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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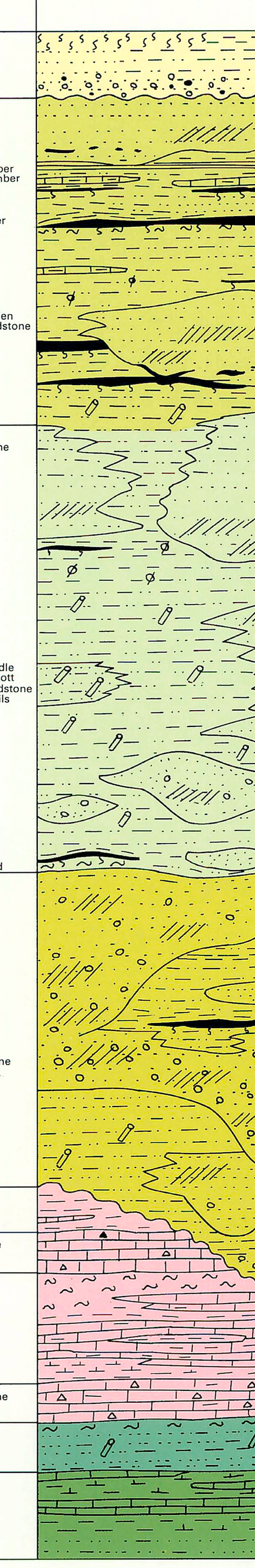
Geologic Map of the
STONEFORT QUADRANGLE, ILLINOIS
IGQ-6



SYSTEM	SERIES (Appalachian)	SERIES (Midcontinent)	INDIANA Fms. (Shaver et al.,1986)	KENTUCKY Fms. (Williams et al.,1982)	THIS REPORT	MEMBERS AND BEDS	THICKNESS OF COAL (in.)	THICKNESS (ft)	DESCRIPTION UNIT	DESCRIPTION
QUATERNARY	Holocene / Pleistocene					Alluvium, talus, loess, lacustrine deposits		0-50	A	Alluvium: clay, silt, sand, gravel, and boulders along stream valleys. Talus: boulders and rock debris below cliffs. Loess: silt, yellow-brown to red-brown, clayey, compact; caps uplands. Lacustrine deposits: clay, silt, and fine sand in northernmost part of quadrangle.
PENNSYLVANIAN	Middle	Desmoinesian	Staunton	Tradewater	Spoon	sub-Davis sandstone		35-60 (225-300)	B	Sandstone, light to medium gray, weathers yellow-brown; fine to medium grained, friable, feldspathic, abundant mica, carbonaceous debris and interstitial clay, shale and coal clasts. Thick-bedded; cross-bedded. Caps hills north and west of Stonefort. Lower contact erosional.
						Carrier Mills Shale Member; Stonefort Limestone Member; Wise Ridge Coal Bed; Mt. Rorah Coal Member	0-12; 6-36	45-55	C	Shale, medium to dark gray, silt-free to silty, thinly laminated. Siltstone, light to medium gray, shaly, thinly laminated. Sandstone, light to medium gray, very fine to fine grained, micaceous, thinly bedded. Shale (Carrier Mills Member) black, hard, fissile; local coal at base. Limestone (Stonefort Member) gray-brown, micritic to finely crystalline, nodular, fossiliferous. Wise Ridge Coal bright to dull-banded, shaly. Mt. Rorah Coal bright-banded, pyritic, commonly split with shale.
								50-75	D	Shale, medium- to dark-gray, silt-free to silty, sideritic, siltstone laminae. Siltstone to very fine sandstone, light gray, shaly, thinly bedded. Limestone, gray, shaly, nodular. Possible thin coal. Interval largely concealed; known mainly from COGEOMAP borehole S-1.
						golden sandstone; Delwood Coal Bed	40	0-75	E	Sandstone, light to medium gray, weathers yellow-brown; fine to coarse grained, friable, feldspathic, much mica, carbonaceous debris and interstitial clay; shale and coal clasts. Thick bedded to massive, cross-bedded. Grades laterally to shale and siltstone. Lower contact erosional.
						Oldtown Coal Bed	0-36	20-100	F	Shale, medium to dark gray, silt-free to silty, thinly laminated. Siltstone, light to dark gray, shaly, thinly laminated. Sandstone, light to medium gray, very fine grained, shaly, micaceous, carbonaceous. Delwood Coal Bed known only in COGEOMAP borehole S-2; elsewhere cut out by golden sandstone. Oldtown Coal Bed bright-banded, blocky, clean, locally cut out by golden sandstone. Trace fossils abundant in shale and siltstone below Oldtown Coal. Interval coarsens downward; lower contact gradational.
		Atokan	Brazil		Abbott	Murray Bluff Sandstone Member	0-6	0-115 (200-350)	G	Sandstone, light gray, weathers dark brown, fine to coarse grained; rare quartz granules. Friable to well-cemented. Mica, lithic fragments, feldspar, and interstitial clay noticable but less abundant than in younger sandstones. Iron oxide abundant. Thick-bedded to massive near base, with large-scale planar cross-bedding; generally becoming thin-bedded and shaly upward. Interfingers with siltstone and shale. Basal contact erosional.
						olive shale		40-100	H	Shale, medium to dark gray, silt-free to silty, partly sideritic, thinly laminated. Siltstone, light to medium gray, shaly, thinly laminated. Sandstone, light gray, very fine grained, shaly, slightly micaceous, thin- to medium-bedded. Coal, shaly, local. Trace fossils abundant. Interfingers with Murray Bluff and middle Abbott sandstones. Unit generally coarsens downward; lower contact gradational.
			Mansfield			Cedar Creek sandstone lentils; middle Abbott sandstone lentils		0-50	I	Cedar Creek Sandstone lentil: sandstone, light to medium gray, very fine grained, very shaly, thinly bedded, heavily bioturbated; mapped only on New Burnside Anticline near west edge of quadrangle. Middle Abbott sandstone lentils: sandstone, light gray, very fine to medium grained, slightly micaceous, iron oxide abundant, thin- to thick-bedded; generally becomes coarser and less mature upward. Present along east edge of quadrangle. Interfingers with olive shale. Lower contacts generally gradational.
						lower Abbott sandstone lentils		0-100	J	Sandstone, white to light gray, weathers gray to brown; very fine to medium-grained, locally numerous quartz granules to about 1/4 inch. Largely quartz sand; little mica, feldspar or interstitial clay. Generally thick-bedded to massive; cross-bedding and slumped bedding common. Grades laterally to shale, siltstone, and thin-bedded sandstone. Lower contact generally erosional.
						basal Abbott shale and sandstone; Reynoldsburg coal bed	0-24	50-110	K	Shale, medium-to dark-gray, silty, thinly laminated. Siltstone, light gray, shaly, thinly laminated. Sandstone, light gray, very fine grained, slightly micaceous, partly shaly, thinly bedded. Reynoldsburg Coal Bed, bright to dull-banded, locally shaly. Occasional trace fossils. Possible large-scale gravity-slide deposit of sandstone lenses and shale-pebble conglomerate, at north portal of Illinois Central railroad tunnel. Interval poorly exposed. Lower contact generally gradational.
	Lower	Morrowan		Caseyville	Caseyville	Pounds Sandstone Member		30-120+ (235-450)	L	Sandstone, white to light gray, weathers gray, fine to coarse grained, quartz granules and small pebbles common; nearly pure quartz sand, well cemented, silica overgrowths on grains. Thick-bedded to massive, planar and trough cross-bedding. Forms cliffs. Lower contact erosional.
						Drury Member		0-80	M	Shale, medium to dark gray, smooth to silty, thinly laminated. Siltstone to very fine sandstone, light gray, slightly micaceous, shaly, thinly laminated. Gentry Coal Bed: upper few inches bright-banded coal; lower part coal and shale interlaminated. Plant fossils common in shale above Gentry Coal and near top of unit. Drury Member cut out by Pounds Sandstone west of Jackson Hollow. Lower contact sharp to gradational.
						Gentry Coal Bed; Battery Rock Sandstone Member	0-24	30-100+	N	Sandstone, white to light gray, weathers gray; fine to very coarse grained; quartz pebbles up to 1 inch abundant; local lenses of conglomerate. Nearly pure quartz sand, well cemented, silica overgrowths on grains. Thick-bedded to massive, cross-bedded. Forms cliffs and ledges. Lower contact erosional.
						Wayside Member		50-150	O	Sandstone, white to light gray, very fine to fine grained, nearly pure quartz sand, very well cemented, largely in flaggy thin to medium beds with ripple marks, load casts and occasional trace fossils; local thick-bedded to massive sandstone forms cliffs up to 40 feet high. Shale, medium gray to black, silty, carbonaceous, thinly laminated; siltstone, light gray, thinly laminated. Conglomerate, consisting of quartz pebbles, and clasts of chert; ironstone and shale up to 4 inches in sandstone matrix, occurs in thin beds near base. Lower contact erosional.
MISSISSIPPIAN	Chesterian				Kinkaid Limestone	Grove Church Shale Member		0-50	P	Shale, greenish-gray, partly silty, partly calcareous. Limestone, brownish-gray, fine to coarse grained. Known only in subsurface.
						Goreville Limestone Member		0-45 (100-160)	Q	Limestone, light- to medium-gray, micritic to medium crystalline, slightly argillaceous, thin to medium bedded, sparsely fossiliferous, occasional chert nodules. Lower contact sharp.
						Cave Hill Member		70-90	R	Shale, greenish-gray to olive-gray and dark gray, smooth to finely silty, soft, thinly laminated, partly calcareous. Limestone, light to dark gray, some weathers yellow-brown; micritic, very fossiliferous, partly silty, partly dolomitic, most beds less than 5 feet. Claystone, green and dark red, soft; near top of unit. Lower contact sharp.
						Negli Creek Limestone Member		25-32	S	Limestone, medium to dark gray, weathers light gray, weathered surfaces rough; micritic to finely crystalline, siliceous, chert nodules common; bedding nodular with shaly partings; common gastropods, crinoids, brachiopods, bryozoans, corals. Lower contact sharp.
					Degonia Formation			35-65	T	Sandstone, greenish-brown to olive, very fine grained, shaly, thinly bedded, ripple marks and burrows common. Siltstone and silty shale, gray, thinly laminated. Claystone, dark red and green, at top of unit. Lower contact gradational.
					Clore Formation			85-115 Total	U	Shale, dark gray, silt-free, soft, platy. Mudstone, greenish-gray to olive-gray. Limestone, dark gray, micritic, dense, shaly, highly fossiliferous. Only upper 30 to 50 feet exposed.

STRUCTURAL GEOLOGY

The Stonefort Quadrangle is situated near the southern margin of the Illinois Basin. Sedimentary strata in the quadrangle have a regional dip of 1° to 2° slightly west of north. This regional pattern is modified by four named folds: from north to south, the New Burnside Anticline, the Battle Ford Syncline, the McCormick Anticline, and the Bay Creek Syncline.

The New Burnside Anticline crosses the northern part of the quadrangle and trends slightly south of west. It is a compound fold, consisting (in the Stonefort Quadrangle) of three separate anticlines, forming a right-stepping en echelon pattern. The first of these lies on the northeast side of Bill Hill Hollow and is faulted on the south limb. The second anticline extends from near Stonefort Bluff almost to the Illinois Central Railroad south of Oldtown. The third fold arises west of the railroad and extends into the Creal Springs Quadrangle. All three are asymmetrical, with north limbs dipping at 10° to 25° (locally steeper), and south limbs generally dipping at less than 10°. Maximum structural relief is over 400 feet. Several faults, most of which strike northeast to east-northeast, are present along the New Burnside Anticline. Most of them are high-angle normal faults; but the fault exposed in the small ravine in the NE 1/4 NW 1/4, Section 6, T.11S., R.5E., apparently is a reverse fault.

The Battle Ford Syncline, named for Battle Ford Creek in the Eddyville Quadrangle, has a sinuous axis roughly one mile south of and parallel to the New Burnside Anticline. It is a broad, gentle, and asymmetrical syncline. The south limb dips at 1° to 2°, while the steeper north flank is shared with the New Burnside Anticline.

The McCormick Anticline strikes southwest from near the center of the east edge to the southwestern corner of the quadrangle. The McCormick is similar in form to the New Burnside Anticline, but the McCormick is a sharper fold, has greater structural relief, and is more heavily faulted. The McCormick varies from a narrow, concentric anticline to a cuspate fold, faulted along the axial plane. Strata on the northwest flank dip at 15° to 45°, while on the southeast limb the dip is less than 5° to 40°. Maximum vertical relief exceeds 750 feet. Faults along the McCormick Anticline tend to produce a right-stepping en echelon pattern. Both high-angle normal and high-angle reverse faults have been observed. Some of the large faults display evidence for two episodes of movement. Drag and rotation of fault slices indicates the last motion was normal and down to the southeast (see cross-section); but inconsistent stratigraphic offset (scissoring) points to an earlier phase of reverse faulting with the southeast side raised.

The McCormick and New Burnside Anticlines are interpreted as products of a compressional force from the southeast. Seismic reflection profiles and magnetic surveys (Heigold and Robare, 1977, ISGS internal report) characterized them as "thin-skinned" folds not involving crystalline basement. Thrust faults ramping upward from one or more decollements within the sedimentary section are postulated to exist beneath both anticlines (Nelson, 1987). Following the compressional event, the region was subjected to northwest-southeast extension, which induced normal faulting.

The Bay Creek Syncline, named herein for Bay Creek, crosses the southeastern part of the Stonefort Quadrangle. The axis of this broad, nearly symmetrical fold is parallel with that of the McCormick Anticline.

Railroad cuts at both ends of the long tunnel in the south-central part of the quadrangle reveal unusual structures, described by Potter (1957). North of the tunnel (S 1/2, Section 19, T.11S., R.5E.) the basal Abbott Formation consists of large lens-shaped bodies of sandstone in a matrix of shale-pebble conglomerate, locally sheared and folded. Potter called this a "breccia" and interpreted it as a product of subaqueous gravity slides. Near the south portal of the tunnel (NE 1/4, Section 31) a series of small-scale south-verging imbricate thrust faults deform the Wayside Member of the Caseyville Formation. The faults are truncated by the base of the overlying undeformed Battery Rock Member. Potter attributed both the thrust faults and the "breccia" to gravitational sliding on the flanks of a rising McCormick Anticline. We consider Potter's theory plausible, although this and other evidence for structural movements during Pennsylvanian sedimentation in the Stonefort Quadrangle, is ambiguous.

ECONOMIC GEOLOGY

Coal has been mined on a small scale in the Stonefort Quadrangle, and nine petroleum test wells are known to have been drilled; none achieved production.

Petroleum exploration has focused on the crests of the McCormick and New Burnside Anticlines. Most of the wells are favorably located with respect to structure. The wells were drilled to depths of 660 to 3058 feet and all were finished in Mississippian strata. Tarry residues or "dead" oil were reported in cuttings from several of the wells. It is likely that volatile hydrocarbons escaped along faults or fractures.

Coal mining has taken place in the northern 1/3 of the quadrangle. The Mt. Rorah Coal Member, in the Spoon Formation, was mined at the surface in the SE 1/4, Section 34, T.10S., R.4E., and dug in small open pits or drifts in the hills north of Stonefort. This coal here is 2½ to 3½ feet thick in several exposures and boreholes, and its depth is not more than 125 feet. The Oldtown Coal Bed was strip-mined in the NE 1/4, Section 6, T.11S., R.5E., and excavated from small adits about 1 mile east of Oldtown and in Section 2, T.11S., R.5E. This coal occurs near the base of the Spoon Formation and is correlated palynologically with the Rock Island Coal of northwestern Illinois. The Oldtown is locally up to 3.0 feet thick, but it thins rapidly away from the area where it was mined, and is partly cut out and replaced by sandstone.

A 3½-foot coal believed to be the Delwood Coal Bed was encountered at a depth of 23 feet in COGEOMAP borehole S-2, SE 1/4, Section 29, T.10S., R.5E. This coal reaches a similar thickness and has been mined both east and west of the Stonefort Quadrangle, but is unknown here except in one borehole. More test drilling might establish minable reserves, possibly in conjunction with overlying Mt. Rorah and underlying Oldtown Coals.

Coal outcrops and small drift mines or test pits in strata of the Abbott and Caseyville Formations have been observed in several scattered localities. The Reynoldsburg Coal Bed is indicated by coal float and test pits north of Cedar Creek in Sections 34, 35, and 36, T.11S., R.4E. According to field notes (ISGS, open files) the coal was "canneloid" and 3.0 to 3½ feet thick. Other Abbott and Caseyville coals observed are less than 2 feet thick and generally are shaly.

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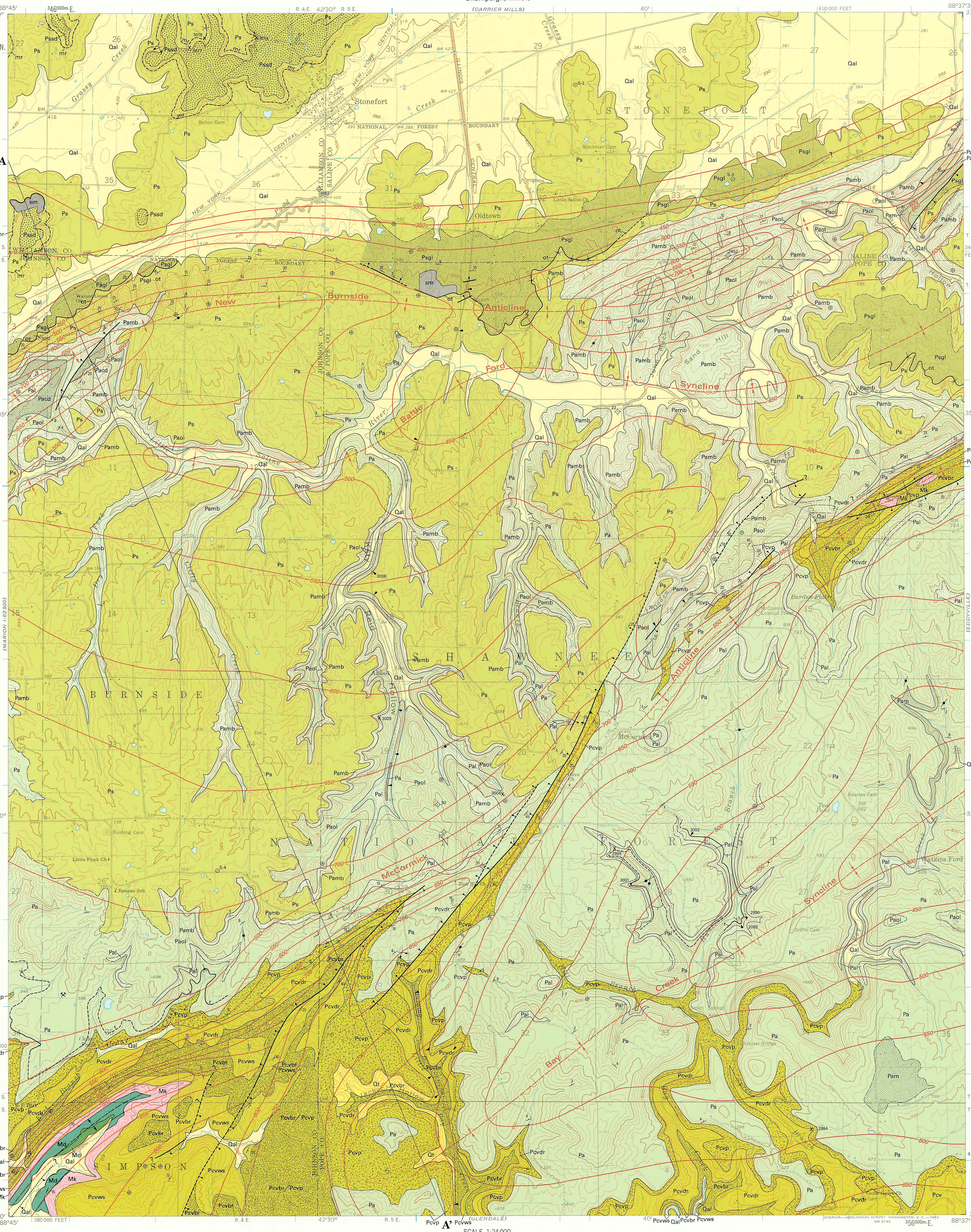


SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

APPROXIMATE MEAN DECLINATION, 1961

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

Cartography by Northern Illinois University, Department of Geography, Laboratory for Cartography and Spatial Analysis: Leonard A. Walther.
Supplemental drafting by: Mary T. Constantine, Illinois State Geological Survey

QUADRANGLE LOCATION

EXPLANATION

QUATERNARY — Pleistocene and Holocene
- Qt — Talus and colluvium
- Qal — Alluvial deposits; may be underlain by lacustrine deposit.

PENNSYLVANIAN

Desmoinesian — Spoon Formation (Ps)
- Pssd, *sub-Davis sandstone*
- mr, *Mt. Rorah Coal Member*
- Psgl, *golden sandstone*
- ot, *Oldtown Coal Bed*

Atokan / Morrowan — Abbott Formation (Pa)
- Pamb, *Murray Bluff Sandstone Member*
- Paol, *olive shale*
- Pam, *middle Abbott sandstone lentils*
- Pacd, *Cedar Creek sandstone lentil*
- Pal, *lower Abbott Sandstone lentils*
- r, *Reynoldsburg Coal Bed*

Morrowan — Caseyville Formation (Pcv)
- Pcvp, *Pounds Sandstone Member*
- Pcvdr, *Drury Member*
- Pcvbr, *Battery Rock Sandstone Member*
- Pcvws, *Wayside Member*

MISSISSIPPIAN

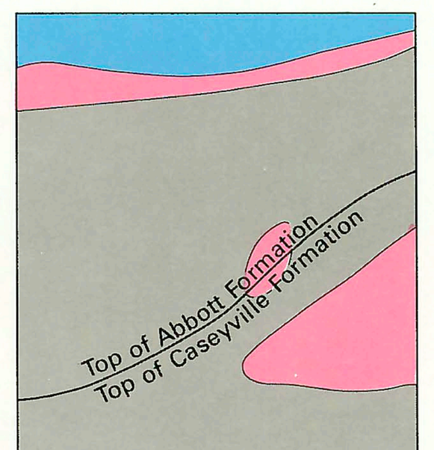
Chesterian
- Mk — Kinkaid Limestone
- Md — Degonia Formation
- Mcl — Clore Formation
- Mcu — Chesterian undifferentiated (cross section only)

Valmeyeran
- Mvu — Valmeyeran undifferentiated (cross section only)

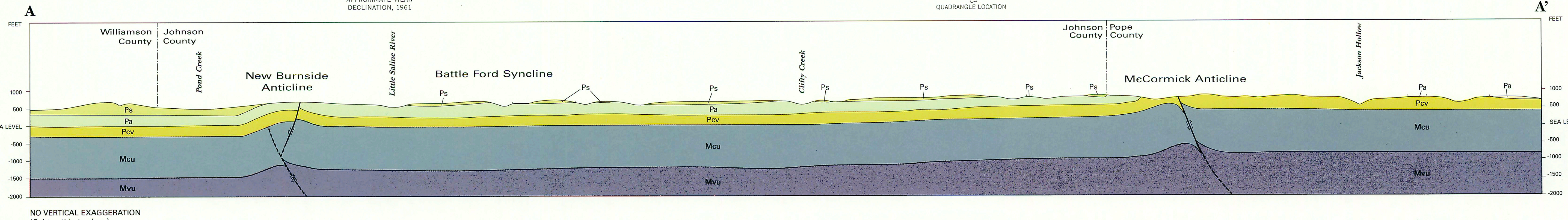
LINE SYMBOLS: Dashed where inferred; dotted where concealed
- Contact
- Coal bed
- Fault: bar and ball on downthrown side
- Anticline
- Syncline
- A——A' Line of cross section
- Structure contour (see index map below)

SYMBOLS
- Strike and dip of bedding (representative sample). Number indicates degree of dip
- Horizontal bedding
- Vertical joints
- Joints, direction of dip indicated
- Abandoned mine shaft, small surface mine or prospect pit
- Abandoned coal adit
- Coal exposure with ISGS coal maceration and palynological analysis number
- Outcrop of special note, shown where contact, map unit, or fault was well exposed at time of mapping
- sm — Surface-mined area

DRILL HOLES FROM WHICH SUBSURFACE DATA WERE OBTAINED
- ISGS cored test hole
- Oil test hole, with ISGS county number



Index map showing different horizons used for structure contours. Contour interval 50 feet. Contours omitted in structurally complex areas and where control absent. Pink indicates areas where control is less accurate, blue insufficient data.



NO VERTICAL EXAGGERATION
(Qal too thin to show)

GEOLOGIC MAP OF THE STONEFORT QUADRANGLE, ILLINOIS

W. John Nelson and Donald K. Lumm

1990