

"DIGGIN'S FROM DAKOTA"



MONTHLY PUBLICATION OF THE "CENTRAL DAKOTA GEM & MINERAL SOCIETY"
P.O. BOX 2445, BISMARCK, ND 58502 - 2445
SERVING: BISMARCK, MANDAN, AND SURROUNDING AREAS IN NORTH DAKOTA

DIGGINS FROM DAKOTA
Jim Ellis Editor
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RMFMS - 1st Place, Small Bulletins, 1988
RMFMS - 3rd Place, Small Bulletins, 1997, New Editor
RMFMS - 2nd Place, Small Bulletins, 1992
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In Association With:

Rocky Mountain Federation of Mineralogical Societies
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Organized: March, 1966

OBJECTIVES

1. To further the study of mineralogy and geology.
2. To arrange field trips to collect minerals, gems, and fossils.
3. To assist its members to improve in the art of cutting, polishing, and mounting gem materials;
4. To provide opportunities for the exchange, purchase, and exhibition of specimens and materials;
5. To share knowledge about gems, minerals, and activities of the Society with the general public.

— Article II, CDGMS Constitution

MEETINGS: First Sunday of each month at the Masonic Center, 1810 Schafer St., Bismarck, ND

EARLY CLASS: One - half hour before each meeting.

ANNUAL DUES: Junior Member - \$6.00, Single Membership - \$10.00, Family Membership - \$12.00

MEETING TIMES: 2:00 PM — From November thru March & 7:00 PM — From April thru October

COMMITTEE PERSONS

PROGRAM: Neill Burnett #223-6758

Jim Nevland #221 - 2419

HOSPITALITY Carol Hickle #794 - 3342

and LUNCH: Emma Brady #663 - 3903

HOSPITAL/CARDS: Gen Buresh #663 - 5397

FIELD TRIPS: Steve & Darlene Newstrom #255 - 4675

EDITOR: Jim Ellis #794-3192

ANNUAL SHOW: (1999) Rodney Hickle #794 - 3342

EARLY CLASS: Harold Brady #663 - 3903

GREETER: Any Volunteers?

Parliamentarian: Gen Buresh #663 - 5397

STAMP CHAIR: Doris Hickle #794 - 3173

LIBRARIAN: Agnes Berg #442 - 5620

PUBLICITY: Any Volunteers?

HISTORIAN: Betty Mautz #337- 5775

DOOR COUNT: Any Volunteers?

VISITORS AND GUESTS ARE ALWAYS WELCOME !

RMFMS State Director for North Dakota: Ray Oliger, 516 N. 20th St., Bismarck, ND #701 - 223 - 4986

All members are encouraged to submit articles/news items for publication. Material for the Newsletter should reach the Editor by the 10th of each month. Advertisements are encouraged for the Newsletter. (\$2.00 for 1/8 of a page per month or \$20.00 per year) Permission is granted to reprint non-copyrighted articles if proper credit is given. The "Diggins From Dakota" Newsletter is published monthly.

CENTRAL DAKOTA GEM & MINERAL SOCIETY'S 25th ANNUAL

GEM & MINERAL SHOW

COMMUNITY CENTER — MANDAN, ND

SEPTEMBER 25 & 26, 1999

Chairman: Rodney Hickle, HC2, Box 191, Center, ND 58530

Phone: 701 - 794 - 3342



PRESIDENT'S MESSAGE

We had a very good attendance at our regular meeting on Sunday, 6 June 1999. We had 23 Adults and one Junior present.

The early class at 6:30 was presented by Mel Berg. He and Agnes had just completed a tour of the southwestern United States, bringing back an excellent collection of rocks that they had picked up during their trip. Mel showed us his rocks, and discussed their origin with us.

The regular class was an interesting discussion of the Heart River presented by Dave Jensen.

Dave presented a beautiful slide show of scenes from the surrounding area, showed us a collection of publications and books on the geology and history of the Heart River drainage and a complete topographic map of the Heart River. One framed map Dave showed us was a Railroad Map from 1909. Anyone want to take a guess on how many Railroad Companies were operating in North Dakota in 1909!!!!

I would like to take the rest of this message to discuss our schedule for the next few months.

- 11 July 1999 - This date is one week later than our regular meeting date because of the 4th of July weekend. So take note. Early class by Harold Brady. The program will be a video presented by Ray Oliger, called "The Zeitner Collection", by June Culp Zeitner, from South Dakota. This should be a very interesting meeting, and I encourage everyone to attend.
- 1 August 1999 - This is our annual PICNIC. It will be held at Sibley Park. Our reservation is for all day. Everyone should bring Pot Luck. We will plan to eat at 1:30 PM. It is also SWAP DAY, so bring whatever you have that you would like to swap, and let's have some finagling.
- 5 September 1999 - Our program will consist of two parts. First we will discuss the upcoming Gem Show at the Mandan Community Center (see below). Second, we will have a presentation by Mr. Bill Yokum, who will talk about Flint Napping. This should be interesting. I would be willing to bet that not many of you understand the art of chipping and napping flint and obsidian.
- 25 - 26 September 1999 - Our annual Gem And Mineral Show. Rodney Hickie, our Show Chairman will need all the help he can get, so let us all get with it and help out. We need enthusiasm, talking it up and lots of volunteers. Remember, this is our show, and we all need to pitch in and make a success of it.
- 3 October 1999 - Bring your most unusual rock, your prettiest rock, your ugliest rock or your proudest rock. We will have a contest and award prizes. You will be expected to defend your selection. This should be a fun night, so start planning on it now. This will be the last month that our meetings will start in the evening.
- 7 November 1999 - Meetings start at 1:30 - Early Class and 2:00 Regular Meeting. We do not have a program for this meeting, Any suggestions?
- 5 December 1999 - This will be our annual Christmas Brunch. Details will be announced later.

Yours in Rocks,
Your President,
Neill C Burnett

Central Dakota Gem & Mineral Society
Minutes from June 6, 1999

The meeting was called to order by President Neill Burnett and the Pledge of Allegiance was recited. The next meeting will be on Sunday, July 11, 1999 at the Masonic Center in Bismarck. Early class at 6:30, meeting at 7:00 PM. Our annual picnic will be on Sunday August 1, 1999 at shelter number 2 at Sibly Park on South Washington. Plan on a 1:30 lunch with the meeting after lunch. Our Sept meeting will be on the 5th, with the show on the 25th and 26th. In October we will have a most unusual rock and a prettiest rock contest.

Melvin and Agnes Berg presented an early class show and tell on all the rocks they picked up during their recent trip.

The minutes of the last meeting were read and approved. The Treasurer reported a beginning balance of 189.92 and ending balance of 283.92.

Committees:

Publicity: Matthew Bovkoon has volunteered to do publicity work as pertaining to a membership drive. He suggests that we put together a little pamphlet that explains all about the CDG&MS, along with the membership forms we already have, to pass out to people.

Hospitality: Servers for July are Agnes Berg and Carol Hickie. Aug. is the annual picnic but servers are needed for Sept., Oct. and Nov.

The Rapid City show presented by the Western Dakota Gem and Mineral Society is coming up soon. It will be on July 17 & 18 at the Rapid City Civic Center.

There were 23 Adults and 1 Junior member present.

The Meeting was adjourned and an excellent program on collecting on the Heart River was presented by Dave Jensen.

WORDS OF WISDOM

To be prepared for war is one of the most
effectual means of preserving peace.

George Washington

Speak softly and carry a big stick: you will go far.

Theodore Roosevelt



JUNE BIRTHDAYS

4-Henry Hanssen
4-Clarence Atwood
20-Emma Brady
20-Tracy West
21-John Atwood
22-Elizabeth Atwood
27-Darlene Newstrom

WEDDING ANNIVERSARIES

18-Duane & Ledores Robey

Watch what you ask for.

"In the middle of a forest, there was a hunter who was suddenly confronted with a huge, mean bear. In all his fears, his attempt to shoot the bear was unsuccessful. He turned away and started to run as fast as he could. Finally, he ended up at the edge of a very steep cliff. His hopes were dim. But, he got on his knees, opened his arms and said, "My God! Please give this bear some religion! "

Then, there was a lightning in the air and the bear stopped just a few feet short of the hunter. The bear was puzzled and looked up in the air and said, "My God! Thank you for the food I am about to receive... "

Source:

e-mail from Jobeth, the Pastor's wife. Author unknown.

VIA ROCKY TALES 3-99



POMPEII — OUT OF THE PAST

1,901 years ago (1,919 for today's year of 1998) the city of Pompeii was utterly overwhelmed by an eruption of Vesuvius in A.D. 79. Present day travelers visit the site of this city, which has been excavated and is very interesting.

Pompeii was built almost entirely of rock, different kinds and different colors for bakery ovens, kitchen fire areas, hot sauna and bath rooms, walls, fountains, railings, etc.

The people of Pompeii had running water, and their streets were quite impressive. There were some one-way streets, others for two-way traffic that were 15 feet wide, and all were paved with rock. The streets were laid out to drain the city after rains, and had rock sidewalks from 6 inches to 15 inches high. Then, from one curb to another there would be flat-topped stepping stones so the pedestrian did not have to step down on the street level. The stepping stones were placed so the horses and the chariot wheels cleared the stones. Also, some white rocks were strategically embedded among the street paving stones, and they would pick up any light reflection from moon, stars, window, torches, etc. This enabled the night traveler to see the streets and intersections.

(From *Nodule Nocker* via *Rocky Tales* 5/92 via *THE BURRO EXPRESS* 5/92) via T-Town rockhound 2-99



More About Water and Minerals

By Kempton H. Roll

Mountain Mineral Monthly 1 & 2/97

(2nd Place in 1997 AFMS Adult Articles Contest)

Via Breccia, Santa Clara Valley Gem and Mineral Society 1/99 VIA PICK and PACK 4/99

Water is a strange and fascinating chemical.

It could be said we're living on a misnomer; that our planet should have been named Water instead of Earth. In its liquid and solid form water comprises almost three quarters (71%) of Earth's surface. It's the main reason why our planet is such, a beautiful blue marble when seen from outer space. Down here, water is the chemical we depend on for survival, if not our very existence. We drink it. We cook much of our food in it; food which couldn't have grown without it. We wash ourselves, our clothes and our dishes with it.

We can swim in and sail on it in the summer and skate on it in the winter. It can rain on us when it's warm or make us shovel it when it's cold. When its phase changes - it turns from a liquid to a gas (steam). Here in the mountains, water boils at a slightly lower temperature because the atmospheric pressure is slightly lower. In a vacuum (no pressure), water can actually boil at room temperature!

Water Pressure

When the pressure is increased, such as in a locomotive boiler or a pressure cooker, it takes a higher temperature to make the water boil. But it will still change phase and turn into a gas. The vapor confined in the cooker causes the pressure to increase so the inside temperature can rise higher than 212 degrees F. The higher the pressure, the higher the water temperature must be in order to go through its phase change.

However, a strange thing happens to water when both the temperature and pressure are raised above a certain point, known to mechanical engineers as its critical point. At these extremes, water no longer undergoes a phase change from liquid to gas. It remains liquid! This phenomenon takes place at 705.40F and 3206.2 psi pressure (more than 218 atmospheres). Mechanical engineers call the resulting liquid medium *water substance*. It is no longer ordinary water.

Water substance

While water substance is important to the mechanical engineer, it appears that it might also have a very special meaning for the geologist and mineralogist. It may help explain why, deep in the bowels of some parts of earth where temperatures and pressures exceed the critical point, water can still be present as a liquid.

Leonard Wiener, a recently retired geologist with the North Carolina State Geological Survey, calculates that to attain critical point pressure (3206.2 psi) water alone, without heat, would have to be at a depth of about 7500 feet or nearly 1 1/2 miles below the surface. Typical rock, he notes, exerts critical point pressure at a depth of roughly 2700 feet or about a half mile. So water confined under a rocky overburden at this depth would have reached its critical point, pressure-wise. Add heat so that the temperature of this trapped water can reach at least 705.40F and its liquidity will be assured by the higher pressure. It now becomes water substance.

Returning to liquid water's ability to dissolve solids, every tea drinker knows that sugar dissolves more easily in hot tea than in cold. This is because all chemical reactions, including dissolution, are influenced

by temperature: the higher the temperature, the more rapid the rate of reaction and the more solids the liquid can hold in solution.

If water's ability to dissolve solids is enhanced at higher temperatures, then it makes chemical sense that water, or water substance to be more precise, deep down in the earth enjoys a greater capability of dissolving minerals like quartz and even metals like gold. In contrast, up on the surface that same chemical, H_2O , under normal temperature and atmospheric conditions, even when boiling, can at best dissolve only tiny traces of quartz, for example. A noble metal like gold is virtually insoluble.

Dissolving Process

Another condition that could play a role in the deep earth dissolving process is the pH factor. How acid or alkaline is this water substance? There are two answers: We have no way of knowing, and it depends on what other chemicals are present. Either way, high or low pH, more hydrothermal (water + heat) chemical reactions will tend to take place which would lead to the formation of more, often exceedingly complex chemical/mineral combinations. It's only when these aqueous solutions subsequently work their way up to the higher reaches, cool down and solidify (hopefully crystallize), that we can appreciate their complexity and enjoy what Mother Nature and Father Chemistry have created for us down below.

Magmatic Water

Surface water is essentially indestructible. It may not be in the right place at the right time, too much or too little, but it's always there, even if it's just in the form of clouds floating in the sky. On the Earth's surface and at temperatures higher than 211F, water simply turns to vapor and escapes into the atmosphere. It does this even at lower temperatures in the form of humidity. Too low and it returns to its original liquid state, i.e., fog and clouds, or, if the air is really saturated, rain. Drop the temperature still further, and it changes phase again and it becomes solid, falling as snow or hail.

With all of these forms of water so readily

accessible on the land, in the sky, and in the rivers and oceans, if the Earth is essentially solid, how does any of this water get down to those depths where hydrothermal mineral formation can take place?

It doesn't.

Deeeeeeep Water

Some surface waters will work their way deep within seemingly impervious rock formations. Most mines, even the deepest, usually encounter water; however, such waters cannot possibly reach critical point conditions. Certainly the temperature would be much too low. Instead, water substance is literally liberated or created by chemical reaction down in the mantle itself where high temperature/high pressure reactions are constantly taking place.

Bill Miller notes that such water molecules can come from OH groups or H_2O in minerals (mica, amphiboles, etc.). Then, he adds, there is juvenile or magmatic water, original water - formed deep within the earth which has a different isotopic signature than meteorological water. Some of it also originates as hydrogen and oxygen gases released through chemical reactions which can recombine to form water and heat energy. While most volcanoes - the safety valves for these sub-surface chemical reactions - spew an assortment of subterranean gases and solids out into the atmosphere, the most voluminous gas is almost always water vapor in the form of steam. This is magmatic water. It may end up as rain and drinking water but it did not start out that way.

If not ejected violently, magmatic water formed at the extremes of pressures and temperatures encountered deep in the earth's reaction chambers will remain in the liquid state. Not as ordinary water; however, it is water substance and as such becomes a super solvent - that seems capable of dissolving a far more impressive array of chemical elements and compounds (minerals) than its surface counterpart.

The great pressure encountered at these depths, can force a saturated liquid substance to work its way upward, taking the nearest path of least resistance, percolating through fissures and cracks in matrix rock dislocations created by plate

EMERALDS IN CANADA

Vancouver, Dec. 2, 1998: Dr. Harlan Meade is pleased to give additional details of Expatriate's discovery of emeralds first reported on Oct. 13, 1998. While exploring a base metal soil geochemical anomaly on one of its Yukon properties, Expatriate's field staff discovered an exciting occurrence of emeralds. Approximately one kilogram of emeralds was collected from float and outcrop during a two-hour examination within a 30 by 100 m area. No attempt was made to systematically evaluate the emerald discovery and surrounding area because the field crew was uncertain

about the significance of the discovery, and later follow-up was precluded by snow cover.

J. H. Montgomery, Ph.D., P.Eng., of Montgomery Consultants, Limited, has been retained by Expatriate to examine the emeralds and geological data supplied by Expatriate, to evaluate the significance of the discovery, and to determine if follow-up work is warranted. Dr. Montgomery has experience with emerald deposits in Colombia and elsewhere, both in evaluation of the deposits and appraisal of individual stones. He is a member of the Advisory Board for the Canadian Institute of Gemology.

In a preliminary report dated Oct. 20, 1998, Dr. Montgomery notes that the geological setting of Expatriate's emerald deposit closely resembles the setting of deposits in one of the world's major emerald producing areas, [*]. He also goes on to state that,

"Many of the emeralds at [Expatriate's property (1)] are corroded, translucent, and fractured, but some near gem-quality stones are present. It is suspected that intense chemical and physical weathering may be responsible for some of the flaws..." "Although only preliminary work has been done on the [Expatriate (1)] emerald deposit, it appears that gemstones of sufficient quality and size are present. I have no hesitation in recommending further work to determine the extent of the deposit and the value of the emeralds..."

References to specific geological settings, property names, and the locations have been removed to provide Expatriate with an exploration advantage and to protect its discovery.

"In order to make a preliminary determination of the yield of gem-quality material, fairly large samples will be required. Emeralds may be recovered by hand-cobbing up to a point. If very large samples are recovered, processing on a larger scale will be required: crushing, washing, screening, and picking off a belt."

Dr. Montgomery points out that emeralds are one of the more valuable gemstones, with good crystals selling for thousands of dollars per carat, and they are often found as clusters in open cavities, some of which have yielded millions of dollars from a single pocket.

Expatriate plans to evaluate the emerald deposit as one of its main priorities for 1999. The program will start as soon as snow conditions permit, and will include small-scale test mining coupled with systematic exploration of the surrounding area.

Expatriate is a VSE-listed junior natural resource company with extensive and varied mineral interests in Canada, mostly in the Yukon Territory. Expatriate is also engaged in international mineral exploration through its wholly-owned subsidiary Latina Resources, Ltd., and owns proprietary metal leaching and sulfuric acid technology through its wholly-owned subsidiary Nitrosyl Technologies Corporation.

(from Expatriate Resources Ltd.,
via The Mineral Mite 12/98,
Pegmatite 2/99.) *Via The Rock Vein*

WATER

tectonics. Or it can collect in vugs left by gas pockets.

At some point, when conditions have changed from high temperature/high pressure to lower pressure and temperature, especially the latter, the above process reverses itself. What went into solution now has to come out. Whenever any liquid is saturated - has dissolved as much as it can - those solids in solution will precipitate out when the temperature drops. Rock candy crystals, for instance, begin to grow when a hot, saturated sugar solution cools down.

In the case of subsurface saturated water substance, if the escape action is not associated with volcanic activity, but instead the liquid remains trapped beneath rock overburden, as it nears the cooler upper regions, it will begin to freeze and allow the chemicals in solution to precipitate as solids. Now they turn into minerals for the Rockhound and ore bodies for the miner. Minerals held in solution may ultimately precipitate out as vein deposits or interstitial deposits. And, sometimes, if the rate of cooling is just right and if there is room, they form into large, single crystals or beautiful clusters of multifaceted crystals. And if we Rockhounds are lucky, we may someday find some of them.

While the chemical known as water plays a vital part in our lives, in the form of water substance, it may be even more important because of its ability to create so many of the minerals and crystals we enjoy collecting. It is a most powerful substance; yet, strangely, one which we mortals destined to live out our lives up here on Earth's surface will never see or feel or taste, even though we drink tame versions of it every day - long after Mother Nature has finished with it down below.