TIPS FOR CLEANING YOUR MINERALS

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CLEANING, PRESERVING, LABELING, AND CATALOGUING MINERALS

Jul89 AGMC NEWS NUGGETS
By Mary P. Allen

My experience with the subject to be discussed has been with the State of Colorado's Bureau of Mines mineral collection. This collection contains over 11,000 specimens and is located on the second floor of the State Museum at Fourteenth and Sherman, across the street from the Capitol Building. It was necessary to go over the entire collection, one specimen at a time to make corrections on labels, rearrange, and clean each specimen. The long accumulation of heating soot and dust had to be removed from the specimens, and we found that 90% of the specimens could be cleaned in plain soap and water.

I would recommend to collectors the use of detergents, as these cleaners make many specimens brighter. In preparing the soap solution, the powder should first be put in a small amount of cold water (this separates each particle), and then run in hot water with a swirling motion to thoroughly dissolve the soap. This is important as the soap jelly formed be endeavoring to dissolve soap in hot water will stick to the specimen and be very difficult to remove from the rough surface.

Only one specimen should be washed at a time and immediately rinsed and dried thoroughly so that it is wet a minimum amount of time. It is important to use lukewarm water, just warm enough to dissolve the accumulation of soot and cause it to crack. This is especially true of large specimens where the heat does not have a chance to penetrate evenly through the entire specimen. I never had one crack, but have been told of instances of very nice large pyrite specimens cracking due to excessive heat being applied by plunging them suddenly into very hot hater.

Many specimens should not be cleaned in water, but this is quite apparent from their appearance; for instance, very fine fibrous materials or hairy-like specimens. The water packs the fibers and even after drying they no longer have their furry appearance. These specimens often can be cleaned in alcohol, ether, or dry-cleaning compounds. Mesolite, chalcotrichite, jamesonite, millerite, and the velvet malachite are a few among many. An especially soiled velvet malachite we had in the collection could be cleaned by gently sudsing up and down and rinsing thoroughly. The small fibers in this particular specimen were short and very tightly packed and so could not mat down. So, before plunging your favorite specimen into a suds bath, try a small piece or just a corner of it and see what reaction you have.

Some specimens, because of their chemical composition should not be washed, also those of the clays or crumbly type. These can be brushed with a soft or stiff brush, depending on the texture. Carnotite, some aluminum-bearing specimens, salts, and any that dissolve in water are among these.

The detergents are especially good to use on the silica specimens, and any of the quartz family, clear calcite, topaz, selenite, and nearly all glassy specimens.

Do not allow your soap solution to become grimy but change to a clean solution often, and running water is the best rinse, as this carries off any scum which might stick to the specimen.

Gold, especially, responds to a good sudsing but often a film forms over a specimen from some other material in the matrix. This can usually be removed by the use of nitric acid. Care should be taken to remove all the nitric acid immediately, or, in a very short time, you will have an even worse film forming. Gold nuggets can be brightened in nitric acid. Wire gold cleans best in a soap solution by sudsing up and down. Do not use a brush of any kind as the wires are easily disturbed and broken.

A brush can be used on most specimens. My favorite is the common vegetable brush. When a very small brush is necessary, a stiff toothbrush answers the purpose. Keep in mind that the tooth brush handle is usually made of plastic and do not put it in acid or alcohol as the plastic dissolves into the solution, adheres to the specimen, and is very difficult to remove. A typewriter key brush is preferable as it has a wooden handle.

Oxalic acid diluted in hot water will remove the iron oxide from such specimens as microcline, quartz, and fluorite.

Place the specimen in a good enamel pan, free of cracks and breaks, and completely cover with a saturate solution of oxalic acid. Place a cover on the pan, and heat to just under the boiling point for about an hour and a half. If the specimen is heavily covered with iron, remove from the solution and scrub in clear water with a stiff brush, removing as much of the iron as possible. Then, if there are still stained places, return to the solution and repeat the process.

Aragonite and calcite that is covered with an iron oxide stain can be cleaned with a weak solution of hydrochloric acid. Care must be taken, as the hydrochloric acid will also dissolve the calcium carbonate. It should be carefully watched so that it remains in the solution only long enough to loosen the iron. It should be thoroughly rinsed and soaked in clear water to remove all the hydrochloric acid.

Barite from both Hartsel and Stoneham can be cleaned in hydrochloric acid, as it will loosen the clay and iron present on these specimens.

Algae and lichens can be removed with a dilute ammonia solution.

A mixture of acetic acid (vinegar) and cigar ashes made into a paste and used, as a scouring powder will often brighten copper. The same results will not be obtained with cigarette ashes.

Lacquering silver and copper specimens after cleaning will keep them bright for a long time. Most copper cleaned with cyanide will have a rosy hue for a day or so after cleaning but on exposure to air will return to a nice copper color, so it is well to wait a day or two before lacquering the copper.

Metallic lacquer should be used as it is very clear and should be applied one part lacquer to three parts thinner; an atomizer or spray is the best method but the specimens can be dipped into the thinned lacquer, placed on an unpainted wood surface and turned over until drained and dried, which takes only a very few minutes. A second coat is advisable if on examination with a magnifying glass the surface is not entirely covered. This solution of lacquer is not perceptible and will not have a lacquered appearance. We found DuPont Metal Lacquer No. 1130 and DuPont Thinner No. 3661 have the best satisfaction. However, on checking with DuPont I find they do not stock No. 1130 any longer but No. 1234, which is specifically made to protect aluminum, can be used for this purpose. No. 1130 can be secured but would have to be ordered special from the factory. Dipping realgar and orpiment specimens into the thinned lacquer prevents these specimens from crumbling, and the red and orange will retain their original color; two coats of lacquer are recommended. Do not use heavy lacquer as a painted look will result and this should be avoided.

For repairing broken specimens, DuPont cement can be used, a thin coat of cement put on both section, squeezed together, the excess removed, parted and allowed to dry, then another thin coat applied to each section, again squeezed together and firmly tied with string, or on small specimens a rubber band can be used. The cement exposed to air-dries almost immediately but it is well to leave the broken specimen tied together for at least twenty-four hours. Labeling specimens is a problem each collector must decide for himself, but the best method I have encountered is to paint a small drop of white enamel on the most undesirable spot of the specimen, just large

enough to write a number in India ink, identifying that particular specimen. When the ink is dry, cover with two coats of metallic lacquer, and the specimen can be washed and scrubbed and still be identified.

When a specimen is large enough, a typewritten label on thin bond paper with complete data as to species, location found and from source obtained can be made and pasted on the specimen with DuPont cement, allowed to dry thoroughly, then two coats of lacquer applied. Some collectors use adhesive tape but within a few months this tape, and even the best of tape will dry and fall off and you have no record. Most museums use the painted number, and for display purposes have typewritten or printed cards placed in front of the specimen, giving the data. For a private collection, I believe Betty Wilklow of the Colorado Mineral Society has one of the best ideas. She mounts each specimen on a square of sheet plastic with cement and uses an electric etching tool to inscribe on the plastic sheet the information regarding the particular specimen. This method also protects the specimen when picking it up to examine, as it is not necessary to touch the specimen itself.

A catalogue should be kept by all mineral collectors, and I believe the best and simplest method is a notebook starting with number one, and as specimens are added to the collection, number two, three, four, etc. From this list any number of categories can be worked out to keep a record of the species separate, such as copper, silver, gold, or to be more scientific, all sulphides, sulphates, etc. The purpose of the collection should be kept in mind when setting up the categories.

At the bureau, a complete card file is kept. When a specimen is placed in the museum, a card six inches by four inches is made out with the number of the specimen, the case number in which it is placed, and all data pertaining to that particular specimen. A cross-file of the species, location, and donor’s name is kept so that a specimen can be located immediately by referring to this file. At all the museums I have visited, I found this same system in use, or one very similar.

Most collectors collect minerals because they find them interesting and consequently want to make their collection interesting to everyone they come in contact with, and it is well to remember that a lovely specimen should be kept clean and sparkling, so do wash their faces once in a while.

CLEANING CHALCEDONY

Oct77 News Nuggets

Last month, Mark Blazek sent me the following, about cleaning chalcedony roses, but there was not enough room for the information. Mark submits the following method (found in an old copy of Earth Science News) for cleaning the rascals: "To one dishpan of roses, add cold water to cover; add one cup of detergent and one pint of Clorox. Heat and let cool overnight. Scrub with bristle brush. Put them, one at a time, into pure muriatic (hydrochloric) acid. Leave until it quits bubbling. Remove with wooden tongs. Soak a week or ten days in oxalic acid (one pound to a gallon of water). Wash." I haven’t tried this elaborate method (too much trouble for me - sounds like my chemistry class). I found simply soap, water, and a toothbrush cleaned up my specimens very well. But those of you who have a lot of time to kill and wish immaculate specimens might try the above method.

Pete Modreski adds a few words about fluorescent agates. Those who have a black light may have noted that some of the agates, but more particularly some of the chalcedony roses, from Apache Creek are fluorescent. They fluoresce green under short-wave ultraviolet light. Not all of the chalcedony shows this fluorescence, and in many pieces certain areas have a much brighter fluorescence. This type of green luminescence is quite common in agate and chalcedony (not in crystallized quartz), and it is known to be caused by traces of uranium in the material. The uranium may be present in only very low concentrations - a few parts per million - in the form of the uranyl iron, UO2 (the same ion present in the mineral Zippeite), but it can be recognized by the distinctive fluorescence.

CLEANING MARBLE

Jan77 News Nuggets, By Mark Blazek

Use mineral spirits on a soft cloth to remove dirt and wax build-up from the marble. A cotton swab can be used to reach nooks and crannies on carvings. Rub briskly once and let stand for several hours. Repeat this process a second time.

After the wax build-up is removed the actual marble itself can be cleaned. This is done with chlorine bleach (full strength!). It is best to perform this process outside in the sun. The heat of the sun will do 80 to 90 percent of the bleaching. If unable to work outside, try to place a spotlight or other heat source near the marble while working. Any stains, mars, or particles which are not bleached out can usually be removed with fingernail polish.

After all stains and mars are removed, wash well in soapy water. Wipe and polish lightly with Carnuba wax.

CLEANING SELENITE

May78 News Nuggets
by Mark Blazek

Here is a tip for cleaning those selenite (gypsum) and calcite specimens (along with a host of others) which are often coated with material that will not readily wash off with water. These usually require some mechanical method of removal of the coating material. A steel or metal tool or brush will scratch the soft mineral. A collecting friend of mine suggested the use of bamboo as a useful means of cleaning selenite, calcite, and similar soft minerals with a minimum of damage. Perhaps many of you are using this method, but the idea was new to me and I have found it to work quite well. The bamboo sticks can be cut to a sharp chisel edge and applied to the coating on the specimens. Bamboo will not soften in water like ordinary wood, and it makes a very convenient (and inexpensive) cleaning tool. Pieces of bamboo can be picked up cheaply in the cooking and gardening sections of most stores.

OXALIC ACID – GENERAL USE AND SAFETY CONSIDERATIONS

Apr97 News Nuggets

Oxalic acid (COOH)2, is the first of the series of dicarboxylic acids. It is a stronger acid than acetic acid and reacts with the alkali metals to form water soluble compounds. The primary use of oxalic acid in lapidary work is in removing iron stains from crystals. Almost all of the quartz crystals from Arkansas are highly stained with iron. A solution of 1 part oxalic acid to 10 parts water is a suitable strength (3 ounces of crystals for each quart of water). The reaction is very slow at room temperature. In order to speed up the reaction it should be carried out at a temperature just below the boiling point. A ceramic hot pot is almost the ideal vessel for the bleaching operation. Several hours of simmering will effectively remove most iron stains. Larger specimens can be done in a metal container on an outdoor grill. Eye protection should always be worn when working with chemical compounds.

The compound is readily oxidized and a fresh solution should be used for the bleaching operation. The oxidation products are carbon monoxide and carbon dioxide. Good ventilation is essential. Outdoors is the preferred location since most of us do not have laboratory hoods.

Another use of oxalic acid is in the final polishing of onyx, marble, and travertine. A felt or other cloth lap is wetted with an oxalic acid solution for a final polishing step after the piece is finished with fine, wet carborundum paper.

Oxalic acid is poisonous and should be labeled and stored out of the reach of children and others who are not familiar with the compound. Oxalic acid is also used in bleaching of wood and leather. It may be purchased at some wood finishing stores, rock shops, and probably more expensively at drug stores.

CLEANING MINERALS WITH OXALIC ACID

Sep76 News Nuggets By Pete Modreski

Here are a few guidelines for using oxalic acid to remove iron stains from minerals like smoky quartz and microcline. First, soak and scrub the mineral thoroughly in water and detergent to remove as much surface dirt as possible. Oxalic acid is a white solid chemical; it dissolves in water to form a solution that is particularly effective

at dissolving iron oxides because it forms a soluble iron oxalate complex. The acid is only weakly corrosive but it is a poison if ingested, so handle both the powder and solution with care.

One can either soak minerals in oxalic acid at room temperature, or heat them in hot (not quite boiling) acid. The room temperature treatment usually requires several days, but heated acid will clean specimens in a few hours. I have found that the hot acid seems to do a better job. Richard M. Pearl, in Cleaning and Preserving Minerals, recommends using about two tablespoons of oxalic acid crystals per gallon of water, and twice as much for heavily stained material. According to Pearl, wood, aluminum, or enamel containers are all suitable for use with the cold acid. An enamel pan must be free of cracks or holes, or the acid will eat a hole through the iron pan. Pyrex glass is probably the best container for hot acid; I have also used a plastic container held within a metal pot as a "double boiler" for heating specimens in acid. Here is a suggested procedure. Place specimen in cold acid initially (the thermal shock may crack crystals if they are placed in hot acid.)

Heat for an hour or more as required to remove the stain. The acid will turn yellow as it dissolves iron.

Do not allow specimens to cool down in the acid; acid will be drawn into cracks in the specimens and be difficult to remove. Instead, remove specimens into a hot (same temperature to reduce thermal shock) pan of water containing a little baking soda to neutralize the acid on the specimens. Allow this to cool, and brush off any remaining iron oxide which has been loosened but not dissolved.

Finally, rinse in clean water. It may be necessary to repeat the entire procedure for heavily coated specimens.

Some Pitfalls: In general, the oxalic removes fine-grained, powdery limonite or hematite deposits easily, but thick solid iron oxide crusts dissolve very slowly. Crystalline hematite patches become bright and shiny and dissolve very slowly. Oxalic acid is not good for cleaning specimens containing calcite or some other calcium minerals, as it dissolves these. Fluorite is not cleaned very well by oxalic acid and seems to be etched by it. Yellow stains can result if specimens are left in oxalic acid as it evaporates. (they should always remain completely covered by the acid.) Also, using too much baking soda to neutralize the acid can result in yellow staining.

When completely successful, oxalic acid cleaning will remove all traces of yellow-orange iron staining, for example, a specimen of clean dark smoky quartz and pure white feldspar. Many specimens, however, are too thoroughly iron-coated to achieve this goal, and the feldspar will always retain some pale red color. Yellow-stained, greenish-looking amazonite becomes a clean, bluer shade after cleaning.