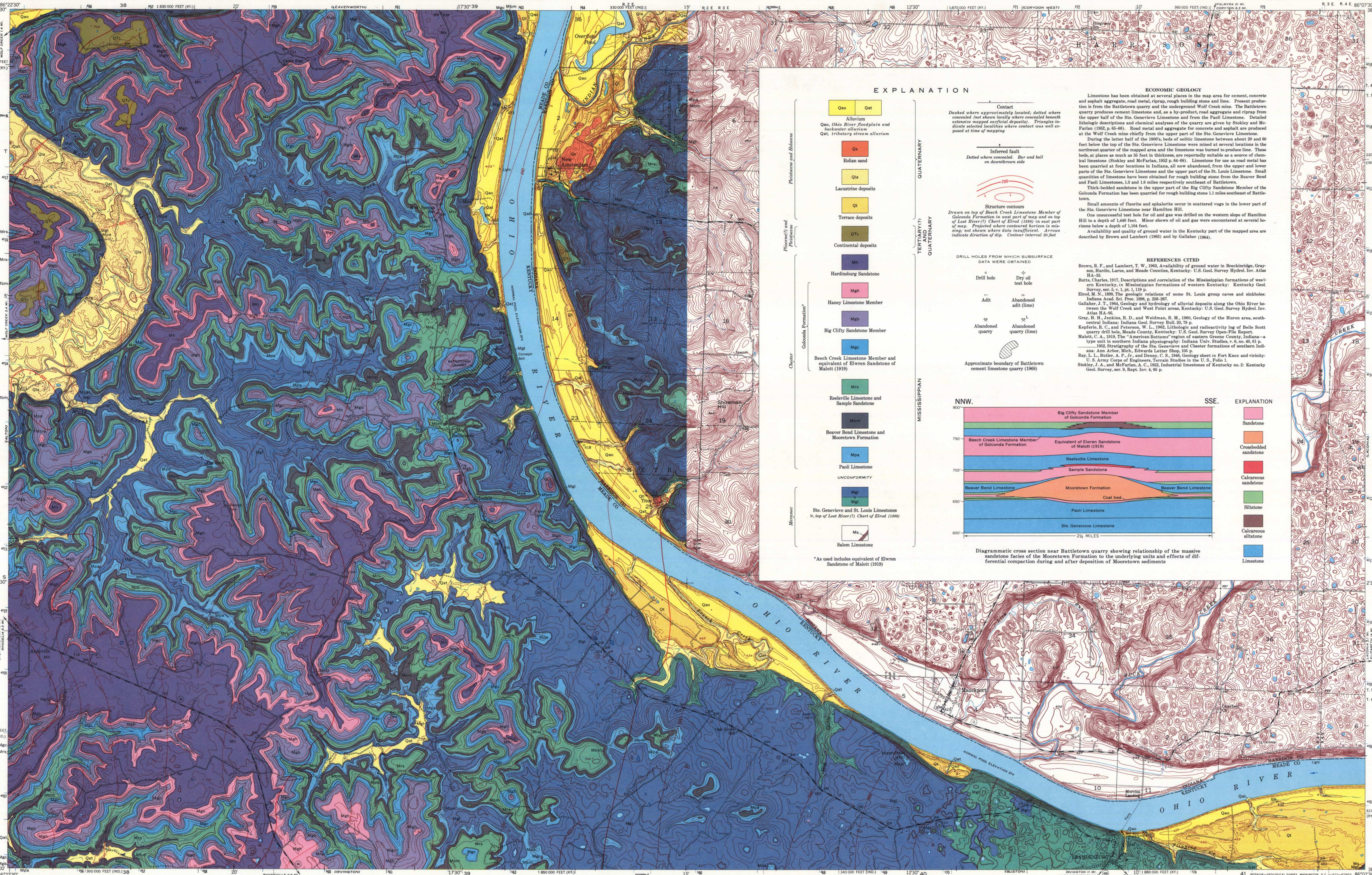
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
V. E. McKELVEY, DIRECTOR

PREPARED IN COOPERATION WITH
THE COMMONWEALTH OF KENTUCKY, UNIVERSITY OF KENTUCKY
KENTUCKY GEOLOGICAL SURVEY
WALLACE W. HAGAN, DIRECTOR AND STATE GEOLOGIST

GEOLOGIC QUADRANGLE MAP
NEW AMSTERDAM AND MAUCKPORT QUADRANGLES
KENTUCKY-INDIANA
GQ-990

SYSTEM	SERIES	FORMATION AND MEMBER	LITHOLOGY	THICKNESS, IN FEET		DESCRIPTION
QUATERNARY	Pleistocene and Holocene	Tributary stream alluvium		0–30	0–75	Silt, sand, clay, and gravel, intermixed and interlayered. Silt, yellowish-brown to medium-gray, admixed clay; locally contains plant fragments; in part derived from nearby loess. Sand, yellowish-brown to medium-brown, medium to coarse subrounded to subangular quartz. Clay, light- to medium-gray, silty, scattered plant fragments. Gravel made up of sandstone, limestone, and chert pebbles and cobbles of local derivation ; along small streams; variable amounts of sand and silt matrix. Unit is alluvium along streams tributary to Ohio River ; includes some colluvium along smaller stream valleys.
		Ohio River floodplain and backwater alluvium		0–75		Silt, sand, clay, and gravel: partly intermixed and interlayered. Silt, light-yellowish-brown to yellowish-gray, admixed clay common. Sand, yellowish-brown, medium to coarse subangular to angular quartz, commonly silty. Clay, light-tan to light-yellowish-brown, silty. Gravel, subrounded to angular pebbles and cobbles of chert, sandstone, and limestone; abundant sand and silt matrix; constitutes most of lower half of unit (Gallaher, 1964). Unit includes some younger colluvium along base of steep slopes.
		Eolian sand		0–30		Sand, yellowish-brown, medium quartz grains and minor amounts of dark heavy minerals, subrounded, well-sorted; crossbedded; derived from fluvial and lacustrine deposits.
		Lacustrine deposits		0–85		Clay and silt, in part intermixed and intertongued. Clay, light-brownish-gray to light-gray, at places laminated. Silt, brownish-gray to yellowish-brown. Sand reported near middle and gravel at base of unit in drill holes just west of map boundary.
		Terrace deposits		0–145		Silt, clay, sand, and gravel, in part intermixed and intertongued. Silt, brownish-gray to yellowish-brown, much admixed clay and sand. Clay, light-brownish-gray to light-gray, silty. Sand, light-brown to yellowish-brown, medium to coarse subangular quartz; silt common. Gravel, present only in subsurface (Gallaher, 1964). Unit includes some colluvium along base of steep slopes.
	Pleistocene	Loess		0–15		Silt and clay, light-brown to yellowish-brown, dominantly quartz, nonbedded, noncalcareous; present only on upland surfaces. Not mapped.
TERTIARY(?) AND QUATERNARY	Pliocene(?) and Pleistocene	Continental deposits		0–10		Gravel, light-brown to yellowish-brown, poorly sorted; stratification indistinct or absent; subangular to subrounded pebbles of light-gray and light-brown chert dominant; subrounded to rounded ellipsoidal pebbles of white quartz common; some pebbles have polished surfaces; locally cemented with iron oxides and hydroxides.
MISSISSIPPIAN	Chester	Hardinsburg Sandstone		15+	65+	Siltstone and shale: Siltstone, light-gray, weathers light brown; thin bedded, in part argillaceous. Shale, light-gray to olive-brown, partly silty.
				25–35		Sandstone, siltstone and shale: Sandstone, very light gray to light-brown, weathers brown to yellowish brown to reddish brown; fine to medium grained, thick to thin bedded, most commonly medium bedded, locally massive; crossbedding, ripple marks and sole markings common; few plant casts and impressions, especially in lower part; light-gray clay pellets common in lower part. Siltstone, light-gray, weathers light brown; thin bedded, in part argillaceous; some beds micaceous; thin interbeds in upper and lower parts of unit. Shale, light-gray to olive-brown to reddish-brown, in part silty; thin interbeds, especially in siltstone.
				0–15		Shale and siltstone, in part interbedded; Shale, light- to dark-gray; locally calcareous in lower part; in part silty. Siltstone, light-gray, thin-bedded; some beds argillaceous. At places unit interfingers with underlying limestone unit.
		Golconda Formation: Haney Limestone Member		25–45		Limestone and shale: Limestone, light- to medium- to brownish-gray, weathers light gray except upper part which at places is dolomitic and weathers buff brown; medium to finely crystalline and medium-grained organic detrital; locally few beds are oolitic; commonly medium to thick bedded with minor amounts thin bedded to laminated; some crossbedding. Medium- to light-gray, very fine grained to oolitic chert in upper half of unit as nodules and thin lenses; chert weathers to white to very light gray angular fragments which are abundant in red soil of Haney residuum; most chert residuum contains small fragments of *crinoid columnals*. Shale, thin medium- to light-gray calcareous partings throughout unit and thin medium- to greenish-gray interbeds in lower and upper parts of member. Unit is very fossiliferous; abundant crinoid fragments and fenestrate bryozoans, including *Archimedes* spp.; brachiopods, solitary corals, and blastoids (*Pentremites* spp.) common. Outcrops common, form ledges on steep slopes. Springs and small caves common at and near base.
		Big Clifty Sandstone Member		10–30	35–75	Shale, siltstone, and sandstone, partly interbedded: Shale, light- to dark-gray, some olive-gray to grayish-red to red, in part silty, upper part locally calcareous; darker-gray beds locally have small coaly plant fragments; light-gray beds commonly have poor fissility. Siltstone, light- to brownish-gray, weathers various shades of brown to reddish brown; thin and even bedded, argillaceous, locally micaceous. Sandstone, light-brown, fine- to medium-grained, thin- to medium-bedded, locally absent.
				10–30		Sandstone and siltstone: Sandstone, light-gray and light-brown to light-yellowish-brown, weathers brown to reddish brown; fine to medium grained, thick to thin bedded, locally massive; some beds lenticular; ripple marks and crossbedding common, honeycomb weathering common where massive. Siltstone, light- to medium-gray to light-brown, thin-bedded. Unit commonly forms cliffs.
				15–25		Sandstone, shale, siltstone, and limestone, partly interbedded. Sandstone, light-brown to light-yellowish-brown, fine-grained, thin- to medium-bedded; ripple marks rare. Shale, light- to greenish- to dark-gray, partly silty, locally calcareous near base. Siltstone, light- to medium-gray to light-brown, thin-bedded, argillaceous, locally calcareous. Limestone in lower part of unit in central and northern part of New Amsterdam quadrangle, gray, weathers brown; medium to finely crystalline, thin to medium bedded, contains quartz sand; contains bryozoans and sparse crinoid fragments.
		Beech Creek Limestone Member		7–15	25–50	Limestone and shale: Limestone, medium- to brownish-gray, rarely dark-gray; upper part commonly weathers buff brown; medium to finely crystalline, rarely coarsely crystalline or superficial-oolitic, medium to thick bedded; few thin to laminated argillaceous beds, upper part of unit at places slightly arenaceous; crinoid fragments abundant and large crinoid columnals common. *Inflatia inflata* (McChesney) (*Productus inflatus* in older publications) and *Diaphragmus cestriensis* (Worthen) which weather light bluish gray are abundant on bedding surfaces in upper 1 to 3 feet and serve as an excellent stratigraphic marker; few large planispiral-coiled gastropods near base. Brownish-gray calcareous shale in central and southwestern parts of New Amsterdam quadrangle as partings and thin interbeds in upper part of member and throughout map area as partings in lower part. Outcrops of unit common in small streams and as ledges on hillsides. Springs common at base.
		Equivalent of Elwren Sandstone of Malott (1919)		15–35		Sandstone, shale, and siltstone: Sandstone, light-brown to light-yellowish-brown, some light-gray, fine- to very fine grained, thin- to medium-bedded, even-bedded, locally thick-bedded and massive with some crossbedding; local ripple marks; small coaly plant fragments rare. Shale, light- to medium- to olive-gray; local discontinuous red streaks; in part silty; more common in upper half of unit. Siltstone, light- to medium-gray to light-brown, thin- and even-bedded, in part argillaceous, rarely micaceous; in part interbedded with shale. Basal contact sharp.
		Reelsville Limestone		7–30	30–65	Limestone and shale: Limestone, medium- to very light gray; lower part weathers light gray and upper part buff to dark reddish brown; finely to medium crystalline, rarely coarsely crystalline; at places some beds in lower and upper parts are oolitic; medium to very thick bedded; locally few beds of medium crystalline fossil debris are crossbedded; slightly dolomitic near middle. Abundant fragments of crinoid columnals and plates; *Pentremites* spp., small brachiopods, and calyx bases and plates of *Agassizocrinus* sp. common. Shale, greenish- to light-gray, 1- to 3-foot-thick unit near middle. Outcrops common in upper part of unit, which forms a distinct topographic bench; lower half of unit not well exposed. Limestone at base appears to interfinger with sandstone of the underlying unit, especially above the Mooretown sandstone lens near Battletown (see diagrammatic cross section).
		Sample Sandstone		20–50		Siltstone, sandstone, and shale: Siltstone, light-gray to light-brown, thin- and even-bedded, in part argillaceous, locally thin bedded; ripple marks common; calcareous above the Mooretown sandstone lens near Battletown (see diagrammatic cross section); local casts of *Sigillaria*. Shale, light- to medium-gray, weathers reddish gray; commonly silty, locally calcareous near top of unit; in upper part and locally near base, commonly interbedded with siltstone.
		Beaver Bend Limestone		0–18	20–65	Limestone and shale: Limestone, medium- to light-gray to light-brownish-gray, fine- to medium-crystalline; medium to thick bedded, locally some thin bedded; dominantly fossil debris, *Pentremites* spp. abundant; locally oolitic, some oolites have nuclei of dark-gray fossil fragments; locally argillaceous at top of unit. Shale, medium- to greenish-gray; thin interbeds and laminae, especially in lower part. Formation very thin, locally absent near Battletown (see diagrammatic cross section). Interfingering with Mooretown Formation common in east-central part of map area. Crops out commonly as a small ledge which on slight weathering exhibits well-defined bedding.
		Mooretown Formation		7–65		Shale, siltstone, sandstone, and coal: Shale, medium- to dark-gray; some beds medium to olive brown; part is carbonaceous and at places contains abundant iron sulphides; locally silty; chiefly in upper half and near base. Siltstone, light-gray to light-brown, thin-bedded, argillaceous. Sandstone, light-brown, less commonly light-gray, fine- to medium-grained; thin to medium bedded, locally thick bedded, some crossbedding in thicker beds; coaly plant fragments common and casts of *Sigillaria* locally abundant in lower and middle parts of unit; locally absent, especially near western margin of map area. Coal, as much as 5 inches thick, locally shaly and very argillaceous; present as two discontinuous beds, one near base and the other about middle of unit. About 0.7 mile north of Battletown a large sandstone lens more than 40 feet thick and about 2 miles wide is exposed for a distance of at least 3.5 miles in a northeast-southwest direction; contains crossbeds that dip S. 20–35° W.; lens is thicker than unit elsewhere in quadrangle partly because of channel-like fill in the upper part of the underlying Paoli Limestone and absence of the overlying Beaver Bend Limestone, but chiefly because of greater differential compaction of the laterally adjacent shale (see diagrammatic cross section). Formation is stratigraphically equivalent to the Bethel Sandstone in Indiana (Gray and others, 1960) and in western Kentucky (Butts, 1917, p. 63).
		Paoli Limestone		17–40	20–45	Limestone and shale: Limestone, light-gray to light-tannish-gray, less commonly medium-gray, weathers light gray to orangish brown; sublithographic to finely crystalline; upper part locally medium crystalline and at places contains sparse poorly developed oolites; thick bedded, less commonly medium to thin bedded; at places upper part contains few small, irregular-shaped nodules of light-gray chert; *Talarocrinus* sp. plates and calyxes common. Shale, greenish-gray, calcareous; thin interbeds, especially in middle part. Unit commonly well exposed as ledges and exhibits prominent vertical joint-controlled weathering which yields angular rubble on top surfaces of outcrops.
				2–6		Sandstone and shale: Sandstone, light- to medium-gray, fine-grained, medium- to thick-bedded, local small-scale crossbedding; very calcareous, at places rock is a sandy limestone. Shale, gray to light-greenish-gray, discontinuous. Unit is the Aux Vases Sandstone as used by Malott (1952). Unconformity at base.
	Meramec	St. Louis and Ste. Genevieve Limestones		15–25	135–195	Limestone, shale, and chert breccia: Limestone, light- to medium-gray, finely to medium crystalline, few beds are sublithographic; medium to thick bedded; oolitic beds local in upper part; some beds locally dolomitic. Shale, light-greenish-gray, in part calcareous; thin interbeds. Chert breccia, medium- to light-gray very fine-grained chert fragments in sparse to abundant matrix of light-gray sublithographic limestone; large chert fragments as much as 1 foot in diameter consist of well-cemented small angular chert fragments of various shades of gray; at top of unit, locally absent; bed is the Bryantsville Breccia of Malott (1952, p. 9).
				60–80		Limestone and sandstone: Limestone, very light gray to medium-gray, finely to coarsely crystalline; excellent abundant and well developed white to light-gray oolites common in upper half of unit in zones as thick as 15 feet; medium to thick bedded, less commonly thin bedded; crossbedding in coarsely crystalline beds; scattered gray fine-grained chert nodules that weather chalky white at and near top of unit; few slightly sandy beds about middle, dolomitic beds near top and base; limestone breccia or intraformational conglomerate locally in upper part; *Platycrinites penicillus* Meek and Worthen common. Sandstone, gray, very calcareous, medium- to thick-bedded, in upper part; locally absent. Unit generally well exposed throughout map area.
				15–20		Shale and limestone: Shale, dark-green to greenish-gray, slightly calcareous. Limestone, medium-gray, finely crystalline, medium- to thick-bedded.
				50–70		Limestone and dolomite: Limestone, very light gray to medium-gray, sublithographic to medium-crystalline; oolitic beds in upper and lower thirds; medium to thick bedded, less commonly thin bedded and laminated; light-gray, fine-grained nodules of chert 15 to 25 feet above base; much of upper half of unit is dolomitic. Dolomite, gray, finely crystalline, medium- to thick-bedded, near middle of unit.
		Lost River(?) Chert of Elrod (1899)		5–14		Limestone and chert: Limestone, very light tan to light-yellowish-gray, medium- to finely crystalline, medium- to thick-bedded; abundant fenestellid bryozoans and brachiopods (especially *Orthotetes* sp.) on bedding plane surfaces. Chert, light- to medium-gray, commonly gray mottled, very fine grained, medium beds to thin elongated lenses, wavy bedding plane surfaces. On upland surfaces unit weathers to angular residual slabs and blocks with limonite-stained irregular surfaces. Well exposed in bluffs along Ohio River.
				20–35		Limestone, light- to medium-gray, medium-crystalline to oolitic, thick- to medium-bedded, few thin beds. Contact between Ste. Genevieve and St. Louis Limestones has been defined by other workers as approximately at the bottom of this unit 20 to 35 feet below the base of the Lost River(?) Chert (Ray and others, 1946; Malott, 1952).
				180–200	340–375	Limestone, dolomite, and chert: Limestone, brownish- to medium-gray, medium- to finely crystalline; commonly dolomitic in upper half; lower half commonly argillaceous; scattered beds have light-gray to light-brown chert nodules; thick to medium bedded, few thin beds. Dolomite, medium- to dark-gray, finely crystalline, thick- to medium-bedded, few beds argillaceous; in upper part. Chert, light-gray to light-tannish-gray, very fine grained, medium-bedded, wavy bedding plane surfaces; grades laterally to lenses; at top of unit.
				60–70		Limestone and gypsum(?): Limestone, medium- to dark- to brownish-gray, fine-grained to sublithographic, thick- to medium-bedded; some thin to shaly bedded to laminated argillaceous limestone near middle; in part dolomitic; "*Lithostrotion*" spp. and *Syringopora* sp. present; petroliferous odor common when broken. Gypsum not present at surface in map area but penetrated by core drill hole in the adjacent Guston quadrangle (Kepferle and Peterson, 1962); large springs in bluff about 0.8 mile east of Brandenburg (Gallaher, 1964) are at the same stratigraphic positions as bedded gypsum encountered in the drill hole.
				65–80		Limestone, medium- to dark- to brownish-gray; some light olive gray in lower part; fine grained to sublithographic; few beds in lower half medium grained organic detrital; thick to medium bedded, few thin to laminated beds near middle; dolomitic at base and near top; commonly argillaceous near middle, scattered gray chert nodules about middle and near base; few small spiriferid brachiopods; strong petroliferous odor when broken.
		Salem Limestone		10+		Limestone, light-brownish-gray to brownish-gray, medium- to coarse-grained, medium- to thick-bedded, slightly crossbedded; some dolomitic. Only upper few feet exposed in extreme southeast corner of map area.



EXPLANATION

System	Series	Symbol	Unit
QUATERNARY	Pleistocene and Holocene	Qao Qat	Alluvium Qao, *Ohio River floodplain and backwater alluvium* Qat, *tributary stream alluvium*
		Qs	Eolian sand
		Qla	Lacustrine deposits
		Qt	Terrace deposits
TERTIARY(?) AND QUATERNARY	Pliocene(?) and Pleistocene	QTc	Continental deposits
MISSISSIPPIAN	Chester	Mh	Hardinsburg Sandstone
	Chester (Golconda Formation*)	Mgh	Haney Limestone Member
		Mgb	Big Clifty Sandstone Member
		Mgc	Beech Creek Limestone Member and equivalent of Elwren Sandstone of Malott (1919)
	Chester	Mrs	Reelsville Limestone and Sample Sandstone
		Mbm	Beaver Bend Limestone and Mooretown Formation
		Mpa	Paoli Limestone
			UNCONFORMITY
	Meramec	Mgl Ir Mgl	Ste. Genevieve and St. Louis Limestones Ir, *top of Lost River(?) Chert of Elrod (1899)*
		Ms	Salem Limestone

*As used includes equivalent of Elwren Sandstone of Malott (1919)

Contact
Dashed where approximately located; dotted where concealed (not shown locally where concealed beneath extensive mapped surficial deposits). Triangles indicate selected localities where contact was well exposed at time of mapping

Inferred fault
Dotted where concealed. Bar and ball on downthrown side

700
Structure contours
Drawn on top of Beech Creek Limestone Member of Golconda Formation in west part of map and on top of Lost River(?) Chert of Elrod (1899) in east part of map. Projected where contoured horizon is missing; not shown where data insufficient. Arrows indicate direction of dip. Contour interval 20 feet

DRILL HOLES FROM WHICH SUBSURFACE DATA WERE OBTAINED

Drill hole
Dry oil test hole
Adit
Abandoned adit (lime)
Abandoned quarry
Abandoned quarry (lime)
Approximate boundary of Battletown cement limestone quarry (1968)

ECONOMIC GEOLOGY

Limestone has been obtained at several places in the map area for cement, concrete and asphalt aggregate, road metal, riprap, rough building stone and lime. Present production is from the Battletown quarry and the underground Wolf Creek mine. The Battletown quarry produces cement limestone and, as a by-product, road aggregate and riprap from the upper half of the Ste. Genevieve Limestone and from the Paoli Limestone. Detailed lithologic descriptions and chemical analyses of the quarry are given by Stokley and McFarlan (1952, p. 65–68). Road metal and aggregate for concrete and asphalt are produced at the Wolf Creek mine chiefly from the upper part of the Ste. Genevieve Limestone.

During the latter half of the 1800's, beds of oolitic limestone between about 20 and 60 feet below the top of the Ste. Genevieve Limestone were mined at several locations in the northwest quarter of the mapped area and the limestone was burned to produce lime. These beds, at places as much as 35 feet in thickness, are reportedly suitable as a source of chemical limestone (Stokley and McFarlan, 1952 p. 64–68). Limestone for use as road metal has been quarried at four locations in Indiana, all now abandoned, from the upper and lower parts of the Ste. Genevieve Limestone and the upper part of the St. Louis Limestone. Small quantities of limestone have been obtained for rough building stone from the Beaver Bend and Paoli Limestones, 1.3 and 1.6 miles respectively southeast of Battletown.

Thick-bedded sandstone in the upper part of the Big Clifty Sandstone Member of the Golconda Formation has been quarried for rough building stone 1.1 miles southeast of Battletown.

Small amounts of fluorite and sphalerite occur in scattered vugs in the lower part of the Ste. Genevieve Limestone near Hamilton Hill.

One unsuccessful test hole for oil and gas was drilled on the western slope of Hamilton Hill to a depth of 1,440 feet. Minor shows of oil and gas were encountered at several horizons below a depth of 1,104 feet.

Availability and quality of ground water in the Kentucky part of the mapped area are described by Brown and Lambert (1963) and by Gallaher (1964).

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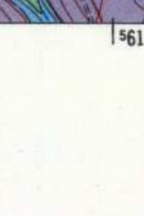
Diagrammatic cross section near Battletown quarry showing relationship of the massive sandstone facies of the Mooretown Formation to the underlying units and effects of differential compaction during and after deposition of Mooretown sediments

Base from U.S. Geological Survey, 1950. Modified 1972

The Carter Coordinate System letters and numbers used to designate five-minute divisions of latitude and longitude are shown along the margins; tick marks indicate one-minute divisions

10,000-foot grid based on Kentucky coordinate system, south zone, and Indiana coordinate system, east zone

1000-meter Universal Transverse Mercator grid ticks, zone 16, shown in blue



APPROXIMATE MEAN DECLINATION, 1972

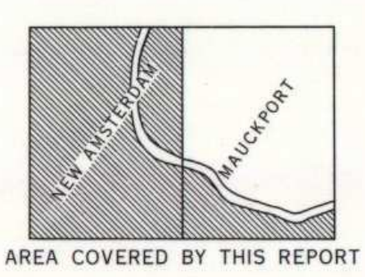
SCALE 1:24 000
1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETERS

CONTOUR INTERVAL 20 FEET IN KENTUCKY
DASHED LINES REPRESENT 10-FOOT CONTOURS
CONTOUR INTERVAL 10 FEET IN INDIANA
DATUM IS MEAN SEA LEVEL

QUADRANGLE LOCATION

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D.C.—1972—K71603

Geology mapped in 1967–68. Geology in Indiana mapped by Donald D. Carr and Richard L. Powell, Indiana Geological Survey, in 1969



AREA COVERED BY THIS REPORT

GEOLOGIC MAP OF THE NEW AMSTERDAM QUADRANGLE, KENTUCKY-INDIANA AND PART OF THE MAUCKPORT QUADRANGLE, KENTUCKY

By

Dewey H. Amos

1972

Price $1.00