

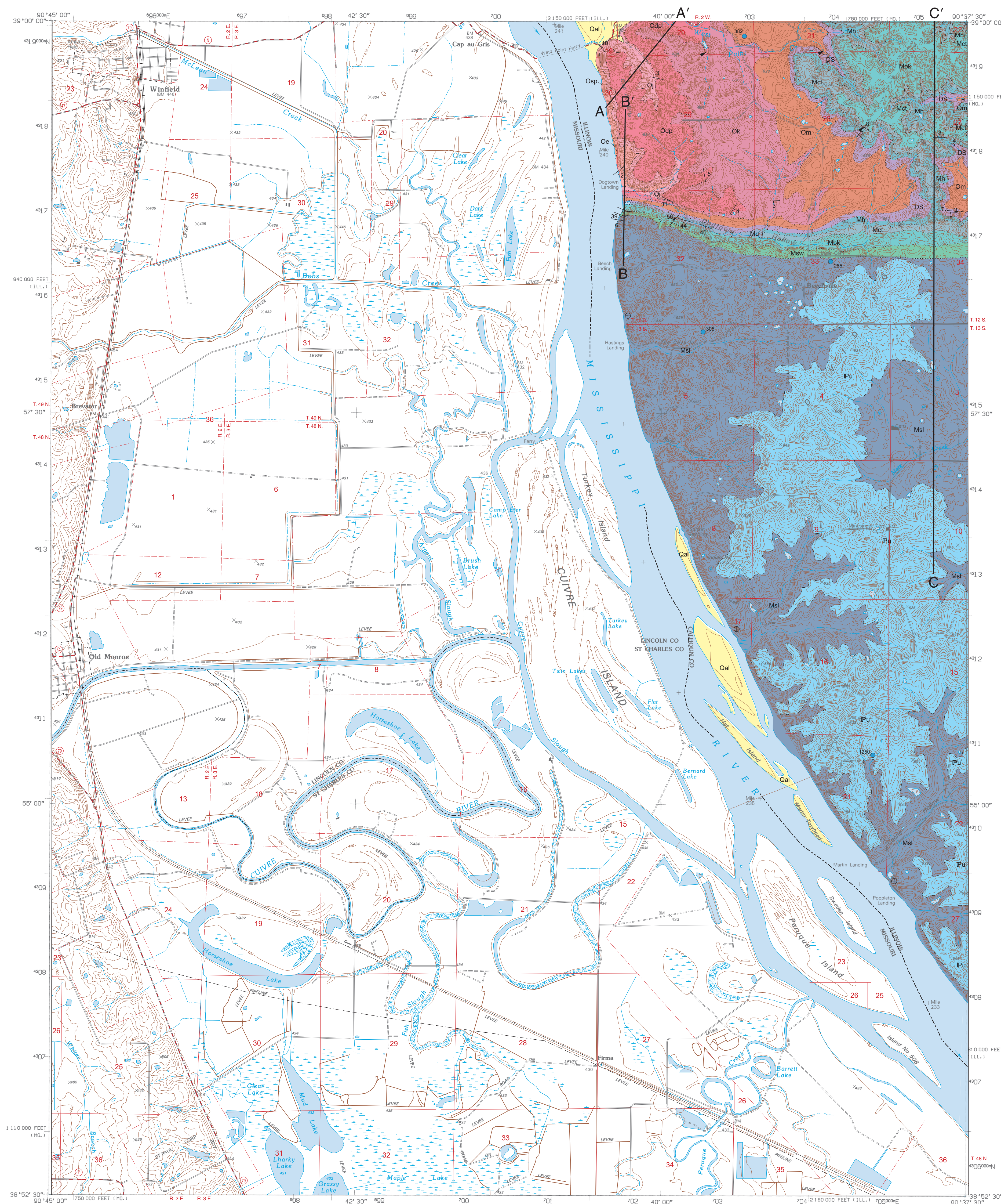
BEDROCK GEOLOGY OF WINFIELD QUADRANGLE

CALHOUN COUNTY, ILLINOIS

ILLINOIS STATE GEOLOGICAL SURVEY
E. Donald McKay III, Interim Director

STATEMAP Winfield-BG

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2008



EXPLANATION

Quaternary	Qal	Alluvium	Holocene
Pennsylvanian	Pu	Pennsylvanian undivided Shelburn, Carbondale, and Tradewater Formations	Desmoinesian
	Msl	St. Louis Limestone	
Mississippian	Msw	Salem and Warsaw Formations	Valmeyeran
	Msk	Burlington-Keokuk Limestones	
	Mct	Mississippian undivided Chouteau Limestone	
Devonian and Silurian	Mh	Hannibal Shale	Kinderhookian
	DS	Devonian and Silurian Formations Cedar Valley Limestone	
	Unconformity	Unconformity	Niagaran
	Unconformity	Unconformity	
Ordovician	Ok	Okemuncie Formation	Alexandrian
	Unconformity	Unconformity	
	Unconformity	Unconformity	Champlainian
	Oj	Joachim Dolomite	
	Osp	St. Peter Sandstone	
Unconformity	Unconformity		
	Oe	Everton Dolomite	

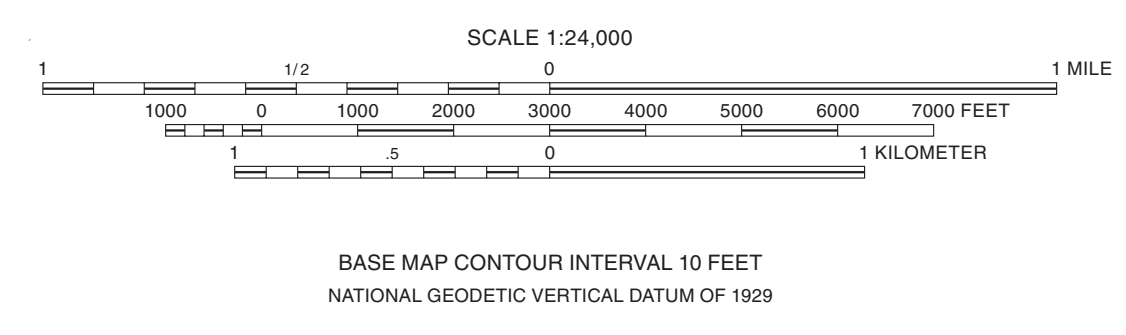
Symbols

- 40 Strike and dip of bedding; number indicates degree of dip
 - 56 Inclined joint; number indicates degree of inclination
 - ⊕ Horizontal bedding
 - ⊕ Vertical bedding
 - ▲ Outcrop of special note, shown where contact or map unit was well exposed at time of mapping
- Drill Holes**
from which subsurface data were obtained
Numeric label indicates total depth of boring in feet
- 109 Water-well boring
- Line Symbols**
dashed where inferred, dotted where concealed
- Contact
 - Normal fault; bar and ball on downthrown side
- A—A'** Line of cross section

Note: Well and boring records are on file at the ISGS Geological Records Unit and are available online from the ISGS Web site.

Base map compiled by Illinois State Geological Survey from digital data (Digital Line Graphs) provided by the United States Geological Survey. Compiled by photogrammetric methods from imagery dated 1952. Field checked 1954. Revised from imagery dated 1993. PLSS and survey control current as of 1954. Map edited 1996. DLGs created 1998.

North American Datum of 1983 (NAD 83)
Projection: Transverse Mercator
10,000-foot ticks: Illinois State Plane Coordinate system, west zone (Transverse Mercator)
1,000-meter ticks: Universal Transverse Mercator grid system, zone 15



Released by the authority of the State of Illinois: 2008

Geology based on field work by Mary J. Seid and Joseph A. Devera, 2007-2008.

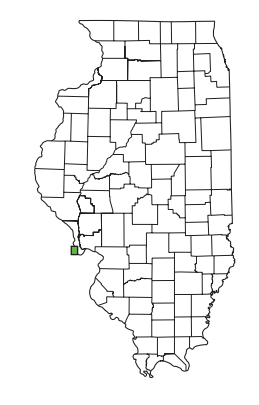
Digital cartography by Jane E.J. Domier, Steven M. Radil, and Brendon M. Aitken, Illinois State Geological Survey.

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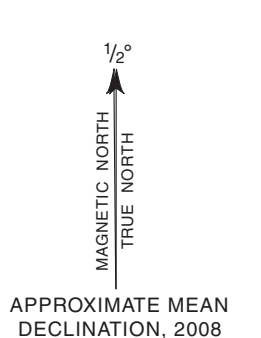


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4	5	
6	7	8

ADJOINING QUADRANGLES
1 Lucketts Ridge
2 Foley
3 Nutwood
4 Marysville
5 Brussels
6 Wentzville
7 O'Fallon
8 Kampville



ROAD CLASSIFICATION

- Primary highway, hard surface
- Secondary highway, hard surface
- Light-duty road, hard or improved surface
- Unimproved road
- State Route

SYSTEM	SERIES	STAGE	FORMATION	MEMBER or BED	GRAPHIC COLUMN	THICKNESS (feet)	UNIT			
QUATERNARY	HOLOCENE			Alluvial deposits		0-170	A			
				PELESTOCENE	WISCONSINAN	Peoria and Roxana Silt	Loess		20-70	B
TERTIARY	FLUCCENE		Grover Gravel				0-20	C		
PENNSYLVANIAN	DESMONESIAN		Shelburn			0-28	D			
			Carbondale	Mecox Quarry Shale Colchester Coal		65-90	E			
			Upper Tradewater	sub-Absaroka unconformity		0-40	F			
MISSISSIPPIAN	VALMEYERAN		St. Louis Limestone	Breccia bed		0-250	G			
			Salem Limestone			70	H			
			Warsaw Shale	upper lower		55-60	I			
			Keokuk Limestone			65	J			
			Burlington Limestone			140-200				
			Meppen Limestone			0-7	205-272			
			Chouteau Limestone			10-65	K			
			Hannibal Shale			20-60	L			
			DEVONIAN	MIDDLE DEVONIAN		Cedar Valley Limestone			0-10	M
			SILURIAN	ALEXANDRIAN		Joliet			0-16	N
Kankakee						0-40				
Bowling Green						10-50				
ORDOVICIAN	CINCINNATIEN		Maquoketa	Depauperate zone		100-200	O			
			Kimmswick Limestone			70	P			
			Decorah			10	Q			
			Plattin Limestone			140-150	R			
			Joachim			80	S			
	CHAMPLAINIAN			St. Peter Sandstone			150	T		
				Everton			8	U		

A Alluvial deposits Alluvium. Clay and silt, including detrital deposits made by streams on river beds and floodplains. All sediment is confined to tributaries, creeks and major river systems.

B Peoria and Roxana Silt Silt. Yellow-brown, reddish, with variable amounts of clay. Windblown material thickly mantles the bedrock close to the major river system and gradually thins away toward the east in the study area.

C Grover Gravel Gravel. Poorly sorted, contains particles that range from sand and granule to pebble size. Clasts are composed of polished and rounded quartzite, chert, quartz, and rare red and black banded iron. The clasts can be red, white, pink, orange, yellow and black. This deposit is poorly exposed and is mainly found in the alluvium in the southern part of the quadrangle. It occurs directly above the bedrock but is covered by loess.

D Shelburn Formation Clay and limestone. Composed of a basal limestone overlain by claystone, with a limestone at the top of the section. The basal limestone is a dense, dark gray fossiliferous packstone and locally contains gray nodules of chert. The middle clay is silty, plastic, and calcareous. Above the clay occurs a limestone where fresh is gray, where weathered is brown. It is a dense, hard, fossiliferous wackestone.

E Carbondale Formation Limestones, claystones, and coal. The lower part of this unit is composed of a white underclay (rooted zone) below a coal. The coal ranges from a smut zone to three feet thick dull to bright banded unit. Above the coal is a thin, black, laminated marine shale. Forty feet of a variegated maroon and olive to gray silty shale containing a thin lime wackestone overlies the black shale. Near the top, two limestone benches occur. Both limestones are dark-gray, argillaceous fossil wackestones. The fusulinid, *Beedeina girtyi* (Douglass 1987; called *Fusulina girtyi* by Rubey 1952), occurs in a light gray packstone at 610 feet elevation, 2300'EL, 1000'WL, Sec. 33, 12S, 2W. The sponge, *Chaetetes milleporaceus*, may occur in this interval.

F Upper Tradewater Formation Sandstone and clay. Poorly exposed and is thickened only where erosion has provided space up to eighty feet into the St. Louis Limestone. It has fine grained micaceous quartz arenites. Clay forms a residuum on top of the underlying limestone and some chert clasts have been associated with the basal part of the unit. The base of this formation has a large unconformity with variable stratigraphic relief.

G St. Louis Limestone Limestone. Dense, gray to gray brown micrite or lime mudstone that yields conchoidal fracture. Beds within this unit vary from thin to thick and massive. There are a few breccia zones within the unit, and they have a hummocky or knobby weathered texture. Most of the accessible outcrops are concentrated along the Mississippi River bank and in larger sinkholes. Fossils include: brachiopods, gastropods, crinoids, echinoids, bryozoans and rugose corals. A colonial coral *Acrocorythus* sp. occurs in the basal portion of the limestone. This unit is dominated by lime mudstones, but packstone and grainstone facies occur locally; oolitic beds were observed near the top of the unit at the top of a sinkhole located 2200'EL, 2200'SL, Sec. 33, T12S, R2W. The base is unconformable.

H Salem Limestone Limestone. Composed of alternating grainstone and laminated facies that are light gray to white. Coated grains and oolites are common to the grainstone facies, which can also be cross bedded. The laminated facies are rhythmically bedded and contain lime mudstone. White and gray, round, "egg-like" chert nodules are common. The grainstone facies also weather by spalling off thin layers perpendicular to the face of the outcrop. In areas near faults, this unit appears to be dolomitized, as seen by its yellow appearance. The diagnostic microfossil or index fossil found in this unit is the foraminiferid *Globoendothyra baileyi*. The basal contact is conformable with the underlying unit.

I Warsaw Shale Dolomite and shale. Composed of silty shale in the lower part and dolomite beds in the upper part. The shale is light gray to greenish gray and interbedded with soft clay layers. The shale can be slightly calcareous and silty. Fossils are rare in the shale but occasional gastropods and conularids occur in the upper part. The upper beds are yellowish gray dolomite that contain small- to medium-sized geodes filled with quartz and calcite. Some of the dolomitic beds are argillaceous. The lower contact is sharp and conformable with the underlying unit.

J Keokuk, Burlington, and Meppen Limestones Limestone and chert. White to light-gray, crinoidal grainstone occurs in thin to thick beds and sometimes as cross-bedded bioclastic facies. In the lower part calcite nodules are common and the limestone can be light gray, tan to brown and somewhat argillaceous. White, fossiliferous, medium-bedded chert occurs in the middle part of the unit. Yellow dolomitic beds also occur within this unit. Brachiopods and bryozoans are also present but are not as abundant as the disarticulated crinoid columns that can make up eighty percent of the beds. The upper portion contains less chert and can be more coarsely crystalline. The basal contact is unconformable with the unit below.

K Chouteau Limestone Limestone. A thin-bedded, light- to medium-gray lime mudstone to pale greenish gray wackestone on a fresh surface, but weathers pale yellowish gray. It is argillaceous and has an hourglass weathering profile. Crinoid and brachiopod fragments are small and disarticulated. Beds are com-

monly thin, undulatory to wavy. Dark-gray chert with white rims occurs as wavy beds at regular intervals throughout the unit. Knobby calcite nodules that are rimmed in quartz are distinct on a weathered surface. The lower contact is conformable but sharp.

L Hannibal Shale Shale. Generally greenish gray to gray, silty and weathers to sticky or gummy clay. It is poorly exposed in this quadrangle but can be massive, non-calcareous, and fissile. The basal contact is unconformable with the limestone below.

M Cedar Valley Limestone Limestone and dolomite. Brown to orange-brown fossil wackestone dominated by spiriferid brachiopods. Other diagnostic brachiopods include: atrypids, *Mucrospirifer* sp., *Paraspirifer* sp., *Orthospirifer iowaensis*, *Ilita johnsonensis* and strophominids. Large rugose corals and articulated and disarticulated crinoid stems are common in places. Laterally, this unit can grade into fossil packstone facies. The packstone is thin bedded, dolomitic, and sandy in places and contains 1 to 2 inch in diameter calcite crystals. Some calcite crystals are oil stained and have a petroliferous odor. The base can be sandy and is unconformable.

N Joliet, Kankakee, and Bowling Green Formations Dolomite. Yellow, with a sugary appearance. This unit is thin to thick bedded, hard and massive. Pale green shale is interbedded in the lower and middle formations and tints the yellow rock with a faint green-gray color. Glauconite and occasional pinkish stains occur in the lower beds. All three formations have moldic porosity. Fossils observed include: brachiopods, crinoid columnals, rugose corals, bryozoans, and trilobites. The trilobite *Gravicalymene celebra* is common in the middle to upper part of the dolomite beds. Throughout this unit, thin bedded dolomite contains nodules or wavy beds of white to caramel chert. Multiple unconformities occur at the base, within and on top of these dolomitic beds.

O Maquoketa Formation Shale. Bluish gray and calcareous in the lower part and siltier in the upper part. The upper facies is tan-brown siltstone and contains fossil algae. The shale weathers to gummy bluish-green clay. A dark shale layer in the upper part contains phosphatic nodules and pyrite with a dwarfed fauna. The contact is sharp and unconformable with the underlying formation.

P Kimmswick Limestone Limestone. White crinoidal grainstone to packstone in the lower part. The upper part of the formation yields thin bedded, fine grained beds and fossil wackestone facies. Crinoidal bioclasts can be cross bedded. Beds are thin to thick bedded and can have a petroliferous odor. The weathered surface can be extremely pitted, resembling a beehive. Fossils include: the trilobites *Isotelus gigas*, *Calyptaulax* sp., *Bumastus* sp., *Calliops* sp.; an important index fossil *Receptaculites* sp. (dasycladasiid algae); and the brachiopod *Rafinesquina* sp. The lower contact is sharp but continuous with the underlying unit.

Q Decorah Limestone Limestone. Thin, wavy or irregular bedded, chocolate-brown, lime-mudstone that is interbedded with thin, brown calcareous shale. This formation is poorly exposed in the quadrangle. It weathers pale gray but is chocolate brown on freshly broken slabs. The lime-mudstone is dense and displays conchoidal fracture. The base is conformable with the limestone below.

R Plattin Limestone Limestone. Gray, thin and irregularly bedded, separated by brown shale partings. It is a dense, lime-mudstone that yields splintery or conchoidal fracture. Some fossil wackestone to brachiopod packstone facies occur in this unit as do dolomite beds. In the lower and middle portions of the unit, one common characteristic is the presence of fodinichnial burrows, i.e. sediment ingesting feeding burrows commonly filled with fine, rounded sand grains. Other fossiliferous zones include corals, straight cephalopods, and brachiopods. Small multicolored chert nodules can occur in the upper 40 feet of this unit. There is an unconformity between this unit and the dolomite below.

S Joachim Formation Dolomite. Brown to tan on fresh surface and weathers brown to red. Bedding is 2 inches to 1 foot thick and tabular; however, some are thick bedded and have a moldic porosity that is visible to the naked eye. Some upper beds are sandy and argillaceous. Dolomite is finely crystalline and can have a strong petroliferous odor. The basal 20 feet contains thin-bedded light bluish gray dolomite. Pyrite is common as finely disseminated microcrystals in the lower part of the formation. The basal contact is sharp but conformable.

T St. Peter Sandstone Sandstone. White to light-gray, medium-grained, well sorted, well rounded, frosted quartz arenite. It is thin to medium bedded with some massive beds, cross bedded, and ripple marked. The unit weathers as rounded, case-hardened beds; the upper part contains vertical, cylindrical secondary features. Large alcoves occur in the upper 40 feet of the unit in the area north of Dogtown Landing. Calcareous beds occur in the uppermost part. No fossils were found in this formation. The lower contact is unconformable and conglomeratic.

U Everton Formation Dolomite. Brown dolomite, thin bedded, nonfossiliferous, and argillaceous in part. This unit is poorly exposed in the quadrangle. The base is concealed.

Note: See accompanying report for references.

