An Ode to Audley

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The Audley Quarry, beside Rt. 3, south Merrimack, NH, has produced many excellent micro-mineral specimens for collectors for almost two decades. The Ryan Audley Corporation operated the site for crushed stone "road-metal" aggregate. My first visit to the quarry was in August 2003. My interest was piqued by the similarity to the geology of the Nashua Mine Falls bedrock. At Mine Falls, excellent specimens of micro anatase, brookite, arsenopyrite and several zeolite species have been collected. The credit for these discoveries goes to Scott Whittemore, an MMNE member during the 1980-1990's. I alerted Scott to the blasting for a hydro dam, having found some massive arsenopyrite specimens. Scott's micro-mineral finds here were eye-opening for me.

Knowledge that the titanium species anatase and brookite could be found in the thin quartz fracture seams of the country rock was key in discovering them at Audley. Many of these seams at Audley are filled with a fine black powder, making it most difficult to spot micro crystals. The successful collecting approach was to fill a bucket with fracture seam containing chunks and bring them home for cleaning.

Club president Scott Rielly arranged for a club field trip to the quarry in May of 2017, figures 1 & 2. Most members came home with nice micros of anatase. I authored a trip report in the June 2017 newsletter.

Figure 1: Audley Quarry 2017, Peter Cristofono photo from MMNE field trip.

Figures 3 through 19 illustrate the species to be found at the Nashua Audley Quarry.

Figure 2. May 2017 MMNE field trip.
Peter Cristofono photo

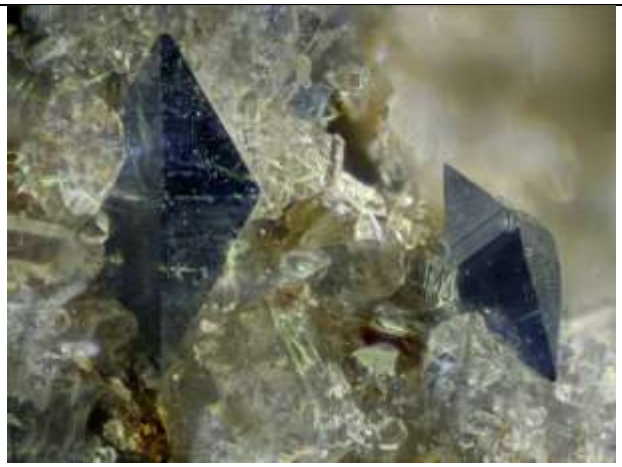

Figure 3. Anatase
Larger crystal is 1.0 mm

Figure 4. Anatase. 0.3 mm crystal

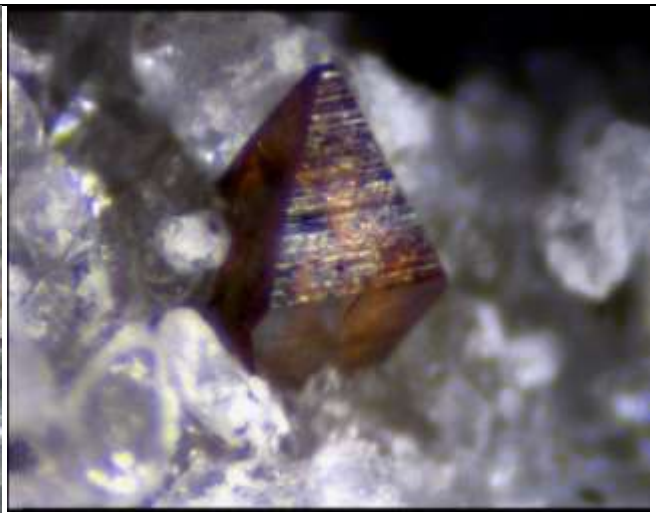

Figure 5. Anatase 0.5 mm crystal

Figure 6. 0.5 mm anatase crystal on quartz crystal

Figure7. 0.5 mm orange anatase crystal

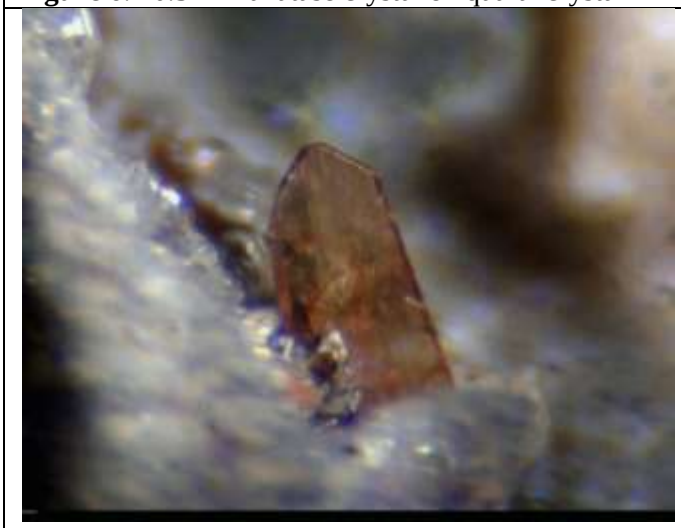

Figure 8. Brookite 0.7 mm crystal

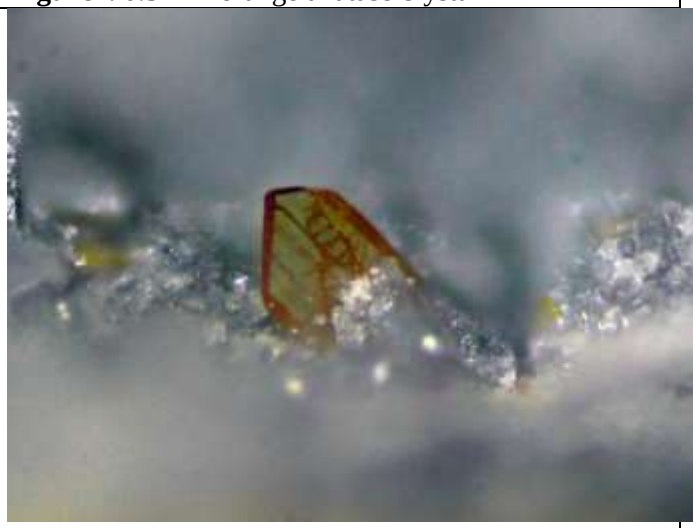

Figure 9. 0.1 mm brookite crystal. (Tiny !)

Figure 10. Titanite 0.7 mm crystal

Figure 11. Calcite, "butterfly" habit. 2.8 cm specimen

Figure 12. Orthoclase var. adularia. 8 mm FOV

Figure 13. Pyrrhotite 4.5 mm xl pair, with tiny pyrite

Figure 14. 2.5 mm field of view
Unknown yellow hexagonal crystal with anatase

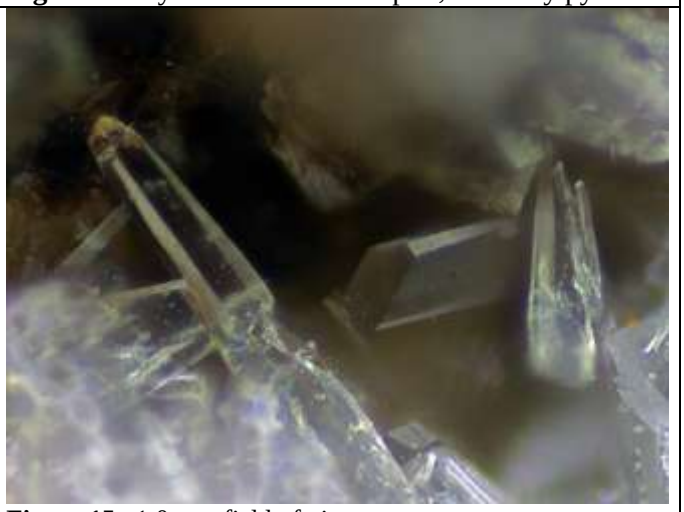

Figure 15. 1.0 mm field of view
Gypsum

Figure 16. Chlorite group – vermiform (worms)
1.3 mm field of view

Figure 17. Malachite with chalcopyrite
4 mm field of view

Figure 18. Aragonite – top of a ball, visual ID
1.6 mm field of view.

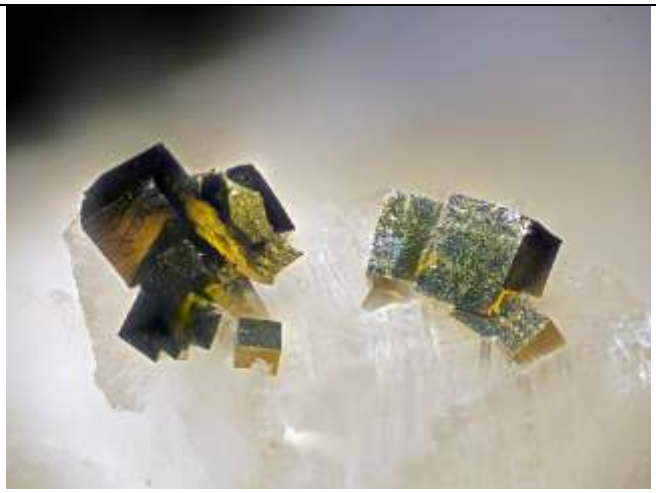

Figure 19. Pyrite on calcite
2 mm field of view.

Prior to 2022, the Audley Quarry remained dormant for several years. In the winter and spring of 2023, blasting and crushing resumed at a furious pace. A full crew was present, even on weekends, with multiple crushers and loaders in operation.. The report is that the land is a future site of a distribution center. The close proximity to the highway makes this a desirable location. The thought of so many beautiful anatase and brookite specimens destined to be entombed in concrete and asphalt is most painful to the author. Fortunately a few have been preserved for future appreciation.

In the end, the mineral collecting community is most grateful to the rock quarry industry for all the fresh material they expose. A large portion of field collecting opportunities and collection additions have been furnished from visits to these sites.

Minerals found at the Audley Quarry, Merrimack, NH.

Anatase. (Figures 3 – 7) For the micro-mineral collector, anatase crystals from the Audley Quarry are the most sought-after species. They are moderately abundant, found in thin (1 to 3 mm thick) quartz crystal and adularia seams in the country rock. The color range of these anatase crystals is quite remarkable for a single locality. The most common habit is the striated, steep-terminated, crystal form, for which the species is well known. Some crystals exhibit a flat termination at the apex.

Aragonite. (Figure 18) A visual identification of spiky balls of milky crystals suggested aragonite. It was only seen on one specimen.

Brookite (Figures 8 & 9) Brookite is another very desirable species to be found at Audley. It is a titanium dioxide trimorph with anatase and rutile. Brookite is rare at Audley and very difficult to spot, occurring as transparent, paper-thin, crystals. It is uncommon in New Hampshire, known (to the author) only from Audley, Mine Falls Park, Nashua, and the Pike Hooksett Quarry.

Calcite. (Figure 11) Calcite is the only species that I collected at Audley that was available in TN and larger specimens. Blasting in 2003 exposed a long vertical vein of fine-grain, yellow-stained, calcite with thin, flat, hexagonal, milky, calcite crystals to 5 mm. Micro crystals of calcite with this same habit are also found in thin seams of the country rock.

Chlorite Group. (Figure 16) Tiny "worms" of a vermiform chlorite group mineral were observed on a few specimens. These were discovered after cleaning specimens that contained other species.

Gypsum (Figure 15). Gypsum occurs as lustrous clear prisms to about 1 mm. It is uncommon, but it would not be surprising to find it abundant in some quarry localized areas.

Malachite (Figure 17) A single specimen of chalcopyrite with a rim of malachite crystals was found. A muriatic acid test gave a strong fizz, indicating a carbonate species.

Orthoclase variety adularia. (Figure 12). This is classic adularia habit, stubby, rhombic prisms. An EDS analysis indicated the potassium feldspar species. Adularia is common at Audley.

Pyrite (Figure 19). Pyrite is most frequently seen at the quarry with calcite and on adularia. The cubic form is most common, but pyritohedrons are also seen.

Pyrrhotite (Figure 13) Occurs rarely as hexagonal tablets, more commonly as bronze-colored, masses. The excellent specimen of figure 13 was found by Bob Janules. It is the best crystallized pyrrhotite specimen that I have seen from NH.

Titanite (Figure 10). Titanite is rare at the Audley Quarry. Field collected examples are transparent pale-brown, occurring on quartz crystals.

Unknown (Figure 14) A few specimens with mm-sized, pale-yellow, hexagonal, prismatic crystals were found. These strongly resemble the synchysite-Ce (EDS verified) crystals found at Mine Falls Park, located a few miles to the south. EDS analysis (Boston College lab) of these Audley crystals showed no rare earth elements present. Elements reported by the analysis were Ca, Si, Al, Mg, Na. No species matched this particularly well.