Much of the stream erosion to form the Chesterfield Gorge probably began with pre-glacial streams, and continued as the Ice Age (Pleistocene) ended **(Fig.1)**. As the ice was melting, and disappearing from this area, large streams of sediment laden glacial melt water began reshaping this landscape. These muddy streams followed the newly exposed terrain and the fractures in the granodiorite. Sediment laden streams are very erosive and probably formed much of the present day gorge.

Thus stream erosion along the combination of horizontal and vertical fractures, created the Chesterfield Gorge that you see here today. Present-day Wilde Brook is not carrying much sediment (note how clear the brook water is). It is frost action and root-pry within the bedrock fractures that continues to break-up the bedrock, very slowly enlarging the Chesterfield Gorge.

**New Hampshire Division of Parks and Recreation**

This park is un-staffed but is open to the public year-round at no charge. Please be reminded that no comfort stations are available and all items (including trash) must be carried out with you when you leave. Please stay on the main trail, as rocks can be loose and slippery. Should an emergency arise during your visit, please call 911 for assistance.

TITLE LXII of the NH CRIMINAL CODE CHAPTER 634 DESTRUCTION OF PROPERTY Section 634:2.XI states:
Under this law any person convicted of criminal mischief against a natural geological formation, site, or rock formation which has been designated as a natural area or landmark shall be guilty of a class A misdemeanor.


**Chesterfield Gorge Natural Area**

## HISTORY OF OWNERSHIP

**One man's generosity played an integral role in the preservation of Chesterfield Gorge.**
George White, a local farmer, bought the land in 1936 to prevent encroaching loggers from clear-cutting it. He sold fifteen acres of the Gorge to the Society for the Protection of New Hampshire Forests. The land was then donated to the State of New Hampshire.


**New Hampshire Division of Parks and Recreation**

Assisted by the NH Geological Survey and the Geological Society of NH

**More at:**
http://des.nh.gov/organization/commissioner/pip/publications/geologic/index.htm

Brochure Design (Version 17) by Samantha Oliver Graphic Design | 978.987.4124


*Explore the loop trail along this rocky gorge, eroded by Wilde brook*


# THE GEOLOGY OF THE CHESTERFIELD GORGE NATURAL AREA

NH Rte. 9, Chesterfield, NH

# HOW WAS IT FORMED?

**As you follow the Gorge Trail, you will see a dark colored crystalline rock exposed in the stream channel.** This local bedrock is a type of igneous rock called a granodiorite…a granite with darker colored minerals in it. Geologists currently believe this rock formed in the crust as molten rock, during the Ordovician time period (450 million years ago).*

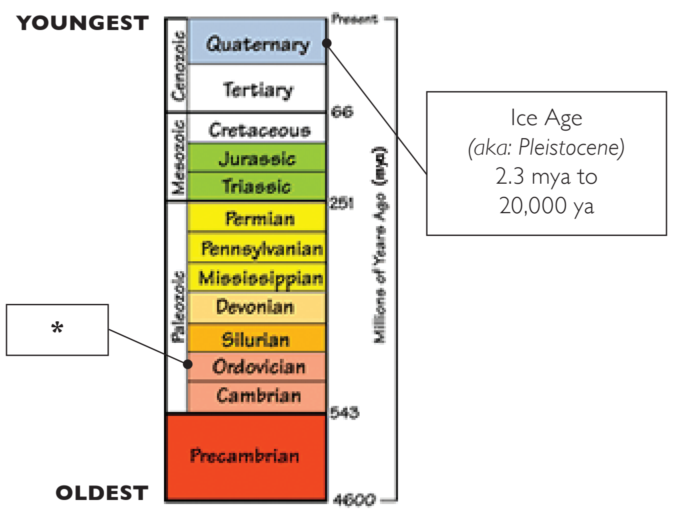


**Fig. 1.** Geologic Time Table

Since the Ordovician, there have been several more geologic collisions between pieces of the Earth's crust called plates. These plate collisions folded and faulted the bedrock into a large mountain system - the Applachian Mountains. The joining of all the plates eventually formed one super-continent called Pangaea. During Jurassic time **(Fig. 1)**, the plates began separating, breaking Pangaea up into the continents that we recognize today. The plates are still slowly moving, even as you read this.

During the 180 million years since the break-up of Pangaea, weathering and erosion have worn down the Appalachians, removing hundreds of feet of overlying rock and exposing this granodiorite. The erosion of all that overlying rock removed a lot of weight. This "weight loss" caused the granodiorite to crack parallel to the land surface. Geologists call all such cracks – bedrock fractures. These near horizontal fractures are known specifically as sheeting fractures **(Fig.2)**. At Chesterfield Gorge, they can be seen to slope slightly downward to the southwest… toward NH Route 9.

**Fig. 2.** Sheeting fractures dipping southwest (to the right) in the stream channel.

The sheeting fractures are intersected at near right angles by vertical fractures **(Fig. 3)**, the result of even older geologic stresses in the granodiorite.

**Fig. 3.** Two sets of vertical fractures, intersecting the horizontal sheeting fractures.


**Fig. 4.** Eroding stream "sliding" down sheeting fractures.
http://www.unb.br/ig/cursos/igb/curva7.gif

Streams follow the "path of least resistance." As Wilde brook eroded its way down through the overlying bedrock, it came to the granodiorite. The stream continued to erode, but now "side-slipped" down the sheeting fractures dipping to the southwest **(Fig. 2 & 4)**.

Whenever Wilde Brook came to a vertical fracture, it followed its zone of weakness. Looking at the stream from the upper bridge over Wilde Brook, the channel runs in a straight line, as it follows one of these vertical fractures. Just downstream from the bridge, Wilde Brook makes a right angle "bend" as it intersects another vertical fracture direction. Then it resumes a straight course along a different vertical fracture direction. Geologists call this a "rectangular drainage pattern." **(Fig. 5)**.

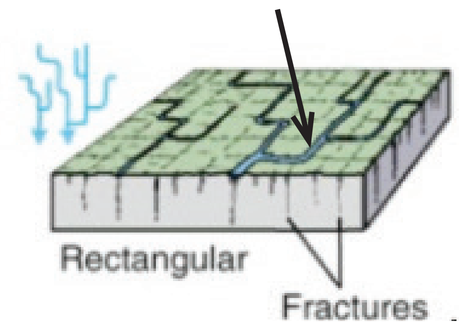


**Fig. 5.** Rectangular drainage pattern.

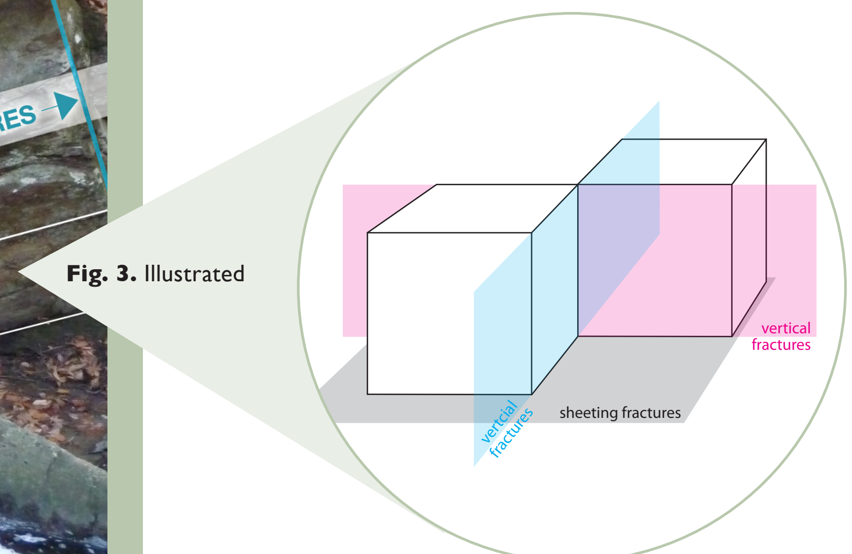


**Fig. 3.** Illustrated