U-006-307.30

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"BEDROCK GEOLOGY OF HAMILTON COUNTY, OHIO" BY M. SWINFORD (IN PREPARATION) OHIO DIV GEOLOGICAL SURVEY (USED AS A REFERENCE IN THE OU 2 RI, OU 2 FS, OU 4 RI, AND OU 5 RI)

11/10/92

21
REPORT
OU4

(22)

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OHIO Department of Natural Resources

DIVISION OF GEOLOGICAL SURVEY
4383 FOUNTAIN SQUARE DRIVE
COLUMBUS, OHIO 43224-1362

Fax no. (614) 447-1918

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GEO FAX

OU 5 RI
OU 4 RI
OU 2 FS
OU 2 RI

DATE 11-10-92

TIME 9:00 AM

Please deliver the following 9 page(s) including this cover sheet

TO: Name Vivian Reynolds

Company/Department F.T. Corp

Fax no 412-373-2135

FROM: Name MAC Swinford

COMMENTS: Draft Copies of Bedrock Unit Descriptions for the Steubenville Bedrock Geologic Map.

DNR 4811

OHIO DEPARTMENT OF NATURAL RESOURCES DIVISION OF GEOLOGICAL SURVEY

Copy of Sohn P.2 10
draft 6/4/76

Pt. Pleasant Tongue

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Limestone and shale, interbedded. Limestone (50% or more of unit), medium-light-gray and medium-bluish-gray, coarse-to fine-grained, fossil-fragmental wackestone and packstone. Beds are planar, lenticular, ~~commonly less than 1 foot thick, but locally up to 1.5 feet thick and moderately spaced. Well-developed ripple marks present locally.~~ Broken and whole fossils common to abundant, many beds contain abundant crinoid columnals. Shale, medium-gray and medium-bluish-gray, weathers with a slight yellow to brown cast, ~~platy,~~ calcareous, locally silty, ~~as distinct beds commonly 1 to 1.5 feet thick and~~ as partings within limestone beds. Only known exposures occur in Fourmile and Fivemile creeks where only upper 20 feet present. Lower contact is not exposed in county.

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Kope Formation

Shale and limestone, interbedded. Shale (75% or more of unit); light- to medium-gray and light-bluish-gray, ~~platy,~~ calcareous, locally silty, sparsely fossiliferous. ~~Present as beds commonly about 3 feet thick and locally up to 10 feet thick which weather and slump readily.~~ Limestone, medium-gray and medium-bluish-gray, fine- to coarse-grained, whole-fossil or fossil-fragmental grainstone, packstone, and wackestone. ~~Beds are planar, lenticular, commonly 6 to 8 inches thick, widely spaced, with ripple marks and graded bedding.~~ Common particularly in upper portion of unit is siltstone to silty limestone, medium-gray to medium-dark-gray, fine-grained, argillaceous, fossil-poor to barren-mudstone to wackestone. Beds are planar continuous, rarely more than 3 inches thick, laminated to cross-laminated with current marks. Unit is much less resistant than overlying and underlying units, landslides common. Only known exposure of lower contact in county in Fourmile Creek where contact is generally sharp. Geophysical and core data used to project lower contact beyond outcrop area.

Limestone and shale, interbedded. Limestone (50% or more of unit), light- to medium-gray, medium- to coarse-grained, fossil-fragmental packstone and grainstone. ~~Beds are planar, lenticular, moderately spaced, commonly having ripplemarks and graded bedding.~~ Beds commonly 8 inches or less in ~~thickness but can be up to 1.5 feet thick~~. Fossils commonly broken with few whole fossils. Much less abundant siltstone to silty limestone, medium-gray to medium-dark-gray, fine-grained, argillaceous, sparsely fossiliferous, mudstone ~~and~~ To wackestone. ~~Beds are planar, lenticular~~ and generally less than 3 ~~inches thick~~. Shale, light-to-medium-gray and light-bluish-gray, platy, calcareous, locally silty, generally fossil poor. ~~Present as individual beds up to 1.5 feet thick or as thin partings.~~ Unit somewhat resistant and present on upper portion of hillsides along the Ohio River and tributaries of that river. Lower contact can be generally sharp (eastern and northern portion of county), interfingering (south-central portion), or gradational (Winton Lake Damsite), but placed above highest thick shale strata of Kope Formation.

Miamitown Shale

Shale and limestone, interbedded. Shale (75% or more of unit), light- to medium-gray, ~~platy to flaggy~~, calcareous, locally very silty, fossil poor, in beds up to 4 feet thick. Limestone, light- to medium-gray and light-bluish-gray, fine to medium grained, argillaceous, locally very silty, whole and fossil fragmental wackestone and packstone. Beds are planar, lenticular, generally less than 0.5 feet thick. ~~Silty~~ Calcareous to silty limestone, medium-gray to medium-dark-gray, fine-grained, argillaceous, as ~~thin discontinuous beds~~ which contain abundant gastropods and pelecypods. Unit slumps readily making exposures rare. Lower contact gradational and placed at the top of the limestone-rich strata of the overlying Fairview Formation. In northern portion of county, base marked by a 0.5 to about 3 feet thick wavy-discontinuous-bedded limestone layer with fissile shale partings. Lower contact not shown on map. Unit designated where present, by a thick line based on the upper contact of unit.

Bellevue Member of the Grant Lake Limestone

Limestone, light- to medium-gray, whole-fossil to fossil-fragmental grainstone with discontinuous fissile shale partings. ~~Beds are discontinuous, wavy, and irregularly surfaced, measuring up to 1 feet in thickness.~~ Whole-and broken-fossils dominated by brachiopods and bryozoans. Much less abundant medium- to coarse-grained, thin-bedded fossiliferous limestone interbedded with light- to medium-gray ~~shale~~. Unit somewhat resistant forming ledges and riffles in creek beds. Lower contact, base of Grant Lake Limestone, placed either at base of wavy-bedded limestone which overlies the main Miamitown shale body or interbedded limestone and shales of Fairview Formation. Unit thins northward and northwestward.

Corryville Member of the Grant Lake Limestone

Shale and limestone, interbedded. Shale (60% or more of unit), light- to medium-gray, ~~platy to fissile~~, calcareous, locally silty with zones of well-preserved whole fossils. Beds may be up to 1.5 feet thick but are commonly less than 8 inches thick. Limestone, light- to medium-gray and light-bluish-gray, fine- to medium-grained, argillaceous, locally silty, fossil-fragmental packstone, grainstone, and wackestone. ~~Beds are planar continuous, up to 1 foot thick but commonly less than 8 inches. Wavy-bedded limestones~~ similar to underlying Bellevue with more abundant platy shale partings are locally abundant. Unit weakly resistant and poorly exposed except locally. Lower contact, (not shown) generally sharp but can be gradational over a 5 feet thick interval where lower portion contains wavy-bedded limestone.

Limestone and shale. Limestone (60% or more of unit), medium- to dark-gray, fine-grained, very argillaceous, phosphatic, whole-fossil and fossil-fragmental wackestone and packstone. ~~Beds are nodular to wavy, discontinuous, up to 1 feet thick~~, and weather distinctly nodular. Whole-abraded brachiopods abuncant particularly in the upper portion of unit. Much less abundant limestone, light- to medium-gray, whole-fossil to fossil-fragmental grainstone with discontinuous-fissile shale partings. Beds are wavy, ~~and~~ discontinuous and up to 1.5 feet thick. Shale, medium- to dark-gray, ~~fissile to platy~~, with abundant fossil fragments. Unit somewhat resistant and only locally exposed in upland streams and roadcuts. Lower contact (not shown) gradational and placed at base of lowest substantial nodular-limestone bed above the platy shales and planar limestones of the Corryville member.

Arnheim Formation

Limestone and shale, interbedded. Limestone (50% or more of unit), medium- to dark-gray, fine- to medium-grained, argillaceous, packstone and wackestone containing well preserved whole fossils and fossil fragments. ~~Beds are planar to wavy, discontinuous, moderately spaced and up to 8 inches thick.~~ Less abundant, light- to medium-gray, whole- and fossil-fragmental grainstone present with discontinuous-fissile shale partings. ~~Beds are lenticular, wavy, irregular surfaced and up to 1.5 feet thick.~~ Limestone (dominant in uppermost portion), medium- to dark-gray, fine-grained, very argillaceous, distinctly nodular bedded packstone and wackestone, with intercalated discontinuous fissile shale. Shale, light- to medium-gray to light-bluish-gray, ~~platy~~, ~~locally fissile~~, c~~arcareous and silty~~, generally fossil poor, in beds 8 inches or less thick. Shale believed dominant in middle of unit. Lower portion of unit locally exposed while middle and upper portions generally covered or built over. Unit weakly resistant. Lower contact with the Grant Lake Limestone generally sharp and placed above nodular-limestone lithology of the Mt. Auburn. Contact projected in the northwest and east-central portions of the county.

Shale and limestone, interbedded. Shale (65% or more of unit), medium- to dark-gray, [redacted], calcareous, locally silty, [redacted]. Zones of well-preserved whole-fossils present. Limestone, light- to medium-gray and light-bluish-gray, coarse- to fine-grained, grainstone and packstone in [redacted]. Unit present at the highest portions of the county which are covered or built over. Exposure permits unit to be differentiated from the underlying Arnheim Formation only in the extreme west-central portion of the county. The contact is marked by very-coarse-grained, phosphatic, planar-bedded-grainstone above the nodular beds of the Upper Arnheim.

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SYSTEM	GROUP	FORMATIONS AND MEMBERS		LITHOLOGY	THICKNESS IN FEET	
ORDOVICIAN	CINCINNATI GROUP	Waynesville Formation	undifferentiated		60'	Shale, 65% or more
		Arnheim formation (informal unit)				LS, 50% or more
		Grant Lake Formation: Mount Auburn Member			15-20	LS, 60% or more
		Grant Lake Formation: Corryville Member	undifferentiated		60-70	Shale, 60% or more
		Grant Lake Formation: Bellevue Member				LS, (shale partings)
		Miamitown Shale			15-35	Sh 75% or more
		Fairview Formation			40-90	LS, 50% or more
		Kope Formation			260-280	Sh, 75% or more
		Point Pleasant Tongue of the Clays Ferry Formation			30'	LS 50% or more

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Descriptions of rock units

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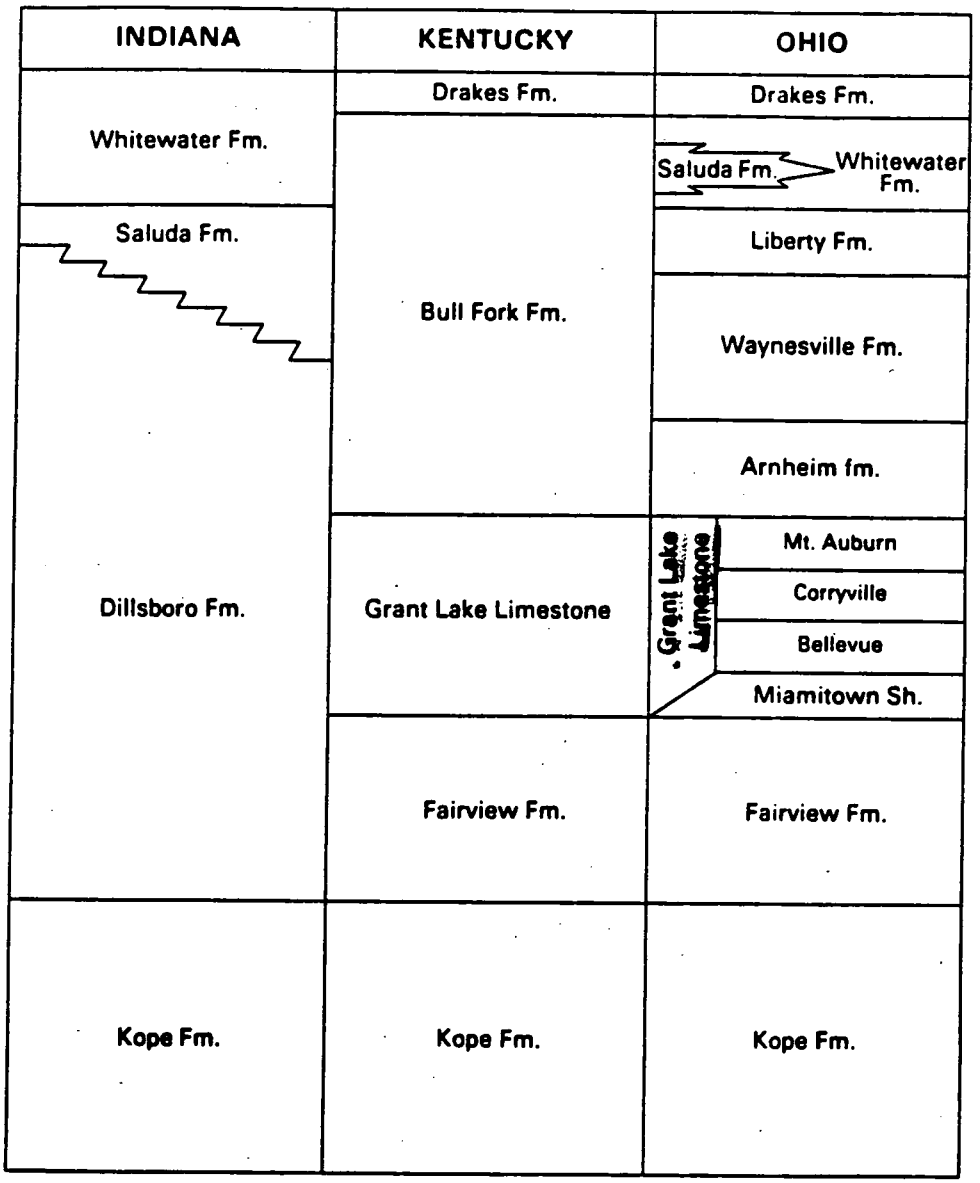


Fig. 2. Correlation of stratigraphic units used in Indiana, Kentucky, and Ohio within the Cincinnati 1:100,000 quadrangle.

Pt. Pleasant Tongue

Limestone and shale, interbedded. Limestone (50% or more of unit), medium-light-gray and medium-bluish-gray, coarse-to fine-grained, fossil-fragmental wackestone and packstone. Beds are planar, lenticular, commonly less than 1 foot thick, but locally up to 1.5 feet thick and moderately spaced. Well-developed ripple marks present locally. Broken and whole fossils common to abundant, many beds contain abundant crinoid columnals. Shale, medium-gray and medium-bluish-gray, weathers with a slight yellow to brown cast, platy, calcareous, locally silty, as distinct beds commonly 1 to 1.5 feet thick and as partings within limestone beds. Only known exposures occur in Fourmile and Fivemile creeks where only upper 20 feet present. Lower contact is not exposed in county.

Kope Formation

Shale and limestone, interbedded. Shale (75% or more of unit), light- to medium-gray and light-bluish-gray, platy, calcareous, locally silty, sparsely fossiliferous. Present as beds commonly about 3 feet thick, and locally up to 10 feet thick which weather and slump readily. Limestone, medium-gray and medium-bluish-gray, fine- to coarse-grained, whole-fossil or fossil-fragmental grainstone, packstone, and wackstone. Beds are planar, lenticular, commonly 6 to 8 inches thick, widely spaced, with ripple marks and graded bedding. Common ~~particularly in upper portion of unit is~~ siltstone to silty limestone, medium-gray to medium-dark-gray, fine-grained, argillaceous, fossil-poor to barren-mudstone to wackestone. Beds are planar continuous, rarely more than 3 inches thick, laminated to cross-laminated with current marks. Unit is much less resistant than overlying and underlying units, landslides common. Only known exposure of lower contact in county in Fourmile creek where contact is generally sharp. Geophysical and core data used to project lower contact beyond outcrop area.

Fairview Formation

Limestone and shale, interbedded. Limestone (50% or more of unit), light- to medium-gray, medium- to coarse-grained, fossil-fragmental packstone and grainstone. Beds are planar, lenticular, moderately spaced, commonly having ripple-marks and graded-bedding. Beds commonly 8 inches or less in thickness but can be up to 1.5 feet thick. Fossils commonly broken with few whole fossils. Much less abundant siltstone to silty limestone, medium-gray to medium-dark-gray, fine-grained, argillaceous, sparsely fossiliferous, mudstone and wackestone. Beds are planar, lenticular, and generally less than 3 inches thick. Shale, light- to medium-gray and light-bluish-gray, platy, calcareous, locally silty, generally fossil poor. Present as individual beds up to 1.5 feet thick or as thin partings. Unit somewhat resistant and present on upper portion of hillsides along the Ohio River and tributaries of that river. Lower contact can be generally sharp (eastern and northern portion of county), interfingering (south-central portion), or gradational (Winton Lake Damsite), but placed above highest thick shale strata of Kope Formation.

Miamitown Shale

Shale and limestone, interbedded. Shale (75% or more of unit), light- to medium-gray, platy to flaggy, calcareous, locally very silty, fossil poor, in beds up to 4 feet thick. Limestone, light- to medium-gray and light-bluish-gray, fine to medium grained, argillaceous, locally very silty, whole and fossil fragmental wackestone and packstone. Beds are planar, lenticular, generally less than 0.5 feet thick. Silty to silty limestone, medium-gray to medium-dark-gray, fine-grained, argillaceous, as thin discontinuous beds which contain abundant gastropods and pelecypods. Unit slumps readily making exposures rare. Lower contact gradational and placed at the top of the limestone-rich strata of the overlying Fairview Formation. In northern portion of county, base marked by a 0.5 to about 3 feet thick wavy-discontinuous-bedded limestone layer with fissile shale partings. Lower contact not shown on map. Unit designated where present, by a thick line based on the upper contact of unit.

Bellevue Member of the Grant Lake Limestone

Limestone, light- to medium-gray, whole-fossil to fossil-fragmental grainstone with discontinuous fissile shale partings. Beds are discontinuous, wavy, and irregularly surfaced, measuring up to 4 feet in thickness. Whole-and broken-fossils dominated by brachiopods and bryozoans. Much less abundant medium- to coarse-grained, thin-bedded fossiliferous limestone interbedded with light- to medium-gray shale. Unit somewhat resistant forming ledges and riffles in creek beds. Lower contact, base of Grant Lake Limestone, placed either at base of wavy-bedded limestone which overlies the main Miamitown shale body or interbedded limestone and shales of Fairview Formation. Unit thins northward and northwestward.

Corryville Member of the Grant Lake Limestone

Shale and limestone, interbedded. Shale (60% or more of unit), light- to medium-gray, platy to fissile, calcareous, locally silty with zones of well-preserved whole fossils. Beds may be up to 1.5 feet thick but are commonly less than 8 inches thick. Limestone, light- to medium-gray and light-bluish-gray, fine- to medium-grained, argillaceous, locally silty, fossil-fragmental packstone, grainstone, and wackstone. Beds are planar continuous, up to 1 foot thick but commonly less than 6 inches. Wavy-bedded limestones similar to underlying Bellevue with more abundant platy shale partings are locally abundant. Unit weakly resistant and poorly exposed except locally. Lower contact, (not shown) generally sharp but can be gradational over a 5 feet thick interval where lower portion contains wavy-bedded limestone.

Mt. Auburn Member of the Grant Lake Limestone

Limestone and shale. Limestone (60% or more of unit), medium- to dark-gray, fine-grained, very argillaceous, phosphatic, whole-fossil and fossil-fragmental wackestone and packstone. Beds are nodular- to wavy, discontinuous, up to 4 feet thick, and weather distinctly nodular. Whole-abraded brachiopods abundant particularly in the upper portion of unit. Much less abundant limestone, light- to medium-gray, whole-fossil to fossil-fragmental grainstone with discontinuous-fissile shale partings. Beds are wavy, ~~and~~ discontinuous, and up to 1.5 feet thick. Shale, medium- to dark-gray, fissile to platy, with abundant fossil fragments. Unit somewhat resistant and only locally exposed in upland streams and roadcuts. Lower contact (not shown) gradational and placed at base of lowest substantial nodular-limestone bed above the platy shales and planar limestones of the Corryville member.

planar L.S.

Arnheim Formation

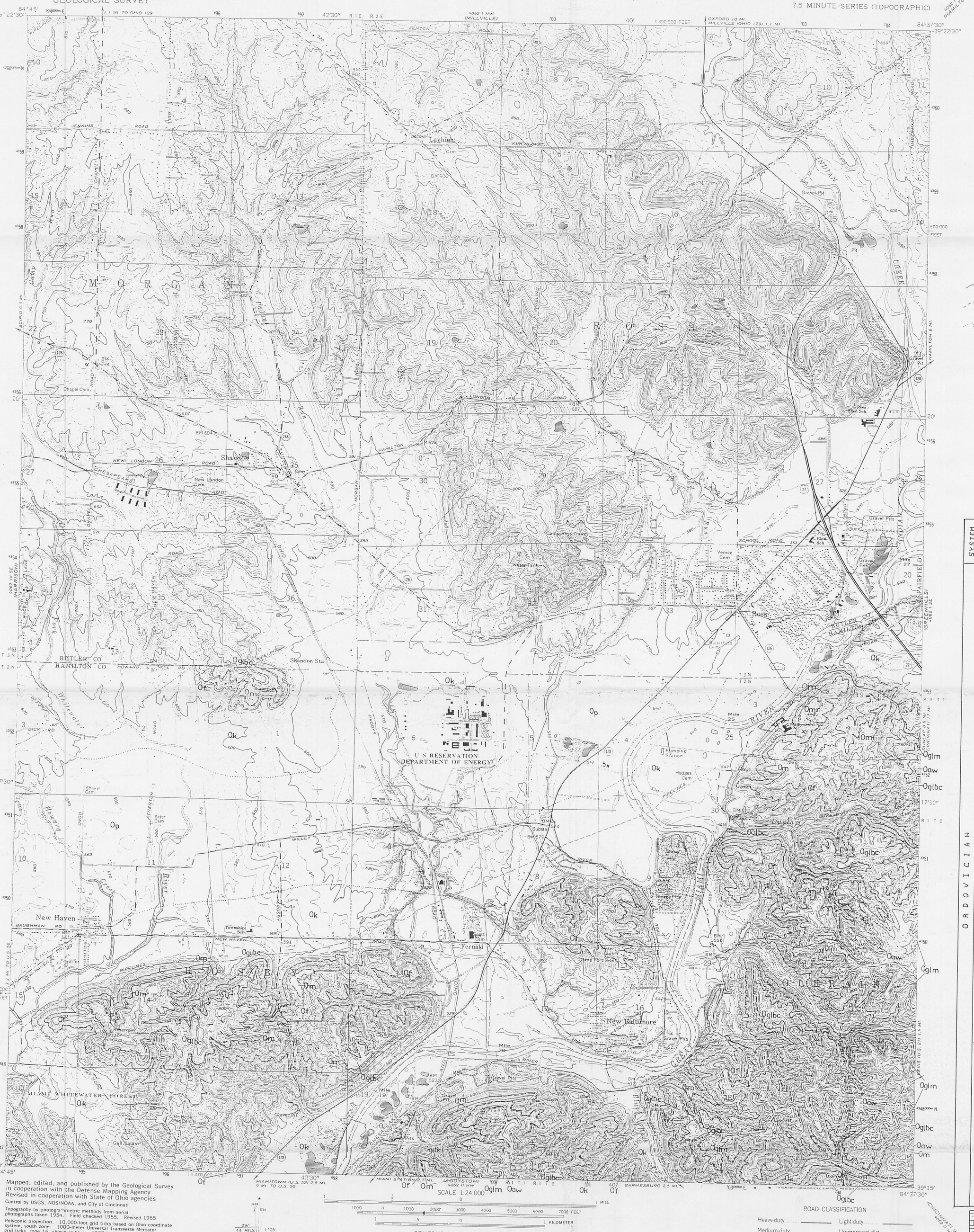
Limestone and shale, interbedded. Limestone (50% or more of unit), medium- to dark-gray, fine- to medium-grained, argillaceous, packstone and wackstone containing well preserved whole fossils and fossil fragments. Beds are planar to wavy, discontinuous, moderately spaced and up to 8 inches thick. Less abundant, light- to medium-gray, whole- and fossil-fragmental grainstone present with discontinuous-fissile shale partings. Beds are lenticular, wavy, irregular surfaced and up to 1.5 feet thick. Limestone (dominant in uppermost portion), medium- to dark-gray, fine-grained, very argillaceous, distinctly nodular bedded packstone and wackestone, with intercalated discontinuous fissile shale. Shale, light- to medium-gray to light-bluish-gray, platy, locally fissile, calcareous and silty, generally fossil poor, in beds 8 inches or less thick. Shale believed dominant in middle of unit. Lower portion of unit locally exposed while middle and upper portions generally covered or built over. Unit weakly resistant. Lower contact with the Grant Lake Limestone generally sharp and placed above nodular-limestone lithology of the Mt. Auburn. Contact projected in the northwest and east-central portions of the county.

Waynesville Formation

Shale and limestone, interbedded. Shale (65% or more of unit), medium- to dark-gray, platy to fissile, calcareous, locally silty, in beds up to 3 feet thick. Zones of well-preserved whole-fossils present. Limestone, light- to medium-gray and light-bluish-gray, coarse- to fine-grained, grainstone and packstone in widely spaced planar beds. Unit present at the highest portions of the county which are covered or built over. Exposure permits unit to be differentiated from the underlying Arnheim Formation only in the extreme west-central portion of the county. The contact is marked by very-coarse-grained, phosphatic, planar-bedded-grainstone above the nodular beds of the Upper Arnheim.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SHANDON QUADRANGLE
OHIO
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey in cooperation with the Defense Mapping Agency
Revised in cooperation with State of Ohio agencies
Control by USGS, NOS/NOAA, and City of Cincinnati

Topography by photogrammetric methods from aerial photographs taken 1954. Field checked 1955. Revised 1965

Polyconic projection. 10,000-foot grid ticks based on Ohio coordinate system, south zone. 1000-meter Universal Transverse Mercator grid ticks, zone 16, shown in blue. 1927 North American Datum. To place on the predicted North American Datum 1983 move the projection lines 3 meters south and 5 meters west as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Area west of the Great Miami River lies within the Miami River Survey
Area east of the Great Miami River lies within the Between the Miamis Land lines based on the Great Miami River Base. Dotted land lines established by private subdivision of the Symmes Purchase

There may be private inholdings within the boundaries of the National or State reservations shown on this map

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

Revisions shown in purple and woodland compiled in cooperation with State of Ohio agencies from aerial photographs taken 1979 and other sources. This information not field checked. Map edited 1981

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
U.S. Route — State Route

SHANDON, OHIO
N3915—W8437.5/7.5
1965
PHOTOREVISED 1981
DMA 4062 I SW—SERIES V852

EXPLANATION

ORDOVICIAN

- Oaw — Arnheim/Waynesville Forma undifferentiated
- Oglm — Mount Auburn Member of Grant Lake Formation
- Oglbc — Bellevue and Corryville Mem of Grant Lake Formation undifferentiated
- Om — Miamitown Shale
- Of — Fairveiw Formation
- Ok — Kope Formation
- Op — Point Pleasant Tongue of Clays Ferry Formation

Contact exposed.

Contact inferred

Contact indefinite; contact beneath glacial drift greater than approximately 50 feet thick and reflects buried bedrock surface as inferred from the revision of Vormelker, J. D., 1985, The bedrock topography of Hamilton County, Ohio; Ohio Division of Geological Survey Open-file map 229.

SYSTEM	GROUP	FORMATIONS AND MEMBERS		LITHOLOGY	THICKNESS IN FEET
ORDOVICIAN	CINCINNATI GROUP	Waynesville Formation	undifferentiated		60+
		Arnheim formation (informal unit)			
		Grant Lake Formation: Mount Auburn Member	undifferentiated		15-20
		Grant Lake Formation: Corryville Member			40-70
		Grant Lake Formation: Bellevue Member			75-90
		Miamitown Shale			15-35
		Fairveiw Formation			40-90
		Kope Formation			260-280
		Point Pleasant Tongue of the Clays Ferry Formation			30+

Interbedded shale and limestone

Interbedded limestone and shale

Silty shale

Nodular or irregular bedded limestone

For detailed lithologic descriptions of these stratigraphic units, please see Swinford, E. M., (in prep.), The bedrock geology and mineral resources of Hamilton County, Ohio: Ohio Geological Survey Report of Investigations.

STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY

OPEN-FILE MAP: BG-B5C6
TITLE: BEDROCK GEOLOGY OF THE SHANDON QUADRANGLE (HAMILTON COUNTY PORTION)

Date completed: APRIL 1990 Geology by: E.M. SWINFORD
Date Fieldwork conducted: 4 - 1984 to 8 - 1985

The information portrayed/contained herein may be preliminary and subject to revision. The Ohio Geological Survey has technically reviewed this document but disclaims any responsibility or liability for interpretations or decisions based thereon.

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