	32.15	32.15	----	31.05	----	31.90	33.20	----	----	33.80	----
2	32.85	32.30	31.75	32.65	31.45	----	32.95	33.55	----	----	34.30	----
3	36.05	32.40	31.40	31.65	----	----	32.20	34.20	35.50	----	33.85	----
4	34.80	32.15	31.65	31.40	----	----	31.85	33.15	35.55	34.50	33.80	----
5	33.65	31.90	31.60	31.40	31.75	32.05	31.95	33.35	35.90	33.55	----	33.85
6	33.40	31.65	----	31.25	21.60	----	32.25	33.45	35.40	33.45	----	33.60
7	32.75	31.80	----	31.20	31.60	32.25	32.45	----	35.45	33.55	----	33.80
8	----	31.65	----	31.30	----	----	----	----	35.70	33.75	----	33.90
9	33.45	31.55	----	31.30	----	----	----	----	35.55	33.40	----	33.70
10	32.85	31.10	----	31.50	----	----	32.25	----	----	33.45	----	33.70
11	32.75	31.55	----	31.10	----	33.00	32.05	----	----	----	----	33.35
12	32.55	31.85	32.50	31.00	----	31.95	32.45	----	----	----	----	33.40
13	32.70	31.80	31.60	31.00	----	31.80	32.15	34.35	----	----	----	33.70
14	32.55	31.65	31.45	33.00	32.40	----	----	33.20	----	----	----	33.25
15	32.20	31.50	32.00	31.40	----	----	----	33.25	----	----	34.05	33.10
16	32.45	31.60	31.45	31.35	----	----	----	33.25	----	----	33.30	33.10
17	32.40	31.45	31.55	31.30	----	----	----	33.40	34.91	----	33.55	33.40
18	31.90	31.35	31.45	31.50	----	----	----	33.45	----	----	----	33.55
19	32.20	31.45	31.55	31.30	32.35	31.50	----	----	----	----	----	33.55
20	32.30	31.80	31.70	31.35	----	31.40	----	----	----	----	----	33.50

Table 6.--Water levels in observation wells in Newton County--Cont.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
21	32.30	31.45	31.60	31.30	e31.65	31.45	----	----	----	----	----	33.35
22	32.35	31.40	31.90	31.10	30.90	31.70	----	----	----	e34.20	----	33.25
23	32.90	31.95	31.75	e31.30	31.25	31.75	----	----	----	33.50	----	33.55
24	32.45	31.90	31.65	----	----	31.35	----	----	----	33.65	e34.15	----
25	32.35	31.80	32.25	----	----	31.40	----	----	----	33.90	33.50	----
26	32.20	31.90	32.00	----	----	31.60	33.00	----	----	33.60	33.65	----
27	32.25	32.20	32.00	----	----	31.65	32.80	----	----	33.65	33.55	----
28	32.40	32.00	31.65	----	h35.88	32.10	e32.70	34.60	----	33.65	33.60	----
29	32.35	31.95	31.70	----	----	31.60	e33.05	34.65	h34.96	33.15	----	33.75
30	32.25	----	----	----	----	32.80	33.50	----	----	33.65	----	----
31	32.20	----	----	----	----	----	33.35	----	----	33.30	----	33.40

Newton 4. (28/8W-19A2). Brown Trucking Co. Brook. NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 19, T. 28 N., R. 8 W. Drilled unused artesian well in sand and gravel, diameter 5 inches, depth 114 feet. Recording gage installed Nov. 5, 1954. Highest water level is 6.2 below lsd, June 16, 1958; lowest 16.5 below lsd, Feb. 22, 1957. Records available: 1954-60. Affected by nearby pumping.

(Daily highest water level from recorder graph, 1954)

Date	Water level	Date	Water level	Date	Water level	Date	Water level
Nov. 6	11.4	Nov. 19	11.4	Dec. 4	11.5	Dec. 16	11.3
7	11.5	20	11.5	5	11.2	17	11.2
8	11.5	21	11.4	6	11.2	18	11.2
9	11.5	22	11.4	7	11.2	19	11.3
11	11.6	23	11.4	8	11.1	20	11.4
12	11.6	24	11.3	9	11.0	22	11.4
13	11.6	28	11.2	10	11.1	23	11.3
14	11.6	29	11.3	11	11.2	24	11.4
15	11.6	30	11.4	12	11.2	25	11.5
16	11.5	Dec. 1	11.3	13	11.3	26	11.4
17	11.5	2	11.4	14	11.3	27	11.4
18	11.5	3	11.4	15	11.2	28	11.3

(Daily highest water level from recorder graph, 1955)

Feb. 18	10.2	Feb. 24	9.9	Aug. 24	11.4	Nov. 6	11.3
19	10.1	Aug. 19	11.3	25	11.5	7	11.2
20	10.0	20	11.3	Nov. 2	11.4	8	11.2
21	9.9	21	11.4	3	11.4		
22	9.9	22	11.4	4	11.3		
23	9.9	23	11.4	5	11.3		

Table 6.--Water levels in observation wells in Newton County--Cont.

(Daily highest water level from recorder graph, 1956)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	----	11.0	9.4	9.4	----	----	----	----	----	12.8	13.2	----
2	----	----	9.3	9.3	----	----	----	10.9	----	12.8	13.2	----
3	----	11.0	9.3	9.5	----	----	----	----	----	12.8	13.3	----
4	----	11.0	9.2	9.5	----	----	----	----	----	12.8	13.3	----
5	----	11.0	9.1	9.8	----	----	9.5	11.1	11.9	----	13.3	----
6	----	10.9	9.0	9.7	----	----	9.6	11.1	11.9	----	13.3	----
7	----	10.9	9.0	9.6	----	----	9.7	11.1	12.0	----	13.3	----
8	----	11.0	9.0	9.7	----	----	9.7	11.1	----	----	13.3	----
9	----	10.9	9.0	9.5	----	----	10.1	11.1	----	----	13.3	----
10	----	10.9	----	9.4	----	----	10.0	11.2	----	----	13.2	----
11	----	10.8	----	9.4	----	----	10.0	11.2	----	----	13.3	----
12	----	10.8	----	9.4	----	8.8	----	----	----	----	13.4	----
13	----	10.7	9.0	----	----	8.9	----	----	----	----	13.3	----
14	----	10.7	9.0	----	----	9.0	----	----	----	----	----	----
15	----	10.6	9.1	----	----	9.0	----	----	----	----	----	----
16	----	10.4	9.0	----	----	----	----	----	----	----	----	----
17	----	----	9.0	----	----	9.1	----	----	----	----	----	----
18	----	10.4	9.0	8.9	----	----	----	11.5	----	----	----	----
19	----	10.2	9.1	9.0	----	----	----	11.6	----	----	----	----
20	10.9	10.1	9.1	9.3	----	----	10.3	11.6	----	----	----	----
21	11.0	10.1	9.0	9.1	----	----	10.3	11.7	----	----	----	----
22	11.0	10.1	9.2	9.1	----	----	10.4	11.7	----	----	----	----
23	11.0	9.9	9.1	9.2	----	----	10.4	11.6	----	----	----	----
24	11.0	9.7	9.1	9.2	----	----	10.4	11.8	----	----	----	----
25	11.0	9.7	9.1	----	----	----	10.6	12.0	----	----	----	----
26	11.0	9.6	9.0	----	----	----	10.6	12.0	----	----	----	----
27	11.0	9.5	9.3	----	----	----	----	12.0	----	----	----	----
28	10.9	9.5	9.2	----	----	----	----	12.1	12.9	----	----	----
29	10.9	9.5	9.3	----	----	----	10.7	12.2	12.9	----	----	----
30	10.9	----	9.3	----	----	----	----	12.1	12.9	13.3	----	----
31	11.0	----	9.4	----	----	----	----	12.0	----	13.2	----	----

(Daily highest water level from recorder graph, 1957)

1	----	----	----	----	----	----	----	----	10.6	----	----	----
2	----	----	12.8	----	----	----	8.4	----	----	11.1	----	----
3	----	----	12.9	----	----	----	8.4	----	10.3	11.2	----	9.6
4	----	----	12.9	----	----	9.0	8.3	----	10.4	11.2	----	9.6
5	----	----	12.9	----	----	9.1	8.2	----	10.5	11.3	11.1	9.6
6	----	----	12.8	----	----	9.1	8.3	9.4	10.5	11.2	11.0	9.5
7	----	----	12.8	----	----	9.5	8.3	9.5	10.5	11.2	----	9.4
8	----	----	12.8	----	----	9.4	8.4	9.6	10.6	11.2	----	----
9	----	----	----	----	----	9.4	----	9.7	10.6	----	----	----
10	----	----	----	----	----	9.4	8.7	9.7	----	----	----	9.1

Table 6.--Water levels in observation wells in Newton County--Cont.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
11	----	----	----	----	----	9.4	8.8	9.8	11.0	----	----	9.1
12	----	----	12.7	----	----	9.4	8.7	10.5	11.0	----	10.6	9.1
13	----	----	12.7	----	----	9.3	8.0	12.0	11.1	----	----	9.0
14	----	----	12.7	----	8.3	9.2	7.9	10.1	11.1	----	----	9.0
15	----	----	12.7	----	8.4	9.2	----	10.2	11.1	----	----	9.1
16	----	----	12.8	----	8.4	9.2	----	10.2	11.1	----	----	----
17	----	----	12.8	----	8.4	9.2	----	10.3	11.2	----	----	9.1
18	----	----	12.7	----	8.4	9.3	----	10.4	----	----	----	8.9
19	13.7	13.1	----	----	8.3	9.1	----	10.4	----	----	----	8.6
20	13.7	13.1	----	----	8.3	9.0	----	10.4	----	----	----	8.5
21	13.6	13.1	----	----	8.3	9.0	----	10.3	----	----	9.7	8.1
22	13.5	13.1	----	----	8.3	9.0	----	10.3	----	11.9	----	7.9
23	13.6	13.3	----	9.0	8.5	9.2	8.0	10.3	----	11.6	----	----
24	13.5	13.2	----	8.9	----	9.5	8.1	10.3	----	----	----	7.9
25	13.4	13.1	----	8.7	----	9.4	8.1	10.3	----	----	----	7.7
26	----	----	----	8.5	----	9.3	8.1	10.3	----	----	----	7.6
27	----	----	----	8.2	----	9.2	8.2	10.5	----	----	----	7.5
28	----	----	----	----	----	8.7	----	10.4	----	----	----	7.5
29	----	----	----	----	----	8.6	8.5	10.8	----	11.0	----	7.5
30	----	----	----	----	----	8.4	8.5	10.7	----	10.9	----	7.5
31	----	----	----	----	----	----	----	10.7	----	----	----	7.6

(Daily highest water level from recorder graph, 1958)

1	7.6	8.6	----	9.2	----	----	----	8.8	10.2	11.0	11.4	10.4
2	7.6	8.6	----	9.2	----	----	----	8.8	10.4	11.0	11.4	10.4
3	7.7	----	----	9.2	----	----	----	9.0	10.4	11.0	11.4	10.2
4	7.8	----	9.3	9.1	----	----	7.8	9.4	10.4	11.0	----	10.2
5	7.8	----	9.3	9.1	----	----	8.0	----	10.4	11.2	11.4	10.2
6	7.7	8.7	9.3	9.0	----	----	8.0	----	10.4	11.2	11.4	10.2
7	7.8	8.8	9.3	9.0	----	----	9.2	9.4	10.4	11.2	11.4	10.6
8	7.9	8.9	9.2	9.1	----	----	8.2	9.4	10.6	11.2	11.4	10.2
9	8.0	9.0	9.2	9.2	----	----	8.4	9.4	10.6	11.2	11.4	----
10	8.0	9.0	9.2	9.2	----	----	8.6	9.6	10.6	----	11.4	----
11	8.1	9.0	9.2	9.1	----	----	----	9.6	10.6	----	11.4	----
12	8.2	9.0	9.3	----	----	----	----	9.6	10.6	----	11.6	10.6
13	----	9.1	9.2	----	----	----	----	9.6	10.8	----	11.4	10.6
14	----	9.1	9.2	----	10.4	----	8.8	9.6	10.8	11.4	11.4	10.4
15	8.4	9.1	9.2	----	10.1	----	8.6	9.6	10.8	11.4	11.4	----
16	8.4	9.1	9.2	9.2	10.1	6.2	8.2	9.6	10.8	11.2	11.4	----
17	8.5	----	9.3	9.3	10.2	----	8.2	9.6	10.8	11.2	11.2	----
18	8.5	----	9.3	9.3	----	----	8.0	9.6	10.8	11.4	----	----
19	8.6	----	----	9.3	----	----	8.0	9.6	10.8	11.4	11.0	----
20	8.6	----	----	9.3	----	----	8.0	9.6	10.8	11.4	11.2	----

Table 6.--Water levels in observation wells in Newton County--Cont.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
21	----	----	----	9.3	----	6.2	8.0	9.6	10.8	11.4	11.0	----
22	----	----	----	9.3	----	6.2	8.0	9.6	10.8	11.4	11.0	----
23	----	----	----	----	----	6.3	8.2	9.8	----	11.4	10.8	----
24	8.5	----	----	----	----	----	8.2	9.6	10.8	11.4	10.8	----
25	8.5	9.3	----	----	----	----	8.4	9.8	10.8	----	10.8	----
26	8.4	9.3	9.4	----	----	----	8.4	9.8	10.8	----	----	----
27	8.5	9.1	9.3	----	----	----	8.6	9.8	10.8	11.6	10.6	----
28	8.5	8.9	9.3	----	----	----	8.6	10.0	11.0	11.4	10.4	----
29	8.5	----	9.3	----	----	----	8.6	10.0	11.0	11.4	10.4	----
30	8.5	----	9.2	----	----	----	8.8	10.2	11.0	11.4	10.6	----
31	8.5	----	9.2	----	----	----	8.8	10.2	----	11.4	----	----

(Daily highest water level from recorder graph, 1959)

1	----	----	8.9	8.0	6.7	8.7	----	11.3	12.5	----	11.7	e9.3
2	----	----	8.9	8.0	6.7	8.9	----	11.4	12.5	----	11.7	9.3
3	----	----	e8.9	7.8	6.9	8.9	----	11.3	12.5	----	11.6	9.3
4	----	----	e8.9	8.0	6.9	9.0	----	11.2	12.6	----	11.4	9.3
5	----	----	9.0	7.8	7.1	9.1	----	11.3	12.7	h13.10e	11.3	9.3
6	----	----	8.8	7.9	7.2	9.5	----	11.3	12.7	----	e11.3	9.3
7	10.3	----	8.9	7.9	7.3	10.0	----	11.3	12.7	----	11.1	9.2
8	10.3	----	8.9	7.9	7.5	----	h11.09	11.4	12.9	----	11.0	9.6
9	10.3	----	8.8	7.9	7.6	----	----	11.4	13.0	----	10.9	9.6
10	10.4	----	8.8	7.9	7.6	----	----	11.8	12.9	----	10.9	9.6
11	10.4	----	----	7.9	7.7	----	----	11.6	13.0	----	10.8	9.5
12	e10.4	----	----	8.0	7.9	----	----	11.6	13.0	12.5	----	9.4
13	e10.3	----	----	8.0	7.9	----	----	11.7	13.1	e12.4	----	9.4
14	10.3	----	----	8.0	8.0	----	----	11.7	13.1	e12.1	----	9.2
15	10.2	----	----	8.0	8.1	h11.00	----	11.7	13.0	12.0	----	9.0
16	10.1	----	----	8.1	8.1	----	----	11.7	13.0	11.9	e10.2	8.9
17	e10.4	----	----	8.2	8.2	----	----	11.6	13.1	11.9	10.0	8.9
18	----	8.5	----	8.2	8.2	----	----	11.8	13.1	e11.8	9.9	8.9
19	----	8.6	----	8.2	8.4	----	----	11.9	13.1	12.2	9.8	8.9
20	----	8.7	----	8.1	8.5	----	----	11.9	13.2	12.1	9.7	8.9
21	----	8.8	----	8.1	8.5	----	----	11.9	13.2	12.1	9.6	8.9
22	----	8.9	----	8.1	8.6	----	----	12.0	13.0	12.0	9.6	9.0
23	----	8.8	----	8.2	8.7	h10.80	----	12.1	13.0	11.9	9.3	9.0
24	----	8.9	----	8.2	8.7	----	----	12.1	13.0	11.8	9.1	9.0
25	----	8.9	8.3	8.1	e8.7	----	----	12.2	13.0	11.8	9.1	9.1
26	----	8.9	8.3	8.3	8.6	----	----	12.3	13.0	11.8	9.1	9.0
27	----	8.9	8.1	7.2	8.6	----	----	12.3	12.9	11.9	e9.1	9.0
28	----	8.9	8.2	7.0	8.7	----	----	12.3	12.9	11.9	9.1	8.8
29	----	----	8.1	6.9	8.7	----	e11.3	12.4	13.1	11.8	9.2	e8.8
30	----	----	8.0	6.7	8.7	h11.07	11.2	12.5	----	11.8	9.1	8.7
31	----	----	8.0	----	8.7	----	11.3	12.4	----	11.7	----	8.7

Table 6.--Water levels in observation wells in Newton County--Cont.

(Daily highest water level from recorder graph, 1960)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.7	h8.75	----	7.6	8.0	8.9	8.2	e10.3	11.5	e12.1	12.1	e12.2
2	8.6	----	----	7.5	8.0	9.0	8.2	10.3	11.6	e12.1	12.2	12.2
3	8.5	----	----	7.5	8.1	9.0	8.2	10.2	12.3	e12.1	12.3	12.1
4	8.3	----	----	7.6	8.1	9.0	8.2	e10.2	12.2	12.1	12.3	12.1
5	8.3	----	----	7.5	8.2	8.9	8.5	e10.3	12.2	12.0	12.3	12.1
6	8.3	----	----	7.5	8.2	8.8	8.6	10.2	11.8	12.1	12.3	12.1
7	8.2	----	8.8	7.5	8.1	8.9	8.7	10.2	11.8	12.2	12.3	12.1
8	8.2	h8.23	8.7	7.6	8.2	8.9	8.7	10.3	11.9	12.1	12.3	12.1
9	8.3	----	8.6	7.7	8.2	8.9	8.8	10.4	11.9	12.1	12.3	e12.1
10	8.3	----	e8.7	7.8	8.3	8.9	8.8	10.4	e11.9	12.2	e12.3	e12.2
11	8.3	----	e8.7	7.8	8.4	8.9	----	10.4	11.9	12.3	e12.3	e12.2
12	----	----	8.7	8.0	8.4	8.7	h9.70	10.4	11.8	12.3	e12.3	e12.2
13	----	----	8.8	7.8	8.5	8.4	----	10.5	12.0	12.2	e12.3	12.2
14	----	----	8.8	7.9	8.5	8.3	----	10.5	12.0	12.3	13.2	12.2
15	----	h7.33	8.9	7.8	8.5	8.2	----	10.6	12.0	12.2	12.2	e12.2
16	----	----	8.8	7.6	8.6	8.2	----	10.7	12.0	12.2	12.2	12.2
17	----	----	8.8	7.2	8.5	8.0	----	10.7	11.9	12.2	12.2	12.1
18	h8.80	----	8.8	7.2	8.4	8.0	----	10.7	11.9	12.3	12.1	12.1
19	----	----	8.9	7.0	8.5	7.9	h11.00	10.8	11.8	12.2	12.2	12.1
20	----	----	8.9	6.9	e8.4	7.8	----	10.7	11.9	12.3	12.1	12.1
21	----	----	9.1	6.8	e8.4	7.8	----	10.7	11.9	e12.3	12.2	12.0
22	----	----	9.0	6.9	e8.4	7.8	----	10.7	11.9	e12.3	12.2	e12.0
23	----	h8.20	9.1	7.0	e8.4	7.8	----	10.9	e11.9	e12.3	12.2	e12.0
24	----	----	9.1	7.1	8.4	7.8	----	11.0	12.0	e12.3	12.1	e12.1
25	h8.70	----	9.2	7.2	8.4	7.8	e9.9	11.0	12.0	12.3	12.1	e12.1
26	----	----	9.1	7.3	8.4	7.9	e9.9	11.0	12.0	12.2	12.1	e12.2
27	----	----	9.1	7.3	8.4	7.9	e10.0	11.1	12.1	12.2	12.1	12.3
28	----	----	8.8	7.6	8.4	8.1	9.9	11.1	12.1	e12.2	12.0	12.2
29	----	----	8.3	8.0	8.5	8.0	e10.0	11.2	12.0	e12.2	12.1	12.1
30	----	----	8.0	----	8.4	8.1	10.0	11.3	12.0	12.2	12.1	12.1
31	----	----	7.7	----	e8.5	----	10.2	11.4	----	12.1	----	e12.1

Newton 5. (29/9W-15E2). Town of Morocco. SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 15, T. 29 N., R. 9 W. Drilled unused water-table well in sand and gravel, diameter 16 inches, depth 49 feet. Recording gage installed July 19, 1956. Highest water level is 4.80 below lsd, June 10, 1958; lowest 9.90 below lsd, Oct. 26-27, Dec. 16, 21-22, 1960. Records available: 1956-60. Affected by nearby pumping.

Table 6.--Water levels in observation wells in Newton County--Cont.

(Daily highest water level from recorder graph, 1956)

Date	Water level	Date	Water level	Date	Water level	Date	Water level
July 20	7.95	Aug 10	8.35	Sept. 6	8.40	Sept. 26	8.60
21	7.95	11	8.35	7	8.45	27	8.60
22	7.95	12	8.40	8	8.45	28	8.60
23	8.00	13	8.25	9	8.55	29	8.50
24	8.00	14	8.20	10	8.45	30	8.45
25	8.10	15	8.15	11	8.55	Oct. 1	8.50
26	8.05	16	8.15	12	8.55	2	8.45
28	8.15	17	8.10	13	8.50	3	8.50
29	8.15	18	8.15	14	8.60	4	8.60
30	8.15	19	8.15	15	8.60	5	8.65
31	8.20	20	8.20	16	8.50	6	8.60
Aug. 1	8.10	21	8.15	17	8.55	7	8.60
2	8.10	27	8.20	18	8.60	8	8.60
3	8.15	28	8.40	19	8.65	9	8.70
4	8.15	29	8.30	20	8.55	10	8.65
5	8.15	30	8.25	21	8.55	11	7.75
6	8.15	31	8.30	22	8.55	12	8.70
7	8.20	Sept 3	8.25	23	8.60	13	8.75
8	8.40	4	8.25	24	8.50	14	8.70
9	8.30	5	8.40	25	8.65	15	8.70
						16	8.75

(Daily highest water level from recorder graph, 1957)

	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.85	8.75	8.80	5.95	7.40	8.30	8.30		
2	8.85	8.75	8.75	6.20	7.30	7.40	8.30		
3	8.85	8.80		6.30	7.20	7.40	8.35		
4	8.90	8.85		6.30	7.10	7.50	8.30		
5	8.95	8.80		e6.35	7.15	7.85			
6	8.90	8.65		e6.45	7.20	7.90			
7	8.90	8.80			7.20	.95			
8	8.90	8.80			7.40	8.00	8.25		
9	8.80	8.75			7.50	8.00	8.25		
10	8.70	8.85			7.55	8.00	8.45		
11	8.75	8.80	7.50		7.55	8.00	8.40		
12	8.65	8.75	7.60		7.40	8.00	8.55		
13	8.75	8.75	7.70		7.45	8.00			
14	8.75	8.75	7.80		7.50	8.00			
15	8.70	8.75	7.85		7.55	8.00			
16	8.75	8.75	7.90		e6.50	7.60	8.00		
17	8.70	8.75	7.90		e6.40	7.55	8.05		
18	8.65	8.75	6.35		e6.35	7.60	8.10		
19	8.70	8.80	6.25		e6.30	7.55	8.10		
20	8.70	8.75	e6.35		e6.30	7.60	8.10		

Table 6.--Water levels in observation wells in Newton County--Cont.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
21	----	8.70	8.75	e6.35	----	6.70	e6.30	7.70	8.10	----	----	----
22	----	8.70	8.80	6.60	----	6.85	----	----	8.10	----	----	----
23	e8.65	8.80	8.80	6.55	----	6.90	6.60	----	8.05	----	----	----
24	8.75	8.75	8.80	e6.65	----	6.95	6.60	----	8.15	----	----	----
25	8.75	8.75	8.85	----	----	----	6.70	----	8.15	----	----	----
26	8.85	8.75	8.80	----	----	----	6.75	----	8.20	----	----	----
27	8.80	8.70	8.80	----	----	6.75	6.85	----	8.25	----	----	----
28	8.80	8.80	8.85	----	----	5.95	6.85	----	8.25	----	----	----
29	8.80	----	8.85	----	----	5.65	6.90	7.30	8.20	----	----	----
30	8.90	----	8.85	----	----	5.70	6.95	e7.35	8.20	----	----	----
31	8.85	----	8.85	----	----	----	7.10	e7.40	----	----	----	----

(Daily highest water level from recorder graph, 1958)

1	----	----	----	7.60	7.95	8.10	6.75	7.15	----	8.05	8.20	7.85
2	----	----	----	7.55	7.95	8.00	6.85	7.20	----	8.10	8.20	7.85
3	----	----	----	7.70	7.95	8.00	6.95	7.20	----	8.05	8.15	7.85
4	----	----	----	7.80	7.90	8.00	7.00	7.30	----	8.05	8.20	7.85
5	----	----	----	7.75	7.90	7.95	7.05	7.30	7.85	8.10	8.15	7.90
6	----	----	----	7.65	7.90	8.10	7.10	7.30	7.80	8.10	8.15	7.90
7	----	----	----	7.60	7.90	8.05	7.10	7.30	7.80	8.30	8.20	7.95
8	----	----	----	7.65	7.90	7.30	7.15	7.30	7.80	8.10	8.15	7.95
9	----	----	----	7.60	7.95	6.10	7.15	7.40	7.90	8.15	8.20	7.95
10	----	----	----	7.65	7.95	4.80	7.15	7.40	7.90	8.10	8.20	7.95
11	----	----	----	7.65	7.95	5.40	7.15	7.35	7.85	----	8.15	7.95
12	----	----	7.65	7.70	7.95	5.55	7.10	7.25	7.85	----	8.25	8.00
13	----	----	7.65	7.70	8.00	4.90	7.10	7.40	7.90	8.15	8.25	7.95
14	----	----	7.65	7.75	8.00	4.85	6.05	7.40	7.95	8.20	8.25	8.00
15	----	----	7.65	7.75	8.15	5.20	5.75	7.40	7.95	8.25	8.10	8.00
16	----	----	7.65	7.80	8.10	5.55	5.80	7.35	7.90	8.25	----	8.00
17	----	----	7.70	7.75	8.05	5.90	6.15	7.40	7.85	8.30	----	8.00
18	----	----	7.65	7.80	8.10	6.00	6.30	7.45	7.80	8.25	----	7.95
19	----	----	7.70	7.85	8.10	6.10	6.45	7.50	7.80	8.20	7.60	8.00
20	----	----	7.65	7.85	8.10	6.05	6.50	7.45	7.90	8.15	7.75	8.05
21	----	----	7.65	7.85	8.15	6.10	6.55	7.45	7.85	8.20	7.80	8.05
22	----	----	7.70	7.80	8.15	6.20	6.65	7.50	7.85	8.20	7.80	8.05
23	----	----	7.70	7.80	8.10	6.40	6.70	7.50	7.95	8.15	7.80	8.05
24	----	----	7.65	7.85	8.05	6.40	6.85	7.50	7.95	8.15	7.90	8.10
25	----	----	7.60	7.85	8.10	6.45	6.90	7.50	8.00	8.20	7.75	8.15
26	----	----	7.60	7.90	8.10	6.45	6.95	7.55	e8.10	8.15	7.70	8.10
27	----	----	7.50	7.90	8.15	6.55	7.05	----	e7.90	8.10	7.70	8.15
28	----	----	7.55	7.90	8.15	6.60	7.05	----	e8.10	8.10	7.75	8.10
29	----	----	7.55	7.90	8.20	6.65	7.10	----	8.00	8.15	7.80	8.15
30	----	----	7.55	7.95	8.20	6.70	7.10	----	8.10	8.15	7.85	8.10
31	----	----	7.60	----	8.20	----	7.15	----	----	8.20	----	----

Table 6.--Water levels in observation wells in Newton County--Cont.

(Daily highest water level from recorder graph, 1959)

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	8.00	----	7.05	6.90	6.55	7.05	7.95	8.00	8.50	8.50	8.25	----
2	7.95	----	7.10	6.80	6.65	7.15	7.90	8.05	8.55	8.55	8.25	e3.15
3	7.95	----	7.15	6.75	6.70	7.25	7.95	8.10	8.60	e8.60	8.30	8.15
4	7.95	----	7.25	6.75	6.70	7.25	7.95	8.10	8.70	e8.50	8.20	8.10
5	.00	----	7.15	6.80	6.70	7.25	7.95	8.10	.70	8.40	8.10	8.10
6	8.00	----	6.90	6.90	6.75	7.30	8.00	8.10	6.70	e8.55	8.10	8.05
7	8.05	----	6.95	6.90	6.80	7.35	8.00	8.10	8.65	e8.50	8.10	8.05
8	8.10	----	7.00	6.95	6.90	7.40	8.10	8.10	.70	8.55	8.10	8.00
9	8.10	----	7.00	6.95	6.90	7.45	8.05	e8.10	8.75	8.50	8.15	8.10
10	8.10	----	7.05	.00	6.90	7.50	8.15	e8.15	8.75	8.50	8.15	8.10
11	8.15	----	7.15	7.00	6.90	7.35	8.05	e8.20	8.70	8.30	8.10	7.95
12	8.15	----	7.20	7.00	6.95	7.30	8.05	e8.25	8.75	8.25	e8.15	7.85
13	8.15	----	7.15	7.05	6.95	7.35	8.05	8.30	8.80	8.35	8.15	7.85
14	8.00	----	7.15	7.15	7.00	7.35	8.10	e8.35	.80	8.35	7.95	7.85
15	7.95	----	6.75	7.10	7.05	7.35	8.15	8.35	8.85	8.40	7.90	7.90
16	7.90	----	6.65	7.15	7.10	7.40	8.25	8.30	8.90	8.40	7.85	7.90
17	8.05	----	6.80	7.20	7.10	7.50	8.15	8.25	8.90	8.30	7.95	7.95
18	8.05	----	6.90	7.20	7.15	7.50	8.15	8.30	8.90	8.25	7.95	7.90
19	8.15	6.75	6.95	7.20	7.20	7.55	----	8.25	8.85	8.20	8.00	8.00
20	8.10	6.85	7.00	6.95	7.20	7.60	----	e8.35	8.80	8.30	8.00	7.95
21	8.10	7.00	7.05	6.95	7.30	7.65	----	8.40	e8.75	8.30	8.00	8.00
22	----	7.05	7.10	7.10	7.15	7.15	----	8.40	9.00	8.35	7.95	8.05
23	----	6.65	7.15	7.35	7.05	7.70	7.80	8.40	e8.95	8.30	7.95	8.10
24	----	6.65	7.20	7.40	7.00	7.70	7.80	8.60	8.70	8.25	7.90	8.15
25	----	6.90	7.25	7.45	7.10	7.75	7.70	8.45	e8.85	8.25	7.95	8.15
26	----	7.00	7.05	7.50	7.10	7.75	7.80	8.55	e8.85	8.25	----	8.10
27	----	7.00	6.85	6.85	7.00	7.80	7.80	8.50	e8.65	8.20	----	8.05
28	----	6.95	6.80	6.65	7.00	7.85	7.86	8.50	e8.50	8.25	----	7.95
29	----	----	6.85	6.30	7.05	7.85	7.90	8.50	8.50	8.25	----	.85
30	----	----	6.90	6.40	7.05	7.85	7.95	8.55	8.50	8.40	----	7.85
31	----	----	6.90	----	7.05	----	8.05	8.50	----	8.35	----	7.90

(Daily highest water level from recorder graph, 1960)

1	7.95	8.00	7.65	6.60	7.25	7.45	7.25	8.05	8.55	8.90	8.85	8.95
2	7.90	7.95	7.65	6.70	7.35	7.50	7.40	8.05	8.60	8.75	8.95	9.00
3	7.90	7.85	7.60	6.85	e7.40	7.55	7.35	8.10	8.50	8.70	8.95	9.00
4	7.95	7.80	7.65	6.90	7.45	7.60	7.35	8.05	8.65	8.95	9.00	9.05
5	8.00	7.75	7.65	6.85	7.55	7.00	7.35	8.05	8.50	8.95	9.00	8.95
6	8.15	7.50	7.70	6.80	7.55	7.00	7.45	8.15	8.50	8.85	8.95	9.10
7	8.00	7.45	7.65	6.65	e7.50	7.10	7.45	8.05	8.65	8.90	8.95	9.00
8	8.00	7.45	7.70	6.90	e7.40	7.25	7.50	8.10	8.70	8.90	8.95	9.10
9	8.00	7.45	7.70	7.00	e7.45	7.30	7.55	8.05	8.70	9.20	8.85	9.20
10	7.95	7.40	7.65	7.10	e7.45	7.40	7.50	8.15	8.65	9.20	8.90	9.15

Table 6.--Water levels in observation wells in Newton County--Cont.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
11	7.95	----	7.65	7.10	e7.45	7.50	7.50	7.95	8.60	9.10	8.85	9.05
12	7.95	----	e7.65	7.25	e7.60	7.40	7.50	7.85	8.65	8.90	8.90	9.00
13	7.81	----	e7.70	e7.35	e7.60	7.35	7.55	7.90	8.65	8.90	8.85	9.25
14	7.75	----	e7.70	----	e7.60	7.20	7.70	7.95	8.70	8.95	8.85	9.20
15	7.75	----	e7.70	----	7.65	7.10	7.75	7.95	8.75	8.90	8.85	9.10
16	7.75	----	7.70	----	7.65	e7.10	7.70	8.00	8.70	8.80	8.85	9.15
17	7.80	e7.30	7.80	----	7.50	----	7.75	8.00	8.65	8.75	8.90	----
18	7.85	7.30	7.80	----	7.45	----	7.70	----	8.60	9.00	8.95	----
19	7.95	7.35	7.80	----	7.35	----	7.80	8.25	8.55	8.95	8.90	----
20	7.80	7.40	7.80	7.00	7.35	7.05	7.90	8.25	8.70	8.95	8.90	----
21	7.75	7.45	7.80	6.95	7.40	7.05	7.90	8.20	8.75	8.90	8.85	----
22	7.85	7.45	7.80	7.10	7.35	6.95	7.95	8.20	8.75	8.90	8.95	9.05
23	7.85	7.50	7.80	7.15	7.40	7.15	8.00	8.20	8.70	8.85	8.95	9.10
24	7.90	7.50	7.80	7.25	7.45	7.15	7.95	8.25	8.70	8.90	8.90	9.15
25	7.95	7.50	7.85	7.30	7.50	7.15	8.00	8.35	8.65	9.00	8.95	9.15
26	7.95	7.50	7.85	7.40	7.60	7.25	7.95	8.35	8.55	9.05	8.95	9.10
27	7.95	7.50	7.45	7.30	7.55	7.35	7.95	8.40	8.80	9.05	8.90	9.15
28	8.05	7.70	6.85	7.30	7.50	7.20	8.05	8.35	8.75	9.00	8.95	9.15
29	8.05	7.60	6.60	7.40	7.50	7.20	8.40	8.35	8.85	8.95	8.95	9.15
30	8.00	----	6.50	7.30	7.45	7.25	8.15	8.40	8.70	8.85	8.95	9.15
31	8.00	----	6.45	----	7.40	----	8.10	8.40	----	8.90	----	9.20

PUBLICATIONS OF COOPERATIVE GROUND-WATER PROGRAM

Report

Ground-water resources of the Indianapolis area, Marion County, Indiana. C. L. McGuinness. Indiana Department of Conservation, Division of Geology. 1943.

Bulletins

- No. 1 Memorandum concerning a pumping test at Gas City, Indiana. J. G. Ferris, Indiana Department of Conservation, Division of Water Resources. 1945.
- 2 A preliminary report of the ground-water levels of the State based on records of twenty-six observation wells for which long time records are available. Indiana Department of Conservation, Division of Water Resources. 1946 (Out of print).
- 3 Ground-water resources of St. Joseph County, Indiana. Part 1, South Bend area. F. H. Klaer, Jr., and R. W. Stallman. Indiana Department of Conservation, Division of Water Resources. 1948.
- 4 Ground-water resources of Boone County, Indiana. E. A. Brown. Indiana Department of Conservation, Division of Water Resources. 1949.
- 5 Ground-water resources of Noble County, Indiana. R. W. Stallman and F. H. Klaer, Jr. Indiana Department of Conservation, Division of Water Resources. 1950.
- 7 Water-level records of Indiana. Indiana Department of Conservation, Division of Water Resources. 1956.
- 8 Ground-water resources of Tippecanoe County, Indiana. Appendix, Basic Data. J. S. Rosenshein and O. J. Cosner. Indiana Department of Conservation, Division of Water Resources. 1956.
- 8 Ground-water resources of Tippecanoe County, Indiana. J. S. Rosenshein. Indiana Department of Conservation, Division of Water Resources. 1958 (1959).
- 9 Ground-water resources of Adams County, Indiana. F. A. Watkins, Jr., and P. E. Ward. Indiana Department of Conservation, Division of Water Resources. 1962.
- 10 Ground-water resources of northwestern Indiana. Preliminary Report: Lake County. J. S. Rosenshein. Indiana Department of Conservation, Division of Water Resources. 1961.
- 11 Ground-water resources of west-central Indiana. Preliminary Report: Greene County. F. A. Watkins, Jr., and D. G. Jordan. Indiana Department of Conservation, Division of Water Resources. 1961.
- 12 Ground-water resources of northwestern Indiana. Preliminary Report: Porter County. J. S. Rosenshein. Indiana Department of Conservation, Division of Water Resources. 1962.

Publication of cooperative ground-water programs--Continued

Bulletins--Continued

- 13 Ground-water resources of northwestern Indiana. Preliminary Report: La Porte County. J. S. Rosenshein and J. D. Hunn. Indiana Department of Conservation, Division of Water Resources. 1962.
- 14 Ground-water resources of west-central Indiana. Preliminary Report: Sullivan County. F. A. Watkins, Jr., and D. G. Jordan. Indiana Department of Conservation, Division of Water Resources. 1962.
- 15 Ground-water resources of northwestern Indiana. Preliminary Report: St. Joseph County. J. S. Rosenshein and J. D. Hunn. Indiana Department of Conservation, Division of Water Resources. 1962.
- 16 Ground-water resources of west-central Indiana. Preliminary Report: Clay County. F. A. Watkins, Jr., and D. G. Jordan. Indiana Department of Conservation, Division of Water Resources. 1962.
- 17 Ground-water resources of west-central Indiana. Preliminary Report: Vigo County. F. A. Watkins, Jr., and D. G. Jordan. Indiana Department of Conservation, Division of Water Resources. 1963.
- 18 Ground-water resources of west-central Indiana. Preliminary Report: Owen County. F. A. Watkins, Jr., and D. G. Jordan. Indiana Department of Conservation, Division of Water Resources. 1963.
- 19 Ground-water resources of northwestern Indiana. Preliminary Report: Marshall County. J. S. Rosenshein and J. D. Hunn. Indiana Department of Conservation, Division of Water Resources. 1963.
- 20 Ground-water resources of northwestern Indiana. Preliminary Report: Fulton County. J. S. Rosenshein and J. D. Hunn. Indiana Department of Conservation, Division of Water Resources. 1963.
- 21 Ground-water resources of west-central Indiana. Preliminary Report: Putnam County. F. A. Watkins, Jr., and D. G. Jordan. Indiana Department of Conservation, Division of Water Resources. 1963.
- 22 Ground-water resources of northwestern Indiana. Preliminary Report: Starke County. F. A. Watkins, Jr., and D. G. Jordan. Indiana Department of Conservation, Division of Water Resources. 1963.
- 23 Ground-water resources of west-central Indiana. Preliminary Report: Parke County. F. A. Watkins, Jr., and D. G. Jordan. Indiana Department of Conservation, Division of Water Resources. 1963.
- 24 Ground-water resources of northwestern Indiana. Preliminary Report: Pulaski County. J. S. Rosenshein and J. D. Hunn. Indiana Department of Conservation, Division of Water Resources. 1963.
- 25 Ground-water resources of northwestern Indiana. Preliminary Report: Jasper County. J. S. Rosenshein and J. D. Hunn. Indiana Department of Conservation, Division of Water Resources. 1963.

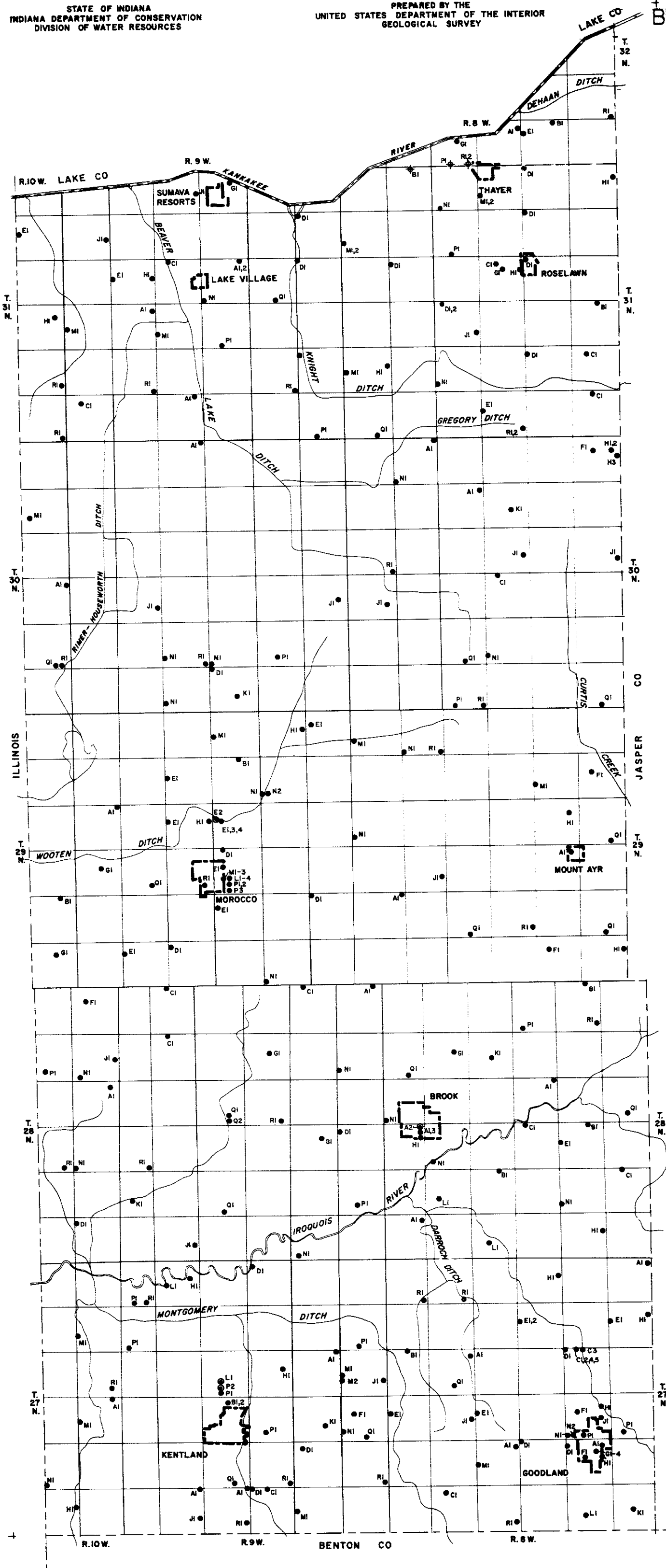
Publication of cooperative ground-water programs--Continued

Bulletins--Continued

- 26 Ground-water resources of northwestern Indiana. Preliminary Report: Newton County. J. S. Rosenshein and J. D. Hunn. Indiana Department of Conservation, Division of Water Resources. 1963.

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EXPLANATION

- R1 Water well or test hole
- NI Observation well
- ◆ BI Oil or gas or test hole

D	C	B	A
E	F	G	H
M	L	K	J
N	P	Q	R

SECTION LETTER SYMBOLS IN WELL-NUMBERING SYSTEM.

6	5	4	3	2	1
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

DIAGRAM OF TOWNSHIP

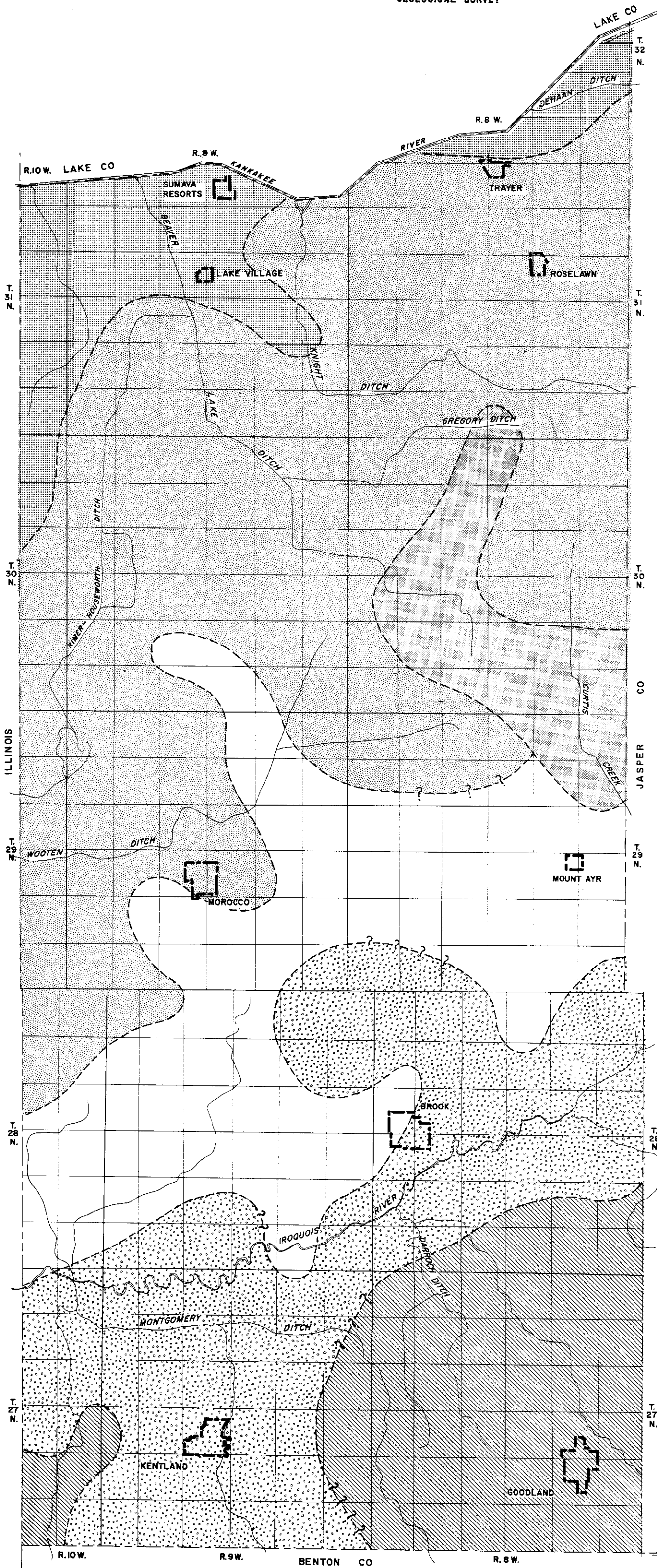
Base from modified General Highway and Transportation Map revised to July, 1953

MAP OF NEWTON COUNTY, INDIANA, SHOWING LOCATION OF WELLS AND TEST HOLES




BY J. S. ROSENHEIM AND J. D. HUNN


1961




EXPLANATION


- 

Production from bedrock


Well depths generally from 100 to 200 feet. Few wells deeper. Locally some production possible from sand and gravel. Water from some wells contains hydrogen sulfide gas. Yields adequate to more than adequate for domestic use. Larger yields possible locally
- 

Well depths from 40 to 300 feet. Locally some production possible from sand and gravel. Water from some wells contains hydrogen sulfide gas. Yields inadequate to more than adequate for domestic use. Larger yields possible locally
- 


Production from bedrock and glaciofluvial sand

Well depths in bedrock generally less than 150 feet. Well depths in sand less than 50 feet. Yields from bedrock and sand generally adequate for domestic use. Larger yields possible from sand
- 

Production from bedrock and glaciofluvial sand and gravel

Well depths in bedrock generally from 50 to 160 feet. Well depths in sand and gravel generally from 50 to 160 feet. Yields from bedrock and sand and gravel adequate for domestic use
- 

Production from glaciofluvial sand and gravel and some wind-blown sand

Well depths generally less than 50 feet. Where improperly located, very shallow wells may be subject to contamination by septic wastes. Yields adequate to more than adequate for domestic use. Larger yields possible
- 

Production from glaciofluvial sand and gravel

Well depths generally from 50 to 100 feet. Locally some wells shallower. Yields adequate to more than adequate for domestic use. Larger yields possible locally

--- Boundary approximate

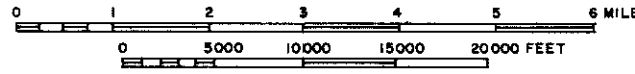
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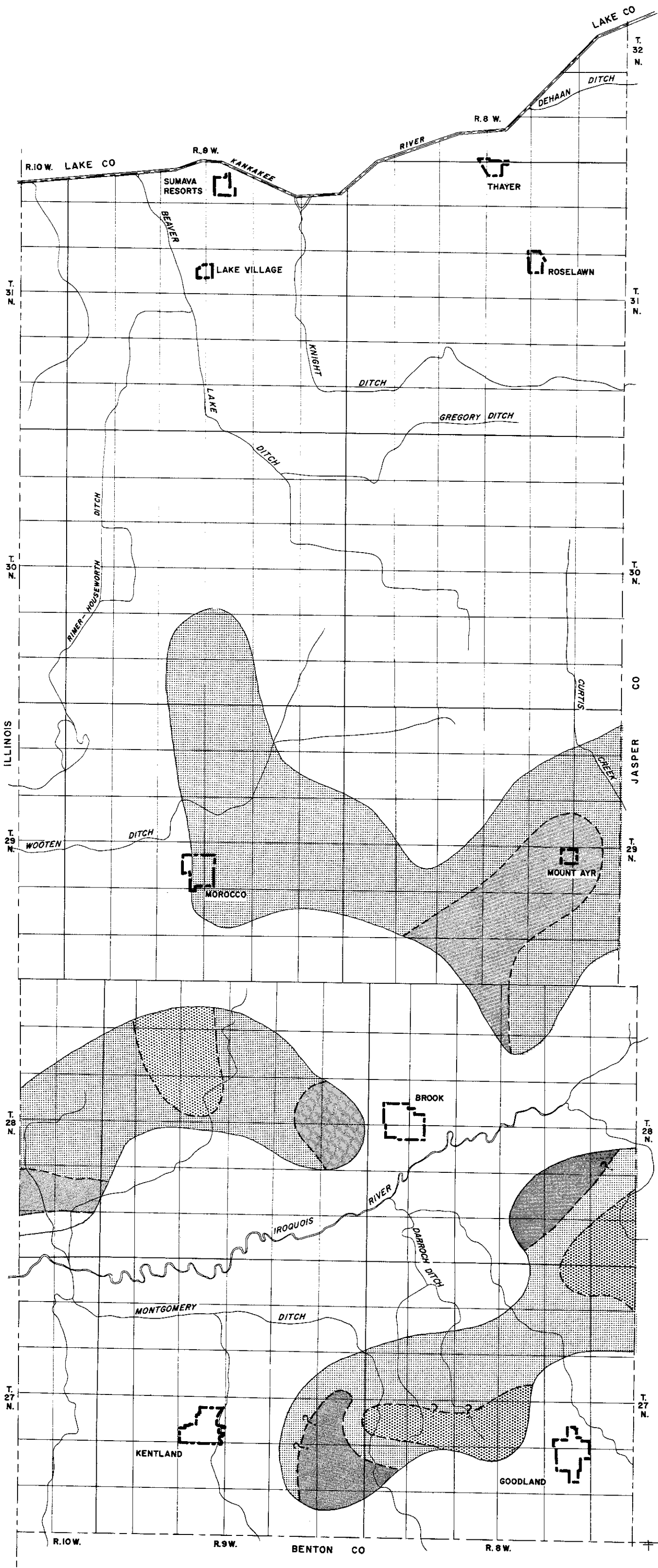
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31	32	33	34	35	36

DIAGRAM OF TOWNSHIP

Base from modified General Highway and Transportation Map revised to July, 1953

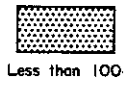
MAP OF NEWTON COUNTY, INDIANA, SHOWING AVAILABILITY OF GROUND WATER



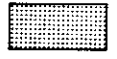


EXPLANATION

HARDNESS OF WATER, IN PARTS PER MILLION



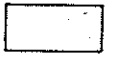
Less than 100



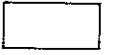
100 - 200



200 - 300



More than 300



Data not sufficient to show hardness

--- Boundary approximate

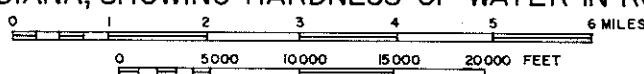
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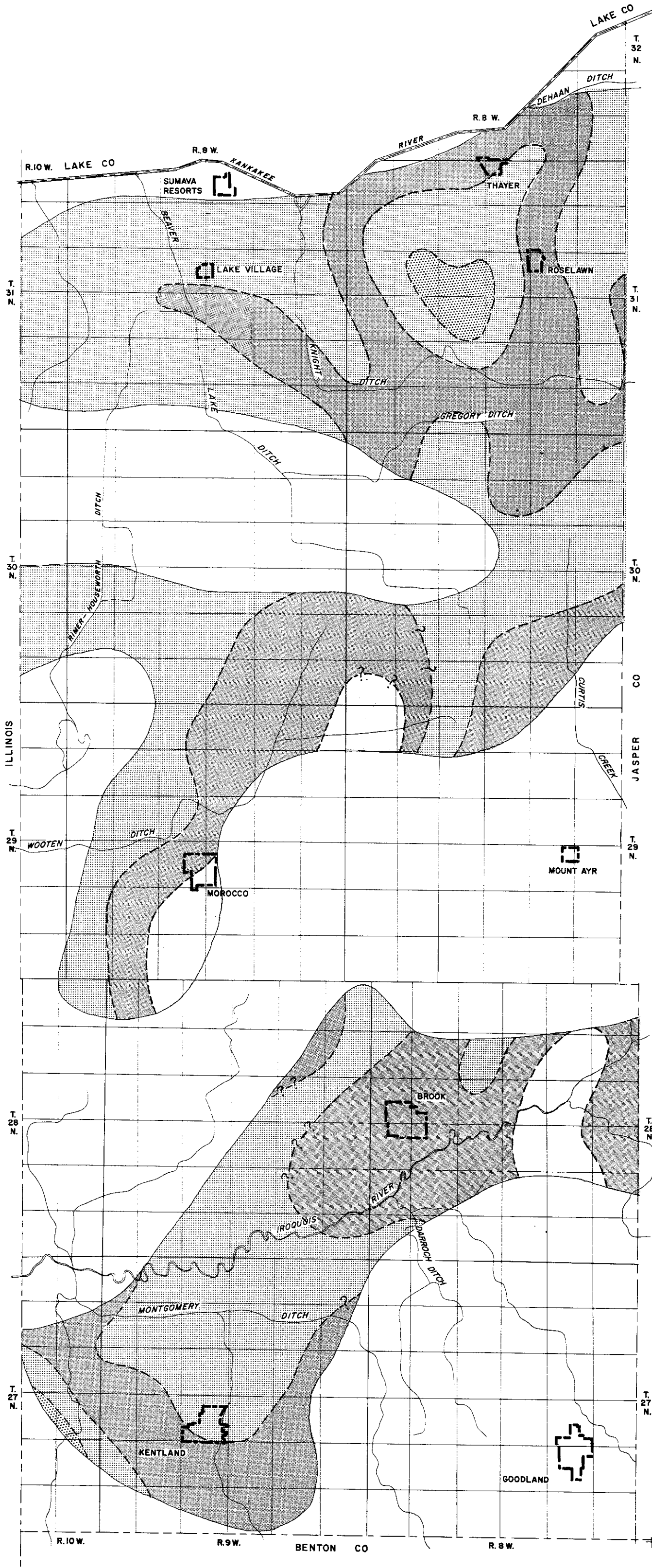
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7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

DIAGRAM OF TOWNSHIP

Base from modified General Highway and Transportation Map revised to July, 1953

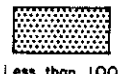



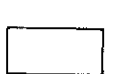
MAP OF NEWTON COUNTY, INDIANA, SHOWING HARDNESS OF WATER IN ROCKS OF DEVONIAN AGE





EXPLANATION

HARDNESS OF WATER, IN PARTS PER MILLION

-  Less than 100
-  100 - 200
-  200 - 300
-  More than 300
-  Data not sufficient to show hardness

Boundary approximate

-?-?-?-?
Boundary uncertain

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

DIAGRAM OF TOWNSHIP

Base from modified General Highway and Transportation Map revised to July, 1953

MAP OF NEWTON COUNTY, INDIANA, SHOWING HARDNESS OF WATER IN SAND AND GRAVEL OF PLEISTOCENE AGE

