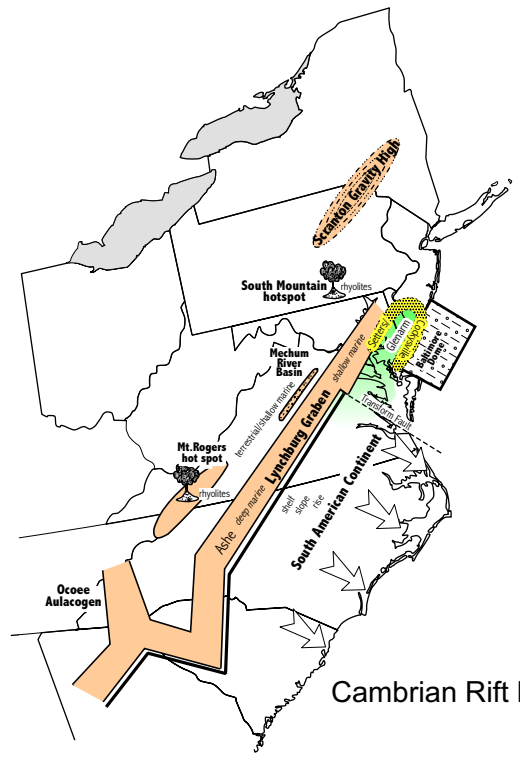
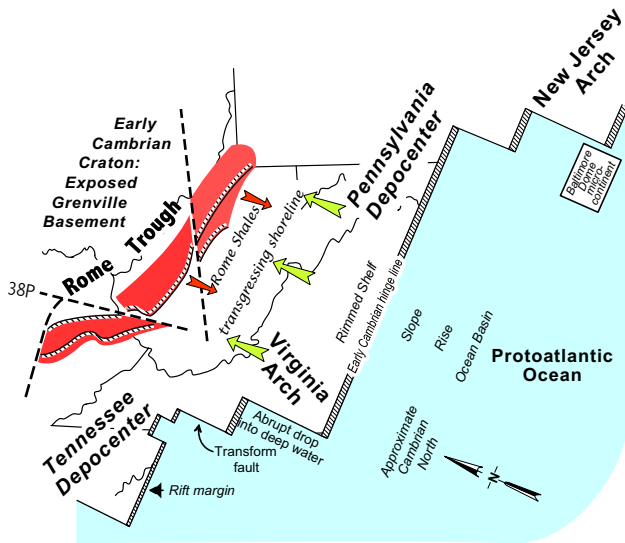


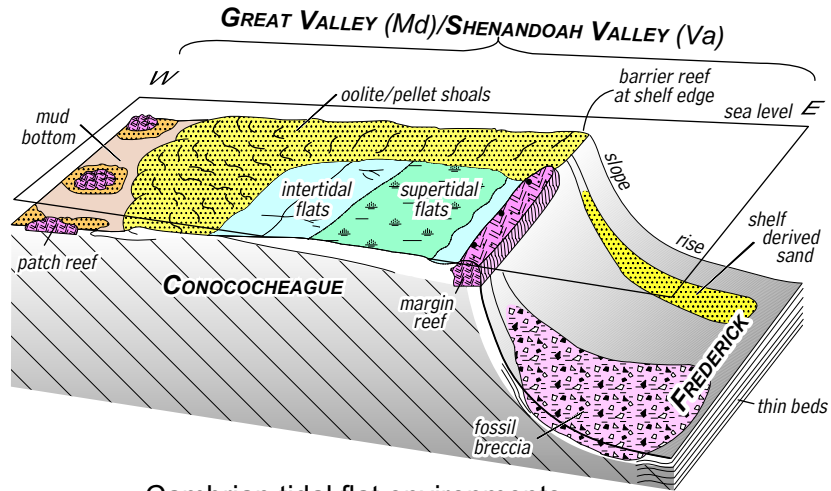
Rodinia Supercontinent
 (One possible reconstruction at about 675 Ma.
 Adapted from Dalziel, 1991)



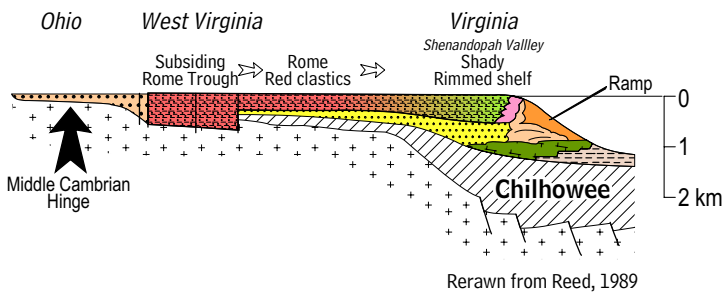
Cambrian Rift Basin



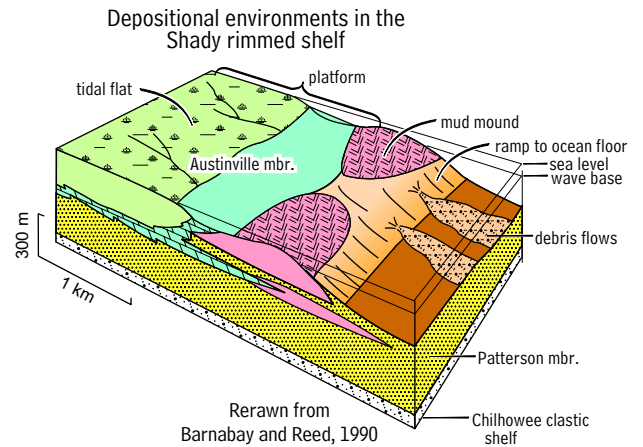
Cambrian Continental Margin



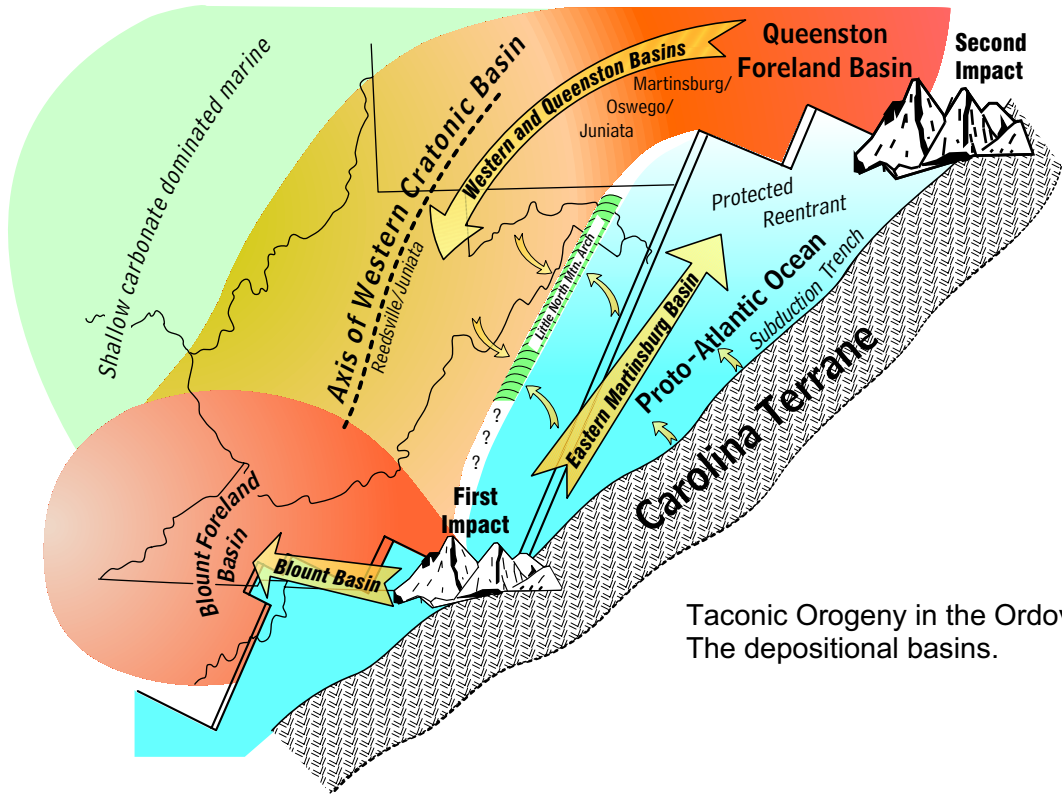
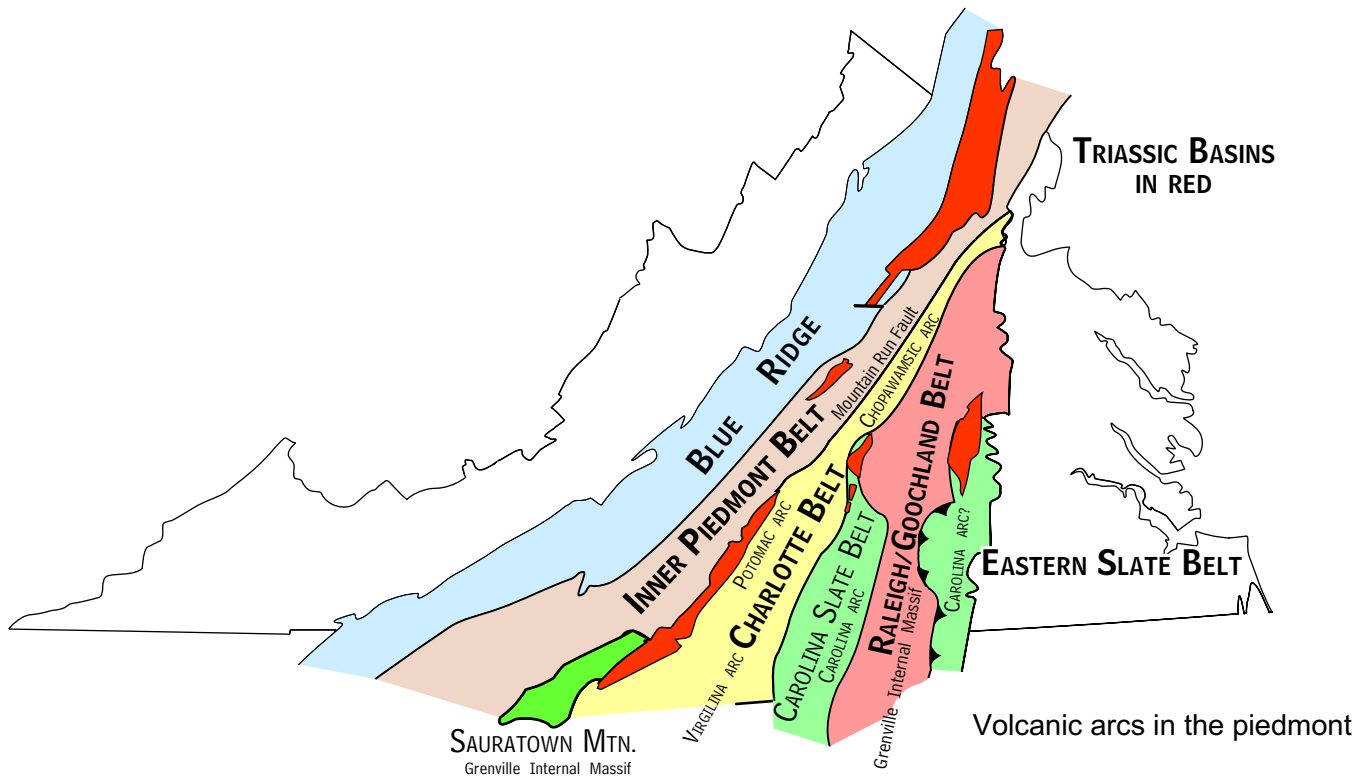
Cambrian tidal flat environments



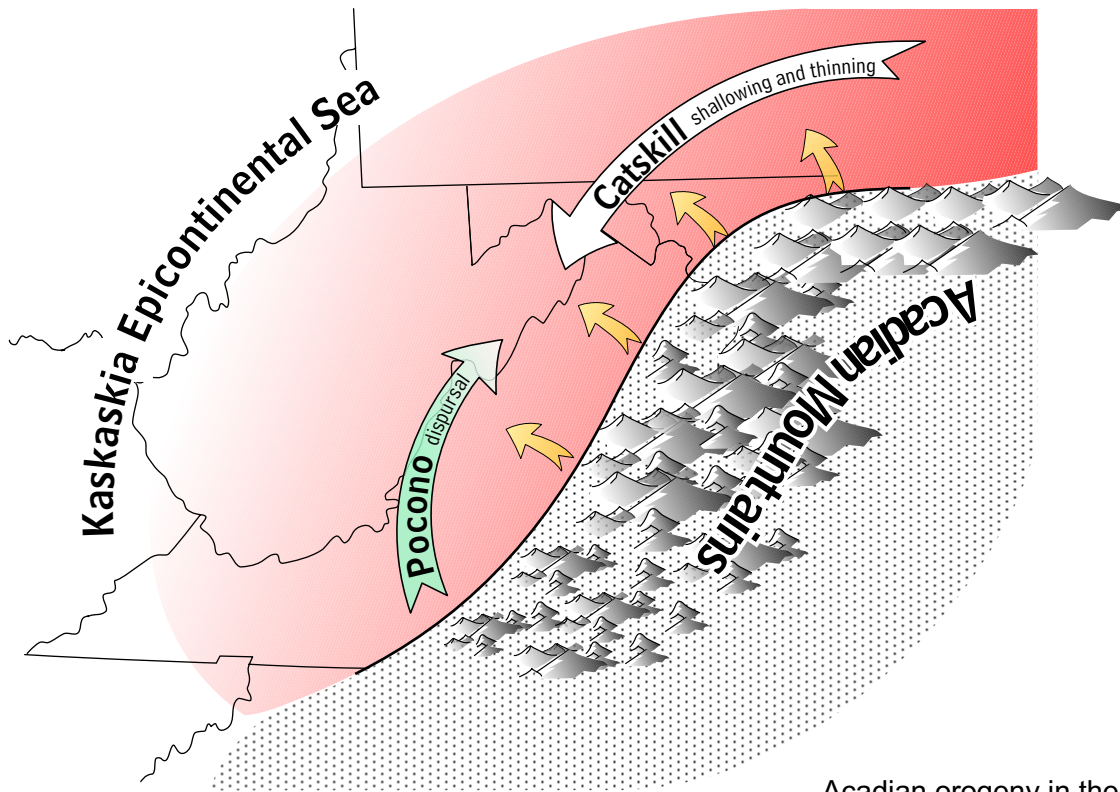
Cambrian divergent continental margin



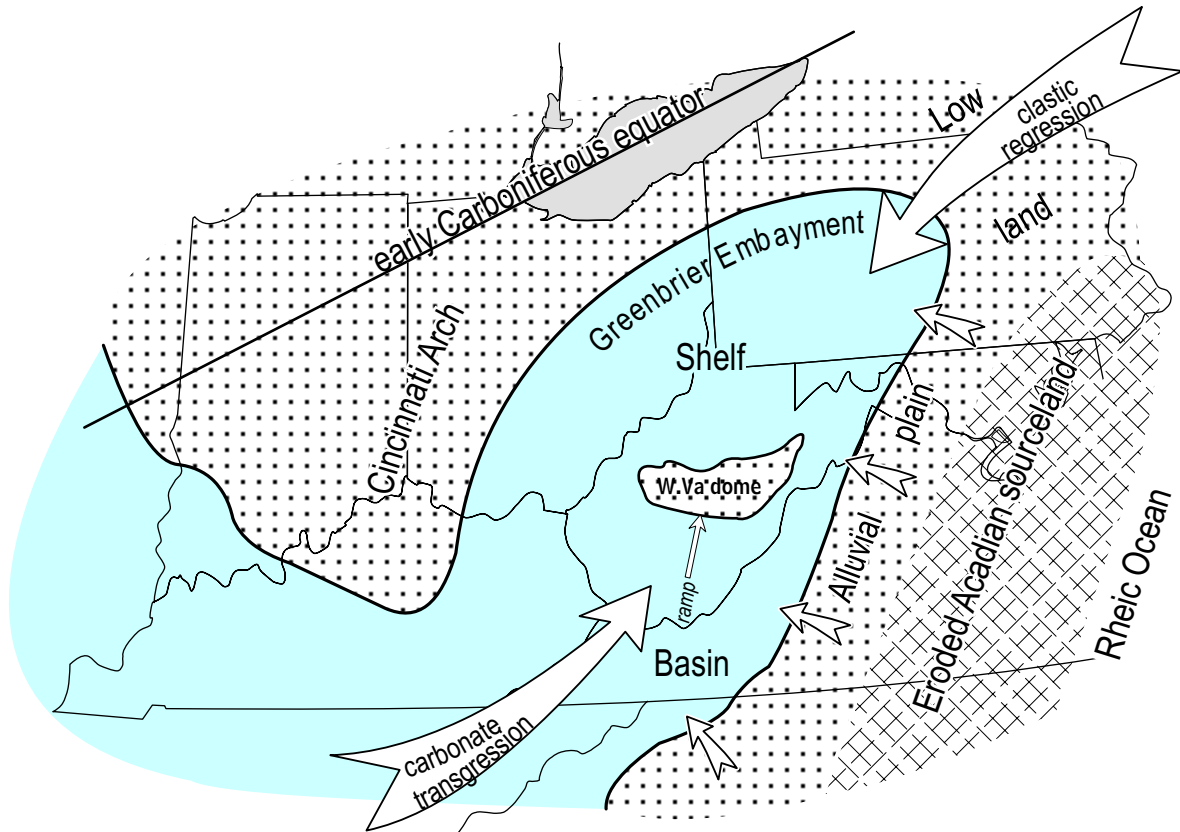
Rerawn from Barnabay and Reed, 1990



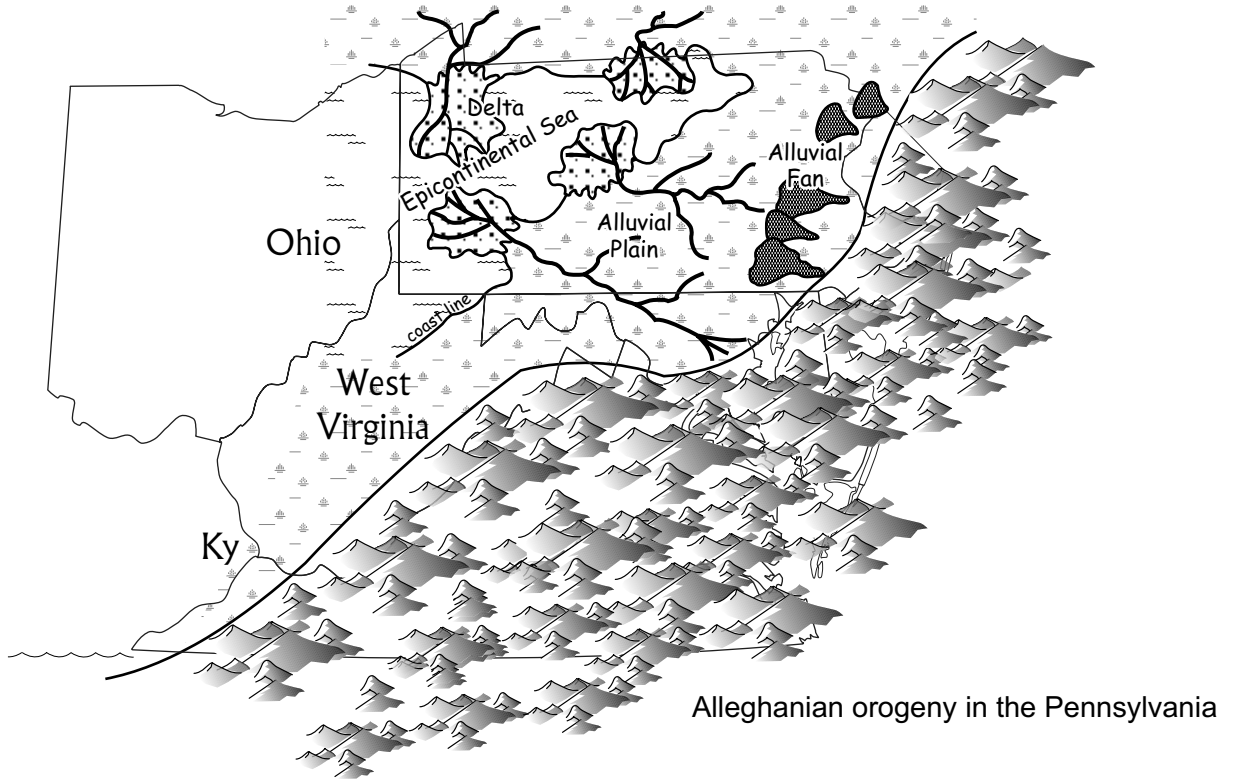
Taconic Orogeny in the Ordovician. The depositional basins.



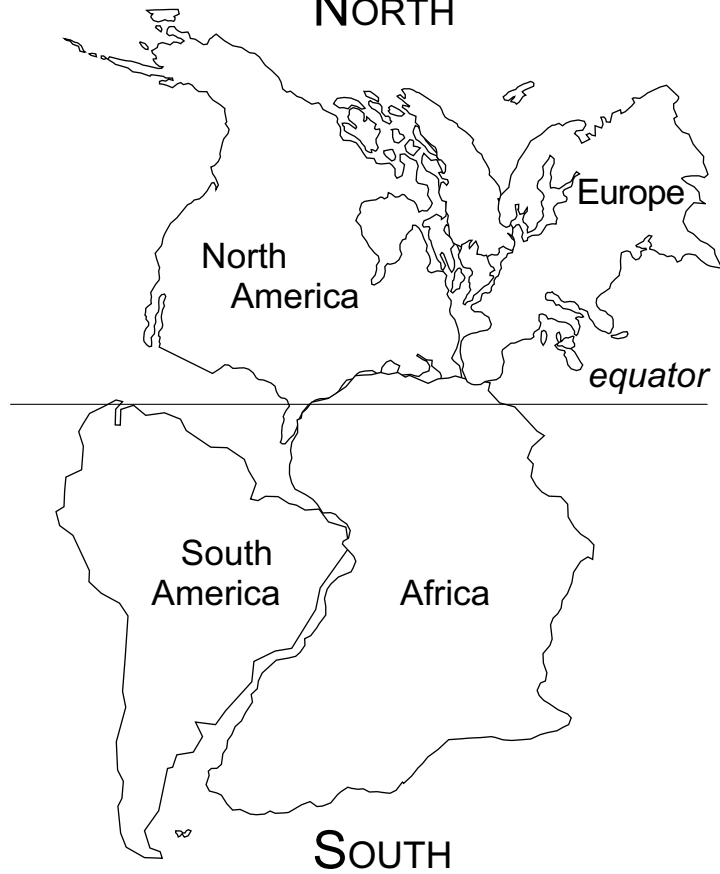
Acadian orogeny in the Devonian.
The depositional basins.



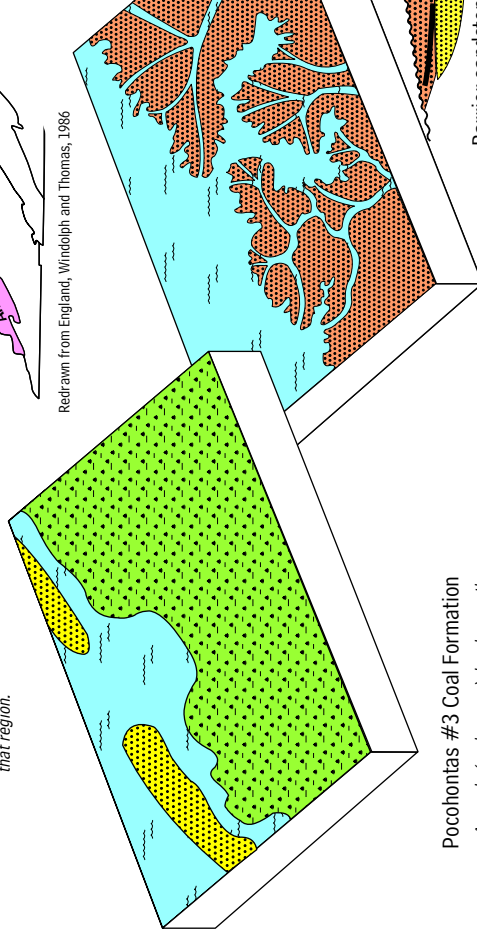
Mississippiian Post-Acadian
Orogenic calm and the shallow
Greenbrier tropical sea



Pangaea Supercontinent NORTH



Virginia's Pennsylvanian coal deposits are found only in the Allegheny Plateau in the far southwest part of the state (purple region on map), but the plateau itself extends across western Pennsylvania, Ohio, West Virginia, Kentucky, Tennessee, and west. Environments illustrated in the block diagrams once existed across all that region.

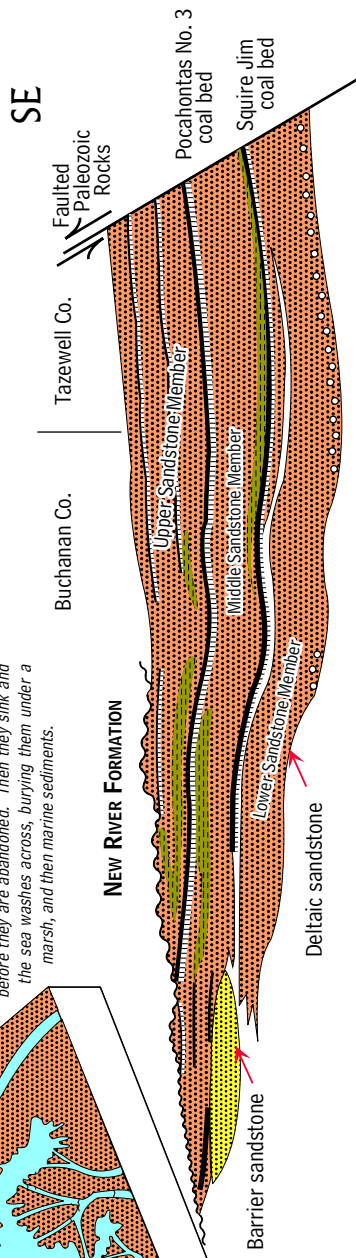


Redrawn from England, Windolph and Thomas, 1986

Delta progradation
Middle Sandstone Member
 Delta progrades (builds out) into the shallow inland sea depositing a thick wedge of sandstone while converting marine environments into terrestrial environments. Deltas prograde for only a few hundred years before they are abandoned. Then they sink and the sea washes across, burying them under a marsh, and then marine sediments.

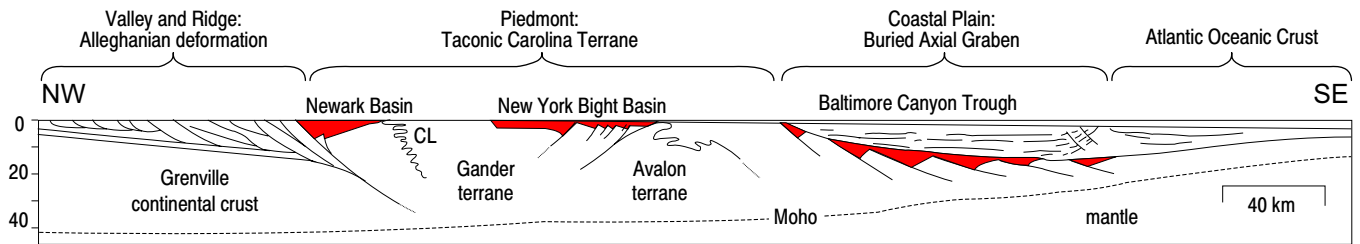
Pocahontas #3 Coal Formation

A marsh (coal swamp) develops as the sea transgresses across the abandoned delta lobe, while a barrier island forms off the coast. Continued sinking allows a thick peat layer to form, and when the next delta lobe moves into the area the peat is buried, compressed, and turned into coal.



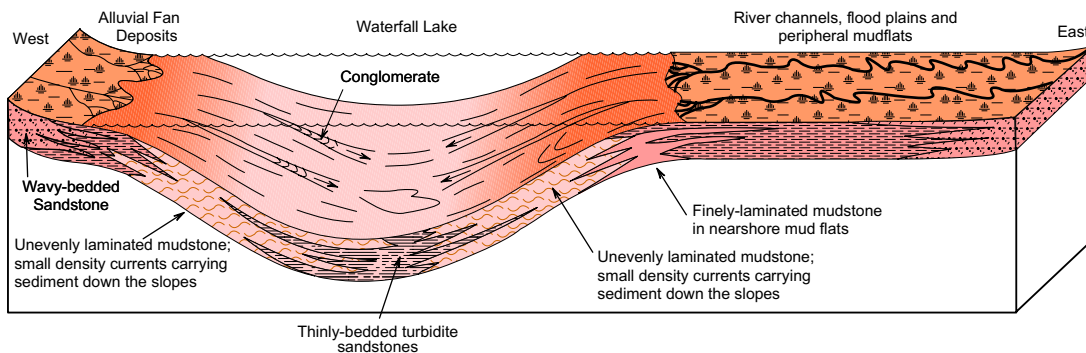
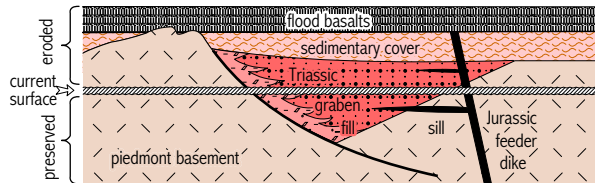
Paleoenvironments in Southwest Virginia . During the Alleghenian orogeny southwest Virginia was a tropical coal swamp. Sediment flowed westward out of the mountains and into a shallow sea where deltas formed.



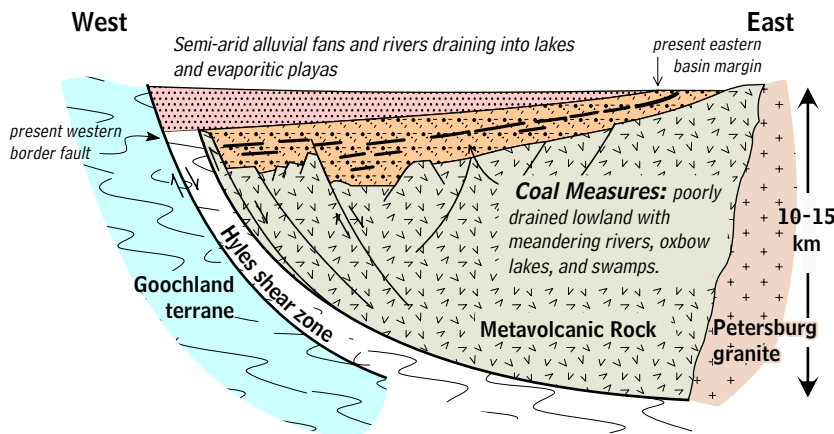


Cross section from the Valley and Ridge of Pennsylvania through the piedmont terranes with their in-faulted Triassic Basins and then across the continental margin to the Atlantic ocean basin, with no vertical exaggeration. Redrawn from Olsen, et. al., 1989.

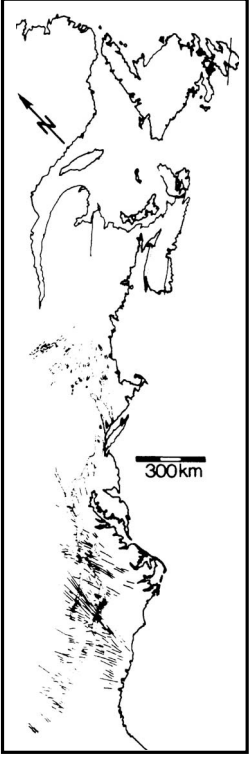
At this point most of the piedmont is buried under a couple of thousand feet of sediment, all of which is now eroded away.



Reconstruction of Waterfall Lake, Culpepper basin, low-water stage. There is a high fault block mountain on the western edge, feeding alluvial fans on the west side of the lake. The eastern broad, flat area is an exposed alluvial plain with rivers draining across it. Small density (turbidity) currents carry sediment toward the lake bottom. At this stage the lake is shallow, oxic, and accumulating red sediments; higher water levels cover the alluvial plain and lead to oxygen poor bottom waters. Early dinosaurs roam across the area, the first tiny mammals scurry in the undergrowth, and fish and aquatic reptiles swim in the lakes. Redrawn from Hentz, 1985.

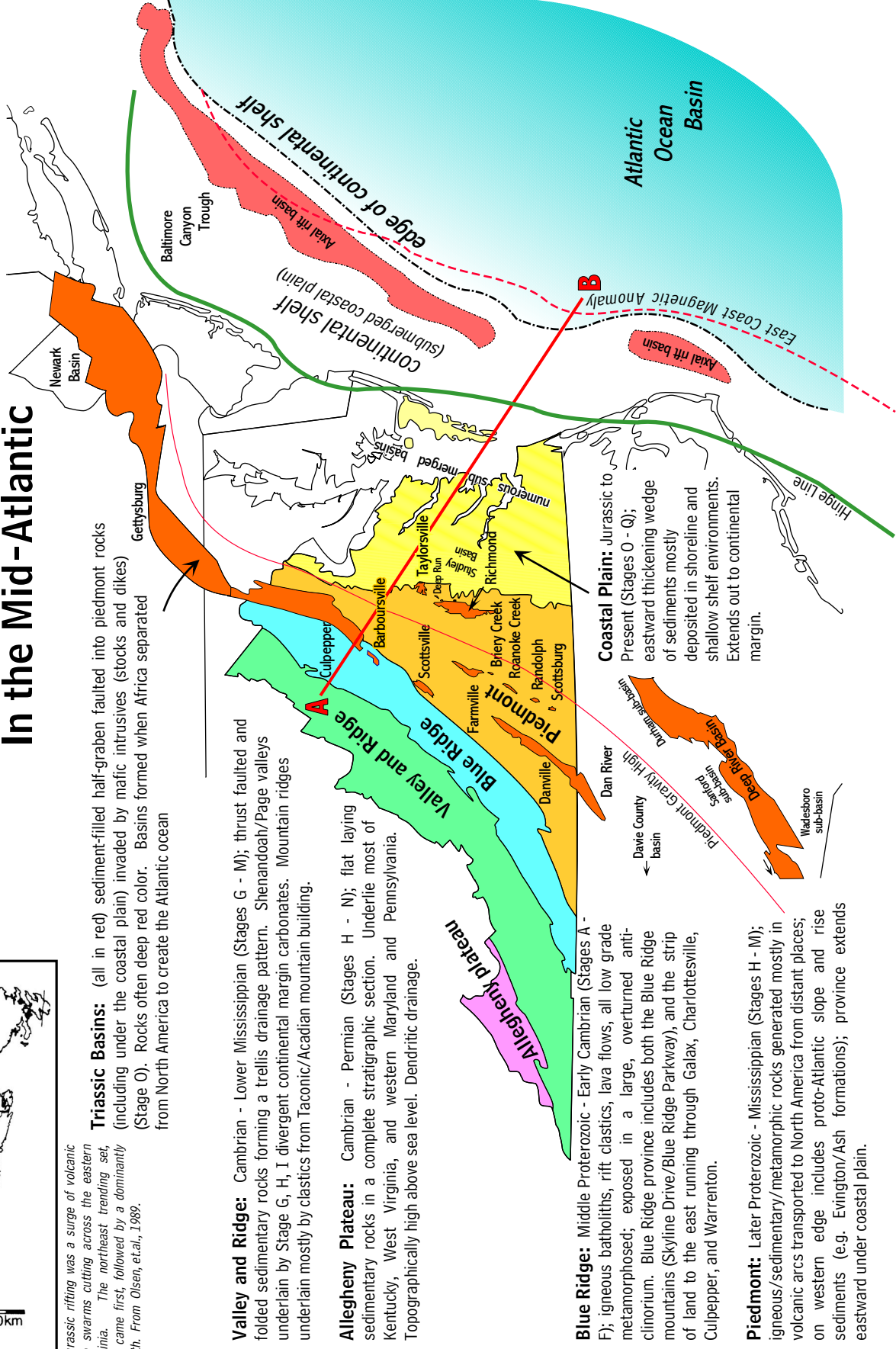


Richmond Basin cross section following complete subsidence. Although the history is complex, it begins with a wet climate and coal deposits such as the 36 foot thick Black Heath coal bed. In the middle history the climate is semi-arid and the area looks more like Nevada - desert-like with dry river washes and scrub vegetation - than Virginia. By the end it has been estimated that the entire piedmont is buried under thousands of feet of sediment.



Accompanying the Triassic-Jurassic rifting was a surge of volcanic activity resulting in extensive dike swarms cutting across the eastern seaboard, including much of Virginia. The northeast trending set, concentrated in the north probably came first, followed by a dominantly northern set concentrated in the south. From Olsen, et al., 1989.

Modern Provinces and Geologic Features In the Mid-Atlantic



Triassic Basins: (all in red) sediment-filled half-graben faulted into piedmont rocks (including under the coastal plain) invaded by mafic intrusives (stocks and dikes) (Stage O). Rocks often deep red color. Basins formed when Africa separated from North America to create the Atlantic ocean

Valley and Ridge: Cambrian - Lower Mississippian (Stages G - M); thrust faulted and folded sedimentary rocks forming a trellis drainage pattern. Shenandoah/Page valleys underlain by Stage G, H, I divergent continental margin carbonates. Mountain ridges underlain mostly by clastics from Taconic/Acadian mountain building.

Allegheny Plateau: Cambrian - Permian (Stages H - N); flat lying sedimentary rocks in a complete stratigraphic section. Underlie most of Kentucky, West Virginia, and western Maryland and Pennsylvania. Topographically high above sea level. Dendritic drainage.

Blue Ridge: Middle Proterozoic - Early Cambrian (Stages A - F); igneous batholiths, rift clastics, lava flows, all low grade metamorphosed; exposed in a large, overturned anticlinorium. Blue Ridge province includes both the Blue Ridge mountains (Skyline Drive/Blue Ridge Parkway), and the strip of land to the east running through Galax, Charlottesville, Culpepper, and Warrenton.

Piedmont: Later Proterozoic - Mississippian (Stages H - M); igneous/sedimentary/metamorphic rocks generated mostly in volcanic arcs transported to North America from distant places; on western edge includes proto-Atlantic slope and rise sediments (e.g. Evington/Ash formations); province extends eastward under coastal plain.

Coastal Plain: Jurassic to Present (Stages O - Q); eastward thickening wedge of sediments mostly deposited in shoreline and shallow shelf environments. Extends out to continental margin.

Line A-B is approximate location of cross sections A through Q.