MICROMOUNTERS OF NEW ENGLAND NEWSLETTER

The MMNE was organized on November 8, 1966 for the purpose of promoting the study of minerals that require a microscope

No. 302 January 2010

Current Meeting
Saturday, Jan. 23, 2010
Trinity Lutheran Church
Chelmsford, MA
Doors open at 9 am

Next Meeting
Sat. Feb 20, 2010
Trinity Lutheran Church
Chelmsford, MA

Map and driving directions are on the last page of this newsletter

For information regarding **MEETING CANCELLATION** due to inclement weather,
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Next MMNE Meeting is January 23

Welcome to the January 2010 MMNE Newsletter! I hope you all had happy and healthy holidays and rang in the New Year with good cheer and fine minerals.

First off I must remind all members that ***the January meeting has been changed from its usual 3rd Saturday of the month to January 23 instead****. The meeting will take place at the Trinity Lutheran Church in Chelmsford, MA.*

The Annual Boston Mineral Club Auction will be held on Saturday, January 16, 2010. Since many MMNE members are also members of the BMC it made great sense to do what we could to avoid the conflict and allow both clubs to enjoy their respective days with maximum attendees. For those unaware, the BMC auction is a fantastic opportunity to pickup great specimens of all sizes as well as great memorabilia and maybe even see some old collecting friends.

Usually, this newsletter includes directions to the meeting place. However, this month's newsletter is getting very big very fast and as a result, the directions had to go. Directions are always available on the website as well as in most previous newsletters. Feel free to call any club officer if you need further assistance.

One of the new features of this edition reflects our subscription to ***Popular Mineralogy*** *and the writings of* ***Dr. Andrew Sicree****. I am sure all members will enjoy the Mohs article. This subscription was voted by the club a few months back. Considering the three articles I have seen so far, I am sure we have made a super investment!*

The passing of Art Smith strikes very close to the heart of many in our club. Some of our members were familiar with Art and as many know, ***Gene Bearss*** *was very close and enjoyed many wonderful summers collecting with him in the White Mountains. I was honored to help Gene and another friend of Art,* ***Mark Jacobson****, to enable correspondence between Sanford, ME and China to assemble a memoriam article for* ***Rocks and Minerals****, which is also featured in this newsletter. The club has also received a very nice acknowledgement from Rocks and Minerals for the two $100 donations in memory of* ***Brian Porter*** *and Art.*

I would also like to thank Gene for his article submission this month on experimental cleaning.

Symposium speakers *for May 15, 2010 are* ***Tom Mortimer*** *on New Hampshire minerals and* ***Gene Bearss*** *discussing what's new at the Estes Quarry. This should be great!*

Symposium Door Prize *will be a very nice small, mineral trimmer (an $85 value) for a lucky attendee. If you are planning on donating to the symposium, please start bringing yo r material to our next meeting so that we may have plenty of opportunity to label accordingly.*

Lost Palermo Specimens – Jim Warner. *Last April at our monthly meeting* ***Jim Warner*** *brought a large selection of Palermo specimens. It appears the two of these never made it back to Jim. Knowing the bustle of our meetings, it is certainly possible somebody scooped them up by accident. Both of these specimens are very important! They were scheduled to be analyzed because of their peculiar crystal formations. The first is a Bjarebyite, tabular crystals, labeled as such. The second specimen was labeled Hureaulite, but it also had cubic Rockbridgeite as well. If any member has either of Jim's misplaced specimens, feel free to send them to Jim or give them to me so that I may get them on to him as soon as possible.*

Jim is also working on a huge article about his career in collecting as well as many wonderful interactions with members old and new. From what I've read so far, I promise this set of articles will be very interesting!

See you all at the BMC auction or at the next meeting of Micromounters on January 23.

Joe Mulvey

If At First You Don't Succeed, Experiment!

By Gene Bearss

The best Leucophanite crystals ever found at Mont Saint Hilaire were found in a pegmatite in 1985. The crystals were up to 4cm in size, but most were in the 2-5 mm size range (M.R., Vol. 21, #4, pg. 320). The Leucophanite occurred as crystals on Aegirine needles as floaters. Associated minerals, also found perched on Aegirine needles included Serandite, Epididymite, Ancyllite-Ce and Natrolite. The Natrolite crystals had an epitactic coating of Tetranatrolite on some prism faces. Unfortunately, all of the mentioned minerals were often coated with Mn and Fe oxides and other crud which obscured the true beauty of the aforementioned minerals.

In the late 1980's Walter Lane (who died in 2004) obtained a small box of the above mentioned minerals. Unfortunately, most of the material was severely coated. Walt and I had both, by this time, purchased a good ultrasonic cleaner. Next to a good microscope and light source a good ultrasonic cleaner is essential if you field collect minerals, unless you are a purist who doesn't clean anything. Walt and I both purchased the NEY model 250 with a three quart tank, variable power and degas controls, plus a heater switch. I have never used the heater switch since just running the cleaner at higher power settings warms the water, plus none of my minerals have been coated with grease. Walt tried cleaning some of the leucophanite and associated minerals in a detergent bath for up to ten hours in the ultrasonic cleaner with mixed results. I cheated and used an old toothbrush with "Soft Scrub" to mechanically clean the specimens. It improved the larger specimen, but I managed to destroy two smaller pieces. At this point I mounted the large crystal and that ended that.

After Walter's sudden and untimely death, his widow Carolyn gave me access to any of his mineral flats, cardboard boxes or egg cartons that I wanted with certain restrictions. While rummaging around in Carolyn's basement I came upon that box of Leucophanite. Never one to give up on a cleaning problem I decided to give the material a try. Since I already knew that running the minerals in a detergent only bath gave limited success I decided to try a solution of detergent and Super Iron Out. Since I knew the Super Iron Out was good at removing Fe and Mn stains and didn't adversely affect most minerals, including carbonates, I concluded it shouldn't at least do any harm.

The Super Iron Out worked as expected with all the black/brown staining gone after one to four hours running time with no ill effects on any of the underlying minerals. Unfortunately, many of the minerals were still coated with a white granular substance which detracted from the aesthetics of the specimen. After some experimentation, which I will not go into since none worked, I decided to try an oxalic acid solution. I knew I could not run the Ancyllite-Ce in oxalic acid and also thought it might effect the Natrolite, being it was a zeolite. However the other minerals I was trying to clean were all silicates and hopefully would not be harmed by the oxalic acid. After a two hour run in the oxalic acid what to my wondrous eyes should appear, but the beautiful minerals with no white crud anywhere near. Also, no Natrolite or Tetranatrolite. By this time I had surmised the white crud must have consisted of Tetranatrolite not Natrolite.

Super Iron Out does not contain oxalic acid… but regular Iron Out does

Notes:

- Tetranatrolite's status as a mineral had a question mark as of 04/20/2008 at Mont Saint Hilaire.
- Super Iron Out does not contain oxalic acid but regular Iron Out does.
- Follow directions when using any chemicals, especially safety instructions!

Figure 1a Showing the specimen prior to treatment

Figure 1b Showing the specimen after a one hour run in a detergent only solution

Figure 1c Showing the specimen after a one hour run in detergent and Super Iron Out solution

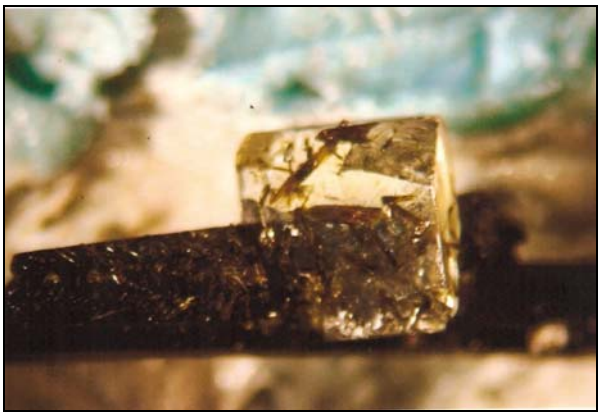


Figure 1d After the same specimen ran in a detergent and oxalic acid solution for one hour

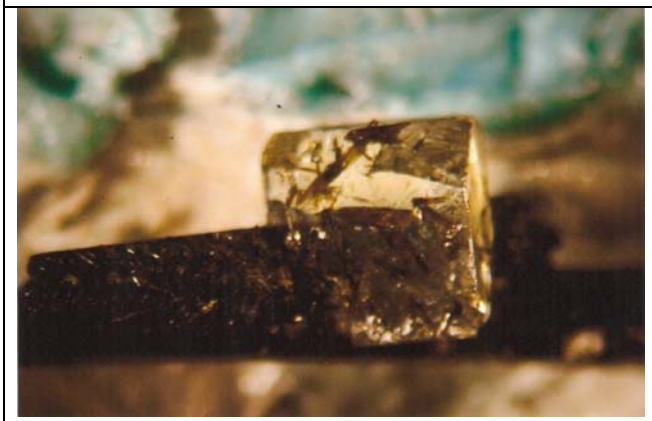


Figure 1e After the same specimen ran in a detergent and oxalic acid solution for one hour

Figure 2 *Serandite on Aegerine after the full process*

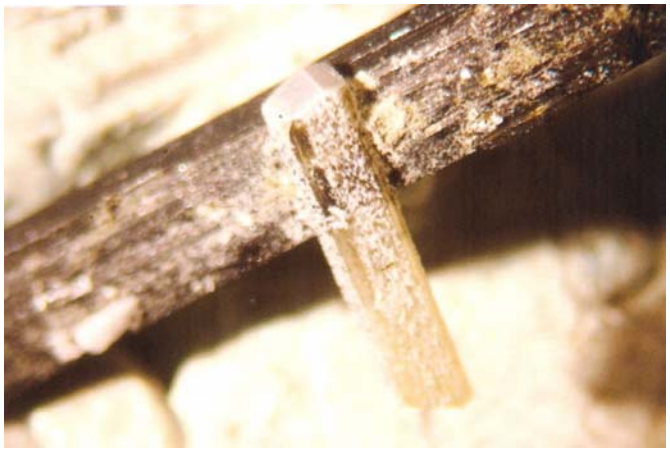
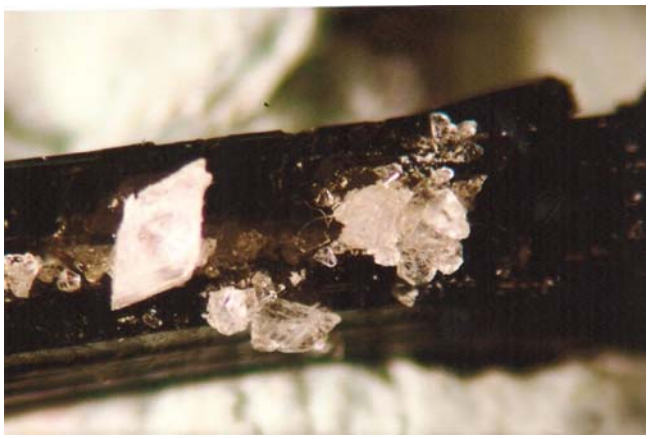


Figure 3 Natrolite on Aegerine with epitactic Tetranatrolite after a run in Super Iron Out, but not in the oxalic acid solution

Figure 4 Epididymite on Aegerine after the full process



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Who Was Mohs and What Is His Scale?

by Andrew A. Sicree

What every schoolkid knows

Every schoolchild and every mineral collector should know the Mohs' Scale of Hardness. Among the first aspects of science taught in grade school, it was created nearly two hundred years ago, it has persisted in use precisely because it is simple to learn and quite useful.

Who was Mohs?

Carl Friedrich Christian Mohs (1773-1839), born in Gernrode, Germany, was a mineralogist and a geologist. After studying at the famous Mining Academy of Freiberg in Saxony under Abraham Gottllob Werner (for whom the wernerite variety of scapolite is named), and a stint as a pit foreman at the Neudorf/Harz mine, Mohs was hired by a wealthy banker, J. F. van der Nüll, to whip his mineralogical collection into shape.

Faced with identifying and organizing a large mineral collection, Mohs employed an unusual strategy. Unlike his mineralogical colleagues, Mohs did not use chemical composition to classify minerals. Rather, he emphasized the physical attributes of the minerals he studied. In particular, he used crystal morphology, cleavage, density, and hardness to classify the minerals. Mohs method had the virtue of using characteristics of minerals that could be readily determined through easy (and inexpensive) observations or simple tests.

In 1812, Mohs moved to the Joanneum in Graz, Austria, and became Professor of Mineralogy. He published a text with the lengthy name of Versuch einer Elementar-Methode zur Naturhistorischen Bestimmung und Erkennung der Fossilien (which translates to A Primary Method to Determine Natural History and Identification of Fossils in 1812. In that same year, he developed his scale of hardness.

Mohs' Scale of Hardness

Based on the work of Werner and his own experience identifying minerals, Mohs assembled a list of common minerals to be used as hardness standards. This is how Mohs described the list of minerals he chose for use in his scale of hardness:

The number
1. denotes the degree of hardness of a variety of PRISMATIC TALC MICA, known by the name of common talc.
2. of a variety of PRISMATOIDAL GYPSUM-HALOIDE, of imperfect cleavage, and not perfectly transparent. Varieties perfectly transparent and crystallised, are commonly too soft.
3. of a cleavable variety of RHOMBOHEDRAL CALC-HALOIDE;
4. of OCTAHEDRAL FLUOR-HALOIDE;
5. of RHOMBOHEDRAL FLUOR-HALOIDE;
6. of PRISMATIC FELD-SPAR;
7. of RHOMBOHEDRAL QUARZ;
8. of PRISMATIC TOPAZ;
9. of RHOMBOHEDRAL CORUNDUM;
10. of OCTAHEDRAL DIAMOND.

Note the unusual spelling of quartz. Some of the mineral names are obsolete, such as "gypsum-haloide" for gypsum, "octahedral fluor-haloide" for fluorite, and "rhombohedral fluor-haloide" for apatite. Apart from nomenclature differences, Mohs' original scale is the same as used today:

1. TALC	6. ORTHOCLASE FELDSPAR
2. GYPSUM	7. QUARTZ
3. CALCITE	8. TOPAZ
4. FLUORITE	9. CORUNDUM
5. APATITE	10. DIAMOND

Mohs did not contend that his one-to-ten scale meant that the difference in hardness between, for instance corundum and diamond was the same as the difference in hardness between talc and gypsum. He recognized that many minerals would fall between any two numbers on the scale, but he selected the minerals on his list because they were common minerals, easily obtainable in large pure specimens (except for diamond, of course) that one could use for scratch tests. Mohs was aware that there is a degree of art in conducting a scratch test and that practice was necessary to achieve consistent results.

Hardness scale controversies

Some minor controversies surround Mohs' Scale. Some authors report 1812 as the year in which Mohs developed his scale. Others report the year as 1820 or 1822. It is probable that Mohs developed his scale over the years preceding 1812. The discrepancy in reported dates may be due to the fact that Mohs' scale did not gain much acceptance until his publication of *Die Charaktere der Klassen, Ordnungen, Geschlechter und Arten; oder, Die Charakteristik des Naturhistorischen Mineralsystemes (The Characteristics of the Classes, Orders, Gender and Species, or, The Characteristics of the Natural History*

Mineral-Systems) in 1821. Mohs published his *Grund-riss der Mineralogie (Treatise on Mineralogy)* in 1822.

More serious is the charge is that Mohs "borrowed" his scale from Abraham Werner, his teacher. Before Mohs, Werner had a developed a scale of hardness that used methods of scratching to compare relative hardness. Late in life, Werner complained that his former students were publishing his ideas without crediting him. Certainly there are similarities between Mohs' and Werner's scales – they share many of the same minerals – but there are important differences as well. Mohs' scale is simpler than Werner's scale (Werner used more minerals) and is inverted. Mohs' scale runs from soft (talc = 1) to hard (diamond = 10) while Werner's scale started with the hardest mineral (diamond = 1) and numerical values increased as the minerals got softer.

The idea of comparing hardness of one mineral with another was not, however, originated by Werner. For instance, both the Greek philosopher Theophrastus (ca. 371-287 BC) and the Roman naturalist Pliny the Elder (AD 23-79) reported observations of relative hardnesses of minerals.

Other authors proposed hardness scales both before and after Mohs. For instance, Jameson used a scale with diamond = 1 and chalk = 21, with talc = 20. Other scientists, such as La Métherie, had even more complicated scales. For instance, La Métherie listed diamond at 2500 and gypsum at 500 with many minerals in between.

The popular success of Mohs' Scale is due to his selection of a small number of common minerals. It is easily memorized (just ask any schoolchild studying rocks!). Also, Mohs hardness numbers rise with increasing hardness – a fact that makes it intuitively more pleasing than scales with descending hardness numbers.

How hard is hard?

Mohs' Scale is an ordinal scale: minerals are arranged in an ascending scale according to their hardnesses, but the scale says nothing about exactly how much harder one mineral is than the next. If we make a rigorous study of the hardnesses of minerals, we discover that what appears to be simple is in fact complicated. There is more than one type of hardness. For instance, there is a difference between "scratch hardness" and "indentation hardness." Scratch hardness is resistance to deformation due to shearing friction with another object, while indentation hardness is the resistance to deformation due to a constant perpendicular load from a pointed object. Scratch hardness involves two forces (shear and perpendicular) while indentation hardness involves only a perpendicular force. Indentation hardness gives us a truer measure of the hardness of a mineral, but scratch hardness is easier to observe when done by hand. It is more difficult (takes more force) to scratch or indent a harder mineral than a softer one. Mohs' hardnesses are scratch hardnesses but, as mentioned above, they are only ordinal and cannot be used to determine the amount of force necessary to make a scratch.

To make a more rigorous, quantifiable measure of hardness, some type of *sclerometer* is employed. A variety of hardness testers have been used over the past two hundred year. Some methods work best with metals while others work best with brittle materials such as glasses and ceramics. (Minerals that fall in each group – there are malleable native metals such as native copper and more brittle minerals such as chalcopyrite.) You may see values reported for Vickers, Brinell, Rockwell, Rosiwal, and/or Knoop hardnesses. Different gadgets and different methods are employed to measure hardness. For instance, Rosiwal hardnesses are grinding hardnesses, while Knoop hardnesses are measured by making a small indentation in the mineral. Both the Knoop and the Rosiwal methods give huge increases in their values between corundum and diamond.

This chart shows typical Knoop and Rosiwal hardnesses obtained for the Mohs minerals:

Mineral	Mohs	Knoop	Rosiwal
talc	1	1	0.03
gypsum	2	32	1.25
calcite	3	135	4.5
fluorite	4	163	5
apatite	5	430	6.5
orthoclase	6	560	37
quartz	7	820	120
topaz	8	1340	175
corundum	9	1800	1000
diamond	10	7000	140000

This illustrates the fact that the hardness gap between diamond and corundum really is much great than the step between corundum and topaz.

In 2012, we'll celebrate the two-hundredth anniversary of Mohs' Scale – a tribute to an eminently practical tool of mineralogy!

Refs.: Broz, M. E., Cook, R. F., and Whitney, D. L., 2006, "Microhardness, toughness, and modulus of Mohs scale minerals," *American Mineralogist*, v. 91, no. 1, p. 135-142. and Newcomb, S., 2009, *The World in a Crucible: Laboratory Practice and Geological Theory at the Beginning of Geology*, Geological Soc. Amer. Special Paper 449, 186 p.

Tough-Guy Minerals

Hardness should not be confused with toughness. For instance, topaz is harder than quartz, but it is not tougher. In fact,

a topaz crystal can be decidedly un-tough. If struck in the proper direction, topaz will display perfect cleavage and split quite nicely – an unpleasant occurrence if the specimen happens to be in *your* nice robin's-egg blue topaz ring!

Toughness is the resistance a mineral shows to cracking when it is stressed. Hardness, on the other hand, is the resistance to shape changes (i.e., deformations) when a *force* is applied. A diamond has extremely strong resistance to shape changes (such as scratches) when rubbed with another material, but diamond crystals can quite readily crack (i.e. cleave) when struck sharply.

Among the tougher minerals are the jade minerals nephrite and jadeite. Nephrite is an amphibole, a calcium- and magnesium-rich variety of actinolite, usually expressed with the chemical formula $Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$. On the other hand, jadeite is a pyroxene mineral ($NaAlSi_2O_6$, monoclinic). Both minerals are typically a pleasant green color, although nephrite can be white, yellow, brown, or black, and jadeite can be white, or (rare) blue or purple. Nephrite has a Mohs hardness of between 6 and 6.5 while jadeite can be a slightly harder 6 to 7.

The exceptional toughness of jade allows the carving of jade sculptures with thin, delicate features. In nephrite, this toughness results from its fibrous texture on a microscopic scale. This structure is not unexpected – nephrite is an amphibole, and other amphiboles are among those minerals that can occur as "asbestos" (i.e., asbestiform or fibrous minerals). Interconnected mattes of fibers are significantly more difficult to break through than a single crystal would be.

Jadeite is more granular than fibrous in its microstructure. A crack that begins in one microscopic grain must switch directions as it crosses into the neighboring grain. This increases the path length of the crack and thus also increases the amount of energy needed to make a crack grow. Even more importantly, cracks in jadeite tend to branch. Each branch or secondary crack consumes additional energy. This crack-branching tendency makes jadeite one of the toughest of all minerals.

Ref.: Bradt, R. C., Newnham, R. E., and Biggers, J.V., 1973, "The toughness of jade," *Am Mineralogist*, v. 58, p. 727-732.

Weird Geology: Gnowing Geognosy

Although "geognosy" sounds vaguely like the name of an obscure 5th Century heresy, the term really means the study of rocks and minerals and their origin and distribution throughout the Earth's crust. The word arises from *geo-* for Earth and the Greek *gnōsis* meaning "knowledge, or seeking to know." Geognosy is a somewhat archaic term, generally superseded by the term geology.

Dr. Andrew A. Sicree is a professional mineralogist and geochemist residing in Boalsburg, PA.

THE JANUARY MMNE MEETING HAS BEEN RESCHEDULED TO SATURDAY JANUARY 23 AT THE TRINITY LUTHERAN CHURCH IN CHELMSFORD TO ACCOMMODATE OUR MEMBER'S ATTENDANCE AT THE BOSTON MINERAL CLUB ANNUAL AUCTION

EPIDOTE

At the East Coast Mineral Show in Springfield, MA this year I purchased the book "Collector's Guide to the Epidote Group" by Robert J. Lauf and published by Schiffer Publishing. The book is pretty good. It is a quick read and heavy on the pictures, but does give technical details that should be sufficient for the advanced collector. I can't help but feel that this is a work in progress. The goal of the book is to explain the epidote group in light of the recent rulings by the IMA. The following are my notes culled from the book and coupled with information from other sources such as Mindat, Wikipedia, rruff.geo.arizona.edu and Frederick Pough's "Field Guide to Rocks an Minerals"

The epidote group consists of eighteen minerals. The nomenclature of the group has recently been updated by the IMA resulting in several species being changed.

Allanites are of particular interest because of their rare earth element content. Allenite-(Ce), Allanite-(La) and Allanite-(Y) have thus far been identified.

Epidote was first named and described by Haüy at the beginning of the 19th century.

Zoisite is no longer considered a member of the epidote group because it has an orthorhombic crystal structure.

Clinozoisite was named in 1896 because it was the monoclinic dimorph of zoisite.

Rare Earth Element bearing epidotes were first recognized by Thomsen in 1811.

Members of the epidote group are now defined as monoclinic silicates whose general formula can be summarized as follows:
A1 A2 M1 M2 M3[SiO_7][SiO_4](O4)(O10) where

A1 is Ca
A2 is Ca, REE, Pb, Sr
M1 is Al, Fe, Mg, Mn
M2 is Al
M3 is Al, Fe^{3+}, Mn^{3+}, V^{3+}, Cr^{3+}
O4 is O^{2}, F^{-}
O10 is OH^{-}, O^{2-}

Short list of discredited names from the Epidote group

Old Name	New Name
Niigataite	Clinozoisite-(Sr)
Hancockite	Epidote-(Pb)
Tweddillite	Manganipiemontite-(Sr)
Strontiopiemontite	Piemontite-(Sr)
Androsite-(La)	Manganiandrosite-(La)

The epidote group is divided into three subgroups; the clinozoisite subgroup, the allanite subgroup and the dollaseite subgroup.

Epidote minerals principally occur as products of regional metamorphism, thermal metamorphism and during the crystallization of acid igneous rock. Epidote also occurs in hydrothermal deposits. Stable over a wide range of pressure and temperatures, their wide range of compositions make them important constituents in making rocks.

Allanite-(Ce) Ingeborg Burggraf specimen, Tom Mortimer, photo
Locality: Government Pit, Albany, NH
Specimen Size: 2 mm bladed crystal
Environment: Miarolitic cavity in Conway granite
Field collected: Inga Berggraf

Minerals of the Epidote Group

- Allanite-(Ce)
- Allanite-(La)
- Allanite-(Y)
- Clinozoisite
- Clinozoisite-(Sr)
- Dissakisite-(Ce)
- Dissakisite-(La)
- Dolluseite
- Epidote
- Epidote-(Pb)
- Epidote-(Sr) *
- Khristovite-(Ce)
- Mukhinite
- Manganipiemontite
- Manganiandrosite-(Ce)
- Manganiandrosite-(La)
- Piemontite
- Piemontite-(Sr)
- Vanadoandrosite

* Not yet discovered
Zoisite is no longer a member

Occurrence: Characteristic of several facies of regionally metamorphosed rocks and some contaminated felsic igneous rocks; in contact zones between igneous and calcareous sedimentary rocks; from alteration of plagioclase (saussuritization).

Association: Zeolites, amphiboles, plagioclase feldspars, quartz, actinolite, calcite (greenschist facies); amphiboles, vesuvianite, scapolite, talc, wollastonite, pyroxenes, garnet (epidote-hornfels facies); pumpellyite, glaucophane, lawsonite, riebeckite, garnet, omphacite (blueschist facies).

Distribution: A few notable occurrences follow for this widespread mineral. From Bourg d'Oisans, Isµere, France. At Arendal, Norway. From Traversella, Piedmont, Italy. Exceptional crystals from the Knappenwand, Untersulzbachtal, Salzburg, Austria. In the USA, ¯ne crystals from around Sulzer, Prince of Wales Island, Alaska; on Garnet Hill, Calaveras Co., California; at the Calumet mine, Cha®ee Co., Colorado; in the Seven Devils district, Adams Co., Idaho; and from the Julie claim, Pamlico district, Mineral Co., Nevada. In Mexico, at San Quentin, Baja California. From Naukluft Farm, Rehoboth, Namibia. In Pakistan, exceptional crystals from Tormiq.

Epidote is a calcium aluminum iron sorosilicate mineral, Ca2Al2(Fe3+;Al)(SiO4)(Si2O7)O(OH), crystallizing in the monoclinic system. Well-developed crystals are of frequent occurrence: they are commonly prismatic in habit, the direction of elongation being perpendicular to the single plane of symmetry. The faces are often deeply striated and crystals are often twinned. Many of the characters of the mineral vary with the amount of iron present for instance, the color, the optical constants, and the specific gravity. The color is green, grey, brown or nearly black, but usually a characteristic shade of yellowish-green or pistachio-green. It displays strong pleochroism, the pleochroic colors being usually green, yellow and brown. Clinozoisite is white or pale rose-red variety containing very little iron, thus having the same chemical composition as the orthorhombic mineral zoisite.

Epidote is an abundant rock-forming mineral, but one of secondary origin. It occurs in marble and schistose rocks of metamorphic origin. It is also a product of hydrothermal alteration of various minerals (feldspars, micas, pyroxenes, amphiboles, garnets, and others) composing igneous rocks. A rock composed of quartz and epidote is known as epidosite. Well-developed crystals are found at many localities: Knappenwand, near the Großvenediger in the Untersulzbachthal in Salzburg, as magnificent, dark green crystals of long prismatic habit in cavities in epidote schist, with asbestos, adularia, calcite, and apatite; the Ala valley and Traversella in Piedmont; Arendal in Norway; Le Bourg-d'Oisans in Dauphiné; Haddam in Connecticut; Prince of Wales Island in Alaska, here as large, dark green, tabular crystals with copper ores in metamorphosed limestone.

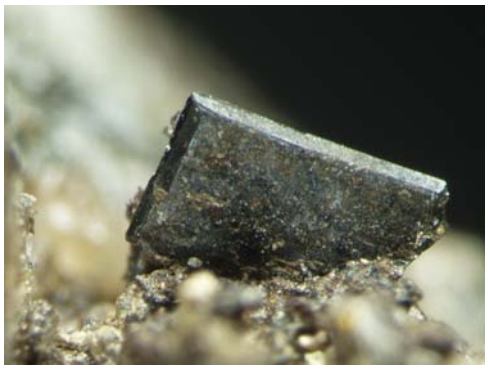
The perfectly transparent, dark green crystals from the Knappenwand and from Brazil have occasionally been cut as gemstones.

Belonging to the same isomorphous group with epidote are the species piemontite and allanite, which may be described as manganese and cerium epidotes respectively.

Piemontite occurs as small, reddish-black, monoclinic crystals in the manganese mines at San Marcel, near Ivrea in Piedmont, and in crystalline schists at several places in Japan. The purple color of the Egyptian porfido rosso antico is due to the presence of this mineral.

Allanite and Dollaseite-(Ce) have the same general epidote formula and contain metals of the cerium group. In external appearance Allanite differs widely from epidote, being black or dark brown in color, pitchy in lustre, and opaque in the mass; further, there is little or no cleavage, and well-developed crystals are rare. The crystallographic and optical characters are similar to those of epidote; the pleochroism is strong with reddish-, yellowish-, and greenish-brown colors. Although not a common mineral, allanite is of fairly wide distribution as a primary accessory constituent of many crystalline rocks, gneiss, granite, syenite, rhyolite, andesite, and others. It was first found in the granite of east Greenland and described by Thomas Allan in 1808, after whom the species was named. Allanite is a mineral readily altered by hydration, becoming optically isotropic and amorphous: for this reason several varieties have been distinguished, and many different names applied. Orthite was the name given by Jöns Berzelius in 1818 to a hydrated form found as slender prismatic crystals, sometimes a foot in length, at Finbo, near Falun in Sweden. Dollaseite is less common, famous from the Ostanmossa mine, Norberg district, Sweden.

System: Monoclinic
Luster: Vitreous, pearly
Hardness: 6
Tenacity: Brittle
Cleavage: Perfect on {001}, imperfect on {100}
Density: 3.38 – 3.49 g/cm^3
Name: From the Greek "Epidosis" = "increase" in allusion to the crystal characteristic of one longer side at the base of the prism.
Optical Properties: Transparent to nearly opaque.
Color: Pistachio-green to pale green, yellow, yellowish green, greenish yellow, greenish black; yellow-green in thin section.
Optical Class: Biaxial ({). Pleochroism: Strong; X = colorless, pale yellow, pale green; Y = greenish yellow; Z = yellowish green.



Allanite-(Ce) :
{CaCe}{Al2Fe2+}[O|OH|SiO4|Si2O7]
Photo Copyright © Scott M. Whittemore 2005
Locality: Gilford, Belknap Co., New Hampshire, USA. Field of view ~ 1.3 mm

CLINOZOISITE {Ca_2}{Al_3}[O|OH|SiO_4|Si_2O_7]
Locality: Joppa Hill, Amherst, NH
Specimen Size: 2.5 cm specimen
Environment: Skarn
Field collected: Tom Mortimer

▲ Epidote

Photo Copyright © 2005 Peter Cristofono - This image is copyrighted. Unauthorized reproduction prohibited.
Locality: Nahant, Essex Co., Massachusetts, USA
Terminated green epidote crystals. View is about 6 mm across. P. Cristofono specimen and photo.

◄ Clinozoisite : {Ca2}{Al3}[O|OH|SiO4|Si2O7]
Photo Copyright © 2006 Peter Cristofono
Locality: Marlborough Junction locality, Marlborough, Middlesex Co., Massachusetts, USA
5 mm brown crystal in calcite. P. Cristofono specimen and photo, field-collected 2006.

In my view, there are two challenges in microscopic photography. Honest color reproduction is one. The other is the need to take multiple shots of a single specimen with different areas in focus and then stacking these images together to create one super image that contains the best parts of each of the individual shots. In previous discussions regarding the club digital camera I briefly mentioned two software solutions for the stacking process. Here for your review please find a wider selection of available programs available for the task at hand. The field of stacking software is much wider once I realized that astronomy photographers have the same issues as us.

Helicon Focus
Website: http://www.heliconsoft.com/heliconfocus.html
Support: support@heliconsoft.com , also, subscribe to their newsletter
Cost: One year license (valid during one year after purchase, reverts to demo mode afterwards)
Lite: $30, Pro $55, Lifetime licenses lite $92 and Pro is $160.

Helicon Focus is a program that creates one completely focused image from several partially focused images by combining the focused areas.

The program is designed for macrophotography, microphotography and hyperfocal landscape photography to cope with the shallow depth-of-field problem.

- Quality: advanced interpolation techniques, 16 bit workflow, direct RAW input
- Scope: unlimted number of images, resolution over 100Mpixels, 64 bit support, Windows/Mac versions
- Performace: very fast, multi-threaded, i7 compatible, batch and command line modes
- Tools: clone from source brush to repaint moving parts, 3D model , dust map, 2D panorama

CombineZ
The purpose of CombineZ is to increase depth of focus by combining pictures that you have taken. Each picture should be in focus at a different depth into the scene. It makes life easier if they have been taken at regular intervals, though this condition is not essential.
Website: http://www.hadleyweb.pwp.blueyonder.co.uk/
Support: Online documentation, email alan@micropics.org.uk and Yahoo! CombineZ discussion group.
Cost: Free.

Zerene Stacker
· Highest quality output images, especially in difficult cases
- Accurate and robust alignment and interpolation
- Advanced stacking algorithms
- Clean handling of hairs and bristles -- no halos or contour lines
- Preserves low contrast detail and avoids "stacking mush" with deep stacks
- Fast and flexible retouching makes it easy to combine the best features of multiple algorithms as well as original frames
- Supports 8- and 16-bit input and output files
- Designed to fully utilize modern multi-core processors and multi-processor computers
- Can generate stereo and 3-D rocking animations from a single stack, even for difficult subjects with structural overlaps and bristles.

Website http://zerenesystems.com/stacker/
Support: support@zerenesystems.com
Cost: Free for 30 days, Pro Edition $289, Personal $89, Student $39. Professional and Personal licenses never expire, and you never have to contact Zerene Systems when you upgrade or replace your computer – just use the same license and keep on working. The Student Edition license terms apply for as long as you're a student, after which you'll need to upgrade to a Personal or Professional Edition.

Licenses include free updates within the same major version number. That is, a license for version 1.0 will also work for everything up through version 1.99. When version 2.0 becomes available, new licenses will be made available at attractive upgrade pricing.

AstroStack3

Initially written for astronomers to stack still photos and video of outer space, AstroStack is a small, easy to use, yet powerful program to enhance pictures made by CCD digital photography or video capturing. It's main purpose is to combine a number of pictures (like a stack of cards, hence the name) made from the same object around the same time. AstroStack 3 introduces a new concept. It has fixed categories in which so called plugins can be combined. This means that the program can be extended. In fact the functionality of the program is mainly built around plug-ins. There will be a growing list of plug-ins, many of them free of charge.

Website: http://www.astrostack.com/
Support: robert@astrostack.com. Astrostack also has downloadable and online manuals, email support, a newsletter and a users forum.
Cost: $59 includes the newest version, all plugins, 3 months of tech support, and free updates.

Image Stacker by Tawbaware

Image Stacker combines multiple images into a single image. It can be used to overcome one of the last remaining limitations of digital cameras compared to their film counterparts: their inability to take very long exposures. Image Stacker can also be used to reduce the appearance of "digital noise" in images created by digital cameras or scanners, and create "synthesized long-exposures" without overexposure. Original intent of the software was to photograph the paths of astral objects on a clear night sky using images taken with a camera. Tawbaware makes many other good looking image processing applications that may stir your interest.
Website: http://www.tawbaware.com/imgstack.htm
Cost: Shareware $17 (there is a free version which is limited to 10 images and output max is 640x480).

Keith's Image Stacker

Keith's Image Stacker is an image processing program that is oriented primarily toward astrophotography. See my astrophotography webpage for information about my personal venture into that hobby. What Keith's Image Stacker provides, more than anything else, is a workspace in which to align many similar images (say from a quicktime movie of Jupiter taken through a telescope with a webcam) and then to produce a stack of the images, which consists of a single image that comprises either the sum, or the average, or some value in between of the individually stacked images. Stacking images is a well-established method for increasing the signal-to-noise ratio in a series of similar images. True "information" will shine through the stack, while random noise will drop out.
Website: http://keithwiley.com/software/keithsImageStacker.shtml
Cost: Shareware, $15.

Iris

Website: http://www.astrosurf.com/buil/us/iris/iris.htm
Astronomical imaging software written by somebody in France. Up to version 5.
Cost: Free.
Support: Webpage is loaded with dozens and dozxens of tutorials and help files.

RegiStax

Website: http://www.astronomie.be/registax/
Yet another freeware astronomy stacking software package. This one was voted Sky and Telescope Magazine's "software package of the year" for 2007.
Support: registax@gmail.com, many online articles.
Cost: Free.

Arthur Edward Smith, Jr. (1935-2009)
The Life and Memories of Art Smith
A Compilation by
Gene Bearss and Mark Jacobson

I first met Art in1967 at the Cove Creek Bridge in Magnet Cove, Arkansas. I had been introduced to Magnet Cove by Bill Riddle, who ran a mineral shop in Memphis, Tennessee. While it was a 200 mile drive from Millington, Tennessee where I was stationed, I still tried to get to the cove every couple of months. I had just started collecting by the bridge when a van pulled up with a group of people led by a tall, lanky guy, Art Smith. The group was from Houston, Texas. They had driven 400 miles compared to my puny 200.

Arthur "Art" Edward Smith, Jr. was born on 29 May 1935 in Teaneck, New Jersey to Arthur, Sr. and Carol Gilcher Smith. He was an avid baseball fan, especially of the Yankees.

In 1953 Art enrolled as a general science major at Wheaton College in Illinois. During his sophomore year, Art took an introductory physical geology course, then was hired to help on a school-sponsored, geologic field trip through the Southern Appalachian Mountains. This experience led him to register for the geologic field camp course held during the summer in the Black Hills. After attending that camp, Art was "hooked" on geology, and changed his major to geology.

After graduation Art worked as a teaching assistant for the University of Missouri geologic field camp in the Black Hills. In the fall, he enrolled in the graduate program at the University of Missouri, where he wrote his thesis on the origin of layered igneous rocks adjacent to some of the Black Hills pegmatites. In 1959 after obtaining a Masters Degree in Geology, Art enlisted in the army and was assigned to the Corps of Engineers in Washington, D. C. This stint gave him an edge in obtaining a job in 1963, during a petroleum slump, as an exploration geologist with Texaco in Houston.

In 1965 he met and married Elizabeth "Betty Jean" McKim. In 1967 their son, Brett, was born. After Brett became older, Betty Jean developed a career in nursing, specializing in geriatrics. From 1973 to 1986, she was an Assistant Professor of Nursing at the University of Texas School of Nursing, Houston.

In 1985 Art ran into Carl Francis at the Houston mineral show and mentioned that he was thinking of writing an article on the Hams and Weeks mine in Wakefield, NH. Carl suggested he contact me since I had ginned up a short article on the same location for the Micromounters of New England bulletin. This started us on a search for information that culminated in the publication in 1991 in Rocks and Minerals of that article.

In August 1986, Art and Betty were struck by a drunk driver who ran a red light. Although Art recovered, Betty Jean only made a partial recovery and could no longer work. After this both Art and Betty Jean started collecting beads and mineral-carved frogs from around the world. Betty Jean's health continued to deteriorate; Art was her primary care giver for 18 years until she passed away in November 2008. After Betty Jean passed away, the Houston Society created the Elizabeth Jean Smith Scholarship fund.

In November of '86 I received a letter from Art dated the 12th of November in which he mentioned the accident which had left Betty Jean with a head injury which was to alter their life until her death in 2008. From 1983 until 1990 Art and I only corresponded by mail. At first we sent micros only, but I also sent a few miniature specimens from Magnet Cove and New England. We usually sent what we thought the other person could use and what we had available for trade. I never received a trade from Art that wasn't more than what I had sent. To say that Art was generous is an understatement!

Art was an avid micromounter, especially of Arkansas phosphates and New England pegmatite minerals. Art once wrote in the Backbender's Gazette that one should always examine or break up unwanted specimens for cavities before discarding.

With all his collecting activities and his attention to micromounts, eventually an unknown mineral was bound to turn up. Artsmithite, a mercury-aluminum-phosphate from the Funderburk prospect, Pike County, Arkansas was named after him by Roberts et al. (2003) from a specimen he found in 1995.

The New England pegmatite micromounts were often obtained during summers when Art stayed at the family camp shared with his brother, Richard who was married to Betty's sister. The pond camp was located in near the Weeks and Ham Mine in New Hampshire. He would often spend several weeks there each year, usually during the hottest part of the Texas summer.

In 1990 Art finally got up to the camp on Round Pond (a.k.a. Lake Ivanhoe) in Wakefield, NH. From 1990 until Betty Jean became too ill to make the trip Art and I and several other guys would get together each summer. These annual gatherings consisted of mineral collecting, going to mineral shows, researching locations, eating out, and conversations. Our conversations were about minerals, religion, and politics. While Art was a Baptist and I a Catholic, we found we had many similar views on Christianity in common. We also had common thoughts on politics and politicians.

(continued)

Art's literary activities were even more prolific than his collecting. He researched and knew the mineralogy and collecting histories of all the places he visited. For magazines and mineral club bulletins, he compiled and had published numerous state mineral locality and mining bibliographies, state locality indexes for Rocks and Minerals, field collecting adventures, micromount columns and locality mineralogies. His articles were published in Rocks and Minerals, Mineralogical Record, Matrix, Gems and Minerals, Lapidary Journal, Mineral News and mineral club bulletins, especially the Backbender's Gazette. He wrote Bibliography of Colorado mining history (1993), Collecting Arkansas Minerals (1996), and with his wife, Betty, Knowing Gemstone Beads (1990).

Art served as a consulting editor of Rocks & Minerals since 1987. Under his influence, the Houston Society has been a strong financial contributor to the magazine, especially its fund for publishing mineral photographs in color. His articles covered the technical range of beginning to advanced collector. At times Art served as a judge for the federation bulletin competition on adult and advanced adult original club bulletin articles. A complete bibliography of Art's publications would easily exceed 100.

Art Smith passed away 11 November 2009 in Houston, Texas after a battle with cancer. Art will be greatly missed by his son, Brett; his two brothers, Richard and his wife Janet McKim, and Robert and his wife Nancy, and their families; Art's wife of ten months, Nancy Farah Smith and her family, the Houston Gem & Mineral Society, and his many friends in the greater mineral community. Art's contributions to the mineral collecting community have been widespread and personal.

Thoughts about Art

He was generous to a fault.
He was constantly on my butt to write articles. Which I usually ignored.
He was meticulous in his research, especially history of a locality he was writing up.
He thought most N.E. historical societies were useless since their histories were 99% genealogy.
He was a great husband to Betty Jean.
Art's family had good genes with people living into their 80's and 90's. It is too bad a cancer that's not supposed to be that serious cut Art's life short. I will always wonder if the events that ended in Art's passing couldn't have been altered. I know those events left me bitter about Art's passing, but not Art. I guess that's why he was a better Christian than me!

Cleveland Micromineral Symposium, Jim Daly, Sauktown Sales, Mill Creek, IN

Over the first weekend in November I attended "Focus on Micromounting", the annual symposium of the Micromineral Society of the Cleveland Museum of Natural History. I hadn't attended this symposium in many years, so I particularly looked forward to it. On Friday morning I drove from my home in Indiana to the museum, arriving about 3:30 PM. On arrival, I went down to the site of the symposium, two downstairs classrooms that had been opened up into one. Early arrivals like myself had until 5 PM to check in and get set up. We then had to leave until 7 PM. The symposium officially opened at 8 PM.

The Friday evening program was a talk by Alfredo Petrov on "The Mines and Minerals of Japan". Alfredo had given a presentation with the same title in Tucson in February, but this was very different. As Alfredo himself said, the program he gave in Tucson tried to cover too much, and just didn't work. It had seemed to me more like a travelogue than a presentation on minerals. This time he concentrated on one locality, the island of Iwo Jima. (this isn't the Iwo Jima of WWII fame- that one is actually called Ioe-jima). After the regular presentation, Alfredo was also persuaded to recount his hilarious experience in seeking out the type locality for yugawaralite.

Saturday consisted of trading and looking over the "freebie" tables (5 tables loaded with material), interspersed with talks. In the morning, Chris Stefano spoke on the Jones Mill Quarry in Magnet Cove, Arkansas. He was followed by a tag-team set of presentations on the Hansonburg District, New Mexico. John Rakovan described the geology and mineralogy of the district, then Pete Richards spoke about the microminerals found there. In the afternoon, Alfredo Petrov took to the podium again, this time to talk about collecting in Bolivia. Saturday evening brought a unique feature of this symposium- a potluck dinner, this year at the home of Pete Richards, with the out-of-town attendees as guests. This is a great opportunity to socialize in a very relaxed and informal atmosphere.

On Sunday we continued the trading and freebie hunting, and heard two more presentations. David Saja described the techniques and value of thin-section mounts, and Verne Friberg gave a presentation on the Black Hills of South Dakota.

The workshop activities continued for a while after lunch, and then the participants started to drift away. By the time I packed up, loaded the van and drove home it was about 7 PM.

New Element Discovered!

Lawrence Livermore Laboratories has discovered the heaviest element yet known to science. The new element, Governmentium (Gv), has one neutron, 100 assistant neutrons, 435 deputy neutrons, and 10000 assistant deputy neutrons, giving it an atomic mass of 10535. These 10535 particles are held together by forces called morons, which are surrounded by vast quantities of lepton-like particles called peons. Since Governmentium has no electrons, it is inert; however, it can be detected, because it impedes every reaction with which it comes into contact. A tiny amount of Governmentium can cause a reaction that would normally take less than a second, to take from four days to four years to complete. Governmentium has a normal half-life of 2- 6 years. It does not decay, but instead undergoes a reorganization in which a portion of the assistant neutrons and deputy neutrons exchange places. In fact, Governmentium's mass will actually increase over time, since each reorganization will cause more morons to become neutrons, forming isodopes. This characteristic of moron promotion leads some scientists to believe that Governmentium is formed whenever morons reach a critical concentration. This hypothetical quantity is referred to as critical morass. When catalyzed with money, Governmentium becomes Administratium, an element that radiates just as much energy as Governmentium since it has half as many peons but twice as many morons.

The Bittersweet Apophyllite by Larry Rush

When I moved to Connecticut in the early 1960's, I met a retired physician who was also interested in minerals, and we became collecting friends. Henry was a quiet, dignified gentleman with a strong scientific mind who appreciated the marvelous aspects of crystals and mineralogy. At one point early in our friendship, he showed me an Apophyllite specimen that his son had acquired for him while traveling in Brazil. While not a "world-class" piece, it was very nice, with two well-formed lustrous 3cm crystals sitting in a hand-sized chunk of matrix. It was appealing enough for me to make a light hearted attempt at humor by suggesting that I would be happy to trade him some locally collected poor quartz crystals for it. In typical fashion, he didn't ridicule this joke, but just smiled and made some innocuous answer. But these silly little remarks became the basis of a humorous tease that went on for some 25 years to follow. Whenever we were together, while collecting, at a club meeting, or just socializing, one of us would always try to have a witty proposal ready for the other about the Apophyllite. It might be a dry comment about trading an old car, or the best piece in my collection, or a favor, such as free lawn mowing for life, or whatever.

These quiet, sly exchanges sometimes consisted of only a few words, a quick reference, or even a look or wink at the right time. We always expected the other to have some new complicated scheme in the planning stage that was related to my getting the coveted Apophyllite. Our wives were never sure what was going on with these oblique maneuverings, and probably thought we were both a little crazed (and maybe we were!), especially when the phone would ring at some odd hour, and it would be Henry, wanting to spring some new insane swap scheme on me. We tried our best (although not always successfully) to come up with novel, clever plots to try out on each other, springing them on the other as surprise moves! We used the telephone, greeting cards and telegrams, notes in a bottle, anything we could to keep the plot interesting. And, obviously, we never wanted to consummate the trade, only to keep the tease going!

Henry died while on a trip in the 80's, and a short time later, I learned that he had included in his will a mention of the Apophyllite. In his typical, soft spoken, dignified manner he had left the piece to me. The almost constant lighthearted teasing of the past 25 years had come to its end along with the life of my friend. He had managed to get the last joke in.

The Apophyllite now sits in a prominent position in my collection. Whenever I look at it, I remember Henry, and our long-term joke, and realize that sometimes it is just those kind of silly interplays between people that help make true, long lasting friendships. I know that I won't part with this specimen in my lifetime, it has just too much of a bittersweet memory attached to it.

Larry Rush
Guilford, CT
ConnRoxMinerals.com

The ***Newsletter*** is the official publication of the Micromounters of New England (MMNE). The last by-laws revision was May 16, 2009. The MMNE is a member of the Eastern Federation of Mineralogical and Lapidary Societies (EFMLS) (http://www.amfed.org/efmls) and the American Federation of Mineralogical Societies (AFMS) (http://www.amfed.org). Material from the *Newsletter* may be copied in other rock and mineral publications if credit is given to the author and the *Newsletter* and permission has been obtained from the author. If there are questions regarding copying contact the editor. The club address is c/o the Secretary. Meetings are held monthly, September through May, except for December, and usually on an informal basis in July. Meeting sites may change and will be posted in the *Newsletter* as far in advance as possible. Visitors are welcome to attend all meetings. Bring a microscope and light source if you have one.

DUES are $12/year for a single person and $15/year for a family membership, levied on a calendar basis. The family membership includes two adults and all children under 18 living at the same address. One copy of the *Newsletter* will be sent on a family membership.

Schedule of Upcoming Meetings

Saturday, January 23, 2010……Bring your favorite Epidote family specimens for the friendly competition
Saturday, February 20, 2010……..To be determined at January meeting
Saturday, March 20, 2010……..To be determined at February meeting
Saturday, April 17, 2010……To be determined at March meeting
Saturday, May 15, 2010…….The 2010 Micromounters of New England Annual Symposium

MEMBERSHIP FORM, NEW AND RENEWAL

Membership in the MMNE runs from January 1st to December 31st. Dues are payable on or before January 1st for the upcoming year. Failure to renew on time will result in cancellation of membership including the subscription to the Newsletter. Please fill out this form and return it with your payment.

Name: _____

Street/PO Box Address: _____

City/State/Zip : _____

Telephone: _____

E-mail address: _____

___ Hard copy via USPS or ____ via email to above address

Membership type: Individual $ 12.00 Family $ 16.00
Family membership includes two adults residing at the same address and all children at that address under the age of 18. Only one copy of the Newsletter per family membership.
Newsletter: The Newsletter is available as hard copy sent through the mail, or via email, which may have color photographs included. Please indicate choice of format. The Newsletter is published in January, February, March, April, May, Summer Issue (June), September, October and November (no December issue), and is send out approximately two weeks prior to the next scheduled meeting.
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