

THE EARTH SCIENCE NEWS

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EARTH SCIENCE CLUB OF NORTHERN ILLINOIS

-----E S C O N I-----

WWW.ESCONI.ORG

EARTH SCIENCE CLUB OF NORTHERN ILLINOIS 2009

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Junior	Open			

John Good & Karen Nordquist are delegates to Chicagoland Gems & Minerals Association. Mark Kuntz served as the March Show Chairman.

The aim of the **Earth Science Club of Northern Illinois** is to promote an interest in the Earth Sciences. In addition to the regular General Meeting, study group meetings are held monthly. They are held by groups of **ESCONI** members interested in the studies of Archaeology, Mineralogy, Micromounts, Paleontology, and the Lapidary Arts. There are also study sessions for Junior members to help them learn more about the earth sciences. From time to time field trips are arranged. **ESCONI** has a fine library of books on the earth sciences that are available to members.

We welcome the attendance of all interested persons at any or all sessions. The schedule is printed on the back page (date, time and place of meeting). Specific information is published in this bulletin.

Membership is \$20.00 (which includes the Bulletin) for annual family membership, or \$50.00 for three years. Dues are payable either at the monthly meetings or by mailing to the **Membership Chair** listed above.

Deadline for Bulletin articles to the editor is the 2nd weekend of each month.

Articles in this publication may be reprinted if full credit is given the author and **The Earth Science News**. Exchange bulletins may be mailed directly to the Editor.

ESCONI website is www.esconi.org
Web Administrator is Diana Lord

September 2009**President's Message**

It is fall and time to begin again. Mark your calendar with the ESCONI meetings so that you don't miss them for they begin again this month with our own Jack Wittry on September 11. Most of the other groups will be Show and Tell so that everyone can brag about what they did this summer and what they found. Be sure to bring in your new fossils and minerals to show.

We are also planning a special holiday party this year to celebrate our 60th anniversary and to help us do this we are gathering memories of past years. If you happen to have any photos or mementos of the past that you would like to share, please let us know so we can add them to the show. Our Historian does have some but we find that we have a gap in the 70's and 80's that we would like to fill in and hope that some of you can help us out. Look through your files and boxes and see what you have and let us know. Especially photos from old meetings, field trips or shows would be nice to see again.

We are also working on details for the 2010 Show. Because of the building program at College of DuPage we may not be able to have the show where we usually do. Be sure to keep an eye on the Bulletins and the web page to see where it will be and when. We are trying for the third week of March to miss the other important events of that month. It is difficult to try to schedule it to miss those other events and to try to get the best dealers. We need your feedback so let us know your thoughts.

KarenNordquist, President

ESCONI FIELD TRIPS**Tentative Field Trip to Larson Quarry Sycamore, Illinois, September 19, 2009**

Collecting Ordovician Fossils Age Limit 18 and above. Hart Hat Quarry. Trip will include safety lecture.

Check the web site for details or contact John Good at 1-630-483-2363 for reservations or e-mail at esconi@hotmail.com

Tentative Field Trips to Braceville September 26 and 27, 2009

Collecting Mazon Creek Fossils

Meet at 9:00 A.M. Saturday and or Sunday at the BP Amoco in Coal City. No Age Limit. Hard Hats not required.

Take I-55 to Exit 236 (Coal City). Take a right onto Highway 113 (Division Street). Go west to Broadway Street and Division in Coal City.

We will be collecting Mazon Creek concretions from an old spoil pile on private property. Hard hats are not required. Boots are recommended. An Estwing rock hammer is the best tool. A small shovel or pick is helpful. Knee pads, backpacks, fanny packs, extra clothes (you will get wet and muddy) are also a plus. Bring a bucket for the fossils. Also bring insect repellent.

Check the web site for details or contact John Good at 1-630-483-2363 for reservations or e-mail at esconi@hotmail.com

SEPTEMBER 2009 ESCONI EVENTS

College of DuPage (COD) Building K, Room #131 for most meetings, but note that the room number is subject to change – there will be a note posted on the entrance door.

General Meeting: Jack Wittry will give a presentation on Mazon Creek fossils
8:00pm Friday, Sept 11

Mineral-Micromount The Geode Splitter Will be back. Pllus a Video with a Show
7:30 PM, Sept 11 and Tell

Paleontology Show and Tell and bring your Mazon Creek jellyfish
7:30 PM Sept 19

Archaeology “When did the alphabet first appear?” by Brian Nugent and
7:30 PM Sept 26 John Good

Junior Subject to reorganization.

ESCONI Field Trips Tentative Field Trip to Larson Quarry, September 19, 2009
 Tentative Field Trips to Braceville September 26 and 27, 2009

See Web Site, www.esconi.org, for details about future field trips in 2009. Contact John Good for comments at 630-483-2363 or ESCONI@hotmail.com

BOARD MEETING The Board Meeting is scheduled for September 25th.

GROUP	GENERAL	MICRO	PALEO	ARCH	BOARD	JUNIOR
September	11	12	19	26	25	
October	9	10	17	24	23	
November	13	14	21	X	Dec 4	
December	TBD	12	X	X	X	
DAY	2 nd FRI	2 nd SAT	3 rd SAT	4 th SAT	4 th FRI	2 nd FRI
TIME	8:00	7:30	7:30	7:30	7:30	7:00

Hard Rock Geode Dig Family Fun
See Page 11 For Details

JOIN THE NEW ESCONI YAHOO E-MAIL GROUP

To keep informed and inform others, join the new ESCONI Yahoo E-Mail Group. E-mail Dave Carlson at fossil54@worldnet.att.net



HELP !!!

Please help us celebrate ESCONI's 60 years!

Do you have any old photos of meetings or field trips from the 1970's or 1980's or earlier??

Let us know so we can add them to the holiday festivities this year. This is a special year for us.

And then come and celebrate with us in early December as we reminisce about the good old days and live the fun now days!!!



General Meeting

June 12, 2009

President Karen Nordquist called the meeting to order and welcomed everyone. She stated that our speaker for the September 11 General Meeting will be Jack Wittry. His talk will focus on antediluvian phytology. She then discussed the Chicagoland Show that was held over Memorial Day weekend (May 23 and 24). Karen expressed her thanks to everyone that helped out at the show. John Good mentioned that additional help and more donations for the silent auction will be needed for next year's event. A brief discussion about next year's ESCONI show was also held. The club would like to have the show during the third weekend of March, 2010, in order to avoid conflict with other shows such as the Mid-America Paleontology Show (MAPS) which will be held the 4th weekend of March. An official date for the ESCONI show should be known by August.

John mentioned that the June 20th field trip to Braceville would be the last organized field trip of the year. A sign-up sheet was available. He also talked about the previous week's trip to the Thornton Quarry. Several good fossils were found, but most were broken. A discussion was then held about places people could go to collect on their own (e.g., Indiana, Kentucky). It was mentioned that legality issues could be a problem for collecting in Indiana. A discussion about the study groups followed.

Karen then mentioned the work on ESCONI's new Mazon Creek fauna book will be started in September. Members are encouraged to bring their jellyfish and worm specimens to be photographed in September and October, respectively. It was then stated that the ESCONI web site (www.esconi.org) is very active. A mention was also made about the ESCONI plant book that is available for purchase. (Both the hardcopy and softcopy versions are available at discount prices during the general meetings.)

Karen then introduced our speaker for the evening – Dr. Robert D. Martin, A. Watson Armour III Curator of Biological Anthropology, Department of Anthropology, The Field Museum. Dr. Martin's career has focused on primates and has ranged from behavior to DNA.

From Primate Ancestry to Human Origins

Dr. Martin began his talk discussing the six natural groups of primates: lemurs, lorises, tarsiers, new world monkeys, old world monkeys, and apes and humans. He presented a geographic distribution map of the primate groups. The lemurs occur in Madagascar; the loris group, old world monkeys, and apes occur in Africa and Asia, the tarsiers occur on select Pacific islands in Asia, and the new world monkeys occur in Central and South America. Among the primate features are: arboreal adaptation, grasping hands and feet, hindlimb domination, large frontal eyes with good 3-D vision, a relatively large brain, few young, extended life history, and social networks.

Dr. Martin then proceeded to show a phylogenetic tree of primates. There were three groups of prosimians and three groups of simians. The tarsiers had some traits similar to both prosimians and simians. Fossil remains of prosimians occur in the Paleocene and Eocene and simians since the Eocene.

General Meeting of June 2009, Continued

By using the fossil record, it can be estimated that the last common ancestor of extant primates probably occurred in the late Cretaceous about 85 million years ago. This is some 20 million years before the dinosaurs went extinct. He showed a print of what this inferred Cretaceous primate ancestor may have looked like, followed by slides of two Eocene fossils primates: *Notharctus* sp. and *Darwinius masillae*.

All living higher primates have a completely enclosed bony eye socket. Thus, the common ancestor of extant primates should also have this feature. As *Darwinius masillae* lacks this feature, it would not qualify as an ancestor. Dr. Martin then showed several slides of *Aegyptopithecus* skulls. It was an early Oligocene anthropoid. He then discussed the origin and types of apes (gibbons, orangutans, gorillas, and chimpanzees). *Proconsul* is the best fossil ape known. Following this, he addressed the shared features of apes and humans and the process of speciation focusing on features such as dentition, cranial capacity, and brain size.



Dr. Martin then discussed human ancestors and human evolution. Among the hominids he discussed were *Sahelanthropus tchadensis* (about 7 million years old); *Orrorin* (dated at 6 million years old); *Australopithecus afarensis* and *africanus*; and *Homo ergaster*, *erectus*, *neanderthalensis*, and *sapiens*. He then finished his talk discussing that the specimen of *Homo floresiensis* may actually be an individual of *Homo erectus* that was microcephalic.

Following presentation, John Good presented Dr. Martin with an honorarium. After a series of questions and answers, the meeting was adjourned with thanks to Dr. Martin for a very entertaining and informative lecture.

Refreshments were served.

The following are select papers authored or co-authored by Dr. Martin for those wanting to delve further into primate ancestry:

Martin, R.D., 1993, "Primate Origins: Plugging the Gaps," *Nature* 363:223-23.

Martin, R.D. et al., 2007, "Primate Origins: Implications of a Cretaceous Ancestry," *Folia Primatol.* 78:277-296.

Tavare, S., et al., 2002, "Using the Fossil Record to Estimate the Age of the Last Common Ancestor of Extant Primates," *Nature* 416:726-729.

Respectively submitted, William S. Vinikour, Recording Secretary

Geodes

By Kathy Dedina

The word geode comes from Greek meaning earthlike. This is a reference to the generally rounded shape of a geode. A geode is described as a rounded rock with a cavity of inwardly pointing crystals. In some geodes the inward crystal growth fills or almost fills the hollow. Most geodes have a chalcedony outside that is more resistant to weathering than the host rock. This hard outside separates geodes from vugs which also are crystal filled but are part of the host rock and cannot be separated from it. Nodules are rounded rock formations of various minerals without inwardly growing crystals. Two rock types host geodes—lava and the sedimentary dolostone. The explanation for geode formation is different in each rock type.

The geode forming process in lava begins with the presence of gas bubbles in the cooling lava. The source of the silica to form the geode could come from alteration of the lava itself or from silica rocks above or below the geode layer. There are several theories to explain how the silica gets into the geode and forms crystals. One theory believes that silica bearing fluids seeps in through the walls and precipitates various quartz materials depending on concentration and condition variables over time. Another holds that a silica rich gel is trapped inside the geode wall as the wall is forming. The quartz mineral forms crystallize from the altering gel. In the third theory ground or meteoric water leaches silica from the lava and deposits in the cavity as a silica lining. These same waters pull silica from silica rich rocks above or below the lava to form a gel that fills the cavity. The gel then separates into the various crystal layers of the geode. Studies have shown that the amethyst in Brazilian geodes formed at 200 degrees centigrade. Examples of geodes from lava include the Brazilian amethyst and Occo geodes, the Mexican geodes and many geodes from the Western U.S.

There are several theories on the formation of geodes in sedimentary rock. Early theories suggested that geodes formed around organic matter, dissolved calcite concretions or silica gel formed around organic matter. The Illinois State Geological Survey Geobit 3 uses the J. Hayes theory of calcite concretions to explain geode formation. The calcite concretions formed where organic matter in carbonate rich sediments was concentrated in quite water. Decomposition of the organic matter caused an anaerobic alkaline environment that precipitated calcium. Chalcedony formed around the calcite concretion as the chemical composition and pH of the water changed. Other changes dissolved the calcite core leaving an opening for the further deposition of geode material. Today the most widely accepted theory is that geodes formed around anhydrite (anhydrous calcium sulfate) nodules. Silica replaced anhydrite on the outside of the nodule in a molecule for molecule basis. The chalcedony that formed often contained anhydrite inclusions. At some point the anhydrite is dissolved away. Euhedral quartz crystals formed in the voids simultaneous to continued silicification of the nodule. Finally the secondary minerals are deposited. Barwood and Schaffer studied geodes in the Salem Formation of Indiana and Kentucky. They concluded that the anhydrite nodules were deposited during dolomitization of the sediments. Silica was introduced during anhydrite nodule formation or shortly thereafter. Silica was present as a gel in a high pH anoxic environment. In their model brine denser than sea water from an evaporite environment would sink through sediments till they reached the edge of the anoxic Illinois Basin and become anoxic. Dolomitization of sediments and mudstones would increase the calcium concentration to the point where anhydrite would precipitate. The pH would increase due to anoxia and sulfate reduction. This would take silica into solution where it would be available to replace anhydrite. Geodes would only form where all the conditions for development were met.

Geodes, Continued

Our geode search begins in Illinois for two reasons. First we are more likely to collect in areas close to home versus distant locations. Second, no area is better known for geodes than our own "Keokuk" location. We use that term to include locations on both sides of the Mississippi River even though the geodes are named for an Iowa city. Keokuk geodes are found in a 50-100 mile radius from Keokuk that includes locations in western central Illinois near the Mississippi, in southeastern Iowa and in northeastern Missouri. Keokuk geodes originate in the Mississippian Age lower Warsaw Formation. They can be collected from exposures of the Warsaw Formation dolomitic rock or from streambeds where the weathered out geodes settle. Tributaries of the Mississippi river are potential collecting locations. Numerous locations are known where geodes occur. Most are on private property which limits collecting. There are several fee collecting areas in Illinois and in Missouri. Entering the terms Keokuk geodes fee collecting areas pulls up websites with information on these areas. Geode dig (June) and Geode fest (September) are two collecting events sponsored by groups local to Hamilton Illinois.

The Geode Gallery website is a good source of information on mineral occurrences in geodes from specific sites. *Geodes Nature's Treasures* by Cross and Zeitner also describes finds from exact locations. Geodes vary in size from under one inch to over two feet and weighing 500 lbs. Most geodes tend to the smaller end around two to four inches. Geodes in the five to seven inch size are larger specimens. The giants can still be found at some sites. Geode secondary minerals may vary within a location and from location to location. Opening the geodes is the next challenge after finding them. Geodes can be opened by hand chiseling a line along the center of the geode. This must be done carefully to prevent shattering the geode into many pieces. Today using a pipe cutter seems a safer and surer method. Geodes can also be sawed open.

Deposits of Mississippian Age limestone with geodes stretch from our area to Indiana, Kentucky, Tennessee, Alabama and Georgia. Indiana and Kentucky both have notable geode deposits. The Ramp Creek Formation and the Harrodsburg limestone in Indiana are known geode localities. Geodes are found in road cuts and construction sites and in streambeds. A number of early Esconli field trips were to a place called Beanblossom to hunt for geodized fossils in a creek bed. We had some at our March show auction. These geodes many of which are solid have the generalized shape of a brachiopod, coral, gastropods, or crinoid. Brown, Lawrence and Monroe counties all have sites for these unusual geodes. Most locations are private property. A *Rocks and Minerals* article (Volume 82 #3) by Smith features a Heltonville site. Smith thought that anhydrite formed within or on a fossil deforming it as it grew. Silicification changes the fossil into a geode.

Indiana has a noted geode with millerite location in a road cut on Rt. 37 near Bedford. A *Mineralogical Record* article (volume 22 #5) by Ley describes the location and the minerals found there. Judy and I made a trip to the site and came home with one geode of quartz covered with chalcedony. Kentucky has the famous Halls Gap millerite site. This location has produced thousands of geodes since its discovery in 1964. It is probably the most famous millerite site in the world. Geodes to 5 inches are found. Even small geodes may contain millerite. A *Rock and Mineral* article (Volume 56 #3) by Medici and a *Mineralogical Record* article (Volume 28 #5) by Goldstein and McKenzie detail this site. The Cross and Zeitner books mention sites in Kentucky for Keokuk type geodes. Again most places are private land. Tennessee also has a number of geode sites. Any Mississippian age site in these states or others may be geode locations or at least have that potential. The highly prized Tampa Bay geodized corals come from Florida and Georgia. Most specimens are lined with chalcedony. A few pieces have quartz crystal centers. Some specimens fluoresce.

Geodes, Continued

Geode collecting is a real possibility in several western states. A Texas website state that fluorescent calcite geodes can be found in limestone from central Texas. Celestite locations are found west of Austin. Amethyst geodes and quartz geodes from South Dakota are listed in the book by Cross and Zeitner. Most sites are on private land or on public areas closed to collecting. The famous Dugway geodes are known for their fluorescence rather than their mineral content. The web lists Dugway collecting sites. California has listed several geode sites. Again, the web is a good way to look for specific sites. A Mineralogical Record article (Volume 20 #6) by Grant describes the azurite geodes from the Blue Ball mine. Several hundred thousand geodes were collected ranging in size from a quarter inch to 3 inches. Most were on the smaller size. The best contained azurite or mixed azurite malachite centers.

Geodes are found around the world. At the recent Chicagoland show my sister purchased a quartz geode from Argentina and a chalcedony geode from Morocco. I purchased a Mexican quartz geode. Also available were amethyst geodes from Brazil. These are some of the largest and most spectacular geodes found anywhere. The amethyst geodes are found in the Rio Grande do Sul area where extensive lava flows covered the area to a depth of thousands of feet. The geodes occur in one flow. Most are elongated in shape with a rounded top. The geodes formed in openings in the lava. Some can be enormous with one in the 30 foot size. Geodes in the one or two foot size are common. The outside of the geode is a green celadonite layer over white or clear quartz which is coated with the amethyst layer. The color of the amethyst varies. Heat treatment of poor quality amethyst geodes changes the color to citrine or green quartz. Gem quality amethyst is cut into lapidary material.

The geodes are mined in pits or underground tunnels. They are cut with hand chisels or saws. The better specimens are then marketed around the world. This is a commercial process unlike the casual search for Keokuk geodes. Specimens are relatively pricey and are available on numerous websites and at many shows. Also from Brazil are the much smaller and less showy Ocos. These geodes are 1 to 5 inches with a oblong shape. They are collected in large numbers and cut and polished before being offered for sale. The interior is a drusy quartz sometimes with black goethite inclusions or coatings. Amethyst is less common in Ocos. The geodes are relatively inexpensive but are interesting specimens.

The Mexican state of Chihuahua is the source of Mexican coconut Geodes. The one I purchased came from the Vila Ahumada area. It was purchased unopened and cracked at the show with a pipe cutter. The inside is a dark grey to black appearing clear quartz which reflects the color of the dark shell. The Mexican coconuts or Las Choyas geodes have been mined in large numbers since the 1960's. Most are between 2-4 inches. About 20% are hollow. Most are lined with quartz. Amethyst and smoky quartz are the rarer varieties. Calcite occurs as dogtooth and platy crystals in half the geodes. Geodes are also found in several other areas of Mexico. The type called Trancas geodes is known for bright green fluorescent quartz that forms unusual shapes. Beautiful blue celestite geodes are found in Madagascar. Some specimens are larger than basketballs. Most are much smaller. Most prized are those geodes with beautiful sky blue crystals.

Geodes are found in many other areas of the world. The above mentioned areas are some of the better known and collected locations.

Geodes, Continued

References:

Geodes Nature's Treasures by Brad Cross and June Culp zeitner

Geode Country by Stephen Sinotte

Observations on Siliicification in Geodes From the Mississippian Sanders Group of Indiana and Kentucky by Harry Barwood and Nelson Schaffer

First Crack Geodes website

The Geode Gallery Keokuk Geode Information Page website

Mineralogical Record Volume 20 #6 by R Grant (Blue Ball Mine)

Volume 22 #5 by R Ley(Bedford, Indiana)

Volume 28#5 by A Goldstein and B McKenzie(Halls Gap)

Rocks and Minerals Volume 56#3 by J. Medici(Halls Gap)

Volume 76#4 by K Vaisvil (Missouri)

Beautiful blue celestite geodes are found in Madagascar. Some specimens are larger than basketballs. Most are much smaller. Most prized are those geodes with beautiful sky blue crystals. Geodes are found in many other areas of the world. The above mentioned areas are some of the better known and collected locations.

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Rocks and Minerals Volume 56#3 by J. Medici(Halls Gap)

Volume 76#4 by K Vaisvil (Missouri)

Volume 82#3 by J Smith(Indiana)

Volume 82#3 by J Smith(Indiana)



The Geode Splitter



Geode with Dog-tooth Calcite

Minerals Found in “Keokuk” Geodes by Jim Daly

For the purpose of this discussion, we'll consider the area of SE Iowa, NE Missouri and W Central Illinois to be the “Keokuk Area”, since the geology and the geodes found there are quite similar.

These are the minerals found in the “Keokuk” geodes:

Ankerite- red-brown rhombs, or powder.

Aragonite- FL bright green- rare

Barite- rosettes, clusters of tabular crystals, long slender crystals. White, yellow, pink or pale blue.

Calcite- Tabular, dogtooth, nailhead, barrel forms. Various colors.

Chalcocite- Black

Chalcopyrite- Bright gold to bronze crystals with striated faces & curved edges.

Chlorite- Black to gray coatings- rare.

Dolomite- Pink, brown or buff saddle-shaped crystals.

Fluorite- Usually cubes.

Galena- Gray cubes.

Goethite- Black shiny elongated crystals, and inclusions.

Gypsum- Long clear crystals. Also flakes & grains.

Hematite- Small red crystals- rare.

Jarosite- Yellow to brown granular masses.

Kaolinite- White to brown clay.

Magnetite- Black granular to lamellar particles- magnetic.

Malachite- Green crystals & crusts. Decomposition product of chalcopyrite.

Marcasite- Capillary crystals, brassy or bronze.

Millerite- Fine wires.

Polydymite- As a pseudomorph after millerite. Gray's Quarry.

Pyrite- Cubes & filiform.

Pyrolusite- Black stains on quartz.

Quartz:

Rock crystal- very clear crystals- most common.

Milky

Citrine- Yellow to orange, usually filling interior of geode.

Chalcedony- Gray, black, blue, orange, red, green (rare) mammillary.

Siderite- Iridescent coatings on calcite.

Smithsonite- Granular gray, brown, blue, yellow or orange- rare.

Sphalerite- Shiny black crystals.

Violarite- ??- Specimen in my collection so labeled, but I have doubts- no documentation.

Non-minerals:

Petroleum

Water

Hydrogen sulfide gas.



Kathy Dedina at the June Mineral Study Group

David Bergmann at the June Mineral Study group

Hard Rock Geode Dig Family Fun

September 25-27, 2009

Montebello Access Area—Hamilton, Illinois

Guided Hunts 2009

2—Friday, September 25th, 2—Saturday, September 26th

1 Sunday, September 27th

Swap & Vendor Areas—Displays—Geode Cracking

Speakers—Identification—On-Site Breakfast & Lunch

For more information contact Mike Shumate (573) 518-4739 or geodefest@hotmail.com

www.firstcrackgoedes.com or www.hamiltonillinois.org

September - Sapphire (Alternate gem: Lapis Lazuli)

By LaVergne R. Novak



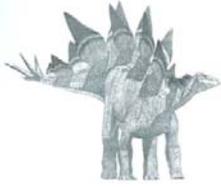
The early Persians and Hebrews called the sapphire “Stone of Saturn.” Our word for this lovely stone is from the Greek *sapphirus*, meaning blue. Like the ruby, it is a variety of transparent corundum and second in hardness only to diamond. A sapphire can be blue, yellow, pink, green, orange, or brown – almost any color except red. The most desirable color is cornflower blue, and the choicest blues come from Burma, Australia, Sri Lanka and Thailand. Some sapphires can be cut to show a six-pointed star.

The sapphire has long been considered the most spiritual of all gemstones, symbolizing purity of the soul and the blue of the heavens. The ancients sensed a link between the sapphire and their gods. The Greeks called it the “Stone of Apollo,” for the god of prophecy. The Romans associated the sapphire with Jupiter, Saturn, and Venus. Early Persians believed the Earth rested on a huge sapphire, which reflected the blue of the sky.

The healing powers of the sapphire have been numerous and varied. The density of the stone makes it cool to the touch, enabling it to put out fires. It cured diseases of the eyes. Powdered and drunk with milk, it could soothe fevers, calm hysteria, and reverse the effects of pestilence and poison. Boils would disappear if rubbed with a sapphire.

Through the Middle Ages the sapphire was worn by clergy to inspire purity in thought and to deliver them from temptations of the flesh. Soldiers going off to battle gave their wives sapphires to ensure their loyalty, because the stone would darken in the event of infidelity. It is not recorded whether the wives gave the soldiers sapphires to wear for the same reason. However, in the 9th Century, Charlemagne was so affected by the sapphire talisman his wife wore that he refused to be parted from her when she died, even after her body had begun to decompose. In desperation, a friend removed the sapphire, and Charlemagne permitted the body to be buried.

(This is a birthstone series. Text was first printed by Lizzadro Museum. Picture is from demandstudios.com.)



Karen's Komments



New Dinosaur and Finger Evolution – *Limusaurus*



The 159 MY old deposits of the Junggar Basin of Xinjiang in north-western China is the source of yet another fascinating dinosaur discovery. It is where they found the tyrannosaur relative *Guanlong*, the oldest horned dinosaur, *Yinlong*, the new stegosaur *Jiangjunosaurus* and many more. Now we can add *Limusaurus inextricabilis* which means “mire lizard who could not escape”. It was found in the fossilized mire pits where bones were found stacked one upon the other. This dinosaur is interesting because it has no teeth but a fully developed beak, a long neck, short arms with out sharp claws, and gizzard stones. All this indicates that it was a plant eater related to meat eaters. (image above by Portia Sloan) It was about 1.7 meters long (5.6 ft.). It is the first ceratosaur from Asia and one of the most primitive members of the group. They often have crests or horns and knobby fingers lacking sharp claws. The skeleton is quite complete and interesting discussion is developing about the fingers. The hand of *Limusaurus* (shown in the photo at right) has lost the fifth finger and has only a single reduced bone for the first finger (pictured at right). This agrees with those who believe that the evolutionary process was the loss of the first and last digit. This fossil strengthens that theory. Others believe that it involved the loss of the fourth and fifth digit. This fossil does add some interesting information to the bush of evolution. As they search for the story of how birds evolved every fossil may offer information that may help to answer the questions. (Xu, Clark, Forster, Erickson et al in **Nature** Vol. 459 6/18, 2009)



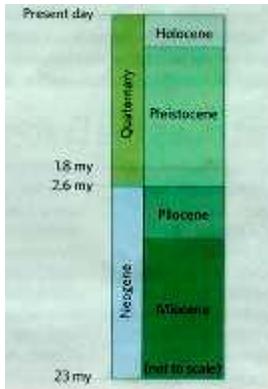
Burpee Continues Success at Hanksville Utah Dig

Scott Williams reports from their Utah dig site in Hanksville Utah that they are still finding piles of dinosaur bones at this rich bone bed. They started digging in 2008 at this late Jurassic site (150-147 MYA) in the Brushy Basin Member of the Morrison Formation that is almost 300 feet wide and almost a quarter of a mile long. They dug out some 4,000 pounds of dinosaur material in 2008 and have already found 2,000 pounds this year.

Karens Komments, Continued

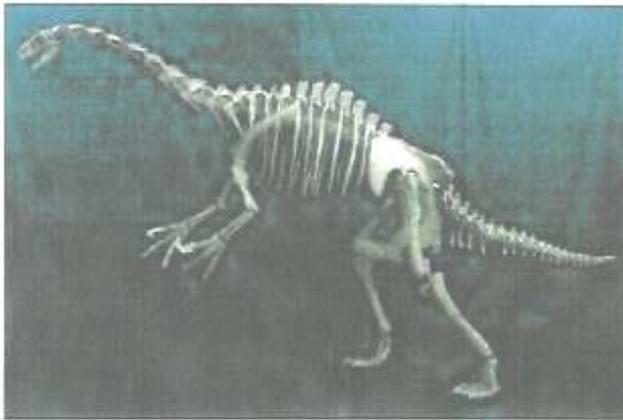
They have identified bones from *Allosaurus*, a possible *Stegosaurus*, a possible *Barosaurus* and several other sauropods. The *Barosaurus* is rare and is about 30% complete so far. It appears to be a juvenile. They may have a *Diplodocus*, a *Camarasaurus* and an *Apatosaurus*. They are looking forward to mounting a number of dinosaurs in the future. They have been hosting a number of visitors at the site giving them tours of their excavation work there. They are trying to encourage tourism at Hanksville. (Burpee Museum Newsletter Summer '09)

Quaternary Expands to 2.6 MYA



On May 21 the International Commission on Stratigraphy (ICS) elected to redefine the base of the Quaternary at 2.6 MYA and the base of the Pleistocene to that time also. That takes 800,000 years from the Pliocene in the Neogene. It is expected to be ratified in a month or two by the executive committee of the International Union of Geological Sciences (IUGS). It had been based on an outcrop in southern Italy but many thought that the cooling of the entire planet 2.6 MYA would be a better boundary. Of course, not everyone is happy about the change and are fighting the final vote. In the end it is just a change in nomenclature and the rocks and time itself have not changed. (Mascarelli in *Nature* Vol. 459 6/4/09)

New Therizinosaur from Utah – *Northronychus*



Lindsay Zanno from the Field Museum announces a new species of therizinosaur that has been found in southern Utah. It lived 93 MYA and stood 13 feet high with 9 inch long claws. It has been named *Northronychus graffami* after Merle Graffam a member of the evacuation team who found the fossil. It had stumpy legs and a large pot belly for digesting the many plants it would have eaten. It also had a keratinous beak and small leaf-shaped teeth. Although they had large claws they were thought to be used not for bringing down prey but for tearing into termite mounds

and mucking up pond bottoms and raking leaves into its mouth from a mangrove. It now appears that many lineages of maniraptoran dinosaurs ate plants as part of their diets and some like *Velociraptor* evolved exclusive meat eating later. This variability in diets may have allowed them to move into new niches and diversify as needed. The other interesting thing about this particular fossil was that it was found in a marine environment. It may mean that the dinosaur had been stranded at sea and had drowned and then sunk to the bottom. It could also have floated out to sea in a storm after death. The photo is of the mount at the Museum of Northern Arizona in Flagstaff by Rob Gaston. (Zanno et al in *Proc. R. Soc. B* July 15, 2009)

Karens Komments, Continued

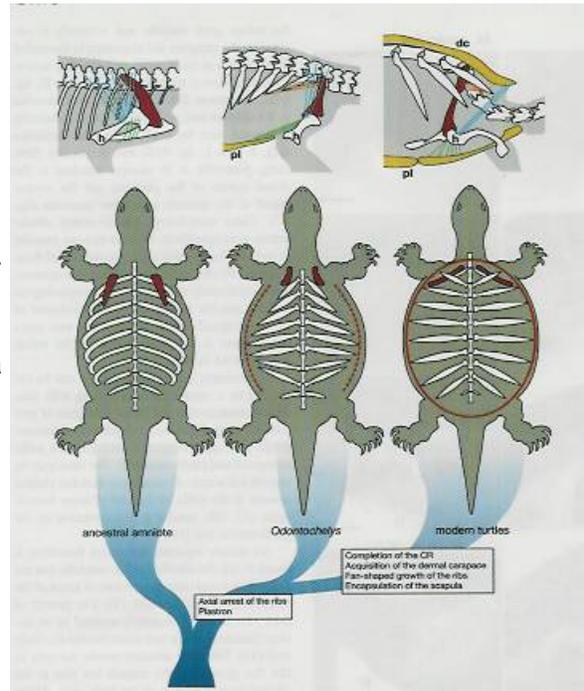
New Cretaceous Crocodile from Brazil – *Armadillosuchus*



This strange new animal was found in 2005 in Sao Paulo state in the Bauru region which was thought to be hot and dry 90 MYA. Usually crocodiles prefer hot and wet climates. There are many unusual features about this fossil including its body armor that gives it its name – *Armadillosuchus arrudai*. It was 6.6 feet long and would have weighed about 265 pounds with a wide head and a narrow toothy snout. It also had the ability to chew like mammals. It could move its lower jaw forward and backward to tear meat and mollusks up. This is different from most crocodiles that would use its powerful jaws to clamp down on their prey. It could also use its powerful legs and hands to dig into the soil to make holes perhaps to avoid larger predators or to stay cool or damp. (de Souza Carvalho in **Jo. of So. Amer Earth Sciences** Feb 2009)

The Turtle Body Evolved Differently

The turtle body plan is different from other vertebrates with its shoulder blades riding on the inside of its ribs so that it can make its shell from its ribs. How this happened has been a mystery and now a new study from researchers in Japan tries to unravel it. The study used fertilized eggs of Chinese soft shelled turtles (*Pelodiscus sinensis*) and looked at the development of the embryos staining them with dyes and scanning them using computer tomography. But there is a variation from the similarity with chicken embryos at day 11 of the 30 day gestation when a carapacial ridge forms at the edge of what will be the shell of the turtle. The ribs grow toward this ridge, go over the scapulae and go on to form the shell. In chicken and mice the ridge is not there and the ribs grow inside the scapulae and around to the front to form the ribcage.



The drawing shows the evolution of the turtle body plan from the article. The ancestral amniote is on the left and the fossil *Odontochelys* which was recently discovered is in the center. This fossil had an intermediate condition with its shoulder blade in front and no shell. On the right is the modern turtle with its scapula on the inside and a shell. The pictures on the top show that the muscle attachments have changed along with the new arrangement. (Nagashima et al in **Science** Vol. 325 7/10/2009)

Karen Nordquist, Paleontology

Local Calendar of Events

LIZZADRO MUSEUM OF LAPIDARY ART

September 26 "Fossil Dig"

Learn about the world famous Mazon Creek fossils from Illinois with Don Baumgartner. These Coal Age fossils (350 million years old) are a unique part of Illinois geologic history and the fossil record. Learn where to collect these fossils and search for a Mazon Creek fossil to take home.

Lecture/Activity - Ages 6 yrs. to Adult - 60 minutes - 2 p.m.

\$4.00 per person, Museum Members Free - Reservations Recommended



September 26, 2009 10am-5pm EarthFest

Burpee Goes Green with our second annual EarthFest. Lectures and presentations on the "hottest" earth-friendly topics. Interactive family workshops, vendor fair. Open to the public.

Free with regular admission, Burpee Members are always FREE

Calendar of Events

The Field
Museum

National Geographic Live events entertain and inspire with captivating stories from the front lines of exploration, illustrated with award-winning photography and video. Each evening concludes with a lively question and answer session and an opportunity to meet the presenter in the lobby.

Tuesday, October 13, 2009 7:30 p.m.

Real Pirates: The Story of the Whydah by Barry Clifford, Underwater Explorer

Tuesday, November 3, 2009 7:30 p.m.

From the Front Line of Global Health by Karen Kasmauski, Photographer

Fossil Hunt at Mazon Creek

Do you like to hunt fossils? Come with us to the world-famous Mazon Creek site, and discover what Illinois was like more than 300 million years ago! Plan on a one-quarter mile walk to fossil locations.

Purchase tickets for the September 26 field trip online

Field Trip Family For families with children ages 8–17.

August 22, 2009 and September 26, 2009; 8 a.m. - 3 p.m.

\$40, members \$28

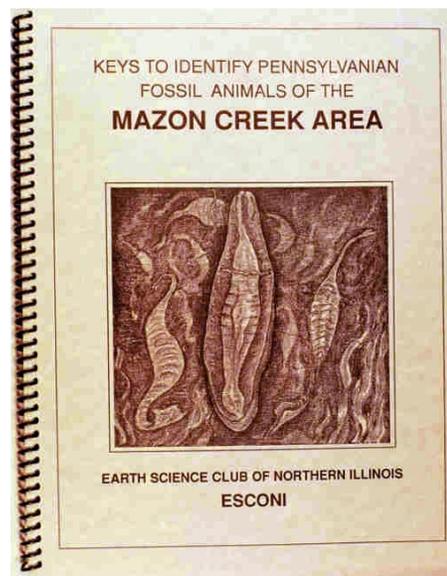
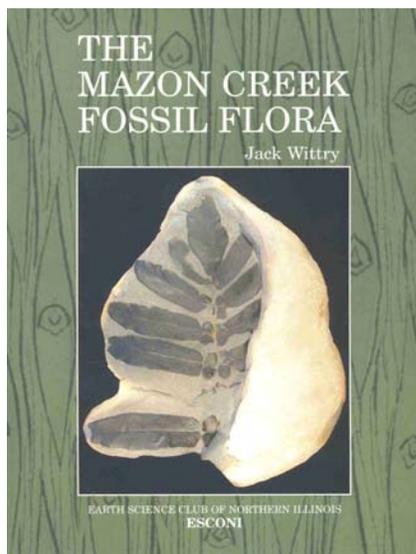
Pre-Registration Required

Public Programs: (312) 665-7400

ESCONI'S Next Book Undertaking!

ESCONI first published *Keys to Identify Pennsylvanian Fossil Animals of the Mazon Creek Area* in 1989. With the success of the publication of *The Mazon Creek Fossil Flora*, it is time to consider updating our twenty-year-old publication of *Keys to Identify Pennsylvanian Fossil Animals of the Mazon Creek Area*. Jim Fairchild, Jack Wittry, Rob Sula, Chris Cozart, and John Catalani have come together with a goal to produce a quality publication that could complement *The Mazon Creek Fossil Flora*. In this updated version, the publication will not only utilize existing illustrations, but will also include photos to represent this diverse fauna. One difference is that the flora book presents major revisions to the classification of Mazon Creek plants, requiring museum specimens to be pictured. The new fauna book, will not present major revisions to species which will allow us to picture specimens from private collections. This provides all Mazon collecting ESCONI members with an opportunity to be a part of this new publication. We envision that each species will be represented by photos of one exceptional specimen and two typical specimens. By doing this we hope to show the reader examples of fossils that are representative of those they are attempting to identify.

On September 19th, we'd like to begin examining Mazon jelly fish fossils at the first paleo meeting. Then, on October 17th, we will cover the worms. We'll keep updates in the bulletin as the book evolves so examine your Mazon Creek collections over the next few months and consider any possibilities you may have to contribute to the new book. Any questions? Contact Jim Fairchild



The Mazon Creek Fossil Flora by Jack Wittry
313 color pictures, 113 taxa, 145 drawings
\$65 hard covers for ESCONI Members
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ESCONI Associates

Keys to Identify Pennsylvanian Fossil Animal of the Mazon Creek Area
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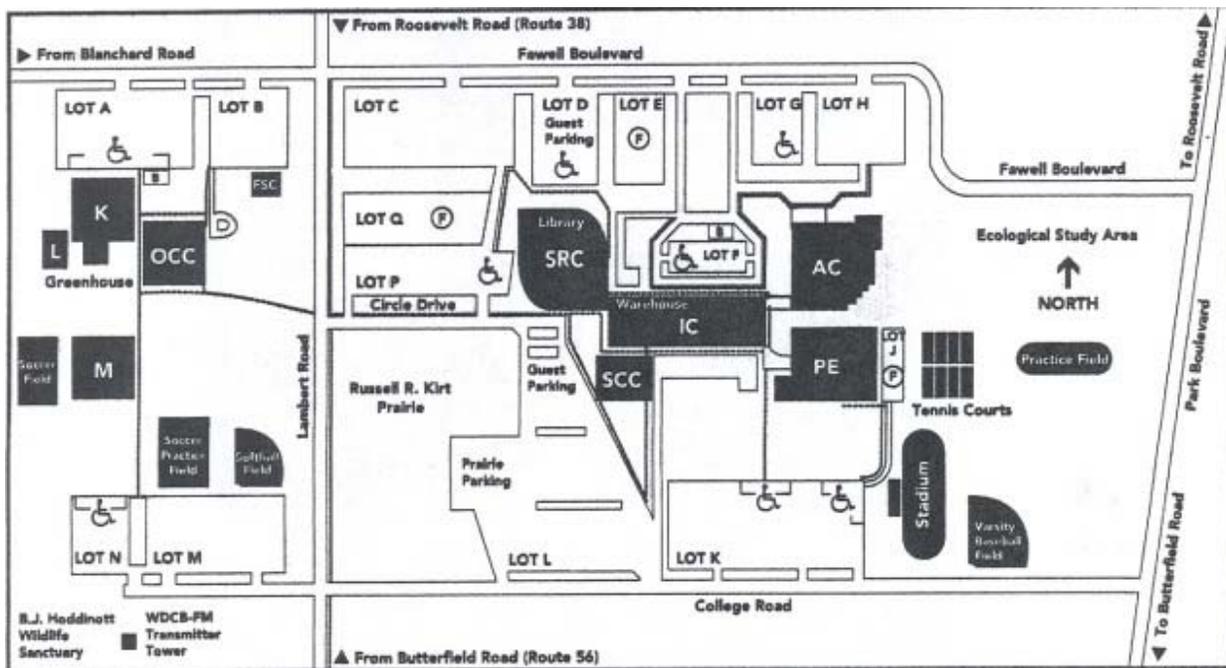
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