

EXPLANATION

- Artificial Fill:** Primarily spoil from quarrying operations. Consists of a heterogeneous mixture of soil and rock debris. May also include variable amounts of trash, junk metal, and building demolition waste. Thickness ranges from 0 to 30 feet (~10 meters).
- Alluvium:** Gray brown to light brown, poorly sorted, coarse to fine sand, silt, and clay with sporadic lenses of subrounded quartz cobble gravel. In places includes chips and cobbles of local bedrock. Alluvium along the Monocacy River downstream from Layne Bridge contains angular blocks of diabase up to 3 feet (~1 meter) across. Southwest of relocated Links Bridge Road, large blocks of New Oxford sandstone and conglomerate up to 6 feet (~2 meters) long occur. Cobbles of metabasalt and of quartzite are common in alluvium along Hunting Creek and Owens Creek which head in the Catoctin - South Mountain area. Unit may be up to 10 feet (~3 meters) thick in smaller tributary streams alluvium has not been shown, but is present as a thin veneer overlying a bedrock channel.
- Terrace Deposits:** Reddish-orange to light brown sandy clay with subrounded cobbles of quartz and local bedrock. Commonly occurs as a thin veneer capping low hills, spurs, and terrace remnants adjacent to the present flood plains. Most extensively developed along the Monocacy River where bedrock is the Triassic New Oxford Formation, but also is present where bedrock is the Frederick Formation. Small patches also occur along Little Pipe Creek, Owens Creek, and Israel Creek. Thickness ranges from 0 to 10 feet (~3 meters).
- Mountain wash:** Light yellow-brown to orange, sandy to clayey silt-loam with numerous admixed pebbles and cobbles of quartz and quartzite. Maximum clast dimension approximately 6 inches (15 cm). Derived from erosion of the thick lens of conglomerate at the base of the New Oxford Formation which forms Chestnut Hill. Some pebbles of chert from the Frederick and Grove Formations are also present. Deposit forms a colluvial apron on the southeast flank of Chestnut Hill and blankets the Grove Formation south and east of the hill. On the northwest side of Chestnut Hill, mountain wash on bedrock of the New Oxford Formation is thin and discontinuous. Thickness is as much as 20 feet (~6 meters).

GEOLOGIC SYMBOLS

- Geologic contact generally inferred or approximate
- Strike and dip of bedding
- Strike and dip of foliation
- Strike and dip of crenulation cleavage or slip cleavage
- Strike and dip of joints
- Plunge of minor fold axes:
 - destral rotation
 - sinistral rotation
- Plunge of mineral elongation lineation
- Normal fault
- Thrust fault:
 - Teeth on upper plate
- Overturned thrust fault:
 - bar on upper plate
 - teeth show direction of dip of fault surface
- Areas of rock slump
- Land disturbed by quarrying operations

Active mining operation:

- Baltimore Brick Co.
- S.W. Barrick & Sons, Inc.
- Lehigh Portland Cement Co.
- Phoenix, Inc.

unconformity

Diabase

Dark greenish-gray to black, dense, fine- to medium-grained, intrusive basalt with ophitic (diabasic) texture. Occurs in steeply dipping to vertical dikes which range between 1 and 200 feet (~0.3 to 60 meters) in thickness. Weathers to orange-red clayey soil with spheroidal residual boulders.

Triassic sedimentary rocks adjacent to the thicker dikes show thermal alteration in zones up to about 100 feet (30 meters) thick, but exposures are poor. Shale in the New Oxford Formation has been baked to a highly fractured, very dark gray to purple, hard, with sporadic yellow-green epidotized nodules. Sandstone has been fused to a dense quartzite and bleached to a light pink to cream color. Where contacts with the diabase are exposed in the quarries at Layne, the Frederick and Grove Formations have zones of bleached and thermally altered rock up to several tens of feet (meters) wide, depending on the thickness of the adjacent dikes. Elsewhere in the quadrangle, contacts with the carbonate rocks are not exposed.

Gettysburg Formation: Primarily thin- to irregularly-bedded, red to orange-red shale, mudstone, and siltstone, but also includes pinkish-gray mudstone, tan and gray-tan shale, and minor amounts of green to greenish-gray shale. May be slightly calcareous and in places contains small limy nodules. Thin sandstone beds occur near the base but are rare higher in the unit. Formation is poorly exposed except along Owens Creek and in channels of several smaller streams northwest of the Monocacy River. Contact with the underlying New Oxford Formation is gradational; the base of the Gettysburg is mapped at the first appearance of tan shale and pinkish-gray mudstone above the more sandy reddish-brown and maroon strata of the New Oxford. Top of the Gettysburg is not exposed in area mapped. Thickness of formation in Frederick County has been estimated by Stose and Stose (1946) to be greater than 5,000 feet (~1,500 meters).

New Oxford Formation: Maroon to dark reddish-brown, argillaceous to silty sandstone and micaceous siltstone with subordinate interbedded silty shale and mudstone. Some reddish-gray to gray arkosic sandstone also occurs. Crossbedding is present in some layers. Bedding in sandstones and siltstones is as much as 1 foot (~30 cm) in thickness and may be cut by as many as three sets of joints. Shales and mudstones are intensely broken by closely-spaced fractures to the extent that bedding is obscured. Formation is best displayed in cliffs along the Monocacy River, Big Pipe Creek, and Little Pipe Creek, and in exposures along the Maryland Midland Railway west of Detour. Southeast of Creagerstown the formation is about 4,500 feet (1,400 meters) thick (Stose and Stose, 1946). To the northeast where the outcrop belt is wider, the section has been repeated by normal faults.

Trac: Poorly bedded, massive to thick-bedded, grayish-white to reddish-gray quartz-pebble conglomerate with variable amounts of interbedded red shale and siltstone and gray sandstone. Occurs at the base of the New Oxford Formation and lies unconformably upon pre-Triassic rocks. Clasts of predominantly rounded to subrounded cobbles and pebbles of vein quartz and quartzite with maximum dimension of 8 inches (~20 cm) occur in a clayey and micaceous arkosic sand matrix. Fragments of silicified wood occur in the deposit on Chestnut Hill and also west of the Monocacy River south of Links Bridge Road. The conglomerate generally is a loose and friable gravel, but locally it has been cemented by silica. Hematite staining and cementation occur sporadically. Thickness ranges from 0 to 500 feet (~150 meters). The extensive development of conglomerate at Chestnut Hill probably represents an ancient delta or channel deposit. Along strike northwest of Chestnut Hill the unit pinches out, but reappears east of Ladiesburg.

unconformity

Grove Formation: Predominantly thick-bedded to massive, light gray limestone with subordinate light gray to buff dolomite. Thin-bedded carbonates are minor, but laminated dolomite occurs sporadically. Algal structures are common, but dolomitic limestone is rare. Nodules of black chert and beds of limestone conglomerate are present in places. Variable amounts of fine- to medium-grained rounded quartz grains occur throughout the formation and layers of sandstone or quartzite are present in the lower part. The thickness of the Grove Formation has been estimated to be 1,500 feet (~450 meters) in Frederick County (Reinhardt, 1974), but the top of the formation is not present in Maryland.

Ogs: Medium-bedded, herringbone cross-bedded, fine- to medium-grained, extremely well sorted, buff to light gray, calcareous sandstone or quartzite composed of rounded grains of quartz. Occurs in the lower part of the Grove Formation. Weathers to an orange or orange-red, punky and friable sandstone. Forms low ridges in the Frederick Valley such as the one that extends from the contact with Triassic rocks at Chestnut Hill south to Devilbitz Bridge Road. Thickness ranges up to about 20 feet (6 meters).

Frederick Formation: Fine-grained, thin-bedded and flaggy to platy, laminated limestone with thin partings of dark gray shale. Lower part also contains light gray, medium-bedded limestone and dolomite with sporadic zones of admixed quartz sand, lenses of conglomeratic limestone, and zones of gray to dark gray shale. Thin silty shales of intensely cleaved and brecciated shaly limestone occur with slices of the Araby and Cash Smith Formations along the imbricated east limb of the Frederick syncline. The Frederick Formation was divided by Reinhardt (1974) into three members on the basis of exposures along the western side of the Frederick Valley. However, the present author made no attempt to subdivide the unit in the Woodsboro Quadrangle because of the lack of good exposures. Reinhardt (1974) estimated the aggregate thickness of the formation in Frederick County to be about 2,600 feet (800 meters), but the true thickness has been distorted by intense cleavage and probable thrust faults.

fault contact: intervening strata missing

Cash Smith Formation (new): Dark gray to black, thin-bedded, strongly cleaved phyllitic shale or slate, grading upward into thin-bedded calcareous shale with limestone nodules. As type locality on Cash Smith Road, 3,000 feet (~900 meters) north of Coppermine Road, fossils identified by E. Yochelson (personal communication, 1978) as *Saiteella* sp. and *Olenellus* getz were found in the lower black shale. These specimens indicate an Early Cambrian age, and the unit is probably correlative with the Kinross Shale of Lancaster County, Pennsylvania (E. Yochelson, personal communication, 1978). Formation is best exposed in the two quarries of the Lehigh Portland Cement Company on both sides of Md. Rte. 350, 1 mile (1.6 km) east of Md. Rte. 194. The Cash Smith Formation has been thoroughly deformed by folds, cleavage, and shear along thrust faults, and the true thickness is unknown.

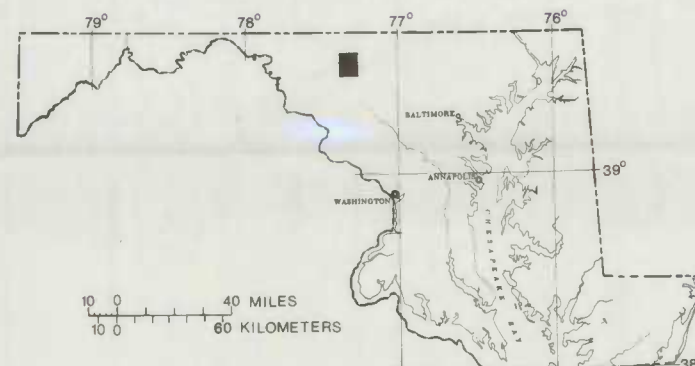
Araby Formation: Gray to tan siltstone and silty shale with zones of dark gray to black, fine- to medium-grained, argillaceous sandstone or quartzite. Bedding laminations of tan and gray silt show disruption by burrowing organisms prior to lithification. Bedding has been further obscured by intense cleavage. Thickness of unit is unknown.

Hjansville Formation: Interbedded layers of dull to lustrous, purple to reddish-gray, hematitic, muscovite phyllite and tan to green chlorite-muscovite phyllite with zones of reddish-gray to tan, medium-grained, sandy phyllite, feldspathic in places. Sporadic quartzites also occur. Formation has been thoroughly deformed by close folding and cleavage, and the thickness is not known.

Hq: Layers and lenses of thin-bedded and phyllitic to thick-bedded and massive, gray, tan, and brown, medium-grained quartzite composed of well sorted, rounded grains of quartz in a matrix of very fine-grained quartz sand or silt. Muscovite and sericite and scattered grains of magnetite and hematite may also be present. Some layers may be feldspathic and light gray phyllitic quartzites contain small amounts of chlorite. Thickness of the quartzites ranges from 1 to 10 feet (~0.3 to 3 meters).

Urbana Formation: Dark gray-tan to gray-green, chlorite-muscovite phyllite with thin interbeds of tan silty phyllite and some thin zones of pale purple phyllite. Weathers tan to orange-tan. Layers or lenses of quartzite are present throughout the formation. Base of the unit is not exposed in area mapped. Formation has been thoroughly deformed by close folding and cleavage, and the thickness is unknown.

ufq: Layers and lenses of white to gray-tan, green, dark brown, and black, fine- to medium-grained, well to poorly sorted, medium-bedded to massive quartzite. Matrix ranges from dense and porcellanous or cryptocrystalline to fine-grained and may be friable, micaceous, or ferruginous. Some layers of quartzite are conglomeratic with pebbles of milky quartz up to 1/4 inch (~1 cm) in diameter. Angular grains and granules are present as well as rare chips of green and tan phyllite. Thickness of the quartzites ranges from 1 to 50 feet (~0.3 to 15 meters).



REFERENCES

- Edwards, J. J., Jr., 1984. The Linganore fault key to use of Sams Creek Formation in the Piedmont of Maryland (ab.). Geological Society of America Abstracts with Programs, v. 17, no. 3, p. 135.
- , 1985. Geologic Map of the Union Bridge Quadrangle, Carroll and Frederick Counties, Maryland. Maryland Geological Survey, scale 1:24,000.
- Reinhardt, J., 1974. Stratigraphy, sedimentology, and Cambro-Ordovician paleogeography of the Frederick Valley, Maryland: Maryland Geological Survey Report of Investigations 52, 71 p.
- Stose, A. J., and Stose, G. W., 1946. Geology of Carroll and Frederick Counties, in The physical features of Carroll County and Frederick County, Baltimore, Maryland Department of Geology, Mines, and Water Resources, p. 11-131.



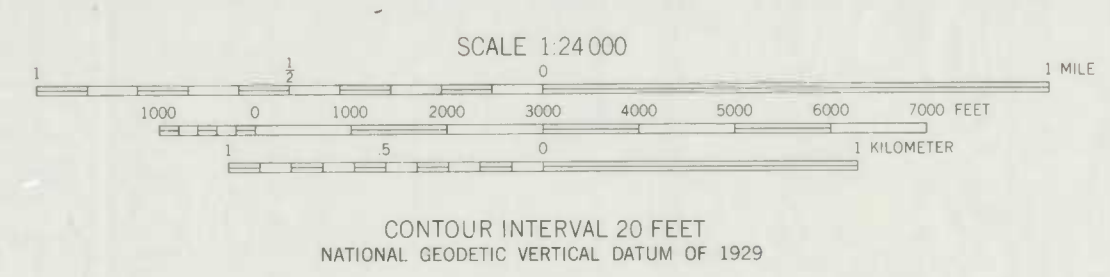
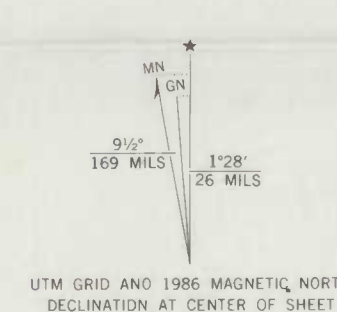
Base map from U.S. Geological Survey Woodsboro Quadrangle, 7 1/2-minute series 1953 (photorevised 1966).
Field work conducted 1969, 1971, 1978-80.

GEOLOGIC MAP OF THE WOODSBORO QUADRANGLE, CARROLL AND FREDERICK COUNTIES, MARYLAND

by Jonathan Edwards, Jr. 1988

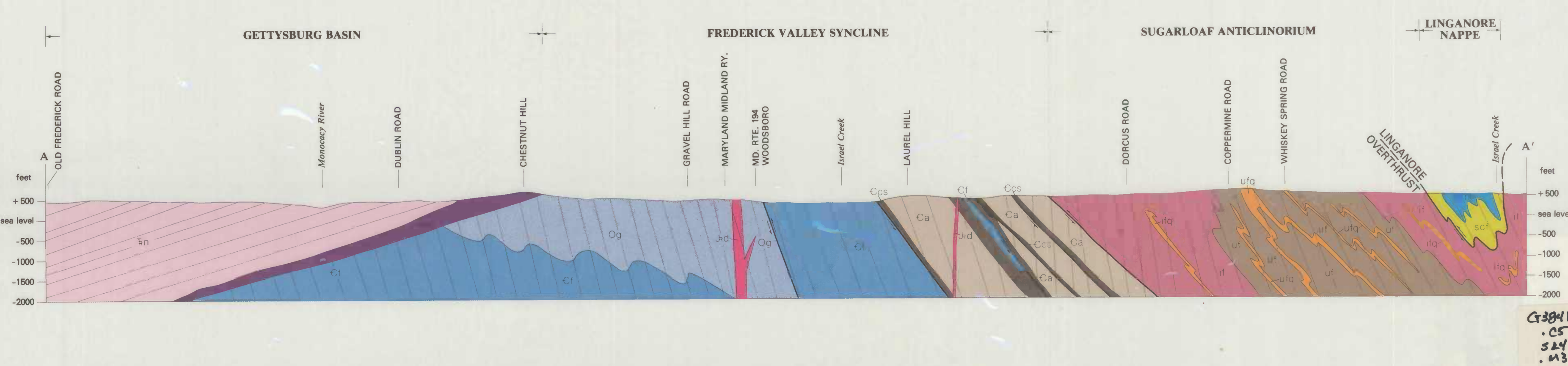
STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
MARYLAND GEOLOGICAL SURVEY
Kenneth N. Weaver, Director

Copies of map available from Maryland Geological Survey 2300 St. Paul Street Baltimore, MD 21218



GEOLOGIC CROSS SECTION

Horizontal scale same as map scale, no vertical exaggeration
Alluvial deposits not shown



LINGANORE NAPPE

Sams Creek Formation: Predominantly lustrous purple, green, and gray phyllite with layers of dark green sheared phyllite metabasalt and sporadic layers of marble. Purple and gray phyllites are composed primarily of sericite and muscovite with small amounts of magnetite and hematite. Green phyllite contains chlorite and muscovite. Phyllites commonly exhibit flattened beds of chlorite or aggregates of sericite on cleavage surfaces and locally may contain many thin calcite laminae. Layers with numerous calcite amygdaloids are also present. Metabasalt is composed primarily of chlorite and epidote and has been strongly sheared. In the Woodsboro Quadrangle the formation occurs within klippen of the Linganore Nappe (Edwards, 1984, 1986), and neither the base nor the top are present. The unit has been thoroughly deformed by cleavage and small-scale folds.

sem: White to gray and reddish-purple calcite to dolomite marble. Occurs locally as thin lenses but also may be present in thick and extensive masses. Thickness ranges from less than 1 foot (~0.3 meter) to greater than 30 feet (~15 meters) in area mapped.

overthrust fault

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SAY
#13
Woodsboro