## Stratigraphy of the Central and Northern Shenandoah Valley, and Eastern West Virginia

<table>
<thead>
<tr>
<th>Sequence Age</th>
<th>West</th>
<th>FORMATION</th>
<th>East</th>
<th>Thickness</th>
<th>DESCRIPTION</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Miss.</strong></td>
<td></td>
<td><strong>MAUCH CHUNK</strong></td>
<td></td>
<td>Coarse s.s., silt, shale. Channels. Plant fossils common in places. Coal</td>
<td>Begin Alleghanian Orogeny</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>GREENBRIAR</strong></td>
<td></td>
<td>Carbonate dominated (oolites, biosparites)</td>
<td>Orogenic Calm</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>POCONO</strong></td>
<td></td>
<td>300-1700’</td>
<td>Quartz sandstone &amp; conglomerate, coarse, thick, large cross beds</td>
<td>Orogenic Calm</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>HAMPShIRE</strong> (Catskill)</td>
<td></td>
<td>2000’</td>
<td>Point Bar Sequences; red</td>
<td>Acadian Orogeny</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>GREENLAND GAP GROUP</strong> (former Chemung) <strong>FOREKNOBS</strong> <strong>SHEELER</strong></td>
<td></td>
<td>2000’</td>
<td>Thick hummocky sequences; at top interbedded red and green fine sands and silts</td>
<td>Acadian Orogeny</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>BRALLIER</strong> (Portage in Pa.)</td>
<td></td>
<td>1500-1700’</td>
<td>Bouma sequences</td>
<td>Acadian Orogeny</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>TULLY</strong> <strong>TULLY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>MILLBorough</strong> (Used south of Shenandoah Co.)</td>
<td><strong>Harrel</strong> <strong>Mahantango</strong> <strong>Marcellus</strong></td>
<td>900’</td>
<td>Dark gray to black silts and fine sands</td>
<td>Acadian Orogeny</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NEEDMORE</strong></td>
<td></td>
<td>Tioga bentonite</td>
<td>Olive gray fine sands, silts, and shales; fossils abundant in places</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wallbridge Unconformity</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Devonian</strong></td>
<td><strong>ORISKANY</strong></td>
<td><strong>LICKING CREEK</strong> <strong>MANDATA</strong> <strong>NEW SCOTLAND</strong> <strong>NEW CREEK</strong> <strong>KEYSER</strong></td>
<td>10-125’</td>
<td>Quartz arenite; white, gray, tan; abundant fossils</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>HELDERBERG GROUP</strong></td>
<td></td>
<td>70-150’</td>
<td>Carbonates of many kinds; sometimes with cherts, or interbedded with shale or quartz arenites; fossils very abundant</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>(Salina in WVa.)</strong></td>
<td><strong>TONOLWAY</strong> <strong>WILLS CREEK</strong></td>
<td>50-250’</td>
<td>Tidal carbonates; ALM, ALD, mud cracks; salt casts; evaporitic to west</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>BLOOMSBURG</strong></td>
<td><strong>WILLIAMSPORT</strong></td>
<td></td>
<td>Bloomsburg; red very fine sands/silts/shale</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>McKenzie</strong></td>
<td></td>
<td>0-75’</td>
<td>Yellow calcareous shale; fossils</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Silurian</strong></td>
<td><strong>CLINTON CAVITY</strong> <strong>KEEFER</strong> <strong>ROSE HILL</strong> <strong>TUSCARORA</strong></td>
<td><strong>MASSA-</strong> <strong>NUTTEN</strong></td>
<td></td>
<td>Massanutton: coarse friable quartz arenites and conglomerates with large planar X-beds Tuscarora/Keeper: quartz arenites, ripples Skiddles. Rose Hill: red fine - coarse sands and shales, ripples, trace fossils</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>JUNIATA</strong> <strong>Osgood</strong></td>
<td></td>
<td>Os/z Tab “ Cub ss ”</td>
<td>Red X-bedded ss; Skolithus; banded w/sh; Gray/white, coarse X-bedded sands</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>REEDSVILLE</strong></td>
<td></td>
<td>Clastic hummocky sequences</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>“TRENTON GROUP”</strong> ?</td>
<td><strong>Dordna</strong> <strong>EDINBURG</strong> (Lantz Mills)</td>
<td>425-600’</td>
<td>Carbonate hummocky sequences</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>“BLACK RIVER GROUP”</strong></td>
<td></td>
<td></td>
<td>Carbonate hummocky sequences</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>LINCOLNSHIRE</strong></td>
<td><strong>NEW MARKET</strong></td>
<td>25-170’</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>40-250’</td>
<td>abundant fossils, darkens up section</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very pure micrites; tidal features</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ordovician</strong></td>
<td><strong>BEEKMANTOWN</strong> (Rockdale Run)</td>
<td></td>
<td>2500’</td>
<td>Thick banded dolomite, black chert; tidal</td>
<td>Divergent Continental Margin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>STONEHENGE</strong> (Chepultpec)</td>
<td></td>
<td>500’</td>
<td>Thick banded micrite, blue; tidal features</td>
<td>Divergent Continental Margin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>CONOCOCHEAUUE</strong></td>
<td></td>
<td>2500’</td>
<td>LS/dolenqtz arenite; abndtidal structures</td>
<td>Divergent Continental Margin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>ELBROOK</strong></td>
<td></td>
<td>2000’</td>
<td>LS/dolenqtz blue-gray; tidal features</td>
<td>Divergent Continental Margin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>ROME</strong> (Waynesboro)</td>
<td></td>
<td>2000’</td>
<td>Red/green shale/dolenqtz/micrite; very variable</td>
<td>Divergent Continental Margin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>SHADY</strong></td>
<td></td>
<td>1600’</td>
<td>Dolomite (granular); LS at top and bottom</td>
<td>Divergent Continental Margin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>CHIL HOWELL</strong> <strong>ANTIETAM</strong></td>
<td><strong>HARPERS</strong> <strong>WEVERTON</strong></td>
<td>500-1500’</td>
<td>Quartz arenite, abnd X-beds</td>
<td>Opening of the Protoalantic Margin</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>800’</td>
<td>Crs feldspathic sands, large planar X-beds and Bouma sequences</td>
<td>Opening of the Protoalantic Margin</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>CACTOCTIN</strong> <strong>SWIFT RUN</strong> (Lynchburg)</td>
<td><strong>GRENVILLE BASEMENT</strong></td>
<td>East of Blue Ridge</td>
<td>Subarea; theolinite, flood basalts (now greenshist)</td>
<td>Opening of the Protoalantic Margin</td>
<td></td>
</tr>
</tbody>
</table>

Peripheral Bulges and the Taconic Foreland Basin

Flexural tectonics: partitioning of the foreland system in response to orogenic loading.

Dynamic subsidence: long-wavelength lithospheric deflection in response to subduction processes.

A

Carbonate cratonic sea
Western cratonic basin
Eastern flysch basin
Continental margin carbonates
North American Continental Margin
Antietam
Catoctin

A'

Taconic Terrane
Overthrust

Germany Valley
Brocks Gap
Massanutten Synclinorium

Tuscarora
Oswego
Massanutten

Reedsville
Juniata
Cub ss.
Martinsburg

Lower Silurian


**LOWER SILURIAN**

- Juniata
- Reedsville
- Oswego
- Cub ss.
- Martinsburg

**UPPER ORDOVICIAN**

- Juniata
- Reedsville
- Oswego
- Cub ss.
- Martinsburg
The Taconic foreland basins in Virginia/West Virginia are complicated by preservation of a peripheral bulge (Little North Mountain Arch) dividing the basin into an eastern deeply subsiding flysch basin (Shenandoah Valley), and a shallow subsiding western cratonic basin (Germany Valley). The plots above are for each basin.
Paleogeography of the early Ordovician, Pre-Taconic, Virginia and Surrounding Areas

Cratonic Epicontinental Sea

Southern Depositional Center

A

Transform fault

Rift margin

Abrupt drop into deep water

Slope Rise Ocean Basin

Subduction Trench

Carolina Terrane

Northern Depositional Center

Remnant Ocean Basin

Cambrian Carbonates

Antietam

Coloctin

North American Continental Margin

Beekmantown

New Market

Lincolnshire

Remnant Ocean Basin
Paleogeography Associated with the middle Ordovician Taconic Orogeny in Virginia and Surrounding Areas
Interpretive Cross Sections From Eastern West Virginia Across Northern Virginia
Showing Deep and Shallow Taconic Facies Relative to Present Geology

Divergent Continental Margin (DCM) carbonate shelf

CO (Cambrian to Middle Ordovician strata)

Grenville basement and rift graben with clastic fill

PRE-TACONIAN (CHAZYAN)

western Taconic facies (clastic shelf)

CO (Cambrian to Middle Ordovician strata)

Grenville basement and rift graben with clastic fill

TACONIAN (CINCINNATIAN)

MASSANUTTEN SYNCLINORIUM

western Taconic facies

eastern Taconic facies

Sil/Dev

Blue Ridge Front

present-day surface

Blue Ridge Overthrust
(complex of overthrust basement and terranes: volcanic arc/microcontinents)

Alleghenian (Late Paleozoic)

Cambro-Ordovician DCM sediments

Precambrian basement

R.J. Diecchio, 1993 Tectonics v 12, no 6, redrawn by L.S. Fichter, 1999