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. 307 Summer, 2010

OFFICERS
2010 - 2011

President
Joseph Mulvey
(603) 880-4018
bassmeister_2000
@yahoo.com

Vice-President
Gordon Jackson
(603) 783-4493
gsj8544@aol.com

Treasurer
Tom Mortimer
(603) 673-4039
tjmort@comcast.net

Secretary
Bob Wilken
(603) 536-2013
microxl@mfire.com

Director
Carlos Gristani
(603) 465-6292
carlosg@gmail.com

Director
Bob Janules
(603) 424-9269
janules@worldnet.att.net

Newsletter Editor
Joseph Mulvey
(603) 880-4018
bassmeister_2000
@yahoo.com

Current Meeting
Saturday September 18
Trinity Lutheran Church
Chelmsford, MA

Map and driving directions are on last of this newsletter

For information regarding **MEETING CANCELLATION** due to inclement weather,
Joseph Mulvey
(603) 880-4018
bassmeister_2000
@yahoo.com

Welcome to the Summer edition of the Micromounters of New England Newsletter!

The highlight of the MMNE season, the Annual Symposium, has come and passed. What a great day we had! Presentations by Gene Bearss and Tom Mortimer were both brilliant. The photography and background knowledge of our resident experts is inspiring to say the least.

If you missed this years' symposium as many regulars did, you certainly missed out on a book load of information! **Tom Mortimer**'s presentation on New Hampshire minerals and his research on identification, history and leg work in the field define what the hobby is all about.

Gene Bearss' presentation on "What's New at Estes Quarry" has now been turned into a video on DVD. Quality of the reproduction is pretty good. Gene's talk was well paced and very informative. All present now feel they are Estes experts!

Thank you to both members for their continued input into our club! And thank you to all the members who donated their time, specimens, items, services and patience to another successful year!

Over the summer I came up with an idea for a club project that I anticipate will broaden our reach, spread the club name and encourage new members to join.

First, some background and slight digression:

There are literally only two books on Micromounting available to interested parties. The first book was **Milton Speckels'** "**Introduction to Micromounting**". I bought a copy of this when I was in 6th grade at the North Shore Club Show in Topsfield. I still have it and it is still in great shape. This summer with the help of Mindat I found the company that owns the rights to this book. In looking around I found that Mr. Speckels passed away a few years ago. The company with rights did not have a copy of this book, so I asked them (Gemguides) if I could scan it, share it with the MMNE and email them a copy as well. They graciously said yes. In the member's only area, you too can download a copy of this book. Greg at Gemguides requests we not share it with non-members.

The other book which I am sure everyone must be aware is **Quintin Wight**'s tome and bible aptly named "**The Complete Book of Micromounting**". This book covers the gamut and details the history as well as modern techniques. It's a beauty and truly is *complete*.

I believe there is room for one more book on micromounting. I believe that book could be written by our club. I also believe that we have already written half of it if you consider all of the newsletter articles written by our members since 1966.

Elsewhere in this newsletter you will find a proposed cover and table of contents for this book. I have assigned many existing articles to become parts of the various chapters. In my mind I see particular members contributing their painstaking expertise to certain chapters. Additionally, we will certainly need a proof reader, somebody to contact past members to obtain their permission, and another volunteer or two to help with basic organizational tasks. I would make sure that every page of this book will have the club name and URL in the footer.

I propose that we offer this book as a free file on the internet. The more it spreads out, the more awareness of our club will grow. We would also be able to print hard copies like **Peter Cristofono** does so well with his volumes on New England Minerals. These could be donated to other clubs' annual shows, or sold by us to benefit the club.

I think this idea has much merit and will truly help the club. I hope you as members agree and will start thinking about the areas of micromineralogy that are your personal forte and document some of your hard earned experience to share with others. I also hope this will be a club project, not the singular effort of a core group of regularly contributing members.

Well there are a few mineral shows before the end of the summer; the East Coast Show in Springfield is 8/13-8/15 and then the annual Capitol Mineral Club Show is in Concord at the end of the month.

Enjoy the summer and we'll see you all in September!

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.

MMNE Secretarial Report May 15, 2010 Annual Symposium

Symposium meetings are historically short meetings that are meant to ratify any changes to the club bylaws and to vote in the the board for the upcoming club year. Bylaws were approved unanimously and the new board was elected based upon the nominations in March and April. Gene Bearss has stepped down as director and has been replaced bby Carlos Gristani.

Notes For Submission of Samples for microprobe/SEM work based upon a Rockhounds email by Dr. Pete Modreski

The cleaner the sample fragment will result in more useful and accurate the information. A weathered, altered or dirty fragment that looks like it may have limonite and clay on it, for example, will likely result in an an elemental X-ray spectrum showing mostly Fe and Si, which may tell you very little. For whatever size range of a grain or fragment that is requested, do your best to insure that it is a clean, pure crystal or cleavage fragment.

Remember that the electron probe or scan analysis will basically sample the surface of the mineral grain, so try to insure that the exposed surface is a clean fracture, crystal, or cleavage surface and not some weathered coating.

Likewise, a fine-grained aggregate of mineral material may likely result in an X-ray spectrum showing a mixture of common elements that does not tell you very much.

And of course, make sure that the crystal or fragment that you send in, is really representative of the crystals on the specimen that you are trying to identify.

Beware of pseudomorphs and replacement--a lot of minerals are oxidized and replaced by iron oxide, and many dark brown specimens may just yield a result of "Fe" plus trace other things, that won't tell you very much.

Also keep in mind that there are a great many common and rock-forming minerals (zeolites, for example) that all contain varying proportions of the common elements like Na-K-Ca-Al-Si-Fe-Mg, and that the X-ray spectrum may not enable you to narrow down the mineral identity very much.

JEAN (KELLEY) McKENNA **Published in The Providence Journal on June 17, 2010**

McKENNA, JEAN (KELLEY) 79, of Cranston, on June 15, 2010 at Rhode Island Hospital after a long illness. Preceded in death by former husband Kurt H. Heilmann. Widow of Donald McKenna.

Mother of

Richard K. (Katherine A.) Heilmann of Pittsburgh, PA. Grandmother of

Megan R.

Heilmann of Pittsburgh. Also survived by nephews, nieces, cousins and many friends. Jean enjoyed Broadway musicals, collecting rocks and minerals, stamps, and cats.

A funeral will be held on Friday at 10:00am in The Butterfield Chapel 500 Pontiac Avenue Cranston. Burial will follow in St. Ann's Cemetery Cranston. In lieu of flowers, memorial donations may be made in her name to Colleen's Fund for Animals, 84 Cutler Street #7 Warren, RI 02885 To sign an online guestbook or for directions to the funeral home please visit

The Complete Guide to Micromounts by Milton Speckels

Thanks to the gracious permission of Gemguides (http://www.gemguidesbooks.com/), we have been allowed to scan in this great book from the 1960's for sharing among the club.

We have permission only for the members to access this file. I stongly request you not share it with non-members as that is not part of the agreement with Gemguides.

Download the Speckels Book in the Members Only area of the MMNE. Be aware that this Acrobat PDF file is about 37 meg in size and will take days to download if you don't have broadband access.

Access to the member's area is still with the following account:
login: 2009member password: optic

2010 SYMPOSIUM BALANCE SHEET

Sales Table receipts:	$525.50
Auction Table receipts:	$161.00
Attendee Registration @ Auburn	$180.00
Prepaid registrations	$375.00
Total Receipts:	$1241.50
Expenses:	
Hall rental & catering	$549.29
Door prize	$85.70
Hall Deposit (??)	$100.00
Total expenses to date	$734.99
Profit to date	$506.51

Thank you to Tom Mortimer, MMNE Treasurer

MAY MINI SYMPOSIUM SILENT AUCTION

This year's silent auction had 9 donors who brought in $161.00 for the Club. This compares to last years 13 donors and $322.00. We would like to thank Members Pat Barker, Nate Martin, Marilyn Dodge, Mike Swanson, Tom Mortimer and Gordon Jackson and dealers Sauktown Sales (Jim Daly), Weinrich Minerals (Dan and Diana Weinrich) for their contributions and success to the silent auction. A special thanks goes to Marilyn Dodge who contributed the Dana Mineralogy books and cabinet which brought over half the auction amount. I think all the successful bidders will agree there were bargains to be had. Let's make next year's silent auction a great success.

year	items	donors	win bidders	amount	avg (with high, above $300 out)
2007	19	3	?	$194	$10.21
2008	33	9	10	$265	$8.03
2009	39	13	17	$322	$6.54
2010	33	9	14	$161	$3.30 (this was first time 7 items had no bids)

Thank You to Pam & Gordon Jackson, silent auction co-chairs.

Survival in the Mines

by Andrew A. Sicree

Hazards of mining

Mining is hazardous, but it is not nearly as dangerous today as it was a century ago. In the late 1800s and early 1900s, it was not unusual for America to lose thousands of men each year to accidents in the mines. Coal mines have always been particularly dangerous. In 1907, the worst year on record, coal mine fires, explosions, cave-ins, and other accidents claimed the lives of more than 3200 miners.

The U.S. has made tremendous progress in mine safety. Although we still lose miners on the job, the annual rate has dropped to a nation-wide average of about 30 deaths each year over the past decade. By comparison, modern-day China loses approximately 6000 coal miners each year to accidents. The U.S. fatality rate has dropped so low that a single accident can significantly boost the annual death rate. For instance, in 2009 there were only 18 on-the-job deaths in U.S. coal mines, but the recent (April 5th, 2010) explosion in a coal mine near Montcoal, West Virginia, left 29 dead. Thus, the 2010 death rate will prove to be more double that of the year before – a stark reminder that mining is still a dangerous occupation.

Death in the air

Underground fires and explosions are major causes of mining fatalities. Both underground fires and explosions can fill a mine with dangerously high levels of carbon monoxide (CO), a colorless, odorless and very poisonous gas. Typically, a mine fire or explosion occurs because coal dust or methane in the mine atmosphere ignites. But combustion us typically incomplete so that carbon monoxide (CO) is produced along with carbon dioxide (CO_2), the more typical combustion product. Carbon monoxide can reach out strike down underground miners even though they may be a mile or two distant from the site of an underground fire or explosion.

Each year, about 1500 Americans are accidentally killed by exposure to dangerous levels of carbon monoxide. Only a small percentage of these carbon monoxide victims are miners. Many fatalities happen in homes with blocked, leaky, missing, or improperly installed vents for furnace or fireplace flue gases.

The problem for the miner lies in the fact that there are no underground windows to open and jump out; a miner is stuck breathing whatever is in the air in the mine.

How does a miner breathe in a fire?

You have to breathe, and it is a long walk (or climb) out of the mine. If you survived the initial explosion or fire, could you make it out alive? A variety of "rescue" devices have been invented to save miners in this situation. The primary danger arises from high carbon monoxide levels, but miners may also face an oxygen-depleted atmosphere as they seek to escape from a burning mine.

Why not simply carry an air tank the way SCUBA divers or fire-fighters do? The major problem is weight: an hour-long supply of air in a heavy metal tank simply weighs too much for the miner to carry it around all day. (A SCUBA diver can do this because the buoyancy of water makes the tank feel lighter.) A 30-minute air supply tank weighs more than 33 pounds (15 kg) and it can take two or three hours to walk out of many coal mines.

Early light-weight "self-rescuers" were essentially catalytic converters that worked similarly to the catalytic converter in your automobile. They contained a catalyst that promoted oxidation of carbon monoxide in the air into carbon dioxide. This strategy worked because the danger level for carbon dioxide – 4% or 40,000 ppm (parts per million) in air – is much higher than that of carbon monoxide – about 400 ppm in air for 15 minutes of exposure. Escaping miners breathed in mine air after it passed through the catalyst that changed carbon monoxide to carbon dioxide. For instance, air with 1000 ppm carbon monoxide, a dangerously high level, would get converted to about 1600 ppm carbon dioxide – a breathable concentration.

One significant drawback of these self-rescuers was that they got extremely hot when working. The heat could scorch a miner's lips as he breathed through the mouthpiece. Not at all pleasant, but the miner dared not take the mouthpiece out of his mouth even if it was burning hot because he knew it was saving his life. Another drawback of the catalyst-based self-rescuers was that they could not produce oxygen. These earlier self-rescuers only worked if the mine air still had enough oxygen to support life even after a fire.

Sources of oxygen

Modern miners rely on the "self-contained self rescuer" (SCSR) to both protect them from carbon monoxide and provide them with an emergency oxygen supply. A typical SCSR weighs provides one hour of breathable air but only weighs about 5.7 lb (2.6 kg). The SCSR employs a fascinating chemical reaction that employs the miner's own breathe to produce breathable air.

The oxygen source for the SCSR is potassium superoxide, a rare and interesting chemical compound with the formula KO_2. You are very unlikely to find it in a jar on a shelf in your local chemistry laboratory because it reacts very rapidly with carbon dioxide, water, and even water vapor. This reactivity makes it uniquely useful.

As a powder, potassium superoxide is yellowish. It will react with either water or carbon dioxide to generate oxygen. Potassium superoxide reacts with water as follows:

$$2\ H_2O(l) + 4\ KO_2(s) \rightarrow 3\ O_2(g) + 4\ KOH(s)$$

Thus water plus potassium superoxide yields breathable oxygen gas and solid potassium hydroxide waste. (Incidentally, this vigorous reaction with water is one reason why SCUBA divers cannot use potassium superoxide as an oxygen source – it is practically impossible to keep the stuff dry underwater.)

When potassium superoxide reacts with carbon dioxide, the reaction is written:

$$2\ CO_2(g) + 4\ KO_2(s) \rightarrow 3\ O_2(g) + 2\ K_2CO_3(s)$$

In this reaction, carbon dioxide reacts with potassium superoxide to generate solid potassium carbonate and breathable oxygen. These reactions also release some heat, so the SCSR gets warmer if it is working properly, but not nearly the scorching heat of the earlier catalytic self-rescuers.

Use of the SCSR

After a mine fire or explosion, a miner should expect that poisonous carbon monoxide will be present in the mine air. He must put on the SCSR immediately. He clenches the breathing tube between his teeth and pinches his nose closed with a nose clip. After the miner blows his first breath into the SCSR, carbon dioxide and water vapor in his breath begin to generate breathable oxygen according to the above reactions. (Each SCSR also has a small supply of oxygen, but that only serves the miner during the first few breathes until the potassium superoxide kicks in.) Each exhalation causes the SCSR to produce more oxygen. To extend the range of the SCSR, oxygen is caught is a large air-tight bag which hangs in front of the miner and allows him to "rebreathe" the air.

Each SCSR will support a miner for about one hour. The actual amount of time the miner has varies based on body size, breathing rate, and physical exertion. If miners are working more than one hour's walk from the mine entrance, the mine will have to place caches of additional SCSRs distributed throughout the mine. Miners walk to the caches, switch to fresh SCSRs, and continue walking toward the mine exit.

It is vitally important the every miner know how to use the SCSR properly. After carbon monoxide killed 13 miners in 2006 at the Sago Mine in West Virginia, some reports claimed that some of the SCSRs were not working properly. Subsequent investigations suggested that better training in their use was needed. Federal Mine Safety and Health Administration (MSHA) regulations were strengthened to require that each underground miner complete four practice sessions with the SCSR annually. Most miners will go through entire careers without ever having to deploy their SCSR, so these practice sessions are critical for keeping miners prepared to use their SCSRs if necessary.

Mineral collectors underground

Explosions and fires occur in mines because of the presence of methane gas, coal dust, diesel fuel, wood supports, and other flammable materials. Miners are required to carry SCSRs when underground, and visitors going underground must also carry SCSRs provided by the mine (SCSRs are rather expensive, and it is unlikely that visitors will have their own). Mine visitors undergo a training session that alerts them to hazards present down in the mine and also teaches them how to use the SCSR in an emergency.

Obviously, if a mineral collector goes underground into a closed or abandoned mine, he faces a number of dangers. Rock fall is a major danger. Bad air (oxygen depleted) is another danger. Mine fires may be less likely in an unoperating mine, but if an explosion or fire should occur while collectors are underground, it will probably prove fatal because they lack protective gear such as self-contained self-rescuers.

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

Underappreciated Wollastonite

Because it is common enough, and is usually found in massive form, wollastonite is one of the less appreciated minerals. Wollastonite is a calcium silicate mineral ($CaSiO_3$, triclinic), although small amounts of iron, manganese, or magnesium may substitute for calcium in its structure. Although wollastonite crystals are found, its most common habit is in the form of bright white fibrous or cleavable masses.

The formation of wollastonite provides an excellent example of how metamorphism alters one mineral to produce another. It chiefly forms during contact metamorphism when hot silica-rich fluids encounter limestone country rocks. Calcite ($CaCO_3$, hexagonal) in the limestone reacts with the silica according to the equation:

$$CaCO_3 + SiO_2 \rightarrow CaSiO_3 + CO_2$$

Note that the reaction also produces carbon dioxide. This is one reason why carbon dioxide "springs" and "seeps" are often found in regions where metamorphism is currently occurring (such as tectonic collision zones and near volcanoes).

The primary market for wollastonite is for the manufacture of ceramics. Because of its high brightness wollastonite finds use in paint fillers and plastics. Wollastonite is named after the English chemist and mineralogist Sir William Hyde Wollaston (1766-1828), the discoverer of the elements palladium and rhodium.

Wollastonite : CaSiO3
Photo Copyright © 2005 Peter Cristofono - This image is copyrighted. Unauthorized reproduction prohibited.

Locality: Lewis Mine (Cabot Corporation mine; Lewis NYCO mine), Willsboro, Essex Co., New York, USA

White wollastonite with minor green diopside.

View is about 6 cm across. Photograph by Peter Cristofono.

Discovery of Untapped Afghan Mineral Deposits
By James Risen Copyright the New York Times

WASHINGTON — The United States has discovered nearly $1 trillion in untapped mineral deposits in Afghanistan, far beyond any previously known reserves and enough to fundamentally alter the Afghan economy and perhaps the Afghan war itself, according to senior American government officials.

The previously unknown deposits — including huge veins of iron, copper, cobalt, gold, and critical industrial metals like lithium — are so big and include so many minerals that are essential to modern industry that Afghanistan could eventually be transformed into one of the most important mining centers in the world, the US officials believe.

The vast scale of mineral wealth was discovered by a small team of Pentagon officials and American geologists. The Afghan government and President Hamid Karzai were recently briefed, American officials said.

While it could take many years to develop a mining industry, the potential is so great that officials and executives in the industry believe it could attract heavy investment even before mines are profitable, providing jobs that could distract from generations of war.

“There is stunning potential here,’’ General David H. Petraeus, commander of the US Central Command, said in an interview. “There are a lot of ifs, of course, but I think potentially it is hugely significant.’’

The value of the mineral deposits dwarfs the size of Afghanistan’s existing war-bedraggled economy, which is based largely on opium production and narcotics trafficking as well as aid from the United States and other industrialized countries. Afghanistan’s gross domestic product is only about $12 billion.

“This will become the backbone of the Afghan economy,’’ said Jalil Jumriany, an adviser to the Afghan minister of mines.

American and Afghan officials agreed to discuss the mineral discoveries at a difficult moment in the war in Afghanistan.

The American-led offensive in Marjah in southern Afghanistan has achieved only limited gains. Meanwhile, charges of corruption and favoritism plague the Karzai government, and Karzai seems increasingly embittered toward the White House.

So the Obama administration is hungry for some positive news to come out of Afghanistan. Yet the American officials also recognize that the mineral discoveries will almost certainly have a double-edged impact.

Instead of bringing peace, the mineral wealth could lead the Taliban to battle even more fiercely to regain control of the country.

The corruption that is already rampant in the Karzai government could also be amplified, particularly if a handful of well-connected oligarchs, some with personal ties to the president, gain control of the resources.

Endless fights could erupt between the central government in Kabul and provincial and tribal leaders in mineral-rich districts.

Afghanistan has a national mining law, written with the help of advisers from the World Bank, but the legislation has never faced a serious challenge.

Another complication is the environment. Because Afghanistan has never had much heavy industry, it has little history of environmental protection.

The mineral deposits are scattered throughout the country, including the southern and eastern regions near Pakistan that have had some of the most intense combat in the American-led war against the Taliban.

The Pentagon task force has already started trying to help the Afghans set up a system for mineral development.

International accounting firms with expertise in mining contracts have been hired to consult with the Ministry of Mines.

Why Mineralogy Matters
by Dave Forest
July 16, 2010

It's been a hectic week of travel through Europe, on behalf of our gold-copper company.

I'm sitting in the Crowne Plaza in Bratislava, Slovakia, getting ready for some meetings in that capacity. The hotel is minutes from the old town, including the church where the monarchs of the Austro-Hungarian empire were crowned. It's an interesting place to say the least.

Slovakia is also interesting for another reason. Uranium.

I'll be spending a little bit of time today reviewing some ideas on that front. As I mentioned on Wednesday, I've been doing a lot of prep research ahead of this. And it's convinced me that one area is incredibly important (and under-appreciated) when it comes to uranium deposits.

Mineralogy.

We talk a lot about uranium deposits. But the importance of what form the uranium takes within a deposit seldom gets mentioned.

The majority of deposits hold uranium in the form of uraninite, a uranium oxide. This is the most chemically-stable form of uranium on the planet.

The processing of uraninite is well-understood. Generally, uranium-bearing ore is crushed and grinded, and then uranium is leached with either an acid or alkaline-carbonate solution. Uranium goes into solution and is then precipitated and recovered using ion exchange.

The last parts of this process (solid-liquid separation and solvent extraction) are fairly straight-forward and don't tend to vary much across uranium deposits.

The initial process stage, however, can vary considerably. As with most ores, some rocks are easier (and thus cheaper) to crush and grind. At deposits that require a high degree of crushing, capital costs for the crush/grind circuits can make up 50% of total capex.

This is an especially important point for uranium. As we've discussed in the past, a large percentage of global uranium production comes from fairly low-grade deposits. Meaning that cost-containment becomes very important to running an economic operation.

Here's a critical example. There are a lot of granites on Earth that contain a few hundred parts per million uranium oxide. But only one of them, Rossing in Namibia, produces a significant amount of yellowcake.

A number of factors historically led to the development of Rossing. Low labor costs, political sensitivities, etc.

But unbeknownst to many, mineralogy is a huge part of the Rossing story.

Ore at Rossing requires very little crushing. There's a special reason for this. Mineral grains appear to have been quite brittle. The grains developed sizeable cracks, where uranium was deposited.

These cracks allow leaching fluids to access the uranium and effectively take it up into solution. At most other deposits, the uranium isn't as easy to get at. Thus, more crushing is required, leading to higher costs.

Here's an idea of the difference mineralogy makes in the Rossing case. Because of the fractured character of grains, Rossing ore was originally processed using crushing to "minus 6 mesh". This means ore grains come out of the crushing circuit at a size of 3.36 millimeters.

At many other uranium operations, ore must be crushed to 250 mesh. Representing a size of 0.058 millimeters. This is a 100-factor difference in crushing. It takes a lot of power and equipment to do more crushing work, leading to higher capital and operating costs.

The "Rossing secret" is instructive. When examining low-grade ore deposits as potential development candidates, this kind of mineralogy could be a key. Doing a little bit of thin-section work at the beginning of an exploration program could identify which granites will succeed or fail.

This is not something that typically gets done as part of most exploration programs. It needs to happen more.

Here's to those little details,

Dave Forest
dforest@piercepoints.com

For more information please visit www.piercepoints.com

Uraninite : UO_2, Gummite

Locality: Palermo No. 1 Mine (Palermo #1 pegmatite), Groton, Grafton Co., New Hampshire, USA

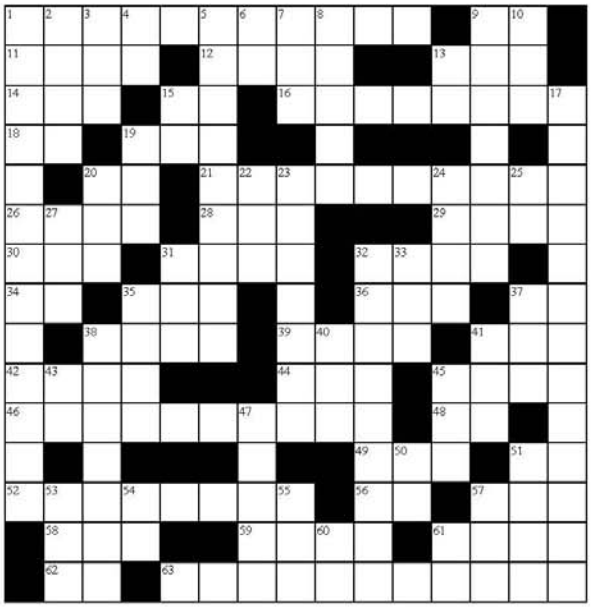
Black uraninite surrounded by yellow "gummite."

Dana Jewell specimen, field collected ca. 1980. Scale at bottom is in millimeters. P. Cristofono photo.

This Photo was Mindat.org Photo of the Day - 18th Jan 2009

Crystal Matrix Crossword

More Zeolites



ACROSS

1 found as cruciform twins
9 an element in emeralds
11 drives down the roads
12 written to remind
13 source of metal
14 rare earth element
15 the devil's element
16 what a phantom crystal is doing
18 favorite as poison
19 found in the home
20 chalcosite state
21 enthusiastic mineral collector
26 horizontal mine entrance
28 ___ the Season to be Jolly
29 said in Pittsburgh
30 Sn
31 boat dock
32 tree-filled valley
34 radon
35 a professional
36 to have dinner
37 politically correct
38 ball ____ hammer
39 rich kids school
41 the maid not SEAn
42 where the fox lives
44 a young boy
45 a hole in the ground owned by a liar
46 violet U oxide mineral
48 iridium
49 ___ ammoniac
51 lake (ab)
52 a zeolite
56 indium
57 twelve
58 to request
59 what mine trucks carry
61 sediment on river bottom
62 acidity scale
63 another zeolite

DOWN

1 related to natrolite
2 colors of minerals
3 the end of minerals
4 not hi
5 cubic zirconia is an ____ diamond
6 physical education (ab)
7 Soc. of Mining Engineers
8 what halite is
9 English minerals source
10 Scots eyes
13 osmium
15 north east (ab)
17 zeolite from Luck Goose Creek Q in Virginia
19 an English mine
20 to triumph
22 old lady exclamation
23 man from Tel Aviv
24 Russian no
25 down (ab)
27 lots of noise
31 prefix for before
32 measures the Earth
33 local area network
35 alert, frisky
37 mightier than the sword
38 color of stilbites
40 tit for ___
41 Russian diamond pipe
43 anti-aircraft
45 one-thousandth
47 not sane
50 anorthite (ab)
51 found in Irish voice
53 large boulders: rip __
54 sand calcite state
55 long time
57 Latin twelve
60 Vietnamese name
61 used in toothpaste tubes

LAST MONTH'S SOLUTION: Time

T	E	T	R	A	H	E	D	R	A	L	■	S	U	Q
R	O	C	K	■	E	C	R	U	■	■	O	A	H	U
A	N	O	■	A	K	■	U	N	D	E	R	S	E	A
N	S	■	E	R	A	■	■	I	■	■	■	S	■	R
Q	■	I	R	■	G	E	O	C	H	E	M	I	S	T
U	L	N	A	■	O	A	R	■	■	■	B	E	N	Z
I	A	N	■	A	N	T	I	■	I	S	A	R	■	T
L	P	■	B	O	A	■	G	■	S	O	S	■	S	R
I	■	N	A	I	L	■	A	E	O	N	■	K	O	I
T	R	I	G	■	■	■	M	A	M	■	G	O	L	D
Y	T	T	R	I	A	L	I	T	E	■	E	H	■	Y
I	■	R	■	■	■	O	■	■	T	E	M	■	A	M
T	R	A	N	S	E	C	T	■	R	A	■	I	G	I
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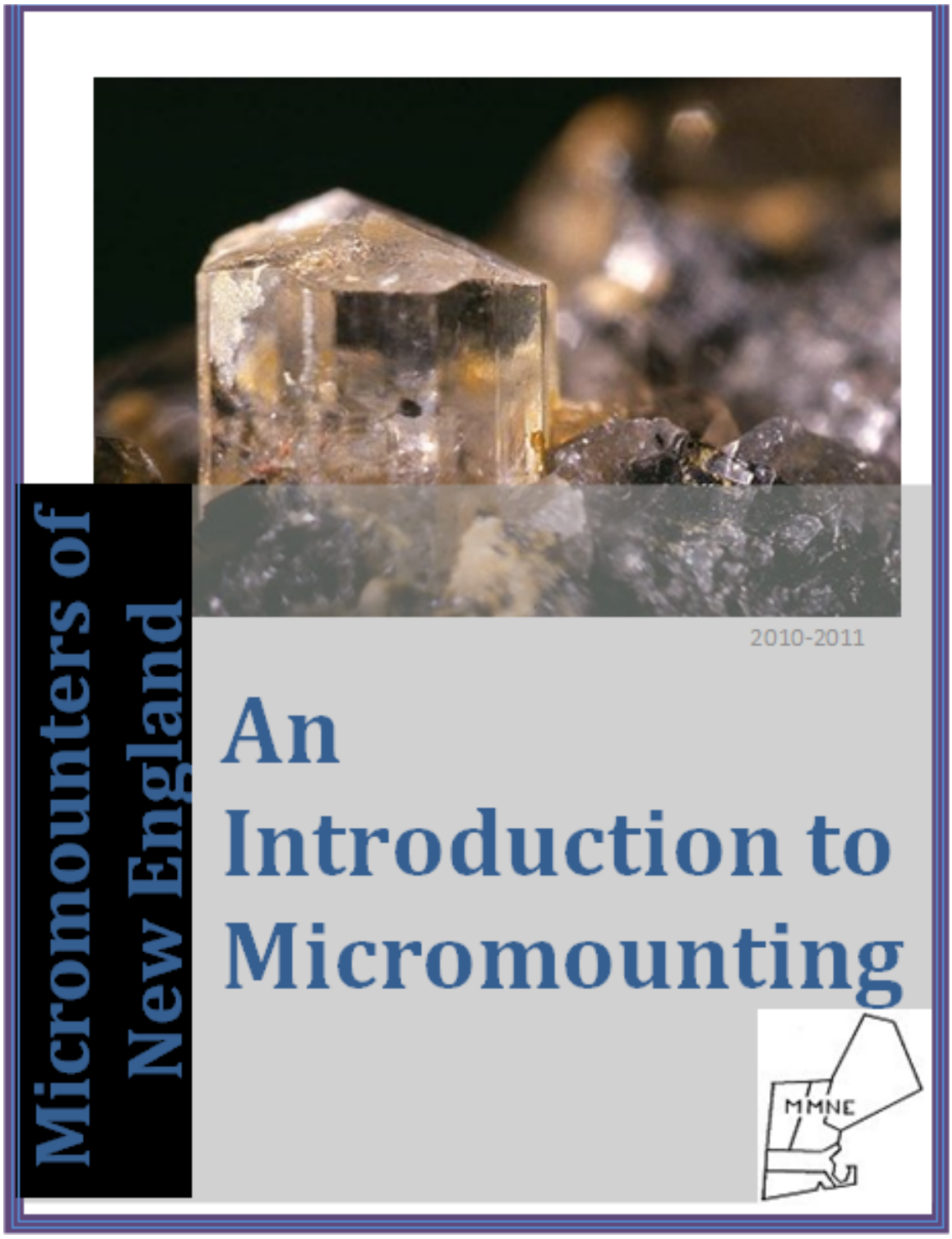

Proposed cover for the new club book.

Contents

Directions to the Trinity Lutheran Church in Chelmsford, MA

170 Old Westford Rd., Chelmsford, MA.
From Rt. 3, take Exit 32, (The "Drum Hill Rotary").
From Rotary, Take Old Westford Rd. towards Westford for about .85 miles to Grandview Rd.
Entrance for Trinity Lutheran Church on left.
Proceed up rather long driveway to parking area.
Our meeting room is at the far end of the low building.

Those coming from the south may want to try an alternate route, exiting from Rt. 495 at Exit 33, then taking Rt. 4 north to a left onto Davis Rd. See map below.

Fall Meetings are at Trinity Lutheran Church in Chelmsford, MA. Meetings start at 9am and wrap up around noon.

September 18

October 16

November 20

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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.
Please remit payment to Treasurer Tom Mortimer, 3 Roberts Rd., Amherst, NH 03031

Joe Mulvey, Newsletter Editor
Micromounters of New England
24 Skyline Drive
Nashua, NH 03062

TO: