

Geologic Site of the Month
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Thrust Faults in Northern Maine



47 10' 44.80" N, 68 53' 3.65" W

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Introduction

On the St. John River just upstream from Dickey is perhaps the most superbly exposed example of a thrust-faulted sedimentary rock layer in the entire State. Here a single layer of siltstone approximately 14 cm thick has been sliced and stacked upon itself to make a unit about 1 meter thick! (See photo above). More than 200 of these slices can be counted in the outcrop which is about 17 meters long. If the slices were all placed back in their original positions, the siltstone layer would have been over 100 meters long. The total reduction in length represented by shortening the siltstone from 100 to 17 meters is 83%.



Photo by Maine Geological Survey

Maine Geological Survey



Formation

The following sequence of figures shows how such a structure might have developed. Figure 1 shows a section of the original 14 cm layer as it appeared shortly after deposition. Compressive forces related to the closing of the proto-Atlantic Ocean about 400 million years ago (a collision of major crustal plates that geologists call the Acadian orogeny) resulted in thrust faulting of one section of the siltstone over another in a sequential fashion from west to east, as illustrated in Figures 2 and 3.

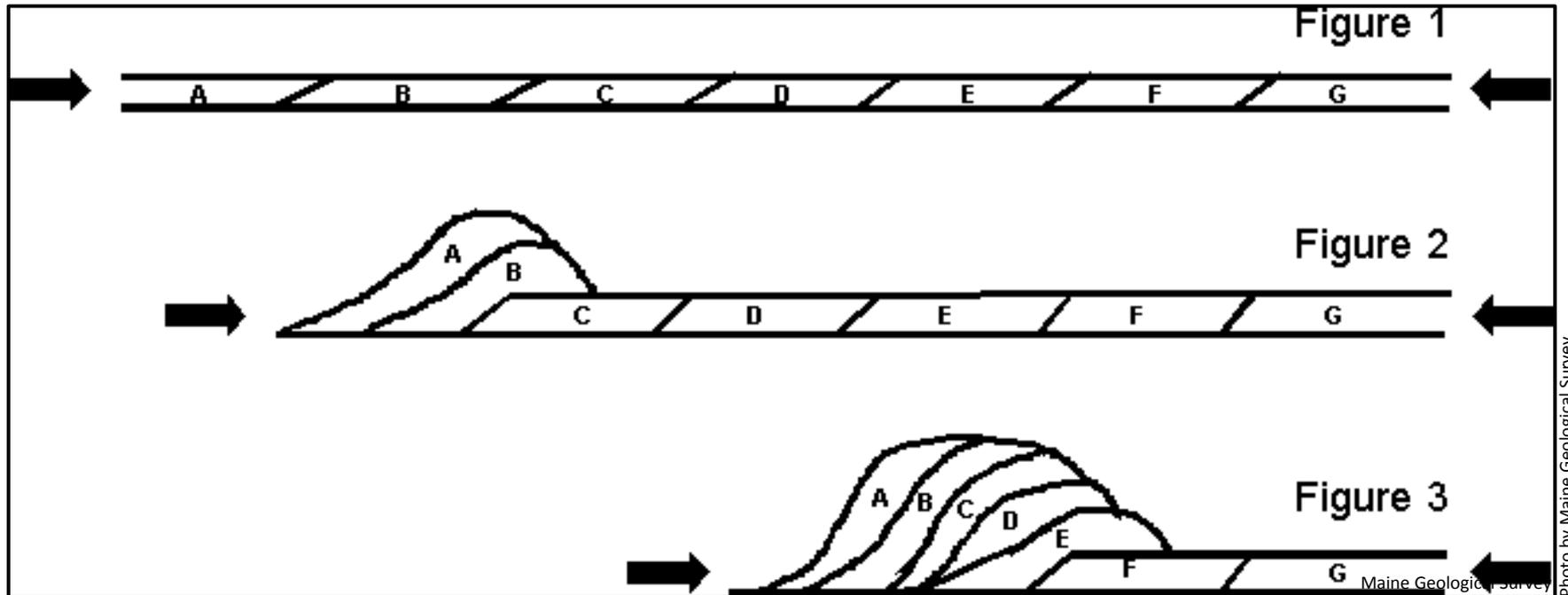


Photo by Maine Geological Survey



Formation

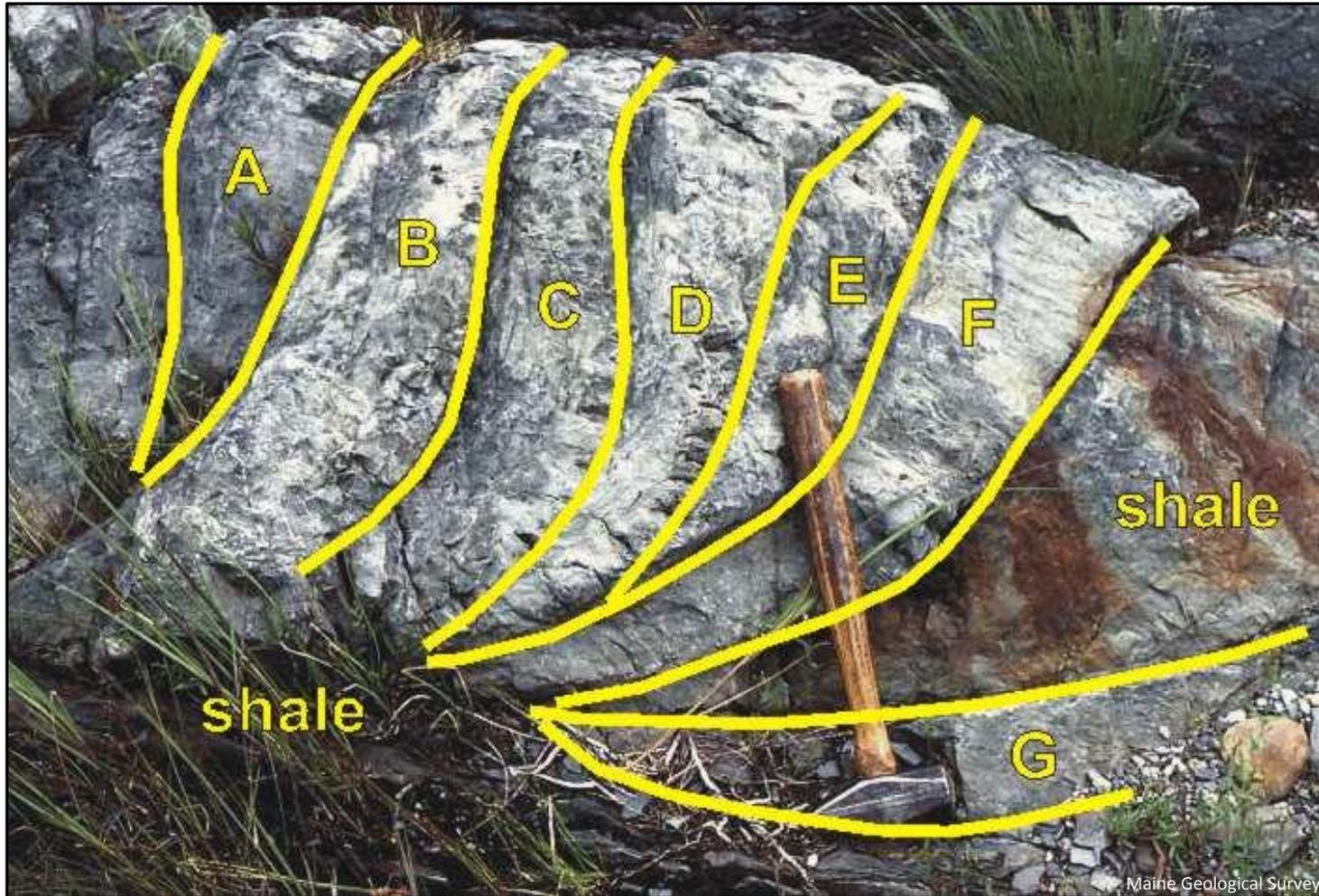


Figure 4. Final stacking of thrust faults (Figure 3) preserved in the outcrop along the St. John River.

Small and Large Scale

This outcrop is an excellent small-scale analog of crustal scale thrust-faulting in many mountain belts. Figure 5 shows a 50-mile section of the Canadian Rocky Mountains near Calgary showing individual thrust slices which are thousands of feet thick stacked on one another. By finding similar ancient structures preserved throughout the bedrock of New England, geologists believe that the Appalachians originally formed by a mechanism similar to that which produced the much younger Rockies and Alps.

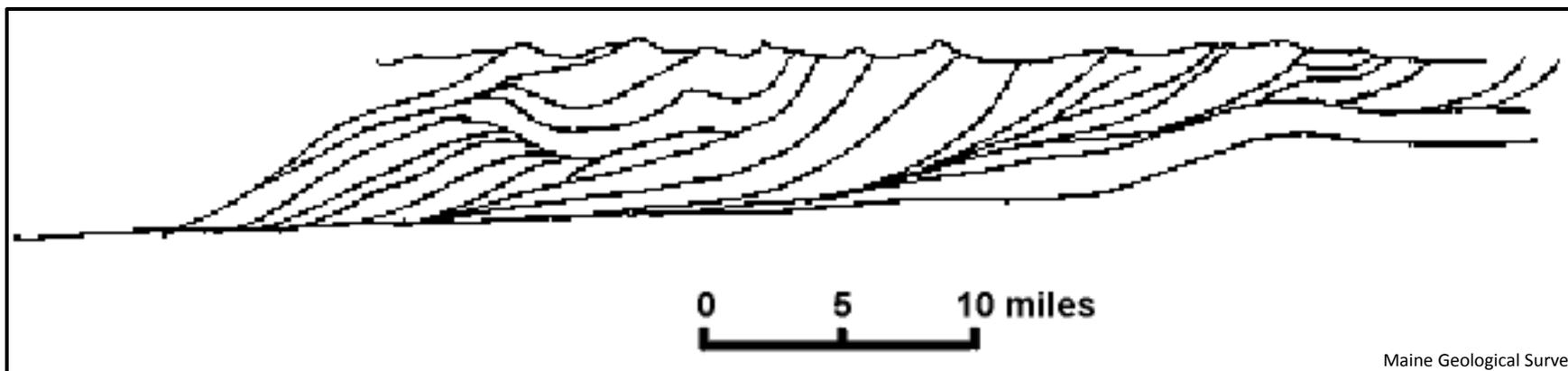


Figure 5. Sketch of thrust faulting in the Canadian Rocky Mountains.

References and Additional Information

Bradley, D.C. and Bradley, L.M., 1988, Early Acadian W-directed thrusting in the Connecticut Valley - Gaspé synclinorium, northern Maine, and its bearing on northern Appalachian plate kinematics: Geological Society of America, Abstracts with Program, volume 20, page 9.

[More about Maine bedrock geology](#)

To visit this outcrop, drive Route 161 west from Fort Kent to the village of Dickey, cross to the north shore of the St. John River on the bridge, and follow the dirt road west for 2.9 miles to the Walker Brook Picnic area. Park and walk downstream for about half a mile to the area of exposed bedrock.

