EXPLANATION

UNCONSOLIDATED TO SEMI-CONSOLIDATED — QUATERNARY

Qal

Alluvium (0.5-6m. thick)

Interbedded, poorly-sorted country rock and vein quartz gravels, quartzose sands, micaceous silts and kaolinitic clays. Typically confined to flood plains of perennial streams in valleys and gathering areas dissected by ephemeral streams in upland areas. Sediment size and mineralogy are directly related to the adjacent country rock and geomorphic setting. In rural, deeply dissected areas, alluvium may be mixed with fine to very coarse colluvium. In urban areas this unit cannot be adequately shown since it is commonly overlain by artificial fill and/or has been severely disturbed.

Structural symbols on alluvium represent bedrock exposures in stream valleys. These are typically either along the margins of the flood plain or close to the main channel of the drainage.

Qac

Colluvium and Alluvium (0.5-6m. thick)

Unsorted, massive clays to gravels interbedded with poorly-sorted alluvial(?) sands and gravels. Defined on the basis of lithology, geomorphic setting and soil series.

Unconformity

CRETACEOUS(?)

ps | pc

Potomac Group (?) (0.5-10m. thick)

Unconsolidated to locally cemented sediments identical with Lower Cretaceous Patuxent Formation sands and clays mapped elsewhere. The sediment caps, however, lack palynological data and are isolated from the continuous Coastal Plain sequence to the east.

- ps *Sand-gravel lithofacies. Poorly to well sorted quartz sands containing variable amounts of vein quartz and quartzite gravel. Framework components are commonly coated with ferric oxides and are locally limonite-cemented. Variable amounts of silt and clay are present in lenses, pods and as matrix. Sands are typically planar to cross-bedded, where exposed below the soil zone. Pebbles commonly range from 1 to 10 cm. in diameter and are concentrated in coarse planar beds or are disseminated in finer sediments.*
- pc *Clay-silt lithofacies. Gray to brown, massively bedded to poorly laminated kaolinitic clay to clayey silt. Delineated in this quadrangle by auger borings and soil series.*

unconformity

INTRUSIVE ROCKS — SILURIAN(?)

p

Pegmatite

Massive, coarse-grained to very coarse-grained, light colored rock comprised of muscovite, quartz, and feldspar.

PRECAMBRIAN(?)*

s

Slaughterhouse Gneiss

Medium-grained, locally massive, orange-weathering biotite-muscovite-microcline-quartz-plagioclase gneiss.

top of crystalline stratigraphic section

BALTIMORE MAFIC COMPLEX

m

Mount Washington Amphibolite

Fine- and medium-grained, generally massive, dark rock consisting of hornblende and plagioclase, and locally, pyroxene. Includes very subordinate (less than 10%) actinolite schist or fels, most commonly as very thin layers (3 cm or less). Variations in hornblende/plagioclase ratio define in places a layering ranging from a few centimeters to more than a decimeter thick. Weathers to a clay-rich, red saprolite enclosing numerous residual cobbles and boulders.

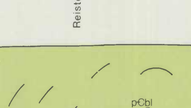
thrust fault

CAMBRO-ORDOVICIAN(?) — GLENARM SUPERGROUP — WISSAHICKON GROUP

qs | s | q

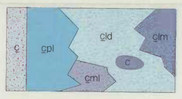
Oella Formation

- q *Oella Formation. Fine- to medium-grained biotite-plagioclase-muscovite-quartz schist, locally garnetiferous and chloritic, with subordinate interlayered fine-grained biotite-plagioclase-quartz gneiss or fels (metagrayuacke) in beds ranging from a few centimeters to two decimeters in thickness.*
- s *serpentinite, Bluish-black, chromite-bearing serpentinite with amphibole and sparse relict olivene and pyroxene. Intricately and irregularly fractured and slickensided. Veined by white magneste, chalcedony, calcite, deweylite, chrysotile, and common opal. Locally talc -rich.*
- qs *Sweathouse Amphibolite Member. Fine-grained epidote amphibolite, commonly laminated, with subordinate interlayered schist and gneiss (described above).*



Loch Raven Schist

- l *Loch Raven Schist. Uniform, medium- to coarse-grained biotite-plagioclase-muscovite-quartz schist with lenticles and pods of vein quartz. Locally rich in biotite and feldspar. Includes rare quartzite.*
  - (g) *garnet facies. Garnet common; staurolite and kyanite rare or absent.*
  - (g-s) *garnet-staurolite facies. Garnet and staurolite common; kyanite rare or absent.*
  - (g-k) *garnet-kyanite facies. Garnet and kyanite common; staurolite rare or absent.*
  - (g-s-k) *garnet-staurolite-kyanite facies. Garnet, staurolite, and kyanite all common.*
- ea *epidote amphibolite. Concordant zones of thin-bedded epidote amphibolite ranging from fine-grained to coarse-grained and from finely laminated to uniform. Quartz usually associated with epidote. Locally includes thin beds of quartzite.*
- a *amphibolite. Similar to above but with epidote rare or absent.*
- q *quartz. Massive, milky vein quartz.*
- lr *Rush Brook Member. Fine- to medium-grained, slabby weathering biotite-plagioclase-muscovite-quartz schist, commonly less micaceous and more gneissic, with very subordinate quartzite in layers one to two decimeters or less in thickness. Rarely garnetiferous, but commonly bearing accessory tourmaline.*
- m *marble*



Cockeysville Marble

Contacts between members of the Cockeysville Marble are interpreted as facies boundaries.

- c *Cockeysville Marble undivided.*
- clm *Layered marble member. Metalimestone and metadolostone interlayered generally on a scale of one meter. Metalimestone commonly medium-grained and moderately silicate-rich (chiefly phlogopite), but may be finer-grained or quite pure. Metadolostone generally finer-grained than associated metalimestone, and generally silicate-rich (chiefly phlogopite and tremolite) and calcite-bearing, but locally quite pure. Outcrops commonly weather to a carbonate sand with embedded metadolostone boulders.*

PRECAMBRIAN*

unconformity

Baltimore Gneiss

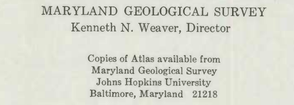
- pCbl *Layered gneiss member. Dark and light biotite-microcline-quartz-plagioclase gneiss interlayered generally on a centimeter to decimeter scale; may vary from biotite schist to quartz-feldspar granofels. Locally bears muscovite, and rarely hornblende. Includes augen gneiss in places. Completely deformed locally.*
- pCbs *Streaked-augen gneiss member. Uniform, medium-grained biotite-microcline-quartz-plagioclase gneiss generally bearing augen that have a stretched appearance; magnetite abundant in places; minor garnet and hornblende locally. Subordinate, fine-grained, dark biotite-quartz-feldspar gneiss generally in layers less than one meter thick.*
- pCbh *Hornblende gneiss member. Similar to the layered gneiss member described above, but with hornblende-bearing dark gneiss constituting about 50% of the total outcrop area. Garnet very rare.*
- pCba *Augen gneiss member. Similar to the layered gneiss member described above, but containing large (1-3 cm), light-colored ovoids (augen) consisting either of feldspar or feldspar and quartz.*
- sz *silicified zone. Massive, silicified, brecciated rock, locally with quartz-crystal-lined vugs.*

For the crystalline rocks primary minerals are listed in order of increasing abundance. Grain size definitions are: fine = less than 1 mm; medium = 1-5 mm; coarse = 5 mm to 3 cm; very coarse = greater than 3 cm.

contact

Generally approximate or inferred. Distribution and concentration of structural symbols is an approximate measure of the reliability of any contact.

boundary between mineral facies of the Loch Raven Schist



normal fault
U - upthrown side
D - downthrown side

thrust fault
teeth on upper plate

axial trace of anticline or dome

vertical | inclined | horizontal

foliation or schistosity
(everywhere virtually parallel to compositional layering)

symmetric | dextrally asymmetric | sinistrally asymmetric

inclined | horizontal

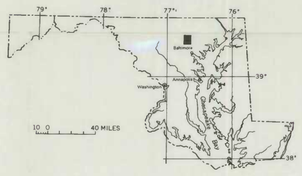
axis and symmetry of minor fold

inclined | horizontal

mineral lineation

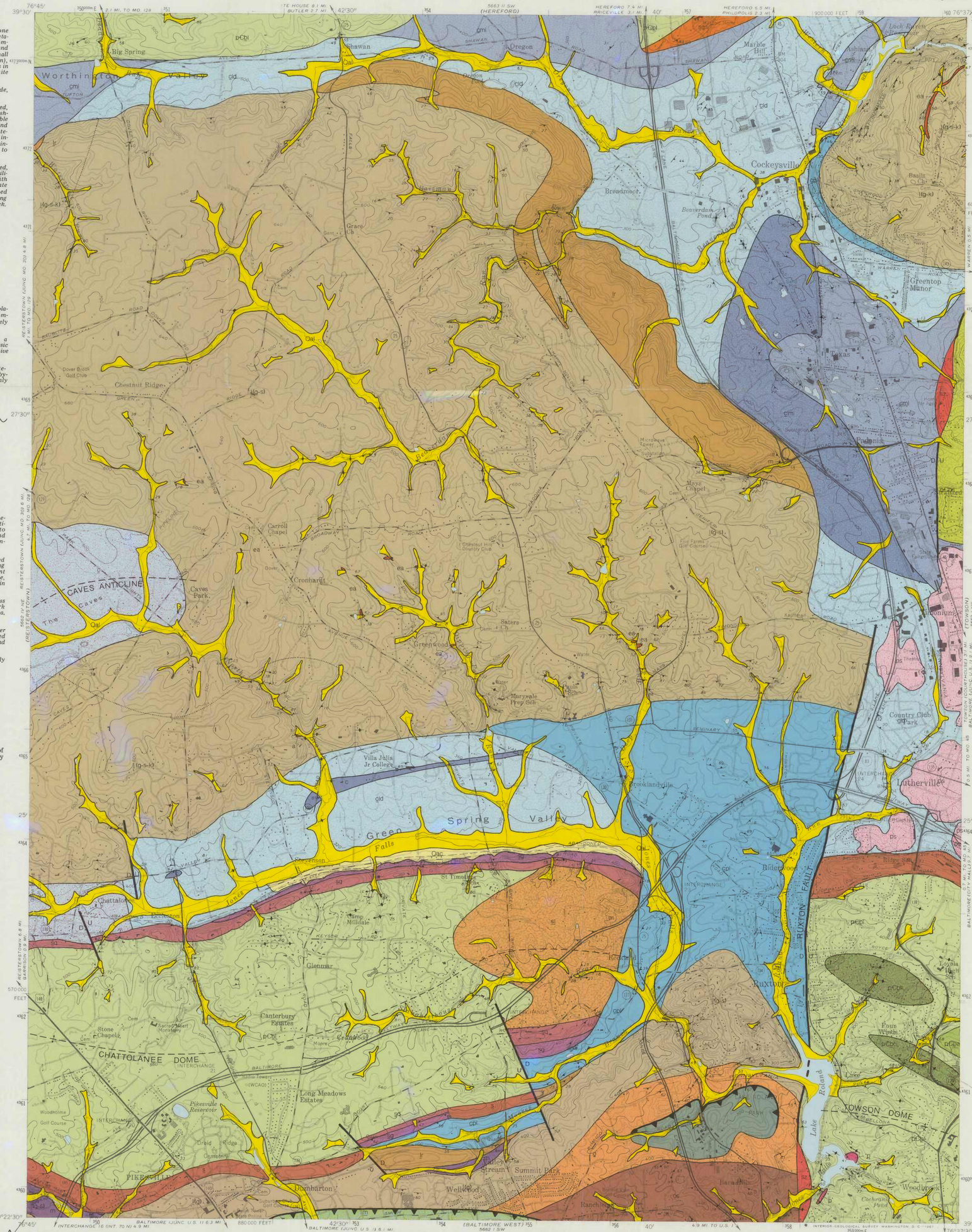
*Age designations based on radiometric dates on *Geologic Map of Maryland* (1968).

QUADRANGLE LOCATION



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

Copies of Atlas available from
Maryland Geological Survey
Johns Hopkins University
Baltimore, Maryland 21218



Base map from U.S. Geological Survey, 1957
(photorevised 1966) Cockeysville Quadrangle
7½ Minute Series

Crystalline rocks mapped by William P. Crowley; sediments by Juergen Reinhardt and Emery T. Cleaves.

Field mapping done, 1972-1975.

Map drafted by
Karen R. Kuff and
Margaret P. Ketcham

UTM GRID AND 1966 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

CROSS SECTION A - A': Horizontal scale same as map scale, no vertical exaggeration.
Discontinuous lines indicate trace of foliation.

Williams & Heintz Map Corporation, Washington, D. C. 20027

COCKEYSVILLE QUADRANGLE: GEOLOGY, HYDROLOGY AND MINERAL RESOURCES

MAP 1. GEOLOGIC MAP OF THE COCKEYSVILLE QUADRANGLE, MARYLAND

By
William P. Crowley, Juergen Reinhardt and Emery T. Cleaves

1975