

Geology



Cannon Cliffs is a familiar scene to many people. Did you ever wonder how these mountains got here? Or why geology plays such an important role in the North Country?

First, about 500 million years ago, this area was covered by an inland sea; the coastline was the present Gulf of Maine. Streams and rivers carried rock, mud, and sand into the sea. These sediments were deposited in layers on top of each other. The layers created enough pressure to compress the particles into rock. There were active volcanoes present and layers of volcanic rock were deposited on top of the sedimentary rocks, filling in the sea. Samples of those volcanic rocks can be seen along the Berlin-Gorham Road (Route 16).

The plate tectonics theory is used to explain how the mountains were formed. The continents are on separate plates of continental crust which move at a very slow (but measurable) rate. When two plates collide, the collision causes enough heat and pressure to fold the rocks at the earth's surface. Because the rocks in this area have been tightly folded, they became stronger. They are strong enough to hold up the Presidential Mountain Range.

About 475 million years ago, the rocks were bent into large-scale, broad folds and molten granite came up into the crust of the earth from below and cooled below the earth's surface. However, this particular mountain building event was not responsible for the mountains we see today. This area was again flooded by an inland sea about 400 million years ago. Mud, sand, and silt were deposited here and formed sedimentary rocks. These rocks covered the earlier mountains.

Then, about 380 million years ago, another mountain building event occurred which created the mountains we see today. Many of the rocks we see in this area have been metamorphosed by the mountain building events. The rocks change, and new minerals and layering called 'foliation' have developed in these rocks. One of the metamorphic rocks found in the Presidential Range is gneiss which has alternating bands of different minerals. The Imp Face is made of gneiss. Schist's are also very common in this area. Examples of schist's can be seen along the summit of Pine Mountain. Some people say the reason the mountains are called the 'White Mountains' is because of the silvery-white reflection off of the mica-schist rocks. Granitic rocks are also found here. Culhane Brook in Dolly Copp Campground has cut through the overlying rock and exposed the granite. This granite is light gray and is composed of quartz, feldspar, and mica. The rock is not folded or metamorphosed. It is younger than other rocks in the area.

About 300 million years ago, there were active volcanoes here again. The volcanic rocks have been weathered away, but volcanic vents are evidence that the rocks were here. Crystal Cascade in Pinkham Notch is a volcanic vent.

After the mountains were formed, the area started to be worn down by erosion. The erosion of mountains can be compared to a thirsty hiker and a glass of water. After a long hike, the person gulps down the water quickly. Gradually, he drinks less and less water, and finally stops when he is no longer thirsty. In a mountain building event, rocks are uplifted to higher elevations (tall, young mountains erode faster than old, lower ones because they are higher up). At first, the uplift occurs at a faster rate than the erosion, so mountains get higher. The uplift slows down, and both processes occur at the same rate. Finally, uplift slows down and erosion occurs at a faster rate and the mountains are lowered. Finally, both processes cease. This happened to the rocks and mountains here, the land was eroded to a nearly flat surface near sea level. A few 'bumps' remained which are the current Northern Presidentials.

After this erosion, uplift occurred once again. The Presidential Range was raised about 5000 feet. Streams cut new, deep valleys where Pinkham and Crawford Notches are now. The Gulfside Trail follows the remnant erosional surface. The mountains probably weren't ever much higher than they are now.