

i16 Pangean intracontinental mountains < thin-skinned tectonics >

All the present continents are fragments of Pangea. An exception is South Paleochina that was an island continent until it joined Asia during the Cenozoic (**Figure i16.1**). North America has moved 30° north and has rotated counterclockwise 20° since the beginning of the Jurassic. North America is a fragment of Laurasia. The opening of the North Atlantic and transform-faulting separated Laurasia and Gondwanaland ending Pangea 180 Ma. In Pangea, the *area* of Laurasia-to-be included the Northern and Southern Laurasia realms, the latter of which included Florida. The supercontinent Pangea itself had only briefest existence. Its fragmentation had begun with rifting and grabening during the Triassic. Pangea was completed in the Early Triassic when North Paleochina joined, completing its Northern Laurasia realm. At the end of the Permian, a paleocontinent comprised of late-Devonian-sutured former paleocontinents, Paleosiberia and Paleokazakhstania, sutured with a paleocontinent comprised of the Southern Laurasia and Gondwanaland realms of Pangea-to-be. Marathon, Ouachita, Alleghenian,¹ and Hercynian, are the names of the orogenies east of each other along the join of the latter two realms. An end-Permian culminating feature of the Alleghenian orogeny is an almost horizontal, large displacement, thrust fault, that cuts through earlier foldings and steeper-dipping thrust faultings (**Figure i16.2**). Compressional disturbances of the Marathon, Ouachita (**Figure i16.3**) and Alleghenian orogenies began in the Late Pennsylvanian and those of the Hercynian orogeny began in the Late Devonian. The Hercynian mobile belt branches east into: the northerly Hercynides, the southerly Mauritanides, and the pre-Alpine between. What was sutured had been the ORS (Old Red Sandstone) and Gondwana paleocontinents, the latter of which included the area of now Florida. The ORS, evidently rotating counterclockwise, had closed at the beginning of the Pennsylvanian against the eastern part of Gondwana that was moving north. The ORS had formed early in the Devonian by the suturing of Paleobaltica and Laurentia paleocontinents. Gondwana was in existence as an island paleocontinent since the mid-Cambrian.

—and for all this “flagon with a dragon” wording, apologies to Danny Kaye!²



Figure i 16.1 Chronology of the break up of Pangea and its forming
(After John James Veevers, 1994)³

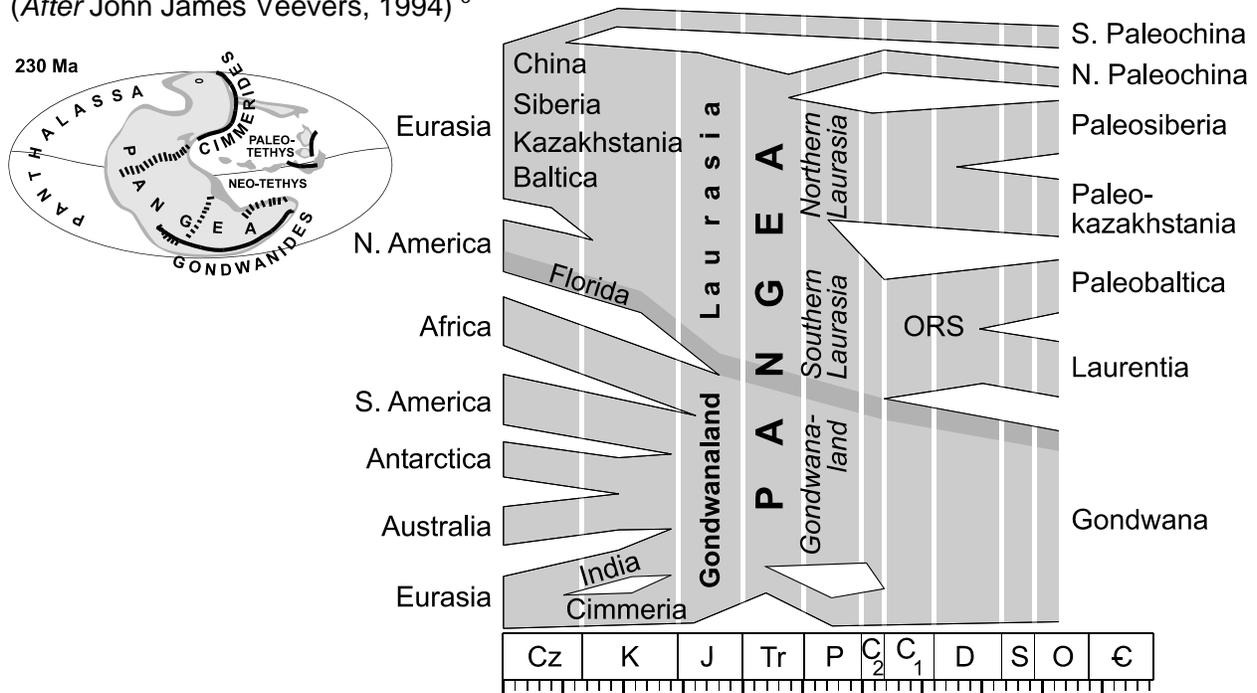


Figure i 16.2 Cross sections of the Appalachian orogenic belt (known geology in the upper bands). Pre-plate tectonic extrapolation and theorization (top cross section *after* Philip Burke King, 1950)⁴ shows the Piedmont as central part of the orogen. In 1979 deep seismic imaging revealed (bottom cross section) that the rocks of the Appalachians are the upper exposed part of an enormous thrust fault block. The thrust sheet is some 10 kilometers thick, and crustal shortening measures 400 kilometers to the west of the, newly inferred, 250 kilometer more easterly, position of the orogen's center (suture zone). The reinterpretation (bottom cross section *after* Frederick A. Cook, 1979),⁵ compatible with plate tectonic theory, has yet to be confirmed by deep drilling. This test is likely to be made, as the Paleozoic sediments, now believed to underlie the thrust sheet (though geothermally to hot for oil) are a prospect for natural gas.

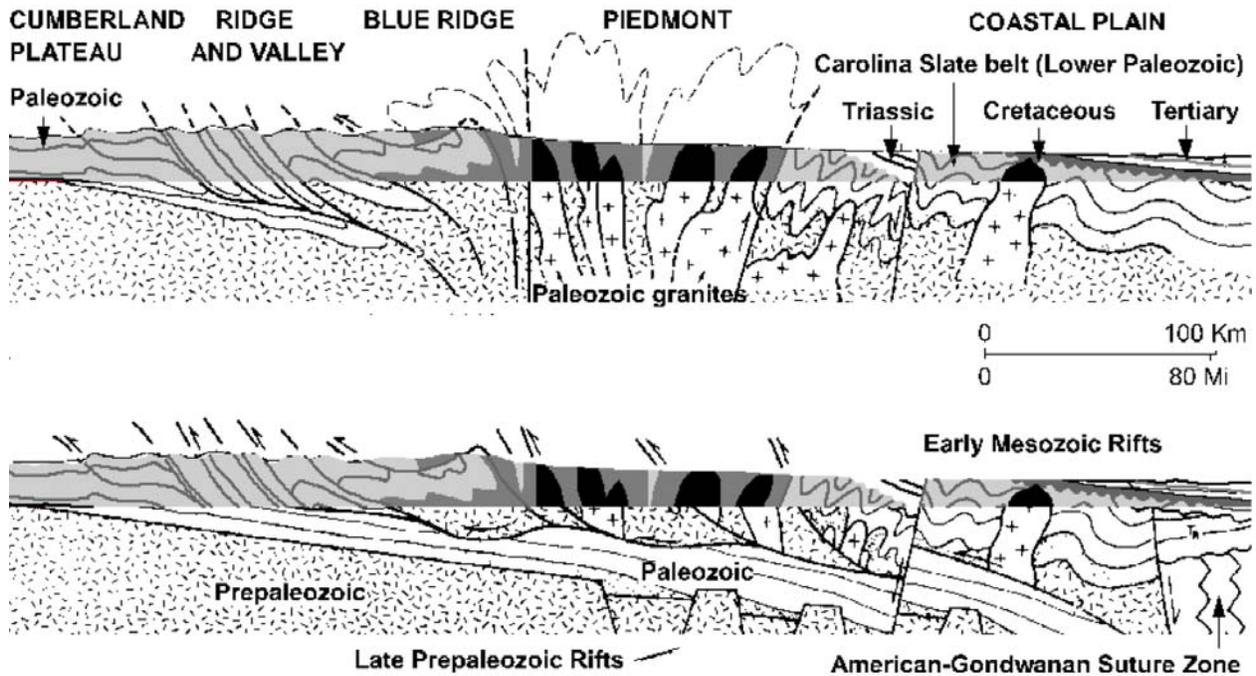


Figure i 16.3⁶ Ouachita fold belt

The geologic section shows folds and north-directed thrust faults of Late Pennsylvanian age. (Vertical exaggeration is ten times horizontal scale.)

