Maine Geologic Facts and Localities

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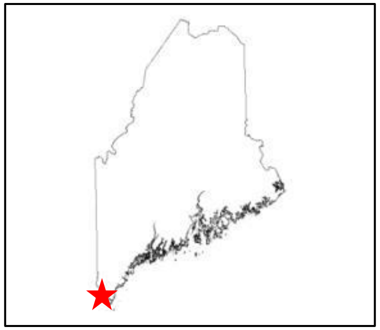
# *A Brief Geological Review of Coos Canyon, Byron, Maine*



44° 43‘ 11.96“ N, 70° 37‘ 52.01“ W

Text by
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## Introduction

A tour of the scenic byways of western Maine is not complete without a stop at Coos Canyon, a popular rest stop on State Highway 17 maintained by the Maine Department of Transportation. On a stretch of road designated as a National Scenic Byway, the formidable Coos Canyon was formed by the violent action of the Swift River as it pours from the Western Mountains across the metamorphic units that underlie this area. The waters of the Swift also carry with it flakes of precious metal from a "mother lode" somewhere out in the hills, making this a popular stop with gold panners (PDF). As you shake the sawdust of Rumford from your feet on your way to the breathtaking views at the Height of Land, you will not be disappointed during any season with a stop at Coos Canyon.


Photo by Robert Marvinney

## Bedrock Geology

From Rumford to Rangeley, this area of western Maine is underlain with a variety of metamorphic rock units ranging in age from around 490 to 400 million years, which are punctured by several bodies of granite and related igneous rocks that are as young as 370 million years old. The high ground to the west of the Swift River in the Byron area is underlain with metamorphic rocks in the contact zone with granite, making the metamorphic rock there particularly resistant to weathering and erosion.

At Coos Canyon, the Swift River cuts through the Perry Mountain Formation of Silurian age (418-443 million years). Named for exposures on Perry Mountain near Rangeley, this unit consists of alternating layers of quartzite and schist, typically in beds a few inches thick. The quartzite layers were originally fairly clean quartz sand, although some beds probably contained some clay minerals as well. The schist was originally silt and mud. Heat and pressure caused by multiple episodes of mountain building transformed these original sedimentary materials to the metamorphic rocks exposed today.

## Metamorphic Rock Weathering Patterns


Photo by Robert Marvinney

**Figure 1.** A moss-covered rock pavement near the parking area clearly illustrates the bedding style and differences in weathering and erosion of the layers in the metamorphic rocks. Beds are generally thin and fairly continuous at this locality. The ribs here are the quartzite beds - made up mostly of quartz which generally does not weather (break down on exposure to the atmosphere) and thus is resistant to erosion. The valleys between the ribs are schist composed primarily of mica, which is highly susceptible to weathering. Micas generally break down to clay minerals that are easily eroded. Originally horizontal bedding is now turned up on edge.

## Perry Mountain Formation


Photo by Robert Marvinney

**Figure 2.** Typical bedding in the rocks of the Perry Mountain Formation. This image shows light-colored quartzite layers with brown schist layers coupled in beds that are less than an inch to several inches thick. The light-colored knots in the schist layers are the metamorphic mineral andalusite. Although the layers in this image have all been exposed to the same metamorphic conditions, the andalusite is only found in the schist layers. Why is this? The parent materials for the schist were clay minerals rich in aluminum, a key component of andalusite. The quartz-rich layers were originally quartz sand which lacks aluminum, and thus will not support the development of andalusite and similar minerals regardless of metamorphic conditions.

## Schist Bed


Photo by Robert Marvinney

**Figure 3.** This image shows the flat surface of a schist bed. The dark knots (about ¼ inch in diameter) on this surface are the metamorphic minerals andalusite and staurolite. The sheen of the surface is produced by the parallel alignment of sheet-like crystals of mica.

## Preserved Sedimentary Structures


**Figure 4.** Some of the beds display well-developed sedimentary structures, as in this image. Within the roughly parallel edges of the light-colored quartzite beds are thin dark lines arranged in waves. These were originally ripples on the bed surface when the sand was deposited, now seen in cross section. That such fine structures have survived millions of years and multiple episodes of heat and compression is remarkable.

## Folds


Photo by Robert Marvinney

**Figure 5.** An example of folding in the layered rocks of the Perry Mountain Formation. Looking straight down on a rock surface, this image shows a V-shaped fold in the layers, open to the right side. This is a symmetrical-style fold in which the two sides of the fold are mirror images. Such features are common throughout the area and attest to the great forces that acted upon these rocks over the eons.

## Folds


Photo by Robert Marvinney

**Figure 6.** Another example of a fold, this one being asymmetrical in which the two sides of the fold are not similar.

## Weathering and Erosion


Photo by Robert Marvinney

**Figure 7.** A small pothole developed in the ledge at Coos Canyon. Potholes develop where water laden with sand and gravel swirls against the rock, gradually developing a depression that enlarges and ensnares more and larger particles from the swirling waters. Many of the large plunge pools at Coos Canyon started in this manner.

## Potholes and Boulders


Photo by Robert Marvinney

**Figure 8.** A clutch of granite boulders in a shallow depression in the metamorphic rocks, looking much like prehistoric eggs in a nest. Well rounded by the action of moving water, it is interesting to theorize how this grouping came to contain only granite boulders.

## Further Reading

Moench, R. H. and Hildreth, C. T., 1976, Geologic map of the Rumford quadrangle, Oxford and Franklin Counties, Maine: U.S. Geological Survey, Geological Quadrangle Map GQ-1272, scale 1:62,500.