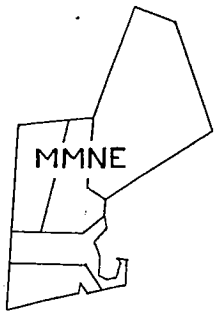

MICROMOUNTERS OF NEW ENGLAND

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

February 1996 Newsletter #188

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Dues are $6.00/year and due on January 1st, payable to the treasurer.

News items for the Bulletin are welcome and should be submitted to the Editor. The Bulletin may quoted if credit is given. The Club address is c/o Editor

Upcoming Meetings
Mar. 16, 1996 (Saturday)
Hudson, MA Public Library

NEXT MEETING

The **FEBRUARY** meeting will be held at the Auburn, MA public library on February 10, 1996 with a snow date of February 17. (The map is on the back of this sheet.) Gene Bearss will speak on the microminerals of the Emmons Quarry (Greenwood, ME).

MEMBERSHIP NEWS

It's ***DUES TIME*** again. Send it to Janet Cares and please include ZIP+4. On the form sent with the last newsletter is a place to list special interests (localities, species, special categories such as phosphates, microphotography etc. - we already know you are micromounters, so come up with something more specific) as well as want lists and available trading material. This information will be put on the membership list, and therefore will be sent to a few other micromount clubs with whom we swap newsletters. You might want to indicate whether you are interested in trading by mail, and if so, what you have to offer. ***If your dues are not received by the mailing date of the March issue, you will not be listed on the mailing list.***

FROM THE EDITOR

This issue contains the second part of my series on cleaning micromounts. ***Please mail me your comments, additions, corrections, etc.*** I would like to put this together as a manual after the last segment has been published and I need your input. In the future I would like to try a similar piece on various methods for identification of minerals including blowpipe, chemical, physical, optical, etc. I would like help or ideas. Please let me know iof you can help.

Pat Barker is still looking for more recipes for the MMNE cookbook. Mail contributions to her at PO Box 810, Campton, NH 03223, (603) 536-2401.

The club is currently looking for a site to hold the July meeting. Herb Fielding has offered his family camp on Lake Winnesquam (just southeast of Lake Winnepesaukee and Laconia, NH), but we are open to any and all suggestions. Be prepared to discuss this at the next meeting.

Pat Barker has made arrangements to order a hard cover book on Hagendorf (Germany) which some of you might have seen at the November meeting. For those of you not familiar with Hagendorf, it is the site of a large and very diverse phosphate deposit, not unlike Palermo. Hagendorf is the type locality for a number of rare species. The book is in printed in German, but the color photographs are excellent and well worth the price of about $24. Contact Pat if you are interested.

Janet Cares has access to copies of the upcoming "Vermont" issue of Rocks and Minerals at $3 each. Contact her directly if interested.

It is time to consider donations to the annual May meeting. We need specimens for give-aways as well as sale material. Anything related to micromounting can be used for sale or auction. All material donated becomes the property of the MMNE and will not be returned if unsold. Please price any sales material with a valuation you would like to see if you we purchasing it. The object is to help cover the costs for our speaker.

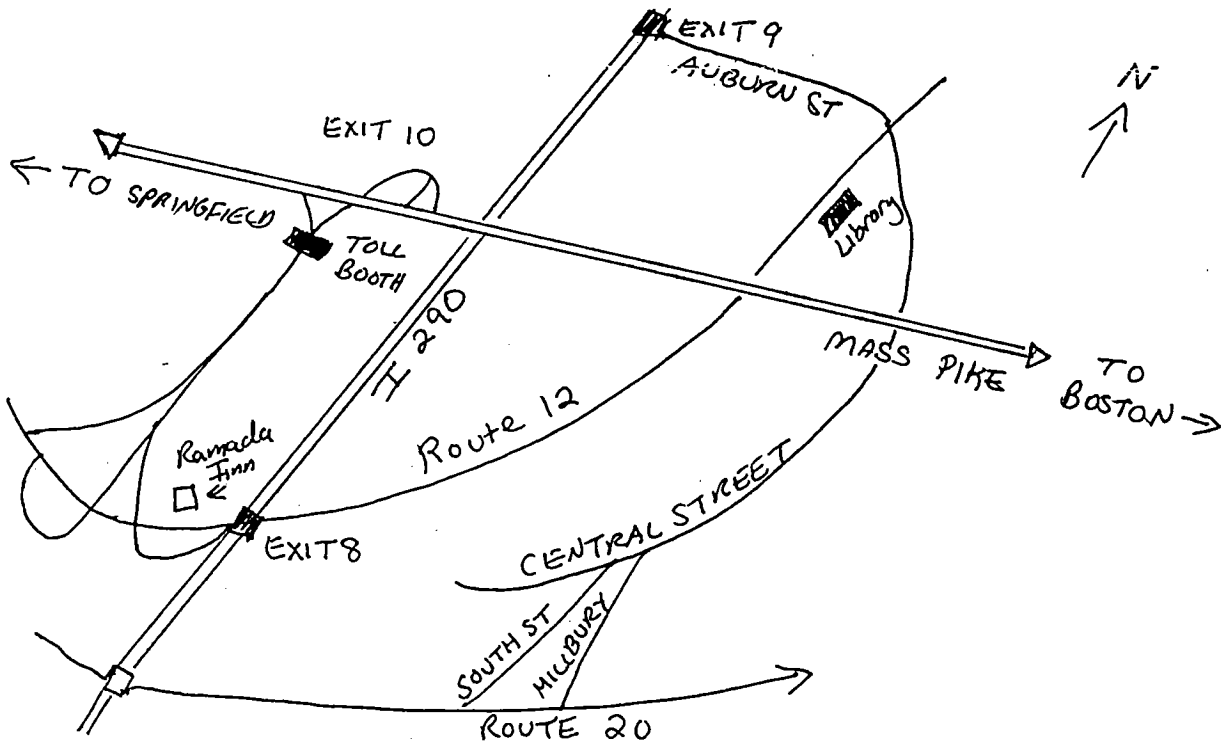
UPCOMING MEETINGS AND SHOWS

March 9: 20th Annual M/M '96 Micromount Swap-Sell-Learn sponsored by the Rock & Mineral Club of Lower Bucks Co. Fairless Hills First United Methodist Church; Fairless Hills, PA.
March 29-31: 24th Annual Atlantic micromounters Conference, sponsored by the Micromounters of the National Capital Area. University of Maryland, College Park, MD. Contact Fred Schaefermeyer, PO Box 10119, Alexandria, VA 22310-0119. (703) 971-3080.
April 18-21: Rochester Mineralogical Symposium, Rochester, NY.

CLASSIFIED ANNOUNCEMENTS

This space is avaliable to active members of the MMNE at no cost. Contact your editor with any sale items (no minerals), trades, want items, etc. The announcement will run for 2 issues of the Newsletter.

- Trade: Used LER *ultrasonic cleaner* in good condition to trade for a pair of 14x eye pieces from a Russian microscope. Gene Bearss (207) 324-3610. (12/95)
- Trade/Sale: Complete run of *Gems and Gemology* (journal of the Gemologic Institute of America), Vol. XVII (1981) through XXV (1989). Good to excellent condition. These issues start with the first issue in the large format. Value $250+. Trade for MSH rarities, other quality micros, or make an offer. Mike Swanson (413) 773-3867. (12/95)
- Sale: *Mineralogical Record*, 102 back issues, comprising: Vol 4, #5 (1973) through Vol 22, #6 (1991), less two missing issues, Vol 5, #5 (1974) and Vol 17, #5 (1986); $1200. Cost from dealers about $1510 in 1993. Bill Henderson (203) 245-0489. (1/96)



AUBURN PUBLIC LIBRARY

MECHANICAL CLEANING TECHNIQUES (continued from last issue)

- ***Needles and other crow bars.*** Sewing needles come in a great variety of lengths and calibers. They can be used to loosen attached fragments of dirt. Moistening the needle by touching it to the tip of your tongue can facilitate the removal of stubborn fibers. Some needles are long enough to hold with your fingers, while others require a pin vise or handle of some type to be useful (a 1/4" dowel with an appropriately sized hole makes a good handle). The stiffer ones, particularly sewing machine needles are strong enough to pop off unwanted or broken crystals or pieces of matrix. For ultrafine work, fine gauge hypodermic needles with their extremely sharp points are invaluable. If the hypodermic needle is attached to a syringe, an air stream can be directed at the same time. Dental picks may be helpful when used for cleaning debris from hand specimens, but under the microscope they have all the finesse of a crow bar.

- ***Bamboo skewers.*** Bamboo is quite soft and yet can be split into fine slivers to use as a pick. The sliver can be moistened and used to polish the surface of micro crystals. The skewers can be obtained from novelty or party shops.

- ***Static electricity.*** Rubbing a pair of fine tweezers or a needle with a piece of nylon or wool can create a static electric charge on the tool. This is often strong enough to pick off tiny fibers or lint.

- ***Cement bead.*** Some collectors advocate using a tiny bead of tacky material such as contact cement (before it dries completely) to lift off dirt. This bead is placed on the end of a fine needle or other tool and then touched against the particle which you want to remove in much the same way as the damp brush is used. A tiny residue of Mineral Tack™ or similar adhesive putty on the tip of a needle can also be effective.

- ***Balsa stick.*** A 1/16 inch balsa stick, cut twice on a diagonal to give a soft point, is very effective in polishing crystal faces and removing soft scum.

CLEANING WITH WATER

Water is not necessarily pure H_2O. Tap water may contain chlorine, calcium and magnesium ions, and other chemicals. Rain water may contain dissolved gases which can produce slight acidity. Many of these ions are capable of reacting with other cleaning agents as well as with the specimen. The alterations on a crystal face caused by a mild acid or alkali reaction may not be obvious on a hand specimen, but when the specimen is viewed through the microscope and you see crystal faces pitted or covered with a scum from your tap water, do not be surprised. If cleaning has to be done with tap water, a good rinsing at the end of the cleaning process with distilled water is recommended. Distilled water is available in the supermarket by the gallon. The runoff from your dehumidifier is essentially distilled water and is free. Deionized water can be purchased in the grocery store. A deionizing kit can also be purchased in a grocery store. It is a simple ion exchange system. In the following discussions "H_2O" will refer to distilled water.

Water works best as a cleaner when warm, and particularly when used n conjunction with detergents. Rapid immersion of a specimen into very warm or hot water can precipitate thermal shock.

- ***Thermal shock.*** When using any liquid-based cleaning method be aware that sudden changes in temperature can result in rapid expansion or contraction of crystals with subsequent cracking or breaking. If the cleaning process is started at room temperature then it is relatively easy to allow all specimens to return slowly to room temperature and thus prevent cracking or breakage.

- ***Water soluble species.*** As a general rule, nitrates, borates, chlorides, sulfates and a few carbonates are soluble in H_2O to a greater or lesser degree. The solubility of marginally soluble species such as malachite and azurite rises rapidly with increases in solution temperature. Extended use of the ultrasonic cleaner will increase the temperature of the bath. Minerals which form in brine such as hanksite and halite should be washed in the brine solution at the time of collection or washed in 95% alcohol.

- ***Clay family minerals*** may be classed as insoluble, but they can absorb great quantities of water with subsequent fragmentation and disintegration.

- ***Micas*** can split along cleavage planes from immersion in water.

- Minerals with "***meta***" in their names may well be altered by submersion in water through the process of rehydration.

- ***Minerals which tend to oxidize***, as many sulfides do, should probably not be washed in water. Alcohol is usually a safe, although not very effective cleaning solution.

- ***Acicular minerals***, particularly those which form mats, will tend to clump together irreversibly when immersed in water. Optimal cleaning is one of the "dry" techniques, but sometimes the use of alcohol as a cleaning agent will work. Try it on a discard first. Very occasionally the use of a wetting agent or surfactant (such as detergent) will prevent the clumping when using water.

- ***Residual water*** left after cleaning can damage the specimen or cause the deposition of a scum on crystal faces. Excess water can be removed by placing the specimen on a lint-free piece of dry cloth or newspaper, preferably face down it the crystal structure will permit. A stream of air can be passed tangentially over the specimen to both blow off excess water and to speed up evaporation. A hair dryer can be used but watch out for thermal effects. The specimen can also be rinsed in alcohol to remove the water.

- ***Soaking*** may loosen adherent matter to the point where it can easily be rinsed off or picked away using fine bamboo slivers or a needle.

- ***Agitation***. Suspend the specimen upside down in water and gently agitate.

- ***Running water***. Dripping water may be all that very delicate specimens can tolerate, while sturdier specimens may tolerate the full force of tap water. Use room temperature water since significant temperature changes can cause thermal fracturing.

- ***Pulse jet***. This irrigator is the sort used for massaging gums and cleaning teeth, but it does produce a fairly strong water jet. It is sold in pharmacies under the name Water Pik™.

- ***Pressurized water***. Water can be put under a fair amount of pressure using a syringe and small hypodermic needle. A pinhole attachment for a garden hose can cause a very fine but strong jetof water.

- *Ultrasonic cleaner*. The use of an ultrasonic cleaner is not particularly complicated, but there are limitations to what it can do. There is an optimal filling level of the tank on each cleaner, so read the instructions.

  a) The energy generated by the cleaner is capable of disintegrating specimens, so tend to use short cleaning times. Most cleaning can be done in just a couple of minutes. Prolonged cleaning can increase the risk of specimen damage as well as cleaner damage, and can significantly raise solution temperature.

  b) If the dirt is packed on the specimen consider a presoak. Depending on the material to be cleaned, wetting agents, detergent, ammonia, weak acids, etc. can be added to the bath. Verify that the agent being added will not damage the specimen or the tank. If chemicals such as acids are used which might damage the tank, make a double bath using a glass container to hold the specimens and cleaning fluid and suspend this off the floor of the tank. One author (4) suggests not using plastic containers since the sound waves may be absorbed by the plastic, reducing the effectiveness of the cleaner Many of us have used plastic continers or supports in an ultrasonic cleaner without obvious loss of cleaning power. The tank should be filled with water to the appropriate level.

  c) Keep specimens and fingers off the floor of the tank. They can dampen the action of the cleaner if they are resting on the bottom, and can actually damage the transducer which is attached to the undersurface of the tank. Use the specimen basket provided by the manufacturer or make one which is suspended above the floor of the tank. A wire mesh basket hung from the sides of the container works well.. Sound waves are transmitted by glass.

  d) The energy generated by the cleaner can damage you as well as your specimen. If you are in the same room as the cleaner, use of ear protection is recommended by some authors even though you cannot hear the sound although most people think this is generally not a problem. Cleansing of fingers can result in skin damage much like a burn, and can cause pain in the joint capsules.

  e) Since the dirt is often loosened rather than removed, rinse specimens well with distilled water at the end of cleaning. If the specimen will tolerate the position, a second cleaning in fresh distilled water with the specimen upside down on a soft bed of material can remove a lot more dirt.

  f) Placing the specimen to upside down in the ultrasonic cleaner may allow tiny particles which otherwise might have become lodged in cracks to fall off the specimen. Make sure that the good side of the specimen rests on something soft such as a piece of cloth or sponge.

  g) Many of the chemicals and compounds used for cleaning specimens are capable of corroding metals including stainless steel, so it is always a good idea to do cleaning in a glass container which has been placed inside the cleaning tank of the ultrasonic cleaner.

  h) The ultrasonic cleaner is capable of rounding the edges of sharp crystals of gold and other soft elemental minerals. (19)

PRECAUTIONS FOR CHEMICAL CLEANING

- Assume that all chemical cleaning products are hazardous to both the specimen and yourself. Follow the guidelines listed below regarding personal protection, and pretest an spare sample before your good specimen is bubbled away.

- Wear goggles whenever using acids, alkalais, or caustic materials. Even one drop of a chemical in the eye can cause permanent damage. Good quality rubber gloves are also advisable.

- Make sure that you know exactly what chemical you are using, as well as its concentration and effects on human tissue. Have a neutralizing agent on hand at all times.

- Keep a good supply of household baking soda or powdered garden limestone on hand to neutralize acid spills. Apply liberally and then flush with water.

- Keep a large bottle of white vinegar on hand to neutralize alkali spills. Apply liberally and then flush with water.

- Always have plenty of water available for immediate flushing and dilution of spills.

- Store chemicals out of the reach of children.

- Keep all containers clearly labeled with the name of the chemical and its concentration. If the material is a combination of chemicals, add a mixing date to help determine if it is still effective.

- Never pour water into an acid. Pour a thin stream of concentrated acid into cold water. The mixing of acid and water generates heat to the point where the water will boil and splatter if added directly to the acid. This is most likely to happen with sulfuric acid.

- Some chemicals such as nitric acid generate toxic fumes when open to the air. Others give off fumes as a by-product of the cleaning process. Have good ventilation available or work outside (upwind) under these circumstances.

- Do not store or use acids near tools as they will quickly rust. This is caused by the acid fumes, not just liquid acid, so your microscope, light, etc. are all at risk.

CLEANING SOLUTIONS (GENERAL)

Micromounts often contain multiple species, many of which are important to save, either to document paragenesis, or simply for aesthetic reasons. Since each of the cleaning solutions listed in the next few sections may react very differently with different species, it is important to look at the whole mount, not just a particular species before deciding on a cleaning solution. As a general rule of thumb, soak a specimen which has been cleaned with some substance other than distilled water, for twice as long as the cleaning soak to remove all traces of the cleaner. Residual traces of the cleaning agent can can discoloration and continued chemical activity so do not cut short the final rinse.

Prior to cleaning a specimen with a chemical bath, it should be soaked in water containing either a detergent or a surfactant for about 20 minutes. This will allow the water to replace air pockets on the specimen and facilitate the penetrateion of the cleaner into all cracks and crevices.

- *Acetone* (CH_2COOH_3). This is an alternative to alcohol for water soluble species. It will remove lacquer and many adhesives. It is very flammable to the point of easily creating an explosive atmosphere, and the fumes are toxic. No neutralizer is necessary. Its rare use does not justify keeping it in a home laboratory.

- ***Alcohol, ethyl.*** Water soluble minerals can usually be safely rinsed in alcohol. It can also be used to rinse acicular minerals which would tend to mat together when rinsed in water (test a spare specimen first). Alcohol can be used to remove residual water from specimens after a water wash to prevent spotting and to speed up the drying process. Alcohol will dissolve shellac and many forms of grease including fingerprints. Ethyl alcohol can be obtained as 190 proof (95%) denatured alcohol at paint stores. In is flammable (but less flammable than acetone) and in its denatured form it is toxic if taken internally. The denaturing additives are used to make it nonpalatable but are generally not harmful to mineral specimens.

- ***Alcohol, methyl.*** This alcohol will work just as well as ethyl alcohol, but it is extremely toxic to most living tissues including humans. This is commercially available as 95% alcohol by weight. It is more flammable than ethyl alcohol. There is no good reason to keep this in the home laboratory purposes if ethyl alcohol is available.

- ***Alcohol, isopropyl.*** This alcohol can also be used for cleaning or drying, but check for the presence of additives such as perfumes when getting it from a drugstore, as they can leave stains and scum on mineral specimens. It can be obtained in hardware stores and is less flammable than ethyl alcohol. .

- ***Alconox*** is a wetting agent (surfactant) which can be added to presoaks to help "wet" the specimen prior to chemical cleaning or use of the ultrasonic cleaner.(19)

- ***Ammonia*** (NH_4). "Household ammonia" commonly contains various additives such as detergents which may make it unsuitable for use as a reagent. "Clear" ammonia is available at the grocery store. Some mineral species will chemically react with ammonia. Lichens and algae can usually be loosened up with a prolonged dilute ammonia soak (also in chlorine bleach). Lichens secrete acids which are capable of slowly eroding the surface of specimens and thus such specimens may be dull or etched under the microscope. Soaking specimens which have a coating of clay in a weak ammonia solution can often loosen up the clay enough to allow its removal with an ultrasonic cleaner or running water. Concentrated ammonia can damage skin, eyes, and mucus membranes. It is neutralized by vinegar. Do not use this on turquois as it turns the turquois white.
- ***Benzene and carbon tetrachloride*** can be used for removal of hydrocarbon deposits but both are toxic and not recommended for stocking in the micromounter's laboratory. If a hydrocarbon solvent is needed, ones such as Thin-X™ are relativley safe and probably work just as well. (Thin-X™ is good for taking old gum from labels off plastic boxes without damaging the plastic.)

- Biz™ bleach (a mixture of enzymes, sodium perborate bleach, water softeners and sodium phosphates) has been recommended for cleaning zeolites. Carefully test other species which have significant solubilities.

- ***Chlorine bleach*** (NaOCl, Javel water, Javex, Chlorox™) is useful for the removal of green algae that is found on some of the zeolites from Nova Scotia. A 10 to 25% solution of Chlorox™ (5.25% NaOCl) in H_2O usually works well. It may take anywhere from a few hours to a couple of days depending on the amount of material to be loosened. Using an ultrasonic cleaner while soaking can significantly speed up the process. Acid sensitive minerals such as carbonates and phosphates can often be cleaned with bleach. Use a glass insert to protect the tank. Full strength chlorine bleach is often very effective in cleaning crbonate minerals. When mixed with acid (including vinegar!) it will release extremely irritating chlorine gas. Never mix with ammonia as extremely toxic gases will be released.

  The following is from "Geminews" of the Montreal Gem & Mineral Club, July 1985. "Hydrogen peroxide (H_2O_2) 15% etches like Javel water. It also reacts violently and produces oxygen when mixed with Javel water. This property can be successfully applied to effectively clean minerals with relatively little risk. First place your mineral in Javel water for about 24 hours to soak the sand and clay deposits. Then submerge it in hydrogen peroxide (careful) and because of the violent reaction the sand and clay particles will be ***blown*** off the specimen. This process can be repeated until the mineral is clean." "The above article is based on a publication which appeared in the Journal of the Netherlands Lapidary Club. It is offered for your careful consideration or use, but neither the editors nor the Montreal Gem & Mineral Club can be held responsible for mishaps of any kind"

- ***Coca-Cola***™ (and other carbonated drinks) has been touted for removal of kaolin-type encrustations on pegmatite minerals. Soak the specimen in Coca-Cola™ for 24 hours and then remove material manually or with an ultrasonic cleaner. Your editor has no experience with this technique. Perhaps carbonic or citric acid is the cleaning agent. (18)

- ***Detergents***. If detergent is used, the liquid variety is preferable since the gel formed by incomplete dissolution of particles can be very difficult to remove from specimens. Some detergents contain chlorine additives which will react with ammonia to release chlorine gas, so make sure you read the labels carefully. Many detergents are highly fluorescent, and a porous specimen may retain enough detergent to take on an artificial fluorescence.

- ***EDTA (versene, ethylene diamine tetra-acetic acid, ethylene dinitrilo-tetra-acetic acid)*** is a chelating agent which can be added to acid baths in ratio of 1:4, EDTA to acid by weight. This will entrap metal ions, particularly those that are dissolved by acid cleaning, and prevent those ions from staining areas around cracks and fissures. The EDTA may react with some minerals, so test first. The chelating reaction is also pH dependent, becoming less effective the higher the acid concentration.

- ***Hydrogen peroxide*** (H_2O_2) can reportedly be used in the same manner chlorine bleach particularly with minerals which are acid sensitive. It is a reasonably strong oxidant so preliminary testing is probably advisable. See comments under chlorine bleach.

- ***Sodium hydroxide*** (NaOH). This is avalaible at the grocery store as caustic or washing soda, and also as drain cleaner. Neutralize with vinegar then use a prolonged H_2O rinse.