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# SUBSURFACE DOLOMITE AND LIMESTONE RESOURCES OF GRUNDY AND KENDALL COUNTIES

Meredith E. Ostrom

DIVISION OF THE  
ILLINOIS STATE GEOLOGICAL SURVEY  
JOHN C. FRYE, *Chief* URBANA

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# SUBSURFACE DOLOMITE AND LIMESTONE RESOURCES OF GRUNDY AND KENDALL COUNTIES

Meredith E. Ostrom

## ABSTRACT

This report, covering Grundy and Kendall counties in northeastern Illinois, was prepared in response to increasing interest in shallow dolomite and limestone resources in counties neighboring the Chicago area. The resources, especially those not exposed at the surface, are indicated on maps (based on well data and outcrops) that show the distribution of the bedrock formations, depth to bedrock, depth to dolomite or dolomitic limestone, and thickness. Dolomite and dolomitic limestones are the dominant carbonate rocks. Seven dolomite or limestone formations, ranging up to 379 feet thick, contain significant thicknesses of carbonate rocks. Several areas are underlain by such rocks at shallow depths.

The available well data regarding the rocks do not permit accurate determinations of the physical and chemical characteristics which might prescribe their potential uses. However, deposits of stone which might be suitable for road material and agricultural limestone are available. Less common, but within the limits of possibility, are deposits of stone suitable for concrete aggregate and railroad ballast. High-purity dolomite may be present locally.

The weathered character of many deposits and the possibility of groundwater in all of the dolomite and dolomitic limestone formations are problems that affect their potential uses. Test drilling is requisite for a thorough evaluation of the resources.

## INTRODUCTION

The dolomite and limestone resources of Grundy and Kendall counties have become of increasing interest because of their proximity to Chicago. In general the counties do not have pronounced topographic relief, and as a result bedrock outcrops are relatively few and not of great thickness. Most of the outcrops are known, having been described in other reports (Worthen, 1870; Krey and Lamar, 1925; Culver, 1922; Lamar and Willman, 1931, 1933; and Lamar, et al., 1934).

Some of the outcrops occurring along the Fox River in northeastern Kendall County are in residential or industrial areas or in areas that are potentially valuable for town sites or industries. This is also true regarding outcrops in some other places. There are large nonresidential and nonindustrial areas, however, where dolomite or limestone is relatively shallow, although unexposed or but poorly visible.

It is toward such shallow occurrences that primary attention is directed here. To this end information is given regarding depth to limestone or dolomite in both counties, even though the rocks may be considerably deeper than is now regarded as within the range of depth of economical quarrying or underground mining. Inasmuch as the growth of northeastern Illinois or technological developments may change the depth to which quarrying is feasible, the information will serve to indicate those areas of possible present interest as well as those which may have future possibilities.

The data available from the well records involved in the study do not provide detailed chemical or physical analytical data on which to base specific recommendations regarding uses for the dolomites or limestones encountered. However, certain inferences are made on the basis of the general geological character of the various formations and the uses for some of them in other areas where they have been quarried.

It has not been feasible to include the detailed records of the numerous wells involved in this study, however, they are available for examination at the offices of the Survey in Urbana.

The assistance of J. E. Lamar, Robert E. Bergstrom, James E. Hackett, H. B. Willman, T. C. Buschbach and George E. Ekblaw, of the Geological Survey, and Robert Sasman of the State Water Survey, in connection with certain phases of this investigation is gratefully acknowledged.

#### PRESENT QUARRYING INDUSTRY

Most of the dolomite and limestone formations which crop out in Grundy and Kendall counties have been worked in a comparatively small way in the past. At present the only active quarry is that of the Central Limestone Company located at Central in the south-central part of Kendall County where about 45 feet of Galena-Platteville formation is being quarried. The rock is largely medium-grained gray limestone, parts of which are mottled with irregularly shaped bodies of light brownish dolomite up to 8 inches in size. The stone is sold for road surfacing, agricultural limestone, and metallurgical flux.

#### SOURCE AND CHARACTER OF DATA

The depth to bedrock, depth to dolomite or limestone, and the thickness of dolomite or limestone penetrated are shown on maps (figs. 1-6). The maps are based principally on well records supplied by well drillers and to a lesser extent on samples saved during drilling and subsequently studied by Survey geologists. Because the records have been supplied by a number of drillers, there is probably a variation in the terms used to describe the formations penetrated and in the accuracy with which the well records were kept. As a result, the accuracy and uniformity of the maps vary. They do, however, present the currently available data regarding dolomite and limestone resources and are believed to give a reasonably good idea of the distribution, depth, and general character of the dolomites and limestones.

## ROCK FORMATIONS

The bedrock in Kendall and Grundy counties consists of rocks of Ordovician, Silurian, and Pennsylvanian age which are overlain by unconsolidated glacial deposits of clay, silt, sand, and gravel in varying proportions, from 0 to more than 250 feet thick.

The bedrock units which crop out or are penetrated in drilling are composed of the rock units listed in table 1.

## GENERAL DISTRIBUTION OF ROCK FORMATIONS

The following series of maps show the distribution and depth of the various bedrock formations in Grundy and Kendall counties.

Figure 1 is a generalized geological map showing the probable distribution of the various bedrock formations as it would appear if all the unconsolidated materials were removed from above the bedrock. The map shows that the southern three-fourths of Grundy County is underlain by Pennsylvanian formations. These formations offer little possibility for commercial limestone deposits because they contain only a few limestones, and such strata as are present are thin (table 1). The lower and upper Maquoketa shales underlie a considerable part of north-central Kendall County, and the St. Peter sandstone is the bedrock in the southwestern corner of Kendall County. Elsewhere the thickest dolomite and limestone formation of wide-spread distribution is the Galena-Platteville formation. The Divine dolomite and limestone formation also underlies a considerable area.

## DEPTH TO DOLOMITE AND LIMESTONE

The approximate depth to the first dolomite or limestone encountered in wells in Grundy and Kendall counties is shown in an over-all view in figure 2. The shallowest dolomite or limestone occurs in southern Kendall and northeast and north-central Grundy County with other shallow areas in northeast and northwest Kendall County. By comparing figures 1 and 2, the identity of shallow bedrock dolomite and limestone formations may be determined.

DEPTH TO DOLOMITE OR LIMESTONE,  
THICKNESS OF DOLOMITE OR LIMESTONE,  
DEPTH TO BEDROCK

The depth and thickness of the first dolomites and limestones encountered in Grundy County wells is shown in figure 3. Outcrops also are indicated. At comparatively shallow depths deposits of dolomite and limestone formations of moderate thickness occur in the northeastern part of the county. In the north-central part, moderately thick to thick dolomite or limestone formations occur at shallow depths. Figure 4 indicates the depth to bedrock in wells encountering dolomite or limestone in Grundy County. It indicates that certain of the shallow deposits shown in figure 3 have no bedrock overburden or only very thin overburden. Their overburden is likely to be clay or silt and possibly sand and gravel at some places.

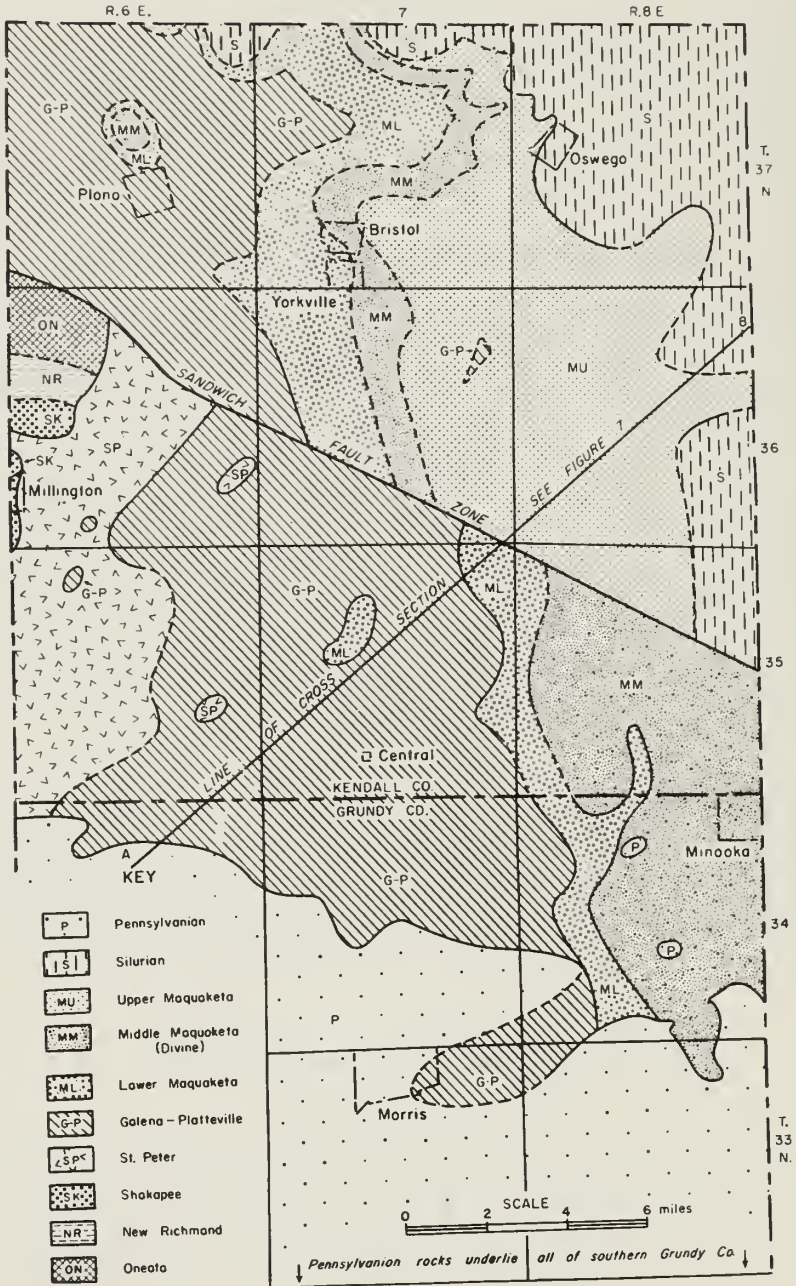


Fig. 1. - Distribution of bedrock formations in Kendall and Grundy counties

DOLOMITE AND LIMESTONE RESOURCES

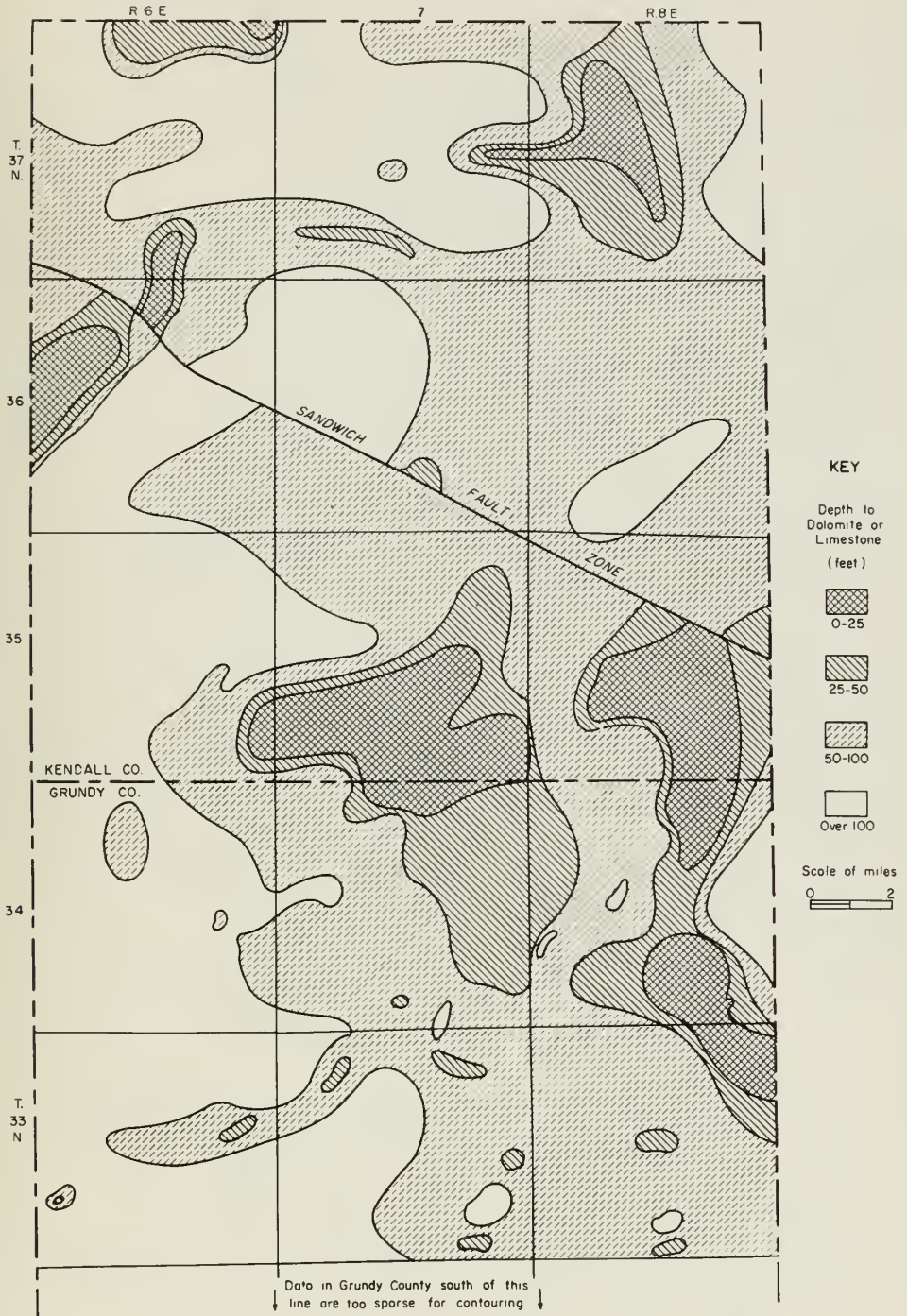
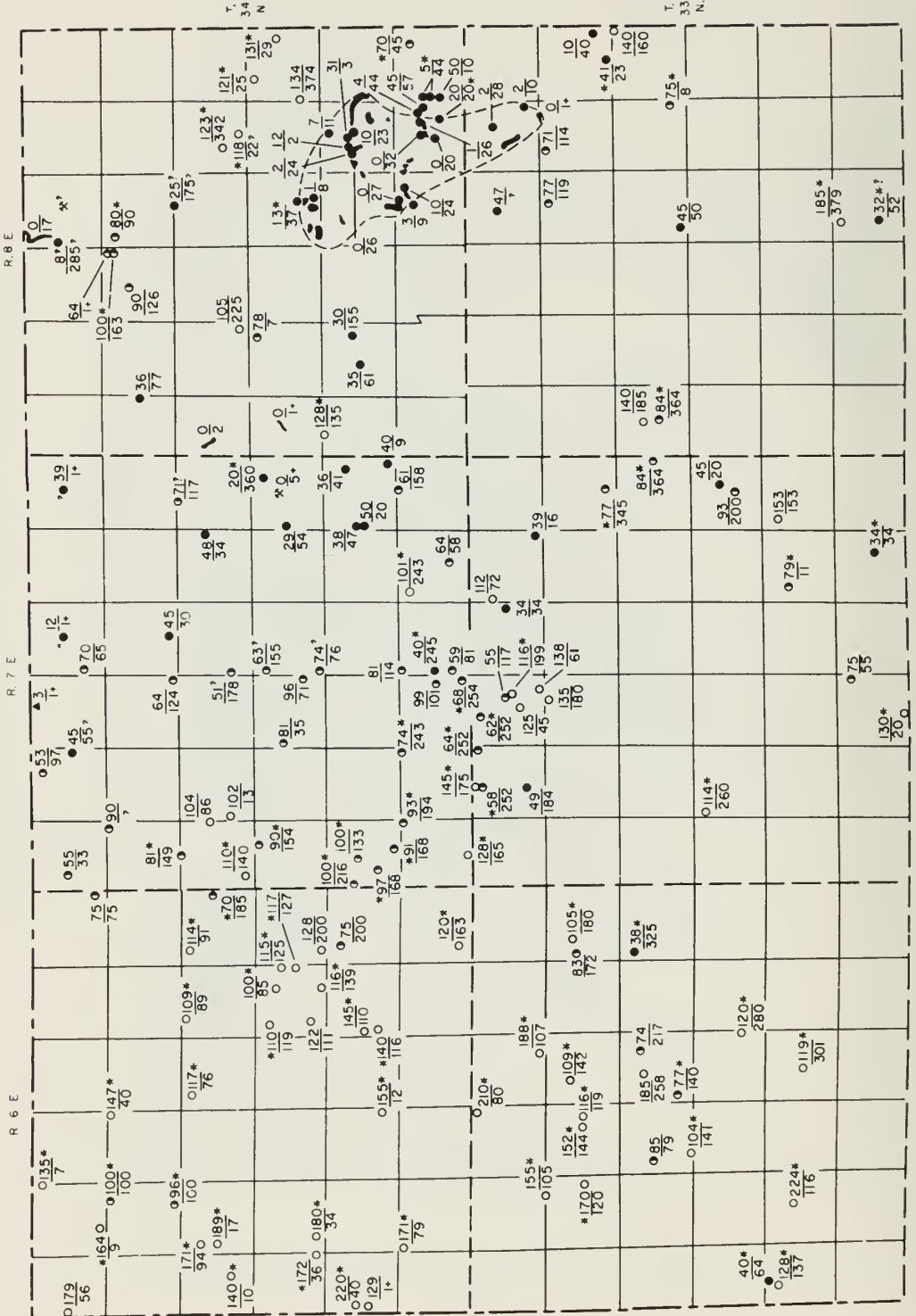


Fig. 2. - Approximate depth to dolomite or limestone bedrock





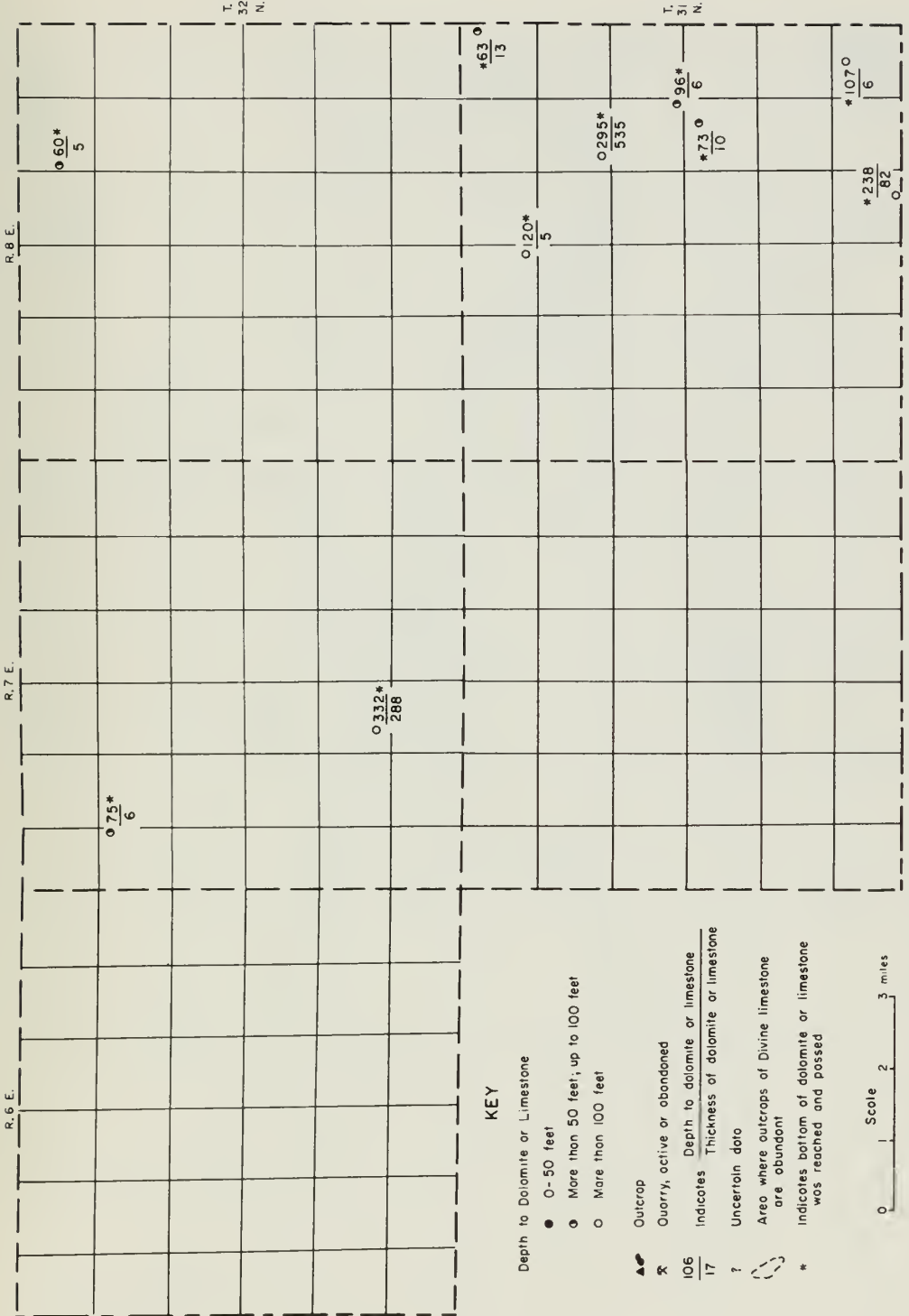
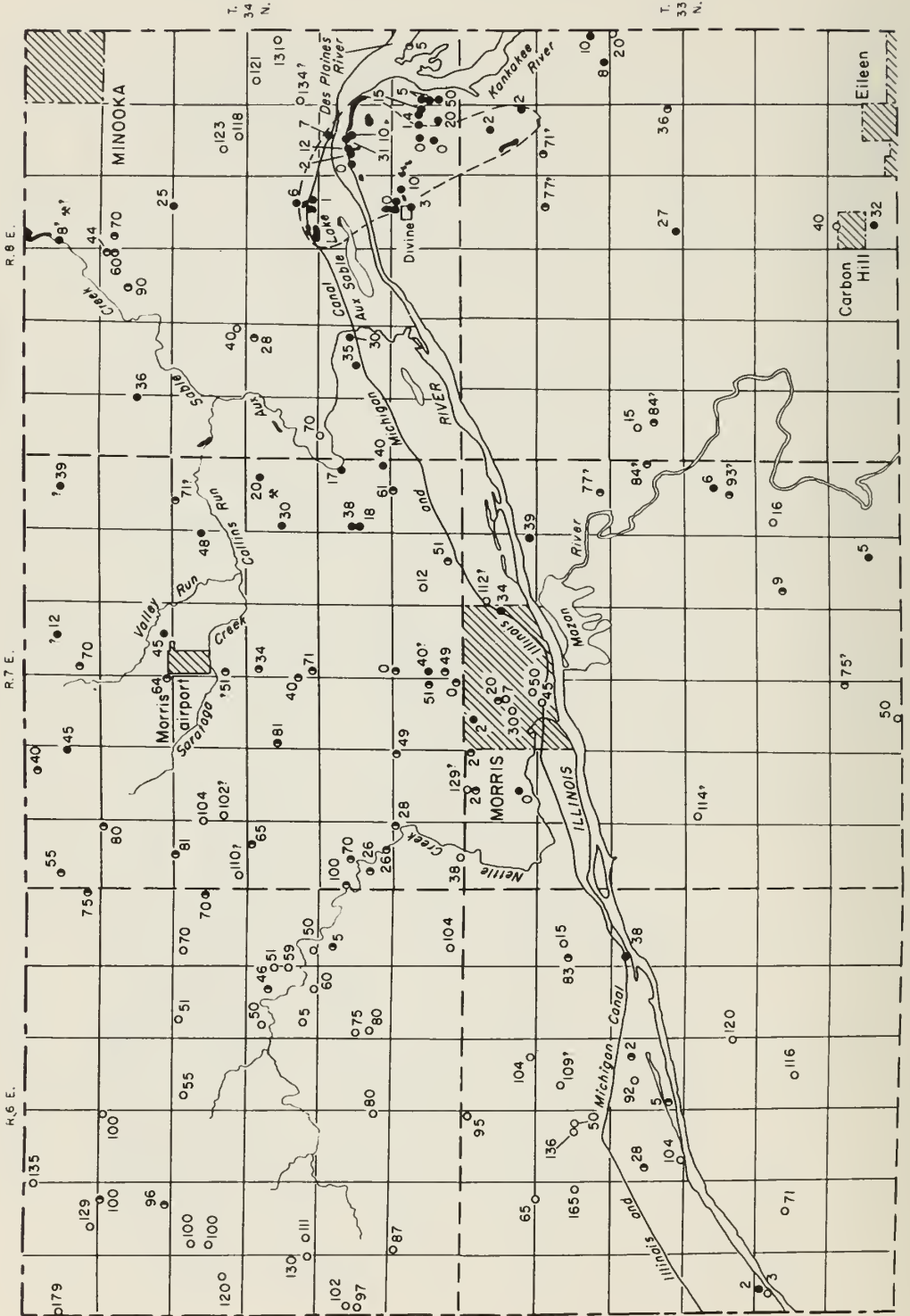


Fig. 3. - Depth and thickness of dolomite and limestone in wells and outcrops in Grundy County



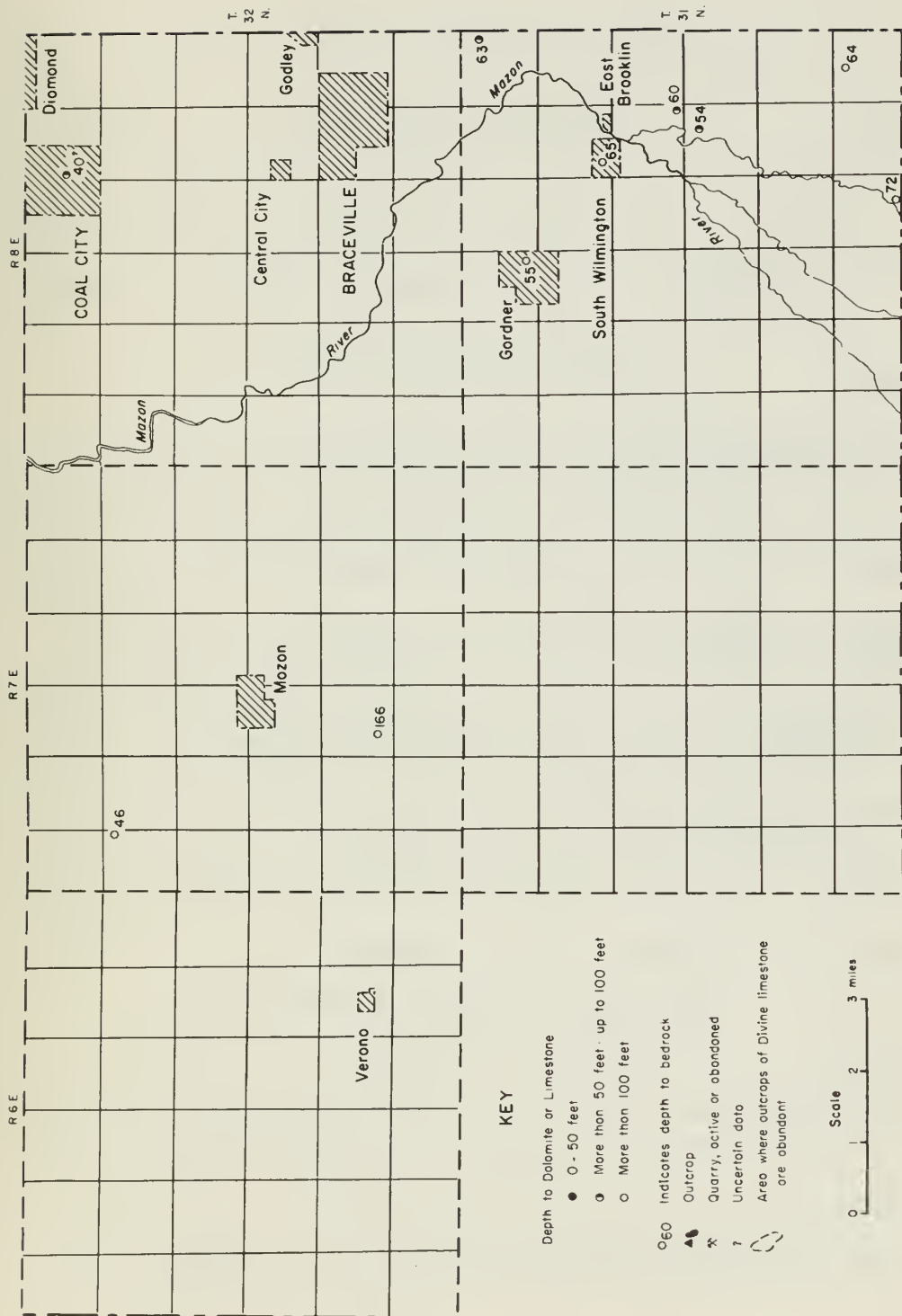


Fig. 4. - Depth to bedrock in wells encountering dolomite or limestone, in Grundy County

Table 1. - Formations Cropping Out Or  
Encountered in Wells

<u>Kind of rock</u>	<u>Maximum thickness, ft.</u>	<u>Geologic name of rock unit</u>	<u>Geologic system</u>
Clay, silt, sand, gravel	250	Pleistocene*	Pleistocene
Shale, sandstone, clay, coal and thin limestone	230	Pennsylvanian*	Pennsylvanian
<u>Dolomite</u>	28	<u>Niagaran</u>	Silurian
<u>Dolomite or dolomitic limestone</u>	70	<u>Alexandrian*</u>	
		Maquoketa	Ordovician
Shale	50	Upper*	
<u>Dolomite &amp; Limestone</u>	70	<u>Divine*</u>	
Shale	115	Lower*	
<u>Dolomite or dolomitic limestone</u>	379	<u>Galena-Platteville*</u>	
Sandstone, shale and thin dolomite beds	89	Glenwood	
Sandstone	335	St. Peter*	
<u>Dolomite, mostly cherty</u>	80	<u>Shakopee*</u>	
Sandstone	77	New Richmond	
<u>Dolomite</u>	215	<u>Oneota*</u>	
Dolomite, sandstone, and shale	20+	Gunter (Ordovician) and Jordan (Cambrian)	
<u>Dolomite</u>	240	Trempealeau	Cambrian

\* Indicates outcrops of this formation occur in Grundy or Kendall counties.

Figure 5 gives details regarding the depth and thickness of the first dolomites and limestones penetrated by wells in Kendall County. The greatest concentration of wells encountering shallow dolomite or limestone is in the southern part of the county. In the central part shallow stone is uncommon, but such rock is again present at scattered points in the northern part of the county. Outcrops are most abundant in the northern part of the county.

The depth to bedrock, regardless of its kind, in wells reporting more than 5 feet of dolomite or limestone is indicated in figure 6. It is apparent that in the areas of shallow dolomite and limestone shown in figure 5, the overburden on the bedrock is largely unconsolidated materials. There is likely to be clay and silt, and possibly sand and gravel, in some places.

#### RELATION BETWEEN MAPS SHOWING "DEPTH TO BEDROCK" AND "DEPTH TO DOLOMITE AND LIMESTONE"

It is possible that, if underground mining of dolomite or limestone in Grundy or Kendall counties should be feasible at some future time, it would be desirable to work a dolomite or limestone formation which has another type of bedrock above it, either because the particular dolomite or limestone formation is the most desirable for the intended purposes, in order to exclude an influx of water from overlying unconsolidated earth materials, or for some other reason.

In this connection, by comparing the data in figure 3 with those of figure 4 (or the data in figure 5 with those of figure 6) it is possible to determine whether a given dolomite or limestone formation at any particular place is overlain by another bedrock formation, or by only unconsolidated glacial materials. If the depth to bedrock and the depth to dolomite and limestone are the same, the dolomite or limestone has no bedrock overburden. However, if the depth to dolomite or limestone is greater than the depth to bedrock, the difference between the two indicates the thickness of bedrock overburden on the dolomite or limestone. The nature of this overburden may be determined by consulting the geological map (fig. 1) and the geologic column in table 1, which gives some idea of the character of the various bedrock formations.

#### CHARACTER AND ECONOMIC POSSIBILITIES OF DOLOMITE AND LIMESTONE FORMATIONS

The dolomite or limestone formations which underlie unconsolidated earth materials, those which are the first dolomite or limestone formations encountered in the bedrock, or those which are dolomites or limestones that are encountered within 200 feet of the ground surface in Kendall and Grundy counties, are described below beginning with the geologically oldest formation. The descriptions are based on information obtained from well records and to a lesser extent from outcrops. Data on chemical composition of the rock and suggested uses are taken or inferred from the same sources. The data should be confirmed by test drilling or other means before attempting commercial exploitation of deposits.

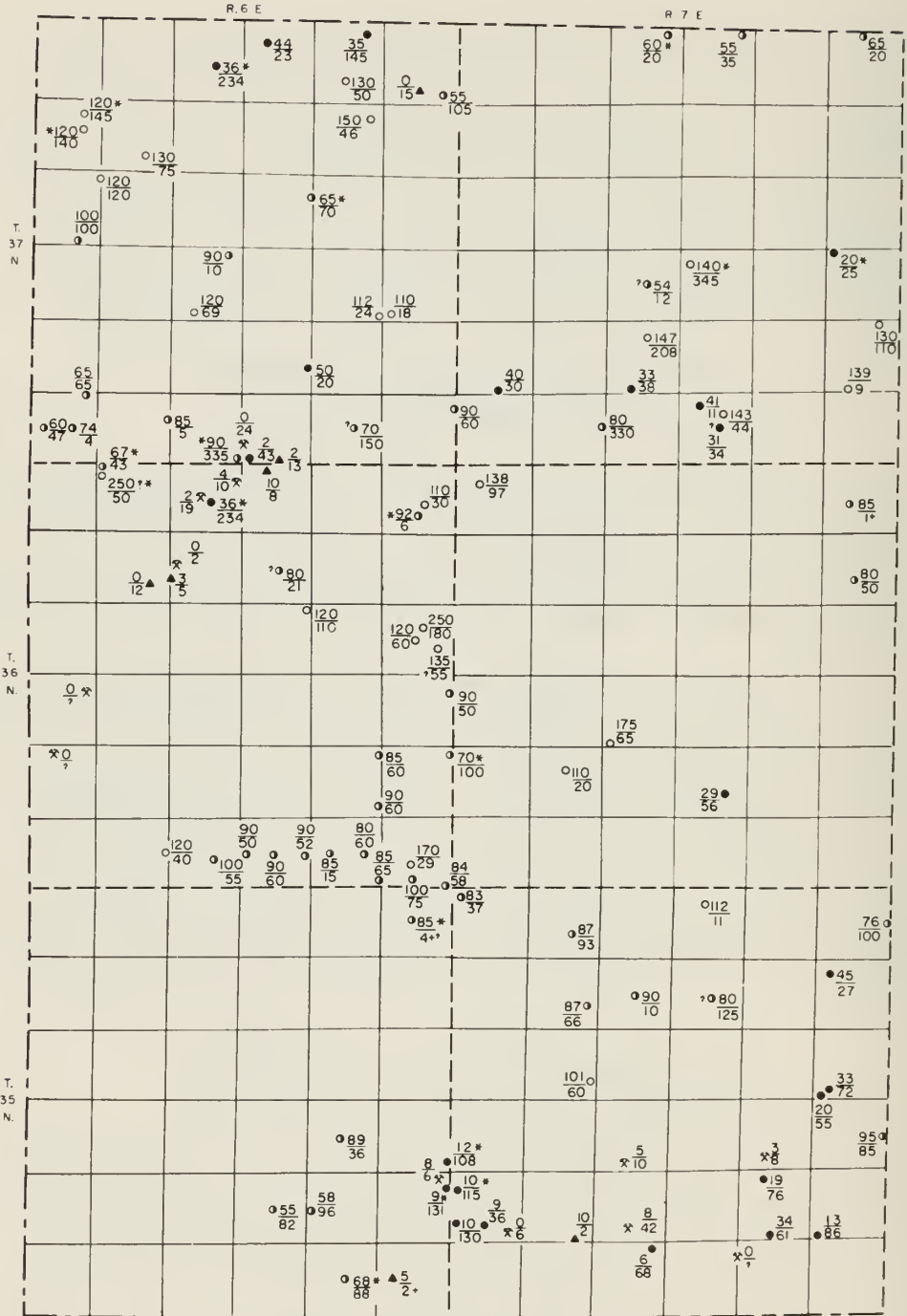
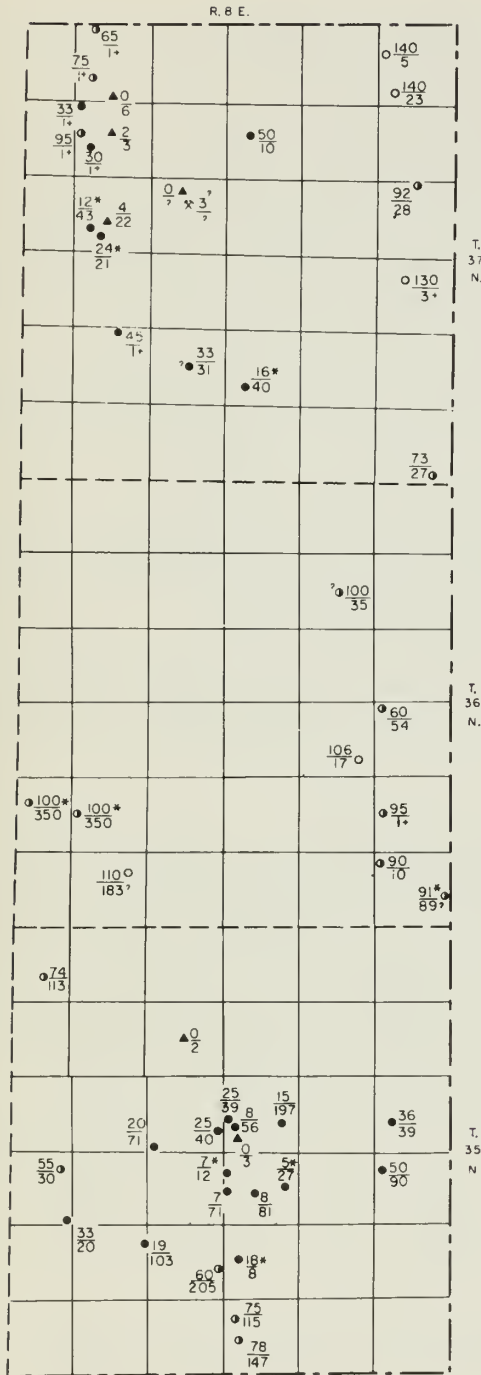


Fig. 5. - Depth and thickness of dolomite and lime-



KEY

Depth to Dolomite or Limestone

- 0-50 feet
- ◐ More than 50 feet, up to 100 feet
- More than 100 feet

▲ Outcrop

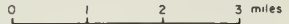
✱ Quarry, active or abandoned

Indicates  $\frac{\text{Depth to dolomite or limestone}}{\text{Thickness of dolomite or limestone}}$

? Uncertain data

\* Indicates bottom of dolomite or limestone was reached and passed

Scale



### Trempealeau Formation

The Trempealeau dolomite was penetrated at a depth of 192 feet in west-central Kendall County. It is light buff to brown, very fine- to coarse-grained, and slightly clayey. Parts of the formation are cherty and sandstone strata are present in some places. Some of the dolomite contains small quartz-lined cavities. The formation is about 125 feet thick. It is reported to contain massive deposits of reef type of dolomite up to 10 feet thick in other parts of northern Illinois. Its most shallow reported occurrence in Kendall County is at a depth of 192 feet in the NW 1/4 NW 1/4 NW 1/4 sec. 5, T. 36 N., R. 6 E. It is not reported directly below glacial material in any well records and it does not crop out.

Some beds of the Trempealeau dolomite might be suitable for use as agricultural limestone or road material. The presence of chert, beds of sandstone, and cavities lined with quartz, limit the use possibilities of the stone.

### Gunter and Jordan Formations

The Gunter and Jordan formations are not distinguishable in Kendall County (Workman and Bell, 1949). They consist of thin-bedded silty and sandy dolomite, and clayey fine- and coarse-grained sandstone, both of which contain chert. A maximum reported thickness of 20 feet occurs at a depth of 300 feet in the SW 1/4 NW 1/4 NW 1/4 sec. 5, T. 36 N., R. 6 E. in Kendall County. They are not exposed nor are they encountered directly below unconsolidated materials in any wells. The Gunter and Jordan formations are not believed to have economic possibilities.

### Oneota Formation

The Oneota formation is predominantly a light gray to bluish gray, coarsely crystalline, dense, mostly cherty dolomite. However, studies of samples from two wells located in west-central Kendall County, one of which penetrated the lower 50 feet of the formation and another which goes through 123 feet and on into the underlying formation, do not mention the occurrence of chert in the Oneota. It is about 215 feet thick and occurs in massive beds up to 15 feet thick. The lower one-eighth to one-fourth of the Oneota is ordinarily clayey and somewhat sandy (Willman and Templeton, 1952).

The Oneota dolomite crops out at three places about one mile northwest of Millbrook in west-central Kendall County (Willman and Payne, 1943; Willman and Templeton, 1952), and has been encountered directly beneath the glacial drift in one well which is located in sec. 5, T. 36 N., R. 6 E. The greatest thickness of Oneota exposed is located in the SE 1/4 NW 1/4 SE 1/4 sec. 8, T. 36 N., R. 6 E., where 12 feet crops out in a stream channel at a breached earth dam.

The widespread occurrence of considerable amounts of chert throughout the Oneota formation restricts its use. However, there seems to be a reasonable possibility that thicknesses up to 123 feet, particularly near the base of the Oneota, might be essentially chert-free and, therefore, might supply a suitable stone for a variety of purposes. If chert-free beds are



present they might be suitable for agricultural limestone, or road material and other purposes; conceivably some strata may be high-purity dolomite.

#### Shakopee Formation

The Shakopee formation consists of buff to light brown and light gray, fine- to medium-grained dolomite, most of which is clayey, silty, and shaly. It is reported to be about 165 feet thick and is restricted to a narrow area adjacent to the western margin of Kendall County. It is not encountered in wells, but is known from several abandoned quarries north of Millington along the Fox River (Willman and Templeton, 1952).

The maximum thickness exposed is in an abandoned quarry about 1 1/2 miles northeast of Millington, on the west side of the Fox River, near the center of the NE 1/4 sec. 19, T. 36 N., R. 6 E. where 25 feet of sandy and clayey dolomite can be seen.

Commonly the Shakopee formation consists of irregular, alternating, varicolored units of dolomite, shale, siltstone, and sandstone. In addition the dolomite varies in purity. The major uses for the purer dolomite beds appear likely to be road stone and possibly agricultural limestone.

#### Galena-Platteville Formation

The Galena-Platteville formation consists of dolomite and dolomitic limestone. Its lower part, having a maximum thickness of about 150 feet, is brownish gray, finely crystalline, compact dolomite and fossiliferous, brown and gray, fine- to very fine-grained dolomitic limestone. At various horizons in this lower portion, but particularly in its upper part, there are lenses, nodules, and beds of chert. The lower part of the formation can be distinguished from the upper part of the formation by the former's usually mottled brown and gray color and the general absence of shaly partings.

The upper part of the Galena-Platteville formation has a maximum thickness of about 220 feet and consists of brown to buff, medium to coarsely crystalline, partly cherty dolomite or dolomitic limestone. The dolomite usually has small cavities, many of which are lined with calcite crystals. The coarser grain size and greater porosity of the upper part of the Galena-Platteville formation distinguishes it from the lower part. Chert is most common in the lower one-half or one-third of the upper part of the formation although it often occurs in variable amounts throughout this upper section (Willman, 1943).

The Galena-Platteville formation occurs as a wide belt that extends in a southeasterly direction from the northwest corner of Kendall County to the vicinity of Morris, in Grundy County, south of which it is covered by Pennsylvanian rocks. The formation crops out at several localities in northwestern and south-central Kendall County and in northern Grundy County (Culver, 1922); it is the source of stone for the only active quarry in the two counties. In outcrop the rock is commonly brownish gray to gray and occurs in beds from one to ten inches thick.

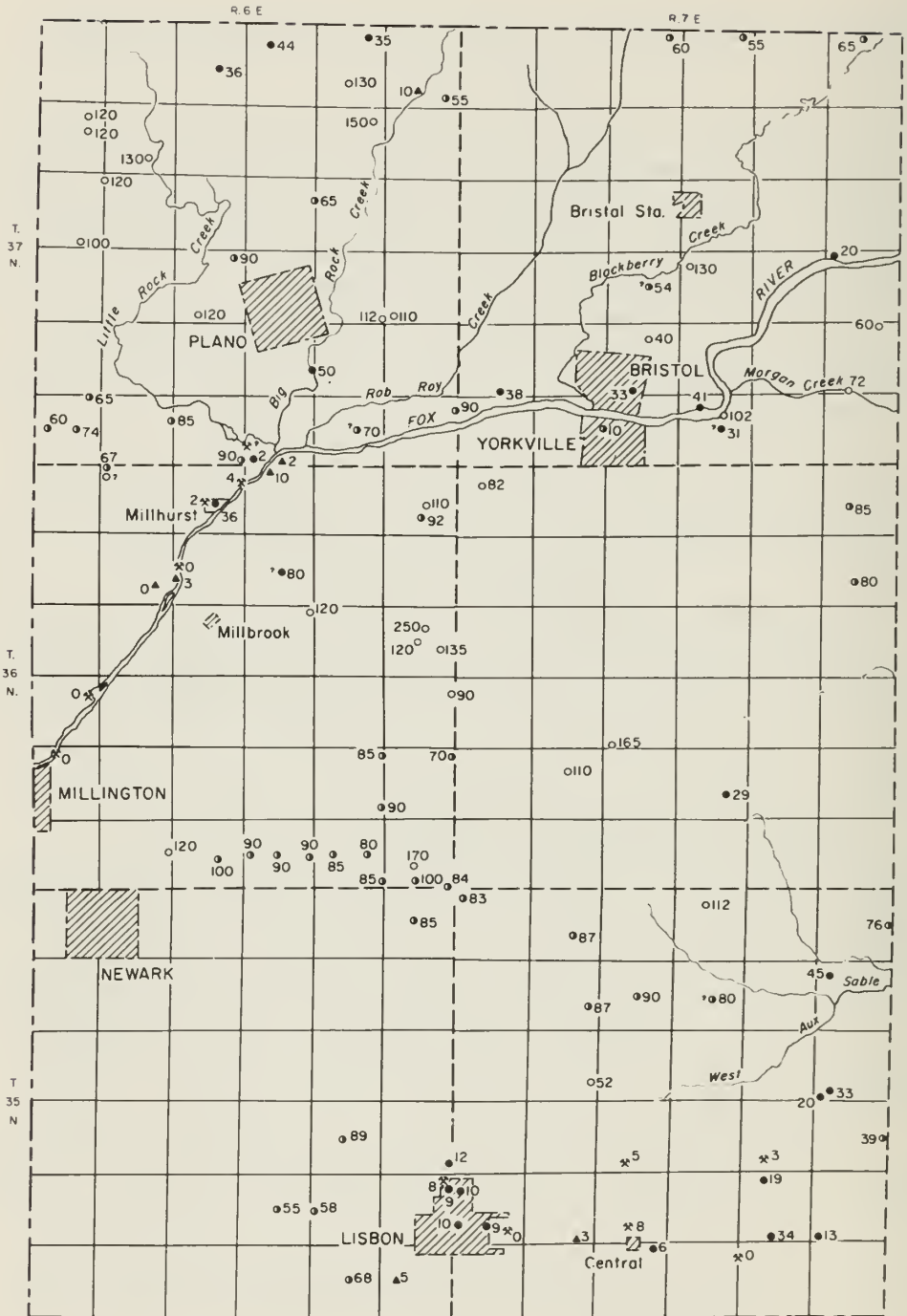
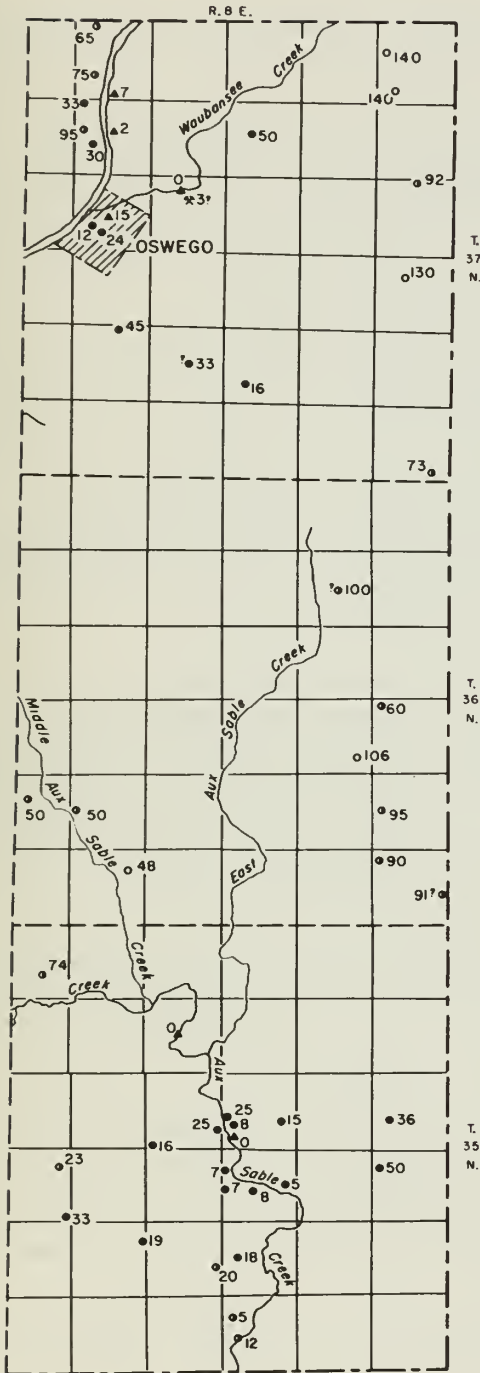


Fig. 6. - Depth to bedrock in wells encounter-



KEY

- Depth to Dolomite or Limestone
- 0 - 50 feet
  - More than 50 feet, up to 100 feet
  - More than 100 feet
- 60 Indicates depth to bedrock
- ▲ Outcrop
  - X Quarry, active or abandoned
  - ? Uncertain data



ing dolomite or limestone in Kendall County

As indicated in table 1, the maximum thickness of the Galena-Platteville formation encountered in wells is 379 feet. The thickness of the formation varies from this maximum down to zero as a result of erosion of the formation by glaciers and streams.

The chemical composition of the Galena-Platteville dolomite varies from relatively high purity to impure. The same statement applies to the dolomitic limestone which occurs in the formation. Judging from the well log descriptions of some of the dolomite beds in the upper part of the formation and the character of the formation where it crops out in other parts of the State, strata of high-purity dolomite may be present. In the lower part of the formation considerable thicknesses of dolomitic limestone of high purity may be present locally. Usually the amount of MgO present is around 5 percent or more, but in places it is possible that limited thicknesses of stone containing less than 5 percent MgO may be present. Such stone might furnish raw material for the making of Portland cement.

Certain parts of the Galena-Platteville, particularly the lower one-third of the lower part, might pass specifications for concrete aggregate and railroad ballast providing that the rock were fresh and unweathered. The possibilities of the upper part of the formation appear less promising because the rock is coarse and somewhat sandy. Agricultural limestone and road stone could doubtless be obtained from the formation.

#### Maquoketa Formation, Divine Member

The Divine "limestone" member of the Maquoketa formation is 70 feet thick in some places. The upper part of the Divine member is usually white, light gray or buff, locally pink or brown limestone which grades downward to gray to dark gray, fine- to medium- to coarse-grained, crystalline and medium-grained, locally porous dolomite. The magnesium carbonate increases from about 1 percent near the top to 39 percent near the base as revealed in cores from borings in Grundy County.

South of the Sandwich fault zone the Divine member covers an area approximately four miles wide, from east to west, in northeastern Grundy County and southeastern Kendall County. North of the fault zone it occurs as an irregular narrow north-south trending belt which passes east of the towns of Yorkville and Bristol. Outcrops reveal only a limited portion of the total thickness of the Divine member due to the low topographic relief of the area and the nearly horizontal attitude of the beds. Exposures of the Divine occur along the banks and in the bed of Aux Sable Creek in southeastern Kendall County and northeastern Grundy County (Worthen, 1870; Krey and Lamar, 1925) as well as in the area in Grundy County just west of the junction of the Des Plaines and Kankakee rivers, on both sides of the Illinois River (Lamar and Willman, 1931, 1933).

A large part of the area in secs. 25, 26, 35 and 36, T. 34 N., R. 8 E., consists of land reported to be preempted as a future site for the construction of the proposed Dresden Nuclear Power Plant and, therefore, may not be available for quarrying.

Locally the upper part of the Divine is a high-calcium limestone, but in observed outcrops the thickness of the high-calcium part is less than about 5 feet. So far as can be told from well records the possibilities for high-calcium limestone in the upper Divine are limited, even where the formation is at its maximum thickness.

Parts of the Divine member might serve as a source of agricultural limestone, road materials, and possibly railroad ballast and concrete aggregate. Possibilities for high-purity dolomite exist but cannot be accurately determined from the data at hand.

#### Alexandrian and Niagaran "Formations"

The lower part of the Alexandrian "formation" is a greenish gray, sandy limestone and dolomite with thin clay partings and interbedded clayey dolomite and silty shale. These beds grade upward into buff to gray, finely crystalline, thin-bedded dolomite or dolomitic limestone with some chert which comprise the upper portion of the formation.

The overlying rocks of the Niagaran "formation" are commonly brownish gray, dense to vesicular, finely crystalline dolomites and dolomitic limestones. Chert occurs in the upper portion of the Niagaran and there is some scattered fine sand at some places in the middle portion. The lower Niagaran beds are more massive and are usually chert free. The nature of the well data available did not permit distinction of the line of separation between Alexandrian and Niagaran rocks.

Rocks of Silurian age, probably Alexandrian, are exposed along the Fox River north of Oswego. They consist primarily of light buff to brownish-gray, finely crystalline, vesicular dolomite with beds from two inches to one foot thick. A maximum of 70 feet of Alexandrian and 26 feet of Niagaran rocks are reported in Kendall County.

The Alexandrian rocks appear in general to have limited commercial possibility, though in some places parts of the formation may provide stone for agricultural limestone, roads, and possibly other uses. The uses for the Niagaran rocks are uncertain but may include agricultural limestone, road stone, and possibly concrete aggregate and railroad ballast. High-purity dolomite also is a possibility.

#### STRUCTURAL FEATURES

A zone, possibly more than one-fourth to one-half a mile wide, in which there is a pronounced dislocation of the bedrock strata, the Sandwich fault zone, traverses Kendall County from northwest to southeast (fig. 1). The rocks were down-dropped along the northeast side of the fault zone and were uplifted on the southwest side (fig. 7). In the western part of Kendall County in the vicinity of Millington, up-folding of the rocks accompanied the faulting. Erosion of the arch thus produced has exposed the Oneota dolomite and geologically younger formations.

Elsewhere in both Kendall and Grundy counties the rock strata slope gently in a roughly easterly direction (fig. 6), though deviations from this dip occur in some places.

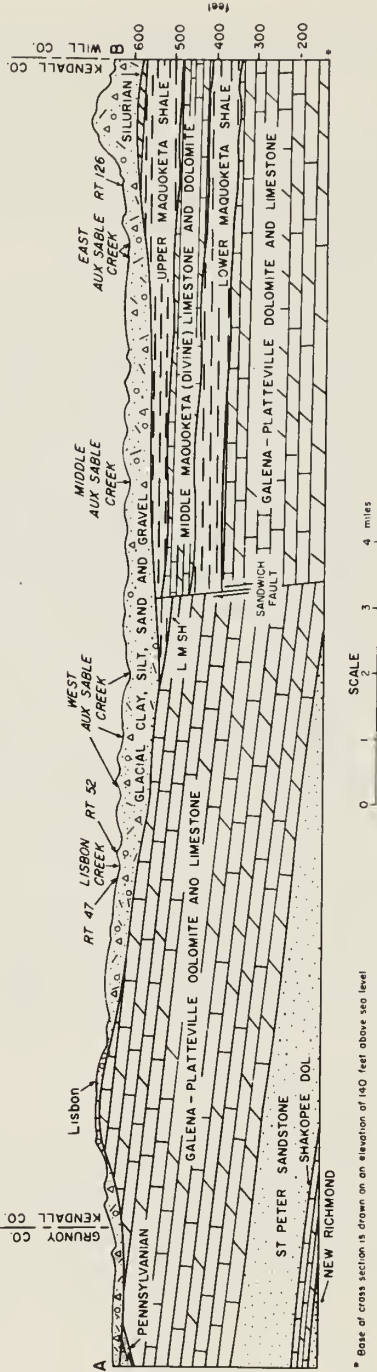


Fig. 7. - Diagrammatic cross section, from SW to NE, across Kendall and Grundy counties

## GROUNDWATER CONDITIONS

Groundwater conditions are significant in determining the suitability of an area or rock unit for mining by open pit or underground methods. Where dolomite or limestone occurs above the water table it is unlikely that a serious water problem will be encountered. However, where such rock is below the water table the possibility of water must be considered.

Groundwater is most likely to occur in limestone or dolomite in open crevices and channels dissolved out of the rock. This solution frequently happens when the rock is at or near the surface of the ground. Thus, dolomite or limestone formations now at or near the ground surface, as well as those which occupied this position at some earlier geologic time, may have water-bearing crevices and channels in them. More specifically, anywhere dolomite or limestone is the first bedrock encountered in wells in Kendall and Grundy counties the upper parts of the formations may be water bearing except as subsequently noted.

Further, as the top of the Galena-Platteville formation was once at the surface of the ground, its upper part is likely to be a water-bearing zone even though the formation is now covered by the Maquoketa shale. This is not to say that water will be present throughout the entire extent of the upper parts of the dolomites or limestones mentioned, as there are no data to prove this, but the possibility should be recognized and considered in connection with prospecting or development, should they be undertaken.

Exceptions to the foregoing are topographically high areas underlain by bedrock at a shallow depth and bedrock hills with thin overburden. These are believed unlikely to contain enough groundwater to prohibit open-pit quarrying or mining at relatively shallow depths. Areas of this sort are shown in figure 2 as areas in which dolomite or limestone is from "0 to 25 feet deep."

Areas in which the Oneota, Galena-Platteville, Divine, and Silurian dolomite or limestone "formations" occur directly beneath the unconsolidated material are shown in figure 1. These formations are widely used as sources of relatively small quantities of groundwater. Records in the files of the Illinois State Water Survey indicate that production from farm and domestic wells in these counties commonly ranges from 5 to 15 gallons per minute. However, many of these wells probably are not pumped to capacity because of the small amounts of water required. Only one well, located in east-central Grundy County, is known to provide enough water from these rocks for a municipal water supply, and it is in the Galena-Platteville formation. In general, therefore, the amount of water that the majority of these wells could supply is unknown and predictions regarding the amount of water that might be encountered in underground mining operations cannot be made on the basis of the available information.

The possibility that the volume of water supplied by wells in the vicinity of a quarry or mine might be decreased, perhaps markedly, by removal of water from the quarry or mine should be borne in mind as well as the possibility that the mine or quarry water may have economic use.

## DEPTH OF WEATHERING

The suitability of rock for many of the commercial purposes mentioned depends upon its being unweathered, or unaltered. Weathering of a dolomite commonly changes the color from brownish gray to light grayish brown to a light brown or light reddish brown, and tends to give the stone a sandy or a "loose-grained" character. Most of the bedrock dolomites or limestones of Grundy and Kendall counties are at least partially weathered. This weathering usually is most prominent at the contact of the rocks with the overlying glacial deposits. The least weathered dolomites and limestones occur where the stone is covered by other rock units, especially shale.

Comparatively unweathered stone is available where there are bedrock hills lying close to the surface, as can be seen at many of the quarries throughout the area but most strikingly in the quarry at Central where very noticeable weathering of the stone has taken place to a depth of only about 5 feet. Dolomite, judged by its brown color to be weathered, is recorded in wells penetrating the Galena-Platteville formation at a depth of 65 feet below its top. Some wells penetrate apparently unweathered dolomite and then enter weathered stone, as though the weathering were controlled by the action of groundwater along and adjacent to underground water channels.

A careful exploratory drilling program is essential, prior to opening a deposit, if the proposed uses for the stone depend upon its state of weathering.

## CLAY-FILLED DEPRESSIONS AND JOINTS

Some of the dolomite and limestone rock units in Kendall and Grundy counties are known to contain locally clay-filled depressions and/or clay-filled joints. The pockets and joints are of various sizes and shapes. Pockets have been reported as large as 5 feet high and slightly greater in width (Willman and Payne, 1942). Joints up to 3 feet wide, extending to depths greater than 45 feet below the top of a bedrock dolomite or limestone, are known to exist.

Clay-filled depressions and joints may occur anywhere that the bedrock is shallow enough to permit the weathering and filling of pockets and the filling of joints. These features hinder quarry development and production because they create problems in the quarrying process.



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