

Geologic Site of the Month  
October, 2004

***"Striped Ledge" on Keewaydin Lake, Stoneham, Maine***



44° 15' 52.18" N, 70° 49' 54.37" W

Text by  
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## Introduction

A couple of years ago the author of this Web page was doing some geologic mapping in the East Stoneham area in western Maine and came across an unusual bedrock outcrop on the shore of Keewaydin Lake (Figure 1). This ledge consists of metamorphic rock (gneiss) intruded by granite and granite pegmatite. The white pegmatite in turn is cut by a complex swarm of many narrow black basaltic dikes, giving the outcrop an unusual striped appearance. Photographs of the ledge appeared in publications during the early to mid 1900's, but the locality seems relatively unknown today.



**Figure 1.** Part of the East Stoneham 1:24,000 quadrangle, showing the location of Striped Ledge.



## Edson Bastin

Edson Bastin, a geologist with the U.S. Geological Survey, visited the site in 1906. He was gathering information for his publication on the "Geology of the Pegmatites and Associated Rocks of Maine" (Bastin, 1911). Fortunately, Bastin's field notes and photographs were archived, and it is still possible to obtain copies of them! Figures 2 and 3 show photos that were copied directly from his original negatives.



Photo by Bastin, 1911

**Figure 2.** View of Striped Ledge from Bastin (1911).



## Edson Bastin

Only the closer view (Figure 3) was used in Bastin's publication, in which it is captioned as follows: "Network of diabase dikes cutting pegmatite and associated gneiss at Keewaydin Lake, in Stoneham." Bastin gave a brief description of the outcrop, which he referred to as "Striped ledge." His use of quotation marks suggests that it was known by this name among local residents, although I have been unable to find any postcard views or other references to the ledge from the early 1900's.



Photo by Bastin, 1911

**Figure 3.** Close-up of the ledge, showing cross-cutting basalt dikes.



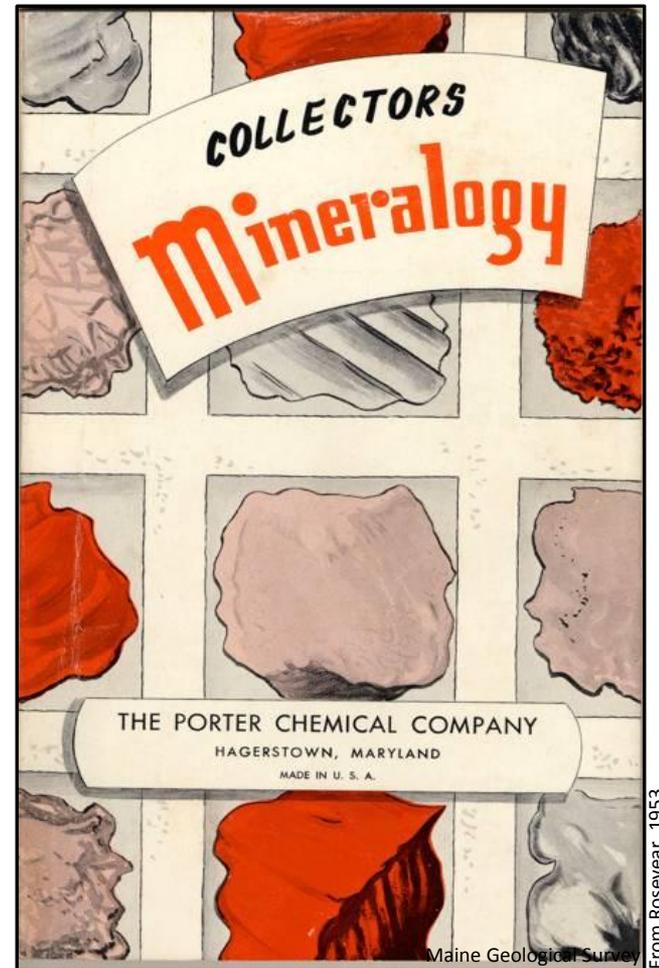
## Porter Chemical Company

The next published view of Striped Ledge appeared in an unlikely place, so a little background information is needed at this point. The Porter Chemical Company in Hagerstown, Maryland, marketed science kits to children for many years during the 20th Century. They introduced several generations of students (myself included) to the wonders of chemistry, mineralogy, and other subjects. The Porter company may be best known for their popular "Chemcraft" chemistry sets, which were sold in many sizes and varieties. However, the company also sold mineral kits. Early versions of these kits included sizable collections of specimens and testing apparatus, nicely packaged in wooden cases (King, 1994). By the 1950's, the kits consisted of a few tiny chips of minerals in cardboard boxes, accompanied by a streak plate and other items used for testing and identifying specimens.



Edson Bastin

The Porter kits included a useful guidebook to mineral identification - "The Collector's Mineralogy" (Figure 4). Two editions of the 144-page manual were authored by Francis Burt Rosevear, a graduate of Cornell University. Rosevear included many USGS photos of mining, minerals, and related subjects. It was easy for him to use these photos because they are Government property and in the public domain. It happens that Rosevear's manual shows the same photo of Striped Ledge that appears in Bastin's book, as well as several other photos that Bastin took in Maine.



**Figure 4.** Cover of "Collector's Mineralogy".

## Striped Ledge Today

Striped Ledge does not look quite so dramatic today as in Bastin's old photos, because it has become encrusted with lichens that reduce the contrast between the dikes and the host rock. However, it is still easy to see the intersecting dikes shown in Bastin's close-up view of the outcrop (Figure 5).



Photo by Woodson Thompson

Maine Geological Survey

**Figure 5.** Part of Striped Ledge in 2004, showing the same intersecting dikes seen in Bastin's photo (Figure 3).



## Striped Ledge Today

The dikes cutting the granite trend generally from southwest to northeast. They most likely intruded the host rock during the Jurassic period, when continental rifting (leading to opening of the Atlantic Ocean basin) caused extensive fracturing of New England's bedrock (McHone, 1992). Basaltic magma intruded these cracks, and cooled and solidified to form dikes such as those seen in Striped Ledge. Close examination of the ledge shows a complex intrusion history at this locality. Some of the dikes have layering parallel to their walls, which may have resulted from several pulses of magma into the fractures and/or chilling of the dike margins in contact with cooler host rock. The photos show that dikes locally cross one another, with the older dikes being offset where they are torn apart by the younger ones.

Detailed bedrock maps are not available for this area, but regional mapping just north of here suggests that the granitic rock and associated pegmatite around Keewaydin Lake are part of the Songo pluton of Devonian age (Moench and Pankiwskyj, 1988). This large pluton intruded older Silurian to Devonian metamorphic rocks that are exposed a short distance to the west. The granite gneiss seen at the north end of Striped Ledge might be a large inclusion of the metamorphic rock that was engulfed by the Songo granite. At the water's edge, the surface of the gneissic rock has been smoothed by glacial erosion. With favorable lighting, the wet surface shows glacial grooves trending north-south and presumably indicating ice flow in a southward direction.



## Further Information

Visitors are welcome to pull up their boat and enjoy this geological phenomenon. The site can also be accessed by a short hike through the woods from the north end of Ban Grover Road on the east side of Keewaydin Lake. Ask permission at David Hayden's house on the hillside at the end of the road, or call him first at (207) 928-3145.

The following contact information will be useful to persons wanting to check for availability of other USGS file photos:

U.S. Geological Survey Photographic Library, MS 914, Box 25046, Federal Center, Denver, CO 80225-0046

Phone: (303) 236-1010

FAX: (303) 236-1013.

Visit their website at the [USGS Earth Science Photographic Archive](#).



References

- Bastin, E. S., 1911, Geology of the pegmatites and associated rocks of Maine, including feldspar, quartz, mica, and gem deposits: U.S. Geological Survey, Bulletin 445.
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