

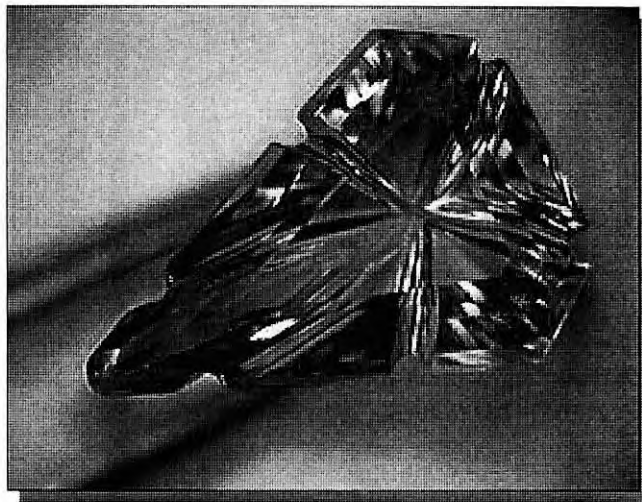
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Gem & Mineral Federation of Canada

La Federation Canadienne des Gemmes et des Mineraux

FOUNDED 1977



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Newsletter
SPRING 1999
Volume 18, Number 2



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THE FEDERATION

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 52 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 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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Newsletter Exchanges, Reprint Requests, and Contributions:

Please forward all exchanges, requests and contributions to the GMFC secretary. The articles published in the GMFC newsletter may be reprinted for non-commercial purposes, provided credit is given to the author. Articles may not be edited or rewritten to change their meaning or substance without the authors prior written approval.

Internet Home Page

Visit our official home page on the internet! Our internet address is: <http://pangea.usask.ca/~dfs846/rmac/gmfc.html>

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Editor's Message

Hello! First of all let me say thank you to all those who helped me with this first issue. I am sure it will take me a while to get my 'sea legs' with this newsletter.

I would also like to say to our members that this is your magazine and if there is a club show or article or something else that you would like to see published, please feel free to contact me.

Until next time, I hope you enjoy this issue!

Mark S. Curtis, Editor



Hematite
Crystal

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President's Message

Greetings!

I hope everyone has experienced a good winter, relaxing vacations and all the other things that go with the cold Canadian season!

This has been a learning year for me, as well as an extremely busy one. We had a house built over the summer and moved in November 27 -30th. I kind of feel that I may have short changed the G.M.F.C. a bit time wise but it could not be helped.

I am very grateful to the fine people on the executive who give so much and ask so little.

Some things have been accomplished and there is always more to be done. The official presentation of the scholarship award was made by Ralph Coffey here in Prince Albert at a meeting of the Association of Professional Engineers. Victoria Garlinski is working on the cook book, please send any help her way re: recipes etc.

The teleconference went well. The bases were covered and most items resolved. My feelings are that there is much more to be done in communications. Let's all work on it!!

Thank you Mark Curtis, for taking on where Dirk left off.

Also a thank you to Dirk for all your effort both as editor and web page expert.

Don

Donald Fabrick
E-mail: rdrunr@sk.sympatico.ca

A Message from the Membership & Directory Committee

from Alice Clarke, Chair

FEDERATIONS/SOCIETIES AND CLUBS: Membership Dues are due in part by January 1 and in full by March 31. It's the middle of April and by this time everyone should have their membership dues in, to Jack Wrightson. Is yours in yet? As of last week, Jack reported that he had still to receive any Membership dues from Alberta Federation of Rockhounds, Saskatoon Lapidary & Mineral Club, Mineral Society of Manitoba, and Nova Scotia Mineral & Gem Society. And two or three Clubs have only sent in half their dues. Is yours one of them? If so, I am sure that you will attend to the matter at once. We would like to be able to submit a full report by the time of our meetings in mid May.

Also it would be appreciated if all non-Federation Society/Clubs would please submit to me the names, addresses and phone numbers of the 1999/2000 President, Secretary and Treasurer, and the number of members as soon as possible. (I have the Lapidary, Rock and Mineral Soejety of B.C.) Thank You.

ASSOCIATES: As of this date only two of the current Associate (Dealer) members have outstanding dues. And there is one new Dealer to welcome:

SAHARA MINERALS, Karin & Bruno Burgermeister
P.O. Box 179, Silverton, B.C., V0G 2B0
Phone (250) 258-2362

Congratulations to the members who have supported the Gem & Mineral Federation for a number of years. Certificates will be going to the following members in the near future.

Green's Rock & Lapidary Ltd.	Calgary, AB	20 years
Komarevich Originals Ltd.	Calgary AB	20 years
O'Ferguson Rocks & Grits	Langley BC	20 years
Gian Carlo & Joan Chitto	Surrey BC	20 years
Tyson's Fine Minerals Inc.	Edmonton AB	15 years
Tepee Rock & Gem	Medicine Hat AB	5 years

Thank you all for your support and participation!

GMFC Scholarship Foundation Inc.

Report by President John A. Hausberg

This is an update from the Scholarship Foundation as to what happened at our Annual meeting in

Winnipeg last May. Ralph Coffey of Mid Pro Rock & Gem Society in Prince Albert, SK. was named the 1998 Scholarship Award Winner.

He selected the University of Saskatchewan in Saskatoon as the University where the scholarship should be awarded. The College of Graduate Studies at U. of S. was contacted, and with their co-operation a winner was selected.

The student is Craig Therens. He is nearing completion of his studies for M.Sc. in geological sciences focusing on the metamorphism and geochemistry of the Werner Lake Co-Cu-Au deposit in northwestern Ontario. He has a B.Sc. with honours in geology. We believe Ralph Coffey met with him in March at a function at the university when a replica of the \$1,000.00 cheque was presented to Craig. (The actual cheque was paid to him through the university last Fall).

This was also the first year that we were giving out an undergraduate scholarship to a child or grandchild of a G.M.F.C. member. 14 students competed for the one scholarship. Peter Michael Bruce Hudson, son of Rick Hudson, Victoria Lapidary & Mineral Soc., was declared the winner. A cheque for \$500.00 was presented to him on our behalf by the Victoria club.

I will take this opportunity to thank all G.M.F.C. clubs and members who donated to the scholarship fund during the past year. A special thanks go out to the members of Parksville & District Rock & Gem Club and the Southern Alberta Rockhound Assn. in Lethbridge for their large special donation to the fund.

The By-Laws of the Scholarship Foundation states that only interest earned on the donations can be used for scholarships. We have enough interest income to support our Graduate \$1,000.00 scholarship and about one and a half \$500.00 undergraduate scholarships. The G.M.F.C. have donated enough money to enable us to offer two undergraduate scholarships in 1999.

At our annual meeting and convention in Kamloops in May, the B.C. Society have agreed to auction off items donated to the scholarship fund. This will be done at their regular auction. We hope that our members will continue to support us in our fundraising. Individuals can receive tax receipts. We are also giving individuals who donate more than \$25.00 a cap or visor. If you just desire one of our caps they will be on sale for \$10.00 each.

I hope to see you in May at our Annual Meeting and I also hope that all of you will be wearing the white Scholarship Supporter cap. ❖

MINUTES OF THE GEM & MINERAL FEDERATION OF CANADA TELECONFERENCE MEETING ON SUNDAY MARCH 21st, 1999 at 1 PM (Alberta Time)

PRESENT:

ALBERTA: Dave Engberg, Bob Findlay, John Hauseberg, Grace Leeuw, Ronald Shannon, Jack Wrightston

BRITISH

COLUMBIA: Gordon Billings, Alice and Elmer Clarke, Ken Dewerson, Margaret Lowe, Don Rotherham,

MANITOBA: Victoria Garlinski.
SASKATCHEWAN: Donald Fabrick,
NOVA SCOTIA: No representation.

PRESIDENT: -- Donald Fabrick welcomed thirteen members gathered for the Teleconference. After exchanges of winter pleasantries, the request for Reports commenced.

SECRETARY: -- Donald asked if all Members had received a copy of the Minutes of the November 15, 1998 Teleconference Meeting. After a short discussion, Margaret Lowe said it was the Agenda and not the Minutes she had not received. It was discovered that her Postal Code should have been "354." Victoria asked if there were any errors or omissions in the Minutes. There being no errors or omissions, the Minutes were adopted as circulated.

TREASURER: -- Jack Wrightson reported the Bank balance as of this day to be \$5,409.34. Memberships are still lagging and at least five have not paid at all: AFRC, Nova Scotia, The Mineral Society of Manitoba, MidPro, and Saskatoon Lapidary. Donald said MidPro will have attention soon. Clubs with partial payments will be paid by month end. Moved by Wrightson/Hausberg as to Report to this date. A short discussion was held on matters and methods of payment. CARRIED.

MEMBERSHIP/DIRECTORY/SUPPLIES: -- Alice Clarke. Membership: Reported 1 new Associate Membership from Nelson area; 5 previous members not yet renewed: Lucky Strike Lapidary, Outback Gems, The Nautilus Arts & Crafts,

Scarborough (heard of Mr. McLeod's passing), Bob & Rae Sprong, and The Aesthetics Underground. New address for Creston Valley Rock & Mineral, 1926 Pine Street, Creston, BC, V0B 1G5 and new Secretary. BC Society will receive balance. at month end. Awaiting returns from four Clubs and todate reporting: 349 families; 573 singles plus 243 for a total of 1,218 adults, and 113 children, with 4 clubs to be heard from. Directory: Publication and will be ready for May. Winnipeg's Rock of Ages has new President. New telephone area code for North Alberta "780" outside of Red Deer and South "403" remains same. Supplies: very few requests.

PUBLIC RELATIONS: -- Hugh Hollins (away celebrating 50th anniversary). Ronald Shannon reported the desire to have to Representative for South and North Alberta. Said he would do so for South Alberta but unable to find a representative for the North but would continue the search. He spoke to some members but the answer "too busy" and Grace Leeuw echo same sentiments. Donald hoped the communications would continue, be it cards, letters, or telephone calls.

NEWSLETTER: -- Donald Fabrick mentioned the resignation of Dirk Schmid (letter attached) and Acting Editor is: Mark Curtis, P.O. Box 1160, Chemainus BC V0R 1K9. Telephone: (250)246-4803. Fax: (250)246-4912. E-mail chemmark@islandnet.com

Clubs and Editors should forward all articles for publication in the Newsletter to Mark. It is hoped that a Newsletter will be published prior to Annual Meeting at Kamloops and other matters will be resolved at that time.

NEWSLETTER AWARDS: -- Ray Goyer (letter attached) is stepping down in May. His successor will be Trudy Martin. Alice will have an update of membership list with new members and changes. Dirk will continue to publish his On Line and we may copy his articles. John Hausberg requested a letter for GMFC from Dirk to safeguard copyrights. Dirk mentioned article on Gemstones in his Winter/

Spring publication.

EDUCATION: -- Gordon Billings reported the draft is now complete and in the process of being typed. Will be ready within 2-3 weeks and approximately 25 copies of the kits and specimens will be ready for distribution in May. Gordon suggested that he would courier a copy so that Ronald Shannon could see it prior to May.

FIELD TRIPS: -- Dick Patenaude's report given by Ronald Shannon -- No report.

INSURANCE: -- Gordon Billings reported that on January 25th, 1999 he mailed out to all Directors and Clubs the Insurance Application forms with Third Party coverage. Gordon mentioned third year in a row with no increase in premium -- \$1.90 per person. Gordon also mentioned his concern that perhaps Clubs were not utilizing coverage for the members as so few forms are completed. To be discussed further at May Meeting.

HISTORIAN: -- Margaret Lowe -- No report

GMFC SCHOLARSHIP: -- John Hausberg John reported that all Clubs were sent forms and only return was from Creston. Reminded that June 30th is deadline for Undergraduate. John reported the following donations to the GMFC Scholarship Fund:

Southern Alberta Rockhound Assoc. -- \$ 500.00
 Richmond Gem & Mineral -- \$ 50.00 in
 memory of Mr. Thomas
 Foxwell & District Rock Club -- \$2,000.00

John mentioned that he will profile Craig Hems in the next Newsletter. John mentioned perhaps Donald could attend at the University and meet Craig. John also mentioned that GMFC would like to give another \$500.00 undergraduate scholarship but required financial assistance from GMFC. MOTION: Hausberg/Wrightson: THAT GMFC donate \$500.00 to the Scholarship Fund for the purpose of funding one Undergraduate Scholarship in 1999. Carried.

John further reported as to Scholarship fund investments:

\$ 9,000.00 invested at 12 1/2%,
 \$11,000.00 invested at 10 1/4%, and
 \$ 5,000.00 invested at 5%
 \$25,000.00 in long term bonds.

Bank balance at the present time -- \$766.51 plus the \$500.00. Cap sales are the source of Scholarship funds and these will be available in May.

1999 SHOW REPORT:

- Ken Dewerson reported all plans progressing satisfactorily.
- Alice and Elmer Clarke are helping with Hotel accommodation and other plans.
- Don Roterham reported to Ken 52 displays, 11 confirmed dealers, open demonstrators invited and radio advertising.
- Kamloops Show with BC Federation Gem Show & Rendezvous -- admission \$4.00 for both. Members of Thompson Valley - fee \$5.00.
- Show in KXA Convention Centre, Kamloops.
- GMFC Annual Meeting Wednesday, May 19th, Thursday 20th, and Friday 21st at Parkview Activity Centre, 500 McDonald Ave., North Kamloops.
- GMFC Scholarship Meeting -- Friday 21st at 9 am.
- GMFC Annual Meeting Friday 21st at 7:30pm and Awards to follow.
- Map packages of Kamloops to go to all Executives, Directors, etc.
- Pancake Breakfast on Monday, 24th.
- Gem Show starts Friday 21st from 6 - 10pm, Dinner Sunday, Donations of rocks requested and appreciated.
- Hotel Scotts Motel -- \$58.00. Mostly booked up
- Dick Patenaude has forms and ribbons for Gem judging.
- Rob Davis, Show Chairman -- 250-554-8983.

The Teleconference closed at 3pm (Alberta) and will meet in Kamloops on Wednesday, May 19th, 1999 at 9 am.

Respectfully submitted,

Victoria Garlinski,
 Secretary

April 20, 1999



Andalusite

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AMBER

by J.P. Jutras

reproduced from the Calgary Rock & Lapidary Club Journal with thanks

Amber, which is also known as the 'gold of the north', is one of the oldest material used for adornment that is known today. Evidence of its use go back to archeological digs dated around 35-45,000 years ago by primitive societies around the Baltic sea. It was traded from the north with the Greeks and Romans 2500 years ago. It is mentioned in many Greek books that have made their way to us, one of which is Homer's classic *Iliad* which recounts the sack of the Greek state of Troy.

Amber is the fossilized sap of trees which have been buried millions of years ago. As the sap flowed from the still living tree, various insects, plant remains and tile occasional lizard or frog may have been trapped by the viscous fluid. These were preserved through the ages and some are in such an excellent state of preservation that DNA has successfully been recovered from these extinct life forms (but there is no evidence in the available literature that someone may have cloned dinosaurs from this DNA...at least not yet!)

As amber is an organic compound, whose average composition runs something like C₁₀H₁₆O, it is not a mineral or a true gemstone. The fossilization process renders the compound compact, hard and resistant to chemical attack by various solvents. Although the hardness of this material is not that great (average 2 1/2 on the Mohs scale, or slightly harder than a fingernail), it can be and is commonly used in rings, broaches and pendants. It can be almost any color but the most abundant material tends to be in the yellow-orange range. Red, green and blue amber can also be found but is much more scarce. The relative softness of amber is no doubt one of the reasons for its early use as it is readily workable with hand tools. Amber can easily be worked with sandpaper and polished with a fine cloth. A good start may be 220 grit paper then, 320, 600 and 1200 grit with polishing done on a small buff with ZAM or a similar compound.

Amber's specific gravity (S.G.) ranges between 1.3 to 1.8 but can be as high as 1.30. The light weight of amber allows it to float on salt water, which is a useful trick to tell amber apart from plastic or glass imitations as most of these will sink in a solution of water and 2 1/2 tablespoons of salt. The fact that amber floats in sea water is the reason why the beaches of the Baltic sea have always been

renowned hunting grounds for this gem material. The actual amber-bearing clay beds lay at the bottom of the sea and are occasionally turned over by strong surf and wave action during storms. The amber is loosened and then floats to shore where it can be collected on the beaches.

Apart from the Baltic sea and Poland (where the amber is mined from terrestrial deposits), historical sources of amber have included Burma, Sicily and Romania. New sources of material include the very prolific Dominican Republic deposits where amber is mined from hard rock in the mountains and where some of the nicest blue and red amber comes from. The largest piece of amber on record from the DR weighed 17 1/2 pounds.

Mexico and Columbia are two new commercial sources of amber on the market. Supply is sporadic but the quality is reported to be good in terms of size and color of the material. One should be careful as some of the material reported from Columbia may be softer, younger tree sap known as copal. Copal is essentially the same material as amber but has not undergone the fossilization process and is therefore not as hard nor as resistant to chemical attack as real amber. The lapidarist will know that he has copal when he tries to polish his piece and the material starts to deform and flow with the buildup of heat caused by the polishing process. Another test is to put a drop of ethyl alcohol on a piece of suspect amber. True amber will not be affected but copal will be attacked by the alcohol and start to soften within 20-30 seconds. At this point, the material will 'pull' at the fibers of a cotton ball used to wipe the alcohol. These tests are 'quick and dirty' ones which offer good guidelines but guidance should be gained from experts if a serious problem arises.

Amber is commonly treated to remove a haze due to numerous small fluid inclusions. The treatment is essentially that of slowly heating the material in oil or, as the Roman Pliny the Elder suggested, to "boil the amber in the fat of a suckling pig". One of the effects created with a special technique of rapid heating and cooling (which remains a trade secret) is that of the famous leaf-like inclusions often referred to as 'sun-spangles'. Small pieces of amber can also be heated to the point where the material will start to flow (180-250° C) and then be pressed together to produce large pieces or what is known

as 'pressed amber' or 'ambroid'. Elongated bubbles and distinct flow lines between the different pieces of amber forming the larger piece are tell tale signs of the reconstruction process.

Closer to home, amber is commonly found in association with the Cretaceous coal seams of Alberta as well as in the badlands, in the Drumheller area. Nice pieces to about 1 inch have been reported. A Much larger occurrence is at Cedar lake, in Manitoba, where the amber is found on one of the lake's beaches. Between 1895 and 19137, the Hudson's Bay Company, reportedly mined more than a ton of amber from this deposit to make varnish.

From the 220 million year old amber of the Bavarian Alps to the 16 million year old pieces from the Dominican Republic, much amber has been found and used for jewelry, trading and scientific research. An excellent book for those who would like to know more is "The Quest for life in amber" by George and Roberta Poinar (Addison-Wesley publishing company, ISBN #0-201-62660-8). Although somewhat technical at times, it is a fun read and has a great bibliography for those who want to dig out more references. ❖

Show Calendar

- May 20 – 23 Wire Artists Group, 1st Annual Convention, London, ON, Workshops, speakers. Fax 519-474-2579 for more information.
- May 26 – 28 Mineral Society of Manitoba, University of Manitoba, Wallace Building, 125 Dysart Road, Contact Margarete Marion-Akins at 204-222-1080
- June 12 – 13 Southern Alberta Rockhounds Show, Lethbridge, Alberta
- July 16 – 18 Sudbury Gem & Mineral Show. Carmichael Arena, Bancroft Drive, Sudbury, ON. Contact Ed or Ruth Debicki at 705-522-5140 (tel/fax) or e-mail ed.debricki@sympatico.ca

- Aug. 8-10 TORONTO, ONTARIO, CANADA-- JEWELLERY WORLD EXPO 1999. National Trade Centre. Reed Exhibition Companies 416-491-7565.
- Aug. 28 – 29 The Kingston Lapidary & Mineral Club hosts their Third Annual Summer Mineral & Lapidary Sale. Contact Ted Pope or 613-384-7486 or Eileen Moss at 613-384-4439
- Sept. 18-19 SCARBOROUGH, ONTARIO, CANADA--GEM & MINERAL CLUB OF SCARBOROUGH. 30th Annual Gem & Mineral Show, "Wonders of the Earth." Mid-Scarborough Community Centre, 2467 Eglinton Ave. E. Hours: 18th, 10AM-6PM; 19th, 11AM-5PM. Show Committee, Box 55409, 2376 Eglinton Ave. E., Scarborough, Ont., Canada M1K 5K3.
- Sept. 25-26 OTTAWA, ONTARIO, CANADA-- OTTAWA LAPSMITH & MINERAL CLUB. 33rd Annual Gem, Mineral, & Jewellery Show & Sale. Nepean Sportsplex, 1701 Woodroffe Ave. Hours: 25th, 10AM-6PM; 26th, 10AM-5PM. Karen Lochhead 819-827-3071. E-mail lochhead@sympatico.ca.
- Nov. 6 – 8 Surrey Rockhound Gem & Mineral Club, Sullivan Hall, Surrey, BC. Contact Gunther Sorgatz at 604-576-1171

If you would like to see your club show or special function listed here, please contact the editor at the address on the front page.



Vesuvianite

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1999 GMFC Show in Kamloops, B.C.

by Ken Dewerson,
GMFC Show Coordinator

Greetings everyone! The upcoming Annual Show and Conference of the Gem & Mineral Federation of Canada will be held on the Victoria Day long weekend, from May 21 to 23, 1999. Please mark your calendar.

The location of the show is the KXA Exhibition Hall in Kamloops, B.C. (Mt. Paul Way and Chilcotin Road). The club hosting the show is the Thompson Valley Rock Club. One of the features of the show will be "Gem Show – Treasures of the Interior."

This time the show will be held in conjunction with the Lapidary Rock & Mineral Society of B.C. annual "Rendezvous". Field trips will be a main feature of the show. More information on the field trips will be announced later. One field trip will be to the only precious opal locality in Canada, which is run by Okanagan Opal, Inc.

Agenda

- Annual committee meetings Wednesday 19th, Thursday 20th, at Parkview Activity Centre.
- GMFC Scholarship Meeting, 9am Friday 21st.
- GMFC Annual General Meeting 7:30pm Friday 21st, KXA Centre.
- GMFC Awards Friday 21st (after general meeting)
- Gem Show starts Friday 21st 6pm-10pm.
- Newsletter Editors Meeting 9am Saturday 22nd. (all editors are welcome)
- Gem Show Saturday 22nd 10am-6pm, Gem Show Sunday 23rd 10am-5pm, In Conjunction with BC Lapidary Rock & Mineral Society.
- Rock, Mineral and Fossil Field Trips Saturday 22nd, Sunday 23rd, Monday 24th.
- Rock Auction Saturday 22nd.
- Bucket Raffle 4pm Sunday 23rd.
- Society Dinner 6pm Sunday 23rd.
- Society General Meeting & Election of Officers Sunday 23rd (after dinner)
- Pancake Breakfast Monday 24th.

Campgrounds - campgrounds with electricity and water are on the west side of the KXA across Mr. Paul Way. Reservations are required, please phone 250-828-3492.

For more information contact GMFC Coordinator Ken Dewerson 250-707-0618, e-mail dewerson@bc.sympatico.ca, or Thompson Valley Show Chairman, Rob Davis 250-554-8983 ❖

De Beers and BHP Agree Diamond Marketing Arrangements

De Beers is pleased to announce that it has reached agreement in principle with BHP to purchase 35% of the run-of-mine production from the Ekati Mine in the Northwest Territories of Canada.

The agreement will come into effect after the negotiation and execution of a definitive contract document and the agreement of a sample, against which the purchase will be evaluated. It is anticipated that this process will be completed by the middle of 1999. The agreement will have a three-year term.

De Beers believes that its expertise, financial strength and distribution processes give it a unique capacity to handle the sale to the market of significant volumes of diamonds, and it is delighted that BHP and its Joint Venture partners have agreed to sell this proportion of the Ekati production to De Beers. ❖

erty. To date precious opal (opal with a play of colour) has been found in all of the various base colours except the grey-black types.

To date no "precious black opal" has been found on the Klinker Property.

For more information about "Okanagan Opal" and the Klinker Opal Property, visit our website at www.opalscanada.com. While you are there, check out the "Fee Digging" section and look over our developing line of opal jewellery.

Copyright ©1998 Bob Yorke-Hardy
E-mail: okopal@junction.net ❖

The Search for Shooting Stars: Hunting for Meteorites on the Antarctic Plateau

by Rick Hudson

reproduced from the Summer 1998 issue of *The Canadian ROCKHOUND*

"Meteorites are samples from parts of the Solar System astronauts may never be able to visit, or that would cost a great deal to explore. They have been dubbed 'the poor man's space probe'."

-- 'Meteorites' by Robert Hutchison and Andrew Graham, Sterling Publishing, NY.

The wind is gusting at 40 knots from the north-west, the air temperature is a bracing -20 centigrade, the sky is clear and sunny. In a land devoid of shape, or form, or colour, there is nothing to see in any direction. Antarctica is truly the last place on Earth: remote, aloof, yielding its secrets only after the most back-breaking effort.

Yet today this great continent is witnessing a remarkable race, ever since a Japanese scientist picked up 9 rocks from the ice's surface near the Yamato Mountains in 1969. Months later, startled re-

searchers realized what he had found – a collection of rare meteorites.

In 1975, a Japanese team visited the same area again, and this time returned at the end of the summer program with a staggering 663 samples! The international race was on, to collect, classify and store these important finds. The USA quickly formed the Antarctic Search for Meteorites group (ANSMET). During the following 20 years, over 17,000 meteorites have been found, tripling the known number available to science.

The Source

What's happening here? To understand the process, we need to go back in time, a long way back. Asteroids are the building blocks of our early solar system, orbiting the sun between Mars and Jupiter. A fragment, or meteoroid, occasionally escapes the asteroid belt, and wanders into an Earth orbit. Some time later, these fragments of space flotsam enter our atmosphere as meteorites or "shooting stars". If observed and measured upon entry, they are called falls; if discovered later, they are finds. Most are finds. After a particularly famous fireball was photographed (by accident) in 1959, both Canada and the USA established a Camera Network to scan the skies and record trajectories. Only when a meteorite's trajectory is precisely known can its origin be calculated. To date, each country has successfully photographed only a single meteorite. In both cases, the source was found to be the asteroid belt.

The largest meteorite found to date is the 65 ton Hoba meteorite in Namibia, south-west Africa (which may have been as large as 120 tons before weathering), but many are tiny by comparison. Small or large, together they form a rain of dust which results in an amazing 10,000-30,000 tons of debris raining down on us every year. (Time to wear a hard hat, when leaving the house!) While most fall into the ocean (the oceans cover 72% of the Earth), others come down on mountains, deserts and forests, where the chances of recovery are slim indeed. The Canadian Camera Network estimates over 26,000 fragments over 100 grams (about 3.5 oz) arrive each year. Since the late 1970s, specially equipped NASA aircraft have been flying at over 60,000 feet, where sticky panels on the wings trap micrometeorites and other space dust for subsequent analysis.

Why Antarctica?

Why, then, are so many meteorites being found in Antarctica? No more are falling there than else-

where. In fact, quite the opposite. Most meteors, comets and asteroids orbit in the same plane as the planets, and rotate about the sun in the same direction as the planets. As a result, they tend to converge with the Earth, rather than slamming head-first into us on diametrically opposing paths. Further, the focussing effect of the Earth's gravitational field tends to draw more meteorites in towards the equatorial regions, with the result that there is a slight preference for falls to occur away from the polar regions.

But Antarctica is unique because it is encased in glacial ice. This frozen cover moves steadily outwards toward the coast, carrying with it anything that has been deposited on it. Remember, of course, that meteorites, being more dense than ice, will slowly sink into the glaciers. But as these rivers of ice approach the coast mountains, they start to be thrust upwards by the underlying slopes. The ice begins to sublimate (change from a solid to a gas state, without going through a liquid phase), aided by fierce katabatic winds that roll down off the high ground (over 2000m on the polar plateau). This process scours the ice away at a rate of about 5cm per year, and slowly, gently, the meteorites are exposed. These zones are known as 'stranding surfaces'.

Such a process serves to concentrate the deposits. By plotting the positions of the meteorites when found, and determining the age of the associated ice, scientists can calculate how long a stone has been buried, and hence when it entered our atmosphere.

A further plus to this deep-freeze process is that the meteorites are kept, quite literally, in cold storage, so they are often in excellent condition when found, with almost no corrosion, oxidation or physical damage done to them after their arrival. The same cannot be said, obviously, for material coming down in deserts or jungles.

The Search

How do scientists find them? Each year, small, mobile groups are dropped off in areas which have been determined to be good sites. Remember, they are looking for zones where there is bare ice, just upstream of mountains or nunataks, which force the sea-bound glaciers to rise and dissolve. The team usually searches in a grid pattern, on snowmobiles, often just 25 metres apart. Every rock on the surface must be examined, and a trained eye quickly tells whether the object is a shooting star or of local origin.

When a meteor is found, its exact position is

noted using a Global Positioning System (satellite positioning). It is photographed, and placed in a specially decontaminated bag, for analysis later. Because of this low pollution process, some important discoveries have been made. In 1980 the ANSMET team returned from the Elephant Moraine area near McMurdo Base with what turned out to be a very exciting sample. EETA79001 was an achondrite (stony meteorite) with abundant melted rock on its exterior. Inside, chemists later discovered traces of noble gases that were identical to those measured by the Viking Lander in the Martian atmosphere.

Another meteorite, found in a crevassed glacier field while scientists were taking a break from meteorite hunting, turned out some years later when it was thawed (all samples are kept frozen back at the Johnson Space Center in Houston, TX) to contain feldspar glass and oxygen isotopes which confirmed its Martian origin. More importantly, there appeared to be extremely tiny structures resembling bacteria. Who knows? The debate will continue for years, but there are exciting possibilities ahead.

How many meteorites are found these days? Typically, a group can work in the field for about 7 weeks during the so-called 'summer' (Dec/Jan). Bad weather (high winds or low cloud) will take up as much as 10 days of that precious time. A team tries to cover about 150 square kilometers per season. A typical season yields 100-200 finds; the best single day was close to 40.

Studying Them

The study of meteorites is called meteoritics, and there are three broad types: stony, stony-iron, and iron. The former are the most common, and are divided into chondrites and achondrites. While meteorites heat up tremendously as they enter the Earth's atmosphere, their cores remain supercooled to near absolute zero, so only a narrow 1-2 mm surface usually melts, often forming a fusion crust of black glass. Other common features are the surface dimples, pits and flow features.

By studying these specimens, that have been 'on ice' both in space and the Antarctic plateau, we are able to see back in time to view primitive matter from early solar nebulae, or from a pre-planetary era, or more recently from our own solar system. To find meteorites, therefore, is to travel back in Einsteinian time to our very distant past and in so doing, gain a glimpse, however fuzzy, of our future.

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British Columbia Fossil Bed Locations

By John Ratcliffe
Kamloops, British Columbia

reproduced from the Fall 1997 issue
of *The Canadian ROCKHOUND*

Detailed maps are available for all locals. For more information, or to obtain a map, please contact John at ratcliff@mail.ocis.net.

Ashcroft area
Fossils: Ammonite, belemnites, clams, conodonts, microflora, ferns, pollen and brachiopods, to mention a few.

Chetwynd area
Period: Quaternary
Fossils: Leaf impressions

Cranbrook area
Period: Early Cambrian
Fossils: Trilobites (*Olenellus* and *Wanneria*)

Denman & Hornby Island
Period: Late Cretaceous
Fossils: Ammonites and clam shells

Fairmont Hot Springs area
Fossils: Brachiopods, ammonites, corals and foraminifera

Harrison Lake (West side)
Period: Cretaceous
Fossils: Ammonites

Hat Creek area
Fossils: Amber (light, golden)

Horsefly River area
Period: Eocene
Fossils: Fish fossils and leaf impressions

Little Forte area
Fossils: Leaf and fern

McAbee area
Period: Eocene
Fossils: Ginkgo leaves, seed pods, insects and fish

Muir Creek area
Period: Tertiary
Fossils: Clamshells and gastropods

Okanagan Falls area
Fossils: Leaf and evergreen

Paul Lake area
Fossils: Crinoids

Princeton
Period: Eocene
Fossils: Leaf impressions, pine needles, pine seeds and root casts

Princeton (Merritt Hwy.)
Period: Eocene. Fossils: Leaf impressions, pine cone imprints and pine needles

Princeton (Whipsaw Creek)
Period: Eocene
Fossils: Leaf impressions and insect imprints

Quesnel
Fossils: Fish and leaf fossils

Taylor area
Period: Cretaceous
Fossils: Ammonites and other marine fossils

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Andalusite

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GMFC Internet Directory

Member Clubs with Home Pages on the Internet

This page contains an updated list of member clubs within the Gem and Mineral Federation of Canada that have a home page on the internet. All clubs shown here are listed on the *Canadian Directory of Rock & Mineral Associations* website. The internet URL address for a club's home page appears below the club name. Provincial federations and associations are listed here as well. Most home pages have an internet e-mail address listed so you can contact the club directly by e-mail.

NATIONAL

Gem & Mineral Federation of Canada
<http://pangea.usask.ca/~dfs846/rmac/gmfc.html>

BRITISH COLUMBIA

Lapidary Rock & Mineral Society of B.C.
http://pangea.usask.ca/~dfs846/rmac/bc_lrmsbc.html

Abbotsford Rock & Gem Club
http://pangea.usask.ca/~dfs846/rmac/bc_abrgc.html

Alberni Valley Rock & Gem Club
http://pangea.usask.ca/~dfs846/rmac/bc_avrgc.html

B.C. Faceters Guild
http://pangea.usask.ca/~dfs846/rmac/bc_bcfg.html

Burnaby Laphounds Club
http://pangea.usask.ca/~dfs846/rmac/bc_burnaby.html

Creative Jewellers Guild of British Columbia
http://pangea.usask.ca/~dfs846/rmac/bc_cjgbc.html

Delta Rockhound Gem & Mineral Club
http://pangea.usask.ca/~dfs846/rmac/bc_delta.html

Dunbar Lapidary Club
http://pangea.usask.ca/~dfs846/rmac/bc_dunbar.html

Fraser Valley Rock & Gem Club
http://pangea.usask.ca/~dfs846/rmac/bc_fvrgc.html

Hastings Centre Rockhounds
http://pangea.usask.ca/~dfs846/rmac/bc_hastings.html

Kokanee Rock Club
http://pangea.usask.ca/~dfs846/rmac/bc_krc.html

Maple Ridge Lapidary Club
http://pangea.usask.ca/~dfs846/rmac/bc_mrlc.html

Penticton Geology & Lapidary Club
<http://vvalley.net/organizations/arts/artsCouncil/geology.html>

Port Moody Rock & Gem Club
http://pangea.usask.ca/~dfs846/rmac/bc_pmrgc.html

Richmond Gem & Mineral Club
http://pangea.usask.ca/~dfs846/rmac/bc_rgmc.html

Ripple Rock Gem & Mineral Club
http://pangea.usask.ca/~dfs846/rmac/bc_rrgmc.html

Surrey Rockhound Gem & Mineral Club
http://pangea.usask.ca/~dfs846/rmac/bc_srgmc.html

Victoria Lapidary & Mineral Society
http://pangea.usask.ca/~dfs846/rmac/bc_vlms.html

ALBERTA

Alberta Federation of Rock Clubs
http://pangea.usask.ca/~dfs846/rmac/ab_afrc.html

Barrhead Gem Seekers
http://pangea.usask.ca/~dfs846/rmac/ab_bgs.html

Calgary Faceter's Guild
http://pangea.usask.ca/~dfs846/rmac/ab_cfg.html

Calgary Rock & Lapidary Club
<http://www.cadvision.com/mnichols/crlc.htm>

Edmonton Tumblewood Lapidary Club
<http://www.geocities.com/Colosseum/Track/6574/>

Medicine Hat Rock & Lapidary Club
http://pangea.usask.ca/~dfs846/rmac/ab_mhrlc.html

Southern Alberta Rockhound Association
http://pangea.usask.ca/~dfs846/rmac/ab_sara.html

SASKATCHEWAN

Saskatchewan Association of Rockhounds
http://pangea.usask.ca/~dfs846/rmac/sk_sar.html

Mid-Pro Rock & Gem Society (Prince Albert)
http://pangea.usask.ca/~dfs846/rmac/sk_mprgs.html

Prairie Rock & Gem Society (Regina)
http://pangea.usask.ca/~dfs846/rmac/sk_prgs.html

Saskatoon Lapidary & Mineral Club
http://pangea.usask.ca/~dfs846/rmac/sk_slmc.html

MANITOBA

Mineral Society of Manitoba
http://pangea.usask.ca/~dfs846/rmac/mb_msmb.html

Winnipeg Rock & Mineral Club
http://pangea.usask.ca/~dfs846/rmac/mb_wrmc.html

Rock of Ages Lapidary Club
http://pangea.usask.ca/~dfs846/rmac/mb_roac.html

NOVA SCOTIA

Mineral & Gem Society of Nova Scotia
http://pangea.usask.ca/~dfs846/rmac/ns_mgsns.html

To see other home pages, please visit the
Canadian Directory of Rock & Mineral Associations website at:
<http://pangea.usask.ca/~dfs846/rmac/>



Topaz

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