Voice of the Dinosaur

Newsletter of the Kawartha Rock and Fossil Club

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LAST MEETING
Oct. 11, 2011

The meeting was chaired by the Vice-President Steve Wesley and began with the regular business meeting and committee reports given as applicable. A review of the Constitution and Bylaws, as required by the Constitution was discussed and it was decided that no changes were necessary.

1. Treasurer's Report - Report accepted as given.

2. Field Trips' Report
- **a. Scheduled trip to Marmora cancelled. No further trips allowed in for the remainder of this year.**
- **b. Trip to Lacy Mine confirmed for Sunday, Oct. 16. Trip leader is George Thompson.**
- **c. If a Trip Leader is not found for 2012, there will be no field trips.**

3. Show Committee
- **a. A meteorite display has been confirmed for the 2012 Show.**

4. Archives Committee - Thanks to Sue Kehoe the loose photos, newspaper articles, etc. are mounted in a binder. Members are requested to pass along any photos or mementos they might have of past shows, field trips, etc. to Bev Fox for the Archives. It is better if photos are sent as jpg files. These will be commercially printed for inclusion in the binders.

5. Other Business
- **a. Bob Beckett represented the KRFC at the AGM of the CCFMS. Business as usual. Nothing new to report.**
- **b. In appreciation for the KRFC's funding of a show case for the new Bancroft Museum, KRFC members have been granted honourary memberships in the Bancroft Gem and Mineral Club for the 2012 year. This will allow the KRFC members free entry into the Museum when it opens in June 2012.**

Feature Presentation

Our presenters for the evening were Bob Beckett and George Thompson. Bob, illustrating his talk with many photos, spoke about a collecting trip he and George Thompson took to Nova Scotia. After the presentation, George Thompson showed off some of the many beautiful mineral samples collected from the areas they visited.

A silent auction was held during the coffee break.

NEXT MEETING - Nov. 8, 2011

Place - Orientation Centre, Peterborough Zoo
Time - 7:00 pm.
Agenda - Regular business meeting.
The fossil of the evening will be ammonites and the mineral will be amphiboles.
Feature Presentation - To be announced.

THE FOSSIL CORNER

Ammonites
By Kevin Kidd

Ammonites were a group of marine invertebrates within the subclass Ammonoidea, class Cephalopoda. Current thinking has them more closely related to modern octopi, squid and cuttlefish than to living nautiloids, although they are believed to have looked similar to the latter. The name Ammonite was inspired by the shape of the shell, which resembles tightly coiled ram's horns. Pliny the Elder called the fossils "Ammonis cornua" ("Horns of Ammon") because the Egyptian god Ammon was typically depicted wearing ram's horns. Often, the genus name for an ammonite ends in –ceras, Greek for horn. Most ammonites are planispiral (coiled in one plane), but some are helically coiled and the heteromorph ammonites are simply bizarre (Figure 1).

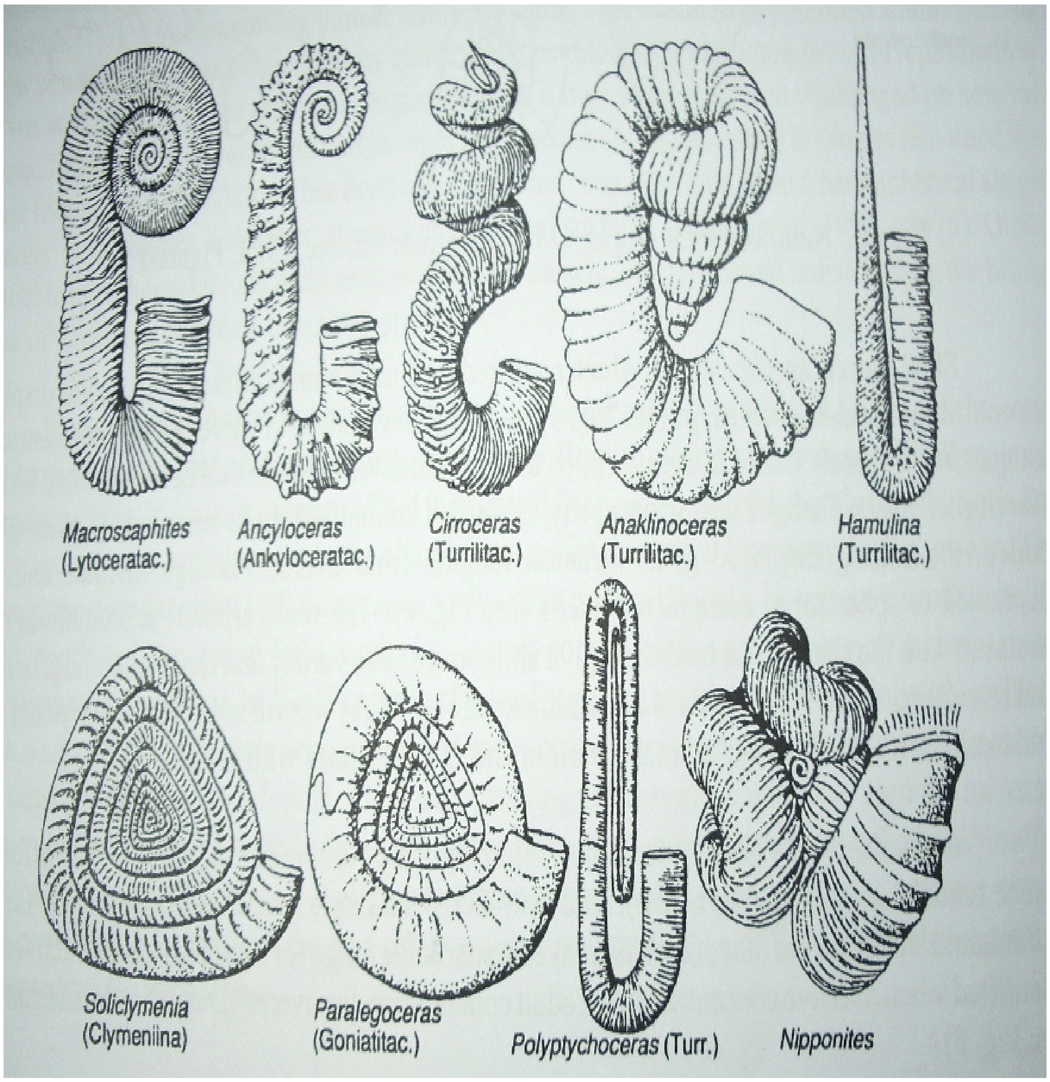


Figure 1
(First figure modified from Seilacher & Labarbera)

They originated in the Devonian from bactritoid nautiloids (straight cephalopods) and died out with the dinosaurs at the end of the Cretaceous. The smallest were virtually microscopic juveniles, and the largest known is a specimen of *Parapuzosia seppenradenensis* from the Cretaceous of Germany. It measures almost two meters in diameter, but the living chamber is incomplete. If complete, it would be closer to 2.5 meters or a bit over eight feet in diameter.

Ammonites have been a part of mythology for centuries. In medieval Europe, they were believed to be petrified, coiled snakes and called "serpent stones". They were also thought to be evidence for the actions of saints such as St. Patrick or Hilda of Whitby and as such, were believed to have healing or oracle-like powers. Ammonites from the Gandaki River in Nepal are called Saligrams, and Hindus believe these fossils are a concrete manifestation of God or Vishnu.

From the Devonian on, ammonoids were very abundant. Many genera evolved and ran their course rather quickly, geologically speaking, becoming extinct within a few million years. For these reasons,

ammonites are excellent index fossils, and it's often possible to link the rock layer they are found in to a specific geological period, in different places around the planet. See Figures 2-5 for examples.

Figure 2

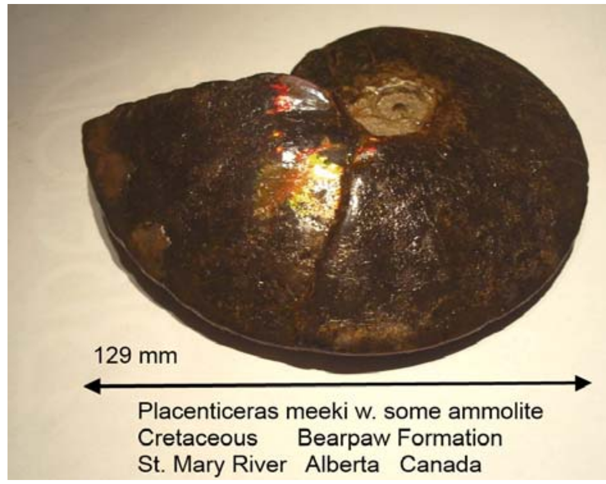


Figure 3

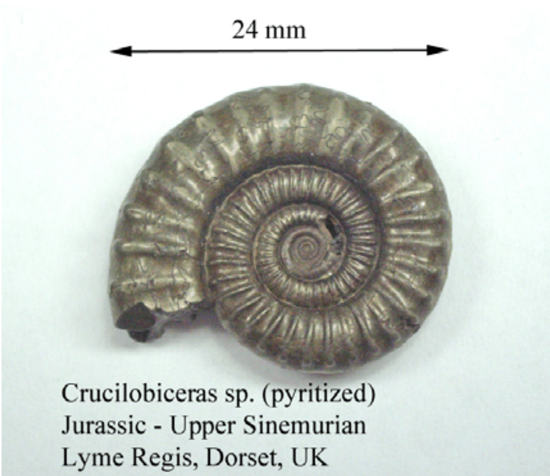


Figure 4

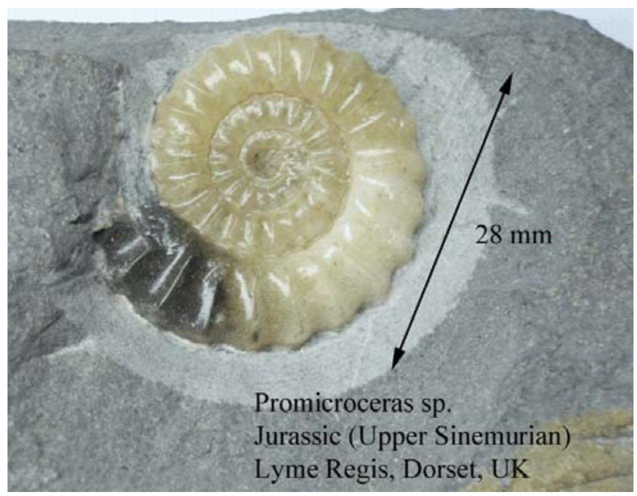


Figure 5

Ammonite fossils are probably among the most frequently altered fossils one can find for sale. Some ammonites are sliced in half and used as decorator pieces. The individual chambers are often filled with minerals or crystals and look quite nice once polished. Also, the shell material, if present at all, isn't the most attractive thing. Polishing beneath the shell, one could find iridescent material known as ammolite, and below that layer would be the sutures. In fact, the easiest way to identify an ammonite species is by the suture pattern. Each species has its own unique pattern, somewhat resembling the interlocking pieces of a puzzle. The sutures are the intersection between the walls of the individual chambers (septa) and the inside of the shell and are made up of saddles (peaks) and lobes (valleys).

There are three types of ammonoid sutures:

Goniatitic - (Figure 6, *Tornoceras arkonense* from Arkona, Ontario – Devonian)
- A mainly Paleozoic characteristic with several undivided lobes and saddles

Figure 6

Ceratitic - (Figure 7, *Ceratites sp*. from Troistedt, Germany – mid Triassic)
- The lobes have subdivided tips and the saddles are rounded and undivided. This type is mainly from the Triassic.

Figure 7

Ammonitic - (Figure 8, *Pachylytoceras hircinum* from Mistelgau, Germany – lower Jurassic)
- Both lobes and saddles are much subdivided. This type is mainly Jurassic and Cretaceous, but can be found as far back as the Permian.

Figure 8

By comparison, Nautiloid shells have only slightly curving sutures, with no lobes or saddles.

As to why Ammonites died out and Nautiloids didn't, there are several theories, but one of the most likely is their reproduction. It is believed that Ammonites, like some of their living relatives, laid a huge amount of eggs at one time, then died. These eggs and the juvenile ammonites, which have been found as fossils, were positively buoyant and were amongst the plankton floating near the surface. The meteor impact that wiped out the dinosaurs is believed to have caused a prolonged period of acid rain, which acidified the ocean surface waters and caused the whole planktonic ecosystem to collapse, including the young ammonites. The Nautiloids, as with the living Nautilus, would have laid fewer eggs, maybe a dozen or so large eggs at one time, but they would lay them season after season. These eggs would settle on the deep sea floor and would not have been affected by the impact. Unlike ammonites, once hatched, the juvenile Nautiloids had a fully functioning shell and could go anywhere they wanted within the water column.

Whatever the reason, and after surviving several near extinctions, ammonites were again on the decline near the end of the Cretaceous. The meteor impact was a blow that they couldn't recover from.

While there are no true ammonites in Ontario, we're just too old, we do have ammonoids. A few species of *Tornoceras goniatites* can be found in the Devonian exposures in the Southwest of the province. While they can get over two inches diameter, the larger ones are rare. Small examples are common and anyone should be able to find several examples without much effort.

And now, for something completely different………..

Photo credits- Fig. 1 – Apr 2011 issue M.A.P.S. digest
Fig 6 & 7 - collection of R.Furze
All others- personal collection

Ammolite
By Kevin Kidd

Not being a gem and mineral guy, this is one of only two columns I feel I could write in the non-fossil section of the newsletter.

Ammolite is one of the rarest gems around, and one of only three organic gems worldwide – do you know the other two? (Answer at the end.) It comes from the fossilized shells of ammonites and is mainly composed of the mineral aragonite. It received official gemstone status in 1981, and is one of only three gems to be introduced in the last 50 years. Untreated, ammolite is quite soft for a gemstone at only 3.5-4.5 on the Mohs scale. It goes by a few other names – aapoak (Kainah for "small, crawling stone"), Calcentine and Korite (after the main producer), but ammolite is by far the most common.

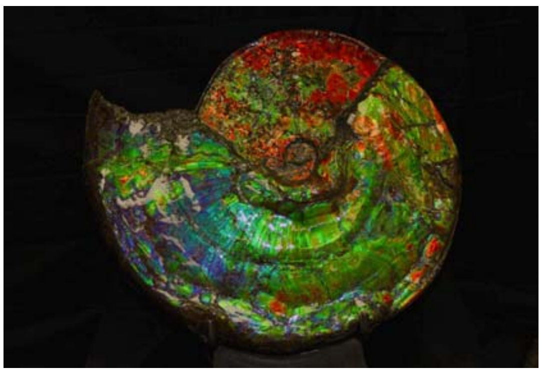
Ammolite is most often found in shades of red and green, but all colors of the spectrum are possible. Unlike most other gems, where the color comes from light refraction, ammolite iridescence is due to the microstructure of the aragonite. Interference with the light rebounding on stacked layers of thin platelets that make up the aragonite, causes the colors. The thicker the layers, the more reds and greens are prominent. The thinner the layers, the more blues and purples. These thinner layers are more fragile, explaining the scarcer colors. Other colors like crimson, violet and gold are quite rare and command a premium. The ammolite layer of the fossil is only 0.5-0.8 mm thick as found, and 0.1-0.3 mm after polishing. Most fossil shells have had their aragonite replaced by calcite or pyrite, making the presence of ammolite particularly uncommon.

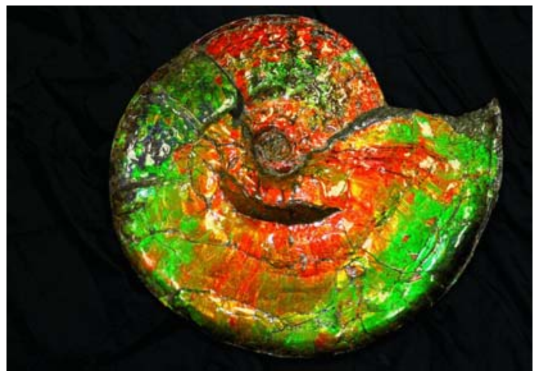
There are three classifications of gem ammolite – natural, doublets and triplets. Natural is a free-form cabochon, not coated and having a natural shale backing. Since it is sold by carat weight, the backing should be no more than 1.5 mm thick. Doublets are also free-form cabochons, but are bonded to a backing. Triplets consist of a backing of dark gray shale, the ammolite layer, and a calibrated coating of optical quartz or synthetic spinel. The coating is designed to give the best optical "flash" as well as being durable enough to be worn as everyday jewelry. The less treatment a piece has, the higher the price.

Ammolite comes from either of two species of Placenticeras ammonite, or, more rarely, the straight cephalopod *Baculites compressus*. These creatures lived in the Cretaceous period, when the Western Interior Seaway split the continent in two. The Seaway ran from the Arctic Ocean to the Gulf of Mexico on the east side of the Rocky Mountains. As the waters retreated, volcanic activity in the Rockies caused the ammonites to be buried in layers of bentonite sediment, which preserved the aragonite shells. Worldwide, significant ammolite deposits are only found in the Bearpaw Formation in Alberta, Saskatchewan and south into Montana. The best area is in Alberta along the St. Mary River, between Lethbridge and Magrath. About half of these deposits lie within the reserve of the Kainah (blood) tribe, and native workers are often employed by the mining firms, who also pay royalties to the tribe for the land. Only about 50 percent of all the ammolite mined is suitable for jewelry.

Ammolite is not easily or often faked. The closest natural imitators are labradorite, iridescent feldspar and broad-flash black opal. The opal is in fact rarer and more valuable, and ammolite is sometimes used as an alternative for it.

This beautiful ammonite (Figures 1 and 2) WAS offered for sale, at around $125,000 US. It has since





been removed from the website, and NO, I didn't buy it, although it would look nice in my collection. My wife may have even let it be displayed outside of the basement. I believe it was nearly two feet in diameter, and from Alberta. Both sides are shown.

By the way, the other two organic gems are pearls and amber, did you guess right?

Photo credits- Indiana9fossils.com (used with permission)

THE MINERAL CORNER
Amphiboles

Article compiled by Ken Fox with information taken from Wickipedia

Mineralogy:

Amphiboles crystallize into two crystal systems, monoclinic and orthorhombic. In chemical composition and general characteristics they are similar to the pyroxenes.
The chief differences from pyroxenes are that:
(i) Amphiboles contain essential hydroxyl (OH) or halogen (F, Cl)
(ii) The basic structure is a double chain of tetrahedra (as opposed to the single chain structure of pyroxene).

(iii) Most apparent, in hand specimens, is that amphiboles form oblique cleavage planes (at around 120 degrees), whereas pyroxenes have cleavage angles of approximately 90 degrees.
(iv) Amphiboles are also specifically less dense than the corresponding pyroxenes.
(v) In optical characteristics, many amphiboles are distinguished by their stronger pleochroism and by the smaller angle of extinction (Z angle c) on the plane of symmetry.

Amphiboles are the primary constituent of amphibolites.

In rocks Amphiboles are minerals of either igneous or metamorphic origin; in the former case occurring as constituents such as hornblende of igneous rocks, such as granite, diorite, andesite and others.

Calcium is sometimes a constituent of naturally occurring amphiboles. Those of metamorphic origin include examples such as those developed in limestones by contact metamorphism (tremolite) and those formed by the alteration of other ferromagnesian minerals (hornblende).

Pseudomorphs of amphibole after pyroxene are known as uralite.

History and etymology:

The name amphibole (Greek *amphibolos* meaning 'ambiguous') was used by R.J. Haüy to include tremolite, actinolite, tourmaline and hornblende. The group was so named by Haüy in allusion to the protean variety, in composition and appearance, assumed by its minerals. This term has since been applied to the whole group. Numerous sub-species and varieties are distinguished, the more important of which are tabulated below in two series. The formulae of each will be seen to be built on the general double-chain silicate formula RSi_4O_{11}.

Mineral species:

Chemical formulae:

Orthorhombic series:

Anthophyllite	$(Mg,Fe)_7 Si_8O_{22}(OH)_2$
Holmquistite	$Li_2Mg_3Al_2 Si_8O_{22}(OH)_2$

Monoclinic series:

Tremolite	$Ca_2Mg_5 Si_8O_{22}(OH)_2$
Actinolite	$Ca_2(Mg,Fe)_5 Si_8O_{22}(OH)_2$
Cummingtonite	$Fe_2Mg_5 Si_8O_{22}(OH)_2$
Grunerite	$Fe_7 Si_8O_{22}(OH)_2$
Hornblende	$Ca_2(Mg,Fe,Al)_5(Al,Si)_8O_{22}(OH)_2$
Glaucophane	$Na_2(Mg,Fe)_3Al_2Si_8O_{22}(OH)_2$
Riebeckite (or Crocidolite)	$Na_2Fe^{2+}{}_3Fe^{3+}{}_2 Si_8O_{22}(OH)_2$
Arfvedsonite	$Na_3Fe^{2+}{}_4Fe^{3+}Si_8O_{22}(OH)_2$
Richterite	$Na_2Ca(Mg,Fe)_5 Si_8O_{22}(OH)_2$
Pargasite	$NaCa_2Mg_3Fe_2+Si_6Al_3O_{22}(OH)_2$
Winchite	$(CaNa)Mg_4(Al,Fe^{3+})Si_8O_{22}(OH)_2$

Note that in all cases except hornblende and pargasite $Si_8O_{22}(OH)_2$ is an essential component. For hornblende and pargasite one or more aluminum atoms has been substituted for silicon atoms.

Descriptions:

On account of the wide variations in chemical composition, the different members vary considerably in properties and general appearance.

Anthophyllite occurs as brownish, fibrous or lamellar masses with hornblende in mica-schist at Kongsberg in Norway and some other localities. An aluminous related species is known as gedrite and a deep green Russian variety containing little iron as kupfferite.

Hornblende is an important constituent of many igneous rocks. It is also an important constituent of amphibolites formed by metamorphism of basalt.

Actinolite is an important and common member of the monoclinic series, forming radiating groups of acicular crystals of a bright green or greyish-green color. It occurs frequently as a constituent of greenschists. The name (from Greek *aktis*, a 'ray' and *lithos*, a 'stone') is a translation of the old German word *Strahlstein* (radiated stone).

Glaucophane, crocidolite, riebeckite and arfvedsonite form a somewhat special group of alkali-amphiboles. The first two are blue fibrous minerals, with glaucophane occurring in blueschists and crocidolite (blue asbestos) in ironstone formations, both resulting from metamorphic processes. The latter two are dark green minerals, which occur as original constituents of igneous rocks rich in sodium, such as nepheline-syenite and phonolite.

Pargasite is a rare magnesium-rich amphibole with essential sodium, usually found in ultramafic rocks. For instance, it occurs in uncommon mantle xenoliths, carried up by kimberlite. It is hard, dense, black and usually idiomorphic, with a red-brown pleochroism in petrographic thin section.

According to Mark Stanley, in the Bancroft area five species of amphiboles are commonly found:

- **Actinolite**
- **Edenite**
- **Hornblend**
- **Richterite**
- **Tremolite**

FIELD TRIP REPORT
Marmoraton Mine, Marmora, Ontario
By Mark Stanley

On Sunday, September 18, 2011 eager collectors met at the entrance gate to the Marmoraton Mine south of Marmora. The group included two members from the Bancroft club and two from the Niagara Club. We met at the quarry gate at 9:00 am for the safety talk and sign in, entering the quarry at 9:15 am.

Just a few minutes after arriving in the pit where they are currently working, I found some large masses of colourless Calcite that was full of crude Pyrite crystals. While I did bring a lot of this home with me, I expect it will be best suited to breaking up for the kid`s sand box at our show in March. Some of the individual crystals approach 2 cm across, but most are less than 1 cm. There were some sharp crystals evident, most appear to be inter-grown with each other.

In the same area I also found some massive dark green Chlorite, it does not look like much, but under magnification you can see the typical Mica-like flat cleavages.

Also some green-black fibrous Tremolite in masses up to 25 cm across, again not very exciting, but typical for the location. The bright lustre does make for some attractive specimens.

In some of the older, undisturbed dump areas I did manage to find some Calcite crystals, including three small, double terminated floater crystals, all less than 1 cm long.

On each trip into the mine, I always try to explore an area that I never visited before. This time I found an area that had huge boulders of the sedimentary rock, Conglomerate. There were two very distinct varieties. The first being a dark red-brown colour, it varied from being a very fine grained, almost like a sandstone, but with some large, rounded Quartz lenses up to 20 cm across, to a typically solid mass of

rounded stones from 1 cm to 10 cm across that were cemented together by the fine grained red-brown material.

The other variety was dark gray-black in colour with predominant rounded pieces of Magnetite. Most of the rounded stones included were less than 5 cm in size. Other included rocks appeared to be white Quartz and red-brown Hematite. It appears that the red-brown Conglomerate was the result of long term weathering of the Magnetite ore body, while the dark gray-black was produced by the action of a glacier, which would explain the rounded pieces of Magnetite.

Thank you to Bob Beckett for organizing this collecting trip.

THE EDITOR'S CORNER

We could not have such a vibrant Newsletter without the participation of members. Thanks go out this month to Kevin Kidd for his informative articles on ammonites and ammolite, illustrated with excellent photos. Thanks, also, to Ken Fox for stepping into the breach and coming up with an article on amphiboles and to Mark Stanley for his excellent report on the field trip to Marmoraton Mine.

Have you visited our Web site lately? Bob Moore is doing an excellent job of making it interesting and informative. There's lots of good stuff. Have a look! www.kawartharockandfossilclub.com

Next month, sharks' teeth, an interesting interview, Physical Characteristics of Minerals and more.

Don't forget to renew your memberships. Form at end of this newsletter.

At our meeting in December we'll have a party so come and bring goodies.

COMING EVENTS

NOV. 2-9, 2011 Robert Hall Originals Annual Fall Open House - 8 Days of Christmas!
Wednesday November 2 to Wednesday November 9. All days 10 am-5pm
138 Sugar Maple Road, St. George, Ontario
Admission: Free
Features: Visit Robert Hall Originals for our Annual Fall Open House. Rocks, minerals, gems, beads, lapidary demonstrations & more!
Contact: robert@roberthalloriginals.com or (519) 448-1236 or 1-800-360-2813
Website: http://www.roberthalloriginals.com

NOV. 12 CMMA Fall Mini-Conference
The Burlington Arts & Cultural Centre, 1333 Lakeshore Road, Burlington. ON
Contact: Bill Lechner at 416-438-8908 or bill.lechner@rogers.com
Website: http://canadianmicrominerals.ca/

NOV. 19-20 London Gem and Mineral Show
Saturday 9:00 am - 6:00 pm Sunday 10:00 am - 5:00 pm
Western Fairgrounds (Special Events Building)
Highway #401 to Highbury exit North, West on Florence, North on Rectory - Main entrance immediately on right hand side.
Features: Over 35 dealers, demonstrators, and educational talks
Admission: Adults $5.00, Children $2.00
Contact: Ken Dardano 519-831-3093 or gneissguy@bell.net
Website: www.gemandmineral.ca

KAWARTHA ROCK & FOSSIL CLUB INC.

2012

MEMBERSHIP Application [ ] or Renewal [ ]
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____

(if a family, list each person's name – parent/legal guardian followed by child/ren & please include the child(ren)'s ages)

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Date: ______________ Membership Card Issued [ ]

Club Memberships are due in December at the Annual General Meeting, or as soon after as possible. Members who do not renew before the end of December are dropped from the Membership List, will not be able to participate in KRFC or CCFMS field trips, other Club activities and will not receive the KRFC Club Newsletter.

If you do not want your information released, please do not complete the following section.

I hereby give my permission to release my name, telephone number and e-mail for inclusion in a KRFC Contact List, to be only issued to KRFC members in good standing.

Signed: ______________________________ Date: ______________