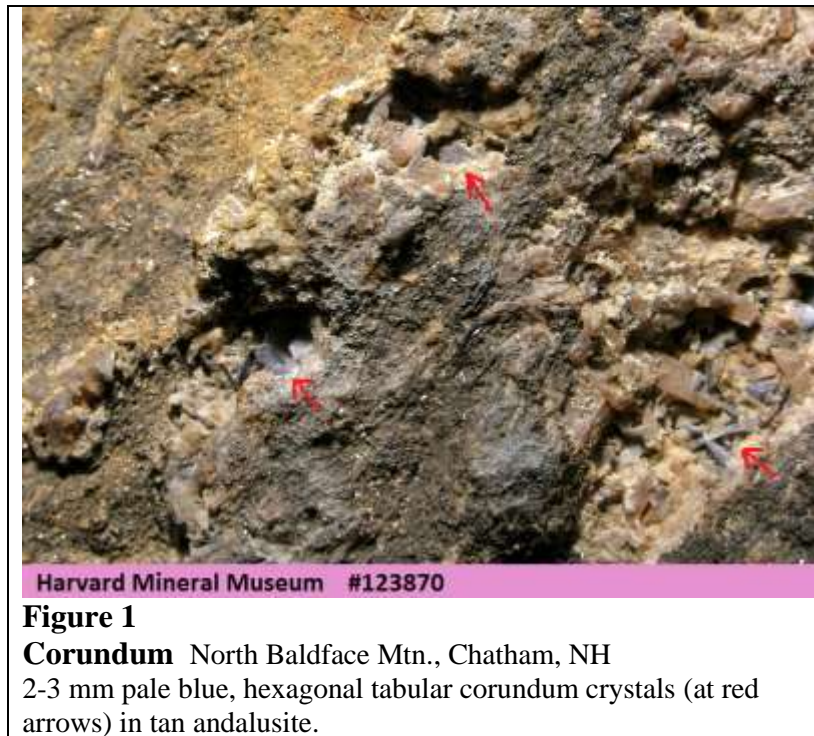


New Hampshire Corundum Quest - Tom Mortimer

A vacant hole for corundum has existed in my New Hampshire mineral species display for many years. The only known (to me) New Hampshire example of this species was in the Harvard collection. It is from Chatham, N.H., Figure 1.



Researching literature references for NH corundum, I found an article...*Ring-Dike Complex of the Belknap Mountains, New Hampshire*, by David Model in the Bulletin of the Geological Society of America, vol. 47, 1936. The article table 4 (pg. 1897) indicated that the Chatham group formation on the west slope of Piper Mountain (of the Belknap Range, Alton, Gilford, NH) contained as much as 4% corundum. My reaction was: if corundum is present in the rock at about one part in twenty-five, it should be a “slam dunk” to find a specimen. Collectors easily find beryl specimens in pegmatites where-in the beryl content is much less than 4%.

Numerous hiking trails traverse the Belknap Mtn. ring dike complex. These are maintained by the Belknap Range Trail Tenders (BRATTS). Hikers are afforded great views of the west side of Lake Winnepesaukee from Piper Mtn. (Figure 2).



Figure 2

Tom Mortimer, Piper Mtn. summit, Sept., 2014. The southern portion of Lake Winnepesaukee is visible in the background.

Armed with good trail maps (e.g. http://belknaprang.org/images/Two-sided_Map_for_Website.pdf), I have made several forays to explore Piper Mtn. over a four year period.

Even with knowledge that corundum could make up to 4% of some outcrops, I tempered my expectations knowing that I might find samples with only mm sized embedded grains. Corundum is very hard (mhos 9) and, as a consequence, it is very resistant to weathering. Its moderate specific gravity (4) enables gem varieties sapphire and ruby to be mined from alluvial deposits by sluicing-panning, for example in Burma and Montana.

As preparation for one Piper Mtn. trip, I wanted to see if I could successfully pan corundum-sapphire from quartz sand. I have four 2 mm to 3 mm pale-gray grains of Montana sapphire in my collection (from a mineral club give-away). As a backyard experiment, I mixed these grains with about a quart of beach sand (of comparable grain size) in my gold pan and panned the mixture with a garden hose water source. After a minute I had reduced the quart of sand to a few table-spoons and easily plucked out my four sapphire grains. I could do this!

There are several streams flowing down the west side of Piper Mtn. I therefore had a two-pronged approach for my corundum quest: I would collect rock samples from ledge outcrops and I would pan at several stream locations.

The geologic map from Model's 1936 report is included below, Figure 3. It identifies the Rockingham Mica Schist (rs) and the Gilmanton Monzodiorite (gm) on the west slope of Piper Mtn. Long & Roberts in *Stepping Stones Across New Hampshire – A Geologic Story of the Belknap Mountains*, 2005, show the formations on the west side of Piper Mtn. as the Gilmanton Monzodiorite (am) and the Rangley Formation Mica Schist (Sr), Figure 5. Most recently, we have the geologic map from the GSNH 2013 Field Trip to Belknap Mtns., Figure 6, that shows the west side of Piper Mtn. occupied by the Ames Augite Monzodiorite (J8), the Lower (Srl), and Upper (Sru) Rangley formations.

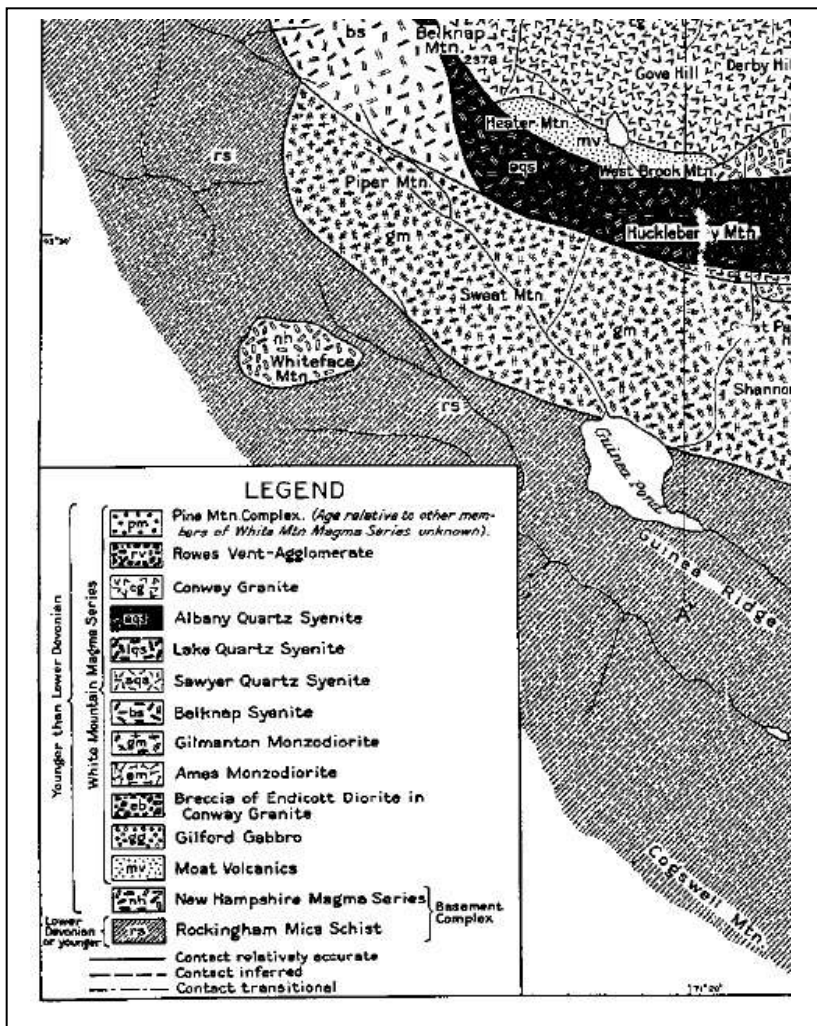


Figure 3 Model, 1936

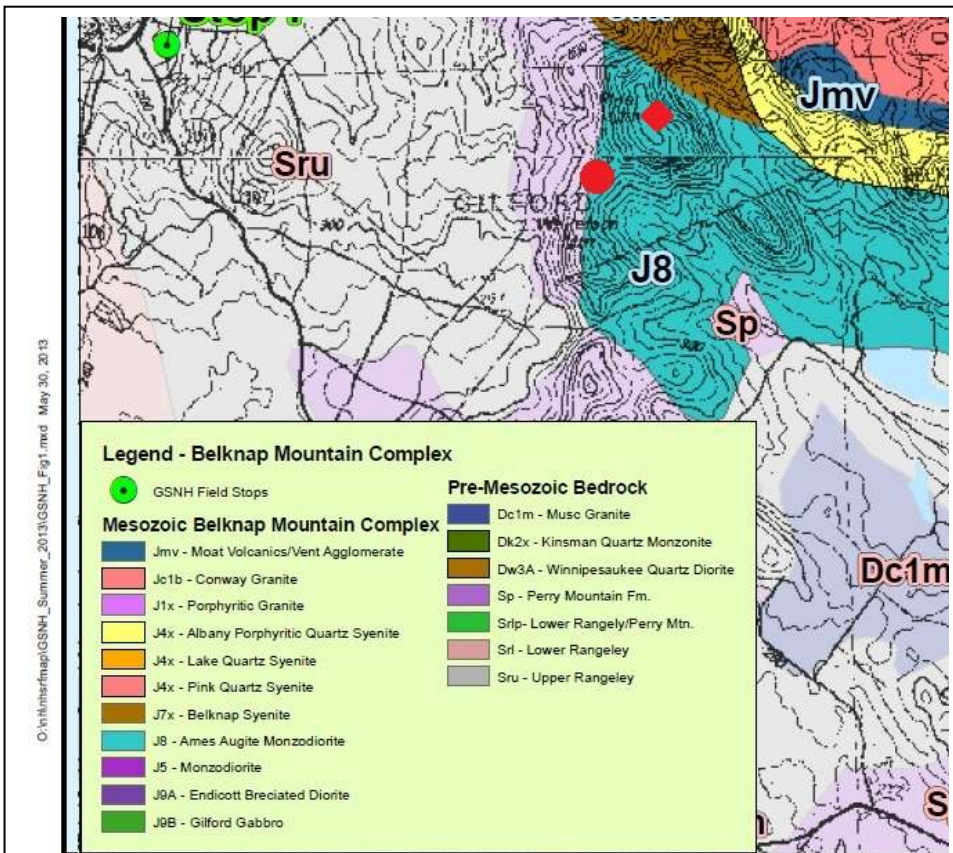
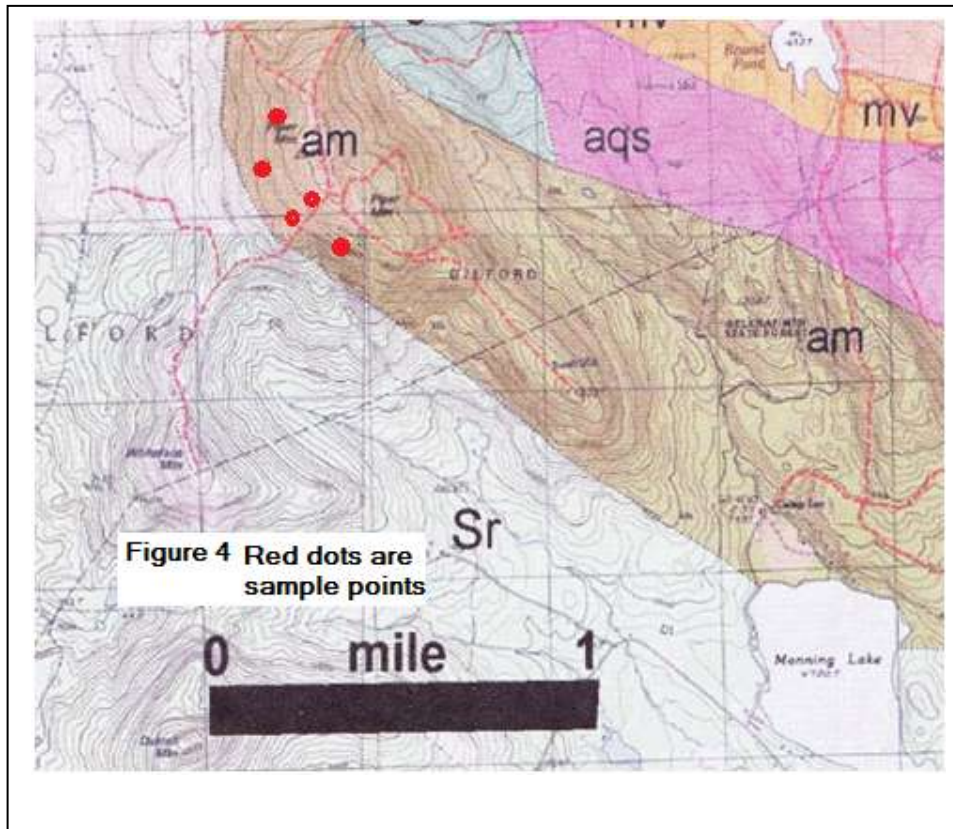


FIGURE 5: Portion of the geologic map from the 2013 Geologic Society of New Hampshire field trip. Added annotation: Red diamond, summit of Piper Mtn. Red circle, saddle between Piper Mtn. and Whiteface Mtn. Sp, (light purple) is Perry Mtn. formation.

The trails on Piper Mtn. provide easy access to portions of the Chatham Group lithologic unit, a medium grained gneissic rock. For my exploration trips I prepared a laminated topo map sheet marked with GPS coordinates of areas I wanted to visit. I wanted to ensure that I had visited a relatively broad cross-section of the Chatham formation and the contact with the monzodiorite on Piper Mtn.

My four day-long visits spread over four years to the Piper Mountain area yielded no corundum. I panned several spots on two streams, and brought home dozens of pounds of ledge samples (of both the schist and monzodiorite) for close examination. As the included photos show, I did find a few interesting minerals to add to my collection.



Figure 6
Anorthite-Labradorite 5 cm specimen. The black amphibole is likely augite.
Piper Mtn. Gilford, NH



Figure 7
Anorthite-Labradorite 1 cm fov from Fig
Piper Mtn. Gilford, NH



Figure 8
Sillimanite 9 mm sillimanite crystal
Panned from stream, Piper Mtn. Gilford, NH



Figure 9
Sillimanite in biotite, 5 cm specimen
Rangely formation, Piper Mtn. Gilford, NH

Larger views of the photos in this article may be seen the galleries of the respective species on <http://mindatnh.org>.

Following this concerted but fruitless effort, I was resigned to a very low probability of ever acquiring a corundum sample for my NH species display. (A hike to N. Baldface is beyond my physical ability.) My fortune changed at the June 2016 MMNE symposium when member Don Swenson informed me that he had spotted a micro-boxed corundum specimen from North Baldface Mtn., Chatham, NH on the sales table. The habit and andalusite association of the corundum crystals was identical to the Harvard specimen. The old label

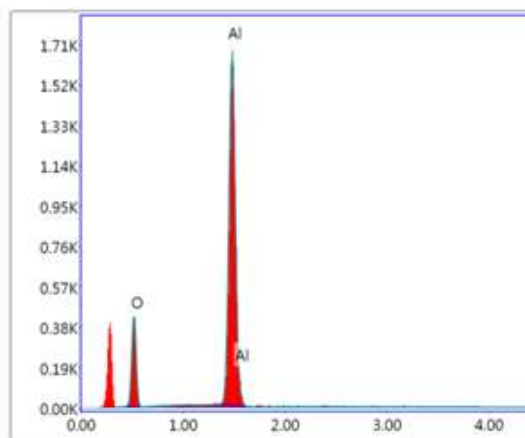
indicates "G. George '63". (Likely Gilbert George of Cranston, RI, a past member of the Micromounters of New England.) Most all of the corundum tablets on this 2 cm specimen are, unfortunately, broken, but there are a couple of complete ones.

An EDS analysis confirmed only aluminum and oxygen were present in these blue tablets. Corundum chemistry is: Al_2O_3



CORUNDUM Bald Face Mtn., Chatham, NH
1 mm blue corundum tablet crystal

Element	Weight %	Atomic %
O K	32.14	44.40
AlK	67.86	55.60



Lsec: 50.00 Cnts: 0.000 keV Det: Octane Plus Det



CORUNDUM Bald Face Mtn., Chatham, NH
2 cm specimen. Corundum tablets on pinkish andalusite



CORUNDUM Bald Face Mtn., Chatham, NH
G. George specimen label