

for a moment, the most powerful and loudest whitewater flow that you have ever seen. It's being squeezed through this narrow canyon. Now you may understand what happened here. **Continue along the trail.**

Stop 5 The cliff rising above you is a bit of a puzzle. Notice that the lower portion has a smoothed, sanded, or even polished look to it. The upper reaches of the cliff, however, are rugged and sharp edged. One hypothesis to explain this puzzle is that the lower reach of the cliff may have been abraded and sanded by the passing dirty floodwaters that carved the canyon itself. Turn around and you will see that this means the raging torrent must have been about 30 feet deep. If so we gain another insight about what was going on here at the end of the Ice Age. But that is a lot of water and perhaps there may be other explanations for what we see. **Continue on trail.**

Stop 6 Modern processes continue to develop Sloan Gorge. Here we see blocks of rock that are being periodically pulled downhill by gravity. **Continue along trail.**

Stop 7 "The Chimney." Here is an erosional peculiarity of little scientific significance, but nonetheless a fun feature to visit.

Stop 8 In the ledge above is an interesting geological structure that might be called a "channel-form." It appears to be the cross section of an old stream channel. The Catskill Delta was a land of many, many rivers, big and small. This seems to have been one of the small ones. You may find evidence of others if you look carefully. **Continue up the trail.**

Stop 9 We have a major break in the topography at this elevation. Notice a flattening. And, above and upstream, notice another set of sandstone ledges. Catskill Delta sandstones come in thick layered sequences or packages and we are passing from one to another. The delta crust was subsiding under the weight of the sediment and the rivers were meandering across the delta surface. A meandering stream would deposit a thick package of sediment and then move on. By the time it or another stream returned, the crust had subsided. So there began the deposition of a new package of sand on top of the old. That's what we see here. From this we learn to appreciate the enormous amount of deposition and time that is represented in Sloan Gorge. The Catskill Delta was active for many millions of years. **Continue on trail.**

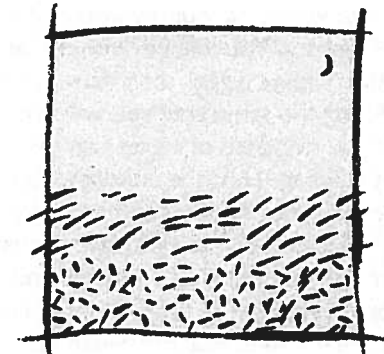
You can follow the trail a distance upstream, cross the gorge and return down the other side. Along the way, see if you can recognize some of the geological features you have learned about today. You will find all of these features throughout most of the Catskills.

Thank you for visiting the Sloan Gorge Preserve Geology Trail. Please consider supporting our mission by making a tax-deductible contribution to the Woodstock Land Conservancy. Feel free to contact us for other ways to help us preserve this special part of the Catskills for future generations.

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A Field Guide to the Geology of the Sloan Gorge Preserve Nature Trail

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The Sloan Gorge Preserve is the gift of the family of Woodstock artist Allan Edward Sloan (1900-1999), and is owned and maintained by the

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Welcome to the Sloan Gorge Preserve, owned and maintained by the Woodstock Land Conservancy and by the generous support of people like you.

The trail through the Gorge will take you through a very scenic slice of the greater Catskills region, a beautiful hike any time of year. It will also take you for a journey into our region's geological history. You will be "visiting" an ancient delta complex bigger than that of the Mississippi. Along the same trail you will learn to recognize the evidence of a great episode of mountain building. This, the Acadian Mountain Building event, created the northern Appalachians and rivaled the events of today's Himalayas. But, more than anything else you will find that Sloan Gorge records the history of the final moments of the Ice Age. In short, Sloan Gorge presents us with a summary of the geological history of the Catskills. Let's start.

Begin the Hike - From the Stoll Road trailhead at the back of the parking lot follow the yellow trail markers and take the left fork of the Yellow Trail just after the bridge. Soon you'll reach another fork at the Allan Sloan plaque. Follow that left to a tree with two yellow blazes. Go right here and up to the bluestone quarry.

Stop 1 A thick ledge rises above you. Imagine that it is roughly 375 million years ago, a time called the Devonian Period. You have arrived at the Catskill Delta complex. All around you is the

primitive tropical ecology of a vast delta complex that resembles the Ganges Delta of modern Bangladesh. The ledge in front of you is sandstone that accumulated as sand filled an ancient delta river channel. This petrified river once meandered across the Catskill Delta. Right in front of you are the typical features of a meandering river. You can pick out what is called "trough cross bedding" in the cliff.

The Himalayas and the Acadians are fraternal twins, separated by enormous lengths of time. The Ganges Delta lies at the foot of the Himalayas which formed when India collided with Asia. Likewise, here in the Northeast, there was a similarly large mountain range looming above our Catskill Delta. It formed when an early version of Europe collided with North America. Turn around and look to the east and in your mind's eye see the Acadian Mountains on our eastern horizon. They are snow capped and as majestic as anything in the modern Himalayas. Today all that is left of the Acadians are the hills east of the Hudson. Rivers descending through the Himalayas deposited the sands of the Ganges; so too the rivers that created the Catskill Deltas. **Turn around and follow the trail back along the wall to the rock quarry.**

Stop 2 Notice that the cliff has a smooth vertical face. If you look carefully you can make out a fracture pattern that resembles a giant feather. The smooth wall and its "fossil" feather comprise a feature called a "joint." Joints record ancient mountain building. These rocks and all

those around here were compressed during the Acadian mountain building event when that early version of Europe collided with North America. Later, during a time called the Late Triassic (about 200 million years ago), North America split from Europe and the two continents began drifting apart. At the moment of splitting, when stresses were released, the joint and its plumose structure formed as a loud fracturing of the rock. Look around the quarry here and you should find more river sandstone with its trough crossing bedding. **Continue north on trail.**

Stop 3 Before you is our memorial to Allan Sloan who donated this land to the Conservancy. A plaque in his honor rests on a heap of broken bluestone that dates back to when two quarries were developed here in the early 20th century. **Continue north on the trail.**

Stop 4 You have entered into a narrow canyon and you have also entered into a wholly different geological realm. While there is a fine canyon here, you may very well see little or no water. The stream may be entirely dry. How does a deep, narrow canyon form if there is no stream? After all, the rivers and streams do all the canyon carving. The answer takes us back to the end of the Ice Age. There was a chapter in time here when the glaciers, especially those in the mountains above, were melting. The melt water fed raging erosive streams that descended into the Hudson Valley. At that time Sloan Gorge was a powerful, erosive, whitewater torrent. It carved most of the canyon we see here. Imagine,