When the Acadian mountains were moving northwest, sediment was deposited in front of them into the closing Kronos Ocean. The Avalon Plate is shown below the Acadian mountains and represents the “basement” upon which all the other rocks lie. The sediments of the Littleton Formation are shown in yellow, blue, and orange. These will eventually become the high peaks of the Presidential Range. Beneath these sediments are the Silurian Rangeley (green), Perry Mountain, Smalls Falls, and Madrid Formations (all three in red). These were deposited earlier into the Kronos Ocean and were covered by the Littleton Formation. The Ammonoosuc Volcanics (purple) and Oliverian Dome (light blue) erupted and intruded in the Ordovician during the Taconic Orogeny that formed Vermont. The Snyder Brook, Mahoosuc, and Moose River Faults that will form during the Acadian Orogeny are shown as dashed lines. The white boxes between the faults will merge through time as the faults move. The rocks in those boxes will become a single column of bedrock representing the geology seen today.
400 Million Years Ago

During this time, D0 faulting along the Mahoosuc and Moose River Faults developed. This is shown on the diagram above as the merging of three of the separated white outlined boxes in previous diagram bounded by the same faults. The faults are shown as heavy black lines with half arrows indicating fault motion. Evidence from the field suggests that these were normal faults that developed shortly after sedimentation depicted in the first diagram. D1 folding is also shown on this diagram in the Littleton, Madrid, Smalls Falls, Perry Mountain, and Rangeley Formations. This folding probably post-dated the D0 faulting. The land surface of the growing mountains at this time would have been about 10 kilometers above the D1 folds shown here. We do not know what geologic features existed in that upper 10 kilometers, as none of it remains due to hundreds of millions of years of erosion. All of these eroded rocks made their way to the Atlantic Ocean and were deposited as sediments, up to 15 kilometers in thickness, along the East Coast. In essence, the diagram above shows what was likely occurring 10 kilometers deep in the Earth during the beginning of the Acadian Orogeny.
380 Million Years Ago

At this time, the D2 Snyder Brook Fault formed and widespread metamorphism developed. The Snyder Brook Fault cut through the Perry Mountain, Smalls Falls, and Madrid Formations (in red) and juxtaposed the cooler Littleton Formation (in yellow) against the hotter Rangeley Formation (in green). The heat within the Rangeley Formation was so great that some of it actually started to melt as temperatures approached 700° C, turning those portions into a metamorphic rock with igneous-like characteristics, called migmatite. It was so hot that portions of the Littleton Formation next to the Rangeley Formation partially melted (light yellow).

By this stage, all the once separated white outlined boxes have merged into a single column of bedrock. The mountains were likely at their highest in terms of elevation, probably about the size of the present Rocky Mountains. This diagram also represents the deepest the rocks of the Presidential Range were ever buried. The estimated depth of the geology shown in the diagram is approximately 13 kilometers below the land surface that existed in the Devonian time period.
Today’s Geology

This is a true-scale cross section from Randolph Valley to Mt. Adams with the Earth’s surface represented by the transition from the colored geology to the gray region above. The 13 kilometers of overlying rock has been eroded away. The last stages of folding, D4, the culmination of the Acadian Orogeny, are shown as folds in the orange, blue, and yellow layers of the Littleton Formation. Notice also that on this present day cross section the regional dip is towards the right or southeast for the Oliverian Dome (light blue), Ammonoosuc Volcanics (purple), Rangeley Formation (green), and three faults. This change in dip resulted from a physical process akin to a “lava lamp,” where the less dense Oliverian Dome rocks rose up as a solid, pushing aside the denser Ammonoosuc Volcanics. The rising Oliverian Dome tilted the once northwest dipping rocks to the southeast. This occurred around the same time as the D4 folds at the end of the Acadian Orogeny. The last gasp of the Acadian orogeny was the intrusion of a suite of igneous granites. These probably came from accumulations of the melted portions of the metamorphic rocks. The pink Bickford Granite (DCtmg) is shown above as it intruded into the already domed Ammonoosuc Volcanics.
Moose antler in Israel River tributary. Leave it as you see it.

D4 folds in a garnet layer within the Littleton Formation schists. These layers may have been garnet sands or thin volcanic deposits when originally formed.