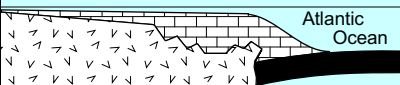
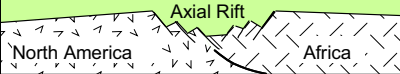
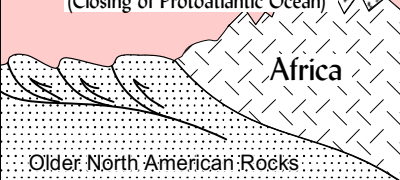
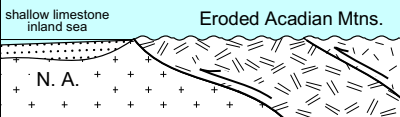
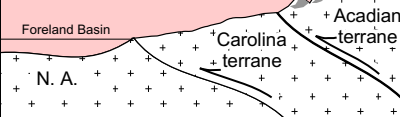
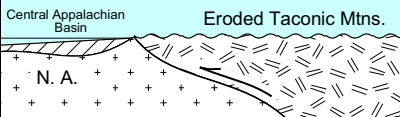
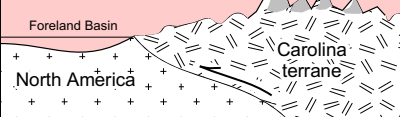
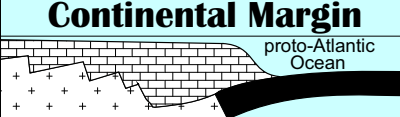



Stratigraphy of the Central and Northern Shenandoah Valley, and Eastern West Virginia

Sequence	AGE	West	FORMATION	East	Thick-ness	DESCRIPTION	Interptetation			
KASKASKIA	Miss.		MAUCH CHUNK			Coarse ss, silt, shale. Channels. Plant fossils common in places. Coal	Begin Alleghenian Orogeny			
			GREENBRIAR			Carbonate dominated (oolites, biosparites)	Orogenic Calm			
			POCONO			300-1700'	Quartz sandstone & conglomerate; coarse, thick, large cross beds	Acadian Orogeny Armorica terrane collides with east coast (survives as Avalon terrane).		
	Devonian		HAMPSHIRE	(Catskill)		2000'	Point Bar Sequences; red			
			GREENLAND GAP GROUP	(former Chemung)	FOREKNOBS SCHEER		2000'		Thick hummocky sequences; at top interbedded red and green fine sands and silts	
			BRALLIER		(Portage in Pa.)		1500-1700'		Bouma sequences	
			MILLBORO		Tully		900'		Dark gray to black silts and fine sands	
				(Used south of Shenandoah Co.)	Harrel Mahantango Marcellus		350-500'			
		NEEDMORE		Tioga bentonite		100-530'	Olive gray fine sands, silts, and shales; fossils abundant in places			
		<i>Wallbridge Unconformity</i>								
TIPPECANOE	Silurian		ORISKANY			10-125'	Quartz arenite; white, gray, tan; abundant fossils	Orogenic Calm		
			HELDERBERG GROUP		LICKING CREEK MANDATA NEW SCOTLAND NEW CREEK KEYSER		70-150' 17-50' 70-600'		Carbonates of many kinds; sometimes with cherts, or interbedded with shale or quartz arenites; fossils very abundant	
			(Salina in WVa.)	TONOLOWAY			50-250'		Tidal carbonates; ALM, ALD; mud cracks; salt casts; evaporitic to west	
		CAYUGA		WILLS CREEK WILLIAMSPORT MCKENZIE		0-400' 0-75'	Bloomsburg: red very fine sands/silts/shale Yellow calcareous shale; fossils			
		CLINTON		KEEFER ROSE HILL TUSCARORA		MASSA-NUTTEN	70' 650' 50-250'	700-1200'	Massanutten: coarse friable quartz arenites and conglomerates with large planar X-beds Tuscarora/Keefer: quartz arenites; ripples Skolithus. Rose Hill: red fine - coarse sands and shales; loads, ripples, trace fossils	Taconic Orogeny Chopawamsic/Arvonnia Terrane collides with East Coast
	Ordovician		JUNIATA		" ? " Cub ss "		0-200'	Red X-bedded ss; Skolithus; bedded w/sh	Taconic Orogeny Chopawamsic/Arvonnia Terrane collides with East Coast	
			OSWEGO				0-375'	Gray/white, coarse X-bedded sands Hummocky		
			REEDSVILLE		MARTINSBURG			3000'		Clastic hummocky sequences Feldspathic/lithic Bouma sequences
			"TRENTON GROUP"		Oranda (Liberty Hall)			40-60'		Carbonate hummocky sequences Gray silty/shale
			"BLACK RIVER GROUP"		EDINBURG (Lantz Mills)			425-600'		Carbonate hummocky sequences Black massive micrites and shale
			LINCOLNSHIRE			25-170'	Micrites, bio- and pelmicrites, chert			
			NEW MARKET			40-250'	abundant fossils, darkens up section Very pure micrites; tidal features	Divergent Continental Margin		
	<i>Knox Unconformity</i>									
		BEEKMANTOWN	(Rockdale Run)			2500'	Thick bedded dolomite, black chert; tidal			
		STONEHENGE	(Chepultepec)			500'	Thick bedded micrite, blue; tidal features			
SAUK	Cambrian		CONOCOCHEAQUE			2500'	LS/dolo/qtz arenite ; abndt tidal structures			
			ELBROOK			2000'	LS/dolo/ blue-gray; tidal features			
			ROME	(Waynesboro)			2000'		Red/green shale/dolo/micrite; very variable	
			SHADY				1600'		Dolomite (granular); LS at top and bottom	
			CHIL-HOWEE	ANTIETAM					500-1500'	Quartz arenite; abndt X-beds Skolithus
				WEVERTON		HARPERS			2000'	Crs feldspathic shale and graded sandstones
								800'	sands; large planar X-beds and Bouma sequences	
	VEN-? dian		CATOCTIN			2000'	Subareal , tholeiitic, flood basalts (now greenschist)	Rifting Opening of the Protoatlantic		
		SWIFT RUN	(LYNCHBURG)				East of Blue Ridge			
			GRENVILLE BASEMENT							

ONE PAGE GEOLOGICAL HISTORY OF VIRGINIA

Age mya	Significant Rock Units	Sequence of Events	Description of Events	
CENOZOIC	Alluvial and Coastal Plain Sediments	Rejuvenation	Gentle uplift of the eroded roots of the Alleghenian mountains starts erosion again leading to formation of the present Valley and Ridge with their long ridges and water gaps.	
	Chesapeake Group Pamunky Group Potomac Group	Atlantic Divergent Continental Margin	After the rifting the new continental margin sinks below sea level and accumulates an eastward thickening wedge of sediments, continuing until the present day. Virginia erodes completely down to sea level, and the sea may at times have covered much of Virginia. Present sea level is low.	
	70			
TR./JR	Newark Group	Rifting (Opening of Atlantic Ocean) Axial Rift	The supercontinent Pangaea rifts apart along a zone now located off the Virginia coast. Culpepper, Richmond, Farmville, etc. basins form. As Africa moves away the present Atlantic ocean begins to open and continues to the present.	
	230			
PENN/PERM	Harlan Wise Gladeville Lee	Alleghenian Orogeny (Closing of Protoatlantic Ocean)	Africa (Gondwana), collides with North America closing shut the proto-Atlantic ocean, and creating the supercontinent Pangaea. A Himalaya size mountain range exists throughout Virginia except the far southwest part of the state. At this orogeny most older rocks in Virginia are thrust faulted and folded toward the west. Coal swamps form in southwest Virginia and spread across most of the eastern United States.	
	310			
	MISS.	Princeton Hinton Bluefield Greenbriar McCraday	Inter-Orogenic Calm	After the Acadian mountains are eroded a large inland sea spreads from eastern West Virginia across most of eastern North America and fills with limestone sediments containing abundant fossils.
		345		
DEVONIAN		Price/Pocono Hampshire Greenland Gap Brallier Millboro Needmore	Acadian Orogeny	A second terrane collides with eastern North America, building a mountain range in the piedmont area. A large basin sinks in western Virginia and W.Va. and fills with a thick sequence of gray, green and red sediments now exposed in outcrops near the VA-WVA border.
		395		
		SILURIAN	Oriskany Helderburg Tonolway Bloomsburg Keefer Rose Hill Tuscarora	Inter-Orogenic Calm
	435			
ORDOVICIAN	Massanutten Juniata Oswego Martinsburg Edinburg Lincolnshire		Taconic Orogeny	A composited volcanic arc terrane (Carolina) collides with southwest Virginia and southeast Pennsylvania creating a mountain range in the western Piedmont region. A deep basin forms in the Shenandoah valley area, and a second basin in W.Va., filling with sediments from the mountain.
	500			
	CAMBRIAN		New Market Beekmantown Stonehenge Conococheague Elbrook Rome Shady	Proto-Atlantic Divergent Continental Margin
		570		
PRE-CAMBRIAN		Antietam Harpers Weverton Catoctin Robertson River	Rifting (Opening of proto-Atlantic Ocean) Blue Ridge Axial Rift	The rifting of the Rodinia supercontinent and the opening of the proto-Atlantic ocean. The continental edge at this time ran down the axis of the present day Blue Ridge province, and Virginia lay south of the equator in a tropical climate.
		1200		
		PRE-CAMBRIAN	Old Rag Lovingsston Pedlar	Grenville Orogeny
1200	