New York State Museum
Mark Schaming, Director

New York State Geological Survey
Langhorne B. Smith, Acting State Geologist

Scale 1:24,000

Contour interval 20 feet

Universal Transverse Mercator, Zone 18
North American Datum of 1983

Elevation contours, hydrography, and planimetry layers from the New York State Dept. of Transportation Raster Quadrangle separates for the Rensselaerville 7½ minute quad. DOT edition date 1993, USGS contour date 1943.

Magnetic declination from the NOAA online Declination Calculator:
http://www.ngdc.noaa.gov/geomag-web/#declination

MN TN

Calculated declination 13.5°W for the year 2012, at the center of the map.

1 ½ 0 1 Miles

1 0.5 0 1 Kilometers

Geologic mapping by C. Ver Straeten, 2011.
Digital data and cartography, J. Pellerin, 2012.

BEDROCK GEOLOGY OF THE RENSSELAERVILLE QUADRANGLE, NEW YORK

Charles A. Ver Straeten

2011

EXPLANATION

GEOLOGIC UNITS

QUATERNARY

Q — Quaternary (Q) material

MIDDLE DEVONIAN

mDpl — Plattekill Formation (mDpl)

Gray to red sandstones to siltstones, and red, olive-green, and gray to dark-gray shales, mudstones and paleosols.

Sandstones were deposited chiefly in or adjacent to river channels; red, green, and gray shales, mudstones, and paleosols ("fossil soils") were deposited on floodplains adjacent to river channels; dark-gray shales may represent wetlands. Apparent trace fossils of plant roots occur in some strata; poorly preserved fossil plant material may also occur. Up to approximately 200 feet (61 meters) of the Plattekill Formation occurs in the southwest portion of the Westerlo 7.5-minute quadrangle; the rest of the formation, which is much thicker, continues beyond the edge of the quadrangle.

mDash — Ashokan Formation (mDash)

Generally gray sandstones to siltstones; green and gray to dark-gray shales, mudstones, and paleosols. Primarily distinguished from the overlying Plattekill Formation by a lack of red strata.

Sandstones were deposited chiefly in or adjacent to river channels; green to gray shales, mudstones, and paleosols were deposited on the floodplains; dark-gray shales may represent wetlands. Apparent trace fossils of plant roots in some intervals; Goldring (1935) also noted fossils of small arthropods Beyrichiatan ostracod) and Estheria membranacea (a brachiopod), which are interpreted to indicate freshwater, not marine, environments. On the adjacent Rensselaerville 7.5' quadrangle to the west, a thin interval within the Ashokan Formation includes separate shell layers with restricted versus normal marine fossils (gastropods-only versus brachiopods+, respectively); these appear to indicate separate, temporary floodings of brackish or hypersaline and normal marine waters into the local area. The Ashokan Formation represents terrestrial coastal plain facies, deposited near the coast. Approximately 80 feet (24 meters) thick.

mDmm2 / mDmm1 — Mount Marion Formation (mDmm1 and mDmm2)

Dark-gray to gray to green shales and mudstones, and gray to brown siltstones and sandstones, with a few thin, minor layers to lenses of chert- and milky quartz-rich conglomerate, and a few thin limestones (Hurley and Cherry Valley Members) at the base.

Marine fossils, often occur in distinct layers separated by roughly 10-26 feet (ca. 3-8 meters) of poorly to non-fossiliferous strata. Overall, the percentage of sand in the rocks increases upward through the member; however, two distinct intervals upward through the formation feature a distinct return to relatively more shale/mudstone. The lower interval of more shaly strata is visible above 1280 feet along Cole Hill Road, approximately 1.4 miles southwest of East Berne, and in other localities; the transition occurs above a distinct marker bed with fossil horn corals, termed the Halihan Hill Bed ("marked by a line"). The upper interval with relatively more shale (which alternate with thick sandstones) occurs below the transition to green and gray terrestrial strata of the Ashokan Formation. The Mount Marion Formation represents intermediate depth to shallow marine environments (from perhaps a few hundred feet at most, to the shoreline at sea level). Using a dip of approximately 160 feet per mile, the Mount Marion Formation from the north-central to south-western area of the Westerlo quadrangle totals approximately 1400 feet (427 meters) in thickness, from the base of the Hurley Member to the base of the overlying Ashokan Formation.

Members of the Mount Marion Formation, from low to high, include:

1) Hurley Member: Limestone, mudstone and minor silt- to sandstone. Approximately 4.3 feet thick (1.3 meters), but varies locally. Two to three thin, fossiliferous limestones and a thin sandstone separated by shales of varying thicknesses.

2) Cherry Valley Member: Limestone, with famous Agoniatites vanuxemi cephalopod fauna. Approximately 4.6 feet (1.4 meters) thick.

3) East Berne Member: Dark-gray shale and mudstone, with minor thin sandstone beds through the member and a thick sandstone at the top. Member marked by distinct basal and top contacts, above Cherry Valley Limestone, and below the overlying Halihan Hill Bed (see below). Approximately 300 feet thick (91 meters) thick on the eastern edge of the quadrangle.

4) Otsego Member: Shale and sandstone, with an overall increase in the percent sandstone upward through the member. The base of the Otsego is distinct, marked by a generally three foot thick fossiliferous zone, at the top of a thick sandstone (Halihan Hill Bed of Ver Straeten (1994)). The upper part of the Otsego Member is gradational into the overlying "undifferentiated upper member," with no distinct boundary. The Otsego Member comprises the bulk of the rocks that form the escarpment running WNW to ESE just south of the hamlet of East Berne (e.g., Irish Hill and Filkins Hill). Cooper (in Goldring, 1935, p. 191) estimated the Otsego Member to be 505 feet (154 meters) thick along Cole Hill Road/Albany Co. Rte. 2, southwest of East Berne (top of Cooper's section marked by the number 1 on the map).

5) undifferentiated upper member: Sandstone-dominated strata, with an increased though still lesser amount of shale in its upper portion (beginning at the top of the "flagstone" sandstones quarried by Heldeberg Bluestone, east of the village of South Berne). Notable marker unit near the top is a dark-gray mudstone interval with corals, brachiopods, and bivalves (Cotton Hill coral bed). Strata are generally not well exposed south of the previously noted escarpment, except in ravines coming into the Switzkill Valley. Approximately 600 feet (180 m) in thickness.

NOTE: The Hurley, Cherry Valley and East Berne members of the Mount Marion Formation are mapped as mDmm1 (ca. 300 feet/91 meters thick). The Otsego Member and undifferentiated upper strata of the Mount Marion Formation are mapped together as mDmm2 (ca. 1100 feet/335 meters thick).

mDus — Union Springs Formation (mDus)

Dominantly black to dark-gray shales and mudstones, with some thin impure limestone layers. Thin calcareous unit at the top (Stony Hollow Member) in the eastern part of the quadrangle disappears to the west, and thickens to the south. Strata are generally non-fossiliferous to poorly fossiliferous, with straight and coiled cephalopods, very small conical shells (styliolinids, dacryoconarids), and some small brachiopods and bivalves. The base of the Union Springs Formation, placed at the top of the underlying Onondaga Limestone, is not found on the quadrangle.

Two members of the Union Springs Formation are found on the Westerlo quadrangle, from low to high:

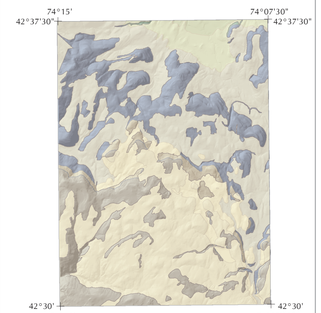
1) Bakoven Member: Black to dark-gray shales and mudstones, with thin, minor limestone beds and limestone concretions. Generally non-fossiliferous to poorly fossiliferous; fossils consist largely of shelled animals that lived up in the water column, not on the sea floor (e.g., straight and coiled cephalopods, and styliolinids/dacryoconarids). Approximately 165 feet (50 meters) thick in the south branch of Onesquethaw Creek, on the east edge of the quadrangle and just over the border. Lowest strata of the Bakoven Member are not found on the Westerlo quadrangle.

2) Stony Hollow Member: Thin, buff-colored, calcareous shale to siltstone at the top of the Union Springs formation in the easternmost portion of the quadrangle. Thin bed at or near base with fossils, including brachiopods and pieces of the trilobite Dechenella haldemani. Some strata are bioturbated. Pyrite nodules present; the pyrite secondarily replaces barite, as is found at the same strata in other states (e.g., PA, VA, WV). To the west, the Stony Hollow Member disappears as strata change laterally to dark-gray mudstones of the upper part of the Bakoven Member. Approximately 12 feet (ca. 4 meters) thick in the south branch of Onesquethaw Creek, on the east edge of the quadrangle.

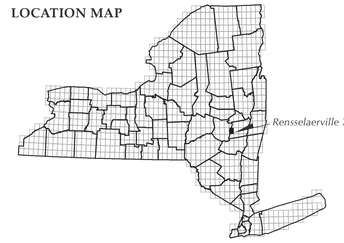
GEOLOGIC SYMBOLS

- Contact, definite
- Contact, approximate
- Contact, inferred
- Limit of Quaternary cover
- Anomoly

SHADED TERRAIN MAP



LOCATION MAP



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