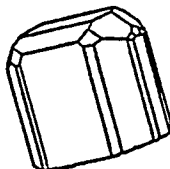
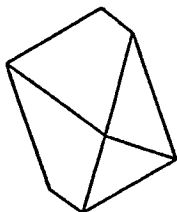
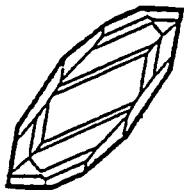
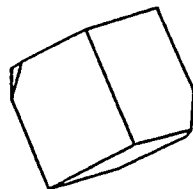
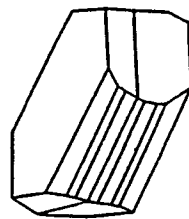


MICROMOUNTERS OF NEW ENGLAND



NORTHEAST MEETING
May 13, 1989

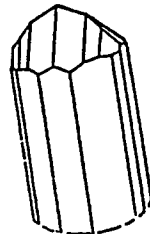
4-H Conference Center
Ashland, MA



PROGRAM

9:00 Registration and Informal Session
12:00 Lunch
1:00 Presentation:

**MICROMINERALS OF THE LAC NICOLET
ANTIMONY MINE, HAM SUD, QUEBEC**
by
George Robinson



2:00 Doorprize Drawings
4:00 Departure

President – Robert Clements Vice Pres. – Margaret Stewart
Recording Sec'y – Patricia Barker Treasurer – Janet Cares
Corres. Sec'y and Newsletter Editor – Mrs. Shelley Monaghan

Additional Information——

Mrs. Janet Cares, 18 Singletary Ln, Sudbury, MA 01776 (508)443-9180

GUEST SPEAKER: GEORGE W. ROBINSON
Mineral Sciences Division
National Museum of Natural Sciences
P. O. Box 3443, Station D
Ottawa, Ontario K1P 6P4
Canada

George became interested in minerals while still in grade school in upstate New York - so interested that he went on to obtain his PhD in mineralogy at Queen's University in Kingston, Ontario. For a time he was an earth science teacher, then a mineral dealer. During this period, he co-authored a collector's guide, "Minerals of the St. Lawrence Valley", and assembled an impressive mineral collection (Rocks & Minerals, M/A, 1980). This was necessarily dispersed when he joined the National Museums of Canada where he is now a Curator in the Mineral Sciences Division. In 1985 he was honored by the dedication of the George W. Robinson Laboratory of Mineralogy at the State University of New York at Potsdam where he did his undergraduate work.

Alone or with others, George has described or is working on a number of new mineral species, among them a new member of the tourmaline group. He is an Associate Editor of the Mineralogical Record and serves on its Board of Directors. He has published articles in Rocks & Minerals and the Mineralogical Record, where his paper on the Sterling Mine in Antwerp, New York, written with Steven Chamberlain received the Friends of Mineralogy Award for the best article of 1984. At the annual "Rochester Symposium" he chairs the session on "What's New in Minerals". He is in the enviable position of being part of collecting and study expeditions to remote Canadian localities, to Greenland, and to the Antimony Mine in Quebec which is the subject of his presentation.

In spite of his many responsibilities George claims to have time for his hobbies which include photography, gem cutting, and flying. His wife, Susan, is an artist who especially enjoys painting wildlife. In the September/October, 1987 issue of Rocks & Minerals she wrote an article on "Mineral Art Today", and one of her paintings appeared on the cover of the same journal exactly one year later.

Cover illustrations - Type Minerals of New England. Clockwise from left: Bjarebyite, fairfieldite, columbite, fillowite, dickinsonite, danburite.

PSEUDOMORPHS

Robert Clements

Minerals have a definite and characteristic form when distinctly crystallized. If a crystal of a mineral is altered so that the internal structure is changed but the external form is preserved, it is called a pseudomorph, from the Greek for "false form". Some pseudomorphs are fairly common and easy to identify and others hard to recognize and discernible only to the more advanced mineralogist. Some are found with an internal structure that may be granular or waxy or have no regular cleavage. For example, pyrite, FeS_2 , may change to goethite, FeO(OH) , but

preserve all the external features of the original pyrite. Such a crystal is described as a pseudomorph of goethite after pyrite. In all cases pseudomorphs are expressed as x after y. One of the best explanations of pseudomorphs can be found in William B. Sanborn's book "Oddities of the Mineral World" published by Van Nostrand Reinhold (1976) in which he refers to them as "ghosts of minerals past". The understanding of the formation of pseudomorphs tells us a story and can provide important clues to the paragenesis of mineral occurrences, as to which minerals were deposited first, second, and third and what major changes have influenced the ore body.

Pseudomorphs (often called "pseudos") are categorized according to the manner in which they are formed. The four major classes of pseudomorphism are alteration, substitution, encrustation, and paramorphism.

ALTERATION

This is the most common type of pseudomorphism. Alteration is a chemical change that occurs to produce a partial or total replacement of the original material by a new, chemically related material with no apparent change in external crystal shape. A core of unaltered mineral may be found in such pseudomorphs. This often occurs within a chemical group such as the copper minerals or within a related family of mineral like the zeolites. A famous example of this form is malachite, $\text{Cu}_2\text{CO}_3(\text{OH})_2$ after Cuprite, Cu_2O , of Chessy, France, where the presence of carbon dioxide, CO_2 , and water, H_2O , allowed the cuprite to alter to malachite. The malachite, $\text{Cu}_2\text{CO}_3(\text{OH})_2$, after azurite, $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$, of Tsumeb, Namibia, which involves a change in the valence of copper, is another good example. Stibiconite $\text{Sb}_3(\text{OH})\text{O}_6$ found as a coating at Ham Sud, Quebec, forms beautifully faithful pseudomorphs after stibnite, Sb_2S_3 , at Catorce, Mexico. At Mount St-Hilaire, pyrrhotite, FeS is often partially replaced by pyrite, FeS_2 .

SUBSTITUTION

In this type of pseudomorph there is a gradual removal of the original material with a simultaneous replacement of it by another without any chemical reaction between the two. A common

example of this is the substitution of silica for wood fiber to form petrified wood. The process begins with the pores and cavities of the wood being filled with the silica in solution. Then as the organic material decomposes it is further replaced with silica until all original material is gone. Another famous example is the beautiful copper, Cu, after aragonite, CaCO_3 , of

Corocoro, Bolivia.

ENCrustATION

In the formation of this type of pseudomorph, a crust of one mineral is deposited over crystals of another. These crusts can be paper-thin and fragile or very thick. They are commonly referred to as negative casts and are readily identifiable.

Included in this class are pseudomorphs of infiltration which occur when a cavity left by the original material is filled by another. Common examples are quartz casts after barite, BaSO_4

from Howardsville, Colorado. The familiar cavities at the Manhan Lead Mine, Easthampton, Mass. were formed when quartz deposited over galena, PbS or calcite, CaCO_3 , which was subsequently eaten

away.

PARAMORPHISM

The name paramorph is given to a crystal whose internal structure has changed to that of a polymorph, having identical chemical formula but different atomic arrangement, without producing any external change. Thus under certain conditions, aragonite, CaCO_3 , which belongs to the orthorhombic system will go over to calcite, CaCO_3 , which belongs to the hexagonal system, while the original orthorhombic form is retained. At Magnet Cove, Arkansas, brookite, TiO_2 changed to rutile, TiO_2 is also a good example of paramorphism. Notice that only the internal structure is changed, and that the chemical formula remains constant. Paramorphs are the most difficult type to detect and can often be identified only by the use of x-ray techniques which reveal the internal structure.

Although most pseudomorphs are unattractive, there are some spectacular specimens such as the prehnite encrustations after anhydrite found in the traprock quarries of New Jersey. For the most part the appeal of pseudomorphs is not their beauty but the story they tell. Unraveling this story is a challenge to all mineral collectors.

Bob, our outgoing President, is a co-founder and current President of the Mineralogical Society of Brattleboro. He enjoys being a volunteer teacher to area grade schools in geology and mineralogy. His special interests include pseudomorphs, phantoms, and inclusions. He owns an art supply and picture framing shop, and when not pursuing his mineral interests, works on his house, and collects stamps, specializing in mineral-related issues.

EXAMPLES OF TYPICAL PSEUDOMORPHS

<u>Pseudomorph</u>		<u>Original Mineral</u>		<u>*Type</u>
Anglesite	PbSO ₄	Galena	PbS	A
Brookite	TiO ₂	Rutile	TiO ₂	P
Calcite	CaCO ₃	Aragonite	CaCO ₃	P
Copper	Cu	Fossils	--	S
		Cuprite	Cu ₂ O	A
		Azurite	Cu ₃ (CO ₃) ₂	A
Goethite	FeO(OH)	Magnetite	Fe ₃ O ₄	A
		Pyrite	FeS	A
Gypsum	CaSO ₄ 2H ₂ O	Anhydrite	CaSO ₄	A
		Aragonite	CaCO ₃	S
		Magnetite	Fe ₃ O ₄	A
Hematite	Fe ₂ O ₃	Cuprite	Cu ₂ O	A
Malachite	Cu ₂ CO ₃ (OH) ₂	Azurite	CuCO ₃ (OH) ₂	A
		Glauberite	Na ₂ Ca(SO ₄) ₂	E
Opal	SiO ₂	Fossils	--	S
		Anhydrite	CaSO ₄	E
Prehnite	Ca ₂ Al ₂ Si ₃ O ₁₀ OH	Marcasite	FeS ₂	P
Pyrite	FeS ₂	Pyrrhotite	FeS	A
		Fossils	--	S
		Barite	BaSO ₄	E
Quartz	SiO ₂	Fossils	--	S
		Anatase	TiO ₂	P
Rutile	TiO ₂	Wurtzite	ZnS	P
Sphalerite	ZnS	Stibinite	Sb ₂ S ₃	A
Stibiconite	Sb			

*A = Alteration, E = Encrustation, S = Substitution,
P = Paramorphism

TOURMALINE: ITS UNUSUAL PROPERTIES

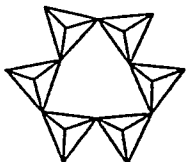
Eugene Mechler

During World War II a large cache of fine tourmaline from Madagascar stored in occupied France was the target of a cloak and dagger operation. Why? While tourmaline is one of the beautiful gemstones, this was not the reason it was sought out. It is piezoelectric - that is it will develop a measurable current under pressures, and was needed in instruments to measure pressure in the breeches of big guns. This property is used today to replace the pilot flame to light gas burners on home cooking ranges, furnaces, and water heaters.

Tourmaline has another unique property which first brought it to the attention of mineralogists. In 1703, the Dutch brought some gems from Ceylon (now Sri Lanka). One was heated in a fire, and on pulling it out, it attracted some of the ashes. This led to the discovery of pyroelectricity: on heating, one end of the crystal becomes positively charged and the other becomes negative. When I described this to a physicist he guessed that the pointed end is positive. This is correct. The pointed end gives off electrons more easily, leaving a positive charge. A very colorful experiment demonstrates this. A powder mixture of sulfur (-) and red lead (+) is shaken on a heated crystal. The red lead flies to the negative blunt end and the sulfur to the positive point. Jewelers are not happy with this phenomenon as a gem tourmaline in a case that is alternately heated and cooled by an electric light or sunlight will attract dust particles and soon become dingy.

Dichroism is another property often demonstrated by tourmaline. This is the apparent color change seen when a crystal is viewed in different directions, and is due to selective absorption of light along the crystallographic axes. It is not shown by colorless crystals, and obviously will not appear in opaque crystals such as schorl unless finely ground and observed under the microscope. Lapidarists must pay close attention to orientation when determining how to cut gem tourmaline because of this.

Why does tourmaline behave in this way? It is tied in with the basic atomic structure. Tourmaline is a ring silicate, in which a pyramid or tetrahedron is formed with a silicon atom at the center, and oxygen atoms at each of the four corners. Each pyramid shares one of its oxygen atoms with the next to form a ring consisting of 6 silicon and 18 oxygen atoms (see drawing).



All the pyramids rest on their flat bases with their points upward. This unusual structure is reflected in the external crystal shape by a flat base and pointed tip as the crystal is usually oriented. In most minerals, such as quartz, both ends of a doubly terminated crystal are the same, but this is not the case for tourmaline and other hemimorphic minerals, and accounts for the unusual electrical and optical properties. Which type of termination are you most likely to see in crystals protruding from the matrix? You might expect the numbers to be equal. Actually about 80% of specimens show the blunt end. It would seem that a tourmaline crystal is more likely to grow if the seed crystal points toward the matrix.

Cleavage is another property related to atomic structure. In ring silicates such as tourmaline the bonds holding the ring together are relatively weak and distributed evenly in all directions with the result that they do not exhibit a well-developed cleavage. This poor cleavage will separate tourmaline from the amphiboles and pyroxenes. Although tourmaline crystals are actually six-sided, alternate sides are smaller, leading to a more or less triangular cross-section.

Tourmaline has axial striations which help to identify it. Its luster is glassy and it gives a colorless streak. It takes a fine polish, is relatively insoluble in acids, and the hardness is 7 to 7 1/2. The specific gravity ranges from 3.02 to 3.26, with the pale pinks and greens on the low side, dravite slightly higher, and dark greens, blues and blacks at the high end.

Tourmalines are formed as late-stage crystallization products in granites, particularly pegmatites enriched with a boron-bearing solution, also in metamorphic rocks or schists, and as scattered rounded grains in sediments. The crystals may occur individually or in radiating fans such as found at Rollstone Hill, Fitchburg, Massachusetts. Larger crystals are more likely to be found near the center of the pegmatite where cooling is slow, giving them a chance to grow; micro crystals are more commonly found in contact zones where cooling is more rapid.

Tourmaline is widespread, especially schorl. I find it in the roadfill on route 117 near my home in Bridgton, Maine. Dravite is more common than previously thought, having now been confirmed in all the New England states. Especially fine uvite crystals are found near Gouvernor and Pierrepont, New York. Liddicoatite, found in Madagascar, was first thought to be elbaite until chemical analysis showed it contained Ca instead of Na in the W position (see Table 1). Some well-known New England localities for elbaite are the Gillette Quarry, Haddam Neck, Connecticut, and the Maine localities of Mount Apatite (Auburn), Dunton (Newry), Black Mountain (Rumford), Mount Mica (Paris), and Mount Rubellite (Hebron). For additional reading on Maine tourmaline, see Edna Lerer's article on another page of this book. Micromounts may be found at most of the above localities, but are particularly good at the Maine localities of Mt. Mica, Black Mountain, Newry, and the Bennett Quarry in Buckfield. At the Stickland Quarry in Portland, Connecticut, it may occur in fine hairs which make interesting micromounts. Around the world notable localities are the Island of Elba (for which elbaite is

named), Sri Lanka, Brazil, San Diego County, California, and the Ural Mountains of Russia.

There is some controversy about the varietal names applied in the gem trade to colored tourmalines. Should we use names like rubellite (red or pink), indicolite (blue), verdelite (green), and achroite (colorless), or should we use elbaite preceded by the descriptive color? Personally I prefer the names descriptive of the colors, such as rubellite. In the 1500's green tourmalines from Brazil were called "Brazilian emeralds." Whenever a perfectly good gem name like emerald is modified by an adjective in this way, let the buyer beware. Smoky topaz is another example of a misleading description, and means only smoky quartz. This is a way of charging a higher price for a less expensive gemstone by making the buyer think he has a real gem.

TABLE 1

The general formula for Tourmaline is $WX_3Y_6(BO_3)_3Si_6O_{18}(O,OH,F)_4$ where W=Ca, K or Na; X=Al, Fe, Li, Mg or Mn; Y= Al, Cr, Fe or V

NAME	COLOR	X	Y	CHROMOGEN
Buergerite	Dark Brown	Fe+3	Al	Fe+2, Fe+3
Chromdravite	Dark Green	Mg	Cr, Fe+3	Cr
Dravite	Brown	Mg	Al	--
Ferridravite	Black	Mg, Fe+2	Fe+3	Fe+2, Fe+3
Elbaite				
Achroite	Colorless	Li, Al	Al	--
Verdelite	Green	Li, Al	Al	Fe+3, Mn+3
Rubellite	Red, Pink	Li, Al	Al	Mn+2, Mn+3
Indicolite	Blue	Li, Al	Al	Fe+3
Liddicoatite	Varicolored	Li, Al	Al	Fe+2, Fe+3, Mn+3
Olenite	Pale Pink	Al	Al	Mn
Schorl	Black	Fe+2	Al	Fe+2
Uvite	Brown, Green	Mg, Fe+2	Al, Mg	Fe+2, Fe+3

Table 1. Color in various species of tourmaline as related to transition elements substituting in the formula. The last column indicates the chromogens or color-producing elements. Most chromogens substitute in the X position with the exception of Cr and Fe+3 in chromdravite and ferridravite which substitute in the Y position. The W position is primarily occupied by Na except in the case of uvite, where Ca is the primary element.

The color of tourmaline is the result of transition elements such as iron, manganese, and chromium substituting for X or Y in the formula as shown in Table 1. These elements have two or more valences or combining capabilities, which may affect the color in different ways. Manganese in rubellite will absorb all wavelengths of light except the reds. When iron has a valence of +2, it has little effect on the color, but when it is +3, color may

become green. If elbaite contains both Mn and Fe+2, the iron will not affect the color and the pink light will come through, but if iron is in the trivalent state, in sufficient amount, the green color will be dominant, partly because our eyes are more sensitive to green light. The manganese pink is simply masked. It is possible that the crystal growth uses up the Mn and the green color is due to the preponderance of Fe+3. Ferric iron is also responsible for the rarer blue color in the indicolite variety of elbaite. A lot of Fe+2 as in schorl will absorb all wavelengths of light so that the crystal appears black. This explanation of color is called the crystal field theory.

"Watermelon" tourmaline (elbaite) illustrates this where the center pink is surrounded by green, which in turn can be surrounded by black schorl. The center of the crystal must be formed first. When a chemical mix crystallizes, the compound with the highest freezing or solidification point is the first to crystallize out - that is the red or pink. As the mixture cools and the manganese ions causing the red color are used up, the ferric ions causing the green color are next to solidify. When the greens are used, or when the mix is cool enough to precipitate the more soluble ferrous ions, the color becomes black, as in schorl. Here is a definite color change. Schorl forms a continuous series with elbaite where the lithium, aluminum radical (Li, Al) in elbaite is gradually replaced by Fe+2 as the temperature of the mix cools. In dravite the mix starts out rich in magnesium, and as this crystallizes out, the Fe+2 replaces Mg to form another series with schorl.

While all these properties - hemimorphism, piezoelectricity, pyroelectricity, dichroism, and the wide range of color - may be present in other minerals, nowhere are they combined and so clearly demonstrated as in tourmaline, serving to make it a unique and beautiful mineral.

REFERENCES:

- Francis, C.A. (1985) "Maine Tourmaline", Min. Record 16: 365-388.
Jones, R. (1984) "Colored Gemstones", Rock & Gem, March: 29-35.
Sinkankas, J. (1971) "Tourmaline", Rock & Gem, May/June: 38-45.
Sorrell, C.A., (1973) "Minerals of the World", Golden Press, NY.

Gene has been a micromounter for about eight years, and finds its space demands fit his lifestyle during winters in Deland, Florida, where he has worked at the Gillespie Mineral Museum at Stetson University. His affinity for chemistry and puzzles make mineral collecting and identification an ideal hobby.



TOURMALINE - THE MAINE STATE MINERAL

Edna Lerer

The mineral collector when you mention Maine, automatically thinks of tourmaline. On February 26, 1971 the Governor of Maine made it official and signed into law an act that made tourmaline the state mineral. The Maine mineral and gem clubs were instrumental in selecting tourmaline and getting the legislation passed.

The colorful history of Maine tourmaline began when two young men, Elijah Hamlin and Ezekiel Holmes accidentally found the first green crystal clinging to the roots of an upturned tree on a hill, later named Mount Mica, in Paris, Maine in the autumn of 1820. Maine's unpredictable weather, in the form of a heavy snowfall, contained the boy's excitement until the spring thaw. What a thrill it must have been when finally it came, to go back to the area and find tourmaline crystals just lying waiting to be picked up.

In the last 169 years there have been other finds almost as exciting as the first "Tourmaline Rush" of the 1820's at Mount Mica. Mount Apatite in Auburn was first mined in 1883, but tourmaline crystal specimens were found in the state's collection coming from the Auburn area in 1839. The Dunton Mine in Newry was first mined before the 1900's, and in the 1903-1904 seasons lovely "watermelon" material was found. The cores of these crystals were red and the outer edges were green, hence the name "watermelon". Another famous find was the so-called "Friday the 13th" pocket, found on August 13, 1954 by Stanley Perham at the BB #7 Mine in Norway, which yielded 14,000 carats. In 1972 to 1974 new pockets at the Dunton Mine once again put Maine tourmaline on the lips and mind of all mineral collectors.

Notable occurrences of rubellite, the pink variety of elbaite, are found at Mount Rubellite (named for the mineral) and Black Mountain, where it once formed a wall of large pink fans with purple lepidolite. The species schorl and dravite also occur sparingly at Maine localities.

Fine Maine tourmaline specimens may be found in sizes from micromounts to the famous "Jolly Green Giant", part of the 1972 Newry discovery, which measures nearly eleven inches in height and close to four inches in diameter. It is now at the Smithsonian National Museum in Washington, DC, and is occasionally displayed at major mineral shows.

Beautiful cut stones and carvings have been made from Maine tourmaline. Gems from Mount Mica were displayed by Tiffany and Co. at the World's Fair in Paris in 1889, and a suite of carved animals, birds, and fishes was created by Gerhard Becker at Idar-Oberstein, Germany, from colorful Newry material. Especially well-known are three necklaces crafted from Maine tourmaline and set in Maine gold. The Hamlin Necklace, now at Harvard's Mineralogical Museum, was made for Augustus C. Hamlin (the son of the discoverer of the original Mount Mica find) prior to 1900 of Maine tourmalines of various shades, most from Mount Mica. The Peary Necklace was commissioned by the arctic explorer Admiral Robert E. Peary for his wife in 1913, and is fashioned of gold

from the Swift River set with nine green Mount Apatite tourmalines. It was donated to the state, and is now on display at the Maine State Museum in Augusta, along with the Maine Tourmaline Necklace, presented to the people of the state of Maine by the Maine Retail Jewelers Association in 1977. It contains 24 stones from the 1972-1973 Newry find set in Maine gold, and embellished with 16 gold nuggets, one for each county in the state.

Through the ages tourmaline has been called by many names. In Hey's "Index of Mineral Species" he lists aschentrecker, iochroite, jochroite, tourmalinite, turmalin, stagenschorl, zeuxite, and zeuxite. The different varieties have included names such as achroite, indicolite, verdelite, taltalite, rubellite, pierrepontitie, tsilaisite, to name a few. The name hamlinite has been applied to the Mount Mica tourmalines. The jewelry trade has its own names, including watermelon, siberite, emeraldite, Brazilian emeralds, Brazilian sapphires, and Ceylonese peridot.

According to the 1987 "Glossary of Mineral Species" by Fleischer, tourmaline is the group name which includes the species buergerite, chromdravite, dravite, elbaite, ferridravite, liddicoate, olenite, and uvite.

To learn more about Maine tourmaline finds, and also about the history of Maine minerals in general, I suggest reading Augustus Hamlin's two books "The History of Mount Mica" (1895) and "The Tourmaline" (1873), "Gemstones of North America" by John Sinkankas (1959 and 1976), "Maine's Treasure Chest" by Jane Perham (1987), "We Walk on Jewels" by Jean Blakemore (1961), and Gems and Precious Stones of North America" by George Kunz (Dover reprint, 1968). Articles I found interesting in mineral-related magazines include Carl Francis' comprehensive account of "Maine Tourmaline" in the Tourmaline issue of the Mineralogical Record, Sept./Oct., 1985, and the articles in the same journal in January/February, 1975 written by Pete Dunn and Dean McCrillis describing the 1972 find at Newry. This find was also featured in Yankee magazine in May, 1986. Several Lapidary Journal articles of interest are in August, 1970 on "Mount Mica's Fabulous Treasure Chest" by E. Courter; April, 1967 "A Tourmaline Bonanza at Mount Mica" by S. B. Graves; April and May, 1977 "Tourmaline" by J. Acord. The Maine issue of Rocks & Minerals (November/December, 1987) features articles on notable displays in Maine. Interesting information on the unique properties of tourmaline is presented by Gene Mechler on another page of this book.

Each year Edna is our personable and persuasive hostess at the Sales Table consisting of member-donated specimens, the proceeds of which pay a large part of the expenses of our Northeast Meeting. Her particular interest is in New England minerals which she enjoys collecting. She is a weekly volunteer at Harvard's Mineralogical Museum, where she has helped to set up a number of displays.

TYPE MINERAL SPECIES FROM NEW ENGLAND

Amesite	1876	Chester Emery Mines, Chester, MA
Annite	1968	Cape Ann, MA
Beryllonite	1888	McKean Mt., Stoneham, ME
Bjarebyite	1974	Palermo Mine, Groton, NH
Chesterite	1978	Carlton Talc Mine, Chester, VT
Clinojimthompsonite	1978	Carlton Talc Mine, Chester, VT
Columbite	1802	Unknown locality in CT
Cookeite	1866	Hebron and Paris, ME
Cummingtonite	1824	Cummington, MA
Danalite	1866	Rockport, MA
Danburite	1839	Danbury, CT
Dickinsonite	1878	Branchville Quarry, Redding, CT
Eosphorite	1878	Branchville Quarry, Redding, CT
Eucryptite	1879	Branchville Quarry, Redding, CT
Fairfieldite	1879	Branchville Quarry, Redding, CT
Fillovite	1879	Branchville Quarry, Redding, CT
Foggite	1975	Palermo Mine, Groton, NH
Frondelite	1949	Fletcher Quarry, Groton, NH
Gainesite	1983	Nevel Quarry, Newry, ME
Gibbsite	1822	Richmond, MA
Goedkenite	1975	Palermo Mine, Groton, NH
Graftonite	1900	Melville Mt., Grafton, NH
Hurlbutite	1952	G. E. Smith Mine, Newport, NH
Hydroxylherderite	1886	Hebron, Paris, Newry, ME
Jimthompsonite	1978	Carlton Talc Mine, Chester, VT
Landesite	1930	Berry Quarry, Poland, ME
Lithiophilite	1878	Branchville Quarry, Redding, CT
Microlite	1835	Chesterfield, MA
Natrophilite	1890	Branchville Quarry, Redding, CT
Palermoite	1952	Palermo Mine, Groton, NH
Perhamite	1978	Bell Pit, Newry, ME
Reddingite	1878	Branchville Quarry, Redding, CT
Samuelsonite	1975	Palermo Mine, Groton, NH
Schoonerite	1977	Palermo Mine, Groton, NH
Sillimanite	1824	Chester, CT
Strunzite	1957	Palermo Mine, Groton, NH
Triploidite	1878	Branchville Quarry, Redding, CT
Whitlockite	1941	Palermo Mine, Groton, NH
Whitmoreite	1974	Palermo Mine, Groton, NH
Wolfeite	1949	Palermo Mine, Groton, NH
Wonesite	1981	Norwich, VT
Wroewolfeite	1976	Manhan Lead Mine, Easthampton, MA
Xanthoxenite	1949	Fletcher Quarry, Groton, NH

References dated 1900 and before are best found in Frondel, C. (1970) Mineralogical Record, 1:69. Fleischer's "Glossary of Mineral Species" will supply the rest.

MICROPERSONALITIES: MEET GUNNAR BJAREBY

Janet Cares

This is the second in a series of biographies of MMNE members, beginning with those who have had minerals named for them. As editor of the Program Book, Janet prefers not to have authors write more than once, in order that every member will have an opportunity to contribute. In this case, however, she and her husband Steve, (who declined to be named co-author, but provided much of the information for this article) are perhaps the only remaining MMNE members who knew Gunnar well enough to recall aspects of his life not already published.

Gunnar Bjareby was born in Sweden in 1899. Though his full name was Alfred Gunnar Bjareby, he was universally known by his middle name, and used the initials G.B. When asked the pronunciation of his last name, he would reply in his faint Swedish accent, "however you like." His wife, Kaarina, however, was firm in pronouncing it B'yah-rah-bee" in the Swedish way.

Since the major events and accomplishments of Gunnar's life have been well documented (see references), this sketch will attempt to present only the highlights along with some personal observations and lesser-known facts which might interest those collectors who were not acquainted with him.

At the age of 24 Gunnar came to the United States to pursue art studies, particularly at the Boston Museum of Fine Arts. Since art could seldom be relied on for total support, he worked regularly as an interior house painter, adding artistic touches and an occasional mural to some of Boston's old homes and public buildings. A mural painted on the wall of a now defunct restaurant in Framingham was painted from memory and depicted a New England farm scene with the four seasons blending into each other from one side to the other.

He exhibited paintings at the former Boston Arts Festival and at galleries on the North Shore. To his correspondents he sometimes sent drawings of minerals, often hand-colored. These are referred to in Susan Robinson's article on "Mineral Art Today." The drawing attributed to Gunnar in that article is not his, but a correct one will be published in Rocks & Minerals later this year.

Gunnar's mineral collecting began at the age of ten, and his enthusiasm continued for the rest of his life. He was a mineral collector, never a rock hound or rock hunter, as he believed hunting was done only for wild animals. As one of the early members of the Boston Mineral Club he was always active in one capacity or another and was voted an honorary member in recognition of his contributions. As Locations Committee Chairman he maintained a set of bound volumes of Geological Survey maps of the New England states. Each map was overlain with tracing paper on which he marked the location of known quarries, mines, road cuts, and prospects, complete with lists of minerals found there. In this way the localities could be pinpointed without marking up the map itself. At present these maps are in the care of the

Harvard Mineralogical Museum in Cambridge.

A portion of Gunnar's mineral collection, one of the finest of its day, was displayed in wall cases in the living room of his fourth floor walk-up apartment on Palace Road in Boston. Collectors would often visit to study minerals or to purchase reasonably-priced specimens, many of which were taken from his collection when he replaced them with finer ones. It was said that he had many more excellent specimens stored in the basement and on the roof of the building. Whether by trade, sale, or donation, many of his minerals have found their way to museums in such far-flung places as Australia, Sweden, and South Africa. The Colorado School of Mines acknowledges a gift of a group of New England specimens, and some also reside at the University of Chicago.

Many of his minerals were self-collected, primarily from New England and neighboring states, but also from Canada. Nova Scotia trips involved walking the beaches at low tide, searching for zeolites and associated species either in the towering walls or on the beach itself as a result of slides coming down from those walls. He could outstrip younger collectors in this endeavor, and by the time they had caught up to him to share in a good find, he was off to a new discovery.

He kept in touch with knowledgeable field collectors of his day, among them Philip Morrill, Neal Yedlin, Phil Foster, Dick Schooner, and Peter Zodac. He was one of the first to scout the now well-known MDC Shaft 10 in Hardwick, Mass, and learned early of the danalite/genthelvite locality in Cumberland, Rhode Island. The Palermo Mine, from which bjarebyite was later to be named, was a great favorite, as was the Gillette Quarry, usually the first trip of the season for the Boston Mineral Club in their early days. A trip to the Manhan Lead Mine always included a visit to Schortman's Mineral Store with an eye to upgrading his collection. He made several trips to Mont St-Hilaire, and was quite excited about its minerals. It is our loss that he was not around longer to help us study them.

In the summer of 1965 he made a trip to northern Europe with the late Chet Teichman, a charter member of MMNE. He brought with him a stone which he had hand-carved for his mother's grave. They visited mineral museums, collectors, and localities in Iceland, Sweden, Norway, and Finland, relying on his multilingual talent to smooth the way. They made certain to stop in the small Norwegian town of Hell to send postcards to friends back home.

Gunnar never owned a car, but was always in demand as a passenger, and knew exactly how to get to any collecting spot. He would always be sitting on the steps with collecting bag and tools in hand waiting for his ride. At lunch time he would reach into a pocket and draw out a battered sandwich which he would supplement with peanuts from another pocket or wild berries when available. Given a choice he would delight in a meal of pea soup and rice pudding. He loved the outdoors, and when others chose to carry a tent, he would make a bed of pine boughs on which to lay his sleeping bag. On one trip while camped in a field with no water in sight, he took his towel, soap, and washcloth with the announcement that he was going to take a bath. He obviously

knew the signs to look for, as he returned a short time later, still damp, but cool and refreshed.

In the field Gunnar was a tireless workier, and unafraid to go after a superior specimen no matter how difficult the job. He used only hand tools, feeling that anything else was unsporting. On one occasion he worked with hammer and chisel for an entire afternoon on a group of fine crystals, only to have the entire mass shatter at the final blow. If he made a discovery while with a group he would take a few of the finest specimens and then call in the rest of the group to share in the find. He was an excellent sight identifier and willing to help the novice, but had little patience with those who failed to learn.

Gunnar was not content merely to amass a large number of minerals, but wanted to learn about them. The microscope proved to be a valuable tool for this purpose and led him into the world of micromounting. He apparently did no testing beyond hardness and cleavage, but with his artist's eye could readily recognize crystal shapes and symmetry.

In the early days, there was no formal micromount club, but a number of interested collectors would get together informally to study, trim, and exchange micros. Gunnar would bring a stack of boxes containing a variety of mineral specimens glued to paper labels. These were circulated at the meetings, and those attending could take a box home to go through at leisure. Many micromount collections got their start from these giveaways.

In November, 1966, a group of micromounters led by Gilbert George and Eldon McFettridge both of Rhode Island, sent out invitations to an all-day micromounting session at the Eliot Church in Newton, Mass. There was a good response, and in January, 1967 the group was officially named the Micromounters of New England. Gunnar was elected vice-president, and in the few meetings held prior to his death gave brief instructional talks on some aspect of mineralogy.

In late May of 1967 Gunnar joined a group of collectors on a trip to Nova Scotia, always a strenuous enterprise. Less than two weeks after his return he suffered a heart attack and died on June 12. He confided to his wife, Kaarina, that he had experienced a previous attack, but did not seek medical attention because he was afraid of having to slow down. He preferred to die with his boots on - his collecting boots, of course.

It is unfortunate that Gunnar was not fully appreciated until after his death. Probably the honor most treasured by him would have been the naming of the mineral bjarebyite from the Palermo #1 pegmatite by Dr. Paul B. Moore and co-workers of the University of Chicago (1973). It was found by them in Gunnar's own micromount collection, which along with his larger specimens had been purchased by Professor Joseph Smith (now Emeritus) of that University. The original description appeared in the Mineralogical Record, and the authors praised Gunnar as "among the most outstanding of 20th century amateur mineralogists." A drawing of bjarebyite appears on the cover of this book.

In 1983 the Boston Mineral Club established an award in Gunnar's name for the best self-collected Massachusetts mineral, and in 1985 he was elected to the Baltimore Mineral Society's

"Micromounters Hall of Fame" in the old-timers' category. The award ceremony, scheduled for their annual symposium in September was not made at that time due to the untimely arrival of Hurricane Gloria. Instead a ceremony was held in the Geology Lecture Hall at Harvard University as part of the regular November meeting of the Micromounters of New England. The plaque was presented by then president Palmer Sevrens to Gunnar's wife, Kaarina and son Thiman, or "Tim" as he prefers to be called. The inscription on the plaque read:

"Gunnar Bjareby began collecting minerals as a boy in his native Sweden. Emigrating to Boston, he spent much of his spare time studying minerals, viewing museum collections, and collecting at localities accessible by streetcar, bus or on foot. An artist by profession he became a micromounter through the appreciation of the beauty of crystallized minerals that were too small to see without a microscope. He played an essential role in the founding of the Micromounters of New England. In a series of articles in *Rocks & Minerals* magazine (between 1959 and 1964) he recounted fifty years of mineral collecting. On organized field trips he could often be seen identifying minerals for others, and was noted for his encouragement and for sharing of his knowledge with the beginner. Gunnar was an avid trader of mineral specimens, enhanced by his ability to read and write in several languages. His remarkable correspondence, such as that with the late Neal Yedlin, often included his beautiful, detailed drawings in color of mineral specimens. Gunnar's micromounts were housed in small cardboard boxes which he made. His micromount duplicates were cemented to handwritten labels which were shared primarily with New England micromounters, students, and novice mineral collectors. In 1973, bjarebyite, a Palermo Mine micro-phosphate mineral was named in his honor. His micromount collection, representing over one thousand species, went to the University of Chicago."

The meeting was open to all friends of Gunnar, and members of the audience were invited to recall personal experiences of him. Afterwards there was an opportunity to socialize over cider and doughnuts, an annual fall custom of the Boston Mineral Club, in Gunnar's day. He would surely have approved of the informality of the proceedings, and it was obvious that his wife and son were genuinely touched to see so many old friends and share in their reminiscences.

Tim lives at 2 Abell Avenue in Ipswich, Mass. Occupying a large part of his living room is the console of an old theater organ, the working parts of which are housed in the adjacent garage. With a little urging Tim will play several musical pieces designed to demonstrate some of the unusual sound effects of the instrument, and will send you to the kitchen where a door can be opened to observe the activity of the drums, whistles, and other moving parts. For some years Tim installed, tuned, and repaired pipe organs, but now has his own business under the name of TEB Millwork. Kaarina, recently deceased, was formerly an instructor in modern creative dance, and later assisted Tim in his business.

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A NOTE OF APPRECIATION

The Northeast Meeting Program Book is written for, about, and most importantly by the members of MMNE. Many members have contributed voluntarily, and some have required persuasion. Authors have been encouraged to retain their style (and in some cases opinions) and the results have reflected that. The aim is not to produce articles of high technical or literary calibre, but to present the interests of members in their own words. In every case some bit of knowledge of mineral-related lore or a different and perhaps unfamiliar aspect of collecting has been presented. It is not easy to write for publication, and all the authors are to be commended for their contributions.

Several people may be singled out for their efforts. John Anderson set the pace as editor of the first Program Book in 1982. Holmes Wilson, who acted as "publisher" through 1986 designed the original cover and added the decorative crystal drawings in the text. He has donated a great deal of time and effort in the past for which we should all be grateful. Norm Nichols, though not a member of MMNE has given of his time and talent to improve the drawings used. His drawing of foggite in 1988 is particularly noteworthy.

Not volunteers, but of great value, have been the people who typed the manuscripts. For several years Holmes took care of that aspect, but had difficulty finding someone who could cope with the long lists of mineral names. For Helen Foley of Harvard's Department of Earth and Planetary Sciences, this was routine, and solved our problem nicely. Assisting Helen last year was Carolyn White, also of Harvard, and she has taken over the entire job this year. We owe all these people a great deal of gratitude for their contributions.

THE ANTIMONY MINERALS OF HAM SUD, QUEBEC

The antimony-bearing minerals at the Lac Nicolet Antimony Mine at Ham Sud, (South Ham) Township, Wolfe County, Quebec are not only rare but beautiful, and seemingly made for micromounter. These brief descriptions will assist in following the speaker's presentation, and may be useful for future reference. Familiar species found at this location such as albite, aragonite, dolomite, gypsum, melanterite, and quartz are not included.

ANTIMONY, Sb. Hexagonal. G 6.6-6.7, hardness 3-3.5. Tin white, usually massive granular or lamellar and easily cleavable. Grey streak.

BERTHLIERITE, FeSb_2S_4 . Orthorhombic. G 4.6-4.7, hardness 2-3.

Steel grey with metallic luster, often appears brown to black with iridescence. Fibrous massive or in needles. Dark brownish-grey streak. (Not to be confused with berthierine, a silicate).

GUDMUNDITE, FeSbS . Monoclinic. G 6.7-6.9, hardness near 6.

Silver-white to steel grey prismatic crystals with metallic luster. Ends chisel-pointed. Often twinned to form crosses or butterfly twins. No good cleavage. Antimony analog of arsenopyrite which it closely resembles.

KERMESITE, $\text{Sb}_2\text{S}_2\text{O}$. Monoclinic. G 4.7, hardness 1-1.5. Usually in cherry-red radiating needles with adamantine to submetallic luster. May be found blending into stibnite as an alteration product. Streak brownish-red.

SENARMONTITE, Sb_2O_3 . Cubic. G 5.5-5.6, hardness 2-2.5. Massive or in clusters of tiny colorless to cream-colored adamantine octahedrons. May be overlooked as it resembles drusy quartz.

STIBICONITE, $\text{SbSb}_2\text{O}_6(\text{OH})$. Cubic. G 5-6, hardness 4-5.5.

Usually as pale to bright yellow earthy crusts or powder on other antimony minerals. May completely replace stibnite.

STIBNITE, Sb_2S_3 . Orthorhombic. G 4.6, hardness 2. In shiny steel grey to nearly black needles or fans of prismatic crystals, sometimes iridescent. Also massive fibrous. Perfect cleavage parallel to prism. Flexible but not elastic. Streak lead grey.

VALENTINITE, Sb_2O_3 . G 5.8, hardness 2.5-3. Takes many forms from prisms to tablets. Prism faces may be rounded by striations. Tabular crystals may be stacked like rows of toppled dominoes. Crystals may be transparent to translucent and colorless to creamy yellow. Luster is adamantine, but pearly on one perfect cleavage surface. Often coated with thin crust of stibiconite.

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THANKS.....are due to many people for their help in making this meeting a success. It would be impossible to list everyone who contributed, so only those in charge of the various aspects are named here. We will attempt to credit others in the Newsletter.

Bob Clements - Coordinator

Edna Lerer - Sales and door prizes

Steve Cares - Specimen giveaways

Vera Fogg - Registrar

Marilyn Dodge - Luncheon sandwiches and framed mineral photo

Pat Barker - Refreshments and sales

Janet Cares - Program Book editor

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All others who contributed time, specimens, food or talent