STATE OF ILLINOIS 1964

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CAMBRIAN AND ORDOVICIAN STRATA OF NORTHEASTERN ILLINOIS

T. C. Buschbach

REPORT OF INVESTIGATIONS 218

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CAMBRIAN AND ORDOVICIAN STRATA OF NORTHEASTERN ILLINOIS

T. C. Buschbach

Illinois State Geological Survey Report of Investigations 218
Urbana, Illinois 1964

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Topographic mapping in cooperation with the United States Geological Survey.

September 1, 1963

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CAMBRIAN AND ORDOVICIAN STRATA OF NORTHEASTERN ILLINOIS

T. C. Buschbach

ABSTRACT

Subsurface studies in seven counties of northeastern Illinois show that Cambrian and Ordovician sediments in the area are cratonic sandstone and dolomite, with smaller amounts of shale, siltstone, and limestone.

Cambrian strata, assigned to the Croixan Series, thicken southward from 2,000 feet in the north to 3,500 feet in the south. At the base, the Mt. Simon Sandstone, coarse grained and commonly with a basal arkosic zone, accounts for about half the total sedimentary section in this region. The Eau Claire Formation consists of a lower sandstone member, a middle dolomite member, and an upper siltstone member. The Galesville and the overlying Ironton Sandstones are rather similar, but the Ironton is generally coarser grained, more dolomitic, and more poorly sorted. The Franconia Formation is primarily glauconitic sandstone that grades southward to dolomite. The Potosi Formation consists of fine-grained dolomite that characteristically contains drusy quartz. Overlying the Potosi Dolomite is the Eminence Formation, the uppermost Cambrian unit in this area. The Eminence consists of fine- to medium-grained, light colored, sandy dolomite that contains oolitic chert and thin beds of sandstone. The Eminence, Potosi, and Franconia thicken to the south.

The thickness of Ordovician strata ranges from about 700 feet in the north to over 1,100 feet in the south. The Canadian Series is represented by the Prairie du Chien Group, characterized by light colored, medium- to coarse-grained dolomite, oolitic chert, and beds of sandstone. The group is divided into four formations—Gunter, Oneota, New Richmond, and Shakopee. Pre-St. Peter erosion has removed the Prairie du Chien from the northern part of the area and reduced its thickness elsewhere.

The Champlainian Series includes three groups—Ancell, Platteville, and Galena. Beneath it a major unconformity cuts down as far as the Franconia Formation. An irregular topography with isolated depressions and a widespread mantle of red shale and chert rubble indicates that solution of carbonates was important in development of the pre-Champlainian (sub-St. Peter) surface. The Ancell Group includes the St. Peter and Glenwood Formations. The St. Peter is clean, fine- to medium-grained sandstone. In northeastern Illinois it commonly contains a basal conglomerate of chert and shale. The St. Peter ranges from 100 to 600 feet thick, the thicker sections occurring where it fills depressions on the underlying surface. The thin Glenwood Formation consists of sandy dolomite and sandstone interbedded with some green shale. The Platteville Group consists of fine-grained dolomite that grades to limestone southward. The Galena Dolomite Group is generally coarser than the underlying Platteville.

The Cincinnatian Series is represented by the Maquoketa Group, which is divided into four formations—Scales Shale, Fort Atkinson Dolomite, Brainard Shale, and the Neda Formation. In places the Neda and part of the Brainard are absent due to pre-Silurian erosion.

Northeastern Illinois is on the broad Kankakee Arch near its merger with the Wisconsin Arch. Minor structural features include the Herscher Dome, the Sandwich Fault Zone, and the DesPlaines Disturbance. The regional dip of the Champlainian strata is eastward at a rate of about 12 feet per mile. Southward thickening of the Croixan and Canadian units introduces a southerly component of dip, so that the top of the Ironton Sandstone dips to the southeast, and the Precambrian basement dips nearly straight southward from 2,000 feet below sea level on the Wisconsin line to over 5,000 feet below sea level at the southern border of this area.

Most of the formations thicken southward, and the Cambrian sandstones become finer grained and more dolomitic in that direction, suggesting that the source area for the clastics was to the north.

INTRODUCTION

Northeastern Illinois is one of the largest urban-industrial complexes in the nation. Its deeper bedrock formations have long been of interest as ground-water sources and, more recently, as reservoirs for storage of natural gas. Several hundred deep wells have been drilled to furnish water for municipal and industrial use. However, the rapid expansion of population and industrialization of the region has caused an increase in pumpage of ground water, accompanied by a steady decline in artesian pressure of water from deep formations (Suter et al., 1959, p. 9).

Cambrian formations in a domal structure near Herscher, Kankakee County, are currently being used to store natural gas for use when demand exceeds the amount that can be transmitted from source areas by pipeline. Other structures possibly suitable for underground storage of gas are being investigated.

Precise determination of the stratigraphic sequence is required for evaluation of ground-water productivity and recharge problems. The solutions of many engineering problems, such as water well drilling and completion, casing and pump setting, and caving zones, also are based on knowledge of stratigraphic position and an understanding of the types of lithologic variation likely to be encountered. This report presents information on gross lithologic characteristics, facies variations, and distinguishing criteria of the subsurface Cambrian and Ordovician strata in northeastern Illinois.

Seven counties in the northeast corner of Illinois are included in the study—McHenry, Lake, Kane, DuPage, Cook, Will, and Kankakee. This area of approximately 4,390 square miles includes all of the greater Chicago region in Illinois and is bounded on the north by Wisconsin and on the east by Indiana and Lake Michigan.

GEOLOGIC SETTING

Northeastern Illinois is located on the Kankakee Arch, a broad, positive, structural element separating the Michigan and Illinois Basins and connecting the Wisconsin Arch to the Cincinnati and Findlay Arches (fig. 1). The broad arch plunges gently southeastward from the Wisconsin Arch in central northern Illinois toward a shallow saddle in north-central Indiana. The upper formations in northeastern Illinois dip gently eastward into the Michigan Basin. However, most Cambrian and Ordovician formations thicken southward into the Illinois Basin.

Most of northeastern Illinois is covered by Pleistocene glacial drift a few to slightly over 200 feet thick. The underlying bedrock is composed chiefly of Silurian dolomite, which varies in thickness from a feather-edge in the western part of the area to about 600 feet in the eastern part. A well developed pattern of stream valleys on the bedrock surface indicates that a mature stage in the erosion cycle had been reached before the area was covered by drift (Bretz, 1955, p. 51).

Underlying the Silurian rocks in northeastern Illinois are from 700 to 1,100 feet of Ordovician strata and from 2,000 to 3,500 feet of Cambrian strata.

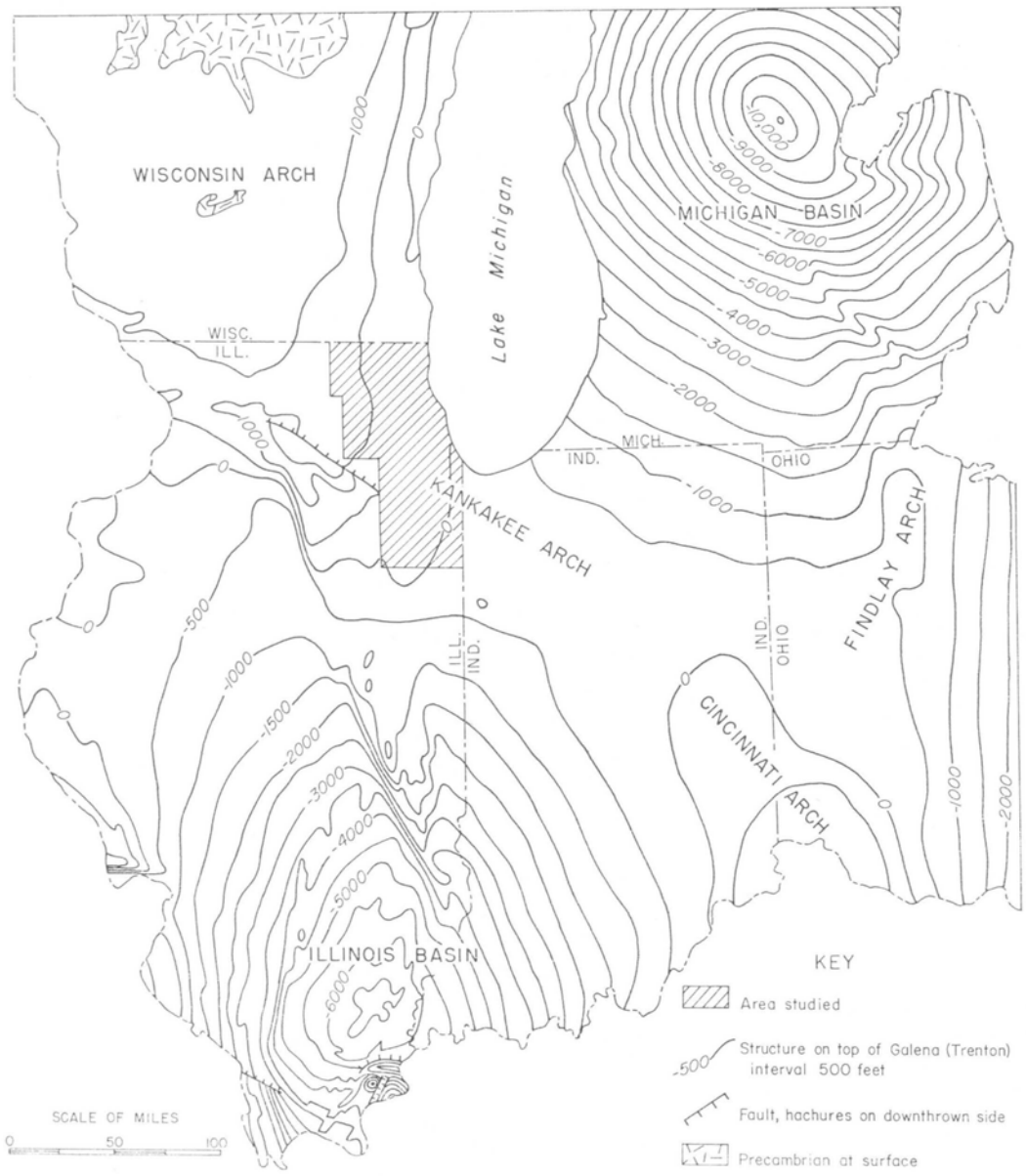

FIG. 1—Structural setting of northeastern Illinois. Structure contours are drawn on top of the Galena Dolomite and equivalents. Modified from the "Tectonic Map of the U. S." (Cohee et al., 1962).

METHODS OF STUDY

About 50 deep wells were selected as reference wells and were studied in detail to determine which criteria could be used to distinguish the formations throughout the area (fig. 2; table 1). Over 700 well logs and sample studies on file at the Illinois State Geological Survey were interpreted to provide data for the isopach and structure maps. Well samples were studied with an 18-power stereoscopic microscope. The characteristics found most valuable were gross

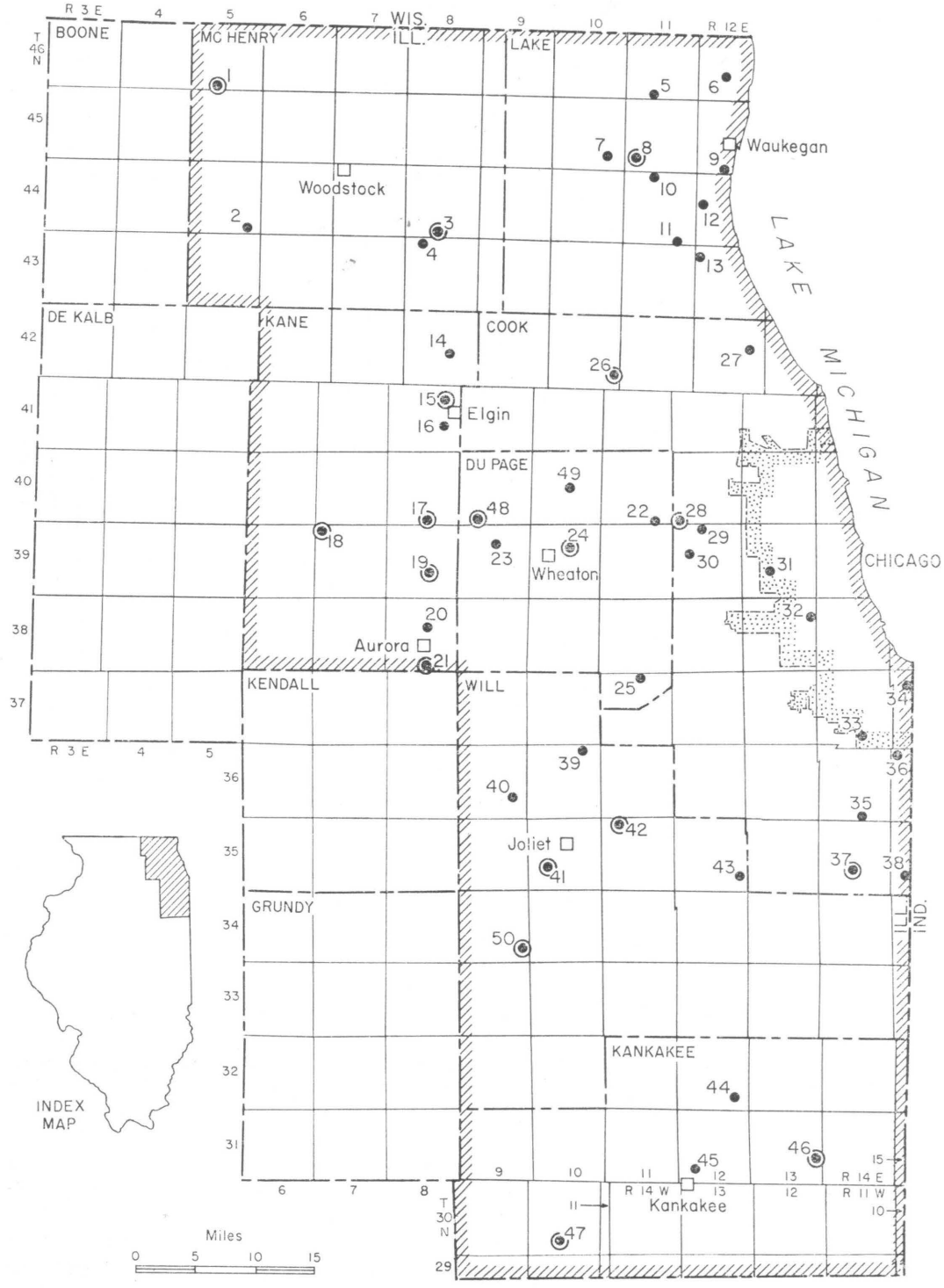

FIG. 2—Location of reference wells. Samples from wells circled are described at end of report.

TABLE 1—LIST OF REFERENCE WELLS

Well No.	Name: Driller — Owner	Location: Sec. - T. - R.	County	Depth (feet)	Deepest formation
1	Varner—Dean Milk Co.	33 - 46 N - 5 E	McHenry	1783	Mt. Simon
2	Egerer—Arnold Engineering Co.	35 - 44 N - 5 E	McHenry	846	Franconia
3	Milaeger—Crystal Lake	33 - 44 N - 8 E	McHenry	1355	Galesville
4	Thorne—Crystal Lake	5 - 43 N - 8 E	McHenry	2000	Mt. Simon
5	Gray-Milaeger—J. R. Simpson, Jr.	33 - 46 N - 11 E	Lake	1364	Eau Claire
6	Miller—Zion No. 3	21 - 46 N - 12 E	Lake	995	St. Peter
7	Gray—Grays Lake	26 - 45 N - 10 E	Lake	1323	Eau Claire
8	Boysen—Wildwood Subdivision No. 2	29 - 45 N - 11 E	Lake	1845	Mt. Simon
9	Gray—Abbott Laboratories	33 - 45 N - 12 E	Lake	1600	Eau Claire
10	Gray—Budd Memorial Home	4 - 44 N - 11 E	Lake	1289	Eau Claire
11	Geiger—Dillon Subdivision	35 - 44 N - 11 E	Lake	1600	Eau Claire
12	Geiger—Austin (Deepfreeze) No. 2	18 - 44 N - 12 E	Lake	1600	Eau Claire
13	Geiger—A. D. Lasker No. 2	7 - 43 N - 12 E	Lake	2000	Mt. Simon
14	Feuerborn—Carpentersville No. 1	22 - 42 N - 8 E	Kane	1140	Galesville
15	Layne-Western—Elgin No. 5	11 - 41 N - 8 E	Kane	1225	Eau Claire
16	Layne-Western—Elgin State Hospital No. 2	23 - 41 N - 8 E	Kane	2000	Mt. Simon
17	Neely—St. Charles No. 6	34 - 40 N - 8 E	Kane	2240	Mt. Simon
18	Layne-Western—Elburn Packing Co. No. 4	6 - 39 N - 7 E	Kane	1345	Galesville
19	Miller—Batavia No. 3	22 - 39 N - 8 E	Kane	2200	Mt. Simon
20	Layne-Western—Aurora No. 12 A	15 - 38 N - 8 E	Kane	2250	Mt. Simon
21	Layne-Western—Aurora No. 16	34 - 38 N - 8 E	Kane	2139	Mt. Simon
22	Miller—Elmhurst No. 6	35 - 40 N - 11 E	DuPage	1476	Eau Claire
23	Chicago & Northwestern R. R.	10 - 39 N - 9 E	DuPage	2082	Mt. Simon
24	Layne-Western—The Wander Co. No. 11	10 - 39 N - 11 E	DuPage	1920	Mt. Simon
25	Miller—Argonne Nat'l Lab. deep well No. 1	3 - 37 N - 11 E	DuPage	1595	Eau Claire
26	Layne-Western—Rolling Meadows No. 2	25 - 42 N - 10 E	Cook	1401	Eau Claire
27	Thorne-Boysen—St. Anne's Home	14 - 42 N - 12 E	Cook	1390	Eau Claire
28	Geiger—Automatic Electric Co. No. 1	31 - 40 N - 12 E	Cook	1900	Mt. Simon
29	Geiger—Richardson & Co.	4 - 39 N - 12 E	Cook	1960	Mt. Simon
30	Miller—Aluminum Co. of America No. 1	17 - 39 N - 12 E	Cook	1495	Eau Claire
31	Geiger—Chicago Vitreous Enamel Co. No. 2	21 - 39 N - 13 E	Cook	1607	Eau Claire
32	Miller—International Rolling Mill Co. No. 1	12 - 38 N - 13 E	Cook	1620	Eau Claire
33	Miller—American Malting Co.	27 - 37 N - 14 E	Cook	1648	Galesville
34	Geiger—Schwill Malting Co. No. 2	8 - 37 N - 15 E	Cook	1735	Eau Claire
35	Mulford—Thornton No. 2	34 - 36 N - 14 E	Cook	1780	Eau Claire
36	Egerer—Red River Refining Co. No. 1	6 - 36 N - 15 E	Cook	1625	Ironton
37	Neely & Schimelpfenig—Borg-Warner Corp. No. 4	21 - 35 N - 14 E	Cook	1805	Eau Claire
38	Thorne—E. J. & E. R. R.	29 - 35 N - 15 E	Cook	1785	Ironton
39	Neely & Schimelpfenig—Public Service Co. No. 1	2 - 36 N - 10 E	Will	1535	Eau Claire

(Continued on next page)

TABLE 1—LIST OF REFERENCE WELLS—Continued

Well No.	Name: Driller — Owner	Location: Sec. - T. - R.	County	Depth (feet)	Deepest formation
40	Livengood—E. L. Herren No. 1	23 - 36 N - 9 E	Will	1958	Mt. Simon
41	Miller—Rockdale No. 2	20 - 35 N - 10 E	Will	1585	Eau Claire
42	Miller—Joliet Site No. 2	5 - 35 N - 11 E	Will	1700	Eau Claire
43	Nelson et al.—J. R. McGlashan No. 1	25 - 35 N - 12 E	Will	2700	Mt. Simon
44	Miller—Manteno State Hospital No. 1	26 - 32 N - 12 E	Kankakee	1760	Franconia
45	Miller—Bradley No. 3	29 - 31 N - 12 E	Kankakee	1040	Prairie du Chien
46	Hughes—Parish No. 1	24 - 31 N - 13 E	Kankakee	5050	Mt. Simon
47	Composite log	28, 29, 32 - 30 N - 10 E	Kankakee	4880	Mt. Simon
48	Gray-Milaeger—E. J. & E. R. R. No. 1	32 - 40 N - 9 E	DuPage	1378	Eau Claire
49	Milaeger—Suncrest Highlands	14 - 40 N - 10 E	DuPage	1395	Eau Claire
50	Layne-Western—Kankakee Ordnance No. 9	25 - 34 N - 9 E	Will	1603	Galesville

mineralogy, grain size, color, and the presence of shale partings, glauconite, chert, oolites, or pyrite coatings on sand grains.

Sandstones

The sandstones of northeastern Illinois are primarily orthoquartzites that are relatively well sorted. The median grain size of sandstone units sampled in a 5-foot interval commonly falls in the medium or fine sand size range (.50 to .125 mm) (fig. 3).

Grain size and sorting of sandstones are important factors in correlation and in economic use. Slight differences in the distribution of grain sizes of sandstones can be observed, but they are seldom recorded in qualitative descriptions. Concurrently with a general study of visual estimates of grain size distribution (Swann et al., 1959), a more precise method of determining and describing sand grain size characteristics was used in this study. The stereoscopic microscope used for studying the well cuttings was fitted with a micrometer ocular. Sand grains representing the median and maximum grain size were visually selected and measured. The median diameter was obtained by visualizing the sample divided into two equal piles, one containing sizes finer than some specific grain, the other containing sizes coarser than this grain. The measurement of the width of the specific grain serving to separate the two piles was used as the median grain size. The maximum grain size represents an actual measurement of the width of the largest sand grain observed in the sample.

Selection of the grains was necessarily subjective, whereas the measurement of the grains was done objectively with the micrometer ocular. Measurements are given in millimeters and also converted to the phi scale, which is a logarithmic scale of grain size commonly used for statistical evaluations of mechanical analyses. Visual estimates made by the author were compared with estimates made on the same samples by D. H. Swann, and also compared with sieve analyses. In general the results were consistent and conformed to sieve analyses within 0.2 ϕ for median size and 0.1 ϕ for maximum size on reasonably well sorted sandstones.

Sorting was estimated according to the following classification:

Well sorted—67 percent of sample in 1 grade size or less (1ø)
Moderately sorted—67 percent of sample in 1 to 2 grade sizes (1 to 2ø)
Poorly sorted—67 percent of sample in over 2 grade sizes (2ø)

This classification permits differentiation of the sandstones of this region. By some other classifications of sorting, nearly all of these sandstones would be considered well sorted.

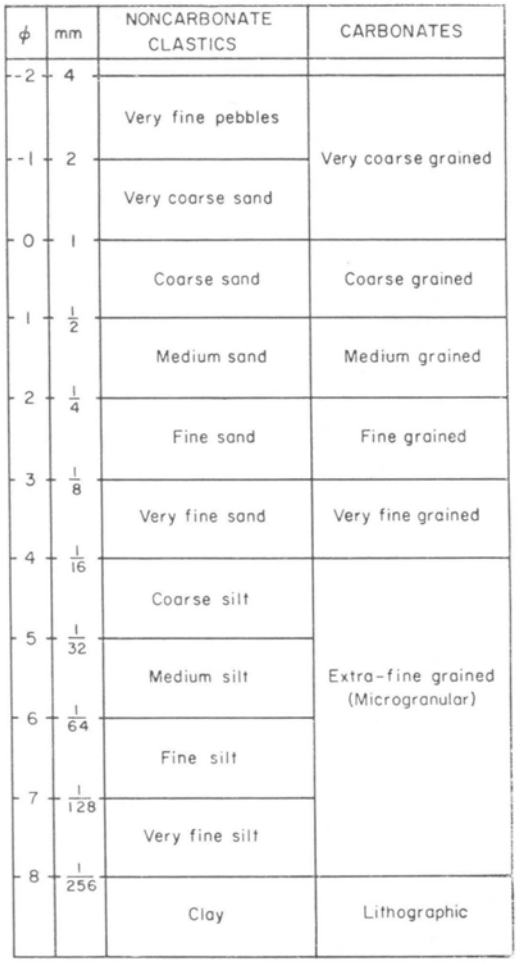

FIG. 3—Grain-size classification used in this report.

Carbonates

The Cambrian and Ordovician formations in northeastern Illinois contain both dolomite and limestone. The carbonates were described, according to prominent identifying characteristics, as dolomitic, calcitic, argillaceous, silty, sandy, or cherty, and according to color, grain or crystal size (fig. 3), and porosity. Accessory constituents, such as glauconite, oolites, fossils, drusy quartz, and secondary minerals also were noted. Dolomite was usually distinguished from limestone by grain size and shape, but acid and staining techniques were used in some cases.

Shales

Shales are distinctive marker beds in the Cambrian and Ordovician section and can be traced throughout the area. Because of their relative impermeability they act as aquicludes in the movement of ground water and also as caprock over gas storage domes. The shales were described, according to their prominent modifying characteristics, as sandy, silty, dolomitic, and calcitic, and according to color, firmness, and the presence of prominent grains of mica, glauconite, and pyrite.

Geophysical Logs

Geophysical logs are not widely used in northeastern Illinois. However, where they are available they are often a valuable aid in well completion, correlation, and in determining some contacts. Geophysical logs available in this area include electric logs (spontaneous potential and resistivity), radioactivity logs (gamma ray and neutron), micrologs, caliper (section gauge) logs, and temperature logs. Electric logs and micrologs of water wells in this area cannot be compared directly with similar logs from oil wells farther south in Illinois because of the presence of fresh formation water, the absence of a filter cake, and larger drill holes in northeastern Illinois. Radioactivity logs have an advantage because casing is commonly set during drilling and they can be run after the casing is set.

The geophysical logs most useful in identifying or separating particular formations are discussed with the lithology of the individual units.

Acknowledgments

This paper is a result of research carried out at the Illinois State Geological Survey and is adapted from a doctoral dissertation submitted to the University of Illinois. Professors H. W. Scott and G. B. Maxey of the University of Illinois were faculty advisors for the dissertation.

H. B. Willman, D. H. Swann, and Elwood Atherton of the Geological Survey furnished helpful suggestions and assistance in this study. Mathias J. Walters, Thomas L. Bon-

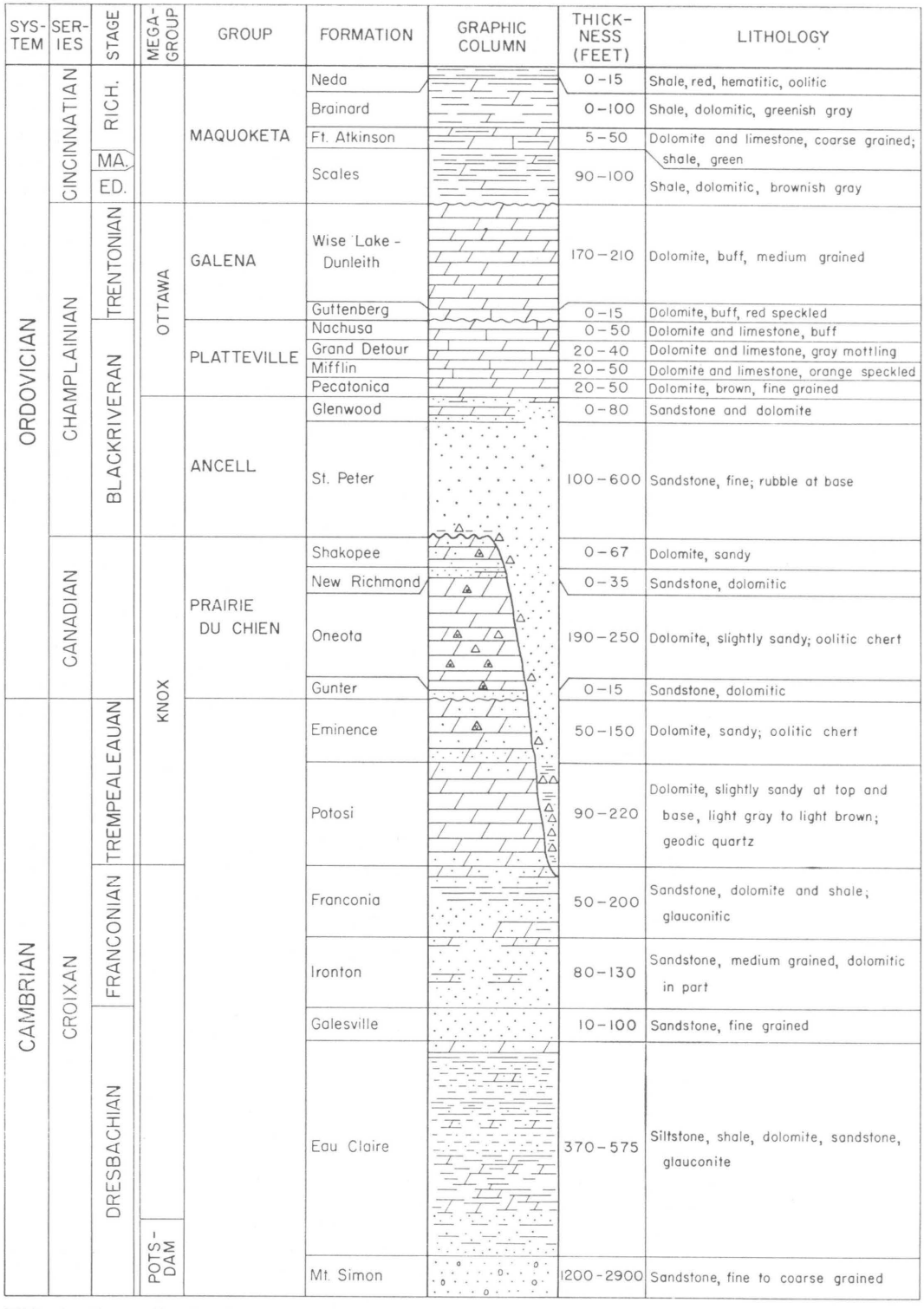

FIG. 4—Generalized columnar section of Cambrian and Ordovician strata in northeastern Illinois.

well, and Louis M. Lutostanski assisted in processing of data and in preparation of illustrations.

J. S. Templeton contributed data on the relations of the northern Illinois subsurface section with areas of outcrops. He prepared a generalized stratigraphic section that has had considerable influence on the thinking of subsurface geologists who have studied samples at the Survey during the past 10 years. He also made extensive studies of the Ironton and Galesville Sandstones. Unfortunately, much of Dr. Templeton's work was unpublished at the time of his death. A portion of his findings has been incorporated into this report.

From 1942 to 1945 a study of the groundwater resources of northeastern Illinois was made by Carl A. Bays and other Survey members and their manuscript is on file at the Survey. Sample descriptions made during that investigation, and many by L. E. Workman while he was on the Survey staff, were used in the preparation of this report.

STRATIGRAPHIC SUMMARY

The sequence and nature of Cambrian and Ordovician formations in northeastern Illinois are shown in cross section (pl. 1) and in a generalized columnar section (fig. 4). Details of the stratigraphy are illustrated by composite logs of the rock stratigraphy of each series.

The history of development of the stratigraphic nomenclature in northeastern Illinois is shown in figure 5. One of the most important factors in this development was the recognition of the magnitude of the truncation of pre-St. Peter rocks. Prior to that, Croixan rocks were commonly misidentified as Prairie du Chien. Understanding of the true relationships led to the recognition of pre-St. Peter movements in northern Illinois.

CAMBRIAN SYSTEM

The Mt. Simon Sandstone consists largely of medium-grained sandstone, but some coarse-grained beds occur, particularly in the upper part of the formation, and they become more abundant to the north. A few zones contain very fine quartz pebbles and others contain beds of shale. From wells in adjoining areas the Mt. Simon Sandstone is estimated to vary from 1,200 feet to over 2,800 feet thick in northeastern Illinois.

The Eau Claire Formation overlies the Mt. Simon and consists of fine-grained sandstone, siltstone, shale, and dolomite. Locally it contains a little limestone. It is about 400 feet thick in the northern and central parts of the area but thickens southward to nearly 600 feet. In general, the Eau Claire in the southern part of the area contains more carbonates and the clastics are finer grained. Glauconite is abundant in several units, and a "sooty" zone, in which the sand grains are incrusted with finely disseminated pyrite, is commonly present at or near the base.

The Galesville Sandstone, above the Eau Claire, is a fine-grained, well sorted sandstone, essentially free from shale and glauconite, that averages about 40 feet thick. It is generally finer grained than the overlying Ironton Sandstone, but in some wells in the eastern part of the area both formations consist of predominantly medium-grained sandstone and are difficult to separate. The Galesville is readily distinguished from the underlying Eau Claire except in the southern part of the area where the lower few feet are dolomitic.

The Ironton Sandstone is a medium-grained, generally poorly sorted, dolomitic sandstone that averages about 100 feet thick. It commonly contains beds of coarse-grained sandstone, and it has more dolomitic cement than does the underlying Galesville. The dolomite content of the Ironton increases southward.

The Franconia Formation, above the Ironton, consists of fine-grained, dolomitic sandstone to the north and sandy dolomite to the south. It is glauconitic everywhere and contains numerous beds of red or green shale. The formation thickens southward from 50 to 200 feet.

The Potosi Dolomite, overlying the Franconia, consists of fine-grained dolomite that

Bannister (1868)	Udden (1909) Trowbridge (1912)	Anderson (1919)	Thwaites (1927)	Willman and Payne (1942)	Workman and Bell (1948)	Suter et al. (1961)	Templeton and Willman (1963)	This Report		
								GRP.	FORMATION Member	
CINCINNATI GROUP	CINCINNATI	MAQUOKETA	MAQUOKETA	MAQUOKETA		MAQUOKETA	MAQUOKETA GRP. NEDA	MAQUOKETA	NEDA	ORDOVICIAN
							MAQUOKETA GRP. BRAINARD		BRAINARD	
							MAQUOKETA GRP. FT. ATKINSON		FT. ATKINSON	
							MAQUOKETA GRP. SCALES		SCALES	
TRENTON GROUP	TRENTON-GALENA	GALENA-PLATTEVILLE	GALENA	GALENA		GALENA	GALENA GROUP WISE LAKE	GALENA	WISE LAKE-DUNLEITH	
							GALENA GROUP DUNLEITH			
			DECORAH	DECORAH		DECORAH	GALENA GROUP GUTTENBERG		GUTTENBERG	
			PLATTEVILLE	PLATTEVILLE		PLATTEVILLE	PLATTEVILLE GRP. NACHUSA	PLATTEVILLE	NACHUSA	
							PLATTEVILLE GRP. GRAND DET.		GRAND DETOUR	
							PLATTEVILLE GRP. MIFFLIN		MIFFLIN	
							PLATTEVILLE GRP. PECATONICA		PECATONICA	
ST. PETERS	ST. PETERS	ST. PETER	Glenwood Mbr.	GLENWOOD	GLENWOOD-ST. PETER	GLENWOOD-ST. PETER	ANCELL GROUP GLENWOOD	ANCELL	GLENWOOD: Loughridge, Daysville, Kingdom	
			ST. PETER	ST. PETER			ANCELL GROUP ST. PETER		ST. PETER	
									ST. PETER: Kress*	
LOWER MAGNESIAN	LOWER MAGNESIAN	PRAIRIE DU CHIEN GRP. SHAKOPEE	PRAIRIE DU CHIEN GRP. SHAKOPEE	PRAIRIE DU CHIEN SER. SHAKOPEE	SHAKOPEE	PRAIRIE DU CHIEN SER. SHAKOPEE	PRAIRIE DU CHIEN GRP. SHAKOPEE	PRAIRIE DU CHIEN	SHAKOPEE	
		PRAIRIE DU CHIEN GRP. NEW RICH.	PRAIRIE DU CHIEN GRP. NEW RICH.	PRAIRIE DU CHIEN SER. NEW RICH.	NEW RICHMOND	PRAIRIE DU CHIEN SER. NEW RICH.	PRAIRIE DU CHIEN GRP. NEW RICH.		NEW RICHMOND	
		PRAIRIE DU CHIEN GRP. ONEOTA	PRAIRIE DU CHIEN GRP. ONEOTA	PRAIRIE DU CHIEN SER. ONEOTA	ONEOTA	PRAIRIE DU CHIEN SER. ONEOTA	PRAIRIE DU CHIEN GRP. ONEOTA		ONEOTA: Blodgett*, Arsenal*	
				JORDAN	GUNTER-JORDAN	TREMPEALEAU	PRAIRIE DU CHIEN GRP. GUNTER		GUNTER	
				TREMPEALEAU	TREMPEALEAU				EMINENCE: Momence*	CAMBRIAN
			MAZOMANIE	FRANCONIA	FRANCONIA	FRANCONIA			POTOSI	
				Ironton Mbr.	Ironton Mbr.				FRANCONIA	
		JORDAN	DRESBACH	DRESBACH GROUP GALESVILLE	GALESVILLE	IRONTON-GALESVILLE			IRONTON: Mooseheart*, Marywood*, Fox Valley*, Buelter*	
									GALESVILLE	
		ST. LAWRENCE	EAU CLAIRE	DRESBACH GROUP EAU CLAIRE	EAU CLAIRE	EAU CLAIRE			EAU CLAIRE: Proviso*, Lombard*, Elmhurst*	
		DRESBACH	MT. SIMON	MT. SIMON	MT. SIMON	MT. SIMON			MT. SIMON	

FIG. 5—History of stratigraphic nomenclature in northeastern Illinois. Asterisks indicate names introduced in this report.

usually contains drusy quartz. The lower part of the formation normally contains some fine sand and glauconite, and a little glauconite occurs near the top. The Potosi thickens southward from 100 to 250 feet, but in the northern part of the area it was largely truncated by pre-St. Peter erosion.

The Eminence Formation, the uppermost Cambrian formation, is composed of sandy dolomite with beds of sandstone at or near the base and averages slightly less than 100 feet thick in the southern part of the area. The dolomite is fine to medium grained and contains oolitic chert.

ORDOVICIAN SYSTEM

The Gunter Sandstone, the basal Ordovician sandstone, is thin, medium grained and dolomitic, and contains gray and green shale partings. The Gunter is present only in the southern part of the area and is not more than 15 feet thick. Where the Gunter Sandstone is absent, the Eminence is difficult to separate from the overlying Oneota.

The Oneota Dolomite, above the Gunter, is medium to coarse grained and cherty. It is absent or thinned by pre-St. Peter erosion in the northern half of the area. Where the top is not eroded, the Oneota ranges from 190 to 250 feet thick and is thickest at the southern border of the area.

The New Richmond Sandstone, overlying the Oneota, is a medium-grained, partly dolomitic sandstone that contains oolitic chert. It is present only in the southwestern part of the area, where it varies from a few to 35 feet thick.

The Shakopee Dolomite, lying above the New Richmond, is a variable formation that consists chiefly of fine-grained dolomite with beds of sandy dolomite, sandstone, and shale. Oolitic chert is common throughout the formation. Because of pre-St. Peter erosion, the Shakopee is absent from all but the southwestern part of the area. Although its maximum thickness in the area studied is only 67 feet, it is much thicker a short distance south.

Because of a major unconformity at its base, the St. Peter Sandstone overlaps formations down to the Franconia in this area and to the Eau Claire a short distance north. The sub-St. Peter surface suggests karst topography with a few master streams rather than normal stream erosion.

The St. Peter consists of beds of fine- to medium-grained sandstone. It is usually 100 to 200 feet thick, but thickens locally to 600 feet to fill irregularities of the underlying surface. The St. Peter commonly includes at its base an irregular unit of shale and chert rubble that is derived from solution of cherty carbonate formations.

In the northern part of the area the Glenwood Formation contains dolomite and is readily separated from the underlying St. Peter. Farther south the Glenwood Formation, if present, is not separated from the St. Peter.

The Platteville and Galena Groups, comprising strata between the Glenwood Formation and the Maquoketa Group, are chiefly dolomite with some limestone. The limestone occurs in a tongue that extends northward through the western half of Kankakee and Will Counties, all of DuPage County, and into northwestern Cook and southern Lake Counties. The limestone is interbedded with dolomite in varying proportions, and some units consist of calcitic dolomite. Limestone in the Galena and Platteville becomes more prominent southward in Illinois. The base of the Galena is marked by a bed of red-speckled dolomite. The combined thickness of the Galena and Platteville increases from 300 feet in the northern part of the area to 400 feet in the south.

The Maquoketa Group is predominantly shale. Throughout the area a rather persistent carbonate unit, the Fort Atkinson Limestone, occurs in the middle. Both the upper shale, the Brainard, and the lower shale, the Scales, grade laterally into shaly dolomite in the northern and central parts of the area. A thin zone of small phosphatized and pyritized fossils, called "the depauperate zone," is normally present at the base of the Maquoketa. Occasionally traces of similar zones are found at the base of the middle carbonate unit. At the top a red shale unit containing oolites in places, the Neda

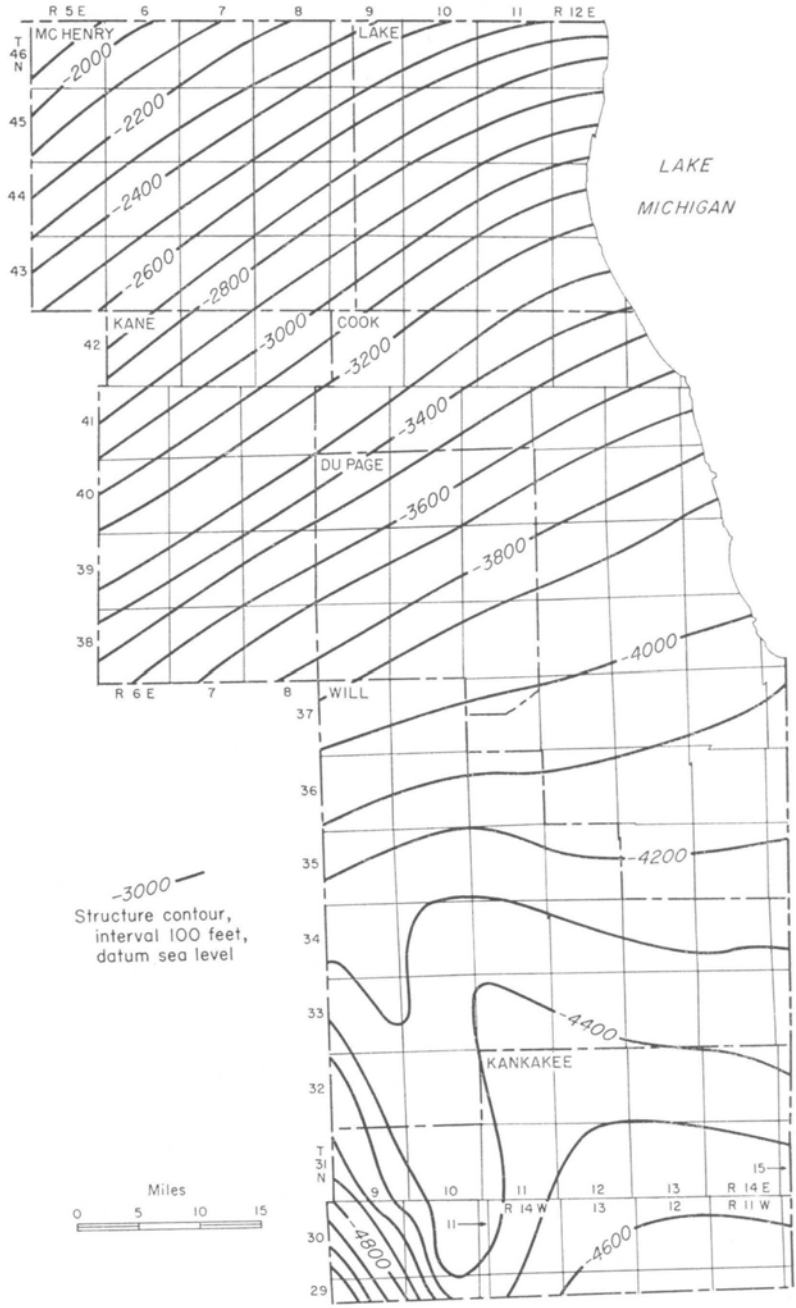

FIG. 6—Structure contours on top of the Precambrian in northeastern Illinois.

Formation, is present locally, but throughout most of the area it has been removed by pre-Silurian erosion.

The Maquoketa varies in thickness from about 100 to over 225 feet in northeastern Illinois. It is unconformably overlain by Silurian strata, except in a few small areas where it is overlain by Pennsylvanian or Pleistocene deposits.

PRECAMBRIAN

No wells have reached Precambrian rocks in the area mapped. However, data from wells in the surrounding area combined with the structural pattern of northeastern Illinois permit inferences concerning the surface of the basement rocks. The top of the Precambrian is estimated to vary from slightly less than 2,000 feet below sea level in the northern part of the area to over 5,000 feet below sea level in the southern part. The structure map on the top of the Precambrian (fig. 6) is a projection of the structure of the Ironton Sandstone, using the estimated thicknesses of the Ironton-Galesville, Eau Claire, and Mt. Simon Formations.

Although near-surface formations now dip gently to the east, the Precambrian surface dips south. The map shows the movements that have affected the area since the beginning of the Paleozoic. However, the topographic relief of the surface at the beginning of Mt. Simon deposition is unknown and in places may alter the map significantly. If the same relations exist in northeastern Illinois as in the outcrop areas in Missouri and Wisconsin, the surface may have local relief of several hundred feet.

About 16 wells in Illinois have reached Precambrian rocks. The wells most commonly encountered medium- to coarse-grained granite. Other rock types reported are quartz monzonite, rhyolite porphyry, and felsite (Grogan, 1949; J. C. Bradbury, personal communication). This suggests that the Cambrian strata overlie a largely granitic surface with occasional dikes and patches of volcanic flow rocks.

CAMBRIAN SYSTEM

Sedgwick, 1835

All Cambrian strata of northeastern Illinois are assigned to the Croixan Series of late Cambrian age, although it is possible that the very thick Mt. Simon Sandstone may include older deposits. Fossils have not been found in the Mt. Simon of the Upper Mississippi Valley, but the conformably overlying Eau Claire contains fossils of Croixan age. No significant or widespread break is recognized in the Mt. Simon sequence, and the entire unit is therefore considered here to be Upper Cambrian.

CROIXAN SERIES

Winchell, 1873

The Upper Mississippi Valley, and especially the St. Croix Falls region in Minnesota and Wisconsin, generally has been regarded as the type region for Upper Cambrian rocks in the United States. The Croixan Series consists of strata that include the *Cedaria* Zone up through the *Saukia* Zone as used by Raasch (1951), or the *Plethopeltis* Zone of Howell et al. (1944). The Croixan Series is divided into the Dresbachian, Franconian, and Trempealeauan Stages (fig. 4).

Dresbachian Stage

The term Dresbach (Winchell, 1886, p. 334-337) has been used to include various rock units beneath the Franconia Formation. It has been used for the Galesville alone, for the Galesville and all or part of the Ironton, for all the Cambrian strata beneath the Ironton, and for all the Cambrian beneath the Franconia. In Illinois the Dresbach has been designated as a group that included the Mt. Simon, Eau Claire, and Galesville Formations (Willman and Payne, 1942). However, placing the Mt. Simon, Eau Claire, and Galesville Formations in a group in northern Illinois seems inadvisable because the Galesville and the overlying Ironton are rather similar and often not separable in subsurface samples, and because

the clean sandstones of the Mt. Simon and Galesville are uniformly and distinctly separated by the silty sandstone, dolomite, and shale of the Eau Claire Formation.

As the Mt. Simon, Eau Claire, and Galesville are traced northwestward to their outcrop areas in Wisconsin and Minnesota, the units become thinner and the Eau Claire contains much less shale and carbonate. The Ironton Sandstone also thins considerably and is commonly included as a basal member in the Franconia. In the outcrop region the Mt. Simon, Eau Claire, and Galesville compose a sequence of rather similar sandstones, to which the term Dresbach Group may be conveniently applied (fig. 7).

In this report the Mt. Simon, Eau Claire, and Galesville Formations are assigned to the Dresbachian Stage, which includes all of the strata of Croixan age below the *Elvinia* Zone (Howell et al., 1944). As the Galesville is unfossiliferous, its position as the top unit of the Dresbachian Stage is largely based on its inclusion in the Dresbachian type sequence. However, the Galesville may be equivalent to the lower part of the Davis Formation in Missouri rather than the uppermost Bonneterre (fig. 8), and if this is correct the Galesville may more properly belong in the Franconian Stage. Because of the great thickening of the Ironton between the outcrop area in Wisconsin and the subsurface in northern Illinois, the Ironton may include some strata older than the *Elvinia* Zone, which defines the base of the Franconian in the outcrop area. Although the top of the Dresbachian is retained at the top of the Galesville in this report, in other areas where strata equivalent to the Ironton are not differentiated from the Galesville, the Galesville includes strata of Franconian age.

Franconian Stage

The Franconian Stage (Howell et al., 1944) in northeastern Illinois is represented by the Ironton and Franconia Formations.

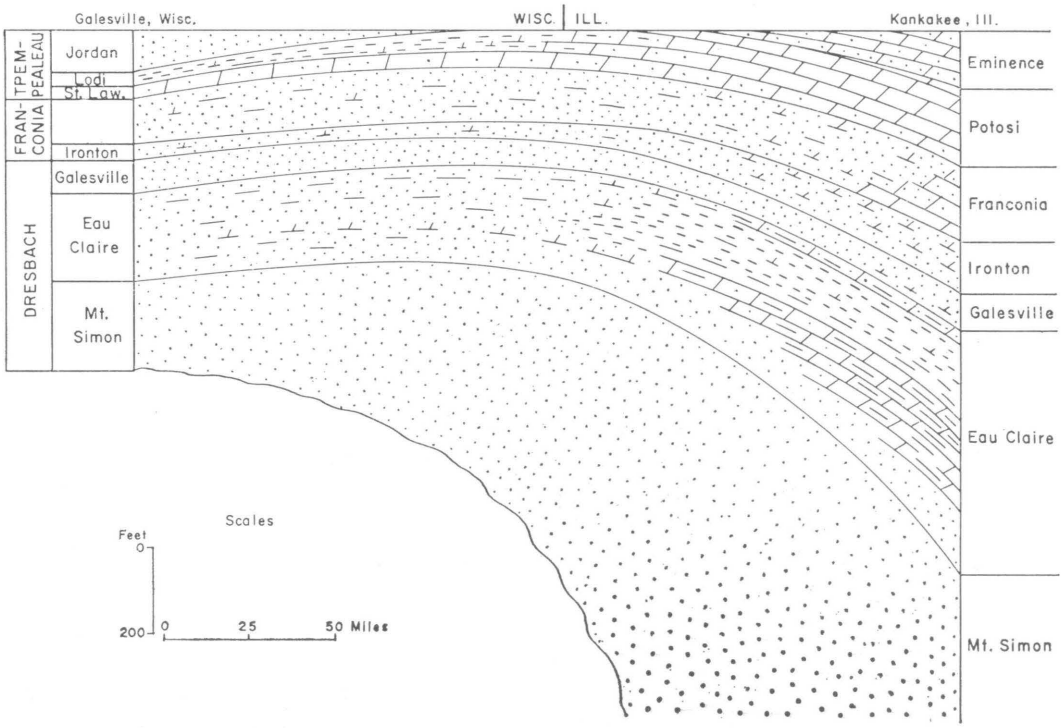

FIG. 7—Diagrammatic cross section of Cambrian strata showing correlation from Galesville, Wisconsin, to Kankakee, Illinois.

SYSTEM	SERIES	Eastern Missouri (Grohskopf, 1955; Knight and Koenig, 1957)	Northeastern Illinois (This Report)		Southwestern Wisconsin (Agnew et al., 1956)	Northwestern Indiana (Gutstadt, 1958 b)
ORDOVICIAN	CINCINNATIAN	Maquoketa	Maquoketa Group		Maquoketa	Maquoketa
		Kimmswick	Galena Group		Galena	Trenton
	CHAMPLAINIAN	Decorah			Decorah	
		Plattin	Platteville Group		Platteville	Black River
		Joachim	Ancell Group	Glenwood		St. Peter
		St. Peter		St. Peter	St. Peter	
		Everton				
	CANADIAN	Powell				
		Cotter				
		Jefferson City	Prairie du Chien Group	Shakopee	Prairie du Chien Group	Prairie du Chien Group
		Roubidoux		New Richmond		
		Gasconade		Oneota		
		Gunter Member		Gunter		Gunter
CAMBRIAN	CROIXAN	Eminence	Eminence		Trempealeau	Trempealeau
		Potosi	Potosi			
		Derby-Doerun	Franconia		Franconia	Franconia
		Davis		Ironton		Galesville
				Galesville	Dresbach	
		Bonneterre	Eau Claire		Eau Claire	Eau Claire
		Lamotte	Mt. Simon		Mt. Simon	Mt. Simon

FIG. 8—Correlation chart of Cambrian and Ordovician rock units in northeastern Illinois and adjacent states.

The stage is based on the exposures at Franconia, along the St. Croix River, in Minnesota, where Ironton strata are classified as the basal member of the Franconia Formation. As thus defined, the Franconian Stage includes strata from the *Elvinia* Zone at the base to the *Prosaukia* Zone at the top (Lochman-Balk and Wilson, 1958).

Trempealeauan Stage

The Trempealeauan Stage (Howell et al., 1944; Nelson, 1956) is represented in northeastern Illinois by the Potosi and Eminence Formations. It is based on the type section of the Trempealeau Formation (Ulrich, *in* Thwaites, 1923) at Trempealeau, Wisconsin. The Trempealeauan Stage is equivalent to the *Saukia* Zone of Lochman-Balk and Wilson (1958) and also of Raasch (1951), except that Raasch placed the base of the *Saukia* Zone within the upper beds of the Franconia Formation. The base of his *Osceolia osceola* zonal unit is accepted as the base of the Trempealeauan Stage.

For many years the name Trempealeau Formation has been used in Illinois for the dolomite containing drusy quartz that lies between the Franconia Formation and the Oneota Dolomite. In the type region the Trempealeau includes, from the base, the St. Lawrence Dolomite, Lodi Siltstone, and Jordan Sandstone. In northeastern Illinois only two units are recognized—a pure dolo-

mite below and a sandy dolomite above. As the lower unit is continuous in subsurface to the Potosi Dolomite and the top unit to the Eminence Formation of Missouri, the Missouri names are adopted for use throughout Illinois. The name Jordan is used in the extreme northwestern part of the state where the Eminence grades into sandstone.

Rock Stratigraphy of the CROIXAN SERIES

The Croixan sediments consist chiefly of sandstone with some shale and dolomite. Most of the individual units become thicker and more dolomitic southward. The thickness of Croixan strata, including the estimated thickness of the Mt. Simon Sandstone, ranges from about 2,000 feet in the northern part of the area to over 3,500 feet in the southern part. Equivalent strata are only 600 to 800 feet thick in the Wisconsin and Minnesota outcrops.

The Croixan Series in northeastern Illinois includes the Potsdam Megagroup and part of the Knox and, in ascending order, the Mt. Simon, Eau Claire, Galesville, Ironton, Franconia, Potosi, and Eminence Formations (fig. 9). The contacts between the Cambrian formations are commonly transitional, and no evidence was found to indicate any major break in the Croixan sequence.

Potsdam Sandstone Megagroup

The Potsdam Megagroup (Swann and Willman, 1961) includes all of the sandstone that unconformably overlies Precambrian up to the overlying dolomites, shales, or siltstones of Croixan or Canadian age. The unconformity between the Precambrian and Potsdam is recognized as the sub-Sauk unconformity (Sloss, 1963). In northeastern Illinois the Potsdam includes the Mt. Simon and the basal sandstone member of the Eau Claire Formation. In ground-water reports this unit has been referred to as the Mt. Simon aquifer (Suter et al., 1959; Zeizel et al., 1963).

The megagroup is unnecessary for mapping purposes in northeastern Illinois because the lower sandstone of the Eau Claire is generally distinguished by its finer grain size, argillaceous content, fossil fragments, or dolomitic cement.

Knox Dolomite Megagroup

The Knox Megagroup (Swann and Willman, 1961) consists of light gray to brown, partly cherty dolomite of Croixan and Canadian age. Throughout most of northeastern Illinois the base of the Knox is placed at the base of the Potosi Dolomite, but in the southern part of the area the underlying Franconia is chiefly dolomite and is included in the Knox.

The Knox Megagroup extends upward to the base of the St. Peter Sandstone. Pre-St. Peter erosion and solution have truncated the Knox Megagroup in northeastern Illinois, and locally the dolomite has been entirely removed.

Regionally, the Knox Dolomite Megagroup thickens southward by (1) inclusion at its base of additional units as they grade into a carbonate facies, (2) thickening of the individual units, and (3) less truncation at the top of the megagroup. The unconformity between the Knox and the overlying St. Peter is the sub-Tippecanoe unconformity.

Mt. Simon Sandstone

In northeastern Illinois the Mt. Simon Sandstone consists of fine- to coarse-grained unfossiliferous sandstone that overlies Precambrian granite and underlies fossiliferous sandstone, shale, and dolomite of the Eau Claire Formation.

The Mt. Simon Sandstone was named by Ulrich (*in* Walcott, 1914, p. 354) for exposures on Mount Simon near Eau Claire, Wisconsin. At this locality 234 feet of coarse-grained, partly conglomeratic sandstone overlies Precambrian granite and underlies the fine-grained, *Cedaria*-bearing sandstone of the Eau Claire (Twenhofel, Raasch, and Thwaites, 1935, p. 1693, 1739-1740).

In early reports on northeastern Illinois, this sandstone was referred to as Potsdam (Udden, 1909; Trowbridge, 1912). Anderson (1919) incorrectly correlated it with the Dresbach (fig. 5). Thwaites (1927, p. 34) correctly correlated it with the Mt. Simon of Wisconsin on the basis of similar lithology and stratigraphic position.

Distribution and Thickness.—The Mt. Simon Sandstone is present in all wells of northeastern Illinois that penetrate the base of the Eau Claire, and it is assumed that the Mt. Simon underlies the entire area. Although no recorded wells within the area penetrate its complete thickness, data from wells outside the area and minimum thicknesses within the area permit inference of the thickness of the Mt. Simon in northeastern Illinois (fig. 10). The isopachs indicate a minimum thickness of about 1,200 feet in northern McHenry County and a maximum of more than 2,800 feet in western Will County. A total of 2,460 feet of Mt. Simon was penetrated near Kankakee in a well that terminated in an arkosic sandstone, probably near the base of the formation.

The greatest known thicknesses of Mt. Simon occur just west of Will County. Thinning to the northwest from Kendall and Will Counties is established by datum points in Illinois and Wisconsin. Thinning to the southeast is suggested by data from two wells in Kankakee County that reach the basal arkosic zone of the Mt. Simon and by subsurface information taken farther east in Indiana (Dawson, 1960, p. 33). There are, however, no wells in Cook County that confirm the northeast thinning indicated in figure 10. It is possible that this thick section of Mt. Simon was deposited in a trench that extended eastward across southern Lake Michigan.

Lithology.—In northeastern Illinois the Mt. Simon consists of fine- to coarse-grained, friable sandstone that commonly is poorly sorted and contains occasional very fine pebbles. As a whole, the sand is coarser grained, more poorly sorted, and more angular than that in other Cambrian or Ordovician sandstones in northeastern Illinois. Cores show well developed cross-bedding, especially in the coarser grained beds. The pebbles are well rounded and vary in size from 2.0 to 3.5 mm. They are often concentrated in beds half an inch to 2 inches thick. In general, the pebbles are larger and more abundant in the western part of the area. No dolomite was observed in the Mt. Simon. Red and green micaceous shale occurs in beds a few inches to 15 feet thick in the upper 300 feet and lower 600 feet of the formation. It makes up less than 5 percent of the total Mt. Simon sequence in any well studied. The individual shale beds do not appear to be continuous through this area.

Templeton (1950) divided the Mt. Simon Sandstone into seven members on the basis of alternating relatively fine-grained units and coarse-grained, pebble-bearing units, as follows, from the top:

Charter Member (pebbly)
Gunn Member (medium grained)
Lacey Member (pebbly)
Mayfield Member (interbedded, pebbly, and medium grained)
Lovell Member (medium grained)
Kenyon Member (pebbly)
Crane Member (medium grained)

Templeton's subdivisions were not recognized in reference well 46, the one well that penetrated most of the section. However, his upper three members are recognizable in several wells along the Fox River in Kane County that penetrate approximately 500 feet of Mt. Simon. The section from the top is as follows:

Charter Member

Pink to yellow-buff, poorly sorted, medium- to coarse-grained, partly pebbly sandstone with median grain size ranging from .40 to .55 mm (1.3 to 0.9ø) and maximum grain size ranging from 1.3 to 3.0 mm (−0.4 to −1.6ø). Some red micaceous shale at or near base. Thickness 280 to 320 feet.

Gunn Member

Pink, medium-grained sandstone having somewhat better sorting than the units above and below. The median grain size is 0.25 to 0.35 mm (2.0 to 1.5ø), and maximum grain size is 0.75 to 1.7 mm (0.4 to −0.8ø). Thickness 130 to 150 feet.

		FORMATION	MEMBER	GRAPHIC COLUMN	LITHOLOGY
CROIXAN SERIES	KNOX MEGAGROUP	EMINENCE 50 – 150'			Dolomite, sandy, light gray, fine to medium grained; thin beds of sandstone; chert, partly oolitic
			Momence 0 – 15'		Sandstone, dolomitic, medium grained.
		POTOSI 90 – 220'			Gray dolomite member — dolomite, light gray to brownish gray, fine grained; creviced near top; some drusy quartz; 50 – 125'
					Brown dolomite member — dolomite, light brown, fine grained, sandy at base; some pink mottling; drusy quartz is common; 30 – 100'
		FRANCONIA 50 – 200'			Sandstone, shale, and dolomite — glauconitic, micaceous, silty, red, green
		IRONTON 80 – 130'	Mooseheart 20 – 60'		Sandstone, dolomitic, medium to coarse grained, poorly sorted; coarse-grained glauconite at top; some pink dolomite
			Marywood 10 – 50'		Sandstone, medium grained, some bimodal sorting
			Fox Valley 10 – 25'		Sandstone, dolomitic, medium to coarse grained, poorly sorted
			Buelter 20 – 80'		Sandstone, rarely dolomitic, medium grained, moderately sorted
		GALESVILLE 10 – 100'			Sandstone, mostly nondolomitic, fine grained, well sorted; a little light brown dolomite at base
		EAU CLAIRE	Proviso 150 – 300'		Siltstone and very fine grained sandstone, dolomitic, shaly, grayish orange to pinkish gray, glauconitic

FIG. 9—Composite stratigraphic log

		FORMATION	MEMBER	GRAPHIC COLUMN	LITHOLOGY
CROIXAN SERIES	POTSDAM MEGAGROUP	EAU CLAIRE 370 - 575'	Lombard 50 - 150'		Dolomite, sandy, silty, brownish gray, fine to medium grained; zones with coarse-grained glauconite; interbedded shale, greenish gray
			Elmhurst 10 - 200'		Sandstone, dolomitic, brown to light gray, fine to medium grained; zones of brachiopod fragments; interbedded shale, gray, weak; "sooty" sandstone at base
		MT. SIMON 1,200 - 2,900'	Charter 280 - 320'		Sandstone, partly conglomeratic, white, pink, yellow, medium to coarse grained; some red micaceous shale at or near base
			Gunn 130 - 150'		Sandstone, pink, medium grained; somewhat better sorted than sandstone in members above and below
			Lacey 100'+		Sandstone, yellowish pink, medium to coarse grained, poorly sorted; a few fine pebbles
			Undifferentiated 700 - 2,400'		Sandstone, white, pink, yellow, fine to coarse grained, arkosic at base; fine pebbles
PRECAMBRIAN					Red granite in wells just outside of area

Croixan strata in northeastern Illinois.

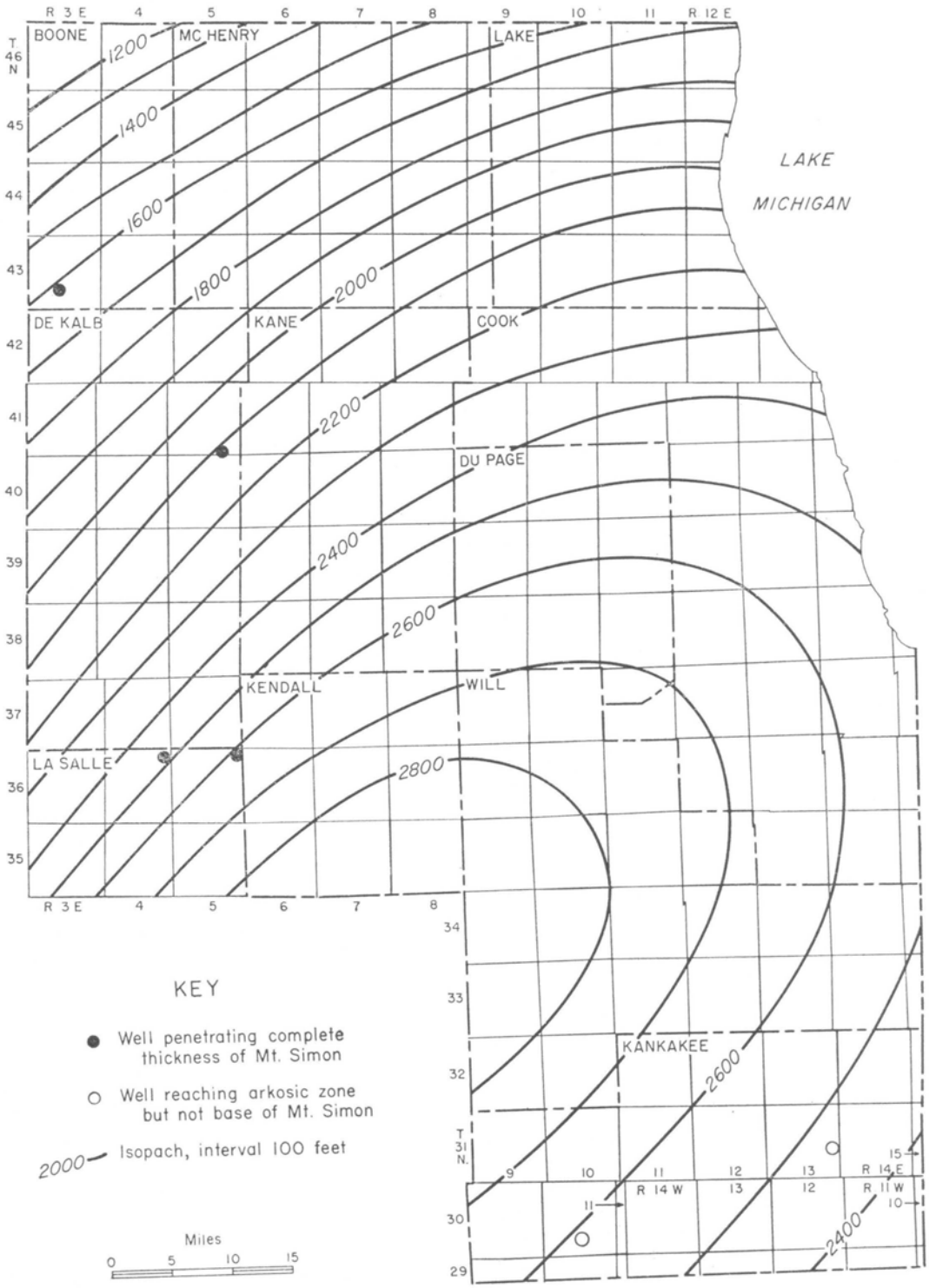

FIG. 10—Thickness of Mt. Simon Sandstone.

Lacey Member

Yellowish pink, medium- to coarse-grained, poorly sorted, partly pebbly sandstone with median grain size ranging from 0.35 to 0.55 mm (1.5 to 0.9ø) and a maximum grain size ranging from 1.5 to 3.0 mm (−0.6 to −1.6ø). Thickness over 100 feet.

Eastward from the Fox River the data are not adequate to enable recognition of the members, although there are alternations of relatively fine-grained units and coarse-grained, pebble-bearing units. In this area there is more irregularity in the sequence than appeared on Templeton's cross section (1950, p. 153).

An arkosic zone commonly occurs at the base of the Mt. Simon Sandstone in northern Illinois. Templeton (1950, p. 154) included the arkosic zone in the lower portion of the Crane Member. In Kankakee County (reference well 46) the upper 80 feet of this zone was penetrated. It consists chiefly of fine- to medium-grained sandstone that contains abundant pink feldspar. Based on information from wells outside the area that reached Precambrian rocks, estimates of the thickness of the arkosic zone in Kankakee County are between 200 and 350 feet thick.

Stratigraphic Relations.—The Mt. Simon unconformably overlies eroded Precambrian basement rocks. The regular thickness of the lower units of the Eau Claire suggests that it conformably overlies the Mt. Simon.

Correlation.—The Mt. Simon Sandstone is correlated with the Lamotte Sandstone of Missouri (Workman and Bell, 1948, p. 2043).

Because of the great southward thickening, the lower part of the Mt. Simon in northeastern Illinois may be older than the Mt. Simon at the type section. No fossils have been found in the Mt. Simon of the Upper Mississippi Valley, but the conformably overlying Eau Claire Formation contains fossils of late Cambrian age.

Workman and Bell (1948, p. 2041, 2043) suggested a correlation of the lower part of the Mt. Simon with the Fond du Lac (Precambrian) of Minnesota, chiefly on the basis of its red or pink color, because the type Mt. Simon is white. However, Templeton (1950) found lateral gradation from the red sandstone to the light colored sandstone and decided that their separation was impractical.

The thick Mt. Simon Sandstone may include equivalents of the Bayfield Sandstone of northern Wisconsin, the Fond du Lac Sandstone of Minnesota, and the Jacobsville Sandstone of northern Michigan, which have been interpreted as continental deposits of middle, and possibly early, Cambrian age (Raasch, 1950; Hamblin, 1958). There is no basis for a formational break within the Mt. Simon sequence in northeastern Illinois, and the Mt. Simon is therefore retained in the Croixan Series.

Eau Claire Formation

In northeastern Illinois the Eau Claire Formation consists of silty, argillaceous, dolomitic sandstone or sandy dolomite lying between the relatively clean sandstones of the Mt. Simon and Galesville Formations.

The Eau Claire Formation was named (Ulrich, *in* Walcott, 1914, p. 354) for exposures near the town of Eau Claire, Eau Claire County, Wisconsin. Ulrich described the formation as consisting of 100 feet of thin-bedded, partly shaly, fossiliferous sandstone overlying coarse-grained sandstone of the Mt. Simon Formation and underlying rather coarse-grained sandstone of the Dresbach Formation. The Eau Claire was traced to northern Illinois in the subsurface (Thwaites, 1923, p. 551).

The Eau Claire Formation of northeastern Illinois is divided herein into three members (fig. 9). The type well for the members is Wander Company No. 11 (reference well 24), a cable-tool well in SE¼ NW¼ NE¼ sec. 10, T. 39 N., R. 11 E., DuPage County, Illinois. Samples are on file at the Illinois Geological Survey (sample set 15,336). The members are designated, in ascending order, Elmhurst Sandstone Member, Lombard Dolomite Member, and Proviso Siltstone Member.

Distribution and Thickness.—The Eau Claire Formation underlies all of northeastern Illinois. It ranges in thickness from slightly less than 375 feet in the central part of the area to 575 feet near the southern

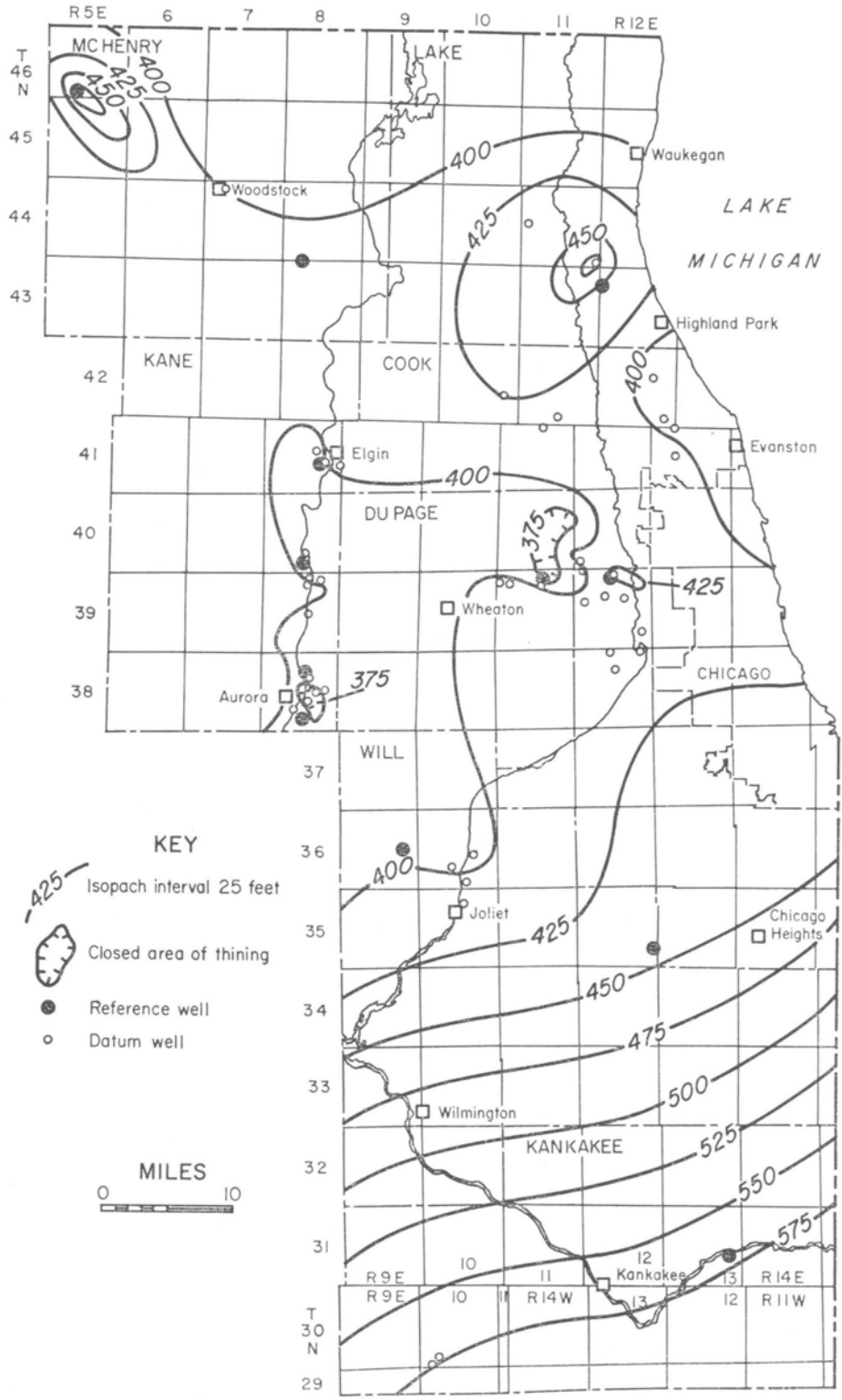

FIG. 11—Thickness of Eau Claire Formation.

boundary of Kankakee County (fig. 11). Regional data indicate a persistent thickening of the Eau Claire southward to southeastern Illinois and southern Indiana (Workman and Bell, 1948, p. 2050; Gutstadt, 1958b, p. 29). The southward thickening in northeastern Illinois occurs primarily in the upper member.

Lithology.—The Eau Claire Formation consists of a variety of rock types. Characteristically, it contains much more siltstone and shale than the formations immediately above and below it. The Eau Claire consists chiefly of sandstone at the northern boundary of the area. Shale, siltstone, and dolomite become increasingly prominent southward. Sandstone in the Eau Claire is usually fine grained and well sorted, a contrast to the relatively coarse-grained, poorly sorted sandstone of the underlying Mt. Simon. Dolomite beds and fossil fragments occur in the Eau Claire, but not in the Mt. Simon. In most of the area the contact is quite sharp, but in places it is gradational through as much as 50 feet. The transition zone usually consists of coarse sandstone interbedded with very fine, silty, fossiliferous sandstone. The contact is picked toward the base of the transition zone, below the fossiliferous sandstone. Reference wells 1, 17, 19, 21, 24, 28, and 46 contain typical sections, which are described under "Sample Studies."

Electric and radioactivity logs are useful in identifying the Eau Claire because of its argillaceous content. In general, the Eau Claire has lower electrical resistivity than the clean sandstones above and below it. The Eau Claire is sharply identified on most radioactivity logs by a marked increase in gamma radiation (fig. 12).

Stratigraphic Relations.—There is no evidence for an unconformity between the Eau Claire and the underlying Mt. Simon Sandstone. The contact between the Eau Claire and the overlying Galesville also is transitional.

Correlation.—The Eau Claire Formation is correlated with the Bonneterre Formation of Missouri (Workman and Bell, 1948, p.

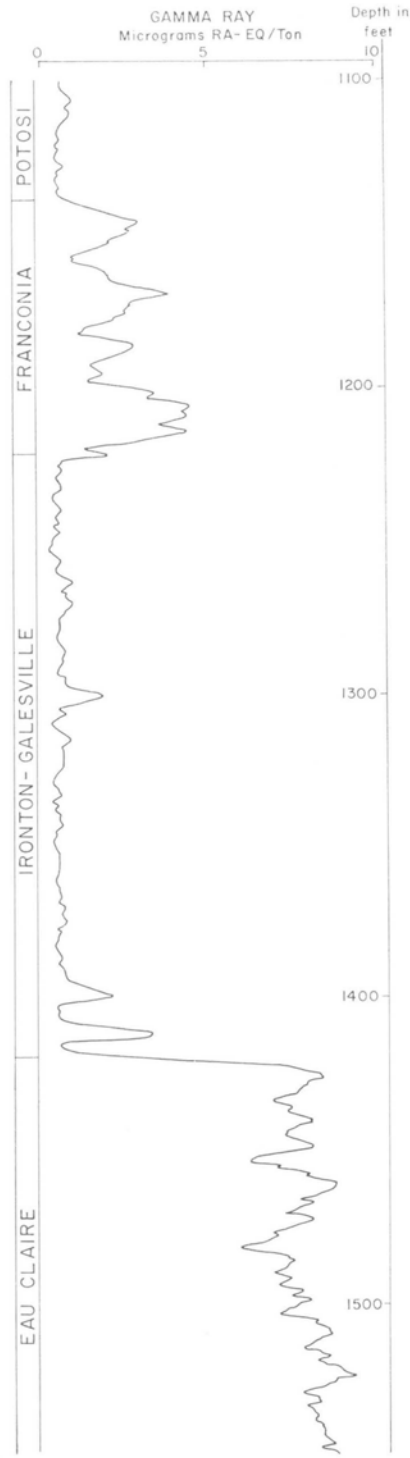

FIG. 12—Gamma ray log of lower part of Chicago and Northwestern Railroad well in DuPage County (sec. 10, T. 39 N., R. 9 E.; reference well 23).

2049), and in part with the Nolichuky Shale of the Appalachian region (Howell et al., 1944). The Eau Claire contains shales and sandy dolomites throughout much of the midwestern United States and has been correlated chiefly on this basis. The fauna and age of the Eau Claire have been discussed by Raasch (1935, p. 306) and Lochman-Balk and Wilson (1958).

Elmhurst Sandstone Member (new)

For the basal sandstone of the Eau Claire Formation the name Elmhurst Sandstone Member is proposed here. The name is derived from the city of Elmhurst, eastern DuPage County, half a mile east of the type well, reference well 24. The member occurs between 1,640 and 1,759 feet.

Distribution and Thickness.—The Elmhurst Member appears to underlie all of northeastern Illinois. It ranges from only 10 to 25 feet thick in southern Kane County to slightly over 200 feet in northwestern McHenry County.

Lithology.—The Elmhurst consists chiefly of fine- to medium-grained sandstone with varying amounts of interbedded gray shale. The sandstone contains zones with abundant brachiopod fragments. At the base of this member the sand grains are usually incrusted with finely disseminated black pyrite that gives them a sooty appearance. Although a sooty zone normally identifies the base of the Elmhurst, several such zones occur higher in the Elmhurst Member in some localities, and they are also occasionally found in the Mt. Simon Sandstone below.

The Elmhurst Sandstone Member is distinguished from the underlying Mt. Simon primarily on the basis of the change downward from fine- or medium-grained, light gray sandstone to coarse-grained, pebble-bearing, light yellowish buff sandstone.

Lombard Dolomite Member (new)

The name Lombard Dolomite Member is proposed here for the unit overlying the Elmhurst Member. It is named for the city of Lombard, eastern DuPage County, 2 miles west of the type well, reference well 24. The member occurs between 1,535 and 1,640 feet.

Distribution and Thickness.—The Lombard Dolomite Member is recognizable in wells throughout the area except in Lake County, where it grades into dolomitic sandstone and has not been separated from the underlying member. The member ranges in thickness from 100 to 150 feet throughout much of the area, but it thins to about 50 feet in northern McHenry County.

Lithology.—The Lombard Member consists chiefly of grayish brown, partly sandy dolomite with interbedded weak, greenish gray shale. Toward the northeastern corner of the area the dolomite grades laterally to dolomitic sandstone. The only limestone found in the Croixan and Canadian rocks of northeastern Illinois is interbedded with dolomite in the Lombard Member in Kane and DuPage Counties (reference wells 17, 19, 23). The Lombard grades southeastward to a more shaly facies. In eastern Kankakee County the member is about half shale and half dolomite. Glauconite is normally abundant throughout the entire member, and some zones are present in which glauconite pellets exceed 1.0 mm in diameter. A rather consistent contact can be picked between the coarsely glauconitic dolomite of the Lombard Member and the underlying fossiliferous sandstone and shale of the Elmhurst.

Proviso Siltstone Member (new)

The name Proviso Siltstone Member is proposed here for a fine-grained clastic unit that overlies the Lombard Member. The member is named for Proviso Township, western Cook County, about 2 miles east of the type well, reference well 24, in which it occurs between 1,385 and 1,535 feet.

Distribution and Thickness.—The Proviso Siltstone Member is readily recognizable throughout northeastern Illinois except in Lake County where the entire Eau Claire is mostly sandstone. The Proviso Member ranges from 150 feet thick in the central

part of the area to more than 300 feet in the southern part.

Lithology.—The Proviso Member is primarily siltstone with considerable shale in most of the area, but in Lake County it consists chiefly of sandstone with some shale. The siltstone is dolomitic, sandy, coarse grained, and firm. It is commonly grayish orange or pinkish gray. The member is characterized by the presence of pink or red shales. Glauconite is occasionally present but is less abundant and finer grained in the Proviso than in the underlying Lombard. The upper part of the member consists of a few to 40 feet of fine-grained, dolomitic sandstone or sandy dolomite that is usually brownish gray, silty, slightly glauconitic, and transitional into the overlying Galesville Sandstone. In places this unit contains thin shale partings and brachiopod shells.

On electric logs the Proviso normally has very low resistivity (fig. 13).

North and west of the area the Proviso grades laterally to sandstone. South of the area it contains beds of brown, oolitic dolomite.

Galesville Sandstone

In northeastern Illinois the Galesville Sandstone consists of fine-grained, only slightly dolomitic, and generally well sorted sandstone overlying the sandstone, siltstone, dolomite, and shale of the Eau Claire Formation and underlying the coarser grained, poorly sorted, dolomitic sandstone of the Ironton Sandstone.

The name Galesville was proposed by Trowbridge and Atwater (1934, p. 45) for the clean, unfossiliferous sandstone, previously called Dresbach, lying above the Eau Claire in Wisconsin. They redefined the Dresbach to include all the sandstones and shales between the Precambrian and Franconia, and they recognized the Mt. Simon, Eau Claire, and Galesville as members of the Dresbach Formation. The type section of the Galesville consists of medium-grained, moderately well sorted, unfossiliferous sandstone exposed in a bluff on Beaver Creek at Galesville, Trempealeau County, Wisconsin, where

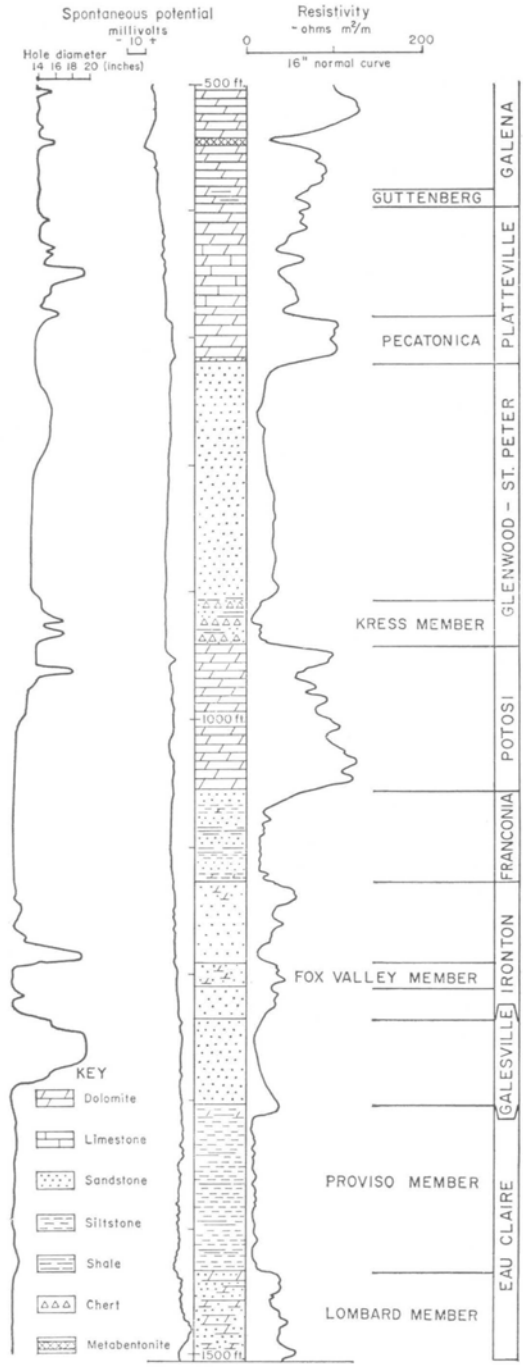

FIG. 13—Electric log of city of Arlington Heights well No. 5 in Cook County (sec. 29, T. 42 N., R. 11 E.).

it overlies fossiliferous sandstone and shale of the Eau Claire and underlies coarse-grained, poorly sorted, fossiliferous sandstone of the Ironton.

This sandstone was included in the Potsdam Sandstone in early reports of Illinois. It was incorrectly identified as Jordan by Anderson (1919), and correctly called Dresbach by Thwaites (1927). Workman (1935) applied the name Galesville to this sandstone in Illinois. However, Willman and Payne (1942) indicated that coarse-grained sandstone at the top of the Galesville in Illinois was probably equivalent to the Ironton Sandstone Member that forms the base of the Franconia in Wisconsin. Workman and Bell (1948) also included these strata in the Franconia. On the basis of extensive subsurface studies by Templeton in the Oregon Quadrangle and adjacent areas in central northern Illinois, Willman and Templeton (1951) referred to the coarse-grained, dolomitic, coarsely glauconitic sandstone (previously correlated with the Ironton Member of the Franconia) as the top unit of the Ironton and elevated the Ironton to formational rank. The Ironton was expanded to include coarser grained, partly dolomitic sandstone previously included in the Galesville in Illinois. The Galesville, in effect, was thus restricted to the underlying finer grained, better sorted, more uniform sandstone, which agrees better with the general relationship observed at the Galesville type locality. As the same relationship exists in northeastern Illinois, the name Galesville is here restricted in this area to the lower part of the strata previously called Galesville.

The Ironton and Galesville Sandstones will in some cases continue to be treated as a single unit referred to as the Ironton-Galesville Sandstone because (1) they have been so treated in many publications, (2) they are not easily distinguished unless the samples are good, and (3) they form a single aquifer. In this usage the Ironton-Galesville is equivalent to the Galesville, or locally Dresbach, as these terms are currently used in Michigan, Indiana, and Ohio.

The hydrogeology of the Ironton-Galesville Sandstone has been described by Emrich (in preparation). In his report he redefines the Galesville type section at Galesville, Wisconsin, on the basis of a regional study in which he includes in the Galesville the fossiliferous sandstone previously included in the Eau Claire, and he excludes at the top coarser grained sandstone that he assigns to the Ironton. This redefinition makes the Galesville a unit consisting of clean, well sorted sandstone consistent with strata generally recognized as Galesville in the subsurface of Illinois.

Distribution and Thickness.—The Galesville Sandstone averages about 40 feet thick and appears to be present throughout the area. It varies from a few to approximately 100 feet thick. The thickness varies considerably within a few miles, but generally the thickest sections are found in Kankakee County. As the Ironton and Galesville are not differentiated on many drillers logs or in some sample studies, the combined thickness of the two formations is shown on plate 2.

The Ironton-Galesville thins northward into Wisconsin and eastward into Indiana (Emrich, in preparation). It thins more gradually westward across northern Illinois. It is over 200 feet thick in much of Kankakee County and for about 35 miles south. Farther south it becomes more dolomitic and grades to sandy dolomite with beds of sandstone. The sandy zone thins southward to near the middle of the state, where it apparently grades into nonsandy dolomite. The name Ironton-Galesville is applied as far south as the sandy zone can be identified.

Lithology.—The Galesville Sandstone consists of white to light buff, clean to slightly silty sandstone that is fine grained, moderately well sorted, and largely nondolomitic. The median grain-size diameter varies from .18 to .24 mm (2.5 to 2.1ϕ), and the maximum grain size is generally close to .75 mm (0.4ϕ). Dolomite is present locally as a cementing material between sand grains. The dolomite is light buff to light pink and relatively free from argillaceous material. The sandstone is characteristically only slightly cemented and the middle part is particularly friable.

The clean sandstone of the Galesville differs from the subjacent Eau Claire, which consists of brown or grayish brown, silty, partly sandy, argillaceous dolomite and locally contains interbedded gray shale.

In the southwestern part of the area the basal beds of the Galesville consist of clean, light brown, very sandy dolomite interbedded with fine-grained sandstone. In that locality the contact between the Galesville and Eau Claire is difficult to recognize because both formations are primarily brown dolomite, but the Eau Claire is argillaceous. Reference wells 1, 8, 18, 19, 24, 37, 41, and 46 contain typical sections, which are described under "Sample Studies."

Geophysical logs are especially useful in identifying the Galesville Sandstone. The electrical resistivity is low and the trace is a bow-shaped curve (fig. 13). In churn-drill holes, caliper logs commonly show the largest hole diameter in the Galesville because of caving of the fine, uncemented sandstone. Gamma radiation is considerably lower in the Galesville than in the underlying Eau Claire (fig. 12).

Stratigraphic Relations.—The Galesville and the underlying Eau Claire appear to be transitional for several feet and the formations probably are conformable. There is no evidence in this area for an erosional unconformity between the Galesville and the overlying Ironton.

Correlation.—The Galesville Sandstone is equivalent to the strata currently called Galesville in Wisconsin, Iowa, and Minnesota. It is probably equivalent to only the lower part of the strata called the Galesville or Dresbach in Michigan, Indiana, and Ohio.

The Galesville thins to a feather edge in central Illinois. It has not been traced directly to the Missouri outcrop region, but it probably is equivalent to basal beds of the Davis Formation (fig. 8). If this correlation is correct, the lower part of the Davis may be Dresbachian in age rather than Franconian.

Ironton Sandstone

The Ironton Sandstone of northeastern Illinois consists of clean, medium- to coarse-grained, partly dolomitic, moderately to poorly sorted sandstone that overlies the finer grained, better sorted sandstone of the Galesville and underlies the glauconitic, argillaceous, and fine-grained sandstone of the Franconia Formation.

The name Ironton was proposed by Ulrich (1924, p. 93-94), although introduced by Thwaites (1923, p. 550), for a few feet of hard, calcareous, coarse-grained sandstone forming the basal member of the Franconia. Ulrich stated that a lithologic break at the base of the Ironton represented the "lowest plane indicating reworking and redeposition" of the underlying Dresbach (Galesville) Sandstone. However, he added that to make sure of the identification of the Ironton it is advisable to search for characteristic fossils.

Twenhofel, Raasch, and Thwaites (1935, p. 1696) placed the base of the Ironton at the change from the massive, medium-grained, fairly well sorted sandstones of the typical Galesville to the overlying coarser and more poorly sorted sandstone of the Ironton. Although Twenhofel personally preferred to place the base of the Ironton just below the first appearance of fossils or glauconite, the grain-size and sorting criteria are clearly used to separate the Ironton and Galesville in most of their measured sections.

In Illinois, beds of buff to red, coarse-grained, dolomitic sandstone at the base of the Franconia were tentatively correlated with the Ironton Member at the base of the Franconia in Wisconsin (Willman and Payne, 1942, p. 55, 57). Workman and Bell (1948, p. 2052) correlated a "basal coarse-grained glauconitic sandstone" of the Franconia Formation with the Ironton. In unpublished subsurface studies on the Oregon Quadrangle in central northern Illinois by J. S. Templeton, and on a broader area by Templeton and M. V. Strantz, the Ironton was expanded to include all the medium- and coarse-grained sandstone, and the Galesville was restricted to the largely fine-grained sandstone. Four subdivisions of the Ironton were recognized—a dolomitic zone at the top, a sandstone, a second dolomitic zone, and a basal sandstone. Willman and Templeton (1951, p. 111, 113) elevated the Ironton to formational rank.

Berg (1954, p. 861) proposed that the name Woodhill be used instead of Ironton because of "an unfortunate choice of type locality" and "because 'Ironton Member' has become a synonym of *'Elvinia* Zone'." At Goodenough Hill, between Ironton and Wood Hill, the unit described as Ironton by Twenhofel, Raasch, and Thwaites (1935, p. 1730) is identical with the unit described as Woodhill by Berg (1954, p. 880). Woodhill appears to be synonymous with Ironton, both in the basis for differentiation and in general usage. Consequently, the name Ironton, which is well established for this unit, is retained in Illinois.

The Ironton of northeastern Illinois is subdivided in this report into four members (fig. 9) on the basis of variations in sand grain size and in abundance of dolomite. These members are essentially the same as the zones differentiated by Templeton and Strantz in central northern Illinois. In a regional study of the Ironton-Galesville Sandstone, Emrich (in preparation) traced the four units in wells throughout the northern part of the state.

The upper three members are more difficult to distinguish in the southern part of the area because they all become dolomitic, but the gross differences in sand grain size generally persist. The type well for the four members is Batavia city well No. 3 (reference well 19), a cable tool well in SE¼ SW¼ NE¼ sec. 22, T. 39 N., R. 8 E., Kane County. Samples are on file at the Illinois Geological Survey (sample set 6,901). The members are designated, in ascending order, Buelter Member, Fox Valley Member, Marywood Member, and Mooseheart Member.

Distribution and Thickness.—The Ironton Sandstone is present in subsurface throughout northeastern Illinois. It is commonly a little over 100 feet thick, but varies from about 80 feet in the northern part of the area to 130 feet in the southern part. The combined thickness of the Ironton and Galesville Sandstones is shown on plate 2.

Lithology.—In the northern half of the area the Ironton Sandstone consists of medium-grained, poorly sorted, white sandstone with some beds of coarse-grained sandstone near the top. The sandstone is composed chiefly of rounded quartz grains. It generally contains some light pinkish buff dolomite as cementing material or as thin stringers interbedded with the sandstone. In the southern half of the area the upper two-thirds of the Ironton Sandstone is dolomitic (pl. 1). The sandstone of the Ironton is coarser grained than sandstones in the formations above and below it, and the Ironton lacks the argillaceous content commonly associated with the overlying Franconia. Reference wells 1, 17, 19, 24, and 37 contain typical sections, which are described under "Sample Studies."

Electric logs show the Ironton as having slightly higher resistivity than the overlying Franconia (fig. 13). In Kankakee County and southward both the Ironton and Franconia are in a dolomite facies, and electric logs are less effective in separating the two formations. There is a considerable decrease in gamma radiation at the top of the Ironton, but no significant change at the top of the Galesville Sandstone (fig. 12).

Stratigraphic Relations.—The Ironton appears to overlie the Galesville Sandstone conformably in northeastern Illinois. The contact between the Ironton and the overlying Franconia Formation is gradational in many places and is therefore considered conformable.

Correlation.—The Ironton Sandstone cannot presently be traced southward beyond central Illinois and central Indiana. On the basis of fossils, especially the trilobite *Elvinia,* the Ironton of Wisconsin has been correlated with the lower part of the Davis of Missouri.

Buelter Member (new)

The basal sandstone of the Ironton Formation is here named Buelter Member, for Buelter School, NE¼ sec. 24, T. 39 N., R. 8 E., Kane County, 2 miles east of the type well, reference well 19. The member occurs between 1,180 and 1,230 feet.

Distribution and Thickness.—The Buelter appears to underlie all of northeastern Illinois. It ranges from 20 to 80 feet thick.

Lithology.—The Buelter is more variable in grain size than are the other Ironton members. It consists largely of medium-grained sandstone that is moderately sorted and rarely dolomitic. Median grain size usually ranges between .30 and .40 mm (1.7 and 1.3ϕ), and maximum grain size between .80 and 1.20 mm (0.3 and -0.3ϕ), with the grain size normally increasing slightly toward the top of the unit.

The base of the member is placed at the contact of the medium-grained sandstone of the Ironton with the underlying fine-grained, well sorted sandstone of the Galesville. In well samples the contact often is fairly sharp, especially in the northern and southern thirds of the area. In the central part of the area some wells show a gradual change downward from medium-grained sandstone of the Ironton to fine-grained sandstone of the Galesville. The contact with the Fox Valley Member above is generally distinct throughout the area.

Fox Valley Member (new)

Overlying the Buelter is a persistent dolomitic sandstone for which the name Fox Valley Member is here proposed. The type well (reference well 19) is at Batavia in the Fox River Valley. The member occurs between 1,168 and 1,180 feet.

Distribution and Thickness.—The Fox Valley Member is present throughout most of the area. It is not differentiated from the overlying Marywood Member in the southern part of the area. The member is commonly 10 to 25 feet thick.

Lithology.—The Fox Valley Member consists of poorly sorted medium- to coarse-grained sandstone that is almost always dolomitic. The dolomite occurs as cementing material or as stringers of fine-grained, light pink to light buff, sandy dolomite interbedded with sandstone. Scattered brown spheroids, and in places oolites, are present in the dolomite. The sandstone consists of rounded quartz grains. Median grain size ranges from .35 to .42 mm (1.5 to 1.3ϕ) and maximum grain size ranges from 1.00 to 1.30 mm (0.0 to -0.4ϕ). The dolomite cement in this member causes its electrical resistivity to be slightly higher than that of adjacent units (fig. 13).

The Fox Valley Member is distinguished from the Buelter below by the presence of light buff to pink, partly oolitic dolomite and by slightly coarser sandstone. The contact of the Fox Valley Member with the Marywood Member above is distinct, except in the southern part of the area where the Marywood is dolomitic.

Marywood Member (new)

The name Marywood Member is proposed here for the sandstone overlying the Fox Valley Member. It is named for the hamlet of Marywood, in Kane County, 4 miles south of the type well, reference well 19, in which the member occurs between 1,120 and 1,168 feet.

Distribution and Thickness.—The Marywood Member appears to underlie all of northeastern Illinois, but in places it is not readily separable from the units above and below, especially in the southern part of the area. The Marywood ranges from 10 to 50 feet thick.

Lithology.—The Marywood Member consists of sandstone that is slightly finer grained and less dolomitic than the units above and below. The median grain size ranges between .25 and .35 mm (2.0 and 1.5ϕ).

Throughout the northern half of the area, the member can be distinguished from adjacent members by its lack of dolomite cement and its slightly finer grain size. Southward it contains a considerable amount of dolomite and can be separated only with careful study of changes in sand grain size.

Mooseheart Member (new)

The name Mooseheart Member is here proposed for a persistent dolomitic sandstone overlying the Marywood. The member is named for Mooseheart Lake, in Kane County, 2 miles southwest of the type well, reference well 19, in which the member occurs between 1,092 and 1,120 feet.

Distribution and Thickness.—The Mooseheart Member appears to underlie all of northeastern Illinois, although it is not everywhere separable from the underlying Marywood. The Mooseheart ranges in thickness from 20 feet in the north to 60 feet in the south.

Lithology.—The Mooseheart Member consists of poorly sorted, dolomitic sandstone that is medium to coarse grained, and has a median grain size that varies from .35 to .50 mm (1.5 to 1.0ϕ). The maximum grain size varies from 1.0 to 1.5 mm (0.0 to −0.6ϕ). In general the grain size is coarser in the northern part of the area. Dolomite occurs as cementing material or in thin stringers interbedded with the sandstone. The dolomite is light buff to pink and very fine grained. Coarse grains of glauconite characterize the upper beds of the member.

The Mooseheart is distinguished from the underlying Marywood on the basis of its coarser grain size and poor sorting. Throughout the northern two-thirds of the area it contains more dolomite than the Marywood.

Franconia Formation

In northeastern Illinois the Franconia Formation consists of argillaceous and glauconitic sandstone or dolomite lying between the rather clean sandstone of the Ironton below and the fine-grained dolomite of the Potosi above.

The name Franconia was applied by Berkey (1897, p. 373) to about 100 feet of sandstone and shale occurring near the town of Franconia, Chisago County, Minnesota. In northeastern Illinois, Anderson (1919) included strata equivalent to the Franconia in the basal part of the Prairie du Chien. Thwaites (1927, p. 27) separated these strata from the Prairie du Chien of northeastern Illinois and correlated them with the Mazomanie of Wisconsin. Later the name Franconia was expanded to include the Mazomanie, and was applied to these strata in northeastern Illinois (Workman, 1935; Workman and Bell, 1948).

Distribution and Thickness.—The Franconia Formation underlies all of northeastern Illinois. It thickens from 50 feet in the northern part of the area to slightly over 200 feet in the southwestern corner (pl. 3). In some parts of the area the St. Peter Sandstone lies unconformably on the Franconia and truncates the upper beds. Where this occurs the Franconia is oxidized to reddish brown.

Lithology.—The Franconia Formation consists primarily of light gray to pink, fine-grained, dolomitic sandstone that is almost always glauconitic, silty, and argillaceous. It contains red and green silty shales in varying amounts. The sand grains are commonly friable and subrounded to angular. The glauconite occurs in fine to medium grains (.13 to .50 mm) that are well rounded. In the northwestern part of the area the upper 10 to 25 feet consists of sandy dolomite that overlies fine- to medium-grained sandstone. The sandy dolomite grades laterally to fine-grained dolomitic sandstone and interbedded red and green shale that extend through most of the central and northeast parts of the area. In the southern half of the area the lower beds of the Franconia consist of sandy, glauconitic, brown dolomite interbedded with dolomitic and glauconitic sandstone. The dolomitic facies thickens southward until it composes the entire formation in southern Kankakee County (pl. 1).

The Franconia is distinguished from the underlying Ironton by a sharp change from fine-grained sandstone or sandy dolomite, which usually contains considerable amounts of silt, clay, and glauconite, to the relatively clean dolomitic sandstone of the Ironton, which is medium grained and contains numerous coarse grains. Coarse-grained glauconite occurs in the upper few feet of the Ironton but is absent below. Reference wells 1, 3, 15, 18, 21, 24, 28, 41, and 46 contain typical sections, which are described under "Sample Studies."

In the northern two-thirds of the area, the Franconia has lower electrical resistivity than the formations above and below (fig. 13) and is an interval of relatively high gamma radiation (fig. 12). In the southern part of the area, where the Franconia is in a dolomite facies, these geophysical characteristics are much less useful in distinguishing the formation.

Stratigraphic Relations.—The Franconia Formation appears to overlie the Ironton Sandstone conformably, and it is conformably overlain by the Potosi Dolomite except in local areas where it is unconformably overlain by the St. Peter Sandstone.

Correlation.—The Franconia Formation has been correlated with the Elvins Group (Davis, Derby, and Doerun) of Missouri (Howell et al., 1944) on the basis of faunal evidence. The upper part of the Franconia in Illinois is correlated with the unfossiliferous Derby and only slightly fossiliferous Doerun that overlie the Davis in Missouri (Workman and Bell, 1948, p. 2053). In central and southeastern Illinois, strata equivalent to the Franconia are included in the Knox Dolomite Megagroup.

The Franconia extends into northern Indiana in subsurface (Gutstadt, 1958b). It is well exposed in Wisconsin and Minnesota.

Potosi Dolomite

In northeastern Illinois the Potosi Dolomite, formerly called Trempealeau, consists of fine-grained, light gray to brown dolomite that contains drusy quartz. It is underlain by sandstone and shale of the Franconia Formation and overlain by light colored, sandy dolomite of the Eminence Formation.

The name Potosi was proposed by Winslow (1894, p. 331, 351, 355) for the magnesian limestone, containing chert and drusy quartz, exposed at Potosi, Washington County, Missouri. In the type area the Potosi overlies the Derby-Doerun (upper Elvins) and underlies the Eminence (Howe and Koenig, 1961).

Although the name Potosi Dolomite is used in central and southern Illinois (Workman and Bell, 1948), this dolomite has previously been called Trempealeau in northern Illinois. The Trempealeau Dolomite was traced from its type section in western Wisconsin to northern Illinois in well records (Thwaites, 1927, p. 25). As previously noted, the name Trempealeau is restricted in this report to the Trempealeauan Stage. The name St. Lawrence has been applied to the dolomite member of the Trempealeau in Wisconsin and has been considered as a possible replacement for Trempealeau in northern Illinois. However, the name St. Lawrence has been used for various segments of the sequence in Wisconsin (Nelson, 1956, p. 168-169), so its use in northern Illinois is rejected in favor of extending the name Potosi from central and southern Illinois.

Distribution and Thickness.—The Potosi Dolomite underlies all of northeastern Illinois except for local areas where it has been removed by pre-St. Peter solution and erosion. Throughout a considerable part of the area, the Prairie du Chien Group is absent and the St. Peter Sandstone rests unconformably on the Potosi. Because of the relief on the sub-St. Peter surface, the Potosi shows large variations in thickness within short distances (pl. 4). A reconstruction of original thickness based on maximum thicknesses (fig. 14) indicates that the Potosi ranged from 100 feet thick in northwestern McHenry County to somewhat over 200 feet in Kankakee County. The Potosi locally appears to be thinned by solution in areas where it is covered by the Eminence and Oneota Dolomites.

Lithology.—In northeastern Illinois the Potosi consists of finely crystalline, slightly argillaceous dolomite that is brown, light gray, or pink. It is generally very slightly glauconitic at the top and glauconitic and sandy at the base. Drusy quartz crystals characterize the Potosi in this area. A small amount of dense white chert also is present. Two rather persistent members can be recognized in well samples—a lower brown dolomite member and an upper gray dolomite member. Reference wells 18, 21, 24, 37, 42, 46, and 50 contain typical sections, which are described under "Sample Studies."

The brown dolomite member is best developed in the southern half of the area, where it varies from 50 to 125 feet thick. It consists of finely crystalline dolomite that is silty in some places. Its color is light brown with occasional pink or red mottling. Drusy quartz is common. Most of the sand and glauconite found in the Potosi of northeastern Illinois occurs in the lower 10 to 40

feet of this member. Both are normally fine grained and rarely abundant, but the amount of sand increases northward. Occasional shale streaks or argillaceous partings are present, but in general the brown dolomite member is much less argillaceous than the underlying Franconia Formation.

The base of the brown dolomite member is placed at the contact of the relatively clean, fine-grained, slightly sandy dolomite of the Potosi and the underlying argillaceous, glauconitic sandstone of the Franconia. Red and green shales characterize the Franconia and are extremely rare in the Potosi.

The overlying gray dolomite member is finely crystalline, commonly contains a little glauconite at the top, and, more rarely, a trace of sand. It is light gray to light brownish gray. Where a full section of Potosi is present, the member varies in thickness from 30 to 100 feet. The unit is creviced in many parts of the area and samples are often missing from well borings or they contain caved chert and sand, especially just below the top. Drillers occasionally report that near the top of the Potosi bits drop several feet during drilling. The upper gray dolomite is separated from the unit below by a rather subtle change downward from light brownish gray or light gray dolomite to brown dolomite.

Stratigraphic Relations.—In well samples the Potosi Dolomite appears to overlie the Franconia conformably, but in Wisconsin outcrops the equivalent St. Lawrence Dolomite rests with a strong basal conglomerate on the Franconia (Raasch, 1951, p. 147). Numerous crevices obscure the relations of the upper contact of the Potosi. The basal sandstone member of the overlying Eminence Formation appears irregular in thickness and distribution, and it may have been deposited principally in depressions on the Potosi surface.

In some parts of the area, the Prairie du Chien and Eminence strata have been removed and the Potosi is unconformably overlain by St. Peter Sandstone (pl. 1).

Correlation.—The Potosi Dolomite of northeastern Illinois is correlated with the St. Lawrence Dolomite and Lodi Siltstone of Wisconsin. The Potosi is called Trempealeau in Indiana (Gutstadt, 1958b) and Michigan (Cohee, 1945a).

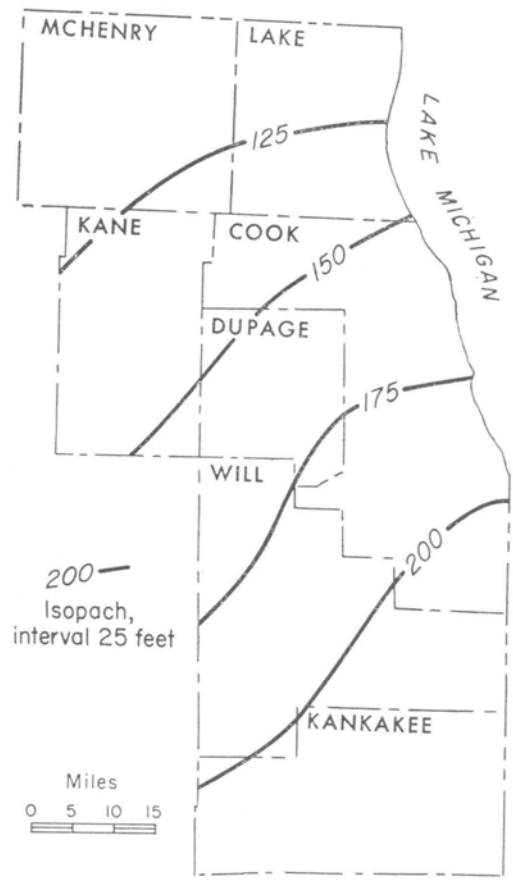

FIG. 14—Reconstructed thickness of Potosi Dolomite in northeastern Illinois.

Eminence Formation

In northeastern Illinois the Eminence Formation consists of light colored sandy dolomite that overlies brownish gray, nonsandy dolomite of the Potosi and underlies the Gunter Sandstone. These beds previously have been assigned to the upper Trempealeau (Potosi) or lower Oneota, or have been called Gunter-Jordan. Where the Gunter is absent, the Eminence underlies cherty and coarser grained dolomite of the Oneota.

The name Eminence first appeared in a table of Missouri formations (Buckley, 1908,

p. 286). It was shown as being underlain by Potosi and overlain by Proctor. No type section was designated, nor was a lithologic description given in the original publication. The formation was presumably named for exposures at Eminence, Shannon County, Missouri (Wilmarth, 1938, p. 685). Subsequent correlations have shown the Eminence and Proctor to be equivalent, and the Eminence is now considered to be the uppermost Cambrian formation in Missouri (Howe and Koenig, 1961), where it is unconformably overlain by the Gunter Sandstone Member of the Gasconade Formation.

In northeastern Illinois a somewhat discontinuous bed of sandstone in the lower 5 to 10 feet of the Eminence is recognized as a member and for it the name Momence Sandstone Member is proposed here.

Distribution and Thickness.—The Eminence Formation is present throughout much of the southern half of the area. It varies from about 50 to 150 feet thick, with the thicker sections along the southern edge. The Eminence is combined with the Prairie du Chien Group on the isopach map (pl. 5).

The Eminence is generally absent in the northern part of the area because of pre-St. Peter erosion. It thickens to the south beyond the limits of this area, reaching 300 feet in southeastern Missouri.

Lithology.—The Eminence Formation consists of light gray to light brown or pink, sandy, fine- to medium-grained dolomite. The dolomite contains oolitic chert and thin beds of sandstone. The Eminence is distinguished from the underlying Potosi by its sandy units, oolitic chert, and medium-grained, light colored dolomite. The creviced zone in the upper part of the Potosi causes poor sample recovery and considerable caving, thus making it difficult to pick a sharp Potosi-Eminence contact in many wells. Reference wells 15, 18, 21, 37, 41, 42, 46, and 50 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations. — The irregular distribution of the basal sandy member suggests that the Eminence overlies the Potosi disconformably. The contact between the Eminence and the overlying Gunter Sandstone is sharp and probably disconformable.

Correlation. — The Eminence Formation grades northward and westward into the Jordan Sandstone in Wisconsin and northwestern Illinois. The basal Momence Sandstone Member appears to be a tongue of the Jordan Sandstone.

Momence Sandstone Member (new)

A characteristic increase in sandiness occurs in the lower 10 feet of the Eminence. In the southeastern part of the area these beds consist of sandstone for which the name Momence Sandstone Member is here proposed. The type well for the member is Hughes Oil Company No. 1 Parish (reference well 46), a rotary well in NW¼ NW¼ SW¼ sec. 24, T. 31 N., R. 13 E., Kankakee County, Illinois. Samples are on file at the Illinois Geological Survey (sample set 997). The name is derived from the city of Momence, eastern Kankakee County, just east of the type well in which the member occurs between 1,650 and 1,660 feet.

Distribution and Thickness.—The Momence Sandstone Member is present in parts of Kankakee, Will, and southern Cook Counties, where it varies from 5 to 15 feet thick. It has a somewhat discontinuous distribution.

Lithology.—The Momence consists of light gray, dolomitic, medium-grained, rather poorly sorted sandstone. In places it contains some interbedded green or gray sandy shale. The Momence Sandstone is distinguished from the underlying Potosi Dolomite by a sharp change downward from sandstone to fine-grained dolomite that contains only minor quantities of sand.

ORDOVICIAN SYSTEM

Lapworth, 1879

The Ordovician System in Illinois is divided into the Canadian, Champlainian, and Cincinnatian Series (Twenhofel et al., 1954; Templeton and Willman, 1963). The thickness of the Ordovician rocks in northeast-

ern Illinois varies from approximately 700 feet in the northern part of the area to over 1,100 feet in the southern part. Pronounced unconformities occur at the tops of the Canadian and Cincinnatian strata, and a lesser unconformity occurs at the top of the Champlainian.

CANADIAN SERIES

Dana, 1874

In northern Illinois the Canadian Series is represented by strata of the Prairie du Chien Group, which includes the Gunter, Oneota, New Richmond, and Shakopee Formations in ascending order. Throughout the area of study the Shakopee has been thinned or removed by pre-Champlainian erosion and solution. The formations generally thicken southward in Illinois, and the Shakopee is further thickened by the addition of beds at its top. The Prairie du Chien of northern Illinois represents only the lower part of the Canadian Series, and the time of deposition of younger Canadian strata elsewhere in Illinois is represented in this area by the sub-Tippecanoe unconformity. The unconformity can be traced throughout the state although it is most prominent in northern Illinois (Templeton and Willman, 1963, p. 28-29).

CHAMPLAINIAN SERIES

Schuchert and Barrell, 1914

The term Champlainian is used to designate the middle series of the Ordovician System in Illinois. It includes the Chazy and Mohawkian Series that previously were used in the state. Classification of the Champlainian rocks in this report follows that proposed in a recent revision of the series (Templeton and Willman, 1963). Correlations of the rock units in the subsurface of northeastern Illinois with outcrops of northwestern Illinois and southwestern Wisconsin are based chiefly on lithologic similarity and stratigraphic position.

The Champlainian Series in Illinois is divided into the Chazyan, Blackriveran, and Trentonian Stages (fig. 4) (Templeton and Willman, 1963). Chazyan rocks are not present in northeastern Illinois, although the St. Peter Sandstone was formerly assigned to the Chazyan. The Blackriveran Stage contains the Ancell and Platteville Groups. The Trentonian Stage is represented in northeastern Illinois by the Galena Group.

CINCINNATIAN SERIES

Meek and Worthen, 1865

The Cincinnatian Series in Illinois is the uppermost series of the Ordovician System. It is divided into the Edenian, Maysvillian, and Richmondian Stages (Templeton and Willman, 1963). In northeastern Illinois the Cincinnatian includes strata assigned to the Maquoketa Group. The Maquoketa had long been considered entirely Richmondian in age, but recent studies (Templeton and Willman, 1963, p. 131) have indicated that the Maquoketa of northern Illinois also includes strata of Maysvillian and Edenian age. Locally as much as the upper half of the Cincinnatian was truncated before the overlying Silurian rocks were deposited.

Rock Stratigraphy of the CANADIAN SERIES

PRAIRIE DU CHIEN GROUP

In northeastern Illinois the Prairie du Chien Group (fig. 15) consists of cherty dolomite with some interbedded sandstone that overlies the Eminence Formation and underlies the St. Peter Sandstone.

The Prairie du Chien was named by Bain (1906, p. 18) for a series of exposures near Prairie du Chien, Crawford County, Wisconsin. He described the Prairie du Chien as gray to white, cherty, partly brecciated dolomite containing siliceous oolites and sandstone near the top.

As first recognized in northeastern Illinois subsurface, the Prairie du Chien included all strata below the St. Peter down to the sandstone now called Ironton Sandstone (Ander-

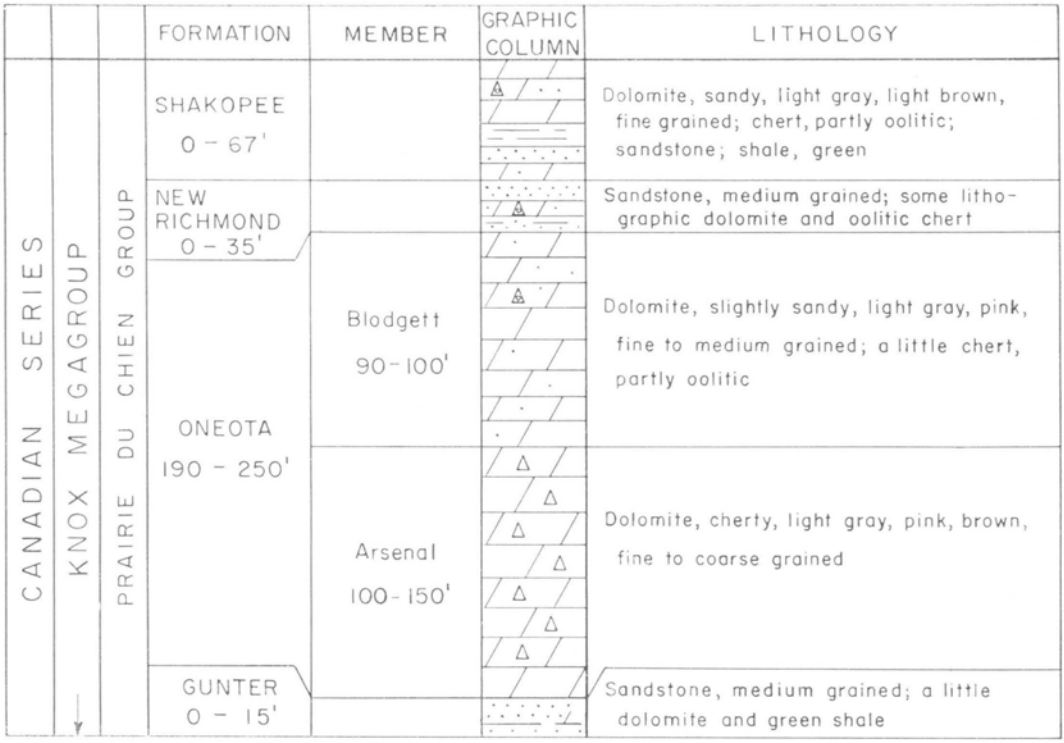

FIG. 15—Composite stratigraphic log of Canadian strata in northeastern Illinois.

son, 1919, pl. 2). Thwaites (1927, p. 27) separated the Mazomanie (Franconia) from the Prairie du Chien, and later (1935, fig. 231) showed the Trempealeau underlying the Prairie du Chien at the Illinois-Wisconsin boundary.

The group is divided into four formations, in ascending order—Gunter Sandstone, Oneota Dolomite, New Richmond Sandstone, and Shakopee Dolomite.

Distribution and Thickness.—Prairie du Chien strata underlie much of the southern two-thirds of the area and are present as outliers in the northern one-third. Because of a major unconformity at the base of the St. Peter Sandstone, the thickness of the group is very irregular (pl. 5). The Prairie du Chien thickens southward and reaches 350 feet in southern Kankakee County. South of the area it thickens to 500 feet in east-central Illinois, with most of the thickening occurring in the Shakopee Dolomite.

Lithology.—The Prairie du Chien Group consists of light gray to brown or pink dolomite with beds of fine- to medium-grained sandstone and thin beds of green shale. The dolomite contains abundant oolitic chert. Where the Gunter Sandstone is not present, the Oneota in places is difficult to separate from the underlying Eminence.

Gunter Sandstone

In northeastern Illinois the Gunter Sandstone consists of medium-grained sandstone overlying sandy dolomite of the Eminence Formation and underlying the Oneota Dolomite.

The name Gunter was applied by Ball and Smith (1903, p. 26) to a thin sandstone at the base of the Ordovician in central Missouri. Workman and Bell (1948, p. 2054-2055) placed the Gunter and Jordan Formations together as a single unit of Cambrian and Ordovician age. Willman and Templeton (1951, p. 111) referred from 17 to 55 feet of sandy dolomite and sandstone in north-central Illinois to the Gunter Formation. It appears now that only the sand-

stone at the top of their sequence should be assigned to the Gunter and the underlying cherty and sandy dolomite should be placed in the Eminence.

Distribution and Thickness.—The Gunter Sandstone is present in scattered localities in southern Cook, eastern Will, and western Kankakee Counties. It varies from a few feet to approximately 15 feet thick. The Gunter appears to be more continuously present south and west of this area.

Lithology.—The Gunter consists of medium-grained, friable, subrounded sandstone that contains beds of light gray, fine-grained dolomite and minor amounts of light green shale. The Gunter Sandstone is easily distinguished from the underlying Eminence, which is medium- or fine-grained dolomite. On electric logs from the southern part of the area, the resistivity of the Gunter is markedly lower than that of the formations above and below it. Micrologs indicate greater permeability in this zone, and radioactivity logs show an increase in gamma radiation, probably due to beds of shale. Reference wells 41 and 50 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations.—Sharp contacts and irregular distribution of the sandstone suggest minor disconformities at the base and top of the Gunter.

Correlation.—Beds of sandstone and sandy dolomite, called the Hickory Ridge Member, at the base of the Oneota in western Wisconsin (Raasch, 1952) may be equivalent to the Gunter. In Minnesota a basal Ordovician sandstone called the Kasota Sandstone appears to be equivalent to the Gunter.

Oneota Dolomite

In northeastern Illinois the Oneota Dolomite consists of relatively coarse-grained, cherty dolomite that is underlain by the Gunter Sandstone and overlain by the New Richmond Sandstone. Where the Gunter is absent the Oneota overlies sandy dolomite of the Eminence Formation.

The Oneota was named by McGee (1891, p. 331-333) for exposures along the Oneota River, Allamakee County, northeastern Iowa, where he described it as coarsely saccharoidal, vesicular dolomite that is underlain by the Jordan Sandstone and overlain by the New Richmond Sandstone. Anderson (1919) introduced the name Oneota into northeastern Illinois, using it to designate strata below the New Richmond Sandstone and above the sandstone now called Ironton. Thwaites (1927) separated the Trempealeau and Mazomanie (Franconia) from the Oneota as used by Anderson (fig. 5). The Oneota is further restricted by recognition of the Gunter Sandstone as a separate formation and the assignment in this report of the sandy beds below the Gunter to the Eminence Formation.

The Oneota of northeastern Illinois is here divided into two members, chiefly on the basis of abundance of chert. The lower very cherty unit is designated Arsenal Member, and the upper less cherty unit is designated Blodgett Member. The type well for the members is Kankakee Ordnance Works No. 9 (reference well 50), a cable tool well in NE¼ NE¼ SW¼ sec. 25, T. 34 N., R. 9 E., Will County, Illinois. Samples are on file at the Illinois Geological Survey (sample set 6199).

Distribution and Thickness.—The Oneota Dolomite underlies most of the southern half of the area, but it was almost completely eroded from the northern half by pre-St. Peter erosion. It has an irregular distribution pattern in Cook, DuPage, and Kane Counties, and it is present only in outliers in the northern part of the area. The Oneota has a maximum thickness of about 250 feet near the southern border of the area and thickens regularly southward to southeastern Illinois and southwestern Indiana. It is exposed along the Fox River just west of the area of this report (Willman and Templeton, 1951, p. 117).

Lithology.—The Oneota Dolomite consists of medium- to coarse-grained, cherty, light gray and pink dolomite that contains minor amounts of sand. Some of the chert is oolitic. The Oneota Dolomite is characterized by its coarse grain size, which is generally coarser

than the grain size of dolomite in any other Cambrian or Ordovician formation in this region. Reference wells 21, 42, 46, and 50 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations.—The Oneota appears to overlie the Gunter Sandstone or Eminence Formation with slight disconformity. There is no evidence of an unconformity at its contact with the overlying New Richmond Sandstone.

Correlation.—The Oneota is correlated with the Van Buren and Gasconade of Missouri (Workman and Bell, 1948, p. 2056), which are now both included in the Gasconade (Howe and Koenig, 1961). South of the area in which the New Richmond Sandstone permits easy separation of the Oneota and Shakopee, the Oneota is commonly an undifferentiated part of the Knox Megagroup.

Arsenal Member (new)

The name Arsenal Member is proposed here for the basal cherty dolomite unit of the Oneota. The name is derived from the Joliet Arsenal, western Will County, which includes the type well, reference well 50. The member occurs between 980 and 1,085 feet.

Distribution and Thickness.—The Arsenal Member has the same distribution as the Oneota Dolomite. In the southern part of the area the member is 100 to 150 feet thick.

Lithology.—The Arsenal Member consists of cherty to very cherty dolomite that is light gray with some brown or pink tinting. It is very slightly glauconitic and medium grained with some coarsely crystalline zones. The chert is partly oolitic and most of it is white, but some light yellow chert is present near the middle of the member. The Arsenal Member is characterized by abundance of chert and lack of sand.

Blodgett Member (new)

The name Blodgett Member is proposed here for the noncherty or only slightly cherty unit overlying the Arsenal Member. The member is named for the town of Blodgett, western Will County, 3 miles southwest of the type well, reference well 50, in which the member occurs between 885 and 980 feet.

Distribution and Thickness.—The Blodgett Member ranges from 90 to 100 feet thick in the southern part of the area, and it is thin or absent to the north.

Lithology.—The Blodgett consists of dolomite that is partly sandy, very slightly glauconitic, light gray or pinkish gray, and medium to fine grained. Oolitic chert is present in small quantities. Thin beds or partings of green shale also are present. The Blodgett is distinguished from the underlying Arsenal Member by its sand content and a distinct decrease in amount of chert.

New Richmond Sandstone

In northeastern Illinois the New Richmond Sandstone consists of dolomitic sandstone that is underlain by the Oneota Dolomite and overlain by the Shakopee Dolomite.

The New Richmond was named by Wooster (1882, p. 106) for an exposure of sandstone near the village of New Richmond, St. Croix County, Wisconsin. Anderson (1919) introduced the name into northeastern Illinois.

Distribution and Thickness.—The New Richmond Sandstone is recognized only in the southwestern part of the area, where it is a few to 35 feet thick. If it was ever present to the north and east, it was removed by pre-St. Peter erosion, but it is also absent in the southeastern part of the area where the Shakopee lies directly on the Oneota. It is absent south and east of the area, but it thickens west of the area, where it is exposed along the Fox River (Willman and Payne, 1943, p. 532), and is about 150 feet thick in north-central Illinois.

Lithology.—The New Richmond consists of sandstone with some interbedded sandy dolomite. The sandstone is moderately sorted, rounded, friable, and generally medium grained. The sandstone is somewhat similar

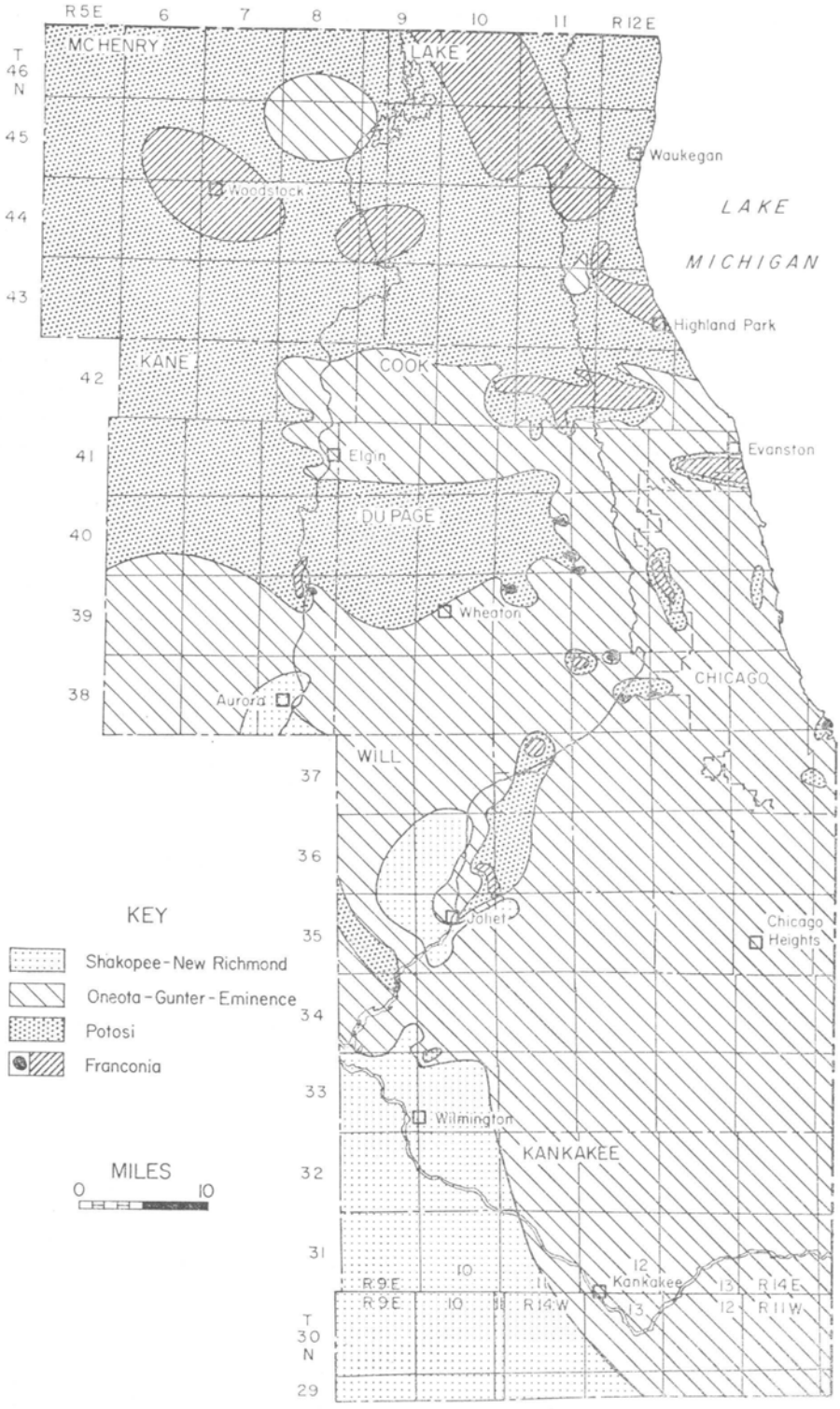

FIG. 16—Sub-St. Peter areal geology of northeastern Illinois.

to the St. Peter Sandstone except that it is slightly coarser grained and not as well rounded. The dolomite in the New Richmond is light colored, very fine grained, and contains oolitic chert. Reference wells 21 and 50 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations.—There is no evidence of an unconformity at either the top or the bottom of the New Richmond Sandstone.

Correlation.—The New Richmond is correlated with the Roubidoux Formation of Missouri, but it probably does not represent all that is designated as Roubidoux. The New Richmond in Illinois is considered dominantly sandstone, whereas the Roubidoux in Missouri contains beds of sandy dolomite at the top (Workman and Bell, 1948, p. 2057).

Shakopee Dolomite

In northeastern Illinois the Shakopee Dolomite consists of very fine-grained, partly sandy dolomite that overlies the New Richmond Sandstone and underlies the St. Peter Sandstone.

The Shakopee was named by Winchell (1874, p. 138-139) for outcrops at Shakopee, Scott County, Minnesota. The name was introduced into northeastern Illinois by Anderson (1919).

Distribution and Thickness.—The Shakopee Dolomite is present only in the southern part of the area. It is over 67 feet thick in southwestern Will County, and it thickens markedly south of the area. It is exposed along the Fox River to the west (Willman and Payne, 1943, p. 532).

Lithology.—The Shakopee Dolomite is a highly variable sequence consisting chiefly of very fine-grained dolomite that is light gray to light brown. The dolomite contains oolitic chert and some thin beds of medium-grained, rounded sandstone and green to light gray shale. In outcrops west of the area it is characterized by highly variable beds of argillaceous and pure dolomite commonly distorted by lenses of massive algal reef structures as much as 10 feet high. It has beds of green shale, and in parts of the sequence are beds of dolomitic sandstone up to 2 feet thick.

Where the New Richmond is absent, the Shakopee is distinguished from the underlying Oneota by its very fine-grained texture and sandiness. Reference wells 21 and 50 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations.—The relations of the Shakopee and New Richmond in northeastern Illinois are obscure. It appears that a facies relationship may exist between the two formations, and in places the New Richmond grades laterally to sandy dolomite in the lower part of the Shakopee.

The Shakopee Dolomite is overlain with distinct unconformity by the St. Peter Sandstone.

Correlation.—The Shakopee Dolomite has been correlated with the Jefferson City and Cotter Dolomites of Missouri (Workman and Bell, 1948, p. 2059). In northeastern Illinois the Shakopee may be equivalent to only the Jefferson City, but farther south it includes the undifferentiated rocks of Canadian age above the New Richmond Sandstone.

PRE-CHAMPLAINIAN UNCONFORMITY

A major erosional unconformity separates the Canadian (Lower Ordovician) and Champlainian (Middle Ordovician) strata throughout northern Illinois. The St. Peter Sandstone, which represents the earliest Champlainian deposition in the region, unconformably overlies successively older strata from the Shakopee Dolomite in the south to the Franconia Formation in the north (fig. 16). The thickness of the St. Peter varies from 100 to 600 feet, with variations of over 200 feet occurring in wells only a few hundred feet apart. These considerable differences in thickness of the St. Peter com-

pensate for irregularities of the sub-St. Peter surface.

Most of the sub-St. Peter surface in northeastern Illinois is mantled by a layer of angular chert fragments intermixed with red or green shale and some sandstone. Much of the chert is oolitic and was derived from Prairie du Chien strata. This basal St. Peter conglomerate is a few to 120 feet thick, with the thicker sections generally beneath thick sections of sandstone.

The relief on the sub-St. Peter surface may have resulted from three processes: stream erosion, subsurface solution and differential compaction, and karst topography. Probably all three processes have acted to shape the surface, for none is necessarily exclusive of the other two (Buschbach, 1961).

STREAM EROSION

The abnormally thick sections (over 225 feet) of St. Peter Sandstone in northern Illinois have in the past generally been considered deposits in deep valleys developed on the sub-St. Peter surface (Fisher, 1925, p. 20; Lamar, 1928, p. 29; Meyer, 1948; Dapples, 1955, p. 445). However, when these very thick sections in Cook and DuPage Counties are mapped as valleys, they cover only about one-tenth of the total area. As one-fourth of the deep wells drilled in the area penetrate abnormally thick St. Peter, thick sections of the sandstone should be present in one-fourth rather than one-tenth of the area in those counties, assuming random distribution of the wells. Mapping thick sections of the St. Peter as continuous channels presents another difficulty—it requires projecting a winding course through many areas where scattered wells show only thin St. Peter.

A third objection to interpreting all the thick St. Peter as deposits in valleys is that the accumulation of angular chert fragments and intermixed clay at the base of the St. Peter appears to be a residuum rather than a stream deposit.

SUBSURFACE SOLUTION AND DIFFERENTIAL COMPACTION

Flint (1956, p. 420) concluded that the irregular sub-St. Peter surface of southwestern Wisconsin was developed chiefly by compaction of lime muds over relatively rigid domal masses, which probably were biogenic. He also recognized various effects of solution and suggested that a clayey residuum on the Prairie du Chien was produced by subsurface solution under the load of younger rocks. Flint found no reason to ascribe the irregularity of the sub-St. Peter surface in that region to subaerial erosion. These conclusions clearly do not apply to northeastern Illinois. Extremely thick sections of residuum suggest some transportation of clay and its accumulation in favorable localities. The removal of several hundreds of feet of dolomite, and in some places a few feet of Franconia Sandstone, by subsurface solution during St. Peter deposition also seems unlikely.

Locally some subsurface solution is indicated by apparent thinning of pure beds within the Oneota Dolomite and compensating thickening of units in the overlying St. Peter Sandstone. This situation may indicate solution under pressure of overlying sediments. In addition, solution may have created cavernous areas in the Prairie du Chien rocks while they were exposed to subaerial conditions, with subsequent collapse resulting from the weight of the lower beds of St. Peter Sandstone. As the top of the Glenwood–St. Peter is essentially flat across both the thin and abnormally thick sections of the St. Peter, any solution and collapse that contributed to the irregularity of the sub-St. Peter surface would have had to be completed before the end of Glenwood–St. Peter deposition.

KARST TOPOGRAPHY

Prairie du Chien rocks generally underlie the St. Peter south of a line drawn from the central part of Chicago slightly north of west across northern Illinois. North of this line the Prairie du Chien occurs only spo-

radically, and the St. Peter directly overlies the Eminence, Potosi, or Franconia Formations. The east-west line appears to represent a north-facing escarpment of Prairie du Chien strata that dipped gently southward (pl. 1, between wells 17 and 21). Behind or south of the escarpment, the locally thick St. Peter Sandstone and basal rubble suggest nearly mature karst topography. In front or north of the escarpment, outliers of Prairie du Chien rocks in knobs or plateau remnants may have been isolated by southward retreat of the escarpment.

Surface streams probably were more prominent north of the escarpment, especially where sandstone, siltstone, and shale of the Franconia formed the bedrock surface. A few deep valleys or channels cutting through the escarpment also would favor vadose solution through a considerable thickness of rocks. Near Joliet several wells in a northeast-southwest alignment have thick sections of St. Peter that probably represent a channel rather than isolated sinkholes.

The Prairie du Chien escarpment and the irregular topography of the sub-St. Peter surface in northeastern Illinois can be compared with the Dripping Springs escarpment and associated karst surface of the Mammoth Cave area of Kentucky (Buschbach, 1961, p. 88).

Rock Stratigraphy of the CHAMPLAINIAN SERIES

OTTAWA LIMESTONE MEGAGROUP

The Ottawa Limestone Megagroup (Swann and Willman, 1961) was established to comprise the Champlainian carbonates that overlie sandstones, shales, and sandy dolomites of the St. Peter or Glenwood Formations and underlie shales of the Maquoketa Group. Neither the overlying nor underlying strata are included in a megagroup. In northeastern Illinois the Ottawa Megagroup includes the Platteville (lower) and Galena Groups and thus provides a name that replaces the hyphenated term "Galena-Platteville."

In the northern part of the area there is a thick dolomite unit (Daysville Dolomite) in the Glenwood Formation, which in drillers logs and cursory sample studies has not been differentiated from the overlying Platteville Group. However, the Daysville is distinguished by its shale and sand content, or by overlying sand and shale, and this report excludes it from the Ottawa Megagroup except in local areas where no well defined sandstone separates it from the overlying Platteville strata.

The Ottawa consists chiefly of dolomite in the northern part of the area, with limestone becoming increasingly abundant toward the south. The unit varies from about 275 feet thick in the northeastern part of the area to 400 feet in the southwestern part. The megagroup continues to thicken south of the area, and it is 1,300 feet thick in southern Illinois where it includes Galena, Platteville, Joachim, and Dutchtown strata (Swann and Willman, 1961, p. 478).

ANCELL GROUP

In northeastern Illinois the Ancell Group (fig. 17) consists of a chert and shale conglomerate at the base, a clean, friable sandstone in the middle, and a dolomitic sandstone at the top. The group unconformably overlies Canadian or Croixan strata and underlies the Pecatonica Dolomite of the Platteville Group.

The Ancell was named by Templeton and Willman (1963, p. 29) for exposures of sandstones and impure dolomites and limestones near the village of Ancell, Scott County, southeastern Missouri. The Ancell Group in northeastern Illinois includes the St. Peter Sandstone (at its base) and the Glenwood Formation. Regional correlations of the Ancell Group are shown by Templeton and Willman (1963, p. 140).

Distribution and Thickness.—The Ancell Group underlies all of northeastern Illinois. It varies from 100 to 600 feet thick (pl. 6).

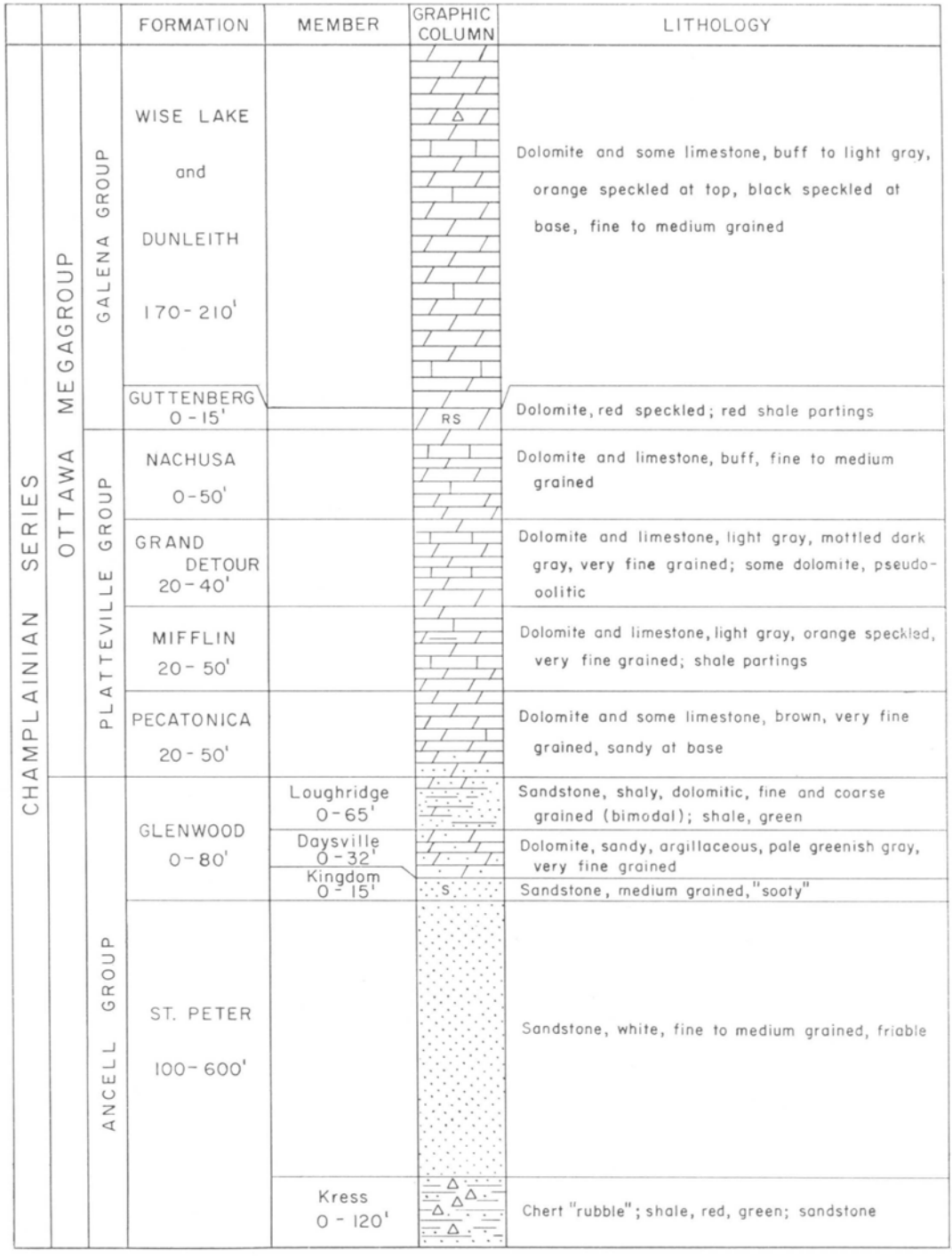

FIG. 17—Composite stratigraphic log of Champlainian strata in northeastern Illinois.

Lithology.—The Ancell Group is mainly sandstone but there is some shale and dolomite in the Glenwood Formation. In the southern half of the area, where the shale and dolomite are absent, the Glenwood is difficult to separate from the underlying St. Peter in subsurface samples.

St. Peter Sandstone

In northeastern Illinois the St. Peter Sandstone consists chiefly of clean, medium-grained sandstone that unconformably overlies the Shakopee, New Richmond, Oneota, Eminence, Potosi, or Franconia Formations and underlies the shaly and dolomitic sandstone of the Glenwood Formation.

The St. Peter was named by Owen (1847, p. 170) for outcrops of sandstone along the Minnesota (formerly St. Peter's) River near Fort Snelling, Minneapolis–St. Paul, Minnesota. The name St. Peter was introduced into northeastern Illinois by Bannister (1868, p. 244). The character of the St. Peter in this and nearby areas has been described by Lamar (1928), Willman and Payne (1942), Workman and Bell (1948), Dapples (1955), and Templeton and Willman (1963).

The basal St. Peter is a conglomeratic mixture of chert, shale, and sandstone, for which the name Kress Member is proposed and defined in this report.

Distribution and Thickness.—The St. Peter Sandstone underlies all of northeastern Illinois. Its thickness in this area varies, ranging from slightly less than 100 to over 600 feet.

The St. Peter is 100 to 200 feet thick throughout most of the northern two-thirds of Illinois. In a band 40 to 50 miles wide across northernmost Illinois, thicknesses of 400 to 600 feet are encountered locally. The St. Peter thins eastward into Indiana (Gutstadt, 1958b) and Michigan (Cohee, 1945b) and generally is absent in the eastern parts of those states. In the northern Ozark region of Missouri, the St. Peter Sandstone is 10 to 135 feet thick (Dake, 1921, p. 22).

The St. Peter has an irregular thickness of a few to 200 feet in the southern half of Wisconsin, with local thickening to over 300 feet at the southern border (Thwaites, 1923, p. 541; Thiel, 1935, p. 567). It is 165 feet thick at Minneapolis, Minnesota, and thins to about 80 feet in the southeastern corner of that state (Stauffer and Thiel, 1941, p. 69). In southwestern and north-central Iowa, the St. Peter is 17 to 30 feet thick, but abnormally thick sections (over 200 feet) are reported in east-central Iowa (Agnew, 1955, p. 1739-1740; Trowbridge, 1917, p. 178).

The St. Peter Sandstone is not separated from the overlying Glenwood Formation in many well records, and the combined thickness is mapped (pl. 6).

Lithology.—The St. Peter Sandstone, except for the basal Kress Member, consists chiefly of quartz sandstone that is friable, medium and fine grained, well sorted and well rounded. It is white, pink, or buff. The coarser grains are exceptionally well rounded, but pitted and frosted. Although beds of fine-grained sandstone 10 or more feet thick are present in the St. Peter, they are not traceable from well to well. Reference wells 1, 3, 8, 15, 18, 21, 24, and 50 contain typical sections, which are described under "Sample Studies."

The Kress Member presents drilling difficulties because of its chert and soft shale, and caving consequently obscures the basal St. Peter contact in some wells.

Stratigraphic Relations.—The St. Peter Sandstone unconformably overlies the Shakopee Dolomite and successively lower formations down to the Franconia (fig. 16). In well samples there is no evidence of an unconformity between the Glenwood and St. Peter, but a minor break at this position occurs locally elsewhere in northern Illinois.

Correlation.—The St. Peter Sandstone is correlated with part of the Simpson Group of Oklahoma, possibly with the Burgen Sandstone at the base of the McLish Formation (Templeton and Willman, 1963, p. 190).

Kress Member (new)

The name Kress Member is here proposed for the basal conglomerate of the St. Peter Sandstone. The name is derived from Kress Creek, which flows southward in sections

6, 7, and 8, T. 39 N., R. 9 E., DuPage County. The headwaters of Kress Creek are approximately 1½ miles southwest of the type well, which is the Elgin, Joliet, and Eastern Railroad No. 1 (reference well 48), a cable tool well in NW¼ NE¼ SE¼ sec. 32, T. 40 N., R. 9 E., DuPage County, Illinois. Samples are on file at the Illinois Geological Survey (sample set 1169). In this well the Kress Member occurs at depths of 940 to 1,004 feet.

Distribution and Thickness.—The Kress Member is present throughout most of northeastern Illinois. Its thickness is extremely variable, ranging from a trace to 120 feet. In general, the greater thicknesses of the Kress underlie abnormally thick sections of sandstone (pl. 1). Thick sections of the Kress can be traced in a broad band across northern Illinois, and thinner sections of a few inches to a few feet are recognized as far south as central Illinois.

The presence of this conglomerate has been reported in Illinois, Iowa, Wisconsin, Minnesota, and Missouri (Dake, 1921, p. 98; Thwaites, 1923, p. 540-542; Stauffer and Thiel, 1941, p. 65; Agnew, 1955, p. 1739; and others). Exposures of the Kress Member in northern Illinois were described by Templeton and Willman, 1963, p. 45).

Lithology.—The Kress Member is largely a chert conglomerate but contains some dolomite fragments. Some of the chert is oolitic. Beds of red and green shale and some beds of medium- to coarse-grained sandstone are present. Red shale is more abundant in the northern part of the area, whereas green shale is more common to the south. The general appearance and occurrence of the Kress Member suggest that it is a relatively insoluble residuum developed on a karst surface and concentrated in local depressions by advancing St. Peter seas. Reference wells 1, 17, 19, 28, and 48 contain typical sections, which are described under "Sample Studies."

Glenwood Formation

In northeastern Illinois the Glenwood Formation consists of sandstone, dolomite, and shale, which are underlain by the St. Peter Sandstone and overlain by the Platteville Dolomite.

The name Glenwood was introduced by Calvin (1906, p. 60-61) for a 15-foot section of shale and sandstone between the St. Peter Sandstone and Platteville Limestone in Glenwood Township, Winneshiek County, Iowa. The Glenwood in northern Illinois was described by Bevan (1926, p. 6-7) and Elder (1936). Templeton and Willman (1963, p. 48) recognized four members—Kingdom Sandstone Member (at the base), Daysville Dolomite Member, Loughridge Sandstone Member, and Harmony Hill Shale Member. The lower two members are recognized in northeastern Illinois, and an upper unit of shaly sandstone is tentatively correlated with the Loughridge. The Harmony Hill Shale is not recognized in northeastern Illinois, although equivalent strata may be present in a facies that is very sandy and consequently may be assigned to the Loughridge in this area.

Distribution and Thickness.—The Glenwood Formation is recognizable in well samples from most of the northern half of the area, where it varies in thickness from a few to 80 feet. It is widely recognized in Wisconsin, Iowa, and Minnesota (Kay, 1935, p. 285-286; Stauffer and Thiel, 1941, p. 73-76; Agnew, 1955, p. 1736), and is also present in Michigan (Cohee, 1945a). As the Glenwood and St. Peter are not separated on many well logs, their combined thickness is mapped (pl. 6).

Lithology.—The Glenwood Formation contains fine- and coarse-grained, dolomitic sandstone, fine-grained dolomite, and some light green shale. In general the sandstone of the Glenwood is more silty and slightly coarser grained than the underlying St. Peter. Bimodal sandstone, with most grains in the fine and coarse grade sizes, characterizes the Glenwood. Although the sandstones in the Glenwood and St. Peter differ in some characteristics, they are seldom separated with confidence in well samples of northeastern Illinois except where the Glenwood contains dolomite or shale. Ref-

erence wells 1, 3, 8, 15, 17, 18, and 26 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations.—A minor unconformity separates the Glenwood and the underlying St. Peter (Willman and Payne, 1942, p. 63), but it is not apparent in the subsurface of northeastern Illinois. The Glenwood may grade laterally into the upper beds of the St. Peter Sandstone in the southernmost part of the area somewhat as it does in the central part of the state (Templeton and Willman, 1963, fig. 13). The contact between the Glenwood and overlying Platteville is sharp, and the basal Platteville beds commonly contain sand.

Correlation.—The Glenwood appears to be equivalent to the Joachim and Dutchtown Formations of southern Illinois.

Kingdom Sandstone Member

A gray sandstone found locally in the lower 5 to 15 feet of the Glenwood in Kane and DuPage Counties is correlated with the Kingdom Sandstone Member of north-central Illinois.

Lithology.—The Kingdom consists of pyritic sandstone that is friable, well rounded, and medium grained. The pyrite occurs as a thin, black coating on the sand grains and gives the sandstone a sooty appearance. The presence of numerous coarse grains of sand and the sooty appearance distinguish the Kingdom Member from the underlying St. Peter Sandstone.

Daysville Dolomite Member

A sandy dolomite overlying the Kingdom Sandstone Member or, where the Kingdom is absent, the St. Peter Sandstone, is correlated with the Daysville Member of the Glenwood in north-central Illinois.

Distribution and Thickness.—The Daysville is present in the northern part of the area, where it varies from a few to 32 feet thick. It thins southward and is absent south of a northeast-southwest line drawn through Geneva and Highland Park.

Lithology.—The Daysville Member consists of sandy, light greenish gray, extra-fine-grained, argillaceous dolomite. It contains some interbedded sandstone and green or light gray shale. The Daysville is distinguished from the Platteville Dolomite above by its greenish color, argillaceous content, and the presence of shale.

Loughridge Sandstone Member

Overlying the Daysville Member is an argillaceous sandstone that is correlated with the Loughridge Member of north-central Illinois.

Distribution and Thickness.—The Loughridge Member is recognizable in the northern part of the area wherever the Daysville Member is present. It is 10 feet thick in northeastern Lake County, and it thickens southwestward to 65 feet in western Kane County. South of a line drawn through Geneva and Highland Park, where the Daysville Dolomite is absent, the Loughridge probably grades into the upper part of the St. Peter.

Lithology.—The Loughridge consists of argillaceous, partly dolomitic sandstone that is white, partly silty, medium grained, and poorly sorted. Locally the sand grains have bimodal size distribution. The sandstone contains thin interbeds of green shale and sandy dolomite. The Loughridge is distinguished from the underlying Daysville Dolomite by a predominance of sandstone.

PLATTEVILLE GROUP

In northeastern Illinois the Platteville Group consists of dolomite and limestone overlying the sandy and argillaceous strata of the Glenwood Formation and underlying the coarser grained dolomite of the Galena Group.

The name Platteville was proposed by Bain (1906, p. 19) as a replacement for the name Trenton previously used in the lead and zinc mining region of Illinois, Wiscon-

sin, and Iowa. The type section, near the town of Platteville, Grant County, Wisconsin, consists of about 65 feet of limestone, dolomite, and thin shales that overlie the St. Peter Sandstone and underlie the Galena Limestone.

As originally defined, the Platteville included shaly beds near its base and top. The basal beds of sandy shale were later named Glenwood (Calvin, 1906) and removed from the Platteville (Bevan, 1926). The shaly beds at the top also were removed from the Platteville and named Decorah (Calvin, 1906).

Anderson (1919) introduced the name Platteville into northeastern Illinois. Templeton and Willman (1963) elevated the Platteville to group status in Illinois and included in it the Pecatonica Formation (at the base) and the Plattin Subgroup, which contains the Mifflin, Grand Detour, Nachusa, and Quimbys Mill Formations, in ascending order. The Quimbys Mill appears to be absent in northeastern Illinois, but the other Platteville formations generally can be recognized in good sample sets.

Distribution and Thickness.—The Platteville Group underlies all of northeastern Illinois. Its thickness varies from slightly less than 100 feet in the north to over 150 feet in the south, and continues to thicken south of the area to about 700 feet in southern Illinois. For mapping purposes the thickness of the Platteville is combined with that of the overlying Galena Group (pl. 7).

Lithology.—The Platteville Group consists chiefly of gray or brown dolomite that grades southwestward into calcitic dolomite interbedded with extra-fine-grained limestone. The basal few feet are commonly sandy. The base of the Platteville Group is placed at the change downward from slightly sandy, brown dolomite or limestone to the white, dolomitic sandstone and green shale of the underlying Ancell Group.

Stratigraphic Relations.—Local unconformities and a regional diastem have been reported at the base of the Platteville (Templeton and Willman, 1963, p. 71). Locally in northeastern Illinois the Glenwood Formation is absent or unrecognizable. If it is absent, the Platteville then overlies the St. Peter Sandstone unconformably.

Irregular thinning of the Platteville Group and the local absence of the Nachusa Formation suggest an unconformity between the Platteville and the overlying Galena Group.

Correlation.—The Platteville is Blackriveran in age and is in general equivalent to beds called Black River in Indiana, Michigan, and Ohio.

Pecatonica Dolomite

In northeastern Illinois the Pecatonica Dolomite consists chiefly of brown dolomite that overlies dolomitic sandstone of the Glenwood Formation and underlies gray dolomite of the Mifflin Formation. The Pecatonica was named by Hershey (1894) for outcrops of buff or light brown dolomite in the Pecatonica River Valley near the southern boundary of Wisconsin. Templeton and Willman (1963, p. 73, 165, 225) proposed as the type section of the Pecatonica exposures in quarries and a roadcut on the East Branch of the Pecatonica River, just north of Woodford, Lafayette County, Wisconsin. They recognized the Pecatonica in the LaSalle outcrop region and at Kentland, Indiana. In this report the Pecatonica is recognized as a distinctive unit in northeastern Illinois.

Distribution and Thickness.—The Pecatonica Dolomite is present throughout the area and varies from 20 to 50 feet thick, the thicker sections being in the southeast.

Lithology.—The Pecatonica consists of fine-grained, brownish gray to brown dolomite that grades to calcitic dolomite or extra-fine-grained limestone in DuPage and western Will Counties. It contains thin, brown, argillaceous partings, and it is commonly sandy in the lower 5 to 10 feet. The brown sandy dolomite at the base of the Pecatonica is quite distinct from the white dolomitic sandstone and soft green shale of the Glenwood Formation. Reference wells 15, 17, 18, 19, 24, 37, 41, 47, and 50 con-

tain typical sections, which are described under "Sample Studies."

The electrical resistivity of the Pecatonica is normally higher than that of the overlying and underlying formations (fig. 13), and the unit is recognizable on most electric logs from northern Illinois.

Stratigraphic Relations. — Regional diastems have been reported at the top and bottom of the Pecatonica (Templeton and Willman, 1963, p. 70-71). In subsurface in northeastern Illinois the contact with the underlying Glenwood Formation appears to be sharp, but the contact between the Pecatonica and the overlying Mifflin Formation appears transitional.

PLATTIN SUBGROUP

In northeastern Illinois the Plattin Subgroup consists of gray to buff dolomite and limestone overlying the Pecatonica Dolomite and underlying the Guttenberg Formation of the Galena Group. The Plattin was named for Plattin Creek, Jefferson County, Missouri (Ulrich, *in* Buckley and Buehler, 1904, p. 111). Templeton and Willman (1963, p. 78) proposed that in Illinois the Plattin be used as a subgroup consisting of the Mifflin (at the base), Grand Detour, Nachusa, and Quimbys Mill Formations. The Quimbys Mill has not been traced into northeastern Illinois and is presumably missing from the area.

In wells where the Platteville formations above the Pecatonica are difficult to separate, the name Plattin is useful. Formations within the Plattin Subgroup appear to be conformable.

Mifflin Formation

In northeastern Illinois the Mifflin Formation consists of light gray dolomite or limestone overlying brownish dolomite of the Pecatonica and underlying the gray-mottled strata of the Grand Detour Formation. The Mifflin was named by Bays (1938, p. 269) for 17½ feet of thinly bedded limestone exposed at the town of Mifflin, Iowa County, Wisconsin. It has been recognized in north-central and western Illinois and at Kentland, Indiana (Templeton and Willman, 1963, p. 79, 165).

Distribution and Thickness.—The Mifflin Formation is present throughout northeastern Illinois, where it varies from 20 to 50 feet thick.

Lithology.—The Mifflin consists of light gray, partly brownish, fine-grained dolomite that grades to calcitic dolomite or extra-fine-grained limestone in DuPage and western Will Counties. It contains green or brown shale partings, zones of orange speckling, and, rarely, chert. Locally there are beds of greenish gray or gray, mottled, argillaceous dolomite. The Mifflin is distinguished from the underlying Pecatonica by its lighter color, more abundant shale partings, and orange speckling. Reference wells 1, 3, 8, 15, 21, 24, 47, and 50 contain typical sections, which are described under "Sample Studies."

Grand Detour Formation

In northeastern Illinois the Grand Detour Formation consists of gray, mottled dolomite or limestone overlying the Mifflin and underlying the Nachusa Formation. The name Grand Detour was proposed by Templeton and Willman (1963, p. 83) for exposures of 52 feet of dolomitic limestone in a quarry 3 miles west of the village of Grand Detour, Ogle County, Illinois, and they described outcrops of the formation at LaSalle, Illinois, and Kentland, Indiana.

Distribution and Thickness.—The Grand Detour is present throughout northeastern Illinois. It is about 30 feet thick but ranges from 20 to 40 feet.

Lithology.—The Grand Detour is a distinctive formation consisting of very fine-grained, light brownish gray dolomite that commonly has dark gray mottling. The dolomite grades to calcitic dolomite or lithographic limestone in DuPage and western Will Counties. Small amounts of chert, green shale partings, and poorly banded oolites are present locally. The Grand Detour is distinguished from the underlying Mifflin by its finer grain size, fewer shale partings, and

the gray mottling. The contact is transitional, and in some well samples the two formations are not separable. Reference wells 8, 15, 21, 37, 47, and 50 contain typical sections, which are described under "Sample Studies."

The top of the Grand Detour Formation commonly occurs about 90 feet above the base of the Platteville Group in this area and often has been erroneously picked as the top of the Platteville in well samples.

Nachusa Formation

In northeastern Illinois the Nachusa Formation consists of buff to grayish brown dolomite or limestone overlying the Grand Detour and underlying the Guttenberg Formation of the Galena Group. The name Nachusa was proposed by Templeton and Willman (1963, p. 87) for exposures near the village of Nachusa, Lee County, Illinois.

Distribution and Thickness.—The Nachusa is present throughout most of northeastern Illinois, but it is absent locally. Its thickness is more variable than that of the other Platteville formations, and its maximum is about 50 feet.

Lithology.—The Nachusa Formation consists of buff to grayish brown, fine- to medium-grained dolomite that grades to limestone in the southwestern part of the area. Chert is common in the upper part of the formation. The Nachusa is distinguished from the underlying Grand Detour by its coarser grain size and buff to brownish color. It is similar to the overlying Galena strata, and they are difficult to separate in some well samples because the red-speckled Guttenberg Formation, which marks the base of the Galena in this area, is very thin. Reference wells 8, 15, 24, 37, 41, 47, and 50 contain typical sections, which are described under "Sample Studies."

GALENA DOLOMITE GROUP

In northeastern Illinois the Galena Dolomite Group consists of medium-grained dolomite that overlies finer grained dolomite of the Platteville Group and underlies shale of the Maquoketa Group.

The name Galena was proposed by James Hall (*in* Foster and Whitney, 1851, p. 146-148) for excellent exposures in bluffs of the Mississippi River near the town of Galena, Jo Daviess County, Illinois. Galena strata were recognized in subsurface in northeastern Illinois by Bannister (1870, p. 114) on the basis of the similarity of their lithology to that of the described outcrops in the type region.

Within the Galena Group in northeastern Illinois a thin Guttenberg Formation is recognized at the base. The overlying strata are assigned to the Dunleith and Wise Lake Formations, but these units have not been differentiated in this area. The name Galena Dolomite will continue to be used for the entire unit.

In western Illinois the Guttenberg Formation is part of the Decorah Subgroup (Templeton and Willman, 1963), which includes, in ascending order, the Spechts Ferry, Kings Lake, and Guttenberg Formations. The Spechts Ferry and Kings Lake are absent in northeastern Illinois. The Guttenberg lacks the strong shaly character of the Decorah farther west, and, as only the Guttenberg is differentiated, the name Decorah is not needed in northeastern Illinois.

Distribution and Thickness.—The Galena Dolomite is present throughout northeastern Illinois, either in subsurface or, rarely, in outcrop. Its average thickness of 200 feet normally varies less than 20 feet. The Galena thins gradually to the south from this area.

Lithology.—The Galena consists chiefly of medium-grained, buff-colored dolomite that grades southwestward into calcitic dolomite with some interbedded limestone. The Galena is distinguished from the underlying Platteville by its coarser grain size and by red speckling or reddish brown shale partings at its base.

Stratigraphic Relations. — The Galena Group unconformably overlies the Platteville Group, and regional evidence indicates a probable unconformity between the Galena and the overlying Maquoketa.

Correlation.—The Galena Dolomite is of Trentonian age and is correlated with the Lexington Limestone of Kentucky and the Nashville Group of Tennessee (Twenhofel et al., 1954; Templeton and Willman, 1963, p. 98).

Guttenberg Formation

In northeastern Illinois the Guttenberg Formation consists of a few feet of red-speckled dolomite that overlies the Nachusa or Grand Detour Formations of the Platteville Group and underlies the Dunleith Formation. The name Guttenberg was proposed by Kay (1928, p. 16) for an exposure near the town of Guttenberg, Clayton County, Iowa. The unit was classified as a member of the Decorah Formation and was elevated to formational status by Templeton and Willman (1963). Slightly shaly beds at the base of the Galena previously have been called Decorah in this area.

Distribution and Thickness.—The Guttenberg is widespread in northeastern Illinois, but it is not recognizable in every well. It is about 5 to 15 feet thick. Regionally, the Guttenberg is 10 to slightly over 20 feet thick in southeastern Minnesota, eastern Iowa, and western Illinois (Herbert, 1949).

Lithology.—The Guttenberg Formation consists of light buff to light grayish brown, fine- to medium-grained dolomite that grades to extra-fine-grained limestone in the southwestern part of the area. A trace of fine sand is present locally. Red speckling or thin reddish brown shale partings characterize the formation and distinguish it from the underlying Nachusa. Where the Nachusa is absent, the base of the Guttenberg is more distinct because of the contrast it presents with the underlying very fine-grained, gray-mottled limestone and dolomite of the Grand Detour. Reference wells 1, 8, 15, 24, 37, 41, 47, and 50 contain typical sections, which are described under "Sample Studies."

KIMMSWICK SUBGROUP

In northeastern Illinois the Kimmswick Subgroup includes the formations of the Galena Group above the Guttenberg Formation.

The Kimmswick is named for the town of Kimmswick, Missouri, south of St. Louis, near which it is well exposed. It is considered a formation in Missouri, but was made a subgroup in Illinois by Templeton and Willman (1963). The Kimmswick Subgroup consists of the relatively pure limestone or dolomite overlying shaly formations of the Decorah Subgroup and underlying the shaly dolomite of the Dubuque Formation. Where the Dubuque is absent, the Kimmswick underlies the Maquoketa Shale.

Dunleith and Wise Lake Formations

In northeastern Illinois the Dunleith and Wise Lake Formations consist of buff dolomite that overlies the Guttenberg Formation and underlies the Maquoketa Shale Group.

The Dunleith Formation is named for Dunleith Township, Jo Daviess County, Illinois, in which exposures occur along the Mississippi River bluffs at East Dubuque. The Wise Lake Formation is named for Wise Lake, 6 miles south of Galena, Jo Daviess County, Illinois, near which it is exposed in bluffs of the Mississippi River (Templeton and Willman, 1963, p. 114, 125-126). In northwestern Illinois the part of the Galena Group above the Guttenberg consists of the Dunleith (at the base), Wise Lake, and Dubuque Formations. In that area the Dunleith is distinguished from the Wise Lake by the abundance of chert and slight argillaceousness in the Dunleith. The Dubuque is more argillaceous and shaly than the Wise Lake as far east as the Rockford region, but beyond that the sequence loses its chert and argillaceous content.

In northeastern Illinois it appears that the Dubuque is absent, and the Dunleith and Wise Lake Formations are so similar that they cannot readily be separated in well samples. As it is difficult to distinguish the units of the Galena Group in this area, the name Galena Dolomite will continue to be used for the entire sequence. However,

where differentiation from the Guttenberg is desirable, the name Kimmswick Dolomite can be used for undifferentiated Dunleith and Wise Lake.

Distribution and Thickness.—The Dunleith and Wise Lake Formations are present throughout northeastern Illinois where their combined thickness is about 190 feet.

Lithology.—The Dunleith and Wise Lake Formations consist of buff to light grayish brown, fine- to medium-grained dolomite that is calcitic in parts of DuPage, Kane, and western Will Counties. Orange specks and pyrite characterize the upper few feet of the unit, and widely scattered chert nodules occur throughout. Locally the lower 5 to 15 feet of Kimmswick is black speckled (St. James and Buckhorn Members of Templeton and Willman, 1963, p. 119). The contact with the Guttenberg appears to be gradational because fragments containing both black and red speckling are found in well samples.

The presence of one or two thin beds of metabentonite is suggested by some electric logs (fig. 13), although none has been observed in subsurface samples.

Correlation.—The lower black-speckled beds are correlated with the St. James and Buckhorn Members of the Dunleith Formation.

Rock Stratigraphy of the CINCINNATIAN SERIES

MAQUOKETA SHALE GROUP

In northeastern Illinois the Maquoketa Shale Group (fig. 18) consists chiefly of dolomitic shale, but dolomite and limestone are common in the middle part. The Maquoketa Shale overlies the Galena Dolomite and underlies dolomite or siltstone of Alexandrian (Lower Silurian) age. On the western border of the area, Silurian strata were locally eroded and the Maquoketa is overlain by Pennsylvanian or Pleistocene deposits.

The Maquoketa was named by White (1870, p. 181) for exposures along the Little Maquoketa River, Dubuque County, Iowa, and the name has been used in northeastern Illinois since 1919 (Anderson, 1919). Early studies in northeastern Illinois (Udden, 1909; Trowbridge, 1912) referred to the shale as Cincinnati (fig. 5). The Maquoketa is now regarded as a group and is divided into five formations—Cape Limestone (at the base), Scales Shale, Fort Atkinson Dolomite, Brainard Shale, and Neda Formation (Templeton and Willman, 1963, p. 131). All but the Cape are recognized in this area.

Distribution and Thickness.—The Maquoketa is present throughout northeastern Illinois except where it has been locally eroded in western McHenry County. It is about 200 feet thick in much of the area and reaches a maximum of 250 feet in western Cook County (pl. 8). It thins to about 100 feet in parts of Cook and northern Will Counties, where it is deeply truncated by pre-Silurian erosion. Along the western edge of the area where the Maquoketa is unconformably overlain by Pennsylvanian or Pleistocene deposits, it crops out locally and its thickness is variable. The thickness of the Maquoketa was mapped only where it was overlain by Silurian strata.

The Maquoketa Group is about 200 feet thick throughout much of central and northwestern Illinois. It thins toward western and southwestern Illinois and thickens markedly eastward in Indiana, Michigan, and Ohio.

Lithology.—The Maquoketa consists chiefly of green to brown dolomitic shale and some light gray to brown, partly silty dolomite and limestone. Commonly a well defined dolomite unit, the Fort Atkinson Dolomite, lies in the middle. Where thick, the Maquoketa generally is capped by a few feet of red shale and hematitic oolite, the Neda Formation. Locally, in the northern part of the area, the Maquoketa grades almost completely to dolomite (pl. 1, wells 3 and 17).

The Maquoketa may be directly overlain by the Edgewood or Kankakee Formations

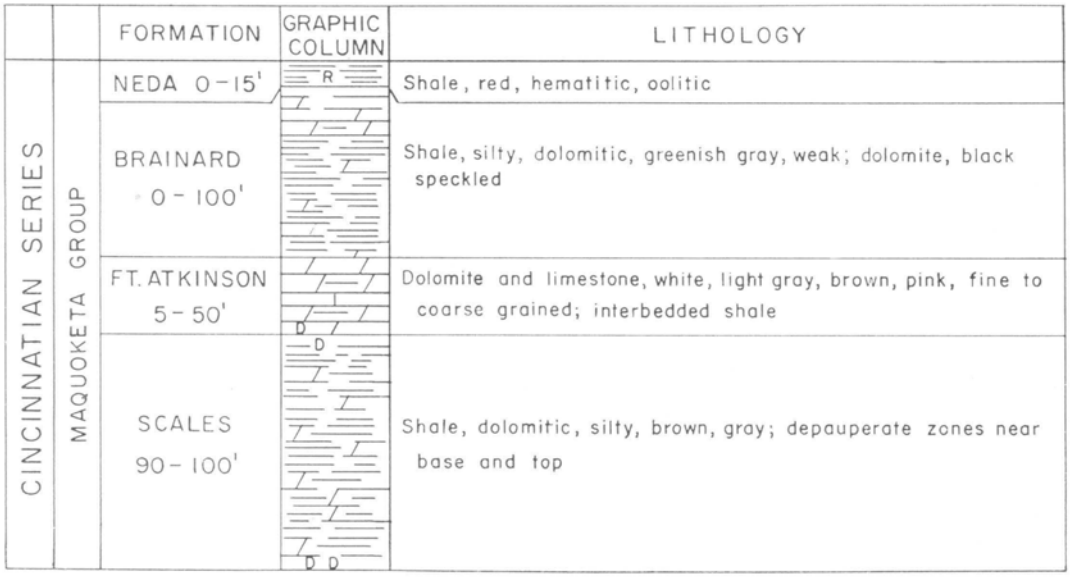

FIG. 18—Composite stratigraphic log of Cincinnatian strata in northeastern Illinois.

of Alexandrian (Lower Silurian) age, by Pennsylvanian strata, or by Pleistocene glacial drift. The Pleistocene deposits consist of poorly consolidated till that is distinct from any Maquoketa strata it may overlie.

The Pennsylvanian strata consist chiefly of gray micaceous shale that is commonly silty and sandy. The Maquoketa Shale is distinguished from the shales of Pennsylvanian age by the presence of dolomite and the lack of sand and mica in the Maquoketa.

The Kankakee Dolomite overlies the Neda Formation in northeastern Illinois, although locally in Kane and Lake Counties where the Neda is absent or missed in sampling the Kankakee directly overlies dolomite of the undifferentiated Brainard and Fort Atkinson. The Kankakee consists of dolomite that is fine grained, light yellowish gray, cherty, and slightly glauconitic. The underlying dolomite of the Maquoketa is distinguished by its coarser grain size, light gray color, black pyritic speckling, interbedded green shale, and the presence of fossil fragments and black-speckled chert.

The Edgewood Formation commonly overlies the Brainard Shale or the Fort Atkinson Dolomite, although in outcrops along the Kankakee River in western Kankakee County the Edgewood overlies the Neda Formation. The Edgewood Formation in northeastern Illinois consists of gray to brownish gray dolomite that is coarsely silty or finely sandy and contains black scolecodont fragments. Locally the silty dolomite grades to dolomitic siltstone.

The Edgewood Formation is normally 10 to 20 feet thick in the area, but it is 100 feet thick in parts of Cook and northern Will Counties where it fills broad pre-Silurian channels that apparently were cut through the Brainard Shale to the top of the Fort Atkinson Dolomite (pl. 1, wells 40, 41). The thicker sections of Edgewood consist of gray to brown silty dolomite with some gray or brown shale partings. Beds of rather pure dolomite occur in the thicker sections, but they are absent where the Edgewood is thin. The Maquoketa is distinguished from the thick sections of Edgewood by the presence of green shale and medium- to coarse-grained, fossiliferous dolomite in the Maquoketa.

Stratigraphic Relations.—The Maquoketa Group unconformably overlies succeedingly lower units of the Galena Group from north to south in western Illinois, but in northeastern Illinois the top of the Galena appears

to be relatively flat. However, the contact of the Galena with the overlying Maquoketa is marked by a sharp change in lithology. The Maquoketa Shale is overlain unconformably by Silurian, Pennsylvanian, and Pleistocene deposits.

Correlation.—The Maquoketa Group generally has been considered to be of Richmondian age (Twenhofel et al., 1954). Gutstadt (1958a, 1958b), however, correlated the lower shale of the Maquoketa with the Eden Shale, and Templeton and Willman (1963) correlated it with Edenian and Maysvillian strata in the type area of the Cincinnatian.

Scales Shale

In northeastern Illinois the Scales Shale consists of brown, dolomitic shale that overlies the Galena Dolomite and underlies the Fort Atkinson Dolomite. The Scales was named by Templeton and Willman (1963, p. 135) for outcrops in railroad cuts in and near the town of Scales Mound, Jo Daviess County, Illinois.

Distribution and Thickness.—The Scales Shale is present throughout most of northeastern Illinois where it is commonly 90 to 100 feet thick.

Lithology.—The Scales Formation consists chiefly of grayish brown to brown, weak to brittle, silty, dolomitic shale that is interbedded with thin layers of fine-grained, silty dolomite. Locally the shale is greenish gray in the lower 5 to 10 feet. In eastern Cook County the characteristic brown color is lacking, and the entire unit consists of weak, gray, dolomitic shale.

A gray shale is recognized locally at the top of the Scales Formation, and in these places the Scales is differentiated into the Clermont Member at the top and the Elgin Member below. However, these units are not generally recognized in borings in northeastern Illinois.

Throughout the area a thin zone of small phosphatized brachiopods, pelecypods, and gastropods at the base of the formation is called the depauperate zone. In places a similar zone occurs in the upper part of the Scales. Reference wells 8, 24, 28, 37, and 50 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations.—The Scales Shale overlies the Galena Group unconformably. The contact of the Scales with the overlying Fort Atkinson is transitional and appears to be conformable.

Correlation.—The Scales Shale is correlated with the Elgin and Clermont Members of the Maquoketa in northeastern Iowa (DuBois, 1945, p. 9-11; Templeton and Willman, 1963, p. 131).

Fort Atkinson Dolomite

In northeastern Illinois the Fort Atkinson consists of dolomite or limestone that is underlain by the Scales Shale and overlain by the Brainard Shale. The Fort Atkinson was named by Calvin (1906, p. 98) for 40 feet of dolomite and limestone exposed in a quarry at Fort Atkinson, Winneshiek County, Iowa. In the type area the Fort Atkinson is underlain by the Clermont Shale and overlain by the Brainard Shale.

In Illinois the Fort Atkinson was called the Divine Limestone (Lamar and Willman, 1931) and the "middle limestone zone" (DuBois, 1945, p. 9, 15) until the name Fort Atkinson was accepted by Templeton and Willman (1963).

Distribution and Thickness.—The Fort Atkinson Dolomite is present throughout most of northeastern Illinois, where it varies from 5 to 50 feet thick. It appears to have formed a resistant bench in areas where pre-Silurian erosion removed the overlying Brainard Shale.

Lithology.—The Fort Atkinson consists chiefly of fine- to coarse-grained dolomite or limestone with some interbedded green or brown, silty, dolomitic or calcitic shale. The rock is white, light gray, or light brownish gray. Some of the coarse-grained limestone contains scattered pink grains. Gray mottling and dark gray, pyritic speckling are characteristic. The Fort Atkinson is fossiliferous,

especially in the limestone facies, and fragments of bryozoans, brachiopods, and crinoid stems are common.

In some localities the underlying Scales contains considerable dolomite near its top, and a sharp line cannot be drawn between it and the Fort Atkinson in the subsurface. Reference wells 8, 24, 28, 37, and 50 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations.—The Fort Atkinson Dolomite is generally overlain conformably by the Brainard Shale, although in parts of Cook and northern Will Counties it is unconformably overlain by the Silurian Edgewood Formation.

Correlation.—The Fort Atkinson Dolomite has been correlated with the Waynesville Limestone of southern Indiana and northern Kentucky and with the Fernvale Limestone of Tennessee (Twenhofel et al., 1954; Templeton and Willman, 1963, p. 132).

Brainard Shale

In northeastern Illinois the Brainard Shale consists of green shale that overlies the Fort Atkinson Dolomite and underlies red shales of the Neda Formation or dolomite and siltstone of Silurian age. The name Brainard was proposed by Calvin (1906, p. 97) for 120 feet of bluish gray shale and associated beds of limestone exposed near the Brainard railway station, Fayette County, Iowa.

Distribution and Thickness.—In parts of Cook and northern Will Counties much of the Brainard Shale was removed before deposition of Silurian strata. The Brainard is also absent in western McHenry and western Kankakee Counties, due to post-Silurian erosion. In northeastern Illinois the Brainard has a maximum thickness of about 100 feet.

Lithology.—The Brainard consists of silty, dolomitic, weak, greenish gray shale that is interbedded with varying amounts of silty, greenish gray dolomite and, less commonly, limestone. In some localities in Lake and southern Kane Counties the Brainard grades to partly silty dolomite that is light gray to light greenish gray, partly black speckled, fine to coarse grained, and commonly interbedded with greenish gray shale. The dolomite contains some black-speckled chert. Where the Brainard consists chiefly of dolomite, it cannot be separated from the underlying Fort Atkinson in subsurface samples. Elsewhere in the area the contact between the two formations is generally gradational. In this report the base of the Brainard is placed below the weak greenish shale with interbedded dolomite and above the light gray dolomite with interbedded shale. South and west of this area the Brainard contains fewer beds of limestone and dolomite and is therefore more easily distinguished from the Fort Atkinson. Reference wells 8, 24, 28, and 37 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations. — The Brainard overlies the Fort Atkinson with apparent conformity. The contact between the Brainard and the overlying Neda appears to be gradational in subsurface samples. Where the Neda is absent the Brainard is unconformably overlain by Silurian, Pennsylvanian, or Pleistocene deposits.

Neda Formation

The Neda Formation of northeastern Illinois consists of a few feet of red, oolite-bearing shale that locally overlies the Brainard Shale and underlies dolomite of Alexandrian (Lower Silurian) age. The Neda was named by Savage and Ross (1916, p. 193) for exposures of iron ore in a pit near Neda, Dodge County, Wisconsin. Workman (1950) described the Neda Formation in northeastern Illinois and noted that it occurred only in localities where the Maquoketa Shale was at or near its maximum thickness.

Distribution and Thickness.—The Neda Formation is present locally in the subsurface of this area but only in localities where the Maquoketa Group exceeds 190 feet thick (pl. 8). The Neda ranges from a few to 15 feet thick.

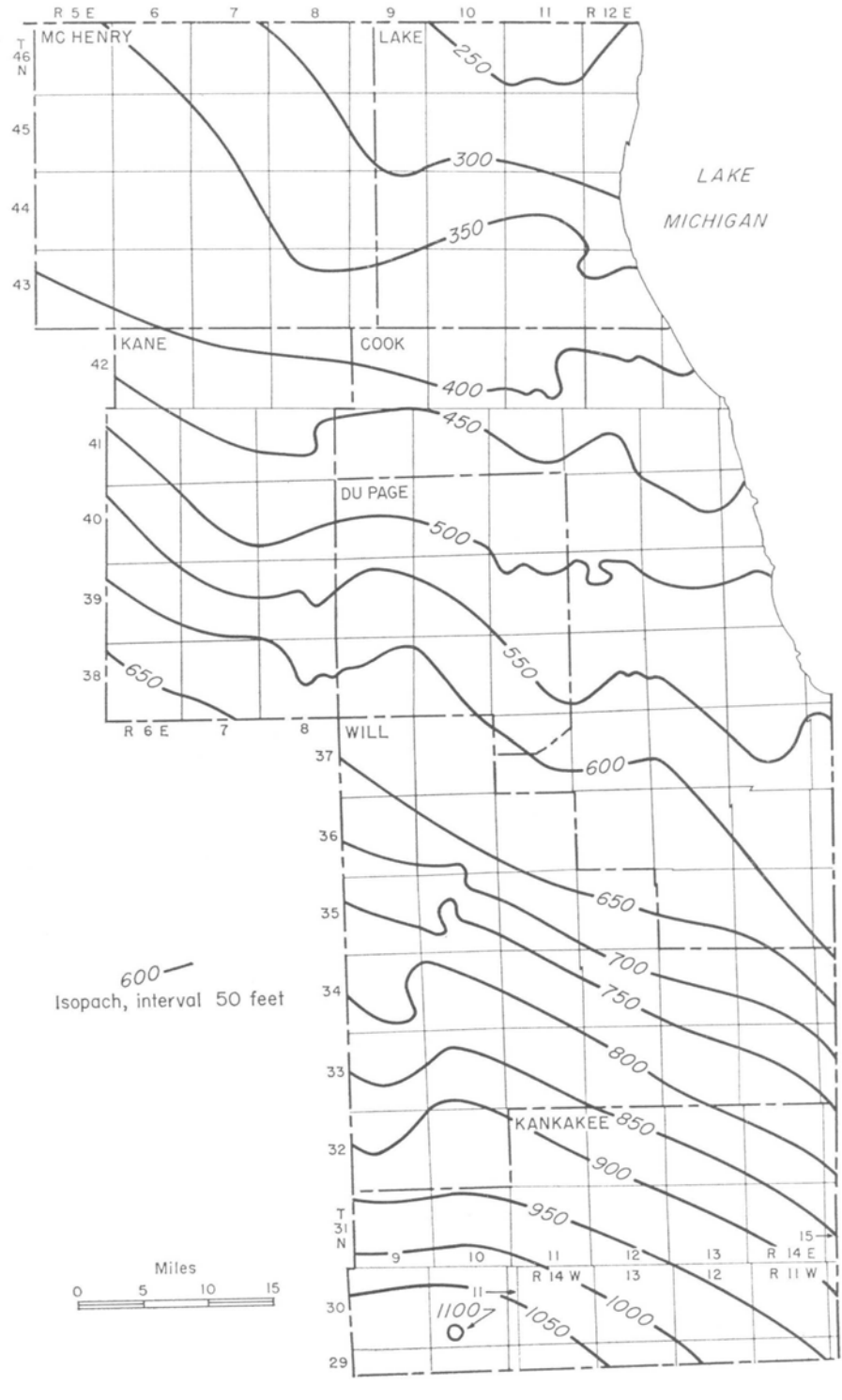

FIG. 19—Thickness of interval between top of the Glenwood–St. Peter Sandstone and the top of the Ironton Sandstone.

Flattened spheroids of hematitic oolite occur in about 10 feet of reddish brown shale at the top of the Maquoketa along the Kankakee River in the southeastern part of T. 32 N., R. 10 E., Will County. The unit was assigned to the Noix Oolite (Lower Silurian) by Athy (1928) and later to the Neda Formation by Workman (1950). The Neda Formation was included in the Maquoketa Group by Templeton and Willman (1963, p. 130).

Lithology.—The Neda consists of weak, red shale that locally contains hematitic, geothitic, or limonitic oolites and interbedded pink or green dolomite. The red color distinguishes the Neda from the underlying Brainard Shale. Reference wells 8, 24, and 26 contain typical sections, which are described under "Sample Studies."

Stratigraphic Relations.—The contact between the Neda and the underlying Brainard appears to be transitional in subsurface. In the northern part of the area the Silurian Edgewood Formation is absent and the Neda is unconformably overlain by the Kankakee Dolomite.

Correlation. — Richmondian fossils have been reported from the Neda (Savage and Ross, 1916). Templeton and Willman (1963, p. 133) suggested that it is the westernmost, and probably the uppermost, tongue of the Queenston red shale of New York.

STRUCTURE

Structure maps were drawn for the top of the Glenwood–St. Peter Sandstone (pl. 9) and the top of the Ironton Sandstone (pl. 10). Datum points on the structure maps indicate reliable wells that reach the formation mapped. However, many wells that penetrate the top of the Galena do not reach the lower formations. The inferred thickness of the Galena and Platteville Dolomites in these wells was subtracted from the elevation of the top of the Galena to estimate the elevation of the top of the Glenwood–St. Peter. The same procedure was used to project structural data to the top of the Ironton.

The two structure maps show that the top of the Ironton Sandstone dips to the southeast throughout most of the area, whereas the top of the Glenwood–St. Peter dips generally eastward at a rate of approximately 12 feet per mile. The component of southward dip on the lower surface is explained by the considerable thickening to the south of strata included between the two surfaces mapped (fig. 19).

KANKAKEE ARCH

The Kankakee Arch (Pirtle, 1932, p. 149; Ekblaw, 1938) is a broad structure that separates the Illinois and Michigan Basins and connects the Wisconsin Arch to the northwest with the Cincinnati Arch to the southeast. Regional isopach maps (Cohee, 1945a; Swann et al., 1951) suggest that development of the Kankakee Arch and separation of the Illinois and Michigan Basins did not take place until after the deposition of Prairie du Chien strata. The area included in this study is located within the broad outlines of the Kankakee Arch as defined by the present structure of Champlainian (Middle Ordovician) rocks (fig. 1).

HERSCHER DOME

The Herscher Dome is an asymmetrical anticlinal structure in the southwestern corner of the area. The dome is about 3 miles wide east-west and 5 miles long north-south. It has over 150 feet of closure and is currently being used for gas storage in the Ironton, Galesville, and Mt. Simon Sandstones. As in other en echelon structures in the LaSalle Anticlinal Belt, the strata dip rather steeply on the western flank and more gently on the eastern.

SANDWICH FAULT ZONE

The Sandwich Fault Zone was recognized by Payne (1938, p. 182-183) from subsurface evidence near the town of Sandwich, De

Kalb County, Illinois. It trends S. 60° E. into east-central Will County. Near the western boundary of Will County the maximum displacement of the fault, shown on plate 9, is slightly over 100 feet, and the south side is downthrown. The displacement appears to diminish eastward.

Uplift on the south side of the fault in DeKalb County brings Cambrian strata to the surface. However, in east-central Will County, wells drilled to the Galena in the northern part of T. 34 N., R. 9 E., indicate reversed relations—the south side is downthrown. The presence of two or more faults seems likely. A graben was reported along the Sandwich Fault Zone in central northern Illinois (Willman and Templeton, 1951, p. 123). The structurally high area north of the fault, shown on plate 9, may be a horst bounded on the north by a fault that has not been observed. The presence of such a fault would broaden the zone of faulting.

The Sandwich Fault is post-Silurian. As major movement along the LaSalle Anticline in northern Illinois was post-Mississippian–pre-Pennsylvanian, followed by lesser uplift in post-Pennsylvanian time (Cady, 1920; Payne, 1939), the Sandwich Fault Zone may also have been active during those times.

DES PLAINES DISTURBANCE

Faulting at DesPlaines in northern Cook County was recognized by Thwaites (1927, p. 42). The faulted area was mapped as the DesPlaines Disturbance on the "Tectonic Map of the U. S." (Longwell et al., 1944). Well records now available show that this area of about 25 square miles consists of a complex of faults and tilted blocks (Emrich and Bergstrom, 1962). The structural and stratigraphic relations are chaotic and quite unrelated to the regional picture of structure and stratigraphy. Therefore, structural contours and isopach lines are not drawn through the DesPlaines area on the detailed maps of this report (pl. 10).

Wells drilled near the city of DesPlaines are reported to have penetrated over 1,600 feet of broken rock. Downfaulted blocks have preserved Kinderhook and Osage strata in the north-central part of the complex. Anomalous thicknesses of 300 feet for the Maquoketa and over 500 feet for the Galena-Platteville also are reported, probably representing steeply inclined strata penetrated in wells located near the faults. Maximum stratigraphic displacement shows some parts of the complex upthrown 600 feet and others downthrown as much as 300 feet with respect to strata in the area adjoining the complex. Preservation of Osage strata on downfaulted blocks dates origin of the structure as post-middle Mississippian.

A negative gravity anomaly of about 8 milligals in the DesPlaines area was interpreted by Pemberton (1954) as evidence for a graben structure in Precambrian rocks of the area, rather than for basic intrusives beneath the complex. In a detailed study of the locality, Emrich and Bergstrom (1962) concluded that the structure either may have resulted from meteorite impact or may represent faulting resulting from focusing of regional forces.

MINOR STRUCTURES

In the northern two-thirds of this area, structural contours on top of the Glenwood–St. Peter (pl. 9) show a series of east-west trending undulations that plunge gently eastward down the regional dip into the Michigan Basin. The available data indicate only the general trends.

STRUCTURE OF CAMBRIAN AND LOWER ORDOVICIAN STRATA

Pre-St. Peter deformation is shown by the pronounced thinning of the Prairie du Chien strata in the northern two-thirds of the area. The cross section (pl. 1) shows that the St. Peter overlaps successively lower formations, from the Shakopee in the south to the Franconia in the north. An isopach map of the interval between the top of the Glenwood–St. Peter and the base of the Franconia shows the variation in thickness of strata between datum planes above and below the

pre-St. Peter unconformity (fig. 19). The interval between these two surfaces, then, represents the structural deformation of the base of the Franconia before final Glenwood deposition. The isopach map shows that the section thins from 1,100 feet thick in the southwestern part of the area to 250 feet in the northeast.

The northward thinning combines depositional thinning of the Franconia, Potosi, Eminence, and Prairie du Chien strata with truncation of Potosi, Eminence, and Prairie du Chien strata before St. Peter deposition (pl. 1).

Some local structural movements probably occurred before the pre-St. Peter warping. Closely spaced wells show a difference of 30 or more feet in elevation at the top of the Ironton Sandstone on either side of a line extending west-northwest for about 6 miles from the northwest corner of the DesPlaines Disturbance. Elevations of the top of the Glenwood–St. Peter in these same wells do not reflect this difference.

CAMBRIAN AND ORDOVICIAN SEDIMENTATION

Cambrian and Ordovician sediments in northeastern Illinois are chiefly cratonic sandstones and dolomites, with smaller amounts of shale, siltstone, and limestone. The source area for the Croixan sediments evidently was to the north, as the sandstones are generally coarser in that direction. Dolomite forms a higher proportion of the Croixan sequence in the southern part of the area where active subsidence occurred, and the aggregate thickness of Croixan and Canadian strata increases in that direction.

Regional isopach maps (Cohee, 1945a; Swann et al., 1951; Lee et al., 1946) indicate that thickening of Croixan and Canadian strata continues into southernmost Illinois. There is no evidence that the Kankakee Arch was a significant feature before Champlainian time.

Deposition of Croixan Strata

The basal Cambrian sandstone in northeastern Illinois—the Mt. Simon—was deposited over eroded Precambrian rocks. The Mt. Simon is gradational upward into the marine sediments of the Eau Claire, but, as no marine fossils have been found in the Mt. Simon of the Upper Mississippi Valley, it may have been deposited in basins that had a considerable influx of fresh water.

In the overlying Eau Claire Formation, the presence of marine fossils and carbonates as far north as central Wisconsin indicates continued northward transgression of the seas.

The Galesville Sandstone overlying the Eau Claire contains no fossils in the outcrop area in Wisconsin and may have been deposited in a broad, shallow basin that was connected to the sea by restricted channels (Raasch, 1935, p. 307). As in the case of the Mt. Simon, a considerable inflow of fresh water could have prevented normal marine organisms from thriving. Such conditions would also account for the absence of glauconite. The apparent thinning and eventual disappearance of the Galesville Sandstone within 50 miles south of Kankakee County also suggest it was deposited in a restricted basin.

However, there is no evidence of a barrier to the south, and the regional pattern of Cambrian sedimentation suggests that the Galesville Sandstone grades southward into dolomite. There is also no evidence of a hiatus in the Bonneterre-Davis sequence of Missouri, which would be expected if the Galesville had been deposited in a basin restricted to the northern parts of Illinois and Indiana and the southern parts of Wisconsin and Minnesota. It seems probable, therefore, that the Galesville is a marine sandstone deposited in a regressing sea, and that the absence of marine fossils is due to depositional conditions unfavorable to marine life or its preservation.

The Ironton Sandstone contains coarser sand than does the underlying Galesville. The coarser size and the introduction of a new heavy mineral suite (Raasch, 1935, p. 309) point to a new or renewed source of clastics during Ironton deposition. Dolomite occurs

as stringers throughout the Ironton in Kankakee County but, except at the top of the formation, becomes less abundant northward. The upper few feet of the Ironton in northeastern Illinois is characterized by the presence of dolomite and coarse-grained glauconite, suggesting transition to the normal marine conditions that prevailed during deposition of the overlying Franconia.

The Franconia Formation probably represents slow marine deposition. It is fossiliferous, shaly, and glauconitic. In Wisconsin and extreme northern Illinois it consists chiefly of sandstone and shale, whereas in Kankakee County it grades to sandy dolomite. Farther south in Illinois and southern Indiana, the Franconia is the lower portion of the Knox Dolomite.

That marine waters became deeper over northeastern Illinois after Franconia deposition is indicated by the relatively pure Potosi Dolomite above the Franconia. Sandstone and siltstone are present in equivalent strata in Wisconsin, but very little clastic material was transported south of the Wisconsin border. A small amount of glauconite and sand in the base of the Potosi represents transition from the Franconia. The southward thickening and decrease in sand content in the Potosi again suggest that subsidence was active to the south and that the source area for clastics lay to the north.

Marine conditions prevailed in this area during the deposition of the Eminence Formation, which is chiefly cherty and sandy dolomite that grades northward into the Jordan Sandstone. The irregular thickness of the Eminence and the uneven distribution of the overlying basal Ordovician Gunter Sandstone indicate that Croixan deposition in the area may have ended with a slight hiatus.

Deposition of Canadian Strata

The Gunter, Oneota, New Richmond, and Shakopee Formations of the Prairie du Chien Group also consist of cherty dolomite and interbedded sandstone, and depositional conditions during Canadian time must have been similar to conditions that prevailed in latest Croixan time. Prairie du Chien strata markedly thicken south of northeastern Illinois.

A pronounced uplift and warping resulted in removal of several hundred feet of Prairie du Chien, Eminence, and Potosi strata before St. Peter deposition. The irregularity of the sub-St. Peter surface appears to be the result of the development of karst topography on the uplifted carbonate sequence. A north-facing scarp of Prairie du Chien with plateau-like remnants, the typical inland-facing scarp of eroded coastal plains, was the dominating feature of the landscape.

Deposition of Champlainian Strata

Like the Mt. Simon and Galesville, the St. Peter in northeastern Illinois is a clean quartz sandstone with no fossils, glauconite, or dolomite. The sand grains are well rounded and frosted and may have undergone several cycles of deposition and erosion. Much of the sand probably was derived from Cambrian sandstones north of Illinois. Cross-bedding in the St. Peter is of aqueous type, and many studies have indicated that the sandstone is a marine deposit.

The Glenwood Formation above the St. Peter consists of sandstone, dolomite, and shale, and contains fossils. It appears to be a transition from the clastic sediments of the St. Peter to the carbonate sediments of the Platteville Group. The overlying Platteville and Galena form a sequence of carbonates with minor amounts of shale. It is largely dolomite, but a limestone facies is present in the southwestern part of the area. The uniformity and continuity of Galena and Platteville strata indicate that extremely widespread seas were present during deposition of this sequence.

Galena and Platteville strata are all relatively pure in northeastern Illinois, and the absence of shale and chert, which characterize the strata in other regions, prevents identification of many subdivisions recognized elsewhere. Because the depositional seas were so widespread, northeastern Illinois was far from the shores and sources of clastic sediments.

Deposition of Cincinnatian Strata

Later seas covered the region with the shale and carbonates of the Maquoketa Group. Several thin beds of phosphatic nodules suggest slow, interrupted deposition of the shale. The argillaceous material probably was derived from the east, as the clastics generally become more abundant and coarser in that direction. The Neda Formation at the top of the Maquoketa is a distinctive unit of red shale carrying hematitic oolites and, locally, marine fossils. It appears to be a westward extension of the Queenston Delta of New York.

The irregular upper surface of the Maquoketa in northeastern Illinois indicates that uplift and erosion occurred before Silurian deposition began. The Neda Formation is absent in much of the area, and the Brainard Shale is locally truncated by what appear to be broad channels. Where the overlying Silurian Edgewood Formation fills these channels, it is as much as 100 feet thick. In areas where the Neda and Brainard have not been removed, the Edgewood is thin or absent.

SAMPLE STUDIES

Description of samples from type wells and selected reference wells. Illinois State Geological Survey sample set (SS) numbers are given.

1. Varner Well Drilling Co.—Dean Milk Co.

Well in NW SW SW sec. 33, T. 46 N., R. 5 E., McHenry County; elevation 870 feet; SS 14396; total depth 1,783 feet.

	Thickness (feet)	Depth (feet)
(Samples not studied above 125′)		
Silurian System		
Alexandrian Series		
Edgewood Formation		
Dolomite, silty, argillaceous, gray to brownish gray, very fine; some black speckled	15	140
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (143′)		
Brainard Shale (75′)		
Shale, silty, dolomitic, greenish gray, weak; about 15% interbedded dolomite, silty, light gray to greenish gray; some brownish gray	50	190
Shale, silty, grayish brown, weak; shale, silty, brown, brittle; a little dolomite, silty, grayish brown to greenish gray	25	215
Fort Atkinson Dolomite		
Dolomite, light buff, gray mottled, fine, pyritic; some coarse, fossiliferous; a little shale, light brown to brown, weak to brittle	20	235
Scales Shale (48′)		
Shale, silty, dolomitic, light grayish brown, weak; dolomite, silty, greenish gray to brown	10	245
Dolomite, argillaceous, grayish brown, very fine; some shale, brown, brittle	10	255
Shale, silty, dolomitic, grayish brown to brown, weak to brittle; some dolomite, as above	15	270
Shale, silty, dolomitic, brown, brittle, some weak; depauperate zone at base; a little dolomite, argillaceous, grayish brown, fine	13	283
Champlainian Series		
Galena Dolomite Group (212′)		
Dolomite, light grayish buff, fine to medium, slightly pyritic, oxidized and orange speckled at top	25	308
Dolomite, light grayish buff to buff, fine to medium; trace of pyrite	87	395
Dolomite, very slightly cherty, light gray to buff, fine to medium; a few dark gray pyritic specks and streaks	45	440
Dolomite, cherty to slightly cherty, buff, fine to medium	25	465
Dolomite, buff, fine to medium; dolomite, partly silty, light gray, fine; some mottled and speckled dark gray	14	479
Guttenberg Formation		
Dolomite, buff, fine to medium, partly red speckled; a few reddish brown shale partings at top; trace of sand and chert	16	495
Platteville Group (94′)		
Grand Detour Formation		
Dolomite, buff to gray, very fine	35	530
Mifflin Formation (30′)		
Dolomite, buff to grayish buff, fine to very fine; a few argillaceous partings, brown, black speckled	10	540
Dolomite, buff to gray, very fine to fine; some red speckled	20	560
Pecatonica Dolomite		
Dolomite, buff to grayish buff, very fine to fine; some gray pyritic streaks; a few argillaceous partings, reddish brown	29	589
Ancell Group (281′)		
Glenwood Formation (26′)		
Dolomite, very sandy (sand very fine), white with slight greenish tint, extra-fine; some uncemented sand, coarse	16	605
Sandstone, white, fine to coarse, friable, rounded; trace of dolomite, sandy, white, extra-fine	10	615
St. Peter Sandstone (255′)		
Sandstone, white, medium, friable, rounded, slightly silty in part	25	640
Sandstone, white, fine to medium, friable, rounded	105	745
Sandstone, pale pink, fine to medium, friable, rounded	77	822
Kress Member (48′)		
Sandstone, red, medium, friable, a few pieces cemented; chert, white; some shale, red	8	830
Sandstone, siliceous, yellow, red, very fine	7	837
Sandstone, silty, argillaceous, siliceous, pink, yellow, fine; chert, white, oolitic	23	860
Chert and crystalline quartz, white, red; shale, silty, red, weak	10	870
Cambrian System		
Croixan Series		
Potosi Dolomite		
Dolomite, grayish brown, fine, glauconitic; geodic quartz	5	875
Franconia Formation (85′)		
Dolomite, very sandy, grayish brown to pinkish brown, fine, glauconitic; shale, pinkish brown, light green, weak to brittle	15	890
Sandstone, silty, argillaceous, dolomitic, pink to red, fine, glauconitic; a little shale, pink, red, weak to brittle	60	950
Sandstone, silty, slightly dolomitic, slightly argillaceous, medium to fine, friable, glauconitic	10	960
Ironton Sandstone (120′)		
Mooseheart Member (15′)		
Sandstone, dolomitic, light yellowish gray, pink, medium, friable	5	965
Sandstone, slightly dolomitic, medium to coarse, friable	5	970
Sandstone, light pinkish buff, medium to coarse, friable	5	975
Marywood Member		
Sandstone, white to light pink, medium, friable, poorly sorted	20	995
Fox Valley Member		
Sandstone, slightly dolomitic, light pinkish buff, medium, friable; some grains cemented by dolomite	17	1012
Buelter Member (68′)		
Sandstone, pale pink, medium, friable, poorly sorted	13	1025
Sandstone, white, medium to fine, friable, rounded, moderately sorted	55	1080
Galesville Sandstone		
Sandstone, white, fine, friable, moderately sorted	15	1095
Eau Claire Formation (485′)		
Proviso Siltstone Member (225′)		
Sandstone, silty, dolomitic, red, fine, firm to friable; shale, silty, sandy, red, a little green and purple	23	1118

Shale, silty, greenish gray, weak to brittle; sandstone, dolomitic, silty, yellow, very fine, firm	7	1125
Sandstone, silty, dolomitic, argillaceous, very fine, friable, glauconitic; a little shale, salmon	10	1135
Siltstone, sandy, dolomitic, light yellowish brown, coarse, firm, glauconitic; a little shale; greenish gray, salmon, weak; siltstone grades to fine sandstone at base	45	1180
Shale, silty, greenish gray, weak; a little siltstone, as above	50	1230
Sandstone, dolomitic, silty, light brownish gray, medium, friable to firm; a little shale, light gray, weak	20	1250
Sandstone, silty, light yellowish gray, fine to medium, well to moderately sorted, friable	51	1301
Sandstone, dolomitic, silty, brownish gray, fine, partly friable	4	1305
Sandstone, white, medium, friable	10	1315
Sandstone, very dolomitic, slightly silty, grayish brown, fine, slightly friable	5	1320
Lombard Dolomite Member		
Dolomite, silty, sandy, brownish gray, very fine, glauconitic in lower 30′; shale partings, gray, weak	45	1365
Elmhurst Sandstone Member (215′)		
Shale, gray, weak to brittle	10	1375
Sandstone, silty, slightly dolomitic, buff to gray, fine to medium; some zones sooty (pyritic); interbedded shale, silty, gray, weak; some fossil fragments	150	1525
Shale, silty, slightly sandy, slightly dolomitic, gray, weak to brittle	40	1565
Sandstone, light gray, medium, friable, pyritic, slightly sooty	15	1580
Mt. Simon Sandstone (203′ sampled)		
Sandstone, light gray to pink, medium, poorly sorted; maximum grain size 1.5 mm	20	1600
Shale, silty, sandy, red, greenish gray, weak, micaceous	15	1615
Sandstone, pink to yellowish orange, medium with some very coarse grains, poorly sorted, friable, finer at base	90	1705
Shale, silty, red, greenish gray, weak, micaceous	15	1720
Sandstone, silty, yellow, medium, poorly sorted, friable; shale, greenish gray, brittle	30	1750
Sandstone, silty, light yellowish gray, fine, friable	5	1755
Sandstone, yellowish orange, medium, poorly sorted; some very coarse grains	28	1783

3. Milaeger Well Co.—City of Crystal Lake

Well in SE SE SW sec. 33, T. 44 N., R. 8 E., McHenry County; elevation 929 feet; SS 22983; total depth 1,355 feet.

	Thickness (feet)	*Depth (feet)*
(No samples above 350′)		
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (171′ sampled)		
Dolomite, slightly cherty, light brownish gray to light greenish gray, fine to coarse; some shale at base, light greenish gray, weak	35	385
Dolomite, cherty, light brownish gray, some greenish gray, fine to medium, pyritic; some chert, black speckled	35	420
Dolomite, cherty, light grayish brown, some greenish brown, fine to coarse; dolomite, light gray, dark gray mottled, black speckled, fine to medium	35	455
Dolomite, argillaceous, grayish brown to light gray, trace of pink, fine to very coarse; a little shale, tan to brown, brittle, pyritic. Shale increases toward base	66	521
Galena Dolomite Group (209′)		
Dolomite, buff, fine to medium, crystalline; a few pieces of chert	104	625
Dolomite, as above; dolomite, light gray to grayish buff, black speckled; a few reddish brown, argillaceous partings	25	650
Dolomite, grayish buff to buff, fine to medium, a few dark gray specks; trace of chert	80	730
Platteville Group (112′)		
No samples	15	745
Grand Detour Formation (60′)		
Dolomite, grayish buff to gray, very fine to fine; trace of chert	50	795
Dolomite, light brownish gray, very fine, dense	10	805
Mifflin Formation		
Dolomite, buff, very fine, dense; a few red specks; reddish brown argillaceous partings; trace of chert	20	825
Pecatonica Dolomite		
Dolomite, grayish brown, fine to medium, sandy at base	17	842
Ancell Group (243′)		
Glenwood Formation (58′)		
Sandstone, very fine; shale, sandy, light green, weak	3	845
Sandstone, white to light gray, fine and coarse, poorly sorted, friable; dolomite, sandy, light green to light grayish brown, very fine	40	885
Sandstone, silty, argillaceous, fine and coarse, poorly sorted, friable; dolomite, sandy, light green; trace of chert	15	900
St. Peter Sandstone (185′)		
Sandstone, light yellowish gray, medium, friable, rounded	15	915
Sandstone, silty, white to light yellowish gray, fine, friable	15	930
Sandstone, white to yellowish orange, medium, friable, rounded	50	980
Sandstone, slightly silty, light yellowish gray, fine to medium, friable	25	1005
Sandstone, silty, fine, friable	20	1025
Sandstone, light yellowish orange, medium, friable, rounded	30	1055
Kress Member (30′)		
Sandstone, pink, medium, friable; chert, white, oolitic; some free oolites, coarse, rounded	20	1075
Sandstone, red, medium, friable; quartz; a little shale, silty, purple, light blue	10	1085
Cambrian System		
Croixan Series		
Potosi Dolomite (25′)		
Dolomite, slightly sandy, light pinkish gray, fine, slightly glauconitic	10	1095
Dolomite, slightly sandy, yellowish gray to pinkish gray, fine, glauconitic	15	1110
Franconia Formation (62′)		
Shale, dolomitic, sandy, pink, red, light green, weak	5	1115
Sandstone, light gray, fine to medium, friable, glauconitic; dolomite, sandy, pinkish buff, fine; shale, red, green, brittle	5	1120
Dolomite, very sandy, pinkish buff to red, fine, glauconitic; sandstone; shale, red, pink, weak	5	1125
Sandstone, silty, dolomitic, pinkish brown, fine, friable, glauconitic; shale, pink to red, weak to brittle; some dolomite, sandy, pinkish buff, fine	40	1165
Shale, silty, sandy, dolomitic, pink, red, green, weak	7	1172
Ironton Sandstone (128′)		
Mooseheart Member (23′)		
Sandstone, slightly dolomitic, light gray, coarse, friable	3	1175
Sandstone, very slightly dolomitic, grayish orange, medium, friable, poorly sorted	10	1185
Sandstone, light yellowish gray, medium, friable, poorly sorted	10	1195
Marywood Member		
Sandstone, light yellowish gray to pinkish buff, medium, moderately sorted, friable	30	1225
Fox Valley Member		
Sandstone, slightly dolomitic, pinkish buff, medium, poorly sorted, friable; maximum grain size 1.0 mm; a little dolomite, pink	15	1240
Buelter Member		
Sandstone, light yellowish gray to pinkish brown, medium, moderately sorted; at 1285 to 1290′—a little sandstone, dolomitic, pink, fine	60	1300
Galesville Sandstone (55′)		
Sandstone, light pinkish buff, fine, friable	30	1330

Sandstone, pinkish buff, fine to medium, friable; a little dolomitic sandstone, pink, fine, firm	10	1340
Sandstone, slightly silty, pinkish buff, fine	15	1355

8. H. Boysen, Jr.—Wildwood Subdivision No. 2

Well in SW SW SW sec. 29, T. 45 N., R. 11 E., Lake County; elevation 780 feet; SS 21332; total depth 1,310 feet for original well; later deepened to 1,845 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 370′)		
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (205′)		
Neda Formation		
Shale, silty, red, weak; dolomite, pale green, fine, possibly caved	20	390
Brainard Shale (85′)		
Shale, silty, dolomitic, light greenish gray to gray, weak; dolomite, light gray to gray with black streaks, fine	35	425
Shale, silty, dolomitic, greenish gray, weak; some dolomite, silty, greenish gray, very fine	50	475
Fort Atkinson Dolomite		
Dolomite, light gray, fine; a little interbedded shale	13	488
Scales Shale (87′)		
Shale, silty, dolomitic, brownish gray to olive, weak; a little dolomite, silty, grayish brown, fine; some black speckled dolomite	77	565
Shale, silty, dolomitic, greenish gray to gray, weak	10	575
Champlainian Series		
Galena Dolomite Group (185′)		
Dolomite, silty, gray to grayish brown, fine to medium; some orange speckled dolomite	5	580
Dolomite, pale yellowish brown, medium to fine; a few brown argillaceous partings	85	665
Dolomite, pale yellowish brown, medium; some dark gray speckled dolomite	50	715
Dolomite, slightly cherty, light yellowish brown to grayish brown, fine to medium	29	744
Dolomite, light gray to grayish buff with dark gray streaks, fine	9	753
Guttenberg Formation		
Dolomite, light gray to grayish brown, fine; some black and red speckles	7	760
Platteville Group (105′)		
Nachusa Formation		
Dolomite, buff to grayish buff, fine; a few reddish brown shale partings at base	30	790
Grand Detour Formation		
Dolomite, light gray to brownish gray with dark gray mottling, very fine, dense	30	820
Mifflin Formation (20′)		
Dolomite, light gray, mottled dark gray, very fine, orange speckled	5	825
Dolomite, brownish gray, extra-fine to very fine, dark gray mottling; a few reddish brown argillaceous partings and red specks	15	840
Pecatonica Dolomite		
Dolomite, brownish gray, dark gray mottled, very fine, partly sandy in lower 5′	25	865
Ancell Group (210′)		
Glenwood Formation (60′)		
Loughridge Sandstone Member		
Sandstone, silty, argillaceous, dolomitic, light gray, fine to coarse; grades to dolomite at base	35	900
Daysville Dolomite Member		
Dolomite, sandy, white to pale green, lithographic; shale, sandy, white	20	920
Kingdom Sandstone Member		
Sandstone, dolomitic, silty, argillaceous, medium; shale, light green, weak	5	925
St. Peter Sandstone (150′)		
Sandstone, silty, light yellowish gray, medium, friable, partly pink in lower 35′. Samples are argillaceous and dolomitic—probably contaminated	80	1005
Sandstone, silty, argillaceous, pink to reddish brown, fine to medium (poor samples)	30	1035
Kress Member (40′)		
Shale, silty, sandy, dark red, green, weak; sandstone, red, medium; chert, white	15	1050
Sandstone, silty, argillaceous, red, medium, poorly sorted, subangular; trace of chert	20	1070
Shale, dark red, light green, weak; sandstone; chert; geodic quartz	5	1075
Cambrian System		
Croixan Series		
Potosi Dolomite		
Dolomite, light pinkish buff, fine, glauconitic; shale, salmon, red, weak. Samples appear weathered below unconformity	15	1090
Franconia Formation (63′)		
Sandstone, silty, dolomitic, reddish brown, fine, glauconitic; shale, silty, red, weak	10	1100
Shale, silty, sandy, dolomitic, dark red and a little light green, weak. Deep weathering or poor samples	53	1153
Ironton Sandstone (107′)		
Sandstone, silty, red to pink, medium, moderately to poorly sorted, friable; maximum grain size 1.0 mm	40	1193
Sandstone, slightly silty, medium, moderately sorted, friable; trace of pink dolomite	22	1215
Sandstone, white, medium, poorly sorted, friable	20	1235
Sandstone, white, fine to medium, moderately sorted, friable	9	1244
Sandstone, dolomitic, pinkish buff, fine, well sorted, firm	9	1253
Sandstone, pale pink, medium, poorly sorted, friable; maximum grain size .90 mm	7	1260
Galesville Sandstone		
Sandstone, silty, very slightly dolomitic, fine, moderately sorted; maximum grain size .50 mm	30	1290
Eau Claire Formation (20′ sampled)		
Shale, silty, red, hard; sandstone, silty, very fine, firm, glauconitic	5	1295
Sandstone, silty, dolomitic, red, very fine, firm to friable	5	1300
Shale, red to maroon, weak, micaceous	5	1305
Sandstone, silty, very fine, reddish brown, friable, glauconitic	5	1310

15. Layne-Western Co.—City of Elgin No. 5

Well in SW NE NE sec. 11, T. 41 N., R. 8 E., Kane County; elevation 750 feet; SS 20946; total depth 1,225 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 60′)		
Silurian System		
Dolomite, buff to yellowish brown, fine	4	64
Ordovician System		
Cincinnatian Series		
Maquoketa Group (211′)		
Shale, silty, dolomitic, light green, weak	11	75
Shale, silty, dolomitic, light greenish gray, weak; dolomite, silty, argillaceous, light greenish gray with a few black specks and streaks	45	120
Dolomite, argillaceous, silty, light gray to gray, medium to coarse, black speckled	15	135
Shale, silty, dolomitic, olive, weak; dolomite, as above	10	145
Dolomite, silty, argillaceous, light gray to olive, fine to medium, black speckled; shale, silty, light olive, weak	30	175
Dolomite, silty, argillaceous, grayish brown, fine to coarse, black speckled; trace of chert; a few shale partings, brown, brittle	70	245

Shale, silty, dolomitic, dark brownish gray, brittle, pyritic at base	30	275
Champlainian Series		
Galena Dolomite Group (185′)		
Dolomite, light grayish brown, fine to medium	50	325
Dolomite, light yellowish gray to light yellowish brown, fine to medium	40	365
Dolomite, light yellowish gray, fine to medium, slightly porous	50	415
Dolomite, cherty, light grayish brown, fine to medium	10	425
Dolomite, light brownish gray, fine to medium; a few dark gray specks in lower part	23	448
Dolomite, light gray, black speckled, fine to medium	9	457
Guttenberg Formation		
Dolomite, buff, fine to coarse, red speckled; reddish brown shale partings	3	460
Platteville Group (119′)		
Nachusa Formation (30′)		
Dolomite, slightly cherty, light gray, very fine to fine; calcite crystals	5	465
Dolomite, cherty, light yellowish brown, fine to medium	10	475
Dolomite, light yellowish brown to light gray, fine to medium	15	490
Grand Detour Formation (40′)		
Dolomite, light gray to light grayish brown with some gray mottling, fine	5	495
Dolomite, slightly cherty, grayish brown, fine to medium	5	500
Dolomite, light gray to light brown with gray mottling in upper half, very fine	30	530
Mifflin Formation (20′)		
Dolomite, light gray to light brownish gray with a little gray mottling, very fine; some orange speckling; a few brownish gray, argillaceous streaks	15	545
Dolomite, light brownish gray, fine; a few reddish brown argillaceous specks and argillaceous partings	5	550
Pecatonica Dolomite (29′)		
Dolomite, grayish brown, fine, cherty at top	10	560
Dolomite, light brownish gray to light grayish brown with some gray mottling, fine; trace of sand at base	19	579
Ancell Group (174′)		
Glenwood Formation (77′)		
Loughridge Sandstone Member (56′)		
Sandstone, dolomitic, fine to coarse, white to light brownish gray	6	585
Sandstone, white, fine and coarse, friable	50	635
Daysville Dolomite Member		
Dolomite, sandy, light gray, light green, extra-fine; some sandstone, medium, white, friable; a little shale, green, brittle	21	656
St. Peter Sandstone (97′)		
Sandstone, white, medium, rounded, friable	59	715
Sandstone, white, fine, friable	10	725
Sandstone, white, medium, rounded, friable	23	748
Kress Member		
Chert, white, partly oolitic; a little sandstone, coarse; shale, green	5	753
Canadian Series		
Prairie du Chien Group (42′)		
Oneota Dolomite (42′)		
Arsenal Member (42′)		
Dolomite, cherty (partly chalky), very light gray, coarse; trace of sand and green shale	12	765
Dolomite, very cherty (chert is white, mostly chalky) light grayish brown, very fine, dense; some light gray and light green shale	10	775
Dolomite, slightly cherty, light gray, pink, light greenish gray, very fine, slightly glauconitic; at top—a little shale, white, weak	10	785
Dolomite, light yellowish gray, light pink, light green, fine to coarse	10	795
Cambrian System		
Croixan Series		
Eminence Dolomite (80′)		
Dolomite, partly sandy, light gray, light green, fine, slightly glauconitic	15	810
Dolomite, sandy, light gray, pink, light green, fine	7	817
Sandstone, white, fine to very coarse; a little chert, white, oolitic; trace of shale, green, weak	8	825
Dolomite, sandy to slightly sandy, light gray, pink, light green, fine, slightly glauconitic	40	865
Dolomite, light gray, fine to medium, slightly glauconitic	10	875
Potosi Dolomite (75′)		
Dolomite, light brownish gray, very fine, crystalline	10	885
Dolomite, light yellowish gray, very fine, crystalline, very slightly glauconitic; geodic quartz	15	900
Dolomite, light buff, faintly pinkish buff, very fine, very slightly glauconitic	14	914
Dolomite, light brownish gray to pink, very fine to fine, glauconitic	26	940
Dolomite, partly sandy, pinkish buff to light yellowish brown with pink mottling, fine, glauconitic	10	950
Franconia Formation (80′)		
Sandstone, very dolomitic, pinkish buff, red, fine, glauconitic, firm; shale, red, green, weak	15	965
Shale, silty, reddish brown to red, weak to brittle	20	985
Sandstone, silty, pinkish brown, fine, friable, glauconitic; a little shale, red	28	1013
Sandstone, dolomitic, greenish gray, fine, firm, glauconitic; shale, green, weak; sandstone, oxidized pinkish buff at base	10	1023
Shale, silty, sandy, reddish brown, weak, glauconitic	7	1030
Ironton Sandstone (142′)		
Sandstone, slightly dolomitic, medium, poorly sorted, friable; maximum grain size 1.4 mm	5	1035
Sandstone, slightly silty, pale yellowish gray, medium, moderately to poorly sorted, friable; maximum grain size 1.1 mm	30	1065
Sandstone, silty, medium, poorly sorted, friable	5	1070
Sandstone, medium, poorly sorted, friable; a little pink dolomite	15	1085
Sandstone, partly silty, white, medium, moderately to poorly sorted, friable; maximum grain size 1.2 mm	25	1110
Sandstone, dolomitic (some pinkish), medium, moderately sorted	5	1115
Sandstone, slightly silty, white, medium, moderately sorted, friable; at base—dolomite, silty, argillaceous, partly sandy, grayish brown, very fine; a little shale, olive, hard	57	1172
Galesville Sandstone (44′)		
Sandstone, slightly silty, fine, moderately sorted, friable; maximum grain size .75 mm	18	1190
Sandstone, white, medium to fine, moderately sorted, friable	10	1200
Sandstone, white, fine, moderately sorted, friable; maximum grain size .60 mm	16	1216
Eau Claire Formation		
Shale, silty, greenish gray, gray, brittle; sandstone, fine to medium; siltstone, dolomitic, yellowish gray, firm	9	1225

17. C. Neely—City of St. Charles No. 6

Well in NW SE NW sec. 34, T. 40 N., R. 8 E., Kane County; elevation 750 feet; SS 25360; total depth 2,240 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 115′)		
Silurian System		
Dolomite, light grayish buff, fine	5	120
Ordovician System		
Cincinnatian Series		
Maquoketa Group (172′)		
Dolomite, silty, partly argillaceous, light greenish gray to brownish gray, partly black speckled, very fine; shale, silty, light greenish gray, weak	35	155
Dolomite, silty, cherty (chert is black speckled), light buffish gray to light greenish gray, very fine	40	195

Dolomite, silty, argillaceous, light gray to gray, black speckled, fine; a little shale, silty, dolomitic, light gray to brownish gray, weak	25	220
Shale, silty, dolomitic, gray, weak; a little dolomite, as above	20	240
Shale, silty, dolomitic, grayish brown to brown, weak to brittle; dolomite, silty, greenish gray to brownish gray, very fine	35	275
Shale, silty, dolomitic, brown; dolomite, gray, very fine; depauperate zone (sample out of place?)	5	280
Shale, silty, dolomitic, brownish gray, weak; dolomite, light gray to brown, mottled, fine to coarse, pyritic	12	292
Champlainian Series		
Galena Dolomite Group (198′)		
Dolomite, buff to grayish buff, fine to medium; some dark gray pyritic specks	172	464
Dolomite, light gray to grayish buff, fine to medium; some black specks; a few red specks at base	26	490
Platteville Group (145′)		
Nachusa Formation (55′)		
Dolomite, light gray to light brownish gray, fine	25	515
Dolomite, slightly silty, light buff, fine to medium; a few reddish brown argillaceous streaks (caved Galena?); dolomite, light gray to gray, mottled, fine; a few black specks	30	545
Grand Detour Formation		
Dolomite, light brownish gray, mottled dark gray, very fine, dense	15	560
Mifflin Formation		
Dolomite, silty, light brownish gray, mottled dark gray in part, very fine to fine; a few orange specks	45	605
Pecatonica Dolomite (30′)		
Dolomite, partly silty, light grayish brown, fine	20	625
Dolomite, slightly sandy, light grayish brown with faint gray mottling, fine	10	635
Ancell Group (457′)		
Glenwood Formation (80′)		
Loughridge Sandstone Member		
Sandstone, slightly dolomitic, white, fine to medium, friable	55	690
Daysville Dolomite Member		
Dolomite, sandy, light gray to light green, very fine; sandstone, white, fine and coarse, friable	10	700
Kingdom Sandstone Member		
Sandstone, light gray, medium, friable, pyritic (slightly sooty)	15	715
St. Peter Sandstone (377′)		
Sandstone, white, fine to medium, rounded, friable	25	740
Sandstone, white, fine, friable	35	775
Sandstone, white, medium, rounded, friable	60	835
Sandstone, light yellowish gray to white, fine to medium, friable, light pink at base	175	1010
Kress Member (82′)		
Shale, silty, sandy, green, weak, glauconitic	5	1015
Sandstone, pink, fine to medium, friable; chert, pink, yellow, partly oolitic	15	1030
Shale, silty, red, green, weak; chert, pink	15	1045
Sandstone, white to pink, medium, friable; a little chert, white	10	1055
Shale, silty, red, weak; a little chert	5	1060
Chert, dolomite, and quartz, pink; shale, red, light blue; coarse sand	10	1070
Shale, red, purple, light blue, brittle; chert	22	1092
Cambrian System		
Croixan Series		
Franconia Formation (62′)		
Sandstone, silty, slightly dolomitic, red, light gray at base, friable to firm, glauconitic; shale, red, light blue, weak. Rocks appear weathered beneath unconformity	38	1130
Sandstone, dolomitic, light gray, fine, glauconitic, friable to firm; dolomite, silty, sandy, gray, glauconitic, fine; a little shale, green, weak	15	1145
Sandstone, very dolomitic, silty, light brownish gray, fine; dolomite, silty, greenish gray, fine	9	1154
Ironton Sandstone (141′)		
Mooseheart Member (56′)		
Sandstone, slightly dolomitic, light pinkish gray, medium, friable, poorly sorted; maximum grain size 1.3-1.5 mm; a few grains firm in dolomite	21	1175
Sandstone, slightly dolomitic, pale pinkish gray, medium, friable, moderately sorted; maximum grain size 1.2 to 1.5 mm; a few grains firm in light pink dolomite streaks	35	1210
Marywood Member		
Sandstone, white, medium, friable, poorly sorted	25	1235
Fox Valley Member		
Sandstone, white, medium, poorly sorted; maximum grain size 1.2 mm; dolomite streaks, white, pink	10	1245
Buelter Member		
Sandstone, white, medium, friable, moderately sorted; maximum grain size 1.2 mm	50	1295
Galesville Sandstone (40′)		
Sandstone, white, fine, moderately sorted, friable; maximum grain size .75 mm	5	1300
Sandstone, white, medium, moderately sorted, friable; maximum grain size 1.0 mm	25	1325
Sandstone, white, fine, moderately sorted, friable; maximum grain size .75 mm; at base—dolomite, sandy, pink	10	1335
Eau Claire Formation (390′)		
Proviso Siltstone Member (205′)		
Sandstone, dolomitic, light gray, very fine, firm; dolomite, sandy, light yellowish gray, fine	5	1340
Dolomite, sandy, light yellowish gray to brownish gray, fine; sandstone, white, fine; shale, silty, greenish gray, weak to brittle	15	1355
Sandstone, dolomitic, yellowish gray to yellowish orange, very fine; grades to siltstone, dolomitic, firm, glauconitic; shale, silty, greenish gray, brittle; a little dolomite, sandy, brown, very glauconitic	65	1420
Siltstone, dolomitic, sandy, orange, firm, micaceous; dolomite, gray to brown, medium, very glauconitic; a little shale, green, pink, brittle	60	1480
Sandstone, dolomitic, light brownish gray, fine to medium, firm to friable, glauconitic; at top—dolomite, sandy, light gray, medium	60	1540
Lombard Dolomite Member (180′)		
Dolomite, sandy, light gray to gray, mottled, fine, glauconitic	25	1565
Dolomite, sandy, calcitic, light gray to grayish brown, very fine	15	1580
Dolomite, very calcitic, sandy, silty, light grayish brown to brownish gray, very fine to medium; some limestone, dolomitic, sandy, brownish gray, dense; a little shale, greenish gray to tan, brittle to weak	50	1630
Dolomite, silty, sandy, slightly calcitic, light grayish brown, fine; coarse glauconite; shale, silty, greenish gray, brittle to weak	25	1655
Dolomite, sandy to very sandy, silty, light buffish gray, very fine to medium, glauconitic; shale, silty, greenish gray, brittle to weak	40	1695
Shale, silty, gray, brittle to weak	15	1710
Sandstone, very dolomitic; grades to dolomite, very sandy, silty, very fine; shale, silty, gray, brittle	10	1720
Elmhurst Sandstone Member		
Sandstone, light gray, fine, friable, pyritic, sooty	5	1725
Mt. Simon Sandstone (515′ sampled)		
Charter Member (300′)		
Sandstone, white, pale yellow, pink, medium to coarse, friable, poorly sorted; maximum grain size 1.8 mm	40	1765
Sandstone, pale pink, medium, friable, poorly sorted; maximum grain size 1.5 mm	75	1840
Sandstone, pale yellow, medium; bimodal sorting; very fine pebbles	10	1850
Sandstone, pink, medium, poorly sorted, friable; some very fine pebbles; a little red shale at 1890-1900′	140	1990
Sandstone, pink, coarse, friable, moderately sorted	15	2005
Shale, silty, red, weak, micaceous; sandstone, red, coarse, friable	15	2020
Sandstone, pink, fine and very coarse, friable; bimodal sorting; very fine pebbles	5	2025

Gunn Member

Sandstone, pink, fine to medium, friable, moderately to well sorted	150	2175

Lacey Member

Sandstone, light yellowish pink to pink, medium to coarse, friable, poorly sorted; very fine pebbles	65	2240

18. Layne-Western Co.—Elburn Packing Co. No. 4

Well in NE sec. 6, T. 39 N., R. 7 E., Kane County; elevation 845 feet; SS 23989; total depth 1,345 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 165′)		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, silty, slightly cherty, light buff to yellowish buff, very fine	7	172
Edgewood Formation		
Dolomite, sandy, silty, light gray, very fine	3	175
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (140′)		
Dolomite, white to light gray, black speckled, fine to coarse, fossiliferous; at top—a little shale, pale green, weak	15	190
Dolomite, partly argillaceous, white to light green, fine to medium, pyritic	10	200
Shale, very silty, red, pink, purple, weak; dolomite, light green, yellowish brown, gray, very fine	5	205
Shale, silty, dolomitic, light green, weak; dolomite, silty, light gray to light grayish brown, black speckled, very fine	10	215
Dolomite, silty, argillaceous, gray to grayish brown, black speckled, fine to medium, pyritic; a trace of depauperate zone at base	13	228
Shale, silty, dolomitic, gray to brownish gray, weak; dolomite, silty, argillaceous, brownish gray, black speckled, fine to medium	42	270
Shale, silty, dolomitic, brownish gray to grayish brown, weak; dolomite, silty, argillaceous, gray to grayish brown, fine; depauperate zone at 300′	40	310
Shale, silty, dolomitic, light gray to pale green, weak; a little sphalerite	5	315
Champlainian Series		
Galena Dolomite Group (190′)		
Dolomite, light yellowish brown to light yellowish gray, fine; a trace of chert at 345-405′	140	455
Dolomite, slightly cherty, light yellowish gray, fine to medium	30	485
Dolomite, light yellowish gray, fine to medium; some gray specks	10	495
Guttenberg Formation		
Dolomite, pale brownish gray; gray specks; a trace of red speckling	10	505
Platteville Group (115′)		
Dolomite, pale brownish gray to very light gray, very fine to medium	10	515
Dolomite, slightly cherty, pale yellowish brown, pink, very fine to fine; a few bluish green argillaceous pockets	30	545
Dolomite, slightly silty, light gray, very fine; some dolomite with faint green tint	5	550
Dolomite, light yellowish brown, very fine to fine	15	565
Dolomite, light gray to pale grayish brown, very fine; some dolomite with green tint	15	580
Dolomite, partly silty, slightly argillaceous, light grayish brown, light gray, light green, very fine to fine; bentonite	10	590
No sample	5	595
Pecatonica Dolomite		
Dolomite, light grayish brown, very fine to fine, slightly sandy at base	25	620
Ancell Group (340′)		
Glenwood Formation (78′)		
Loughridge Sandstone Member (65′)		
Sandstone, dolomitic, pale yellowish gray, fine, friable, subrounded	15	635
Sandstone, white, fine, friable, subrounded	35	670
Sandstone, white, fine to coarse, friable; dolomite, sandy, light gray to light green, extra-fine	15	685
Daysville Dolomite Member		
Dolomite, sandy, slightly argillaceous, light yellowish gray to light green, extra-fine	13	698
St. Peter Sandstone (262′)		
Sandstone, white, medium, friable, rounded	22	720
Sandstone, light yellowish gray, fine, friable	130	850
Sandstone, light yellowish gray, medium, friable	20	870
Sandstone, light yellowish gray, fine, friable	5	875
Sandstone, light yellowish gray, medium, friable	15	890
Sandstone, light yellowish gray, fine, friable	33	923
Kress Member		
Chert, white, pink, oolitic; sandstone, pink, medium, friable; shale, red, brittle	37	960
Cambrian System		
Croixan Series		
Eminence Formation (48′)		
Dolomite, very sandy, pale yellowish gray, light grayish brown, pink, fine, slightly glauconitic; sandstone, dolomitic, white, medium	10	970
Dolomite, slightly sandy, light gray, pink, pale green, extra-fine, dense, slightly glauconitic	15	985
Sandstone, very dolomitic, pale yellowish gray, pink, fine; grades to dolomite, very sandy, light yellowish gray, fine, glauconitic	7	992
Dolomite, partly sandy, light yellowish gray, very fine, slightly glauconitic	6	998
Dolomite, light brownish gray, very fine, slightly glauconitic; a trace of chert, white, chalky	10	1008
Potosi Dolomite (79′)		
Dolomite, pinkish buff to red, red speckled, very fine, very slightly glauconitic; dark red dolomite at base	17	1025
Dolomite, pinkish brown to dark red, fine to very fine, red speckled; free sand, medium (caved)	40	1065
Dolomite, pale yellowish brown, pink, very fine to fine, glauconitic; some red speckled dolomite	22	1087
Franconia Formation (73′)		
Sandstone, very dolomitic, light yellowish gray, very fine to fine, glauconitic, friable to firm; shale, green, weak	10	1097
Sandstone, dolomitic, argillaceous, pink to red, fine, friable to firm, glauconitic; dolomite, sandy, red	13	1110
Sandstone, silty, dolomitic, yellowish brown, fine, glauconitic; a little chert and green shale	10	1120
Shale, silty, sandy, grayish green, weak; sandstone, silty, argillaceous, dolomitic, light greenish gray, very fine to fine, friable, glauconitic	30	1150
Sandstone, very dolomitic, silty, argillaceous, greenish gray, pinkish gray, fine, firm to friable, glauconitic	10	1160
Ironton Sandstone (145′)		
Mooseheart Member (50′)		
Sandstone, dolomitic, light gray to yellowish gray, medium, friable, poorly sorted; maximum grain size 1.0 mm; a few grains firm in dolomite streaks	25	1185
Sandstone, slightly silty, pale grayish orange, medium, friable, moderately sorted	25	1210
Marywood Member		
Sandstone, silty, slightly dolomitic, fine to medium, friable, poorly sorted; maximum grain size .75 mm	15	1225
Fox Valley Member		
Sandstone, white, medium, friable, poorly sorted; maximum grain size 1.0 mm; dolomite, sandy, pink	10	1235
Buelter Member		
Sandstone, white, medium, friable, moderately to poorly sorted; maximum grain size 1.0 mm	70	1305

Galesville Sandstone

Sandstone, white, fine, moderately sorted, friable; maximum grain size .50-.65 mm; some sandstone, medium	40	1345

19. J. P. Miller Co.—City of Batavia No. 3

Well in SE SW NE sec. 22, T. 39 N., R. 8 E., Kane County; elevation 670 feet; SS 6901; total depth 2,200 feet. Type well of the Buelter, Fox Valley, Marywood, and Mooseheart Members of the Ironton Sandstone.

	Thickness (feet)	Depth (feet)
(No samples above 60')		
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (150' sampled)		
Brainard and Fort Atkinson Formations (110' sampled)		
Dolomite, light gray to light grayish buff, fine to medium, slightly glauconitic; some small buff pellets; trace of argillaceous material between some crystals; trace of chert	10	70
Dolomite, as above; some black specks; dolomite, silty, argillaceous, green, fine	25	95
Dolomite, slightly cherty, slightly silty, slightly argillaceous, white, light green, light brownish gray, fine	39	134
Dolomite, silty, slightly argillaceous, slightly cherty, gray to brownish gray, black speckled, very fine to fine; some small fossils at base	36	170
Scales Shale		
Shale, dolomitic, silty, grayish brown; a little dolomite, silty, argillaceous, grayish brown, very fine	40	210
Champlainian Series		
Galena Dolomite Group (180')		
Dolomite, light gray to light grayish brown, fine to medium; trace of chert	170	380
Dolomite, light gray to light brownish gray, dark gray speckled, fine	10	390
Platteville Group (135')		
Nachusa Formation (45')		
Dolomite, light gray to gray, fine to very fine	10	400
Dolomite, light grayish brown to light gray, fine	35	435
Grand Detour Formation (35')		
Dolomite, light gray to light grayish brown, mottled dark gray, extra-fine	15	450
Dolomite, light grayish brown, extra-fine	20	470
Mifflin Formation		
Dolomite, light brownish gray to brownish gray, very fine; some dolomite, argillaceous, greenish gray	20	490
Pecatonica Dolomite (35')		
Dolomite, light grayish brown, very fine, pyritic; a little sandy conglomerate	5	495
Dolomite, sandy at base, light grayish brown, fine; trace of chert	30	525
Ancell Group (350')		
Glenwood Formation (65')		
Loughridge Sandstone Member		
Sandstone, argillaceous and dolomitic at top, white to light gray, fine to medium	48	573
Daysville Dolomite Member		
Sandstone, dolomitic, silty, argillaceous, light yellowish gray, very fine to coarse, bimodal	17	590
St. Peter Sandstone (285')		
Sandstone, white, fine to medium, uncemented, iron-stained in lower 35 feet	250	840
Kress Member		
Chert, white, yellow, pink, oolitic; sandstone, medium; dolomite, buff, fine; a little shale, red, brittle	35	875
Cambrian System		
Croixan Series		
Eminence Formation (45')		
Dolomite, sandy, pinkish buff to pink, fine; free sand and oolitic chert	15	890
Dolomite, slightly sandy, light gray, pink, red, very fine, slightly glauconitic; a little shale, white, pink, weak	30	920
Potosi Dolomite (100')		
Dolomite, light yellowish gray, pink, very fine to fine; geodic quartz; chert at base	15	935
Dolomite, pinkish buff, red speckled, very fine; a little geodic quartz; some shale and clay (crevice fill)	85	1020
Franconia Formation (72')		
Dolomite, sandy, pinkish buff, fine, slightly glauconitic; sandstone, dolomitic, greenish gray to reddish brown, fine, glauconitic; shale, salmon, weak	10	1030
Sandstone, dolomitic, silty, greenish gray, fine, glauconitic; at top—dolomite, partly sandy, silty, greenish gray, pink, red, fine	25	1055
Shale, silty, dolomitic, greenish gray, weak	7	1062
Sandstone, silty, dolomitic, greenish gray, fine, glauconitic; a little shale, green, red, weak	13	1075
Shale, silty, sandy, greenish gray, red, weak	9	1084
Sandstone, very dolomitic, gray to greenish gray, very fine, glauconitic, firmly cemented	8	1092
Ironton Sandstone (138')		
Mooseheart Member		
Sandstone, dolomitic, medium (median grain size .40 mm), poorly sorted; maximum grain size 1.3 mm	28	1120
Marywood Member		
Sandstone, silty, slightly dolomitic, medium (.35 mm), moderately to poorly sorted	48	1168
Fox Valley Member		
Sandstone, dolomitic, slightly silty, white, medium (.40 mm), poorly sorted; maximum grain size 1.0 mm; some dolomite, pale pink	12	1180
Buelter Member (50')		
Sandstone, very slightly dolomitic, white, medium (.35 mm), moderately sorted; maximum grain size .80 mm	10	1190
Sandstone, slightly silty, medium (.40 mm), poorly to moderately sorted; maximum grain size .95-1.2 mm	40	1230
Galesville Sandstone (55')		
Sandstone, silty (5-10%), white, fine (.18-.22 mm), moderately to well sorted, uncemented; maximum grain size .75-.90 mm	40	1270
Sandstone, silty, yellowish gray, medium (.30 mm), moderately sorted; maximum grain size .90 mm	5	1275
Sandstone, silty, slightly dolomitic, yellowish gray, fine (.20 mm), well sorted; maximum grain size .50 mm	10	1285
Eau Claire Formation (375')		
Proviso Siltstone Member (203')		
Sandstone, silty, argillaceous, dolomitic, light grayish brown, fine; shale, silty, greenish gray, weak to brittle	10	1295
Interbedded: siltstone, dolomitic, grayish orange, coarse, firm, glauconitic; and shale, silty, greenish gray, pinkish gray, micaceous, weak to brittle	135	1430
Shale, silty, sandy, olive to light gray, weak	30	1460
Sandstone, silty, slightly dolomitic, fine	28	1488
Lombard Dolomite Member (162')		
Sandstone, as above; grades to dolomite, sandy, silty, light brownish gray, fine to medium	12	1500
Sandstone; shale; dolomite, very calcitic, light gray	10	1510
Interbedded: dolomite, calcitic, sandy, silty, light brownish gray, very fine, glauconitic; and shale, silty, greenish gray, weak	90	1600
Dolomite, silty, sandy, light buff, coarse to fine; coarse glauconite	9	1609
Interbedded: shale, silty, greenish gray to tan, brittle to weak; and dolomite, silty, sandy, light buffish gray, fine, slightly glauconitic	41	1650
Elmhurst Sandstone Member		
Sandstone, light gray, fine, pyritic; shale as above	10	1660

Mt. Simon Sandstone (540′ sampled)

Charter Member (285′)

Sandstone, silty at top, light gray, yellowish orange, pink, medium to coarse (.40-.52 mm), moderately to poorly sorted; maximum grain size 1.3-2.6 mm	270	1930
Sandstone, as above; a little shale, red, weak, micaceous	10	1940
Sandstone, silty, yellowish orange, medium (.30 mm), moderately sorted; maximum grain size 1.0 mm	5	1945

Gunn Member

Sandstone, slightly silty, pink, medium (.25-.35 mm), moderately sorted; maximum grain size .80-1.7 mm	130	2075

Lacey Member

Sandstone, silty at top, pink to yellowish pink, medium to coarse (.35-.55 mm), poorly sorted; maximum grain size 1.5-2.1 mm	125	2200

21. Layne-Western Co.—City of Aurora No. 16

Well in SE NW NW sec. 34, T. 38 N., R. 8 E., Kane County; elevation 655 feet; SS 22141; total depth 2,139 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 80′)		
Silurian System		
Dolomite, cherty, light gray to yellow, oxidized, very fine to fine	5	85
Dolomite, light gray, fine to medium, porous; a trace of glauconite	5	90
Dolomite, slightly argillaceous, slightly cherty, light gray to light green, fine to medium	5	95
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (155′)		
Dolomite, slightly argillaceous, light green, yellow, red, fine to coarse, fossiliferous; a little shale, purple, weak	5	100
Dolomite, cherty, argillaceous, light green to light gray, grayish brown, fine to medium; some black speckled dolomite	35	135
Dolomite, argillaceous, silty, grayish brown to gray, black speckled, very fine to fine	20	155
Dolomite, cherty (chert is black speckled), silty, argillaceous, gray to grayish brown, fine to medium, pyritic; a little shale, silty, brown, brittle	13	168
Dolomite, white to light gray, black speckled, fine to coarse, pyritic	12	180
Dolomite, argillaceous, light gray to brown, black speckled, fine to coarse; interbedded with shale, silty, brown, weak to brittle; at base—dolomite, silty, argillaceous, gray to grayish brown, fine	20	200
Shale, silty, dolomitic, brownish gray to brown, weak to brittle; a little dolomite, silty, argillaceous, brownish gray, very fine	50	250
Champlainian Series		
Galena Dolomite Group (190′)		
Dolomite, slightly calcitic, light grayish brown, fine to medium	40	290
Dolomite, light brownish gray to light gray, fine to medium; a little calcite	30	320
Dolomite, calcitic, light brownish gray to light gray, fine to medium	65	385
Dolomite, light brownish gray to light gray, fine to medium; at base a few gray specks	50	435
No samples	5	440
Platteville Group (138′)		
Nachusa Formation		
Dolomite, light brownish gray, fine to medium; a little chert at top	30	470
Grand Detour Formation		
Dolomite, light gray to light brownish gray, very fine, dense; some dolomite, greenish gray	25	495
Mifflin Formation (40′)		
Dolomite, pale grayish brown, very fine	15	510
Dolomite, slightly silty, slightly argillaceous, light gray to light brownish gray, very fine to fine	20	530
Dolomite, light gray to light brownish gray, light brown, very fine to fine; some orange specks	5	535
Pecatonica Dolomite (43′)		
Dolomite, light yellowish brown, very fine to fine; a trace of chert	10	545
Dolomite, sandy in lower 3′, light grayish brown to brown, fine; a few brown argillaceous streaks	33	578
Ancell Group (147′)		
Glenwood-St. Peter Sandstone (147′)		
Sandstone, slightly dolomitic at top, pale yellowish gray, medium, friable, subrounded	27	605
Sandstone, pale pinkish gray to white, fine to medium, friable	35	640
Sandstone, pale pink, fine, friable	10	650
Sandstone, pale pink to white, fine to medium, friable	70	720
Kress Member		
Shale, dolomitic, sandy, light green, gray, weak	5	725
Canadian Series		
Prairie du Chien Group (195′)		
Shakopee Dolomite		
Dolomite, cherty, slightly sandy, light yellowish brown, very fine to fine	10	735
New Richmond Sandstone		
Sandstone, silty, light yellowish gray, medium, friable, subrounded	35	770
Oneota Dolomite (150′)		
Blodgett Member (55′)		
Dolomite, slightly sandy, white to light yellowish gray, fine	10	780
Dolomite, cherty, white to light yellowish gray, medium; some chert is oolitic	10	790
Dolomite, light yellowish gray, pink, green, fine to medium	10	800
Dolomite, cherty, light yellowish gray, pinkish orange, fine to medium	5	805
Dolomite, light gray, fine to medium	20	825
Arsenal Member (95′)		
Dolomite, cherty, light yellowish gray, pink, fine to coarse; a little secondary quartz	30	855
Dolomite, cherty, white to very light gray, medium; a few streaks of dolomite, silty, gray, very fine; a little quartz and oolitic chert	45	900
Dolomite, slightly sandy, light yellowish gray, fine to medium	5	905
Dolomite, cherty, light grayish brown, fine to medium	15	920
Cambrian System		
Croixan Series		
Eminence Formation (78′)		
Dolomite, cherty, slightly sandy, light yellowish gray, fine, slightly glauconitic; sandstone, siliceous, white, fine to medium, firm	25	945
Dolomite, sandy, light yellowish brown, pink, light green, fine	30	975
Sandstone, light gray, medium to coarse, friable to firm; dolomite, sandy, light yellowish gray, pink, light green, slightly glauconitic; a trace of green shale	23	998
Potosi Dolomite (117′)		
Dolomite, slightly sandy, pale brownish gray, very fine to fine, very slightly glauconitic	17	1015
Dolomite, slightly cherty, light grayish brown, fine to very fine; dolomite, white to light yellowish gray, very fine; geodic quartz	25	1040
Dolomite, yellowish brown to light grayish brown, mottled red, very fine, slightly pyritic; a trace of green, brittle shale	35	1075
Dolomite, pale brownish gray to pale yellowish gray, very fine, dense	25	1100
Dolomite, light grayish brown, very fine to fine, very slightly glauconitic	15	1115
Franconia Formation (85′)		
Sandstone, very dolomitic, greenish gray, fine to medium, firm, very glauconitic	17	1132
Sandstone, silty, argillaceous, dolomitic, greenish gray, fine to medium, firm to friable, glauconitic; shale, silty, sandy, dolomitic, greenish gray, weak; a little dolomite, silty, gray, very fine	53	1185

Sandstone, very dolomitic, light greenish gray, very fine to fine, firm, glauconitic; a little shale, light greenish gray, weak	15	1200
Ironton Sandstone (110′)		
Mooseheart Member (50′)		
Sandstone, dolomitic, white, medium (median grain size .32 mm), slightly glauconitic, moderately sorted; maximum grain size 1.2 mm	15	1215
Dolomite, very sandy, pinkish gray, fine; sandstone, white, medium (.40 mm); maximum grain size 1.0 mm	10	1225
Sandstone, slightly dolomitic to dolomitic, pale yellowish gray, medium (.40 mm), poorly sorted; maximum grain size 1.2 mm	25	1250
Marywood Member		
Sandstone, white, fine to medium, moderately sorted; maximum grain size .90-1.2 mm	32	1282
Fox Valley Member		
Sandstone, dolomitic, slightly silty (3%), white, light pink, medium (.38 mm); maximum grain size 1.3 mm; a few brown dolomite pellets; a trace of dolomite, sandy, light yellowish gray, fine	8	1290
Buelter Member		
Sandstone, white, medium (.40 mm), poorly sorted; maximum grain size 1.2 mm; dolomite streaks, sandy, white, fine	20	1310
Galesville Sandstone (55′)		
Sandstone, slightly silty (3%), white, medium (.30 mm), friable, moderately to well sorted; maximum grain size .80 mm	15	1325
Sandstone, slightly dolomitic, white, medium (.30 mm), friable, well sorted; maximum grain size .70 mm; at base—dolomite, sandy, light brown	40	1365
Eau Claire Formation (390′)		
Proviso Siltstone Member (229′)		
Dolomite, very silty, argillaceous, sandy, brownish gray to brown, very fine; at base—sandstone, dolomitic, white, fine, firm to friable	15	1380
Shale, silty, sandy, dolomitic, greenish gray, weak, slightly glauconitic; siltstone, dolomitic, light yellowish gray, firm, micaceous, glauconitic	35	1415
Siltstone, dolomitic, coarse; grades to sandstone, dolomitic, very fine, yellowish orange, firm, glauconitic, micaceous	25	1440
Sandstone, very silty, argillaceous, dolomitic, grayish orange, very fine, friable to firm, glauconitic, micaceous	50	1490
Siltstone, sandy, dolomitic, brownish orange to yellowish orange, coarse, firm to friable, glauconitic, micaceous; shale, silty, grayish red, weak; shale, silty, greenish gray, brittle	65	1555
Shale, silty, dolomitic, greenish gray, weak, glauconitic; dolomite, silty, gray, fine, glauconitic	5	1560
Sandstone, silty, dolomitic, very fine to fine, friable to firm, glauconitic; some shale, silty, greenish gray, weak	34	1594
Lombard Dolomite Member (151′)		
Dolomite, slightly silty, slightly sandy, light gray to grayish brown, mottled gray, fine to medium, glauconitic	41	1635
Dolomite, silty, sandy, slightly calcitic, light gray to grayish brown, fine; some fossil fragments; shale, silty, greenish gray, brittle	30	1665
Sandstone, silty, greenish gray, weak to brittle, glauconitic; a little dolomite, as above; coarse glauconite at base	30	1695
Dolomite, silty, slightly sandy, light grayish brown, very fine to fine, glauconitic; shale, silty, sandy, dolomitic, greenish gray, brittle to weak; some coarse glauconite	50	1745
Elmhurst Sandstone Member		
Sandstone, light gray, fine, friable, pyritic, sooty	10	1755
Mt. Simon Sandstone (245′ sampled)		
Sandstone, yellowish buff, medium (.45 mm), friable, poorly sorted; maximum grain size 1.3 mm	20	1775
Sandstone, pink to pinkish orange, medium (.42-.48 mm), friable, poorly sorted; maximum grain size 1.6 mm; at 1820-1825′—sandstone, silty, pink, fine (.25 mm)	80	1855
Sandstone, yellowish pink to pink, medium (.37 mm), friable, moderately sorted; maximum grain size 1.3 mm	50	1905
Sandstone, light yellowish pink, coarse (.50 mm), friable, poorly sorted; maximum grain size 1.5 mm	5	1910
Sandstone, silty, argillaceous, dark pink, medium (.40 mm), friable, poorly sorted; maximum grain size 1.5 mm; a little red shale	20	1930
Sandstone, yellowish pink, coarse (.50 mm), friable, poorly sorted; maximum grain size 2.0 mm	10	1940
Sandstone, pink to orange, medium (.40-.45 mm), moderately to poorly sorted, friable; maximum grain size 1.5 mm	40	1980
Sandstone, silty, argillaceous, dark pink to orange, medium (.47 mm), friable, moderately sorted; maximum grain size 1.7 mm	10	1990
Sandstone, pale, yellowish pink, medium (.47 mm), friable, moderately sorted; maximum grain size 1.2 mm	10	2000
Samples lost	139	2139

24. Layne-Western Co.—The Wander Co. No. 11

Well in SE NW NE sec. 10, T. 39 N., R. 11 E., DuPage County; elevation 668 feet; SS 15336; total depth 1,920 feet. Type well of the Elmhurst, Lombard, and Proviso Members of the Eau Claire Formation.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 150′)		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, light gray, fine	7	157
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (218′)		
Neda Formation		
Shale, silty, red, weak; a little dolomite, yellow, green, fine	13	170
Brainard Shale		
Shale, silty, dolomitic, greenish gray, weak; a little dolomite, silty, greenish gray, very fine	70	240
Fort Atkinson Dolomite		
Dolomite, silty, slightly argillaceous, slightly cherty, light gray to brownish gray, black speckled, fine; phosphatic nodules at base	50	290
Scales Shale (85′)		
Shale, silty, dolomitic, gray to brownish gray, weak; dolomite, silty, argillaceous, gray to brown, fine, pyritic	15	305
Shale, silty, dolomitic, grayish brown, weak to brittle; a little dolomite, silty, argillaceous, brown, fine	70	375
Champlainian Series		
Galena Dolomite Group (190′)		
Dolomite, buff, fine to medium; a little calcite	75	450
Dolomite, buff, fine to medium; a few black specks; a few calcite crystals; a few brown argillaceous films	100	550
Dolomite, light gray to grayish brown, speckled dark gray, fine to medium; a few brown shale partings	8	558
Guttenberg Formation		
Dolomite, light grayish brown, red speckled, fine to medium; red shale partings	7	565
Platteville Group (130′)		
Nachusa Formation (30′)		
Dolomite, light brownish gray, very fine to fine; a few calcite crystals	15	580
Dolomite, calcitic, light brown to light gray; grades to limestone, light brown, lithographic	15	595
Grand Detour Formation (25′)		
Limestone, dolomitic, light brownish gray, gray mottled, lithographic to very fine	7	602
Dolomite, light gray to light grayish brown, very fine to fine; some gray mottling	18	620

Mifflin Formation (35′)

Dolomite, slightly argillaceous, light grayish brown, very fine to fine	15	635
Dolomite, light brownish gray, gray mottled, orange speckled, fine; shale partings at top	20	655

Pecatonica Dolomite (40′)

Dolomite, light grayish brown, gray mottled, very fine to fine	30	685
Dolomite, buff, fine; some brown shale partings	10	695

Ancell Group (187′)

Glenwood–St. Peter Sandstone (187′)

Sandstone, dolomitic, light brownish gray, fine to coarse, friable to firm	10	705
Sandstone, white, fine to medium, friable, rounded (dirty samples)	163	868

Kress Member (14′)

Dolomite, light gray, pale green; sandstone, fine to coarse; a little shale, green, light gray	7	875
Sandstone, light gray, fine; some glauconite	7	882

Canadian Series

Prairie du Chien Group (58′)

Oneota Dolomite (58′)

Arsenal Member (58′)

Dolomite, cherty, slightly sandy, light yellowish gray to light gray, fine to medium	8	890
Dolomite, light gray, medium; a little shale, green, light gray, weak	10	900
Dolomite, cherty, light gray, pinkish gray, medium; a trace of shale, green, brittle	40	940

Cambrian System

Croixan Series

Eminence Formation (60′)

Chert, white, oolitic; a little dolomite, slightly sandy, light yellowish brown, fine to medium, glauconitic	10	950
Dolomite, cherty (chert is oolitic), slightly sandy, light yellowish gray, fine to medium; some sandstone, pale yellowish gray, medium, friable to firm; a little shale, green	37	987
Dolomite, light yellowish gray to very light gray, very fine, pyritic; free sand	13	1000

Potosi Dolomite (110′)

Dolomite, light brownish gray, very fine	10	1010
Dolomite, light yellowish brown, very fine to fine	15	1025
Dolomite, light yellowish gray, very fine to fine; some shale, green, weak, glauconitic	5	1030
Dolomite, light yellowish brown, very fine to fine; a little geodic quartz	25	1055
Dolomite, light grayish brown, very fine to fine; geodic quartz	35	1090
Dolomite, light brown to light grayish brown, very fine to fine, slightly glauconitic; geodic quartz	10	1100
Dolomite, light pinkish brown, very fine to fine, glauconitic	10	1110

Franconia Formation (80′)

Sandstone, dolomitic, pinkish buff to reddish brown, fine, firm, glauconitic; shale, red, green, brittle	20	1130
Sandstone, dolomitic, greenish gray, fine, firm to friable, glauconitic; shale, green, weak	55	1185
Sandstone, very dolomitic, light greenish gray to light brownish gray, very fine, firm, glauconitic	5	1190

Ironton Sandstone (170′)

Mooseheart Member (55′)

Sandstone, dolomitic, white, medium (median grain size .42 mm), moderately sorted; maximum grain size 1.3 mm; thin beds of dolomite, sandy, white, pink, slightly oolitic	35	1225
Sandstone, slightly dolomitic, coarse (.55 mm), friable, moderately sorted; maximum grain size 1.2 mm	5	1230
Sandstone, slightly dolomitic, white, medium (.42 mm), friable, poorly sorted; maximum grain size 1.0 mm	15	1245

Marywood Member

Sandstone, white, medium (.38 mm), bimodal sorting; maximum grain size 1.0 mm	5	1250

Fox Valley Member (30′)

Sandstone, white, medium (.45 mm), friable to firm, poorly sorted; maximum grain size 1.2 mm; dolomite streaks, light buff, pink, fine	15	1265
Sandstone, slightly dolomitic, white, medium (.40 mm), friable, poorly sorted; maximum grain size 1.0 mm	15	1280

Buelter Member

Sandstone, white, medium (.30-.45 mm), friable, moderately sorted; maximum grain size .90-1.2 mm	80	1360

Galesville Sandstone

Sandstone, white, fine (.20-.23 mm), friable, well sorted; maximum grain size .50-.75 mm	25	1385

Eau Claire Formation (374′)

Proviso Siltstone Member (150′)

Dolomite, sandy, silty, grayish brown, fine, glauconitic; shale, silty, greenish gray, brittle; sandstone, white, fine, friable	19	1404
Siltstone, sandy, grayish orange to brownish orange, coarse, firm, glauconitic, micaceous; shale, reddish brown, green, weak to brittle	46	1450
Sandstone, very dolomitic, light gray, medium, firm, very glauconitic; grades to dolomite, very sandy	5	1455
Siltstone, dolomitic, gray, firm, glauconitic; shale, silty, greenish gray, weak to brittle	15	1470
Siltstone, dolomitic, pinkish orange, firm, glauconitic, micaceous; shale, pinkish brown, green, weak to brittle	65	1535

Lombard Dolomite Member (105′)

Dolomite, very sandy, silty, light gray, fine to coarse, very glauconitic; sandstone, dolomitic; siltstone, as above	20	1555
Dolomite, silty, sandy, light gray to light grayish brown, fine to coarse, very glauconitic; a little shale, brown, brittle	15	1570
Dolomite, sandy, light gray to light brownish gray, fine to medium, glauconitic; a little sandstone, dolomitic, very fine, firm; at base —coarse glauconite and green shale	70	1640

Elmhurst Sandstone Member (119′)

Sandstone, dolomitic, white to light gray, fine to medium, friable to firm; fossil fragments	50	1690
Sandstone, white, fine, friable, well sorted	30	1720
Sandstone, slightly dolomitic, fine, slightly pyritic, friable	15	1735
Sandstone, silty, dolomitic, light gray, very fine, firm; siltstone, dolomitic	5	1740
Sandstone, light gray, fine, friable, pyritic	19	1759

Mt. Simon Sandstone (161′ sampled)

Sandstone, light gray, medium, poorly sorted, pyritic, sooty	6	1765
Sandstone, light yellowish gray, medium (.45 mm), friable, poorly sorted; maximum grain size 1.5 mm	35	1800
Sandstone, white, fine (.25 mm), friable, moderately sorted; maximum grain size .70 mm	8	1808
Sandstone, light yellowish buff, medium (.42 mm), friable, poorly sorted; maximum grain size 1.3 mm	47	1855
Sandstone, yellowish pink to pink, medium (.30-.45 mm), friable, moderately to poorly sorted; maximum grain size 1.1-2.2 mm	65	1920

26. Layne-Western Co.—Rolling Meadows No. 2

Well in NE NE SE sec. 25, T. 42 N., R. 10 E., Cook County; elevation 710 feet; SS 24400; total depth 1,401 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 180′)		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, light gray to light grayish buff, very fine	10	190
Ordovician System		
Cincinnatian Series		
Maquoketa Group (210′)		
Neda Formation		
Shale, silty, reddish brown, weak; limonitic nodules; dolomite, very silty, light green, white, very fine	10	200

Brainard and Fort Atkinson Formations (124′)		
Dolomite, silty, light gray, light green, very fine; some shale, silty, light tan, light green, weak	15	215
Shale, silty, dolomitic, light greenish gray, weak; dolomite, silty, greenish gray, very fine	10	225
Dolomite, light gray, brownish gray, black speckled, fine to coarse, fossiliferous, slightly pyritic; a little shale, silty, gray, weak	99	324
Scales Shale (76′)		
Shale, silty, brown, brittle; phosphatic nodules	2	326
Dolomite, silty, light tan to brown, fine to coarse; some black specks; at top—dolomite, silty, greenish gray, very fine	19	345
Dolomite, silty, argillaceous, grayish brown, very fine; shale, silty, dolomitic, brownish gray, weak to brittle	5	350
Shale, silty, dolomitic, grayish brown to dark brown, weak to brittle; a little dolomite, silty, grayish brown, very fine	50	400
Champlainian Series		
Galena Dolomite Group (205′)		
Dolomite, light grayish brown, fine to medium; pyritic and orange speckled in upper 25′; a few dark gray pyritic streaks; a few reddish brown argillaceous partings	170	570
Dolomite, slightly argillaceous, light grayish brown to brown, fine to medium; some black specks	18	588
Limestone, dolomitic, light gray to light grayish brown, dark gray speckled, very fine to medium; a trace of sphalerite	9	597
Guttenberg Formation		
Limestone, very dolomitic, light brownish gray to grayish brown, black speckled, orange speckled, extra-fine; a few shale partings, reddish brown	8	605
Platteville Group (125′)		
Nachusa Formation (30′)		
Dolomite, calcitic, slightly cherty, light yellowish brown, gray, fine	10	615
Limestone, dolomitic, light brown to grayish brown, extra-fine	20	635
Grand Detour Formation		
Limestone, dolomitic, light gray to light grayish brown, dark gray mottled, lithographic; dolomite, calcitic, light brown, very fine; a trace of chert	25	660
Mifflin Formation (38′)		
Limestone, dolomitic, slightly argillaceous, light brownish gray to light gray; some dolomite, argillaceous, calcitic, dark brown, orange speckled; a little dark gray mottling	10	670
Limestone, dolomitic, slightly argillaceous, light brownish gray to light gray, orange speckled, lithographic; some coarse fossil fragments; a little dark gray mottling	28	698
Pecatonica Dolomite (32′)		
Dolomite, calcitic at top, light grayish brown, very fine; some gray mottling	22	720
Dolomite, sandy at base, light grayish brown, fine to very fine; a few orange specks	10	730
Ancell Group (228′)		
Glenwood Formation (70′)		
Sandstone, dolomitic, white, medium	5	735
Sandstone, white, fine to medium, friable; a little dolomite, sandy, light gray, extra-fine; a little shale, sandy, green, weak	50	785
Kingdom Sandstone Member (15′)		
Sandstone, light gray, medium, pyritic, sooty	5	790
Sandstone, light yellowish gray, medium, poorly sorted, pyritic	10	800
St. Peter Sandstone (158′)		
Sandstone, white to light yellowish gray, medium, friable, rounded	35	835
Sandstone, slightly silty, white, buff, fine, friable	10	845
Sandstone, light gray to light buff, medium, friable, rounded	50	895
Sandstone, light buff, fine, friable	10	905
Sandstone, light pinkish buff, medium, friable, rounded	17	922
Kress Member (36′)		
Chert, white, pink, yellow; sandstone, coarse to medium; shale, red, green, brittle	18	940
Dolomite, slightly sandy, light gray, fine; sandstone, medium; shale, red, green; chert	18	958
Cambrian System		
Croixan Series		
Potosi Dolomite (95′)		
Dolomite, light yellowish brown, very fine to fine, slightly glauconitic	12	970
Dolomite, silty, light gray, greenish gray, pinkish gray, very fine, slightly glauconitic	5	975
Dolomite, light yellowish gray to light yellowish brown, pink mottled, very fine to fine; pink and red specks; a trace of glauconite	70	1045
Dolomite, sandy, pinkish gray, fine, very glauconitic	8	1053
Franconia Formation (57′)		
Sandstone, dolomitic, silty, pinkish brown, fine, friable to firm, glauconitic; at base—a little dolomite, sandy, red	17	1070
Shale, sandy, silty, dolomitic, green, red, weak	15	1085
Sandstone, silty, argillaceous, greenish gray, fine, friable, glauconitic; shale, sandy, silty, dolomitic, green, weak	25	1110
Ironton Sandstone (135′)		
Mooseheart Member (40′)		
Sandstone, dolomitic, white, medium (median grain size .45 mm), friable, poorly sorted; maximum grain size 1.5 mm; streaks of dolomite, white	20	1130
Sandstone, slightly dolomitic, medium (.30 mm), friable, moderately sorted; maximum grain size .75 mm	5	1135
Sandstone, white, medium (.40-.45 mm), friable, poorly sorted; maximum grain size 1.3 mm	15	1150
Marywood Member		
Sandstone, white, medium (.37-.40 mm), friable, moderately sorted; maximum grain size 1.0-1.2 mm	30	1180
Fox Valley Member		
Sandstone, dolomitic, white, medium (.40 mm), friable, poorly sorted; maximum grain size 1.2 mm; streaks of dolomite, sandy, white	20	1200
Buelter Member		
Sandstone, white, medium (.40 mm), friable, moderately sorted; maximum grain size 1.2 mm	45	1245
Galesville Sandstone (45′)		
Sandstone, white, fine (.25 mm), friable, moderately sorted	10	1255
Sandstone, white, fine (.20 mm), friable, well sorted; maximum grain size .60 mm	10	1265
Sandstone, dolomitic, pink, medium (.30 mm), friable to firm, moderately sorted; maximum grain size .80 mm	5	1270
Sandstone, slightly dolomitic, slightly silty, fine (.20-.22 mm), friable, well to moderately sorted; maximum grain size 1.0 mm	20	1290
Eau Claire Formation (111′ sampled)		
Shale, silty, greenish gray, weak; a little siltstone, sandy, dolomitic, yellowish buff; a little shale, red	50	1340
Sandstone, silty, dolomitic, grayish orange, very fine, firm, glauconitic; a little shale, silty, green, weak	15	1355
Shale, silty, greenish gray to reddish brown, weak, micaceous; siltstone, dolomitic, grayish orange, coarse, firm, glauconitic, micaceous	46	1401

28. S. B. Geiger Co.—Automatic Electric Co. No. 1

Well in NE NE SW sec. 31, T. 40 N., R. 12 E., Cook County; elevation 655 feet; SS 27117; total depth 1,900 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 260′)		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, light buffish gray, very fine	10	270

Edgewood Formation

Dolomite, silty, sandy, light gray, very fine to fine; a few black specks	15	285

Ordovician System

Cincinnatian Series

Maquoketa Shale Group (178′)

Brainard Shale

Shale, silty, dolomitic, light greenish gray to light gray, weak; some dolomite, silty, greenish gray to grayish brown, very fine	100	385

Fort Atkinson Dolomite

Dolomite, grayish brown to brown, medium to coarse, pyritic; some dark gray streaks and specks	5	390

Scales Shale (73′)

Shale, silty, dolomitic, grayish brown, weak; a little dolomite, silty, grayish brown, very fine	65	455
Shale, silty, dolomitic, light gray, weak; some shale, brown, brittle; at base—a little shale, silty, green, brittle	8	463

Champlainian Series

Galena Dolomite Group (217′)

Dolomite, light grayish brown to light brownish gray, fine to medium; a few reddish brown argillaceous films	97	560
Dolomite, light brownish gray, fine, pyritic; abundant calcite crystals	15	575
Dolomite, light brownish gray to light grayish brown, gray, fine to medium, pyritic; abundant calcite crystals; a trace of sphalerite at 595-600′ and 610-615′	55	630
Dolomite, light brownish gray to light grayish brown, fine to medium; calcite crystals	50	680

Platteville Group (111′)

Limestone, dolomitic, light brownish gray, fine to medium, pseudo-oolitic; calcite crystals; clay, calcitic, white to light gray, pyritic	20	700
Limestone, dolomitic, light grayish brown, light gray, very fine; grades to dolomite, very calcitic; some coarse fossil fragments; calcite crystals	10	710
Dolomite, calcitic, light brownish gray, fine to medium; grades downward to limestone, dolomitic, light brownish gray, dark gray mottled, extra-fine; coarse fossil fragments; calcite crystals; clay, calcitic, white, smooth, pyritic	70	780
Dolomite, grayish brown, fine	11	791

Ancell Group (199′)

Glenwood Formation (59′)

Sandstone, dolomitic, light gray, fine to coarse, friable to firm	9	800
Sandstone, argillaceous, silty, dolomitic, light gray, fine to coarse. Samples contaminated from caving	35	835
Sandstone, light gray, fine to coarse, pyritic	10	845
Sandstone, argillaceous, silty, dolomitic, light gray, medium	5	850

St. Peter Sandstone (140′)

Sandstone, white to light yellowish gray, medium, rounded, friable, pyritic at top	40	890
Sandstone, light gray, fine, friable	30	920
Sandstone, light gray, medium, friable. Samples contaminated	50	970

Kress Member

Chert; sandstone; dolomite; shale, green	20	990

Cambrian System

Croixan Series

Eminence Formation (80′)

Dolomite, slightly sandy, slightly cherty, yellowish brown, fine	15	1005
Dolomite, sandy, light yellowish gray, white, pink, fine; chert, partly oolitic; a little shale, green, brittle	40	1045
Dolomite, slightly sandy, light yellowish brown to pinkish brown, fine, slightly glauconitic; some chert, white, yellow	25	1070

Potosi Dolomite (138′)

Dolomite, light yellowish gray, light pinkish gray, very fine to fine	20	1090
No samples	25	1115
Dolomite, light brownish gray, very fine to fine; a little drusy quartz	50	1165
Dolomite, light grayish brown to light yellowish brown, pinkish brown, very fine to fine; a little drusy quartz	25	1190
Dolomite, light yellowish brown to pinkish brown, very fine to fine, slightly sandy, slightly glauconitic	18	1208

Franconia Formation (80′)

Sandstone, dolomitic, slightly argillaceous, pinkish buff to red, fine, firm, glauconitic; shale, reddish brown, salmon, green, weak; at top —a little dolomite, silty, argillaceous, sandy, red, fine	24	1232
Sandstone, silty, dolomitic, light greenish gray, fine, firm, glauconitic; shale, silty, bluish green, salmon, green, weak	23	1255
Shale, very silty, very sandy, dolomitic, bluish green, weak; sandstone, as above	10	1265
Sandstone, silty, light greenish gray, fine, firm, glauconitic; shale, silty, light greenish gray, weak	10	1275
Sandstone, very dolomitic, light greenish gray to light gray, very fine to fine, firm, glauconitic	5	1280
Shale, silty, greenish gray, salmon, weak; sandstone, as above	8	1288

Ironton Sandstone (152′)

Mooseheart Member (52′)

Sandstone, very dolomitic, slightly silty, white, pink, medium (median grain size .43 mm), friable, moderately sorted; maximum grain size 1.1 mm; some sand firm in dolomite streaks	22	1310
Sandstone, silty, dolomitic, white, medium (.37 mm), friable to firm, poorly sorted; maximum grain size 1.3-1.5 mm	30	1340

Marywood Member

Sandstone, silty, fine (.22 mm), moderately sorted; maximum grain size 1.1 mm	10	1350

Fox Valley Member

Sandstone, silty, slightly dolomitic, medium (.30 mm), friable, poorly sorted; maximum grain size 1.4 mm	20	1370

Buelter Member (70′)

Sandstone, slightly silty, white to pale yellowish gray, medium (.37 mm), friable, moderately sorted; maximum grain size 1.0 mm	25	1395
Sandstone, slightly silty, white, medium (.25-.35 mm), friable, moderately sorted; maximum grain size .75-1.0 mm	45	1440

Galesville Sandstone (30′)

Sandstone, white, fine (.20 mm), friable, moderately sorted; maximum grain size .50 mm	8	1448
Sandstone, white, fine (.25 mm), friable, moderately sorted; maximum grain size .75 mm; a few streaks of dolomite, sandy, white	7	1455
Sandstone, dolomitic, medium (.30 mm), moderately sorted; maximum grain size .80 mm. Contaminated samples	15	1470

Eau Claire Formation (405′)

Proviso Siltstone Member (175′)

Dolomite, sandy, argillaceous, grayish brown, fine, slightly glauconitic; sandstone, white, fine to medium, friable	10	1480
Shale, silty, greenish gray, dark brownish red, gray, weak, micaceous; siltstone, dolomitic, sandy, grayish orange, coarse, firm, glauconitic; at base—dolomite, sandy, light gray, fine, glauconitic	165	1645

Lombard Dolomite Member

Dolomite, sandy, silty, light gray to light grayish brown, fine to medium, glauconitic, pyritic; shale, silty, greenish gray, green, pink, glauconitic; coarse glauconite at base	75	1720

Elmhurst Sandstone Member (155′)

Sandstone, dolomitic, white, medium, friable, slightly glauconitic	15	1735
Sandstone, slightly dolomitic, light grayish buff, fine, friable	15	1750
Sandstone, buff, fine, friable; streaks of dolomite, silty, sandy, light gray, very fine	30	1780
Sandstone, white, fine, friable, well sorted	45	1825
Shale, silty, greenish gray, brown, weak; a little dolomite, argillaceous, brownish gray	10	1835
Sandstone, light gray, fine to medium, friable, pyritic, sooty	30	1865

Sandstone, light yellowish gray, medium (.35 mm), friable, slightly sooty, moderately sorted; maximum grain size .85 mm	10	1875
Mt. Simon Sandstone		
Sandstone, pale yellowish gray, medium (.42 mm), friable, moderately sorted; maximum grain size .85 mm	25	1900

37. Neely and Schimelpfenig—Calumet Steel Division, Borg-Warner Corp., No. 4

Well in NE NW NE sec. 21, T. 35 N., R. 14 E., Cook County; elevation 640 feet; SS 21216; total depth 1,805 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 425')		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, light grayish buff, fine	10	435
Edgewood Formation		
Dolomite, very silty, argillaceous, gray, black speckled, very fine; at base—shale, silty, dolomitic, gray, weak	10	445
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (234')		
Brainard Shale (80')		
Shale, silty, dolomitic, olive, very weak	5	450
Shale, silty, dolomitic, greenish gray, weak; a little dolomite, silty, greenish gray, very fine	75	525
Fort Atkinson Dolomite		
Dolomite, slightly silty, light grayish buff, gray mottled, fine to coarse, fossiliferous, slightly pyritic; shale, silty, dolomitic, greenish gray to yellowish gray, weak to brittle; proportion of shale increases toward base	40	565
Scales Shale (114')		
Shale, silty, dolomitic, gray, weak; a little dolomite, silty, greenish gray, fine; a little dolomite, grayish brown, fine to coarse, pyritic	85	650
Shale, silty, dolomitic, brownish gray, weak; a little dolomite, very silty, argillaceous, grayish brown, very fine	10	660
Shale, silty, dolomitic, light gray, weak	19	679
Champlainian Series		
Galena Dolomite Group (196')		
Dolomite, light yellowish brown, fine to medium; a few dark gray streaks	86	765
Dolomite, light yellowish brown to light brown, fine to coarse; shale at 780', white, calcitic; a trace of sphalerite at 820'	65	830
Dolomite, light brownish gray to brown, fine to coarse; some dark gray streaks and specks; a few argillaceous partings, brown	25	855
Guttenberg Formation		
Dolomite, light brownish gray to brown, fine; some red specks; some shale partings, reddish brown; at top—chert, red speckled	20	875
Platteville Group (130')		
Nachusa Formation		
Dolomite, slightly cherty, light grayish brown to brown, light gray, fine; shale at 885', weak, bentonitic	45	920
Grand Detour Formation (38')		
Dolomite, grayish brown to gray, very fine	10	930
Dolomite, light gray to brownish gray, extra-fine to fine; some dark gray mottling	28	958
Mifflin Formation		
Dolomite, light brownish gray to grayish brown, very fine; a little dark gray mottling	22	980
Pecatonica Dolomite		
Dolomite, light grayish brown to brown, fine; a few argillaceous films, dark brown	25	1005
Ancell Group (133')		
Glenwood–St. Peter Sandstone (133')		
Sandstone, silty, argillaceous, slightly dolomitic, medium, friable	20	1025
Sandstone, silty, white to yellowish brown, medium, rounded, friable (dirty samples)	113	1138
Canadian Series		
Prairie du Chien Group (97')		
Oneota Dolomite (97')		
Arsenal Member (97')		
Dolomite, very cherty, light gray, fine to coarse	12	1150
Dolomite, cherty, light gray to gray, fine to medium	15	1165
Shale, dolomitic, white, weak	5	1170
Dolomite, cherty, light gray to light brownish gray, gray, fine to coarse	17	1187
Dolomite, slightly silty, slightly sandy, light brownish gray, light greenish gray, fine, slightly glauconitic; oolitic chert	8	1195
Dolomite, slightly cherty to cherty, light yellowish brown to light gray, fine to medium	40	1235
Cambrian System		
Croixan Series		
Eminence Formation (70')		
Dolomite, slightly cherty, slightly sandy, light yellowish gray, fine	5	1240
Shale, silty, greenish gray, weak; dolomite, cherty, sandy, light greenish gray, extra-fine	5	1245
Dolomite, cherty, slightly sandy, light yellowish gray, pink, fine to medium, slightly glauconitic	22	1267
Sandstone, dolomitic, light gray, medium; dolomite, sandy, light gray to light brownish gray, fine	13	1280
Shale, dolomitic, light gray, weak	3	1283
Dolomite, slightly sandy, light grayish brown, pink, green, fine	17	1300
Dolomite, light gray, fine; shale, light gray, weak; calcite crystals	5	1305
Potosi Dolomite (173')		
Dolomite, light brownish gray, fine to very fine, very slightly glauconitic	15	1320
Dolomite, light brownish gray to light gray, fine to medium	35	1355
Dolomite, light yellowish gray, gray, fine, pyritic; a little clay, gray, weak	24	1379
Dolomite, light yellowish brown, fine; drusy quartz; trace of glauconite at base	71	1450
Dolomite, light yellowish gray, fine; drusy quartz; some clay, white, weak	15	1465
Dolomite, slightly sandy, grayish brown, fine, glauconitic	13	1478
Franconia Formation (154')		
Dolomite, sandy, grayish brown, pink, fine, very glauconitic; a little shale, sandy, light green, weak	22	1500
Sandstone, dolomitic, silty, argillaceous, greenish gray to pinkish buff, fine to very fine, firm to friable, glauconitic; shale, sandy, silty, green, bluish green, weak	98	1598
Dolomite, silty, sandy, grayish brown, fine to very fine, slightly glauconitic; sandstone, silty, dolomitic, greenish gray, fine, glauconitic; at base—shale, light green, weak	34	1632
Ironton Sandstone (148')		
Mooseheart Member (43')		
Sandstone, very dolomitic, fine (median grain size .22 mm), friable to firm, poorly sorted; maximum grain size .80 mm	8	1640
Sandstone, dolomitic, white, medium (.35 mm), friable to firm, poorly sorted; maximum grain size 1.1 mm; dolomite streaks, sandy, light buff, pink, fine	35	1675
Marywood Member (42')		
Sandstone, slightly silty, medium (.30 mm), friable, poorly sorted; maximum grain size 1.0 mm; some dolomite streaks, light buff, oolitic	35	1710
Sandstone, silty, white, fine, friable, moderately sorted	7	1717
Fox Valley Member		
Sandstone, dolomitic, white, medium (.35 mm), friable to firm, moderately sorted, maximum grain size 1.0 mm; dolomite streaks, sandy, light gray	13	1730
Buelter Member (50')		
Sandstone, white, medium (.30 mm), friable, poorly sorted; maximum grain size 1.2 mm	25	1755

Sandstone, white, medium (.35 mm), friable, moderately sorted; maximum grain size 1.1 mm	15	1770
Sandstone, white, medium (.30 mm), friable, moderately sorted; maximum grain size 1.0 mm	10	1780
Galesville Sandstone (15′)		
Sandstone, dolomitic, white, fine (.22 mm), friable, well sorted; maximum grain size .70 mm	10	1790
Sandstone, white, dolomitic, fine (.17 mm), friable, well sorted; maximum grain size .60 mm	5	1795
Eau Claire Formation		
Dolomite, silty, sandy, brownish gray, fine; argillaceous streaks	10	1805

41. J. P. Miller Co.—City of Rockdale No. 2

Well in NE NW NW sec. 20, T. 35 N., R. 10 E., Will County; elevation 556 feet; SS 11923; total depth 1,585 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 90′)		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, cherty, light yellowish gray, very fine, slightly glauconitic	4	94
Edgewood Formation (54′)		
Dolomite, silty, grayish brown, very fine; a few brown argillaceous partings; a little chert at top	36	130
Dolomite, silty, gray to brownish gray, black speckled, very fine	10	140
Dolomite, very silty, argillaceous, gray to brownish gray, black speckled, very fine; at base—grades to shale, very silty, dolomitic, brownish gray, brittle	8	148
Ordovician System		
Cincinnatian Series		
Maquoketa Group (107′)		
Dolomite, white to light yellowish gray, fine to medium; some dark gray mottling	30	178
Dolomite, silty, argillaceous, brownish gray, very fine; shale, silty, dolomitic, grayish brown to dark brown, brittle to weak	62	240
Shale, silty, dolomitic, gray to grayish brown, weak to brittle	15	255
Champlainian Series		
Galena Dolomite Group (187′)		
Dolomite, light brownish gray to gray, fine to medium, pyritic at top	60	315
Dolomite, light grayish brown to brown, light gray, fine to medium; a little calcite at base; a few reddish brown shale partings at base	120	435
Guttenberg Formation		
Dolomite, light gray to reddish brown, black speckled, red speckled, fine to medium; shale partings, reddish brown; a trace of chert	7	442
Platteville Group (158′)		
Nachusa Formation (43′)		
Dolomite, light brownish gray to brown, fine to medium; a trace of chert; a few shale partings, brown	28	470
Dolomite, calcitic, light grayish brown, brown, light gray, fine; a trace of chert	10	480
Limestone, very dolomitic, light grayish brown to light brown, lithographic	5	485
Grand Detour and Mifflin Formations (75′)		
Dolomite, calcitic, gray to brownish gray, mottled dark gray, very fine	17	502
Dolomite, brown, very fine	24	526
Dolomite, very calcitic, light grayish brown, extra-fine; some gray mottling	14	540
Limestone, very dolomitic, light grayish brown to brown, mottled gray, lithographic; some coarse fossil fragments	10	550
Dolomite, calcitic, light grayish brown, gray, very fine	10	560
Pecatonica Dolomite (40′)		
Dolomite, brown, very fine	14	574
Dolomite, very calcitic, light yellowish gray to brown, very fine to fine	12	586
Dolomite, sandy at base, light grayish brown to brown, mottled gray, fine	14	600
Ancell Group (151′)		
Glenwood–St. Peter Sandstone (151′)		
Sandstone, light gray, medium, friable; slightly dolomitic at top	5	605
Sandstone, white to light yellowish gray, medium, rounded, friable	130	735
Sandstone, white, fine, friable	10	745
Sandstone, silty, light gray, medium, friable	6	751
Canadian Series		
Prairie du Chien Group (244′)		
Dolomite, slightly sandy, greenish gray to brownish gray, very fine to fine	9	760
Dolomite, sandy, light grayish brown to light yellowish brown, very fine; thin stringers of sandstone, dolomitic, medium, subrounded; a little oolitic chert at top	45	805
Dolomite, slightly sandy, light yellowish brown, pink, fine to medium	27	832
Dolomite, slightly cherty, light gray to light brownish gray, pink, fine to medium	88	920
Dolomite, cherty, light yellowish gray, pink, red, fine to coarse; a trace of chert, yellow	18	938
Dolomite, slightly sandy, slightly cherty, light brownish gray, pink, fine, slightly, glauconitic	46	984
Gunter Sandstone		
Dolomite, sandy, slightly cherty, light gray, fine; interbedded with sandstone, dolomitic, light gray, medium, friable to firm	11	995
Cambrian System		
Croixan Series		
Eminence Formation (80′)		
Dolomite, slightly sandy, light yellowish gray, fine	25	1020
Dolomite, sandy, light yellowish brown, fine to medium	20	1040
Dolomite, slightly sandy, light brownish gray to light yellowish brown, very fine to fine, slightly glauconitic	30	1070
Momence Sandstone Member		
Sandstone, dolomitic, medium; dolomite, cherty, fine	5	1075
Potosi Dolomite (143′)		
Dolomite, light gray to buff, very fine to fine; some samples lost near top	35	1110
Dolomite, light grayish brown, very fine to fine	35	1145
Dolomite, slightly cherty, light yellowish brown, very fine; drusy quartz	65	1210
Dolomite, slightly sandy, pinkish brown, very fine; drusy quartz	8	1218
Franconia Formation (132′)		
Sandstone, very dolomitic, light gray, fine, very glauconitic	15	1233
Sandstone, dolomitic, light gray, pink, very fine to fine, friable to firm, glauconitic; a little dolomite, pinkish buff; a little shale, green, weak	14	1247
Sandstone, silty, dolomitic, greenish gray, very fine to fine; siltstone, very dolomitic, dark gray, firm	18	1265
Sandstone, dolomitic, greenish gray, brownish gray, fine, friable to firm, very glauconitic; shale, green, weak; dolomite, very silty, gray, very fine	20	1285
Dolomite, silty, yellowish brown, very fine, slightly glauconitic	31	1316
Sandstone, very dolomitic, very silty, argillaceous, dark gray, greenish gray, very fine to fine, glauconitic	14	1330
Dolomite, sandy, yellowish brown to pinkish buff, fine, slightly glauconitic; sandstone, white, medium	15	1345
Shale, sandy, silty, dolomitic, light green, weak	5	1350
Ironton Sandstone (120′)		
Sandstone, dolomitic, medium (median grain size .37-.42 mm), friable to firm, moderately to poorly sorted; maximum grain size 1.1-1.3 mm	60	1410

Sandstone, dolomitic, slightly silty, white, medium (.35 mm), friable, poorly sorted; maximum grain size 1.1 mm	30	1440
Sandstone, slightly silty, white, medium (.30 mm), friable, poorly sorted; maximum grain size .90 mm	10	1450
Sandstone, very dolomitic, medium (.40 mm), firm; dolomite, very sandy, light brown, very fine	10	1460
Sandstone, silty, dolomitic, medium (.35 mm), friable, poorly sorted; maximum grain size 1.1 mm	10	1470
Galesville Sandstone (60′)		
Sandstone, white, fine (.20 mm), friable, moderately sorted; maximum grain size .75 mm	30	1500
Sandstone, white, fine (.22 mm), friable, bimodal sorting; maximum grain size 1.0 mm	15	1515
Sandstone, slightly silty, white, fine (.18-.20 mm), friable, moderately sorted; maximum grain size .75 mm	15	1530
Eau Claire Formation (55′ sampled)		
Dolomite, silty, grayish brown, fine; sandstone, white, fine, friable; shale, grayish brown, weak	20	1550
Siltstone, dolomitic, coarse, light orangish gray, firm, glauconitic; dolomite, silty, grayish brown, fine; shale, silty, greenish gray to light brown, weak to brittle	35	1585

42. J. P. Miller Co.—Joliet Site No. 2

Well in NE NW SW sec. 5, T. 35 N., R. 11 E., Will County; elevation 670 feet; SS 20836; total depth 1,700 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 260′)		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, light yellowish gray, fine, slightly glauconitic	5	265
Edgewood Formation (73′)		
Dolomite, silty, argillaceous, cherty, light gray to light buffish gray, fine	30	295
Dolomite, very silty, argillaceous, brownish gray, black speckled, very fine	20	315
Dolomite, silty, argillaceous, dark gray to brownish gray, very fine to fine; some black specks	23	338
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (97′)		
Fort Atkinson Dolomite (32′)		
Dolomite, white, fine to coarse; a few black pyritic streaks and specks; at top—a little shale, silty, gray, weak	27	365
Dolomite, silty, argillaceous, brownish gray, very fine; some coarse fossil fragments	5	370
Scales Shale		
Shale, silty, dolomitic, brownish gray to dark brown, weak to brittle; a little dolomite, silty, argillaceous, grayish brown, very fine	65	435
Champlainian Series		
Galena Dolomite Group (211′)		
Dolomite, light brownish gray, light gray, fine to medium	95	530
Dolomite, slightly calcitic, light yellowish gray, light gray, fine to medium; some calcite crystals	90	620
Dolomite, calcitic, light gray to light brown, medium; some black specks; some limestone, dolomitic, light yellowish gray, lithographic; a few reddish brown specks and argillaceous partings	26	646
Platteville Group (132′)		
Limestone, dolomitic, light yellowish gray to light grayish brown, lithographic; some gray mottling; a little dolomite, calcitic, light yellowish brown, fine	29	675
Dolomite, calcitic, light yellowish brown, light gray, light greenish gray, fine	25	700
Dolomite, calcitic, light yellowish brown, light gray, fine; a little limestone, dolomitic, light grayish brown, lithographic	75	775
Limestone, light yellowish brown to light yellowish gray, lithographic	3	778
Ancell Group (132′)		
Glenwood–St. Peter Sandstone (132′)		
Sandstone, silty, slightly dolomitic, light gray, medium, friable	27	805
Sandstone, silty, white, medium, friable, rounded	20	825
Sandstone, silty, pale yellowish gray, fine to medium, friable to firm	55	880
No samples	20	900
Kress Member		
Shale, dolomitic, sandy, greenish gray, weak; chert, white	10	910
Canadian Series		
Prairie du Chien Group (210′)		
Shakopee Dolomite		
Dolomite, sandy, light yellowish brown, pink, very fine to fine; chert, oolitic; shale, sandy, green, weak	15	925
Oneota Dolomite		
Blodgett Member (95′)		
Dolomite, slightly sandy, slightly cherty, light yellowish brown to light yellowish gray, fine	15	940
Dolomite, light yellowish gray, fine to medium	35	975
Dolomite, slightly sandy at top, light gray, light yellowish gray, pink, medium	45	1020
Arsenal Member (100′)		
Dolomite, very cherty, light yellowish gray, pink, fine to coarse; at 1075′—chert, yellow	60	1080
Dolomite, cherty, light yellowish gray to light yellowish brown, pink, red, fine to coarse	40	1120
Cambrian System		
Croixan Series		
Eminence Formation (80′)		
Dolomite, sandy, light yellowish gray, medium	5	1125
Dolomite, slightly cherty, yellowish brown, pink, red, medium	10	1135
Dolomite, cherty, siliceous, white to light yellowish gray, fine; some chert, oolitic	10	1145
Dolomite, cherty, sandy, light gray, pink, light yellowish gray, medium; a trace of glauconite; drusy quartz, pink, yellow, white	50	1195
Shale, sandy, pink, purple, light green, white; dolomite; sandstone	5	1200
Potosi Dolomite (170′)		
Dolomite, light yellowish brown to pale yellowish gray, pink, fine, very slightly glauconitic; a trace of chert	70	1270
Dolomite, silty, light brownish gray, fine; drusy quartz	30	1300
Dolomite, slightly silty, light yellowish brown to light brownish gray, pink, fine; a little drusy quartz	20	1320
Dolomite, light brown to light gray, pinkish brown, fine to medium	20	1340
Dolomite, slightly cherty, light grayish brown, fine; some interstitial dolomite, white, extra-fine	20	1360
Dolomite, slightly sandy, light yellowish gray, very fine to fine; sandstone, very dolomitic, grayish red, fine, firm, glauconitic	10	1370
Franconia Formation (100′)		
Sandstone, dolomitic, reddish brown, fine, firm to friable, glauconitic	25	1395
Sandstone, dolomitic, silty, greenish gray, fine, friable, glauconitic	30	1425
No samples	10	1435
Dolomite, silty, sandy, argillaceous, greenish gray, very fine, glauconitic	15	1450
Dolomite, silty, sandy, grayish brown to gray, fine, glauconitic	20	1470
Ironton Sandstone (155′)		
Sandstone, very dolomitic, white, medium (median grain size .40 mm), friable to firm, moderately sorted; maximum grain size .90 mm	15	1485
Sandstone, dolomitic, slightly silty, light gray, medium (.37 mm), friable to firm, poorly sorted; maximum grain size 1.0 mm	10	1495

Sandstone, dolomitic, white, medium (.45 mm), firm, poorly sorted; maximum grain size 1.3 mm; dolomite streaks, sandy, light brown, pink, fine 15 1510
Sandstone, white, medium (.35 mm), friable, poorly sorted; maximum grain size 1.0 mm; dolomite streaks, light buff, light brown, fine; brown spheroids 40 1550
Sandstone, white, medium (.25-.32 mm), friable, moderately to poorly sorted; maximum grain size 1.0-1.2 mm 75 1625

Galesville Sandstone (40′)

Sandstone, white, medium (.28 mm), friable, well sorted; maximum grain size .90 mm 20 1645
Sandstone, dolomitic, light brownish gray, fine (.18 mm), friable to firm, well sorted; maximum grain size .75 mm 20 1665

Eau Claire Formation (35′ sampled)

Dolomite, silty, grayish brown, fine; sandstone, white, fine to medium 10 1675
Shale, silty, olive, weak 5 1680
Shale, silty, greenish gray, weak; a little dolomite, gray 10 1690
Siltstone, dolomitic, light orangish gray, firm, glauconitic 10 1700

46. Hughes Oil Co.—Parish No. 1

Well in NW NW SW sec. 24, T. 31 N., R. 13 E., Kankakee County; elevation 622 feet; SS 997; total depth 5,050 feet. Type well of the Momence Sandstone Member of the Eminence Formation.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 500′)		
Silurian System		
Alexandrian Series		
Dolomite, slightly silty, light gray to gray, black speckled, very fine	10	510
Dolomite, light buff to buff, fine	30	540
Dolomite, very silty, light buff to grayish brown, light green, very fine; shale, silty, dolomitic, light green to brown	10	550
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (205′)		
Brainard and Fort Atkinson Formations (120′)		
Dolomite, silty, greenish gray to brownish gray, fine; shale, silty, dolomitic, greenish gray to gray	20	570
Shale, silty, dolomitic, olive to gray, weak; a little dolomite, silty, greenish gray, very fine	40	610
Dolomite, white to light grayish brown, medium to coarse, pyritic; some black streaks and mottling at top	30	640
Dolomite, slightly argillaceous, grayish brown, fine to coarse, fossiliferous; phosphatic nodules at base; a little shale, silty, grayish brown, brittle	30	670
Scales Shale (85′)		
Shale, silty, dolomitic, grayish brown, weak to brittle; a little dolomite, argillaceous, grayish brown, medium	30	700
Shale, silty, dolomitic, dark grayish brown, brittle	55	755
Champlainian Series		
Galena Dolomite Group (185′)		
Dolomite, light brownish gray, fine to medium, pyritic at top	75	830
Dolomite, light yellowish gray to light grayish brown, fine to medium; some brown argillaceous partings	70	900
Dolomite, slightly cherty, light brownish gray to light grayish brown, fine to medium	40	940
Platteville Group (165′)		
Dolomite, cherty, light grayish brown to light brownish gray, fine	58	998
Dolomite, brown, fine to very fine; some gray mottling	12	1010
Dolomite, gray, brownish gray, extra-fine, dense; orange specks at base	40	1050
Dolomite, slightly calcitic, light brownish gray, fine to medium; a few shale partings, brown	10	1060
Dolomite, grayish brown, very fine; a few dark gray pyritic streaks	20	1080
Dolomite, sandy at base, brown, very fine to fine	25	1105
Ancell Group (165′)		
Glenwood–St. Peter Sandstone (165′)		
Sandstone, dolomitic, light gray, medium, friable to firm	5	1110
Sandstone, white, fine to medium, friable, rounded	50	1160
Sandstone, light yellowish gray, light pinkish buff, fine	110	1270
Canadian Series		
Prairie du Chien Group (230′)		
Shakopee and Oneota Dolomites (110′)		
Dolomite, light gray, fine to medium; a trace of chert; a trace of shale, green	20	1290
Dolomite, cherty (chert is oolitic), light gray, fine to medium	20	1310
Dolomite, sandy, white, coarse, pyritic; shale, green, weak	20	1330
Dolomite, cherty (some chert is oolitic), slightly sandy, light gray, white, fine to coarse; some gray mottling	50	1380
Oneota Dolomite (120′)		
Arsenal Member (120′)		
Chert, white; some dolomite, light gray, medium	10	1390
Dolomite, cherty, light gray to light grayish brown, fine to coarse	50	1440
Dolomite, very cherty to cherty, yellowish brown, light gray, fine to medium, slightly glauconitic; at 1470 to 1480′—dolomite, light pink	50	1490
Dolomite, slightly cherty, slightly sandy, light gray to light brownish gray, fine to medium; a little shale, gray, green, brittle	10	1500
Cambrian System		
Croixan Series		
Eminence Formation (160′)		
Dolomite, sandy, light brownish gray, light gray, pink, fine	30	1530
Dolomite, white, medium; oolitic chert	10	1540
Dolomite, slightly sandy, light gray, fine to medium	20	1560
Dolomite, sandy, light gray, fine; oolitic chert	30	1590
Dolomite, very sandy, cherty, light gray, fine; a little shale, greenish blue	20	1610
Dolomite, slightly sandy, light grayish brown to light yellowish gray, fine to very fine; a little oolitic chert; a trace of glauconite	40	1650
Momence Sandstone Member		
Sandstone, dolomitic, light yellowish gray, medium, friable to firm, pyritic	10	1660
Potosi Dolomite (198′)		
Dolomite, light yellowish gray, very fine to fine; a trace of glauconite	20	1680
Dolomite, light gray, very fine to fine; a trace of drusy quartz	50	1730
Dolomite, slightly cherty, light brownish gray, very fine	20	1750
Dolomite, light grayish brown, pink, very fine to fine; a trace of glauconite and drusy quartz	100	1850
Dolomite, slightly sandy, light brownish gray, mottled pink, very fine to fine, slightly glauconitic	8	1858
Franconia Formation (152′)		
Dolomite, slightly sandy, pinkish buff, very fine; sandstone, dolomitic, greenish gray, very fine, firm to friable, very glauconitic	12	1870
Dolomite, very sandy, greenish gray, pink, very fine, very glauconitic	20	1890
Dolomite, slightly sandy, grayish brown to pinkish brown, fine, slightly glauconitic	20	1910
Dolomite, argillaceous, brown to dark brown, gray, very fine; shale partings, brown, gray, brittle	30	1940
Dolomite, slightly silty, light grayish brown, pink, very fine, slightly glauconitic	60	2000
Dolomite, very sandy, silty, greenish gray, very fine, glauconitic	10	2010

Ironton Sandstone (140′)

Sandstone, dolomitic, white, medium (median grain size .35 mm), friable to firm, moderately sorted; maximum grain size .80 mm; dolomite streaks, sandy, light brown, fine; some brown dolomitic spheroids	40	2050
Sandstone, dolomitic, white, light buff, pink, medium (.27 mm), friable, poorly sorted; maximum grain size .75 mm	10	2060
Sandstone, dolomitic, white to light buff, medium (.35-.37 mm), friable, moderately to poorly sorted; maximum grain size .90 mm; dolomite streaks, sandy, light brown; brown dolomitic spheroids	40	2100
Sandstone, light buff, medium (.30 mm), friable, poorly sorted; maximum grain size 1.0 mm; a little dolomite, light brown, fine	50	2150

Galesville Sandstone (60′)

Sandstone, white, fine (.22-.24 mm), friable, moderately sorted; maximum grain size .90 mm	40	2190
Sandstone, slightly dolomitic, slightly silty, white, fine (.18 mm), friable, well sorted; maximum grain size .75 mm	20	2210

Eau Claire Formation (570′)

Proviso Siltstone Member (338′)

Sandstone, white, medium, friable; dolomite, silty, grayish brown, fine, glauconitic	40	2250
Shale, silty, greenish gray, weak; some sandstone, as above	20	2270
Siltstone, dolomitic, grayish orange, pinkish gray, coarse, firm, glauconitic, micaceous; shale, silty, grayish red, greenish gray, brittle, micaceous	220	2490
Siltstone, very dolomitic, light gray, firm, glauconitic, micaceous; shale, silty, green, grayish red, brittle, micaceous	20	2510
Shale, silty, grayish red, green, brittle	38	2548

Lombard Dolomite Member (152′)

Dolomite, slightly silty, slightly sandy, light gray to grayish brown, fine to medium, glauconitic; shale, green, brittle; at base—fossil fragments and coarse-grained glauconite	132	2680
Dolomite, very sandy, silty, grayish brown, fine to medium, very glauconitic, fossiliferous; shale, silty, green, red, brittle	20	2700

Elmhurst Sandstone Member (80′)

Sandstone, dolomitic, silty, light gray to light grayish brown, very fine, firm, glauconitic; fossil fragments; shale, green, brittle; a little dolomite, silty, brownish gray, fine	60	2760
Sandstone, light gray, medium (.30 mm), friable to firm, pyritic, slightly sooty, glauconitic; fossil fragments	20	2780

Mt. Simon Sandstone (2,270′ sampled)

Sandstone, grayish orange, medium (.42 mm), friable, moderately sorted; maximum grain size 1.1 mm	10	2790
Sandstone, yellowish gray to grayish orange, fine to medium, friable, angular	160	2950
Sandstone, silty, pink to yellowish gray, fine to medium, friable, poorly sorted, subrounded to angular	80	3030
Sandstone, light gray to pinkish buff, fine to medium, friable, subrounded to angular; some sandstone, coarse, sooty	80	3110
Sandstone, yellowish orange, medium, friable, angular, poorly sorted	50	3160
Sandstone, slightly silty, pinkish buff to yellowish orange, coarse to medium, friable, poorly sorted; maximum grain size 1.5 mm	130	3290
Sandstone, silty, yellowish orange, medium (.35 mm), friable, moderately sorted	10	3300
Sandstone, silty, pinkish gray, fine (.25 mm), friable, poorly sorted, angular; a little shale, gray, brittle, micaceous	10	3310
Sandstone, silty, pinkish gray, coarse (.55 mm), friable, poorly sorted; maximum grain size 1.7 mm	10	3320
Sandstone, slightly silty, yellowish orange to light grayish yellow, coarse to medium, friable, poorly sorted; some fine pebbles; at 3450 to 3460′—a little shale, gray	620	3940
Sandstone, pink, medium (.35 mm), friable	20	3960
Sandstone, light yellowish gray, pink, coarse to medium, friable, poorly sorted; a few fine pebbles	500	4460
Sandstone, yellowish buff to yellowish orange, medium to fine, friable, poorly sorted	510	4970
Sandstone, pinkish buff to pink, fine to medium, friable, arkosic; feldspar, pink	80	5050

47. Composite Log

Composite log of wells in secs. 28, 29, and 32, T. 30 N., R. 10 E., Kankakee County. Depths are based on ground elevation of 665 feet at the location of the Roy Feuerborn—Herscher No. 4 well in NW NE SE sec. 29; SS 11114; total depth 725 feet. Descriptions from the Maquoketa Shale to the top of the Glenwood–St. Peter Sandstone are from a sample study of the Herscher No. 4 well. The section from the Glenwood–St. Peter to the top of the Eau Claire is summarized from sample and core studies of the Natural Gas Storage Co.—Illinois Central Railroad No. 1 well in NW NW SW sec. 28; SS 22224; core no. 2727; total depth 2,022 feet. The Eau Claire and Mt. Simon sequence is interpreted from geophysical logs of the Natural Gas Storage Co.—Schwark No. 7 well in NW SW SW sec. 32; SS 30643; total depth 5,003 feet.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 47′—Pleistocene)		
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (103′)		
Dolomite, argillaceous, light gray to light grayish brown, fine to medium	13	60
Shale, silty, dolomitic, gray to grayish brown, weak to brittle	20	80
Dolomite, silty, argillaceous, brownish gray, fine to medium	5	85
Shale, silty, dolomitic, grayish brown, weak; a little dolomite, silty, grayish brown, very fine	65	150
Champlainian Series		
Galena Dolomite Group (190′)		
Dolomite, light brownish gray to light grayish brown, fine to medium; some oil stain	165	315
Dolomite, light brownish gray, mottled brown, fine to medium; a few brown argillaceous partings	10	325
Dolomite, cherty, light grayish brown, fine to medium	5	330
Guttenberg Formation		
Dolomite, light brownish gray, mottled brown, fine to medium; some red specks and shale partings; chert, red	10	340
Platteville Group (198′)		
Nachusa Formation		
Dolomite, light grayish brown to light brownish gray, fine to medium; a few shale partings, reddish brown; a trace of chert	45	385
Grand Detour Formation (50′)		
Dolomite, slightly calcitic to very calcitic, gray, dark gray mottled, very fine	30	415
Dolomite, brown to grayish brown, very fine	20	435
Mifflin Formation (55′)		
Dolomite, argillaceous, brownish gray to brown, fine; a few argillaceous streaks, gravish brown	5	440
Dolomite, calcitic in upper half, light grayish brown to light brownish gray, fine to very fine; some argillaceous streaks, brownish gray	50	490
Pecatonica Dolomite (48′)		
Dolomite, light grayish brown, fine; a few dark brown argillaceous partings	15	505
Dolomite, grayish brown, fine	25	530
Dolomite, slightly sandy, grayish brown, mottled gray, fine	8	538
Ancell Group (225′)		
Glenwood–St. Peter Sandstone (225′)		
Sandstone, white to light gray, fine to medium, friable; at top—a little dolomite, sandy, light gray, fine; at base—sandstone, silty, fine	218	756

Kress Member

Shale, sandy, green, white, weak; a little chert, white 7 763

Canadian Series

Prairie du Chien Group (349′)

Dolomite, sandy, light gray, fine to very fine; chert, oolitic; shale, green 37 800

Sandstone, dolomitic, white, medium, friable to firm, subrounded; some dolomite, as above 25 825

Dolomite, light gray to light buff, fine to very fine; chert, white; some dolomite, sandy; a little shale, green 30 855

Dolomite, light gray, buff, fine to medium, porous; shale, light green 100 955

Dolomite, cherty, white, gray, pink, medium to coarse 80 1035

Dolomite, brownish gray to gray, fine to coarse, vuggy, porous; oolitic chert; shale, green 65 1100

Gunter Sandstone

Sandstone, dolomitic, light brownish gray, medium 12 1112

Cambrian System

Croixan Series

Eminence Formation

Dolomite, sandy, light gray to light brownish gray, fine to coarse, porous, vuggy; shale partings, green; chert, tripolitic, partly oolitic; some quartz crystals and coarse dolomite rhombs in vugs 92 1204

Potosi Dolomite (212′)

Dolomite, sandy at top, brownish gray, pinkish brown, fine to medium, vuggy, slightly glauconitic; drusy quartz 133 1337

Dolomite, grayish brown, fine to medium, slightly vuggy; some pink mottling; some glauconite and pyrite 69 1406

Dolomite, sandy, grayish brown, pink mottled, medium, glauconitic 10 1416

Franconia Formation

Sandstone, dolomitic, greenish gray, fine, subangular, firm, very glauconitic; interbedded with dolomite, sandy, light grayish brown, medium, glauconitic. Beds of conglomerate: (1) flat pebbles of sandstone, dolomitic, greenish gray, fine, very glauconitic; (2) in a matrix of sandstone, very dolomitic, fine; or (3) dolomite, very sandy, gray to pinkish gray, medium, glauconitic; some interlaminated siltstone, dolomitic, gray; and shale, silty, brown, brittle. Dolomite and siltstone increase toward base, especially in the lower 65′ 208 1624

Ironton Sandstone (152′)

Sandstone, dolomitic, white, pink, light grayish brown, fine to coarse, friable to firm, poorly sorted; interbedded with dolomite, sandy, brown, fine to medium, oolitic 129 1753

Sandstone, white to light buff, fine to coarse, friable, poorly to moderately sorted; a little green shale in thin partings 23 1776

Galesville Sandstone (82′)

Sandstone, white to light pinkish buff, fine to medium, friable, moderately to well sorted 66 1842

Sandstone, white, fine to very fine, friable, well sorted; some shale partings, green; a little dolomite, pink; some brachiopod and trilobite fragments 16 1858

Eau Claire Formation (562′)

Interbedded and interlaminated—siltstone, dolomitic, grayish orange, coarse, firm, glauconitic; shale, dark green, brittle, micaceous, fissile, fossiliferous 322 2180

Shale, silty, green, red, brittle; dolomite, silty, sandy, light gray to grayish brown, fine to medium, glauconitic 160 2340

Interbedded—dolomite, silty, brownish gray, fine; sandstone, dolomitic, silty, light gray to light brownish gray, very fine, firm, glauconitic, fossiliferous; shale, silty, green, brittle 80 2420

Mt. Simon Sandstone (2,460′ sampled)

Sandstone, white, pink, yellow, fine to coarse, firm to friable, arkosic at base; some interbedded siltstone and shale, especially in upper 1,000′ 2460 4880

48. Gray-Milaeger Co.—Elgin, Joliet, and Eastern R. R. No. 1

Well in NW NE SE sec. 32, T. 40 N., R. 9 E., DuPage County; elevation 755 feet; SS 1169; total depth 1,378 feet. Type well of the Kress Member of the St. Peter Sandstone.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 130′)		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, light buff, fine	5	135
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (190′)		
Neda Formation		
Shale, silty, red grading to green, weak	15	150
Brainard and Fort Atkinson Formations (100′)		
Shale, silty, dolomitic, greenish gray, weak	20	170
Dolomite, gray, dark gray speckled and mottled, fine to coarse, pyritic; some interbedded shale, silty, gray, weak; chert, white, black speckled	80	250
Scales Shale		
Shale, silty, grayish brown, weak; some dolomite, silty, grayish brown, very fine; depauperate zone at base	75	325
Champlainian Series		
Galena Dolomite Group (185′)		
Dolomite, light brownish gray, fine to medium, vesicular, pyritic at top; trace of chert	175	500
Guttenberg Formation		
Dolomite, light brownish gray to light brown, fine; black and red specks; a little shale, reddish brown	10	510
Platteville Group (140′)		
Dolomite, light gray to light buff, fine	40	550
Dolomite, light brownish gray, dark gray mottled, very fine	20	570
Dolomite, grayish brown, very fine	10	580
Dolomite, light yellowish brown, fine	10	590
Dolomite, light brownish gray, dark gray mottled, fine	10	600
Dolomite, light brownish gray to gray, dark gray speckled, fine	30	630
Dolomite, brown, fine	20	650
Ancell Group (354′)		
Glenwood–St. Peter Sandstone (354′)		
Sandstone, dolomitic, white, medium, friable to firm; dolomite, sandy, light yellowish gray, fine; at top—shale, dolomitic, white, weak	70	720
Sandstone, white, fine and coarse, friable	20	740
Sandstone, silty, light yellowish gray, fine to medium, poorly sorted	70	810
Sandstone, white, medium, friable, rounded, moderately sorted	130	940
Kress Member (64′)		
Chert, white, red, partly sandy; a little dolomite, light grayish brown, fine, partly oolitic	20	960
Shale, red, light green, white; sandstone; chert, white; dolomite, light brownish gray, fine	44	1004
Cambrian System		
Croixan Series		
Potosi Formation (94′)		
Dolomite, light brownish gray, pink, fine to very fine; chert, white; drusy quartz, white, red	66	1070
Dolomite, light grayish brown, very fine, slightly glauconitic	28	1098
Franconia Formation (82′)		
Sandstone, argillaceous, silty, dolomitic, red, buff, fine, friable to firm, glauconitic; shale, silty, sandy, red, light green, weak	42	1140
Sandstone, argillaceous, dolomitic, greenish gray, fine, friable to firm, glauconitic; sandstone, silty, dolomitic, yellowish gray, very fine; shale, green, weak	40	1180

Ironton Sandstone (140′)		
Sandstone, dolomitic at top, light pinkish buff, coarse, friable, poorly sorted; some grains firm in dolomite streaks	50	1230
Sandstone, slightly dolomitic, white, medium to coarse, friable; a little dolomite, sandy, light gray; a few light brownish gray oolites	30	1260
Sandstone, white, medium, friable, moderately sorted	40	1300
Sandstone, slightly dolomitic, white, medium, friable	20	1320
Galesville Sandstone		
Sandstone, white to light buff, medium to fine, friable, moderately sorted	54	1374
Eau Claire Formation (4′ sampled)		
Sandstone, dolomitic, argillaceous, grayish brown, fine; shale, silty, sandy, gray, greenish gray, brittle; dolomite, sandy, grayish brown, fine	4	1378

50. Layne-Western Co.—Kankakee Ordnance Works No. 9

Well in NE NE SW sec. 25, T. 34 N., R. 9 E., Will County; elevation 589 feet; SS 6199; total depth 1,603 feet. Type well of the Blodgett and Arsenal Members of the Oneota Dolomite.

	Thickness (feet)	*Depth (feet)*
(Samples not studied above 100′)		
Silurian System		
Alexandrian Series		
Kankakee Formation		
Dolomite, cherty, light gray, light greenish gray, very fine	15	115
Edgewood Formation		
Dolomite, very silty, argillaceous, brownish gray, black speckled, very fine; grades to siltstone, dolomitic, gray, black speckled, firm	25	140
Ordovician System		
Cincinnatian Series		
Maquoketa Shale Group (165′)		
Brainard Shale		
Shale, silty, dolomitic, light greenish gray to gray, weak; a little dolomite, silty, gray, very fine	40	180
Fort Atkinson Dolomite (55′)		
Dolomite, silty, argillaceous, grayish brown, black speckled, very fine, pyritic	13	193
Limestone, dolomitic, white to gray, dark gray mottled, coarse, pyritic	7	200
Dolomite, calcitic, white to light gray, dark gray mottled, coarse, pyritic	25	225
Dolomite, light grayish brown, medium; shale, very silty, dolomitic, gray, black speckled, brittle	10	235
Scales Shale (70′)		
Shale, silty, dolomitic, grayish brown to dark brown, brittle; some black specks	5	240
Shale, silty, dolomitic, grayish brown, weak to brittle; a little dolomite, silty, grayish brown, very fine	40	280
Shale, silty, dolomitic, dark brown, black speckled, brittle to tough	8	288
Shale, silty, dolomitic, grayish brown, weak	17	305
Champlainian Series		
Galena Dolomite Group (179′)		
Dolomite, light brownish gray to light gray, fine, pyritic at top; calcite crystals; some dark gray specks	35	340
Dolomite, calcitic, light brownish gray to light gray, fine; calcite crystals; a little limestone, dolomitic, extra-fine, fossiliferous	60	400
Dolomite, light brownish gray, fine to medium; some light brown streaks and mottling; a little calcite	55	455
Dolomite, calcitic, light gray to light brownish gray, dark gray speckled, medium, porous	15	470
Guttenberg Formation		
Dolomite, calcitic, slightly cherty, light gray to light brown, dark gray speckled, red speckled, medium; some reddish brown shale partings	14	484
Platteville Group (167′)		
Nachusa Formation		
Dolomite, very calcitic, slightly cherty, light brownish gray to light gray, fine; at base—grades to limestone, very dolomitic, light grayish brown, extra-fine	48	532
Grand Detour Formation (28′)		
Limestone, very dolomitic, light gray, gray mottled, extra-fine	18	550
Dolomite, gray, grayish brown mottled, very fine	10	560
Mifflin Formation (46′)		
Dolomite, light brown, very fine	10	570
Limestone, dolomitic, light brownish gray to light gray, lithographic; some dark gray mottling; some orange specks; a few shale partings, brownish gray	36	606
Pecatonica Dolomite (45′)		
Dolomite, slightly calcitic, light grayish brown, very fine	22	628
Limestone, very dolomitic, light brownish gray, lithographic to extra-fine, fossiliferous	17	645
Limestone, dolomitic, sandy at base, light brownish gray to light brown, lithographic; a few argillaceous partings, brown	6	651
Ancell Group (157′)		
Glenwood–St. Peter Sandstone (157′)		
Sandstone, dolomitic, light gray to gray, medium, firm	4	655
Sandstone, slightly silty, white to pale yellowish gray, medium, fine, friable, rounded	85	740
Sandstone, silty, light gray, fine to medium, friable, pyritic	15	755
Sandstone, silty, light yellowish gray, fine, friable	10	765
Sandstone, slightly silty, white to light yellowish gray, medium, friable, rounded	43	808
Canadian Series		
Prairie du Chien Group (284′)		
Shakopee Dolomite (67′)		
Dolomite, sandy, light gray to light brownish gray, pink, fine to very fine, pyritic; a little shale, green, white	17	825
Dolomite, silty, slightly argillaceous, slightly sandy, light brownish gray to reddish brown, fine to very fine	10	835
Dolomite, sandy, cherty, light grayish brown, very fine; a little oolitic chert	40	875
New Richmond Sandstone		
Sandstone, dolomitic, light yellowish gray, medium, subrounded; some dolomite, light yellowish gray, very fine	10	885
Oneota Dolomite (200′)		
Blodgett Member (95′)		
Dolomite, light yellowish gray, fine, very slightly glauconitic	35	920
Dolomite, slightly cherty, light gray, pale green, pale pink, fine; a little oolitic chert	15	935
Dolomite, slightly sandy at top, light gray, pale pink, pale green, medium; trace of glauconite; at 960 to 965′—chert, pale yellow	45	980
Arsenal Member (105′)		
Dolomite, very cherty, siliceous, light yellowish gray, fine to medium	20	1000
Dolomite, slightly cherty, light gray, fine to coarse	20	1020
Dolomite, cherty, light yellowish gray, medium to coarse	10	1030
Dolomite, light gray, pink, fine, slightly glauconitic; at top—dolomite, slightly sandy	15	1045
Dolomite, cherty, light grayish brown to light gray, fine; a little shale, greenish gray, weak to brittle; a little chert, oolitic	40	1085
Gunter Sandstone		
Sandstone, dolomitic, light gray, medium, friable to firm	7	1092
Cambrian System		
Croixan Series		
Eminence Formation (93′)		
Dolomite, sandy to slightly sandy, light yellowish gray, light pinkish gray, very fine; a little oolitic chert at base	46	1138
Dolomite, slightly sandy, pink, light gray, light green, very fine to coarse	12	1150

Dolomite, slightly cherty (chert is oolitic), light grayish brown, fine	5	1155
Dolomite, slightly sandy, light gray, pink, red, fine to medium; thin stringers of sandstone, medium	25	1180
Momence Sandstone Member		
Sandstone, dolomitic, slightly siliceous, light gray, medium to coarse, subrounded; a little dolomite, light gray, pink, medium	5	1185
Potosi Dolomite (163′)		
Dolomite, light gray, light brownish gray, fine to very fine; a little drusy quartz; a trace of glauconite at top	15	1200
Dolomite, light brownish gray to light gray, fine, slightly glauconitic	24	1224
Dolomite, light yellowish gray, fine to very fine; a little drusy quartz	26	1250
Dolomite, light yellowish brown to light yellowish gray, fine to medium	35	1285
Dolomite, silty, light gray, fine to very fine	13	1298
Dolomite, silty, brownish gray, fine; pyritic speckling; a few argillaceous films	27	1325
Dolomite, light buff to buff, pinkish buff, fine	15	1340
Dolomite, slightly sandy, buff to pinkish buff, fine, slightly glauconitic	8	1348
Franconia Formation (117′)		
Sandstone, dolomitic, light greenish gray, pink, very fine to fine, friable to firm, glauconitic; dolomite, sandy, pinkish buff; a little shale, green, weak	17	1365
Sandstone, silty, dolomitic, argillaceous, greenish gray, very fine to fine, friable to firm, glauconitic; a little siltstone, dolomitic, gray, firm; a little shale, green, weak	35	1400
Sandstone, very dolomitic, silty, greenish gray to brownish gray, fine, firm, glauconitic; at base —shale, silty, dolomitic, gray, brittle	20	1420
Dolomite, silty, sandy, light grayish brown, fine, slightly glauconitic	24	1444
Sandstone, very dolomitic, very silty, gray, very fine to fine, friable to firm, glauconitic	11	1455
Dolomite, sandy, silty, gray to grayish brown, fine, glauconitic	10	1465
Ironton Sandstone (130′)		
Mooseheart Member (45′)		
Sandstone, white, medium (median grain size .32-.38 mm), friable, moderately sorted; maximum grain size 1.0 mm; dolomite streaks, sandy, light buff, pink, white, fine	20	1485
Sandstone, dolomitic, white, medium (.38 mm), friable to firm, poorly sorted; maximum grain size 1.1 mm	25	1510
Marywood Member		
Sandstone, slightly silty, medium (.37 mm), friable, poorly sorted; maximum grain size 1.1 mm	5	1515
Fox Valley Member		
Sandstone, white, medium (.40 mm), friable to firm, poorly sorted; maximum grain size 1.1 mm; dolomite streaks, sandy, light brown, pink, oolitic	20	1535
Buelter Member		
Sandstone, slightly silty, white, medium (.36 mm), friable, poorly sorted; maximum grain size 1.1 mm; at 1555 to 1561′—sandstone, dolomitic	60	1595
Galesville Sandstone (8′ sampled)		
Sandstone, white, fine (.20 mm), friable, well sorted; maximum grain size .75 mm; at base —dolomite, sandy, grayish brown	8	1603

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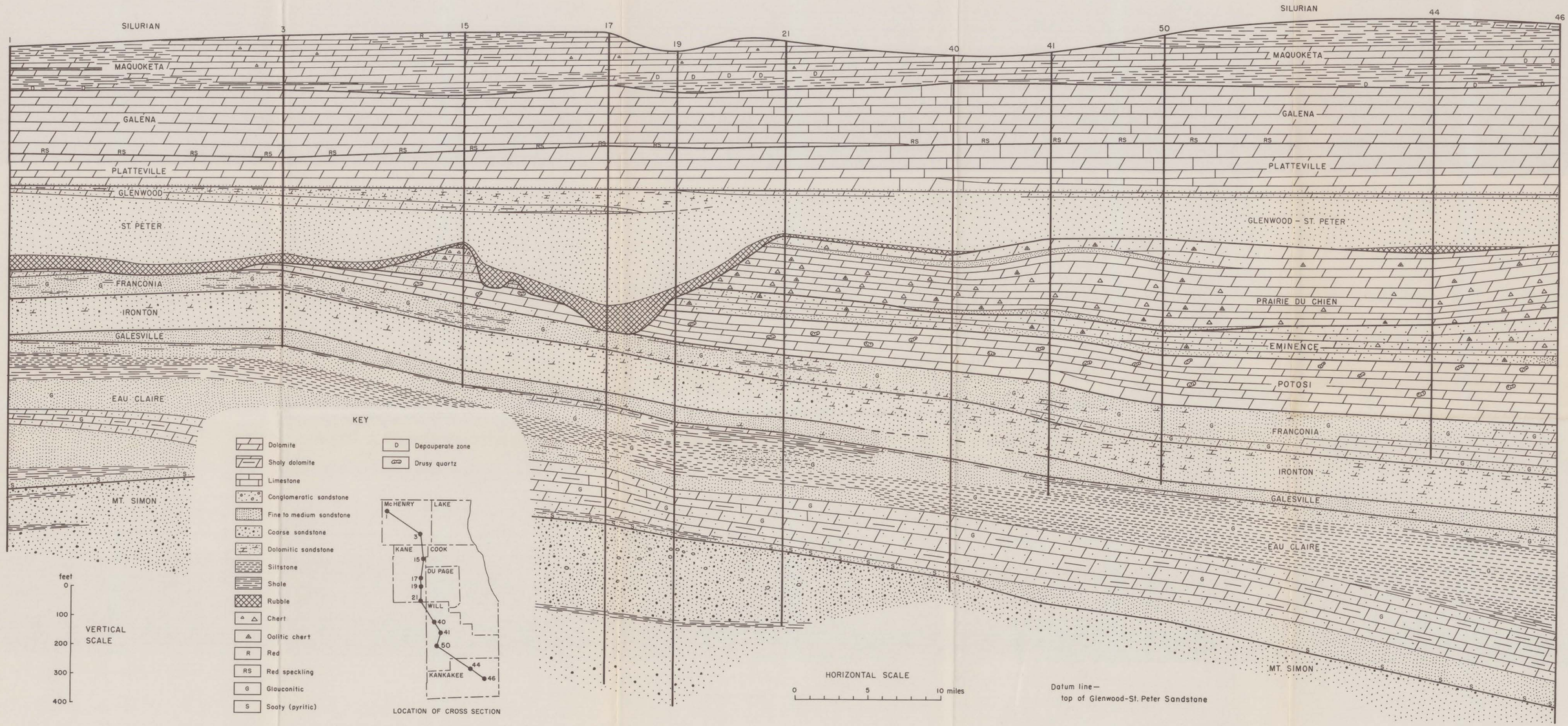


CROSS SECTION OF CAMBRIAN AND ORDOVICIAN FORMATIONS THROUGH NORTHEASTERN ILLINOIS

T. C. Buschbach

1959

Illinois State Geological Survey

Report of Investigations 218 – Plate 2

THICKNESS OF IRONTON AND GALESVILLE SANDSTONES

T. C. BUSCHBACH
1959

KEY

- 200 — Isopach, interval 25 feet
- Closed area of thinning
- Reference well
- Datum well

SCALE

0 1 2 3 4 5 miles

LAKE MICHIGAN

THICKNESS OF FRANCONIA FORMATION

T. C. BUSCHBACH
1959

KEY

- 100 — Isopach, interval 25 feet
- Closed area of thinning
- Reference well
- Datum well
- Potosi on Franconia / St. Peter on Franconia

SCALE

0 1 2 3 4 5 miles

MICHIGAN LAKE

THICKNESS OF POTOSI DOLOMITE

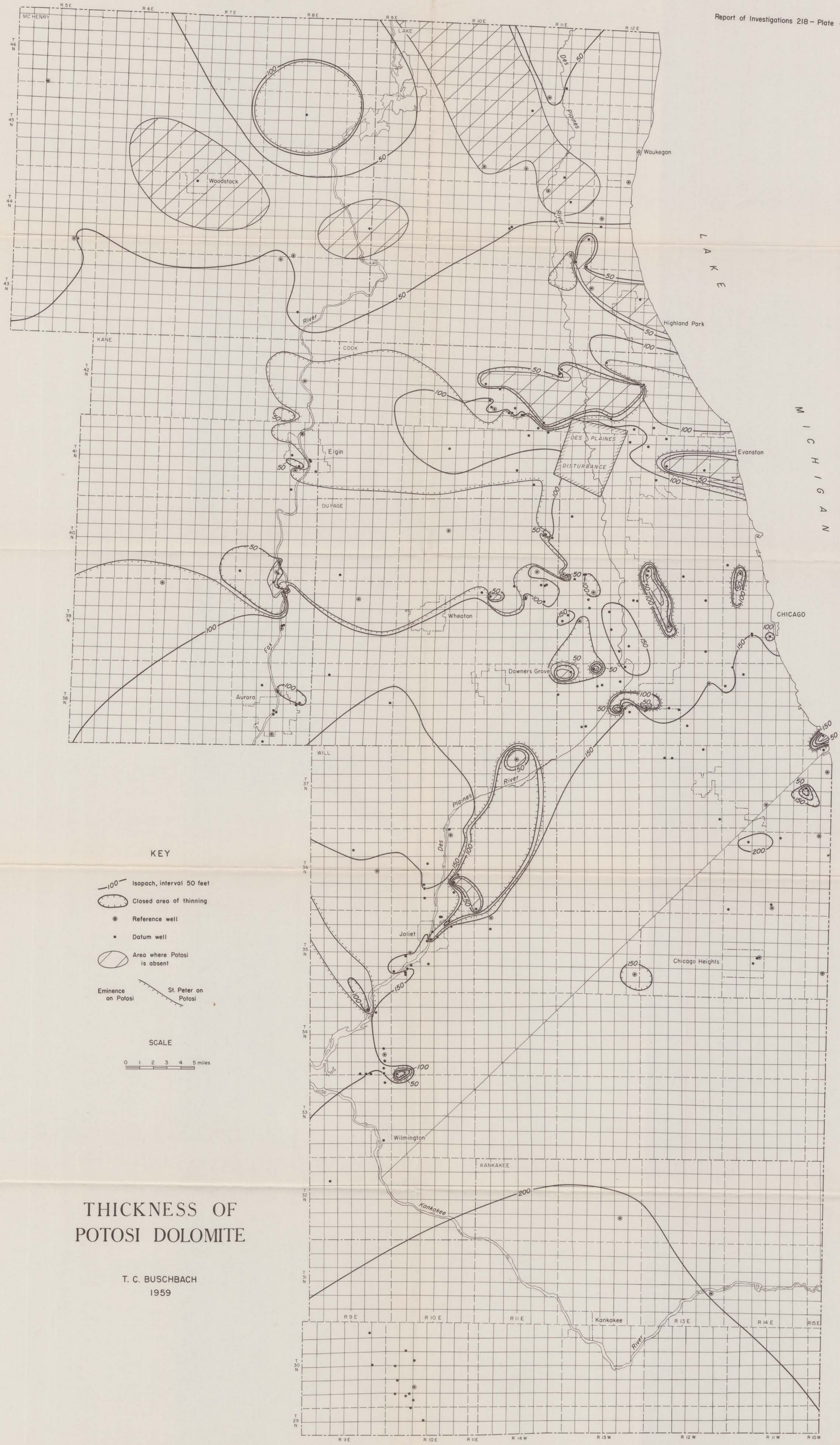
T. C. BUSCHBACH
1959

KEY

- 100 — Isopach, interval 50 feet
- Closed area of thinning
- Reference well
- Datum well
- Area where Potosi is absent
- Eminence on Potosi / St. Peter on Potosi

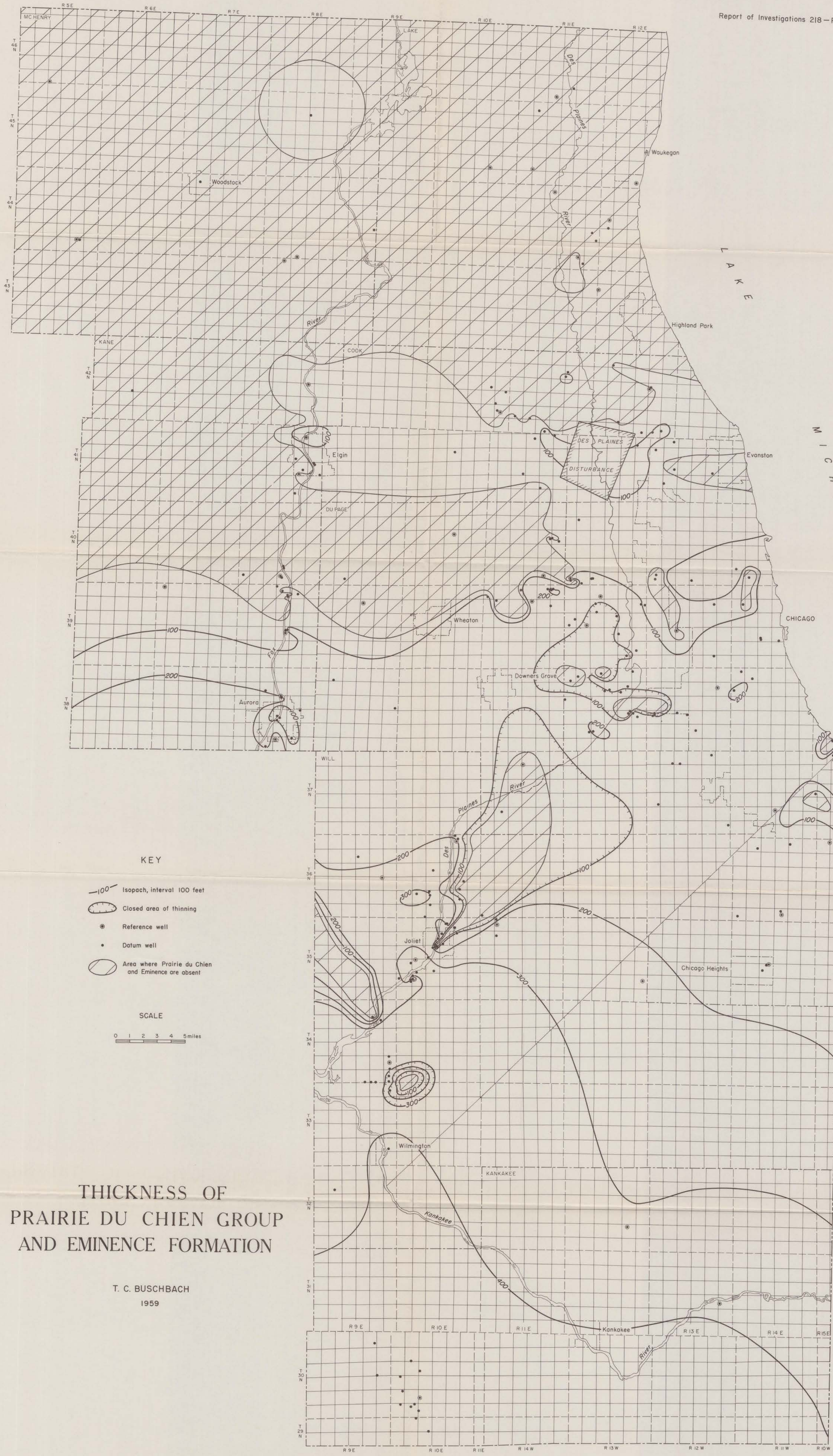
SCALE

0 1 2 3 4 5 miles



Illinois State Geological Survey

Report of Investigations 218 — Plate 5



KEY

- 100 — Isopach, interval 100 feet
- Closed area of thinning
- Reference well
- Datum well
- Area where Prairie du Chien and Eminence are absent

SCALE

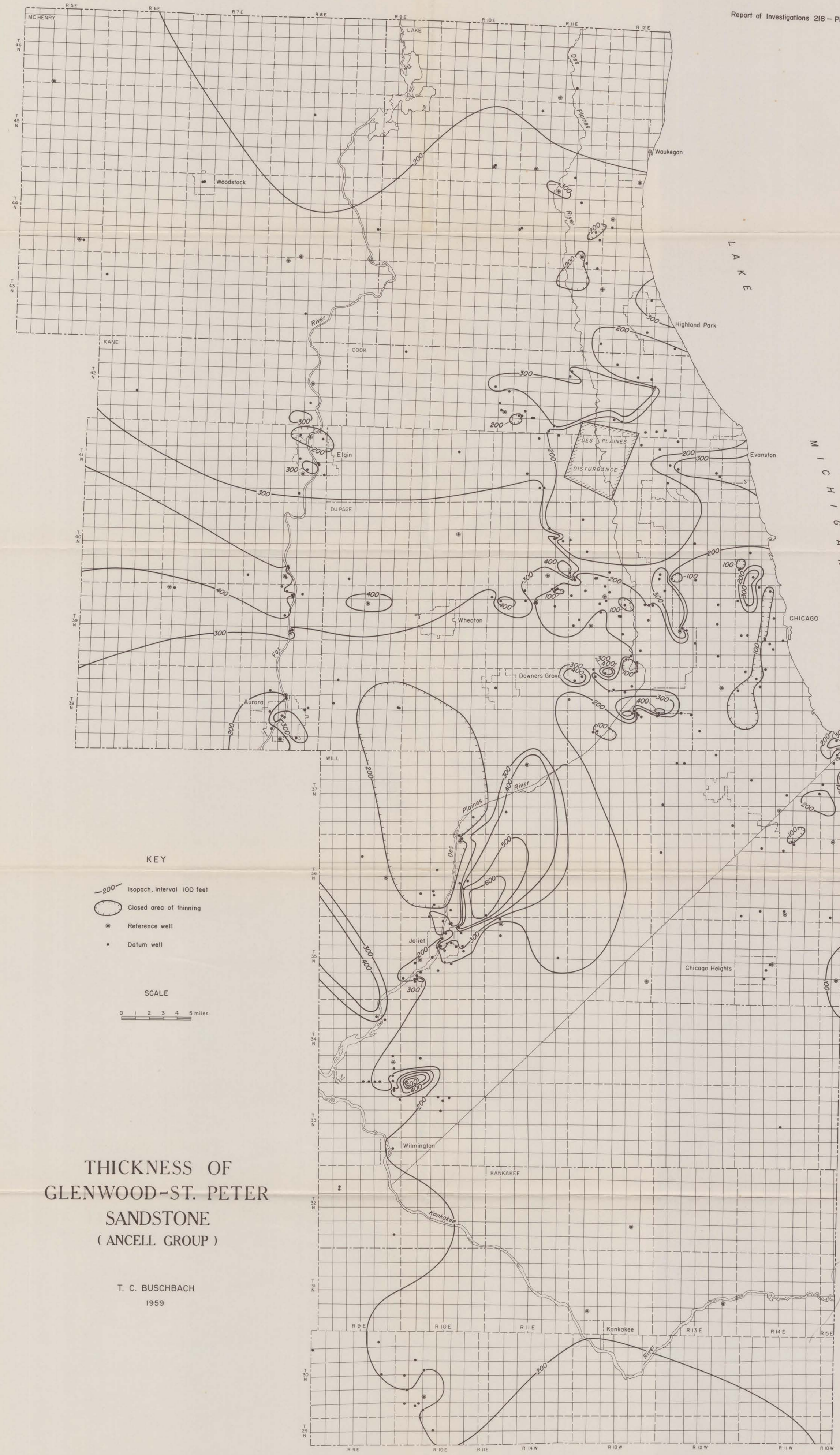
0 1 2 3 4 5 miles

THICKNESS OF PRAIRIE DU CHIEN GROUP AND EMINENCE FORMATION

T. C. BUSCHBACH
1959

Illinois State Geological Survey

Report of Investigations 218 – Plate 6



KEY

200 Isopach, interval 100 feet

Closed area of thinning

Reference well

Datum well

SCALE

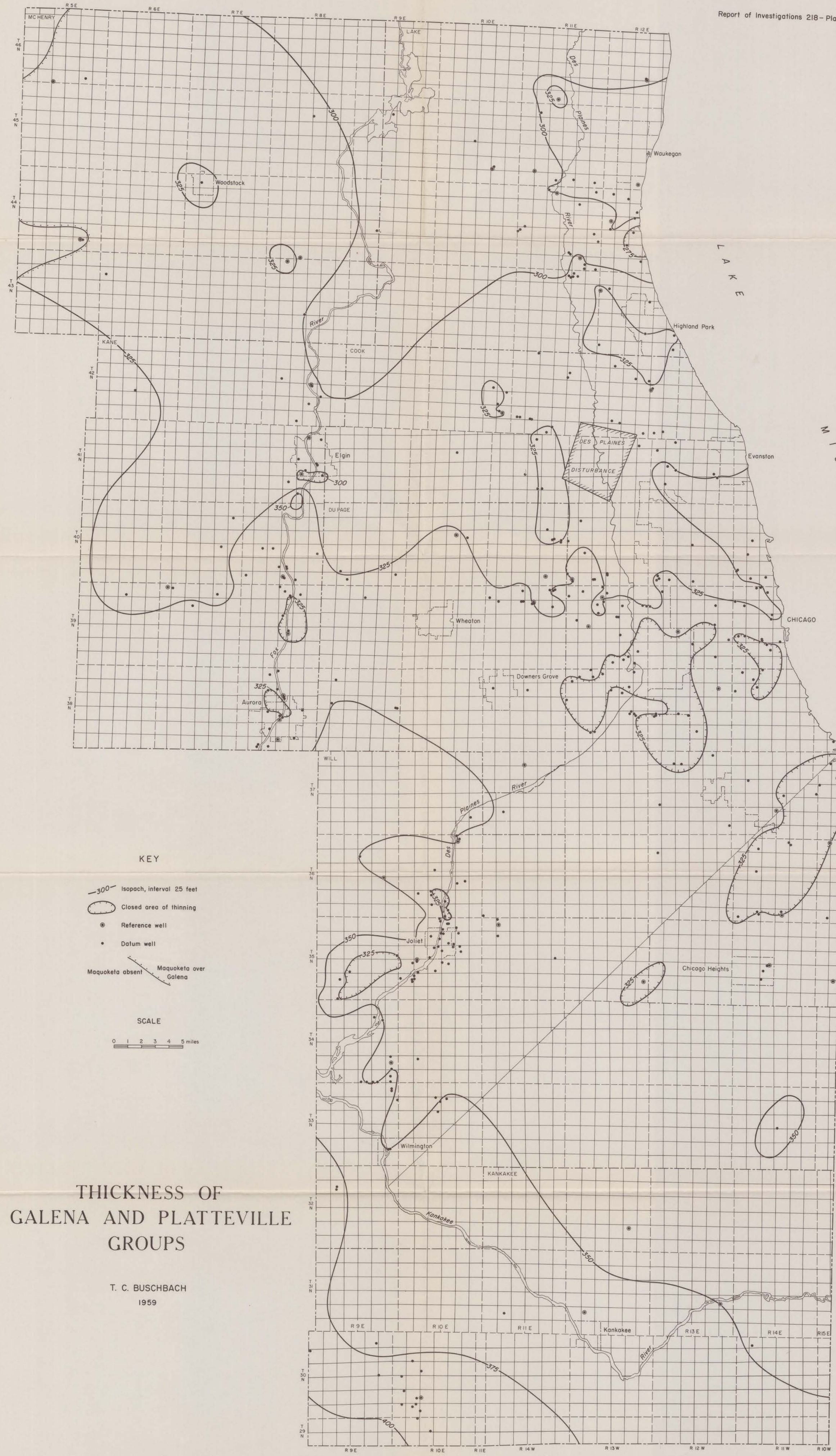
0 1 2 3 4 5 miles

THICKNESS OF GLENWOOD-ST. PETER SANDSTONE

(ANCELL GROUP)

T. C. BUSCHBACH

1959



KEY

300 — Isopach, interval 25 feet

Closed area of thinning

Reference well

Datum well

Maquoketa absent — Maquoketa over Galena

SCALE

0 1 2 3 4 5 miles

THICKNESS OF GALENA AND PLATTEVILLE GROUPS

T. C. BUSCHBACH

1959

THICKNESS OF MAQUOKETA GROUP

T. C. BUSCHBACH
1959

KEY

- 200 — Isopach, interval 25 feet
- Closed area of thinning
- Reference well
- Datum well
- Area where Maquoketa is absent
- Silurian over Maquoketa / Silurian absent

SCALE

0 1 2 3 4 5 miles

LAKE MICHIGAN

TOP OF GLENWOOD–ST. PETER SANDSTONE

T. C. BUSCHBACH
1959

KEY

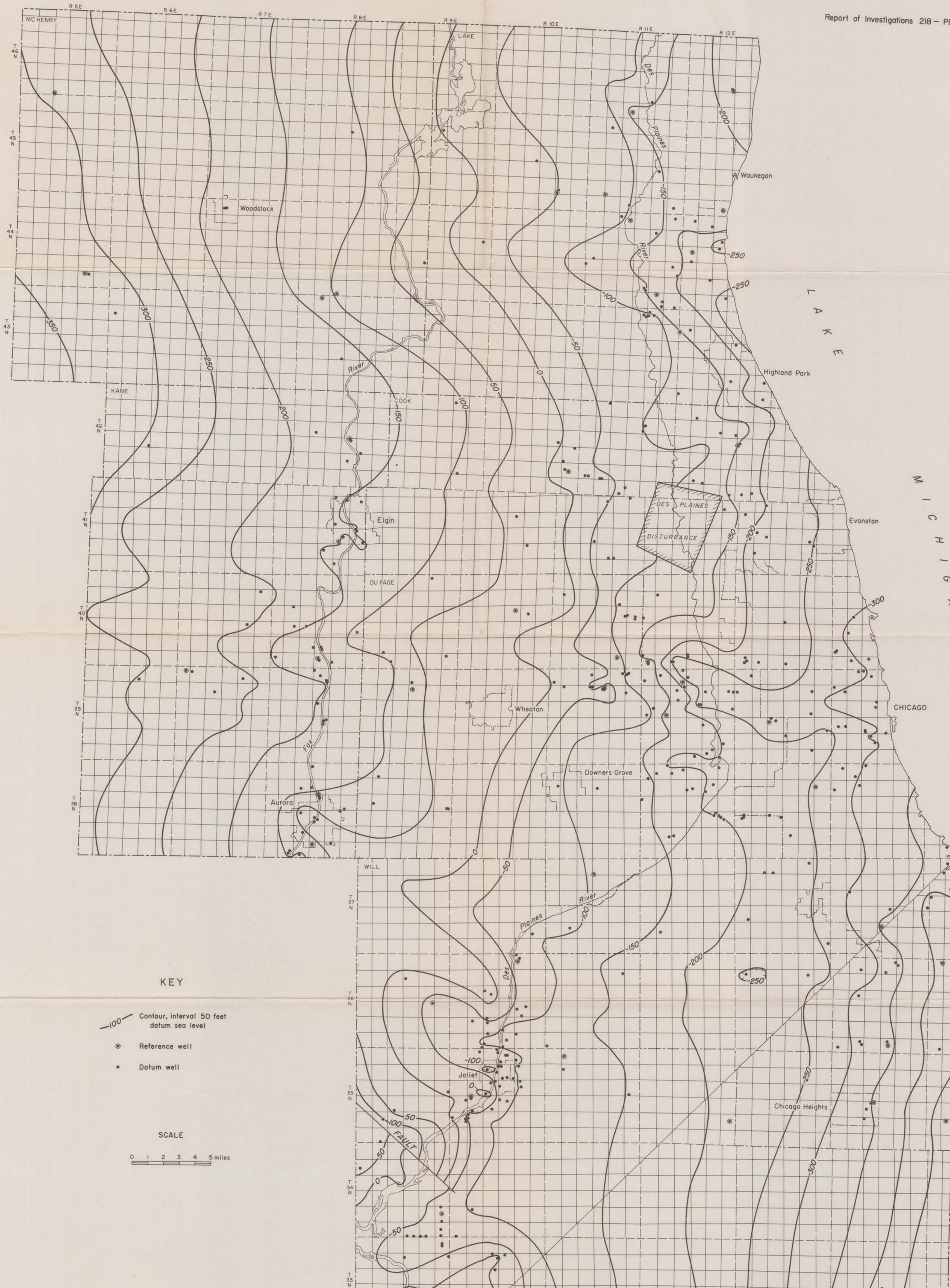
-100 Contour, interval 50 feet datum sea level

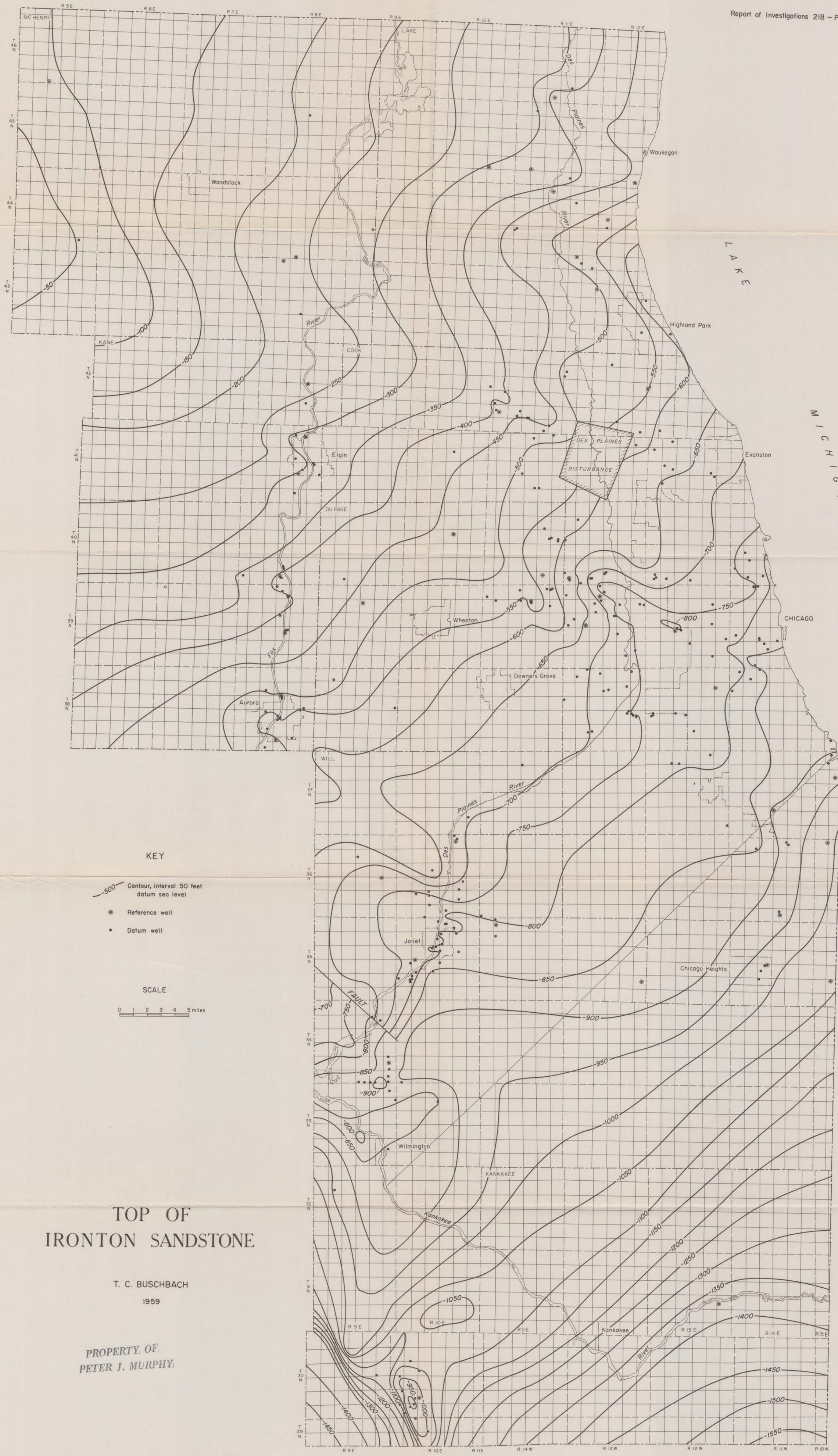
Reference well

Datum well

SCALE

0 1 2 3 4 5 miles





KEY

-500 Contour, interval 50 feet datum sea level

Reference well

Datum well

SCALE

0 1 2 3 4 5 miles

TOP OF IRONTON SANDSTONE

T. C. BUSCHBACH

1959