Gems and Minerals of Maine Pegmatites

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Granitic pegmatites in Maine have been collected, commercially mined, and scientifically investigated for two centuries. Feldspar is by far the most important commercial product, but it is the sporadic production of gemstones beginning in the 1820s and continuing to the present that sustains interest in exploring Maine's many pegmatites. The only other pegmatite district in North America with significant gem production is in San Diego County of southern California.

In a review paper Wise and Francis (1992) using the scheme of Cerny (1982) classified Maine's pegmatites as "rare element" pegmatites and grouped them into two pegmatite "fields". The Brunswick field is located along the seacoast northeast of Portland. The Oxford field is inland northwest of Portland. A fault of regional significance separates the two terranes in which they are located. Both fields have been subdivided into clusters of pegmatites termed "series." The Brunswick field comprises four series of which the Topsham series is the most important and mineralogically interesting. It was the pioneering feldspar mining district in Maine. The Oxford field is much larger and comprises nine series. Cerny's model of pegmatite petrogenesis envisions a parent pluton of fertile granite surrounded by a fringe of daughter pegmatites with the pegmatites furthest from the pluton being the most enriched in rare elements. At least superficially the pegmatite series of the Oxford field corresponds to this model, whereas the Topsham series in the Brunswick field lacks an apparent parent. For this and other reasons the petrogenesis of Maine's pegmatites still cannot be considered well understood despite a century of study.

In contrast, the mineralogy of Maine's pegmatites is well established. Approximately 100 species have been identified in Maine pegmatites and pegmatites host the greatest diversity of minerals in any geological environment in Maine. All of the pegmatites are granitic and peraluminous in composition. Granitic implies that quartz is abundant. Peraluminous means that they carry more than enough aluminum to combine with all of the potassium and sodium to form feldspars (microcline and albite). Excess aluminum is incorporated in such accessory minerals as almandine, chrysoberyl, gahnite, muscovite, topaz, and tourmaline. The primary iron-manganese phosphates triphylite and lithiophilite are common and their breakdown leads to a large suite of secondary minerals that occur mostly as micro crystals. Uraninite and its secondary minerals are also present but not important compared to occurrences in adjacent New Hampshire and North Carolina. Maine's most famous pegmatite mineral is purple fluorapatite. Highly faceted gemmy crystals were discovered at the P.P. Pulsifer quarry in Auburn in 1901. Spectacular new finds of particularly deeply colored crystals were made there in 1966 and 1967. Purple fluorapatite also occurs in pockets at several other pegmatites. Beryllonite, gainesite, kosnarite, landsite, and perhamite, all phosphates, were first described from Maine pegmatites. The *Mineralogy of Maine* by Vandall T. King and Eugene E. Foord (1994) is an exhaustive compendium on Maine's minerals.

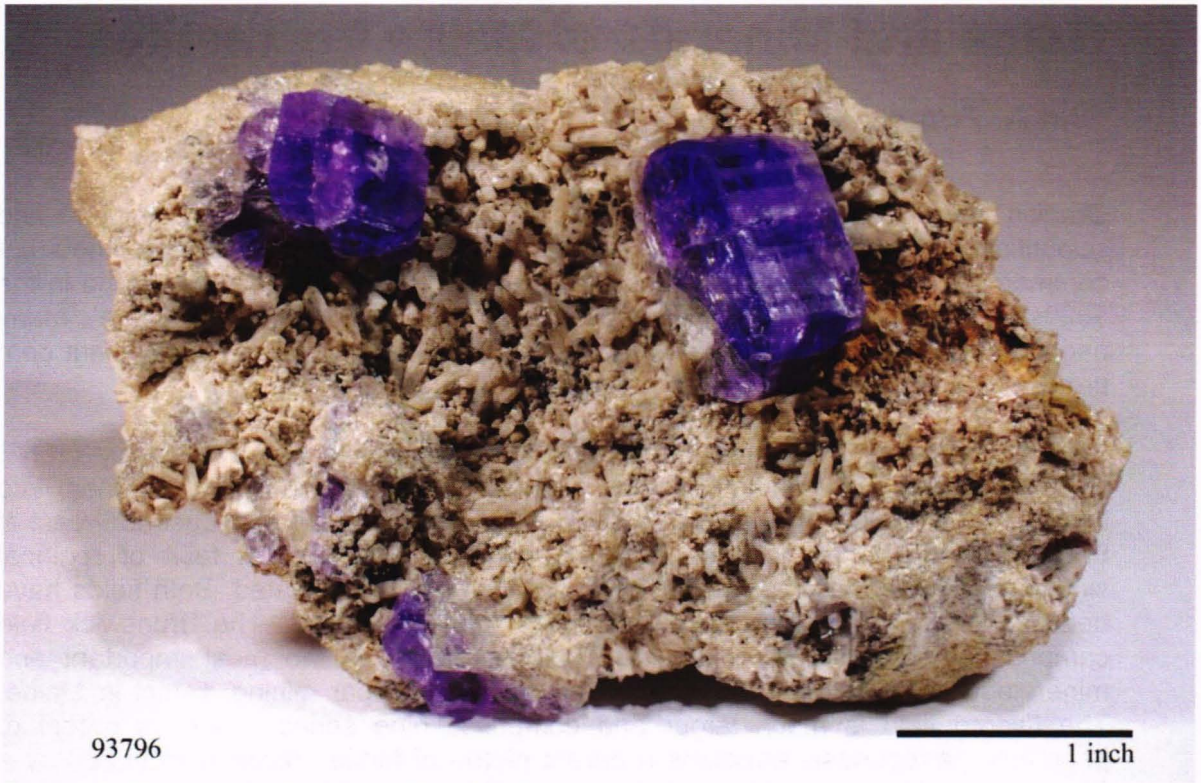

Figure 5. Fluorapatite from the Pulsifer Qaurry, Auburn, Maine.

Gemstones easily capture the imagination and have motivated visits to Maine's pegmatites by tourists, collectors, prospectors, miners and scientists since the discovery of colorful, gemmy tourmaline (elbaite) at what is now the Mount Mica quarry and mine in the town of Paris, Maine in the early 1820s. In the later nineteenth century Augustus C. Hamlin (1829-1905) notably promoted Maine's tourmaline and other gems by purchasing Mount Mica and operating until his death. Hamlin's books *The Tourmaline* (1873), *Leisure Hours Among the Gems* (1884) and *The History of Mount Mica of Maine, U.S.A. and Its Wonderful Deposits of Matchless Tourmalines* (1895) document his gemological enthusiasm and activities at Mount Mica. He mounted many cut tourmalines in pendants, the best of which he displayed on the "Hamlin Necklace", a premier example of 19th century American jewelry that he bequeathed to Harvard University.

It is currently on display at the Gemological Institute of America in Carlsbad, California and will be included in the inaugural installation of the Rita J. Kaplan and Stanley H. Kaplan Family Foundation Gallery, a permanent jewelry gallery, at the Museum of Fine Arts, Boston next year. Francis (1985) recounts the history of Mount Mica, the bonanza tourmaline discovery at the Dunton mine in Newry in 1972 and other Maine tourmaline occurrences. Mount Mica is now owned and actively operated by Gary and Mary Freeman who expanded the quarry and are now mining underground, something rarely done in exploiting Maine's pegmatites. Their activities are well documented on their attractive website *www.coromotominerals.com*. The Dunton mine too is now locally owned, but further work has not yet produced significant results.

Figure 6. Hamlin necklace featuring tourmaline from Mount Mica, Paris, Maine.

Maine's gems have been well very described by John Bradshaw (2000), an expert in rare gems. Tourmaline is preeminent and is Maine's state gem. A 256 ct gem from Mount Mica is a North American record for green tourmaline. Beryl is a distant second in importance. An aquamarine of 137 ct from Stoneham is another North American record for size. Other colors – yellow, pink, colorless – are less common. Amethyst is next in commercial importance with Deer Hill in Stow being the premier producer of crystal specimens and gem stock. Some dark red almandine has been cut and used for jewelry. All of the other gems are noncommercial but of interest to collectors. The other color varieties of quartz (rose quartz, smoky quartz, citrine and rock crystal) are common; the rest are rare. Beryllonite is of special note. Many colorless brilliant-cut gems of 1-2 cts were cut in the early 20th century. Modern stones to 25 cts are world-class examples. Small examples of albite, chrysoberyl, fluorapatite, gahnite, montebrasite, petalite, pollucite, rhodochrosite and spodumene are in the Harvard collection.

An exciting development that is sure to perpetuate interest is the museum devoted to Maine's minerals and mining heritage being established in Bethel, the cultural capital of Oxford County. It will feature a fine collection of local gems and minerals. The principals also own the Bumpus Quarry in the neighboring town of Albany. It is being developed as an educational heritage site for school children and tourists.

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