



# Gem & Mineral Federation of

FOUNDED 1977



Blue Opal  
*see page 5*



Various polished stones.  
Clockwise, from top right:  
amazonite, jasper, petrified wood,  
moss agate. Center: labradorite.



Alberta Agate  
*see page 11*



Newsletter  
WINTER 2002/3  
Volume 21, Number 3



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host club of the annual show. GMFC members adhere to a Code of Conduct for Canadian collectors respecting the earth sciences, and the federation keeps its members informed of government legislation on collecting sites.

## Annual Show & Convention

Each year the GMFC and a host member club organizes a national gem, mineral and fossil show within Canada. Demonstrations, field trips, dealers, displays and speakers are featured at the annual shows. The annual meeting and committee meetings are held in conjunction with the annual show.

## Membership

We accept new members anytime. Federation dues are normally collected during the fall. A newsletter is included with the membership. Please contact the GMFC if your club would like to become a member.

## Scholarship Foundation

This is a separate entity of the GMFC, legislated in 1992, to provide scholarships to post graduate students in the earth sciences. A scholarship nominee is appointed through a selected committee, from nominations received from its members. The nominee selects the university from which the student is chosen. The foundation accepts donations for which tax receipts are issued.

## How to Contact Us

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## Internet Home Page

Visit our **new** official home page on the internet! Our address is:

[www.gmfc.ca](http://www.gmfc.ca)

## About the GMFC

The Gem & Mineral Federation of Canada (GMFC) was founded in 1977 as an organization to assist its members by various means to promote the earth sciences, to protect collecting sites, to educate collectors, and to foster good will, friendship and rapport among all. The federation currently consists of 55 member clubs across Canada.

Member clubs benefit from comprehensive third party liability insurance provided to members. Our federation also provides assistance to member clubs by loaning multimedia materials (such as slides and videos) for meetings, and a directory of member clubs, individuals and dealers is published yearly. An interest-free loan is provided by the GMFC to the

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**Disclaimer**  
Letters, articles and editorials in this newsletter express the opinion of the author and not necessarily that of the GMFC. While all articles are verified to the best of our ability, the GMFC, its directors and officers, the publication and its staff assume no responsibility for the contents of this publication. The editor reserves the right to accept, edit or reject all material submitted for publication.

## GMFC Scholarship Foundation Inc.

Report by Don Fabrick, President

The scholarships given out this year were as follows, the GMFC & Trudy Martin scholarship of \$1000.00 was won by Mr. Gregory Sparks a graduate Bachelor of Sciences (Honors) - Earth Sciences student at the Memorial University of Newfoundland, St. John’s NF.

Two \$500.00 scholarships were handed out this year, one won by Sean Gottshall, grandson of Bill Gottshall from the Parry Rock & Gem Club in Regina SK and the second by Jesse Fillion son of Leslie Fillion from the Calgary Rock & Lapidary Club Calgary AB. Letters of appreciation were received from them.

Please note that there were three \$500.00 scholarships to be handed out but only two entries were received. I am sure there must be more

students of rock club members deserving of these awards so don't forget about them for the coming year.

Many donations were received from friends and members of the Jack & Thelma Wrightson family to the scholarship foundation. We are very grateful for these and our sincere thanks go out to you as well as our condolences.

Don Fabrick  
President  
G.M.F.C. Scholarship Foundation

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# President's Message

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**Dear fellow Rockhounds:**

I hope you had a fine summer and that you were able to collect lots of things for your winter projects. Now that we have had our second serious snowfall, I can safely say that it's time. Yes, time to start those classes, lubricate the faceting machine, check those grinders, heat up the torch for silver soldering, clean and prepare those mineral specimens.

I chose to make "communication" the main objective of my presidency. If we can not communicate effectively to you the members about who we are, what we do and why the GMFC is beneficial to you, then we have failed. Our excellent newsletter, which has been distributed free through your club, has not reached enough members. We considered making it available by subscription, but that meant that it was no longer available for free. Therefore to facilitate greater distribution of our newsletter and to make available all sorts of other information that is only available if you purchase the appropriate pamphlet from our Supplies Director such as the booklet called "Rockhounding in Western Canada" or "Collecting Micromounts etc." In all there are currently six booklets printed, we hope that number seven will be "Rockhounding in Eastern Canada". We are hoping that our members who live east of the lakehead will assist us with that one. We are also investigating ways that we can have all our literature translated into French as a price we can afford.

To solve the problems encountered in communication we have set up our own extensive website [www.GMFC.ca](http://www.GMFC.ca). This will make all our information available to you at any time of the day or night. The website is up and running, however as I write this it's still under construction. "What will be on this new website?", you may ask. Our Newsletter starting with this issue as well as all back issues that we have on the computer. The site will outline how the GMFC works, the Objectives of the GMFC, the Code of Ethics for GMFC members and dealer members, the Code of Conduct for Canadian Collectors. A guide to exhibiting at Gem, Mineral and Fossil shows. All the handbooks I spoke about earlier. The GMFC Scholarship Foundation Inc. The various forms used by Judges at competitive shows. A Show Calendar where clubs and federations can list their upcoming shows. A Dealers' Page where all Associate dealer members will have the same amount of space they currently have in the GMFC Directory. A Directory of all member clubs. There will also be information of interest to members and the public at large.

When the GMFC was founded in 1977, the objective was to have an organization which was of benefit to our members, as well as one promoting popular interest and education in the Earth Sciences. We believe that our website will go a long way towards achieving those goals. For those of you who have been getting the newsletter and do not have access to a computer, we will continue to mail you a copy.

On behalf of the GMFC, its Executive and Directors, my wife, Pat and I wish you a Merry Christmas and a Happ Prosperous New Year!

Yours in rockhounding

**John A. Hausberg**

President  
Gem & Mineral Federation of Canada

PS For the executive members, please remember that Sunday April 13, 2003 is the date of our next

# Scribbles from the Scribes

by Trudy Martin

## CLUB NEWSLETTER CONTEST

So far, there are 16 newsletters entered in the 2002 / 2003 Contest . Four editors from last year have either already 'retired' or will do so by the end of the year. It is uncertain if the new editors will take advantage of the contest. Sample copies of the Newsletter, Article and Poem score sheet have been sent to ALL Editors. It is hoped that those who have not yet entered their newsletter in the contest will do so before the year end. With the Show and Annual Meeting in July, the cut off date for reading will have to be the March issues.

The purpose of the contest is to offer the editors a guideline (score sheet) which, over the years, has resulted in improved and award winning newsletters. You are not competing against each other. You are competing against yourself and an established score sheet. Each Newsletter is marked on its own merit All the readers this year are past or present editors and authors plus a retired school teacher. We're sure they will do an excellent job.

## INDIVIDUAL ARTICLES & ORIGINAL POEMS

A few Articles but no Poems yet. Like bananas, they usually arrive in a bunch at the end. This can sometimes put undue stress on the readers. It would be appreciated if articles and poems, like the newsletters, are sent in as they are published. Additional copies of the Article or Poem score sheet can be photocopied (if the editor kept the original) or extra copies will be mailed to those editors requesting them.

Any questions or concerns regarding the contest should be directed to the Contest Chairman - Trudy Martin, (403) 287-1570, <martintm@telus.net>, 110 Lissington Drive SW, CALGARY, AB, T3E 5E3

## EDITORS GET-TO-GETHER

The 2003 GMFC Show & Convention will be

held July 19 & 20, in Regina, Saskatchewan. An Editors meeting will be scheduled for Saturday - whether morning or afternoon is still to be decided. We invite ALL EDITORS and anyone interested in COMMUNICATION to attend this meeting. Coffee, Cookies and Conversation are on the menu. Editors should bring extra copies of their newsletters to exchange.

## EDITORS APPRECIATION DAY

Unless you have been THE EDITOR, or been involved in the typing, printing, stuffing, stamping, sealing and mailing of the club newsletter you have no idea how time consuming and frustrating a job it can be. Let's pick a day to show these editors how much we appreciate their effort. How about Valentine's Day ? It would be the ideal day to send some flowers, a box of chocolates or even just a card to your editor to say Thank You.

## SCRIBE - Special Congress Representing Involved Bulletin Editors



SCRIBE is an organization OF editors, FOR editors. As Scribe President, I again extend an invitation to all Canadian Editors to join their fellow editors in this worthwhile organization. Scribe publishes a quarterly newsletter as well as a yearly CD packed full with newsletters, articles, hints, tips and clip art.

If you happen to be in Quartzsite, Arizona on 1 February 2003, please join us for our yearly meeting. 09:00 MST, Senior Citizen's Centre, Moon Mountain Road. Check out the Scribe web site <http://scribesite.home.att.net> or contact me direct. Thank You.

# Notes from the Directors'

## Teleconference on October 20, 2002

All committee reports were read and discussed.

1. There are two new member clubs from the east. The Montreal Rock and Mineral Club and The Brantford Rock and Mineral Club. We would like to extend a hearty welcome to both of these club. Enjoyed having you involved and look forward to continued involvement.
2. Ron Shannon from Ontario agreed to be the new Public Relations Chairman.
3. The Newsletter will be produced by Christmas. The Newsletter will be distributed as it has in the past for 2003. NOTE: There will be no changes.
4. A disclaimer will be printed in the front of the newsletter. Please read and use as appropriate.
5. Ken Dewerson gave a report on his teaching trip to the Whitehorse area. An article to appear in the December Newsletter.
6. The \$1000. Scholarship for Trudy Martin was won by Gregory Sparks, a Master of Science student at the Memorial University of Newfoundland at St. Johns. The \$500. Scholarships were won by Sean Gotshall, grandson of Bill Gottshall of the Regina club and Jesse Fillion, son of Leslie Fillion, current librarian of the Calgary Rock and Lapidary Club. The third \$500. Scholarship was not applied for. It is hoped that Rock Club members think about these scholarships for next year. Don Fabrick will be sending out information later on in the year.
7. There has been approximately \$1100 received through donations through the passing of Jack & Thelma Wrightson. Thank-you everyone.
8. The 2003 GMFC and Regina Show are progressing well. It would be nice to

support the Regina Club who is putting on this show. All who can, come to Regina for July 19, 20, 2003.

9. The Cook Book will be sent to the printer early in the new year. There is still time to send in recipes. Send to the GMFC Secretary.
10. The new BY-Laws will be printed and distributed as soon as they are received back from the government.
11. There will be a GMFC Website. The web address will be GMFC.ca
12. Universal Rockhound stickers to be sold through the clubs. For information contact Trudy Martin.

President – John Hausberg  
Secretary – Maureen Wade

### STOLEN MINERALS AND FOSSILS

On Oct 27th 2002, BC Gem Show dealer, Sahara Minerals was the victim of theft of extensive minerals and fossils from his vehicle in White Rock BC including:

- 8 boxes of Morrocan mineral specimens of Azurite, Azurite/ Malachite, Quartz geodes, Quartz with Goethite, and Selenite.
- 18 boxes of Morrocan Fossils, Ammonites, Goniatices, Orthoceras, and Trilobites.

If any society member, or dealer has any information on the above specimens, please contact your local RCMP or Crime Stoppers. Hopefully we can assist our member dealer recover his property. Thank You.

# Call of the Yukon

by Ken Dewerson

Fred Dorward a member of the Whitehorse Gem & Mineral Club, saw a need to invigorate the activities of his club, he identified a requirement for some hands on training for the general membership, not only for the Whitehorse club but also for the native Yukon people of Carmacks who live close to three claims that the club held. The local club members didn't feel that they were qualified to teach the techniques of cabochon making so Fred made a request to the B.C. Society to assist them with the teaching.

Unfortunately for the Federation and all rockhounds Fred Dorward passed away in June of 2000.

Early in 2002 Walter Bilawich, another driving force of the Whitehorse Club took on Fred's vision, and requested assistance with the teaching of the Little Salmon\Carmacks First Nation

The request was passed down to a willing volunteer, myself, Ken Dewerson, who took the request to the Gem & Mineral Federation annual meeting in Calgary.

The objectives of the Federation are to Promote interest and education in the various Earth Sciences, to provide assistance and guidance to Regional and Provincial Federations and to sponsor various activities. With this in mind, it was decided to sponsor in part my trip to the Yukon

Most of the Yukon was heavily glaciated, and as a result all the gravel deposits are well sorted. This means that you can find almost anything in gravel pits and in river and stream gravels. Carmacks is 100 miles north of Whitehorse, a promising rockhound area is north-west of Carmacks running for about 80 miles and covering 1800 sq. miles or more. Carmacks is virtually surrounded by Tertiary volcanics. They form prominent outcrops in the area, the striking cliffs west of the village being the most noticeable. Many of these flows characterized by amygdaloidal lava and base are sometimes separated by spaces. Both amygdaloids and spaces may be filled with jasper, agate, chalcedony, quartz crystal, calcite, and or zeolites. One claim held by the Club is 4.5 miles north of the Carmacks Yukon River Bridge. The cliffside is about ½ mile from a

posted sign on the highway. Two geologists from Vancouver recently explored the whole mountain area and discovered nodules everywhere, to 4 inches, they ranged from red jasper, moss agate as well as hollow to druzy quartz. 6.5 miles south of Carmacks is another claim marker on the west side of the highway, black agate, white plume agate and smoky iris chalcedony have been found at this location. In the Carmacks Store is a display of beautiful blue agate and botroidal chalcedony collected by local native Morris Skorken.

I left Kelowna and arrived in Whitehorse May 21st, I was met by club members Walter Billawich and Bob Green, who drove me to Carmacks to meet Morris Skorken of the Carmacks Little Salmon Band. For lapidary equipment, a Genie was borrowed from Cheryl Rivest & David Ashley of Yukon Goldsmiths, and a trim saw from Luke Lacasse, the mayor of Carmacks. Jewellery findings were donated by the B.C. Lapidary Society and a Cabochon display was borrowed from Chester Miller of Delta B.C.

In the 2 days of the classes, 10 students completed at least 1 piece of jewellery. I also managed to get in a field trip north of Carmacks at the Tier Agate location, where I found a 12 inch vug full of red botroidal agate, however not having any equipment with me, the agate is still there.

Many natives, including the Band Chief, were unavailable to attend the sessions and requested a future training date.

My next trip to the Yukon will be to assist the Whitehorse Club, and hopefully to retrieve that Botroidal agate.



# A Fairly Fast Mounting Technique

by Johannes Swarts

I currently have a backlog of several hundred specimens sitting loose in their hinged boxes, waiting to be mounted. This is a task I've never looked forward to - lots of finicky work for clumsy fingers? Some hobbyists use little blobs of the mineral tack or putty to render the specimens immobile (it keeps the piece from rattling about and bruising the interesting stuff). Personally, I prefer the specimen mounted on an unobtrusive pedestal and the interior of the box blackened. Mounted this way, the specimen seems to float in space under the 'scope and reduces annoying glare from the shiny interior of plastic boxes. Some micromounts in my collection have black paper liners in a slip-top box with the tiny rock fitting on an all-but invisible pedestal - truly exquisite work! However, the thought of cutting and sizing those little bits of paper...

In mounting a number of specimens for the trade with the California club, I came up with an assembly-line method that allowed me to mount 40 or so specimens in rapid order. I use the 1 x 1 x 7/8 inch hinged box with clear top and black base. Further supplies include:

1. Small corks (probably ½ inch or so in length), tapering to one end. Or balsa wood stock ¼ inch or less square.
2. Duco Cement or its equivalent (some use Elmer's for its solubility in water).
3. India ink.
4. A hobbyist's or model maker's saw - long rectangular blade, finely serrated on one edge. The blade on mine is 4 ½ x ¾ inches in size).
5. Exacto blade - the holder and the blades.
6. Flat black modeler's paint, acrylic, which cleans up with water. (The pigment in this paint is extremely fine-grained, giving a very flat appearance and application by brush is less messy than spray paint).
7. Small paint brushes

The small corks and Duco Cement can be found in hardware or drug stores, while the other materials can be found in a good hobby supply store. Let's start with the pedestal material first. If the little corks are available, dump a bunch of them in a small jar and pour in enough India ink to evenly wet (and blacken) all the corks. India ink is preferable for this step, as it is easily available and dries quickly to a very flat black.

When all the corks are black decant off the excess India ink and spread then out on newspaper to dry. Balsa stock can be cut quickly to ½ inch or so lengths with the modeler's saw and treated similarly. The point here is to make the pedestals black.

While the pedestals are drying, take the plastic micro boxes and, using the Exacto blade, scribe a series of crisscrossing lines in the interior of the center of the base on each box. This roughens the area where the pedestal will later be glued, affording the glue a better 'grip'. Once the pedestals have dried thoroughly (solvent-based glues don't adhere well to moist things), start gluing the pedestals into the boxes. I find that a small dollop of glue applied to both the roughened area in the box and the base of the pedestal, then allowed to dry for twenty seconds or so, makes for a quick tight bond. Press the pedestal firmly into the box for 10 seconds, then set aside. A large number of boxes can be prepared very quickly in this manner. Allow the glue to set and harden thoroughly.

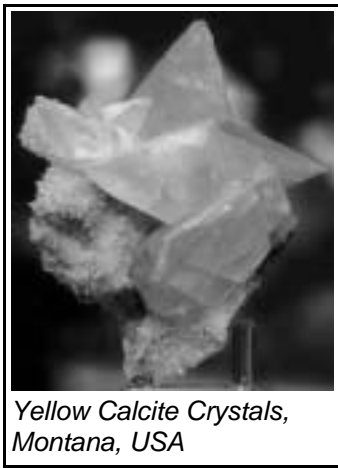
Once the glue has dried, use a small brush to paint the interior of the micro box base with the flat black modeler's paint. This can be done with a few quick strokes of the brush. Little attention need be paid to the vertical sides of the base, as they are scarcely visible with normal viewing angles under the 'scope. Set the boxes aside to dry thoroughly.

Small unblackened spots on the pedestal and the glue joint can also be touched up at this point. Any number of micro boxes can be prepared in this fashion and kept on hand. Now we are ready to begin mounting. Since my specimens have already been trimmed to fit a micro box and hopefully cleaned, it's simply a matter of orienting the specimen and gluing it onto the pedestal. Always try to pick the most unobtrusive, yet strongest support when sizing the pedestal to the specimen. If the specimen appears to be to 'tall' to fit (this can be checked by eyeballing the specimen next to a box with a pedestal), I gently saw off a portion of the pedestal with the modeler's saw. Sawing at an angle or making a 'V' cut into the top of the pedestal can specimens with irregular or angled bottoms. Be sure to gently blow off or otherwise remove the resultant sawdust before proceeding. Having a variety of pedestal diameters or cross-sections affords even the smallest rock an unobtrusive mount. Certainly, very small or

single crystal mounts may be better displayed on pedestals consisting of toothpicks, porcupine quills, or even cactus needles or cat's whiskers. Some things to remember.

Everything looks much bigger under the microscope, including oversized pedestals and errant droplets or hairs of dried glue. A dirty paintbrush can leave specks of dust embedded in the paint used to blacken the box interior, specks of sawdust can also clutter the view and even dirty the specimen. Have fun and don't forget to label the box!

*Reprinted from the Micromounters of  
New England Newsletter, January 1999*



*Yellow Calcite Crystals,  
Montana, USA*



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Sympatico's NetLife™ Magazine, 1999

## Now Let Us Praise Some Famous

### Introducing some noteworthy and historic rocks.

Certain stones started out as dumb common boulders, like all the rest. But one day they got a lucky break, and now they're genuine rock stars. Here's a few of them.

Family pride leads me to start with Plymouth Rock, that icon of American strength and faith. It's a large piece of Dedham Granodiorite that, according to legend, was sitting on the ground where John Alden of the original Plymouth Colony first stepped on American soil in 1620. That great man is my ancestor thirteen generations back, but I didn't learn this legend from the mouth of myfather, John D. Alden; instead I

read about it on some Web site. And the legend isn't, strictly speaking, actually true either. In fact Plymouth Rock is a fraction of its old self, having suffered the hammers of souvenir gatherers and other indignities during its up-and-down history.

So let me present an idealized image of the stone in its better days, from a souvenir plate purchased at the John Alden Shop in Plymouth, Massachusetts. Surely no humbler-looking object has ever been depicted by the porcelain artists at Jonroth & Co., England, unless they made a plate to commemorate mashed potatoes (which would be a good idea, by the way).

Somewhat more exalted, if only in being physically higher off the ground, is the Blarney Stone, set in the battlement of Blarney Castle in Cork, Ireland. Kissing the stone gives you the gift of persuasive speech. Legend, again, has it that this boulder is half of the Stone of Scone, awarded to the great Cormac McCarthy for his support of Robert the Bruce in the Battle of Bannockburn in 1314.

A proper geologist recorded his judgment that the Blarney Stone is no different from the rest of the castle, which is made of limestone (a lower Carboniferous biomicrite, to be more precise) from a local quarry. I swear it's true, but the last time I went to the Web page documenting that, it had mysteriously vanished—something that almost never happens on the Web! Was the geologist himself talking blarney? I'm not sure, because another legend has it that the true Blarney Stone was taken away, which means the geologist was looking at a sham stone. Is the truth out there somewhere?

The Stone of Scone itself is the rock upon which the kings of Scotland were crowned, and the Scots know it as the Stone of Destiny. The English took it in 1296 and, having themselves become the rulers of Scotland, had the stone built into the royal coronation chair to keep the tradition alive. (The stone was returned to Scotland in 1996, but can be taken back whenever it's time to crown a new monarch.) You see already that if the English took it in 1296, then Robert the Bruce could not have given half of it to Cormac McCarthy in 1314.

The Stone of Destiny is a block of yellowish sandstone of uncertain geologic origin. Legend traces it back to Biblical times as the stone upon which Jacob laid his head in Genesis chapter 28, and thus it is a solid symbol of the Promised Land. But there's a legend that the stone the English took in 1296 was a fake! That would solve the discrepancy with the Blarney Stone—if we assume that one is also a fake.

Perhaps the most exalted rock in every sense is the Black Stone of the Kaaba, a dark boulder set in gold on the outer wall of Islam's central shrine, the Kaaba, in Mecca. Muslim sites make it clear that the Black Stone is not worshipped like an idol. It's merely a much-loved marker, the "official" starting point of the walk around the Kaaba that forms the core of the holy pilgrimage called the hajj. For instance, the Black Stone was once taken away for a period of years, and the hajj was not affected. Perhaps the royals of the British Isles could learn from this.

The Black Stone has just one legend, and it's a good one. It's said that when Abraham and Ishmael, patriarchs of the Arab people, were building the Kaaba, the stone was delivered to them by an angel from heaven. That story suggests that the Black Stone is a meteorite, and indeed meteorites have been prized and revered by many different peoples around the world. But I wouldn't ask any Muslim, even a geologist, to waste one second of their hajj examining the stone to satisfy my curiosity.

Scientists too have given names to stones—even geologists, who you might think know better. My current favorite example is the roster of 162 sliding rocks of Racetrack Playa, in the California desert. Each of them is being mapped with GPS technology by geologist Paula Messina of San Jose State University, and each of them bears a woman's name. In fact each stone has its — I mean, her own Web site, and if that's not fame I don't know what is.

Every year the stones are found sitting on their vast dry lakebed, but not in the same position. Behind each one is a shallow track in the cracked playa mud, proof that some rare combination of wind, water and physics animated them when no one was there to see. That's no legend . . . merely a mystery.

*Found on the internet at:  
[http://geology.about.com/library/  
weekly/aa032600a.htm](http://geology.about.com/library/weekly/aa032600a.htm)*

**Editor's Note:** Please mark on your calendars that May 15, 2003 is the deadline for submissions for your next newsletter.

# Some Notes on Optical Effects in Gemstones

by Charles Lewton-Brain

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This list introduces some of the terms used in discussing optical effects in gemstones.

## Lustres

Lustre (or the American spelling Luster) refers to the amount and quality of light reflecting from a gem's surface to the eye. It is partially a subjective measurement but can be helped by comparison with a standard set of gems with known lustres. The hardness of a material, its refractive index and the degree to which it has been polished will have a bearing on the lustre. In general the harder a material is the higher the lustre, the softer it is the lower the lustre. The Americans and the British use slightly different nomenclature for lustres.

The American Liddicoat terms the categories: "metallic, submetallic, adamantine, subadamantine, vitreous, subvitreous, waxy, greasy, silky, dull." He goes on to say: "The first three reflect the presence of refractive indices over the refractometer scale. Subadamantine suggests an index high on the scale; vitreous, midscale; and subvitreous, low. Waxy and greasy lustres are usually associated with poorly polished surfaces, while silky refer to stones with many needle like inclusions." (Liddicoat, 'Handbook of Gem Identification', pp 216, 1993 ed.)

Britain's Webster says that many gems have a glassy or vitreous lustre. He gives examples and lists the lustre types as: "Metallic: silver, Adamantine: diamond, Subadamantine: demantoid garnet, Resinous adamantine: certain zircons, Vitreous: quartz, Resinous: amber, Silky: fibrous materials such as satin-spar, Pearly: usually seen only on cleavage faces, Waxy: turquoise". (Webster, "Gems: Their Sources, Descriptions and Identification". pp 670)

John Sinkakas makes a correlation between refrac-

tive index and luster (he's American). Refractive index is given first, then the corresponding comment on luster.

- 1.3-1.4 Poor reflections, inclined to be greasy or oily in appearance
- 1.5-1.8 Brightly reflective, like glass
- 1.6-1.9 Resinous in appearance
- 1.9-2.5 Very brightly reflective, adamantine, sometimes appearing as if the mineral is lightly coated with a metal film.
- 2.5 + Submetallic, bright luster, definitely metallic in appearance

(Sinkakas, John, "Gemstone and Mineral Data Book", pp 336)

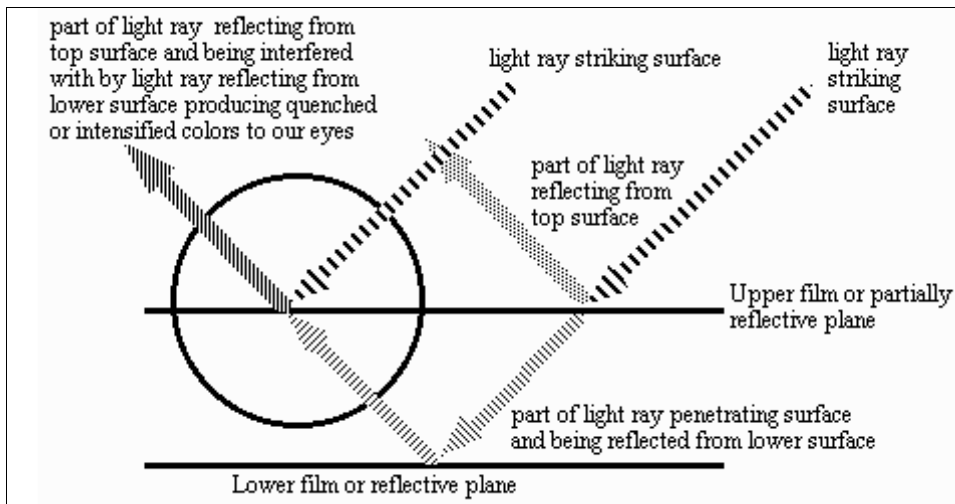
## Sheen

Sheen is due to the reflection of light from material below the surface of a gem. Moonstone, spectrolite and other feldspars are examples. Sheen in moonstone is also called schiller or adularescence. Pearls too have sheen as light reflects from below the surface of the pearl.

## Interference of Light

When a light ray strikes a surface composed of thin films part is reflected and part refracted into the films.

The ray then reflects from film levels below the top surface and reenters the air. As it does so it interferes with; either intensifying or quenching certain wavelengths (colors) in other light rays reflecting from the top of the film. This produces color and light effects like that of oil on water, soap bubbles, Titanium and Niobium coloring, labradorite, tempering colors on steel and so on. In the diagram below a single ray is shown but in reality an infinite number of rays are doing the same thing simultaneously at all points on the surface of the partially reflective top layer or film.



crocidolite (tigers eye) and quartz. Many gems can exhibit an 'eye' including tourmaline, beryl, nephrite, jadeite etc.

### Asterism

Star stones, these are most commonly sapphire and ruby but may include garnet, spinel, diopside and other gems. It is a special type of chatoyancy as the cause is due to many small fibrous inclusions oriented at set angles to each other. Examples

are ruby (60o), garnet (70o). These inclusions in the case of corundum are all parallel to the lateral axes of the crystal and at right angles to the vertical crystal axis. When the stone is cut with the top of the cabachon dome oriented with the main crystal axis passing vertically through it and the silk inclusions parallel to the girdle of the stone asterism results. Each set of silk has a streak of light at right angles to it and a star is seen.

### Spectroscope

Along with the microscope and refractometer this is a major identification tool in gemology. As light passes through a gem the presence of certain chemicals will cause specific wavelengths of light to be absorbed. Instances also occur where wavelengths are intensified or the stone actually emits light (fluorescence wavelengths - rubies, spinel). When light is spread out by a prism or diffraction grating spectroscope into a wide band these absorbed wavelengths show up as lines or areas of darkness in the spectrum. While the actual wavelength numbers can be used in identification usually only a pattern of lines is used to identify the stone. It can be the fastest way of checking out large numbers of stones, even small ones, especially red gems, as spinel, ruby and tourmaline have distinctive spectra. It can be used to identify synthetic verneuil sapphire, blue synthetic spinel, almandine garnet to name a few. Note that British gemmologists have the red on the left and Americans have it on the right when looking at spectra.

Here is an example of what the absorption spectrum pattern of a gem stone might look like through a spectroscope. We are however dealing with an ideal here because in real life the spectrum lines you see are really faint, fuzzy, hard to see things. The most

### Iridescence

A general term for color effects produced by interference or by diffraction. Color play in opals, mother of pearl etc. are examples. Play of Color

A term used to describe the colors seen in opal. This is caused by light diffraction from a regular structure of silica spheres in opals.

### Diffraction

When light passes over many tiny sharp edges or between many repeated points of differently refracting media an interference like phenomenon occurs; light is spread out into specific colors. You can see this on music CDs and sometimes on mesh between you and a light source. This principle is used in the diffraction grating spectroscope.

This is what causes the play of color in opals, light being bent and diffracted as it passes innumerable regular stacked layers of minuscule silica gel spheres.

### Opalescence

The milky appearance of opals. Sometimes it is used to describe play of color.

### Chatoyancy

When a gem material contains many minute fibrous inclusions oriented in one direction and it is cut en cabachon a streak of light or 'eye' can be seen at right angles to the direction of the inclusions. An example used to explain this is the light streak visible on a spool of silk thread or on an old 35 RPM record. Examples include chrysoberyl (cymophane),

realistic drawings available can be found in Liddicoats 'Handbook of Gem Identification'. Red is on the right in the diagram below - because I like the American drawings the best.



**Suggested Reading:**

'Gem Testing' by Anderson and Webster

'Handbook of Gem Identification' by Richard Liddicoat.

The latter has the best group of drawings available

on what spectra look like, very fuzzy, hard to see at times.

Anderson, B.W. Gem Testing. London: Butterworths, 1980.

Liddicoat, Richard T., Jr. "Handbook of Gem Identification". 12th ed. Santa Monica: Gemological Institute of America, 1993.

Sinkakas, John,. "Gemstone and Mineral Data Book: A Compilation of Data, Recipes, Formulas and Instructions for the Mineralogist, Gemologist, Lapidary, Jeweler, Craftsman and Collector". Prescott, AZ: Geosciences Press, 1988.

Webster, Robert. "Gems: Their Sources, Descriptions and Identification". Fourth ed. Rev. B.W. Anderson. London: Butterworths, 1983.

## Unique Agate Discovered by Local Rockhound near Calgary, Alberta

Many will be familiar with the age-old verse "Seek and Ye shall find". For many years Richard Hayes of Calgary, Alberta, has found in the local gravels near Calgary various interesting coral and clam fossils, crinoid stems, shells in shale, fossilized wood, and occasionally a fossil bone. In April, Richard made a remarkable find of what may be a unique agate or carnelian, "as good as you can get". He found the fist-sized, translucent orange/reddish stone nodule in gravel lining the irrigation ditch between Calgary and Chestermere Lake, while looking for stones to polish.

Carnelian is an orange/reddish-coloured form of chalcedony, which is itself a microcrystalline variety of the mineral quartz. Further examination will be conducted by members of the Calgary Rock & Lapidary Club to determine whether the nodule Richard found is either carnelian or agate. It is more likely that the nodule is agate instead of carnelian. Agate, a banded form of chalcedony, occurs in various places throughout western Canada.

Some of the best places to find agate in Canada in-

clude the agate pit near Souris, Manitoba, various gravel pits throughout southern Saskatchewan and Alberta, and certain spots along the lower Fraser River valley in southern British Columbia. Many local rock and mineral clubs have visited some of these localities over the years to collect material for lapidary workshops and projects.

"I just finished polishing a few hunks of the nodule and have put the end-cut side by side with a Brazilian agate that I took my training on. The Calgary agate is prettier by a long shot. It has a orangey/reddish/yellow translucency that is certainly a more interesting colour than the Brazilian and Montana agates I have polished," noted Richard.

Richard has already cut and polished the stone (Figure 1, front cover). According to Richard, "the agate nodule does show some cracks - it obviously traveled downstream quite a distance and got banged around some on the way - but the largest piece has held up and although I made it look like a two inch tombstone it shines brightly back at me from my display case."

"When I got it home I checked it out again and decided I had to have a look at the inside. So the next day I took it over to where I have my rock-saws and started slicing it up. I cut off the one end where the fractures caught my eye and then sliced off the face and took off another thin slice about an eighth of an inch thick. Because of an internal fracture the thin slice broke and I stopped right there after realizing it truly was an agate and probably one of a kind."

"I polished up the pieces and have a couple fragments of the slice in the tumbler. The main rock and its end are in my displays and I made a couple pendants...The local Green's Lapidary bunch have seen the rock and were impressed with the wine-like colour and commented that it is probably a one of a kind for Calgary."

Dubbed "Calgary Rock", Richard's find has attracted some attention. He is also interested in learning

whether others have made similar finds around Calgary. "My question is has anyone else ever found an agate nodule - as big as a fist - in local gravel?" It is possible that more chalcedony (whether agate or carnelian) may exist in the gravels around the city.

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## How to Tumble and Polish Your Stones

Tumbling stones is a fun activity that is ideal for children and a basic prerequisite for those beginning the lapidary hobby. All you need is a tumbler and some abrasives (grit). It does not matter the size or make of your tumbler. For a rotating tumbler, the recipe is always the same, although some manufacturers do offer variations on how much grit to use. Regardless, if you follow the simple procedure below, you will have great results each and every time a batch of rock is tumble polished.

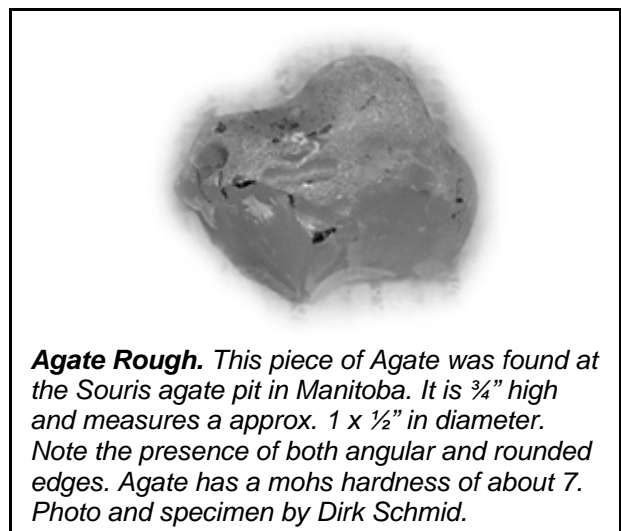
I will first present a quick overview on tumbling, followed by the details for each step. I've also included a few helpful tips and hints at the end of the article.

### Overview

There are 5 steps to complete most tumbling loads. These are as follows:

#### 1. Coarse Grinding

This is the work-horse step where you decide what style your finished stones will have. (Well-rounded edges or sharper angular edges.)



The longer you leave stones in the coarse stage, the rounder and smoother the finished product will be. I personally prefer the rounder smoother type. Hardness has an impact, therefore all my info is geared to stones with a hardness of mohs 7. For mohs 6 cut all times by half and for mohs 5, cut all times by half again. Stones 4 and softer require

special attention and you need to gain experience at mohs 7 first.

## 2. Medium Grinding

After completion of coarse grinding, thoroughly wash all grit from the stones before charging tumbler with medium grit. Do not pour the slurry down the sink as it is dense and can clog drains.

## 3. Fine Grinding

As per step 2, and then proceed to the polish step.

## 4. Polishing

This step requires a knowledge level of rocks to develop as there are 5 or 6 different types of polish. The best all purpose polish is Tin Oxide but it is pricey at \$30.00 per pound. I use Cerium Oxide at \$20.00 per pound as it will polish 99% of all stones, and use Tin Oxide on only those stones that require it, i.e. Obsidian.

## 5. Burnishing

This is a 15 minute laundry detergent step that is just like washing dirt from clothes. The scum is literally washed from your polished stones and puts that extra good sparkle onto them.

### The Details

Step 1: Fill tumbler barrel to 3/4 full with stone. Stone size should not exceed 1" and the load needs to vary in size, preferably from 1/4" to 3/4". Add water until the water level can be seen but does not cover the top-most stones. Add the number of heaping tablespoons of coarse grit as the size of your tumbler.

Coarse grit ranges, size wise, from #45 to #90. Properly and securely install the lid and then allow to rotate 24 hours per day for 2 to 3 weeks. Patience is a virtue as 3 weeks produces better looking finished stones.

Normally, you do not need to "Burp" the tumbler as most quartz, agate and jaspers do not produce gas. If organic material gets into the load, e.g. bone, gas can be produced.

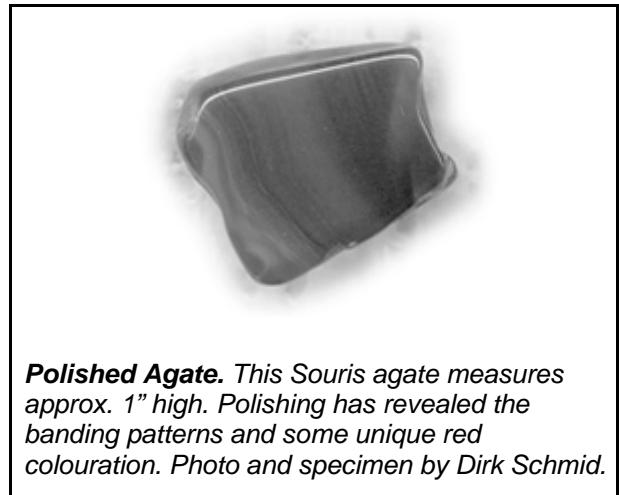
If the load is inspected before the 3 weeks are up, be sure the lid area is thoroughly cleaned to prevent a poor seal and resulting leakage.

### Step 2:

After 3 weeks, open barrel and wash rocks and barrel to remove all traces of coarse grit. The slurry may be flushed or disposed of in the garden etc. Do not try to save the slurry for later use as it tends to set up similar to concrete. Return all stones to the barrel, noting that you have lost about 40% of your original volume. This is normal and occurs with every load. The remaining steps lose very little material and volume as this is the beginning of the polishing process. With the stones in the barrel, add water as in step 1 until it is visible but does not cover the stones. Now add the number of heaping tablespoons of medium #220 grit, replace lid, and rotate for 1 week.

### Step 3:

After 1 week, open barrel and wash rocks and barrel again until clean disposing of the slurry in the same manner as in step 1. Return the rocks to the barrel, add water as before, then add the number of heaping tablespoons of fine #500 or #600 grit. Replace lid and rotate for 1 week.



### Step 4:

After 1 week, open barrel and wash rocks and barrel thoroughly. Replace stones into barrel, add water as before, then the polish compound of your choice, Cerium Oxide or Tin Oxide, again in heaping tablespoons to the size of your tumbler, i.e. 3 tablespoons for a 3 lb barrel. Also, cut a 1/2" square of bar hand soap and add this to the barrel. It aids in the polishing action. At this stage, if the tumbler volume is less than 50%, add 10% to 15% of plastic pellets to bring the volume over 50%. When the barrel volume is less than 50%, proper tumbling action does not occur. The maximum volume of

plastic pellets is 20%. Replace lid and rotate for 1 week.

#### Step 5:

After 1 week, open barrel and thoroughly wash rocks and barrel. Replace stones into barrel and add 1 tablespoon of powdered laundry detergent, close barrel and rotate for 15 to 20 minutes. Open barrel, wash again and admire the quality of the finished polished stones!

#### Tips & Hints

Always clean the stones and tumbler inside thoroughly between each step.

When the final polish step is ready to begin, if the tumbler is less than 50% full, plastic pellets need to be added to bring the load volume up to 50%. Do not, however, use more than 20% of the load as plastic pellets.

Use stones of the same hardness in your tumbler for best finished results. Soft stones grind away faster than hard ones which means that the soft stones in your tumbler will not polish while the hard ones will. Because the beginner cannot tell which is soft or hard, when your 4 steps are complete, all the unpolished stones are probably soft ones which can be set aside until there are enough of them to do a step 4 polish run. You will be surprised how many will polish.

There are many types of polish. The most versatile is called Cerium Oxide, but it will not polish any type of glass. To do this a polish called Tin Oxide is required. It is approximately \$30.00 per lb while Cerium is about \$19.00/lb.

#### Where to find Tumbling Materials

There are many American and several Canadian

dealers who sell tumbling supplies and lapidary equipment. In Canada, it is sometimes difficult to find dealers, as some advertise only locally. However, nearly every major Canadian city has a least one supplier. Some dealers also live in rural towns. So one has to do a bit of searching. The benefit of going through a Canadian dealer, of course, is that you don't have to worry about postage, currency exchange, and tariffs.

The Canadian Rockhound magazine has several suppliers listed in its dealers section. Also, check the yellow pages, and try contacting local clubs, as they will likely know of a local supplier.

#### Further Reading

1. *How Gems are Cut and Polished*  
by John Miller
2. *Working with Jade*  
by Tod Leedham
3. *Scenic Stone*  
by Dutes Duteil
4. *The Thunder Bay Agate Mine*  
by Dennis Seargeant

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## The Origin of Fossils

#### What are Fossils:

They are evidence of life that lived in the geologic past. Very few animal or plant remains are preserved as fossils since most organic life is composed of soft parts which are seldom preserved.

The two main conditions that are almost essential for

the preservation of organic remains are:

1. That the organism has hard parts such as Bones, Shells etc.
2. That the remains are covered quickly If remains are not covered quickly scavengers will eat them, rivers or waves may destroy them or Oxygen will

decompose them chemically. One of the best ways to preserve fossils is for a CONCRETION to surround them. Concretions are formed around organic remains after sediments are deposited and there is local cementation of those sediments.

**Fossils may be DIRECT or INDIRECT Evidence of past life.**

**A. DIRECT-**

Fossils which are of the DIRECT Evidence type are where the actual remains are involved in some manner.

**Unaltered Remains**

These are usually the unaltered hard parts such as shells, bones, wood, coral. They are never The actual remains of soft parts are rarely preserved since they normally decompose; however Many animals as large as mammoths have been preserved in glacial ice. Insects enclosed in the amber are largely actual remains. Some remains of animals are found in tar deposits, such as La Brea deposits. The oldest actual remains of soft parts are rare dehydrated or mummified remains such as 150 million old dinosaur skin.

**Mineral Replacement -**

Three groups of replacement fossils are recognized:

Permineralization - Mineral matter strengthening of the hard parts by filling in the pore space.  
Petrification - The complete replacement of the original organic hard parts by mineral water Usually the mineral matter is silica or Calcite, Dolomite or Pyrite.

Distillation - The removal of the volatile materials, mostly water, to preserve a record of the soft parts with the carbon remains. Carbon remains, along with impressions, are the chief record of organic soft parts and therefore they are very important

**B. INDIRECT -**

Fossils which are INDIRECT Evidence of prehistoric life are:

Fossil Molds - Three dimensional impressions of the inside or outside of organic remains. Fossils

Casts - Duplicates of the original remains by filling in the molds with mineral water. Only the outside is duplicated

Impressions - Flat impressions formed where an organism lay in the mud.

Coprolites - Fecal droppings of organisms. Very important since they indicate food and the environment present.

Footprints - Special molds that indicate the animal that made them as well as the animals weight and mode of travel.

Tracks and Trails - Of worms and insects indicating presence. of the organism.

Borings and Tunnels - General forms of life can be

identified as being present from these Casts. These are the earliest evidence of life on land

Chemical Remains - Trace fossils that some form of organism was present.

**C. VERY INDIRECT!**

Presence of Organic Carbon Molecule, Organic acids.

Coal is evidence for presence of plants. Petroleum is evidence for the presence of plant or animal life.

In addition to telling the details of life in the past and the story of such unique animals as the giant dinosaurs, fossils also tell of past climates.

Colonial corals in Greenland rocks attest to warmer conditions in the past than today, and imprints of fir and spruce in unconsolidated clays near the surface recorded the penetration of glacial cold far to the south Fossils are frequently used to determine the marine or fresh-water origin of rocks.

Note: Concretions are often found in shales, sandstones, and limestones. They may be spherical or flattened masses formed around a fossil or some other nucleus. They may be very small or up to several feet in diameter. Concretions are often harder than the enclosing rock and hence are found as they weather out of it.

*Information extracted from material presented to CLGMS by: Bob Cross, Professor of Geology, San Jacinto College - North*

**FALSE FOSSIL ODDITIES**

**DENDRITES** are perhaps the most common geologic oddity which resembles a tiny fern frond or colony of algae. The term "dendritic" refers to the branching figure resembling a fern frond, branch or tree. They are usually formed in thin hard-bedded shales and limestones. Concentrations of the manganese mineral called pyrolusite (black manganese inside) percolate into the cracks and fissures of shale and limestone, leaving behind a residue which forms the dendritic patterns.

**CLEANING LIMESTONE FOSSILS**

Clean limestone fossils with a little Sani-flush in a pail of water. After the fizzing stops, drain and repeat as necessary. Rinse thoroughly when finished. As with any chemical, use caution and protect your eyes. Via The Mountain Gem, and Rocky Review 12/94

**FOSSILS AND MEDICINE**

Now that you have collected fossils of many varieties and from many classes, I have some information of a historic nature for their practical use. In the end it

could reduce your medical expenses and save you some money. How so?, you say. Well, I say, read on.

As I so often do in my spare time, I take a book or magazine from the shelf and glance through and perhaps recall something of interest. Recently I came across an article, "A fossil For What Ails You." What follows is a review of part of the folklore connected with customs and practices dating back to the Paleolithic tribes of Europe.

As recently as 200 years ago many people in the world, including scientists and doctors believed that among other things fossils had remarkable power to cure different ailments. Physicians and folk doctors didn't agree on why fossils cured people and animals, but they agreed fossils were good medicine. Would it surprise you to know oil of amber was listed in an important Pharmacopoeia (list of drugs, their use and amounts) as a bonafide medicine as late as 1948?

The use of fossils reached their peak just after the Middle Ages. Physicians and folk doctors collected and prepared their own medications. In the 13th century, Emperor Frederick II of Germany set down strict rules ordering a separation of roles for the physician and apothecary. These rules however, did not apply to the folk doctors. The apothecaries prepared the fossils for use by grinding them to a fine powder and then mixing them with wine, water or other liquids for internal use. Honey, wax, oil or other things were used to make ointments or salves.

In 1700 a large deposit of mammoth bones were found near the Neckar River. The Duke of Wurtemberg ordered a scientific dig. The scientists of the day did so and in the process got into an argument whether they were elephants brought to Europe by Hannibal, bones from old Roman sacrifices or animals destroyed by the great flood recorded in the Bible. While this was going on, the pharmacists, who collected materials for their own use, calmly gathered all the teeth and powdered them for medicinal use.

No one seems to know why certain fossils were used for specific illnesses except that the shape of the fossil determined its use. An example, in Scotland, the oyster Gryphaea, commonly called the Devil's toenail, was used for arthritic joint pains.

Amber is the fossil sap of extinct pine trees. It has been used longer and for a greater variety of medicinal purposes. Powdered amber mixed with other medicines was given to pregnant women to prevent miscarriage. Powdered amber mixed the wine eased the pain of childbirth. A necklace of amber beads worn by small babies protected against secret

poisons, witchcraft and sorcery.

Callistrus, a Greek of the 4th century BC believed that yellow amber if worn as a collar about the neck cured fevers and diseases of the mouth, throat and jaws. Powdered and mixed with honey and oil of roses, it was good for diseases of the ear; added to honey, it was an excellent salve used to improve dim eyesight. In the 16th century, a doctor found a way to make oil of amber and from then to the 19th century it was used by many doctors for gout, rheumatism, whooping cough, bronchitis and other ailments.

Ammonites are the favorite fossil of many collectors all over the world. The Greeks of the 3rd century used ammonites as a cure for blindness and snakebites. The snakebite remedy came from The belief ammonites were snakes.

Sea urchins were also part of the pharmacists' stock. A Cretaceous sea urchin spine, found in Palestine, was used for almost 2,000 years. Pline, the Roman historian of the 1st century, said that whoever licked it would find his gallstones broken and voided in short order, but Galen, a 2nd century physician, said that they should be crushed in mortar and mixed with water to be effective.

Belemnites were thought to be thunderbolts by people of the Middle Ages and still are in some parts of Great Britain. They were crushed and the powder kept a person from being struck by lightning or bewitched by demons from the sky. They were also used to cure a variety of illnesses and prevented nightmares.

Fossil shark teeth were thought to be tongues of serpents that St. Paul had turned to stone on his visit to the island of Malta. Because of this myth they were believed to have power against the bites of any reptiles. Wine in which shark teeth had been soaked was thought to be a good antidote for snake bite or any other poison.

Cures for ailments were also found in the use of jet, a very hard coal, dragon bones, unicorn horns (which were probably the horn of the male narwhale) and toadstones, which were the teeth of rays.

I have enjoyed reading of this use of fossils in early medical practice. For me, I will stay with modern medicine.

by Fred Labahn as reprinted in Osage Hills Gems 2/99, via RFMS Newsletter 3/91

*Reprinted from BC Rockhounder  
December 2001, with thanks!*

# GMFC 2002 Internet Website Directory: Member Club Web Home Pages

**By Dirk F. Schmid, M.Sc.**

*Editor of the Canadian Rockhound Magazine  
Winnipeg, Manitoba, Canada*

**T**he Internet has become an invaluable tool for helping collectors and hobbyists find clubs across the country. In Canada, there are now about 50 rock and mineral clubs that have their own web page on the internet. This represents almost half of all rock and mineral clubs currently in existence in Canada.

In 1997, a national directory of rock and mineral clubs was established by the Canadian Rockhound magazine as a service to collectors and hobbyists. This directory was made available on the Internet. Prior to this, it was very difficult to track down clubs, and most Canadians were never aware of the existence of rock and mineral clubs. Few clubs published any directories or club lists. Since 1997, the directory on the internet has grown and it is regularly visited by tens of thousands of people.

The **Gem & Mineral Federation of Canada** went online on December 30, 1996 — one of the first earth science organizations in Canada to go online. The federation's web home page is still on the Internet and can be accessed by everyone. Member clubs should visit the GMFC website for information and news. Clubs will find contact information, information on insurance, details about the GMFC's annual shows, and a complete list of member clubs. Member clubs maintaining their own web page are asked to provide a prominent link to the GMFC web page in order to help members and the GMFC to navigate the club web pages.

Below is a list of member clubs within the GMFC that currently have a website on the

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Internet. Beneath the name of the member club you will find the URL web address for the club's website. All addresses were tested in June 2002 and found to work.

## **Gem & Mineral Federation of Canada**

<http://www.gmfc.ca> (NEW!)

**1120 Rock Club** (Kelowna, BC)

[http://www.canadianrockhound.com/clubs/bc\\_1120.html](http://www.canadianrockhound.com/clubs/bc_1120.html)

**Alberni Valley Rock & Gem Club** (Port Alberni, BC)

<http://www.rockslide.0catch.com>

**Alberta Federation of Rock Clubs**

[http://www.canadianrockhound.com/clubs/ab\\_afrc.html](http://www.canadianrockhound.com/clubs/ab_afrc.html)

**Calgary Faceter's Guild**

[http://www.canadianrockhound.com/clubs/ab\\_cfg.html](http://www.canadianrockhound.com/clubs/ab_cfg.html)

**Calgary Rock & Lapidary Club**

<http://www.crlc.ca>

**Canadian Micro-Mineral Association**

<http://www.canadianrockhound.com/clubs/cmms.html>

**Edmonton Tumblewood Lapidary Club**

<http://www.geocities.com/etlc99>

**Kokanee Rock Club** (Nelson, BC)

[http://www.canadianrockhound.com/clubs/bc\\_krc.html](http://www.canadianrockhound.com/clubs/bc_krc.html)

**Lakes District Rock & Gem Club**

<http://www.hiway16.com/clubs/pages/ldrock.asp>

**Lapidary Rock & Mineral Society of B.C. \***

<http://www.lapidary.bc.ca/rocks/>

[http://www.canadianrockhound.com/clubs/bc\\_lrmsbc.html](http://www.canadianrockhound.com/clubs/bc_lrmsbc.html)

**Medicine Hat Rock & Lapidary Club**

[http://www.canadianrockhound.com/clubs/ab\\_mhrlc.html](http://www.canadianrockhound.com/clubs/ab_mhrlc.html)

**Mid-Pro Rock & Gem Society** (Prince Albert, SK)

[http://www.canadianrockhound.com/clubs/sk\\_mprgs.html](http://www.canadianrockhound.com/clubs/sk_mprgs.html)

**Nova Scotia Mineral & Gem Society** (Halifax, NS)

<http://accesswave.ca/~nsmgs/index.html>

**Victoria Lapidary & Mineral Society**

<http://www.islandnet.com/~vlms/>

**Winnipeg Rock & Mineral Club**



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