...for all have sinned and fall short of the glory of God,...

(Romans 3:23 ESV)

For the wages of sin is death, but the free gift of God is eternal life in Christ Jesus our Lord.

(Romans 6:23 ESV)

...but God shows his love for us in that while we were still sinners, Christ died for us.

(Romans 5:8 ESV)

For with the heart one believes and is justified, and with the mouth one confesses and is saved. For the Scripture says, "Everyone who believes in him will not be put to shame." For there is no distinction between Jew and Greek; for the same Lord is Lord of all, bestowing his riches on all who call on him. For "everyone who calls on the name of the Lord will be saved."

(Romans 10:10-13 ESV)

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Lynn Lemons Memorial Safari:
Mammoth State Park; Cahokia Mounds; Keokuk Geodes

by Douglas Roger Dexheimer

A new CSAMA Safari to eastern Missouri, western Illinois, and southeast Iowa is in the planning stages for this coming Labor Day Weekend. This safari will include something for lovers of large fossils, Indian lore, and beautiful minerals.
One of CSAMA’s speakers, Lynn Lemons, would have led the safari to Cahokia Mounds if he were still living. Lynn made several presentations to CSAMA in the past. One of his primary interests was the migration of American Indian tribes from the Middle East to North America. Unfortunately, cancer has prevented that from happening. This safari is named in his honor.

A more detailed description of each of the stops on this safari is included in this newsletter.

The first stop of this safari will be the Missouri Mastodon State Park, located near Imperial, just a few hundred feet west of I-55. The park itself has been engulfed in a suburban neighborhood, to the extent that there are no camping facilities at the park. The museum/information center has limited hours, so visitors should arrive early in order to see the exhibits, and enjoy the trails through the forest.

Note: Mapping programs show construction on I-70, so it may be best to take the scenic route of US 50 from Kansas City to Imperial. Either way, the travel time from Greater Kansas City to Imperial is estimated to be 4 to 5 hours.

The site is the home of the Kimmswick Bone Bed, one of the most famous and extensive Pleistocene ice age deposits of fossils, including a number of bones of giant mastodons. Interpretative trails and picnic sites dot the landscape and a museum tells the natural and cultural story of the Clovis culture, which existed in the area before written history.

See the article on mastodons, mammoths, and elephants, which reports on some fascinating DNA evidence of baraminology. It begs the question, did all three of these large creatures ride through the Great Flood along with Noah and his family, or does the DNA evidence suggest that there has been some variation within the "pachyderm" kind, since the flood?

Our next stop is just across the Mississippi River, near Collinsville, Illinois. There are campsites and motels in the area, which are convenient to the Indian mounds. More information on campsites and motels is forthcoming for safari registrants.
Cahokia Mounds State Historic Site.3

The Safari will next visit the Cahokia Mounds State Park, where early mound builders built an Indian city just east of St. Louis, in western Illinois. The population of the colony there was thought to be larger than the city of London, England at that time. Many earthen mounds were built in the area, and nearby.

Monk's Mound.

Cahokia Mounds is the largest and earliest pre-Columbian settlement north of Mexico. It was occupied primarily during the Mississippian period (800-1350), when it covered over 1,600 hectares (3,950 acres) and included some 120 mounds. It is the pre-eminent example of a cultural, religious, and economic center of the Mississippian cultural tradition, which extended throughout the Mississippi Valley and the southeastern United States. This agricultural society may have had a population of 10,000-20,000 at its peak between 1050 and 1150. Cahokia is an early and exceptional example of pre-urban structuring.4
There is an interpretive center where visitors can see and hear the archeologists' account of these advanced people. There are guides who take walking tours on the trails which crisscross the park.

Camping facilities and motels are abundant in this area.

See the article on the migration of North American natives, for a look at the possible connections between the Mound Builder Tribe and early European people.

The third stop on the Safari is known for abundant geodes. Rock hunters will find more Keokuk Geodes than they can carry in this locale.

Although geodes of different kinds are found all over the world, the greatest abundance and variety are found in the outcropping of the Mississippian lower Keokuk bed within a 70 mile radius of the intersection of the Mississippi and Des
Moines Rivers. Southeastern Iowa is one of the state’s best Geode collecting areas. Geode State Park in Henry County is named for the occurrence of the geode.

The large number of mineral inclusions and the exquisite crystal groups that they form have made the Keokuk Geodes the most beautiful and the most sought-after of all geodes by museums and collectors the world over. The most common size of Keokuk Geodes is about 3-4 inches across, and some reach 2 feet across and larger. Most Keokuk Geodes occur within a 35 mile radius of Keokuk.⁶

The roundish hollow crystal-filled rocks are collectively referred to as "Keokuk Geodes," having been named after the city of Keokuk, Iowa located in the heart of the collecting area. Most of the geodes are derived from the lower Warsaw Formation, a widespread rock unit of Mississippian age. Calcium carbonate and clay muds deposited in a shallow sea (according to evolutionists, about 340 million years ago) were subsequently lithified to form the shales, shaley dolomites, and limestones. Geodes can be dug out of exposures of the lower Warsaw Formation where they are concentrated in certain layers. Loose geodes can also be collected in stream channels where water has eroded the rock.

Participants in CSA safaris should register on the CSAMA website so that planning for the size of the party can be done.

Please refer to the accompanying article on Keokuk geodes in this issue for more information, and to see a few sample photographs of geodes.

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2. Ibid.
3. https://www.google.com/maps/place/Cahokia+Mounds+State+Historic+Site/@38.6553433,90.0665496,14z/data=!3m1!4b1!4m2!3m1!1s0x87d8ab52d79595af:0x30679191a51caf6

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August Monthly Meeting
August 4th, 2015

Compromise
moderated by Kevin Anderson

Compromise can be a good thing. For example, it can help mend a relationship. But what about a relationship between truth and fiction? A compromise in that case creates only fiction. Many who attempt to find a compromise between "science" and "religion" end up deferring to man’s
wisdom instead of God’s truth. This is because any division between science and religion portends a false dichotomy: a compromise between the real science of God’s truth about the history of our origin, and man’s best speculation on our origin without God. The result is the exchange of truth for a lie. (See Romans 1:25.)

Monthly Meetings
2015

(1st Tuesday of each month; content subject to change; no signup or registration necessary.)

For a more detailed description of the monthly meeting topics visit www.csama.org.

- January 6th: “Formed to Fly” DVD, by Dr. David Menton, moderated by Kevin Anderson.
- February 3rd: “Expelled: No Intelligence Allowed” (the 2008 motion picture) DVD, moderated by Bob Farwell.
- April 7th: “Canopy Theory,” by Dave Penny.
- June 2nd: “Evolution’s Achille’s Heels” DVD, by Creation Ministries International, moderated by Kevin Anderson.
- August 4th: "Compromise”, moderated by Kevin Anderson.
- September 1st: “Creation Variations,” by Dave Penny.
- October 6th: “Chinese Characters or Mysteries Confucius Cannot Solve” DVD, moderated by Bob Farwell.
- December 1st: “The Chair” DVD, by Frank Peretti, moderated by Kevin Anderson.
Another of the Created Kinds: Elephantid

by Douglas Roger Dexheimer

This coming Labor day, 2015, CSAMA will have a creation safari to eastern Missouri. The first stop on this safari will be the Missouri Mastodon Park, south of St. Louis.

As you can see in this artist’s rendition, the mastodon is similar in shape and smaller in size to today’s African bull elephant, and also resembles the wooly mammoth seen in cave drawings in Europe. The thought arises... are these large creatures all part of the same created kind?

Remember how our recent baramin articles centered on the possibility of interbreeding? Readers of this newsletter will recall a number of articles that probed into the genetic background of a number of creatures: canines, felines, bovines, equines, etc.

At the risk of falling into the same heresy that pervades evolutionary biology, let us momentarily consider the concept of homology, which is defined as "a fundamental similarity based on common descent, or a structural similarity of two segments of one animal based on a common developmental origin."¹

It appears as if these creatures are of the same kind, but since two of the three are extinct, interbreeding experiments are not possible. Another way to determine that is to examine the DNA of the creatures. I have corresponded with Dr. Robert Carter, the genetics specialist for...
Regarding the DNA of these large creatures, Dr. Carter advises:

Mammoth and mastodon DNA has been sequenced. A simple Google search should bring up the results. I am not certain what the 'baraminological' implications are, but it should be obvious when looking at the results. If I remember correctly, the mammoth is more closely related to the Asian rather than the African elephant, and mastodon is the outgroup, but I might be wrong about some of the details....²

The following is an excerpt from an article which Dr. Carter so kindly sent me.

The mitochondrial genome of an American mastodon was recently sequenced and used to root a phylogenetic analysis that included full mitochondrial genome sequences from woolly mammoths and the two living elephant genera. The study definitively established that mammoth and Asian elephant mitochondrial DNA lineages are more closely related than either is to African elephants.³

I went online with Google.com and found a secular article with a diagram claiming that these beasts “evolved” from a common ancestor.

![Evolution of modern elephants](image)

Secular conception of the evolution of Pachyderms.

Finally, I went to the CMI website, and searched for “mastodon.” I came up with an article entitled, "Ancestors, selection and Nepalese ‘mammoths,’ ” which concludes:
Asian elephants.

African and Asian elephants, along with now-extinct species such as the mammoth, stegodon, and mastodon, are most likely all descended from the one basic “kind” present on the Ark. That “elephant” would have contained all the genetic information for the possible species variation to come as its descendants spread across the globe after the Flood.  

I would also invite your attention to an article by Jonathan Sarfati “Mammoths, the riddle of the Ice age”.  

Many people see mammoths, as featured in ‘stone age’ cave paintings, for instance, as part of a world many tens of thousands of years before the present. The biblical truth about history would indicate a time-frame much closer to the present. Thus it was exciting when some huge live elephants were discovered recently in Nepal, which had the same sloping backs and humped heads as the elephants (mammoths) drawn in the cave paintings. This would indicate that the genetic information for these features has survived within the modern elephant gene pool, bringing the ‘time of mammoths’ not only much closer to, but right into, the present.

This is confirmation that the time span between the separation of the mastodon, the mammoth, and modern elephant is short, practically a matter of a few hundred years.

If you wish to see examples of mastodon skeletons nearby, join our safari to eastern Missouri and western Illinois, coming up this Labor Day Weekend.
Mastodon Museum in Missouri.

Here’s is a webpage that shows a map of the park:
https://mostateparks.com/map/mastodon-state-historic-site

Camping facilities are not available in the immediate area. It is probably best to visit the Missouri Mastodon Park as early in the day as possible, leave when the park closes at 5:00, and then travel to the abundant campsites in western Illinois, near the Cahokia Mounds State Park.

Travel time from Kansas City via I-70 (with multiple construction zones) is about 4 hours (257 miles). More relaxed travel time via US 50 to see the Missouri countryside: about 5 hours (270 miles).

1 http://dictionary.reference.com/browse/homology
2 Email correspondence from Dr. Robert Carter, 3 June 2015.
3 Roca pdf file attached to above email.
4 http://creation.com/heard-of-elephants
5 http://creation.com/mammoth-riddle-of-the-ice-age
6 Ibid.

Ω

For the grace of God has appeared, bringing salvation for all people, training us to renounce ungodliness and worldly passions, and to live self-controlled, upright, and godly lives in the present age, waiting for our blessed hope, the appearing of the glory of our great God and Savior
Jesus Christ, who gave himself for us to redeem us from all lawlessness and to purify for himself a people for his own possession who are zealous for good works.  

(Titus 2:11-14 ESV)

Repent therefore, and turn back, that your sins may be blotted out,...  

(Acts 3:19 ESV)

...yet we know that a person is not justified by works of the law but through faith in Jesus Christ, so we also have believed in Christ Jesus, in order to be justified by faith in Christ and not by works of the law, because by works of the law no one will be justified.  

(Galatians 2:16 ESV)

Therefore God has highly exalted him and bestowed on him the name that is above every name, so that at the name of Jesus every knee should bow, in heaven and on earth and under the earth, and every tongue confess that Jesus Christ is Lord, to the glory of God the Father.  

(Philippians 2:9-11 ESV)

2015 Creation Safaris

- March 20 – (Friday, 7:15 PM) – Astronomy Safari.
- April 17 – (Friday, 8:00 PM) – Astronomy Safari.
- April 25 – (Saturday) 8AM - 6PM - Southeast KS Fossils and Mineral Safari.
- May 15 – (Friday, 8:30 PM) – Astronomy Safari. (CANCELED)
- May 23 – 25 – (Saturday - Monday) – Southeast MO Volcanic Mountains Safari.
- June 6 – (Saturday) – Photo/Nature Hike Creation Safari at O.P. Arboretum.
- June 18-20 – (Thursday - Saturday) – Ozark Stream Float - Elk River.
- June 20 – (Saturday, 8:45 PM) – Astronomy Safari. (CANCELED)
- July 11 – (Saturday, 8:45 PM) – Astronomy Safari.
- July 18 – (Saturday) – KU Natural History Museum. (CANCELED)
- August 14 – (Friday, 8:15) – Astronomy Safari.
- August 15 – (Saturday) – Greater KC Fossil Hunt.
- September 4 - 7 – (Friday - Monday) – Lynn Lemons Memorial Safari / Mammoth State Park / Cahokia Mounds / Keokuk Geodes.
- September 11 – (Friday, 7:30 PM) – Astronomy Safari.
- October 9 – (Friday,7:15 PM) – Astronomy Safari.
- October 17 – (Saturday) – HaHa Tonka Safari.
- November 6 – (Friday, 7:15 PM) – Astronomy Safari.
- November 21 – (Saturday) – Squaw Creek National Wildlife Refuge Safari.
You must register for any safari. For safari details, and to register please visit: www.csama.org

Astronomy safaris only, call:
(913)-515-6421.

Cahokia Mound Builders Indian Tribe

by Douglas Roger Dexheimer

One of the greatest cities of the world, Cahokia was larger than London was in AD 1250. The Mississippian who lived here were accomplished builders who erected a wide variety of structures from practical homes for everyday living to monumental public works that have maintained their grandeur for centuries.¹

A THRIVING ANCIENT METROPOLIS

According to archaeological finds, the city of Cahokia was inhabited from about A.D. 700 to 1400. At its peak, from 1050 to 1200, the city covered nearly six square miles, and 10,000 to 20,000 people lived here. Over 120 mounds were built over time, and most of the mounds were enlarged several times. Houses were arranged in rows, and around open plazas, and vast agricultural fields lay outside the city.²

The mound building Indians were agrarian, grew corn and beans for their own people, and traded these goods with remote tribes for needed materials, such as flint in the north, and coral in the south.

AGRICULTURE

The mound builders were known for their farming.

Over the course of thousands of years, American indigenous peoples domesticated, bred and cultivated a large array of plant species. These species now constitute 50 –60% of all crops in cultivation worldwide. In certain cases, the indigenous peoples developed entirely new species and strains through artificial selection, as was the case in the domestication and breeding of maize from wild teosinte grasses in the valleys of southern Mexico.

...Many crops first domesticated by indigenous Americans are now produced and used globally. Chief among these is maize or "corn", arguably the most important crop in the world. Other significant crops include cassava, chia, squash (pumpkins,
zucchini, marrow, acorn squash, butternut squash), the pinto bean, and most common beans.\textsuperscript{3}

Specialization in farming and hunting meant that there were others who built and protected their city, others who devoted their time to handcrafts, and yet others dedicated to watching the sun, and plotting out the directions of sunrise and sunset at equinoxes and solstices. Today, these people would be called prehistoric astronomers, or \textit{skywatchers}.

\textbf{ASTRONOMERS}

One of the ways they plotted the directions of the sunrise and sunset is a structure known today as "Woodhenge." It consists of several circles of post holes that were discovered to the west of \textit{Monk’s Mound}. These circles are believed to have been used to mark the equinoxes, and possibly signaled the times to plant and harvest.

The above illustration shows the construction of the circle of poles. Note the direction of the shadows cast by the poles in the sunlight.

An extensive account of the discovery of the post holes, and their supposed significance are provided at this website: \url{http://cahokiamounds.org/explore/cahokia-mounds/woodhenge}.

The above photo was taken from near the center pole, looking eastward toward Monk’s Mound. Unfortunately, the photo was taken on a cloudy day, so the sun and the shadows cast by the poles are not apparent. There are three poles with white wrapping, signifying the direction of the sunrise at summer solstice on the left (north), equinox due east, and winter solstice to the right (south).
This archeological, astronomical structure is named after a similar wooden structure located in England.

The term “henge” is often incorrectly thought to mean a circular structure of stone. In fact, henge refers to an enclosed structure made of compressed earth containing a ditch on the inside of the bank, giving the perception of keeping something inside the enclosure, rather than keeping something, or someone, outside of it.⁴ The ages of the English Woodhenge precede the North American Indian Woodhenge.⁵ This suggests that knowledge of astronomical alignments may have been carried with the tribe migrating from northern Europe to North America.

MIGRATION
Furthering this suggestion is the observation that the native people on the east side of North America resemble the stature and facial profile of some very early Norse explorers, whereas the western natives resemble the stature and facial features of oriental people.

Several years ago, this writer prepared a term paper for a course in Genetics locally at Johnson County Community College. The Y-chromosome of migrating people groups studied by Dr. Spencer Wells was compared to the *Table of Nations* that is found in Genesis chapters 9 & 10.

Dr. Robert Carter of Creation Ministries International (CMI) discussed this study by Dr. Wells when he compared the mitochondrial DNA of the people groups. You can see the paths of people groups A, B, C, and D from Asia to the Western Hemisphere, or New World.

![Human mtDNA Migrations](image)

Notice the dotted line connecting the “X” of northern Europe to the “X” in midwestern America. This backs up the next two references in *National Geographic* and *Nature*, that there is a strong connection with northern Europeans to North American native Indians.⁶

I discovered that the paths of human migration around the earth shown above, agree to a remarkable extent with the *Table of Nations* in Genesis. There is one arrowhead missing from the map. It should show the migration from the Middle East -- Babel -- towards Africa, not *out of* Africa, as is commonly taught by secular evolutionists. This detail was discussed by CMI geneticist, Dr. Carter:

> It comes as a surprise to most people to hear that there is abundant evidence that the entire human race came from two people just a few thousand years ago (Adam and
Eve), that there was a serious population crash (bottleneck) in the recent past (at the time of the Flood), and that there was a single dispersal of people across the world after that (the Tower of Babel). It surprises them even more to learn that much of this evidence comes from evolutionary scientists. In fact, modern geneticists have uncovered an abundant testimony to biblical history.7

AFTER THE FLOOD
The last remaining significant reference in the Bible that will help us build our model of human genetic history is called The Table of Nations. It is found in Genesis. The Table of Nations is a record of the post-Babel tribes, who they descended from, and where they went. If the Bible is an accurate source of history, one might expect to be able to find a significant amount of evidence for the Table of Nations in genetic data. The truth is not that simple, however, and it is important to keep several things in mind. First, the account was written by a person in the Middle East and from a Middle Eastern perspective. It is incomplete in that there are huge sections of the world that are not discussed (sub-Saharan Africa, northern Europe, most of Asia, Australia, the Americas, and Oceania). It also reflects a snapshot in time. It was written after the dispersion began, but not necessarily before the dispersion was complete. Indeed, much has changed in the intervening years. People groups have migrated, cultures have gone extinct, languages have changed, separate cultures have merged, etc. The history of man has been full of ebb and flow as people mixed or fought, resisted invasion or were conquered. The history of man since Babel is very complicated. Modern genetics can answer some of the big questions, but answers to many of the smaller details may elude us forever.

This is an important topic for the creation model. The world does not look at the Bible in a favorable light. In fact, it disparages it, sometimes with open hostility. Attacks are often centered on the claim that the Bible is not reliable on historical grounds, and if the history of the Bible is inaccurate, what about the theology? Think about what Jesus told Nicodemus in John 3:12, “If I have told you earthly things and you do not believe, how will you believe if I tell you heavenly things?” Many people today see no history in the Bible; therefore, the spiritual implications are meaningless to them. What would happen for evangelism if the history of the Bible turns out to be true after all? [Emphasis added.]8

In addition to the above findings by Dr. Carter, there is recent DNA evidence from secular scientists, that as much as 1/3 of Native American DNA is closely linked to northern Europeans "This study changes this idea because it shows that a significant minority of Native American ancestry actually derives not from East Asia but from a people related to present-day western Eurasians," Willerslev said. "It's approximately one-third of the genome, and that is a lot," he added. "So in that regard I think it's changing quite a bit of the history."9

While the land bridge still formed the gateway to America, the study now portrays Native Americans as a group derived from the meeting of two different populations, one ancestral to East Asians and the other related to western Eurasians, explained Willerslev, whose research was published in the November 20th edition of National Geographic.
Another recent article corroborates this discovery. "Evidence from DNA of Upper Palaeolithic
Siberian genome reveals dual ancestry of Native Americans"\textsuperscript{11}

The MA-1 mitochondrial genome belongs to haplogroup U, which has also been found at high frequency among Upper Palaeolithic and Mesolithic European hunter-gatherers, and the Y chromosome of MA-1 is basal to modern-day western Eurasians and near the root of most Native American lineages. Similarly, we find autosomal evidence that MA-1 is basal to modern-day western Eurasians and genetically closely related to modern-day Native Americans, with no close affinity to east Asians. This suggests that populations related to contemporary western Eurasians had a more north-easterly distribution 24,000 years ago than commonly thought. Furthermore, we estimate that 14 to 38% of Native American ancestry may originate through gene flow from this ancient population.\textsuperscript{12}

In the above articles, feel free to drop zeros from the ages. I.e., change “24,000” to “2,400,” for example. As usual, scientists like to throw in lots of zeros for effect. They do not have evidence for the ages, just guesses. Our dates are not guesswork, but are based on biblical evidence.

Join us on the Lynn Lemons Memorial Safari this coming Labor Day Weekend. (Remember, all safari participants must register in advance, on the CSA Safari page.)

\textsuperscript{1} \url{http://cahokiamounds.org/explore/}
\textsuperscript{2} \url{http://cahokiamounds.org/learn/}
\textsuperscript{3} \url{https://en.wikipedia.org/wiki/Indigenous_peoples_of_the_Americas}
\textsuperscript{4} \url{https://en.wikipedia.org/wiki/Bluestonehenge}
\textsuperscript{5} \url{https://en.wikipedia.org/wiki/Woodhenge}
\textsuperscript{6} \url{http://creation.com/noah-and-genetics}
\textsuperscript{7} Ibid.
\textsuperscript{8} Ibid.
\textsuperscript{9} \url{http://news.nationalgeographic.com/news/2013/11/131120-science-native-american-people-migration-siberia-genetics/}
\textsuperscript{10} Ibid.
\textsuperscript{11} \url{http://www.nature.com/nature/journal/v505/n7481/full/nature12736.html}
\textsuperscript{12} Ibid.

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Too far away to attend CSA meetings?
Why not attend via audio or video tape?

Attend CSA Meetings by ordering the audio ($5) or video ($13) copy.
A full list of what is available can be found in a link at:

\url{www.csama.org}
To order, request by meeting date and topic. Copies of above items may also be borrowed from...

The CSA Lending Library
8904 Mastin
Overland Park, KS 66212
(913) 492-6545

Help Wanted

CSAMA is seeking an editor for, and contributors to, our newsletter. If you are a born-again Christian, believe the Bible is the infallible word of God, subscribe to the literal 7-day creationist viewpoint, if you have researching and writing skills, and if you have suitable ideas for articles to contribute to our publication and can meet a monthly deadline schedule, please contact the newsletter webmaster via the link at www.csama.org.

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Keokuk, Iowa Geode Hunt

by Douglas Roger Dexheimer

This is a supplemental article associated with the 2015 Lynn Lemons Memorial Labor Day Safari. We’ll discuss the Keokuk geodes found in the Warsaw formation. This formation is exposed in approximately a 50-mile radius around Keokuk, Iowa. This layer also extends into Illinois and Missouri. Although geodes in this layer are found in 3 states, they are still referred to as "Keokuk geodes."¹

There are a number of websites that feature the Keokuk geodes, and how to find them. Here are just a few:
http://wheretofindrocks.com/field-trip-midwestern-geode-localities/
http://wheretofindrocks.com/rockhounding-101-how-to-really-find-minerals-and-rocks/
http://www.rocksforkids.com/2how.html (This last site has a good discussion of crystal growth in geodes and elsewhere.)
The Keokuk geode formation is characterized by two distinct geode-bearing layers: a gray shale layer, and a brown, carbonate-rich, clay layer.

The lower level is made of a gray shale. The shale is very hard and the geodes do not come out easily. These geodes are very clean on the inside and don't require much cleaning once opened.
The geodes can be dug out of the gray shale using rock hammers, chisels, pry bars, sledge hammers, and paleopicks.

The second layer is a brown carbonate-rich clay. This layer is much softer than the gray shale. It produces many more hollow geodes. Geodes can be extracted from the brown clay by using a paleopick, rock hammer, or even a small shovel (spade). The geodes in this layer require some cleaning once opened due to some iron and calcium deposits that have coated the quartz crystals during formation. If you're not one to dig, many rivers and creeks in the Keokuk area have cut though these two layers and weathered out the geodes, which can be easily picked up along the bottom of the water way or on rockbars and sandbars.

Geodes from the Keokuk area contain a variety of minerals, but quartz is dominant in most. Beautiful transparent to white quartz crystals cover the interior walls of many geodes. Chalcedony forms the outer shell in all Keokuk geodes. White, gray, blue, yellow or orange chalcedony also encrust the interior walls of many geodes. Calcite is common and occurs in many crystal habits and colors. An additional 17 minerals have been identified in Keokuk geodes; some of the more noteworthy include: kaolinite, dolomite, pyrite and sphalerite.²

Sphalerite on Quartz³

Barite on Quartz⁴
The special *Wheeler-Rex 590 Soil Pipe Cutter* (shown above) is the best way to open a geode. The photos on the webpage linked by footnote 5 illustrate the use of this tool. At least one of these special tools will be available on the safari -- no need to buy one of your own, unless you plan to open many geodes.

The techniques of opening and cleaning the opened geodes are spelled out in detail on the website.5

If you intend to participate in this safari, please register on the *csama.org* safari signup page, so that proper arrangements can be made in advance. Some of the best geode "mines" may charge for access.

**NOTE: PROPER PERMISSION MUST BE OBTAINED BEFORE ENTERING THESE AREAS. MOST OF THE GEODE-BEARING CREEKS AND RIVER ACCESS LOCATIONS ARE ON PRIVATE PROPERTY.**

1 [http://www.keokukiowatourism.org/geode.htm](http://www.keokukiowatourism.org/geode.htm)
3 [http://www.firstcrackgeodes.com/showcase_specimens.html](http://www.firstcrackgeodes.com/showcase_specimens.html)
4 Ibid.
You are invited to attend all of the monthly meetings, and as many of the safaris as you can fit into your schedule. Pass the word. Tell your friends and neighbors about CSAMA and our activities. Show them how to subscribe to the **CSAMA Newsletter**. Never miss an opportunity to debunk the "millions-of-years" notion that evolutionists insist is necessary for life as we know it.

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**We’d love to hear from you!**

If you have questions or comments, or if you have suggestions for making our newsletter better, please feel free to contact us. We’ll do our best to respond to every query.

*Thank You!*
*The Editor*

(Use the editor link on the contact page at [www.csama.org.](http://www.csama.org/))

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