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# THE BADGER DIGGIN'S

The Badger Lapidary and Geological Society, Inc.  
Monroe, Wisconsin

Devoted to the Earth Sciences

Vol. 44, No. 10

December 2009

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## The Silicon Tetrahedron

by Jordan Marché

Among the most common rock forming minerals of the Earth's crust, quartz has a chemical composition of one silicon atom joined with two oxygen atoms ( $\text{SiO}_2$ ), the combination of which is electrically neutral (i.e., having no net electrical charge). However, this tri-atomic structure alone is insufficient to explain the extraordinary diversity and complexity that comprise the five (or more) principal groups of silicate minerals. For that, we need to understand the nature of a slightly more complex molecular arrangement of silicon and oxygen atoms, that comprises a three-dimensional structure known as the silicon tetrahedron (and which is *not* electrically neutral).

Silicon, like the lighter atom carbon which it somewhat resembles (and occurs beneath on the Periodic Table of Elements), has four electrons in its outer shell. These four electrons can be readily shared (in bonds) with other atoms and serve to give the remaining silicon atom (or ion) a net charge of +4. An oxygen atom, in turn, has six electrons in its outer shell (out of a possible total of eight). As such, it would like to 'acquire' two additional electrons and complete its outer shell, thus giving the new atom (or ion) a net charge of -2. When one silicon atom bonds with two oxygen atoms, the exchange of electrons negates their electrical charges (+4 vs. -4) and the result (as stated above) is the neutral quartz molecule ( $\text{SiO}_2$ ). But again, this does not explain how larger and more complex structures, composed of quartz, occur in nature. For that, we need to understand how the larger silicon tetrahedron, with a net electrical charge of -4, is constructed, and which enables bonding with other units like itself, to build the various silicate mineral groups.

[To be continued]

## Meeting/Holiday Party

Our annual holiday party will be held at 6 p.m. on Saturday, December 12, at the American Legion Post #84, located at 1627 12<sup>th</sup> Avenue, Monroe, WI. Dinner will be served at 6:30 p.m.

Nominally, dinners are \$14 per adult and \$10 for children (ages 10 and under). But as in previous years, the Club has agreed to subsidize half of the adults', and all of the childrens' meal costs (thus reducing your out-of-pocket expenses to \$7 per adults).

If you have not already done so, please let Daisy Peterson know how many in your family will attend, so that we may submit a count. Phone: 608-328-1523 or e-mail: [daisyjovilu@gmail.com](mailto:daisyjovilu@gmail.com).

We will again be playing the **Gold Brick Game**. Everyone should bring two inexpensive wrapped gifts that are VERY WELL cushioned.

We look forward to seeing you there for a night of great food and fun.

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**Tentative Calendar of Club Events – 2009**

**Dec. 12 Christmas Party; officer elections**

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**Dues are due!**

Now is the time to renew your BLGS dues for the coming calendar year. Costs are \$10 for individuals and \$15 for families. If you have not done so already, please pay your dues (cash or check – made out to BLGS) to Treasurer Daisy Petersen at the Christmas party.

**Annual Elections**

Per the Club’s bylaws, we will have our annual officer elections at the Christmas meeting. At press time, the slate of officers is as follows: Pres.: Dan Trocke; V-Pres.: Mary Westby; Sec.: Laurie Trocke; Treas: TBA. Elected officers may not serve for more than two consecutive calendar years.

**MWF Club Events**

**Dec. 12-13: Sheboygan Falls, WI.** Glacial Drifters Geologic Society’s 5<sup>th</sup> Annual Show, Sheboygan Falls Municipal Building, 14240 Washington Ave., Sat. 10-5, Sun. 10-4. Contact: Kevin Ponzio, (920) 980-6413.

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**The Madison Gem and Mineral Show – A Review**

By Ted Tinker

Sponsored by the Madison Gem and Mineral Club, it was worth going to see, just for the variety of museum-quality items, including a display on fluorescence. It did not matter if your interest lay more with fossils, gems and minerals, or just plain rockhounding; they offered something for everyone. I was surprised at how many booths were displayed by people living within a short drive of Madison. Not all have their own shop. Some work out of their home or garage. After recently spending a substantial amount on some very nice agate samples from a supplier located north of Milwaukee, I had pretty much talked myself out of attending. I just figured it would be better for my budget to avoid this one. Unfortunately it drew me in like an ice cream truck’s music, and as it turned out it was well worth the trip. There was something for any price range and I was able to pick up some nice mineral samples in the \$2 to \$6 price range, as well as a good deal on bulk agates. Everyone I talked to was very friendly and informative, and I left a little more knowledgeable. I also left with my wallet a little lighter and my truck a little heavier. Alas, this is the price of being a collector!

## Meeting Minutes (November)

The meeting was called to order on November 14<sup>th</sup> at the Monroe Public Library. We welcomed new members Chris Konetski, Linda Neill, and Ted Tinker.

Our program for the month was held after the business meeting at the Freeport (Northern Illinois Rock Club) show, where Jordan Marché gave a talk on the Ice Age impact theory.

A wedding card was passed around for everyone to sign and that will be sent to Dave Zimmerman and Jane Lagacé. They were married in Quebec on October 25<sup>th</sup>.

The minutes from the September meeting were accepted as printed in *The Badger Digger's*. There was no business meeting held at the October Lapidary Party.

The first door prize drawing was held. The recipient is to give a five-minute talk at the next meeting or else submit an article to the newsletter. Marv Hanner won an ammonite fossil.

*Old Business* – Dan asked again if anyone was interested in working on the club web site. One of our new members, Ted Tinker, volunteered to pursue this with input from Dan and Teri.

It was also decided that we would print book-markers instead of business cards. Dennis and Mary Westby offered to work on the design for the bookmarkers. Teri was to e-mail them a digital copy of the Badger club log; they will put Dan's contact information onto the copies.

The second door prize was won by Chris Konetski. It was a piece of blue chalcedony from Malowi. Chris should give a five-minute talk at a future meeting or else submit an article to the newsletter.

*New Business* –

1. The election of officers will be held at the December meeting. Dan explained the nominating process. Because of the two-successive-year term limit for elected

officers, the Club is currently looking for anyone interested in the offices of vice president and treasurer. Mary Westby volunteered to serve in the vice president's position. Thank you, Mary! Next, Daisy summarized her responsibilities as treasurer: handling membership dues, reserving the meeting room, tracking all banking and sales at the show, and purchasing & bringing door prizes to the monthly meetings. If anyone is interested in serving as treasurer, please let Dan know before the December meeting.

2. Dan received a letter forwarded by Donna Wilde pertaining to the Monroe High School (BLGS) scholarship. The problem with offering the scholarship is that it has been difficult to ensure that the recipient is going to school with a major in the sciences. Teri moved that we forgo the scholarship on a permanent basis and use the funds to build a junior program. Marv seconded the motion and it passed unanimously.
3. Dan has assembled lists of potential trips and meeting activities for the next year. He will need to schedule an officer's meeting in January to forge an outline for the year's activities. Please contact Dan with any further suggestions or requests.
4. Dan announced that he has made up a mineral sample kit (102 bagged specimens) for a home-school circle in Beloit. Anyone interested in working on or donating specimens for this sort of thing should contact Dan. Teri mentioned that the club already has four or five boxed mineral sample kits to loan out to schools and groups, but was not sure of their current location.
5. It was suggested that we hold mini-auctions at the meetings as a way of distributing club-owned material donated by Bud Higgins or Dave Zimmerman. The purposes are to generate funds for the club, give members an exclusive opportunity to purchase these materials, and encourage members to attend monthly meetings. Jack made a motion,

which was approved, to have a mini-auction at the January meeting. This will be a silent auction set up on the What's Rockin' Table, with approximately 15 specimens coming mostly from the Bud Higgins collection.

6. There will be a larger auction of club material at Dan and Laurie Trocke's farm on January 23<sup>rd</sup>, starting at 11:00 a.m. This will be open to all Badger club members. The auction will be held in the barn, which will be heated; hot drinks will be served. Please contact Dan for details, directions, etc.
7. Marv exhibited a specimen from Dave Zimmerman's Canadian calcite pocket. There will be an auction on these in the future.

*Show Business* – The show dates are March 27<sup>th</sup> and 28<sup>th</sup> at the Monroe High School. The theme for this year's show is, "Colors of the Earth". The first show flyers, prepared by Teri, were handed out. Dan agreed to oversee the electrical power setup at the show and to diagram it. If anyone has any recommendations, please contact Dan or Teri.

Jordan Marché won the third door prize – a cluster of amethyst crystals from Magaliesberg, South Africa. He is to give a five-minute talk at next meeting or submit an article to the newsletter.

*Treats* – We thank Jack Hoxie for bringing snacks to the November meeting. Volunteers who signed up to bring snacks to future meetings are:

*January:* Mary Westby; *February:* Chris Konetsky.

The meeting was adjourned and some members made their way down to the Freeport show.

*Dan & Laurie Trocke*

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### **What's Rockin'**

The What's Rockin' Table had a lot of great specimens on it for the November meeting. Erich Hessner brought in meteorites from many places around the world. He had a piece from Canyon

Diablo, Arizona (the famous crater). Another was from a meteorite that fell in 1947 in Sikhote-Alin, Russia. He also had a much older meteorite from Campo del Cielo, Argentina. This one is estimated to have fallen some four to six thousand years ago! Erich also had a star drill bit from the Minnesota Mine in Michigan's Upper Peninsula and a piece of native copper with a drill scar on it from the Mass Mine, C shaft – also in Michigan's UP.

Not to be outdone, Dave Cress brought in a pair of meteorites. These two were also from Campo del Cielo in Argentina and were estimated to have fallen at the same time. The larger specimen weighed about 8 lbs. and the smaller one 0.5 lb.

Marv Hanner brought in a number of great items to share. He had watermelon tourmaline pieces; hematite, rhodochrosite and dolomite from South Africa; orange kyanite from Tanzania and tanzanite. He also brought in a piece of vesuvianite from China; some quartz with rutile inclusions; a piece of slickensided serpentine from Canada; and some calcite from Canada that he had received from Dave Zimmerman.

Teri Marché brought in some nice dolomite crystals from Mexico; a specimen of white phantom (dogtooth) calcite on rhombohedral calcite (having a black goethite coating) from Pints Quarry, Iowa. She and Jordan also displayed the large fossil cephalopod (a.k.a. "petrified snake") from the Mellum Quarry near Dodgeville, Wisconsin that they had collected during the Lapidary Party field trip.

Ted Tinker brought in a piece of cerussite from Morocco. Harold Carter brought in a wonderful example of a *Lepidodendron* root (replaced by pyrite) that he had collected at the clay pit in Utica, Illinois on July 25, 2009.

Dave Reese brought in a couple of pieces of limonite. Limonite is an iron ore that was used at the Illinois Iron Furnace during the Civil War era.

Thanks to everyone for the sharing these great pieces!

*Laurie Trocke*

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