Prepared in cooperation with the U.S. Geological Survey
Dallas L. Peck, Director, under the cooperative
Geologic Mapping Program (COGEOMAP)

Illinois Department of Energy and Natural Resources
ILLINOIS STATE GEOLOGICAL SURVEY
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Geologic Map of the
BLOOMFIELD QUADRANGLE, ILLINOIS
IGQ-10

SYSTEM	SERIES	GROUP	FORMATION	MEMBER and BED	GRAPHIC COLUMN	THICKNESS (feet)	DESCRIPTION UNIT
PENNSYLVANIAN	Atokan	Raccoon Creek	Tradewater			0-70	A
				Reynoldsburg Coal Bed			
	Morrowan		Caseyville	Pounds Sandstone Member		10-80	B
				unnamed*		70-120	C
				Battery Rock Sandstone Member		30-100	D
				Wayside Member		30-100	E
MISSISSIPPIAN	Chesterian	Pope	Kinkaid Limestone	Gorsville Limestone Member		0-20	F
				Cave Hill Member		60-100	G
				Negli Creek Limestone Member		25-35	H
			Degonia			20-50	I
				Ford Station Member		30	J
			Clore	Tygett Sandstone Member		15-100	K
				Cora Member		45-60	L
			Palestine Sandstone			40-60	M
			Menard Limestone			125-140	N
			Waltersburg			30-120	O
			Vienna Limestone			15-50	P
			Tar Springs Sandstone			80-130	Q
			Glen Dean Limestone			60-80	R
			Hardinsburg Sandstone			90-110	S
			Golconda	Haney Limestone Member		40-60	T
				Fraileys Shale Member		80-120	
				Beech Creek Ls. Mbr.		0-10	

*Previously called Drury Member

A Interbedded sandstone, siltstone, shale, and coal. *Sandstone* is light to medium gray lithic arenite that weathers to brown and is very fine to medium grained; it contains noticeable mica and interstitial clay. Bedding is thin to thick and irregular. *Siltstone* and *shale* are medium to dark gray and fissile. The Reynoldsburg Coal is brightbanded to dull and shaley, and less than 1 foot thick. Lower contact is gradational.

B *Sandstone* is a white to light gray quartz arenite that weathers to yellowish gray; it is very fine to coarse grained, but dominantly fine, and contains scattered quartz granules and small pebbles. Unit is thick bedded to massive; crossbedding and slumped bedding are common. Lower contact is erosional.

C Interbedded sandstone, siltstone, shale, and coal. *Sandstone* is white to light gray quartz arenite that is very fine to fine grained; quartz pebbles are rare. Unit is dominantly thin bedded and ripple marked; load casts are common. Local crossbedded sandstone is up to 15 feet thick. *Siltstone* is light to dark gray, laminated, and burrowed. Clay *shale* and silty shale are medium gray to black, blocky to fissile; plant fossils are common. *Coal*, shaley and lenticular, is up to 18 inches thick. Lower contact is sharp to gradational.

D *Sandstone* is white to light gray quartz arenite that is fine to very coarse grained; quartz pebbles up to 1 inch in diameter are abundant; conglomerate lenses are common near the base; unit tends to fine upward. Unit contains prominent wedge-planar and tabular-planar unidirectional crossbedding; foresets generally dip southwest. Lower contact is erosional.

E Interbedded sandstone, siltstone, shale, and conglomerate. *Sandstone* is white to light gray quartz arenite that is very fine to fine grained; quartz pebbles are rare. Unit is dominantly thin bedded; ripple marks, load casts, and tool marks are common. *Siltstone* is light to dark gray and laminated. Clay *shale* and silty shale are medium gray to black, blocky to fissile. Lenticular *conglomerate* of quartz and ironstone pebbles occurs in sandstone matrix. Lower contact is a major unconformity.

F *Limestone* consists of light to medium gray, crinoidal packstone and grainstone that are medium to coarse grained. Beds are 4 to 24 inches thick; unit contains occasional chert nodules. Lower contact is sharp.

G Interbedded limestone, shale, and claystone. *Limestone* is light to dark gray lime mudstone to fine grained skeletal packstone that weathers to light gray; it is dense and fossiliferous. Chert lenses and beds up to 12 inches thick are present in the lower part. Clay *shale* is dark greenish gray, dark gray, and black, soft to hard, well laminated, calcareous, and fossiliferous. *Claystone*, greenish gray and red variegated, occurs at the top of the unit. Lower contact is sharp.

H *Limestone.* Lower part of the unit is dark brownish gray, fine grained, argillaceous, cherty lime mudstone and wackestone that contain belerophontid gastropods and *Girvanella* oncoids. The upper part is light to medium gray, fine to coarse grained, argillaceous, crinoidal packstone and grainstone. Lower contact is sharp.

I Interbedded sandstone, siltstone, shale, and claystone. *Siltstone* to very fine *sandstone* is bluish, greenish, and olive gray, laminated, brittle, and locally burrowed. Silty *shale* is gray to greenish gray and laminated; clay shale is dark gray and platy. *Claystone* is dark greenish gray, olive gray, and red mottled, mainly at the top of the unit. Lower contact is sharp (?).

J Limestone with shale interbeds. Two types of *limestone* are present: the first is light to dark gray, fossiliferous lime mudstone and wackestone that weathers to olive gray and orange; unit is massive and sandy near the base. The second type is dark gray, argillaceous lime mudstone. Clay *shale* is dark gray, fissile, and partly calcareous. Lower contact is sharp to gradational.

K Sandstone, siltstone, shale, and limestone. There are commonly two coarsening-upward intervals: dark gray clay *shale* at the base grades upward to silty shale and *siltstone*, then to thin bedded shaley *sandstone*, then to medium bedded sandstone rooted at the top. Bluff-forming crossbedded sandstone is present along Max Creek. *Limestone* in Tygett is dark gray argillaceous lime mudstone and wackestone. Lower contact is sharp.

L Shale with limestone interbeds. *Shale* is dark gray, olive gray, and black, clayey to finely silty, fissile, and partly calcareous. Lenses and interbeds of *limestone*, mostly dark gray, are fossiliferous, argillaceous lime mudstone and wackestone; limestone beds are less than 3 feet thick. Coquinoid nodular limestone occurs in lower part of the unit. Lower contact is gradational.

M Interbedded sandstone and shale. *Sandstone* is white to light gray quartz arenite that is very fine grained. Unit is crossbedded to massive in exposures east of Cedar Creek; elsewhere, it is dominantly thin bedded, micaceous, ripple marked, and contains load casts, tool marks, trails, burrows, and occasional brachiopods. *Shale* is medium to dark gray, silty, and contains sandstone lenses and laminae. Interval coarsens upward overall. Lower contact is sharp to gradational.

N Limestone with shale interbeds. *Limestone* is medium to dark gray and brownish gray, skeletal wackestone and packstone that weathers to mottled light gray; it is mostly fine to coarse grained. Dense lime mudstone is common in the lower Menard. *Shale* is olive gray and greenish gray, soft, platy, and calcareous. At the top and base of the Menard are intervals of shale containing lenses and thin beds of slabby to nodular coquinoid limestone. Lower contact is gradational.

O Sandstone, shale, and local coal; laterally variable. *Sandstone* is light gray quartz arenite that weathers to brownish gray; it is very fine to fine grained. Thick bluff-forming crossbedded sandstone occurs in the vicinity of Wartrace; foresets are unidirectionally southwest-facing. Elsewhere, sandstone is dominantly thin bedded and ripple marked. *Shale* is dark gray, weathers to silvery gray, and is silty and siliceous; it is also dark gray to black, carbonaceous, soft, and contains plant fossils. *Coal* is shaley near the top of the unit. Lower contact is generally gradational.

P *Limestone* is medium to dark gray, fossiliferous lime mudstone to wackestone that weathers to brown porous residuum. Locally, coarse skeletal grainstone occurs at the top. Unit is very siliceous, silty, dolomitic, and contains abundant dark chert lenses and bands. Clay shale is dark gray, soft platy, calcareous, and has interbeds of argillaceous limestone in the upper Vienna. Lower contact is sharp.

Q Interbedded sandstone, siltstone, shale, and coal. *Sandstone* is light gray to greenish and brownish gray, slightly micaceous quartz arenite that is very fine to fine grained, thin to thick bedded, and displays crossbedding, ripple marks, small load casts, and burrows. Some calcareous sandstone occurs near the base. *Siltstone* and silty *shale* are medium to dark gray, well laminated, and ripple marked; clay shale is dark gray and platy. A thin, shaley *coal* occurs most commonly at or near the top of the unit. Commonly, several coarsening- and fining-upward intervals are 15 to 30 feet thick. Lower contact is generally sharp but locally gradational and intertonguing.

R Limestone and clay shale. The upper part is *limestone*, a light to dark gray and brown, crinoidal grainstone that weathers to dark gray with orange mottling; it is fine to very coarse grained, partly oolitic, and crossbedded. The lower part, largely *clay shale*, is medium gray to dark greenish gray, soft platy to mudlike, partly calcareous, fossiliferous, and poorly exposed. Lower contact is concealed.

S Interbedded sandstone, siltstone, and shale. *Sandstone* is light gray to light brown quartz arenite that weathers to yellowish gray and is very fine to fine grained. Unit is mostly thin bedded and ripple marked, but has occasional thick beds. *Siltstone* and silty *shale* are medium to dark gray and greenish gray, laminated, and ripple marked. Lower contact is concealed.

T Interbedded limestone and shale. *Limestone* is mostly light to medium gray, fine to very coarse, fossiliferous, crinoidal-bryozoan packstone. *Shale* is greenish gray, soft, and calcareous; it can also be dark gray, fissile, and sidentic. The lower portion is largely shale; the upper portion is largely limestone.

STRUCTURAL GEOLOGY

The Bloomfield Quadrangle is situated along the southern margin of the Illinois Basin (Eastern Interior Basin). Regionally, the strata dip northward at a rate of approximately 140 feet per mile, which is slightly more than 1°.

The McCormick Anticline enters the quadrangle at the northeast corner and trends southwest to the village of Pond, where it curves to the south-southwest. The McCormick is a compound structure, composed of several folds and faults that form a left-handed (lower right to upper left) en echelon pattern. Structural relief northeast of Pond is 250 to 300 feet. Southwest of Pond, the relief gradually diminishes. Individual anticlines are narrow, sharp-crested, and asymmetrical; dips on the northwest flanks are steeper than on the southeast flanks. Faults follow the hinges of anticlines and the steep limbs of monoclines. Although most of the faults are not exposed, they are likely to be high-angle normal faults because deformation adjacent to the faults is relatively slight. A reverse fault that dips 70° to the east is exposed in the ravine north of Concord Cemetery (Section 30, T12S, R4E). Reverse faulting near the crest of the McCormick Anticline in NW SW SW, Section 19, T12S, R4E, is indicated by the presence of overturned bedding.

A seismic profile northeast of the study area indicates that the McCormick Anticline is underlain by northwest-verging thrust faults that are detached within the sedimentary section. Evidence from adjacent areas indicates that two episodes of deformation were involved. The first was compressional, and it formed thrust faults and anticlines. The second was extensional and induced normal faulting. In some instances, the same fault first underwent reverse, then normal movement (Nelson et al. 1991). Within the New Albany Shale (Devonian–Mississippian) or shales of the lower part of the Pope Group, thrust faults may be detached from the crystalline basement.

Two faults along the west edge of the map area are part of the Little Cache Fault Zone, which consists of high-angle normal faults that strike slightly east of north. Displacement of the northern fault zone increases southward from about 130 to 280 feet. From offsets of stratigraphic contacts on the opposite side of the valley, it is inferred that the southern fault exists beneath the Quaternary alluvium east of Bloomfield. Its throw is about 50 feet.

A pair of normal faults that form a graben in the southeastern part of the map area is named the Wartrace Fault Zone for this map. Maximum displacement on these faults is 100 to 150 feet. A reflection seismic profile shows that these nearly vertical faults displace the entire Paleozoic sedimentary succession.

Ten sharp, hingelike anticlines with widths and breadths of a few meters were observed southeast of the axis of the McCormick Anticline. Their axes strike west, west-northwest, and north-northeast. Similar anticlines occur in the Glendale Quadrangle to the east (Devera 1991). These structures are tentatively interpreted as having formed under the compressional stress field that produced the McCormick Anticline.

ECONOMIC GEOLOGY

No production of metallic ores, fossil fuels, or industrial minerals is reported for the Bloomfield Quadrangle. Limestone is the only resource that has likely potential for development.

Several formations in the Pope Group contain limestone that may be suitable for quarrying. A large quarry in the Kinkaid Limestone is active at Buncombe, 6 miles west of the Bloomfield Quadrangle. Limestone from the Kinkaid has been used for road rock, aggregate, and agricultural lime, and may be suitable for Portland cement, bituminous pavement, and other uses (Lamar 1959). The Menard Limestone contains an interval of dominantly limestone 100 to 110 feet thick. This limestone commonly is siliceous and contains thin shale interbeds, but some of it may be usable for road rock, aggregate, and agricultural lime (Lamar 1959). The Glen Dean Formation contains an 18- to 25-foot-thick limestone at the top; it was formerly quarried near Vienna just west of the study area. A sample from that quarry contained about 93% calcium carbonate (Lamar 1959). Limestone from the upper part of the Golconda Formation may also be thick enough to quarry.

One petroleum test hole has been drilled in the quadrangle: the Comanche Oil Corp No. 1-C Branham Community, located in the NW NE NW, Section 32, T13S, R4E. This well reached total depth at 3,175 feet in the Lower Devonian Clear Creek Formation; no shows of oil were reported. The nearest oil production is in small fields about 15 miles north of the study area. Several dry and abandoned test holes have been drilled on the McCormick Anticline northeast of the study area.

Coal beds occur in the Tar Springs, Waltersburg, and Caseyville Formations; but all are lenticular, shaley, less than 18 inches thick, and thus lack economic value.

REFERENCES

Devera, J. A., 1991, Geology of the Glendale Quadrangle, Johnson County, Illinois: Illinois State Geological Survey, Illinois Geological Quadrangle 9, scale 1:24,000.

Lamar, J. E., 1959, Limestone resources of extreme southern Illinois: Illinois State Geological Survey, Report of Investigations 211, 81 p.

Nelson, W. J., J. A. Devera, S. P. Esling, L. R. Follmer, E. D. Henderson, R. J. Jacobson, M. S. Lannon, D. K. Lumm, R. A. Peppers, C. B. Trask, M. H. Riggs, and C. P. Weibel, 1991, Geology of the Eddyville, Stonefort, and Creal Springs Quadrangles, Southern Illinois: Illinois State Geological Survey, Bulletin 96, 85 p.

Base from U.S. Geological Survey, 1966. 10,000-foot grid based on Illinois coordinate system
Photorevised 1978

UTM GRID AND 1990 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
1 MILE
1 KILOMETER
CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ILLINOIS
QUADRANGLE LOCATION

Geology compiled in 1987 and 1988
Cartography by Williams & Heintz Map Corp.

NOTE: a detailed report on the geology of this quadrangle has been published as Illinois State Geological Survey Bulletin 99,"Geology of the Bloomfield Quadrangle, Johnson County, Illinois," by W.J. Nelson.

EXPLANATION

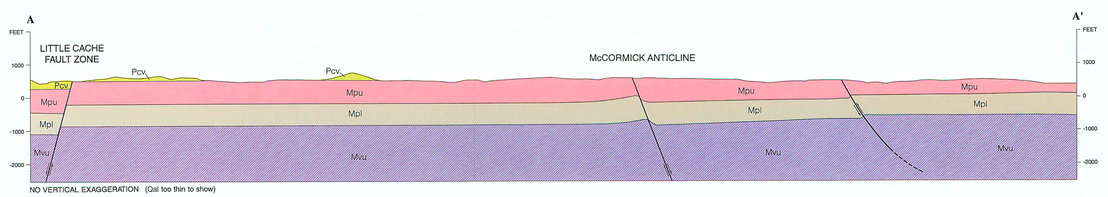
QUATERNARY	Holocene	Qal — Alluvium
		Unconformity
PENNSYLVANIAN	Atokan	Pt — Tradewater Formation
	Morrowan	Pcv — Caseyville Formation: p, Pounds Sandstone Member; dr, "Drury" Member; bc, Battery Rock Sandstone Member; w, Wayside Member
		Unconformity
MISSISSIPPIAN	Chesterian	Mk — Kinkaid Limestone
		Mdf — Degonia Formation and Ford Station Member of Clore Formation
		Mct — Tygett Sandstone Member and Cora Member of Clore Formation
		Mp — Palestine Sandstone
		Mm — Menard Limestone
		Mw — Waltersburg Formation (stippled pattern = bluff-forming sandstone)
		Mv — Vienna Limestone
		Mwv — Waltersburg Formation and Vienna Limestone, undifferentiated
		Mts — Tar Springs Sandstone
		Mgd — Glen Dean Limestone
		Mh — Hardinsburg Sandstone
		Mg — Golconda Formation
		Mpu — Upper Pope Group undifferentiated (Kinkaid through Tar Springs)
		Mpl — Lower Pope Group Glen Dean through Aux Vases (cross section only)
	Valmeyeran	Mvu — Valmeyeran undifferentiated (cross section only)

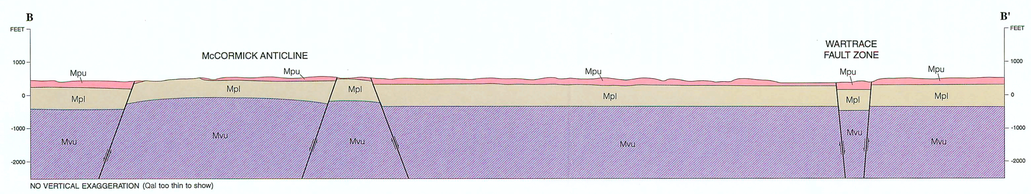
LINE SYMBOLS: Dashed where inferred; dotted where concealed

- Contact
- Fault: bar and ball on downthrown side
- Reverse fault: triangle on upthrown side
- Anticline, arrow at end indicates plunge
- Monocline
- A—A' Line of cross section

SYMBOLS

- 30 Strike and dip of bedding; number indicates degree of dip
- 78 Overturned bedding
- Horizontal bedding
- Miniature anticline, outcrop scale
- Outcrop of special note, shown where contact, map unit, or fault was well exposed at time of mapping
- 20282 Oil test hole, with ISGS county number
- 79 Water well, with ISGS county number





GEOLOGIC MAP OF THE BLOOMFIELD QUADRANGLE, JOHNSON COUNTY, ILLINOIS

W. JOHN NELSON

1995