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A complete iron meteorite and a slab of a stony-iron meteorite from Dennis Bomke's collection

Meteorites 101 – An Introduction to Meteorites

A presentation by Dennis Bomke, LOESS Member, Riddle Hill Rocks

What's a chondrite? Every wonder what all the terms are that you see in the news when a meteorite falls? This program will describe what meteorites are, where they come from and how they are classified. There will also be a sampling of meteorites and reference materials for you to look at.

Workshop News

This coming month we have several workshop options! **Jim Reynolds** is back on his feet. But of course you knew that - I mean, who else's feet would he be on? That'd be just silly if he borrowed someone else's feet!

Jim has given me the following schedule. He will have sign-up sheets out at the meeting on the 24th or you can call him between 9 am and 7 pm at [redacted]

Saturday March 1:	AM and PM sessions
Monday March 3:	Evening session
Tuesday March 4:	AM and PM sessions
Wednesday March 5:	Evening session
Thursday March 6:	AM and PM sessions

We also have wire wrapping March 22nd, hosted by **Doris Keene** with **Margaret Jacinto** assisting. We will have sign up sheets at the meeting.

Workshop Opportunity

Dave Fitch, President of the Peoria club and a member of LOESS, wants us at LOESS to be aware that they have a lapidary workshop in Pekin and it is open to anyone. It is at the Miller Senior Citizens' Center, 551 S. 14th Street in Pekin, just south of the lake at Mineral Springs Park. It is every Thursday evening 6-9 PM (5th Thursday of the month excluded). There is a $3 fee that goes to the Center and a donation box for supplies. We have two grinding stations with 8" 80 and 200 diamond wheels and then sanding belts 200, 400, and 600. Polishing is on a 12" bull wheel. A smaller 6" trim cuts your slabs to shape. We typically have 4-6 people but can accommodate 10 very friendly participants. Again, it is open to all. It is operated by members of the Peoria PAS Geology Group, but not affiliated with them. For more information, Dave can be contacted at [redacted] **2714** or Jeff Becker at [redacted] We are very friendly - no biting allowed.

CALENDAR OF EVENTS

FEBRUARY

24: NEW DATE!! LOESS Membership Meeting, Illinois State Museum, 7:00 PM

MARCH

8-9: Macomb GESCI Show - For questions, contact Colleen Kugler [redacted] or ckugler@frontiernet.net

17: THIRD MONDAY - LOESS Membership Meeting, Illinois State Museum, 7:00 PM

22: Wire Wrapping Workshop - Sign-up at the meeting or contact **Doris Keane** at [redacted]

22: Field Trip - First 2014 trip, destination TBA

APRIL

26-27 Decatur, IL - 63rd Central Illinois Gem & Mineral Club - Macon Co. Fairgrounds, 9 AM -6 PM Saturday, Sunday 10 AM - 4 PM

21: THIRD MONDAY - LOESS Membership Meeting, Illinois State Museum, 7:00 PM

26: Field Trip - destination TBA

Rock Clips

EW

Speak of the Devil… Frog, that is.

The monstrous 'devil frog', Beelzebufo *ampinga*, lived some 65 to 70 million years ago, during the Cretaceous Period, in Africa. It was about 10 inches across, making it close to the largest frog that ever lived. Recent finds of bone fragments in Madagascar now indicate that it has massive spikes on it's skull and body armor on its back. Probably defense mechanisms against attack by dinosaurs and crocodiles.

The find is also important because the species is clearly related to the horned frogs of South America. This is problematic because the last time South America and Africa were connected was 112 million years ago. This new data then pushes the emergence of the Ceratophryidae family back more than 40 million years than previously believed.

Earth - Cracks???

Have you ever heard a cryoseism? Because our ground is pretty dry, the warm air on Sunday allowed water to seep deep into fissures and cracks. The water flowed down into and around the rock and limestone. When the Arctic cold front came through during the day, the temperature dropped quickly. We all know that water expands as it freezes (the reason why soda cans explode when they freeze and why a milk jug of water will expand to a ball-shape if it freezes). The water in all of these cracks expanded so quickly, it created mini explosions…explosions of water and ice all over the region. These booms aren't enough to physically shake the ground, but they are enough to startle livestock and unsuspecting people!

Help Needed to Continue GESCI show

We are always in need of volunteers to help with the setup on Friday afternoon and during the show on the weekend. Please consider helping out if you are coming to visit and shop. Even just an hour will help relieve someone who has been working all weekend! The bulk of the work has always fallen on those GESCI club members more local to the Macomb area, but we have lost many friends in the last few years, and many should not work as hard as they used to. We really need to pitch in and fill this void, so that the show may continue. If you are interested in helping, contact **Ed Wagner** and I will forward your message on. Emails are best… easiest to disperse.

WHAT'S NEW? AFFILIATION UPDATES:

-adapted from Rock Chatter, Donna Moore, Editor

Geodeland Earth Science Clubs, Inc.

Midwest Federation of Mineralogical and Geological Societies

American Federation of Mineralogical Societies

The GESCI Board met on January 25 to discuss final preparations for the 34th show in Macomb. The theme is "*Rocks, Minerals and Fossils of Illinois*."

We are always in need of volunteers to help with the setup on Friday afternoon and during the show on the weekend. Please consider helping out if you are coming to visit and shop. The bulk of the work has always fallen on those GESCI club members more local to the Macomb area, but we have lost many friends in the last few years, and many are not able to work as hard as they used to. We really need to pitch in and fill this void, so that the show may continue.

The spring Executive Board meeting will be held in Wauwatosa, WI, on May 19. The fall convention will be in Des Moines, IA, on October 18-19. Tony Kapta, President, will be leading the meetings.

LOESS is the sponsor for the MWF Youth Poster Contest. See the insert about it!

The AFMS Endowment Chairman is still looking for some nice prize donations for the raffle, which will be at the Tulsa, OK, AFMS/RMFMS (Rocky Mountain Federation of Mineralogical Societies.) Items should be quality pieces with a retail value of $20 or more. Anything rock related works - from jewelry to minerals and fossils. Even a nice gold nugget would work!!

President's Message

I had a President's message all written out and ready to go, but I can't pass up this opportunity. I thought it would be a lot more fun to write a message from my 5th floor balcony overlooking Clearwater Beach, in Florida. While scratching my sunburn. And drinking an ice cold Dr. Pepper, which is sweating and dripping all over the table (high humidity today…)

Its been a rough week. It gets cold enough in the evenings that we have to put on long sleeves and pants! This early in the year, it only gets into the upper 70's or lower 80's. It's been a problem, staying cool!

So while my girlfriend attends lectures, for continuing education units, I have been left alone to wander aimlessly up and down the beach. I've decided that I much prefer the Gulf Coast to the Atlantic! Warmer water and smaller waves. The waves do bring up a lot of shells, but most are under an inch across. Maybe the best ones get picked up by the early risers though.

Down at the south end of the beach, they are drilling and placing concrete pilings for yet another high-rise hotel or condo unit. I've spent a fair number of hours there – big machines and geology!! Apparently down 30 or 40 feet is where the hard bedrock begins – or as hard as it gets around here. Florida is composed of shallow marine sediments, most of which are very soft and porous. What they think of as 'gravel' around here is not what we think of! All their gravel has shells in it.

After they hit rock, after driving a large steel pipe down, they put a drill down the middle of that and clean out the sediment and continue to drill deeper. Then the hole gets filled with concrete and steel bars, with the steel pipe being pulled back out, by a large jack-hammer working in reverse.

Later in the week Beth and I will be going over to Ruck's Pit, at Fort Drum, FL. If you are not familiar with this spot, there is a layer of shells there that have golden yellow calcite crystals inside. This should be interesting for more than one reason. The crystals are important of course… but this will be Beth's first hands-on experience rock collecting! I just have the gut feeling she will pull the beginner's-luck thing and find the nicest piece. And then she can rub it in. We'll have to wait and see! I have written an article about our experience there, so read about it later on in the bulletin!

Until next month, enjoy the weather. I hate to run, but the beach is waiting!! ***EW***

Secretary's Desk: Business/ Reports

January - 2014

Carole Harp

The Business Meeting was called to order at 7:49 pm.

President's Report - **Ed Wagner** reported there will be a board meeting in February.

Secretary's Report - There were no minutes in December due to the Christmas party.

Treasurer's Report - Dennis Bomke reported an income of $7,259.91, expenses of $6,561.02, and a balance of $19,010.00. Motion to approve made by **Edie Sausaman**, seconded by **Bob Hayden**. Approved.

Program Plans - February will be **Dennis Bomke** with a talk on Meteorites, March will be **Ed Wagner** talking about Mexican Coconut Geodes, April will be **Keith Peregrine** giving a talk on Copper country, and January of 2015 will be Denney Jewelers talking about diamond inclusions.

Field Trip Plans – Field trips are being planned at the next Board meeting.

Workshop Plans - February 15th will be a beading workshop at La Bead Oh, February 22nd will be the stained glass workshop at the Research and Collections Center, **Jim Reynolds** lapidary will be in March, and March 22nd will be wire wrapping at La Bead Oh.

GESCI Liaisons - The GESCI show will be held on March 8th and 9th in Macomb. They are still in need of displays and help with set-up and tear-down.

Show Committee - LOESS is looking for theme ideas for the show this year. Also, we are always looking for new dealers, demonstrators, and exhibits.

Old Business - No old business.

New Business - LOESS is sponsoring the MWF youth poster contest this year. We will be responsible for judging the posters, purchasing prizes, and mailing everything back to the entrants. This year's theme is "Favorite Birthstones". There will be more information in the next MWF newsletter.

Adjournment - Motion to adjourn made by Jeri Hayden, seconded by Margaret Jacinto. Everyone slid out the door at 7:56 pm.

Show-and-Tell

Tracy Motter - 2 picture books she created through mixbooks.com

ROCKHOUND NEWS

Please send information for *Rockhound News* to
loesseditor@gmail.com
or [redacted]

On the Road

Ed Wagner left the white snow for the white sands… of Florida. While there he hunted at the famous Ruck's Pit for fossil clam shells with golden calcite in them. The operation is still alive and well! It may not be the collecting of old, but there are still good finds there to be made.

While there, he ran over to visit with Hugh and Rita Bass, and found Ann Ringdahl there too! Yet this spring, Dennis Bomke is heading down there, so this appears to be the new place for rockhounds to hang out. At least during the winter!

Quite a Find!

With Paleo Prospectors, **Tom Williams** found this Hadrosaur fibula, in North Dakota. It was one of the few things that week that he found. "It really didn't look good when I lifted it out of the ground, it was pretty tore up on the top. So I carefully packed it anyway. The back side was covered with mud, and after three years the mud finally fell off and I had sort of forgotten about it. But after carefully removing it, "Oh WOW," there was some significant bone surface left on the back." Tom handed it off to a restorer, and he said it was thirsty for glue. "It is a lot heavier now than when I found it. So it came out cool!"

On The Road

Dennis Bomke was a fill-in at the Kirkwood, MO show. It sounds like it was a good show, one of the best he has done.

Answers to January Mineral Trivia

A prominent club member, using his geologic skills, solved last month's Junior Activity puzzle without looking at the word list! He's also an artist.

ROCK CANDY is unique because it has two different hardnesses in one crystal.

Q: _____ has the element *strontium* in it, which is used to make bright red fireworks.

A: Too hard for me. My mind is already too full!

BUBBLE GUM is very valuable. It is also *ductile* which means it can be stretched into long, thin wires.

GOLD FOIL WRAPPED CHOCOLATE is also known as "Fool's Gold."

FISH IN PONDS NEAR REACTORS is an important source of uranium for nuclear reactors.

EARTH is the mineral name for nature's magnet.

KIDNEYS can form huge crystals, some as big as 600 pounds.

MY WIFE SAYS MY HEAD is the hardest substance on Earth.

RAIN BARREL is the green variety of the mineral beryl.

MONEY, LOTS OF IT, is used in photography and jewelry.

GRAPES, DUH!, usually grows in rounded masses that look like a bunch of grapes.

Fort Drum Crystal Mine (Ruck's Pit)

by Ed Wagner

When in Rome, well… I don't think it would be wise to do as the Ancient Romans did. But when in Florida, collect fossils! And that's just what I did last week. My girlfriend and I were in Clearwater while she was attending a conference. I had the hard job though – going to the beach. It was pretty rough. Sometimes it was so cold I had to put on long sleeves!

After we were done there, we headed inland to visit for a few days with Beth's parents. They are snow birds, and I'm thinking that's not so bad of a life! I'm thinking of getting a place down there, dying my hair gray, and getting a golf cart as well. I wonder how many golf carts in Florida have never been on a golf course?? We had a nice visit, and while I was down there, I ran over to Punta Gorda to visit with **Hugh** and **Rita Bass**. Low and behold, **Ann Ringdahl** was there too! We all went sailing, which I was hesitant about but it was a lot of fun. Saw a beautiful sunset too! I have to thank Hugh and Rita – just wish I could have had more time there.

Beth's parents also live close to a beach… or rather where the beach was about 2 million years ago. Indications are that this area, about an hour west of the Atlantic shore, was at that time the shore of an embayment, with a peninsula or string of islands to the east. This provided a quiet environment for the population of shallow water fauna. There are indications that the layers with the calcite crystal-filled clams may have resulted from a storm event which scoured the bay floor and deposited the shells on

the shoreline. When clams die, the cartilaginous spring on the hinge opens the shell. This soon rots and the halves become separated. But, in the richest zones of calcite crystals, the clams have both shells tightly closed. This kept sediment out and allowed the unimpeded growth of crystals inside later on. This would indicate rapid burial of live clams, thus some kind of catastrophic event.

Hopefully, later I will have a chance to write a more in depth article, but for now… from the porch of her parents home… while your snow is blowing… I'd like to share our experiences at the pit.

One of the first things I noticed when in Florida is that you can drive forever and never go up or downhill. Everywhere it is flat. We enjoyed a scenic drive on some state and county highways getting over there. It was interesting seeing the agriculture of the area. There are many fields of orange trees and fields of caladium. Lake Placid is the caladium capital of the world. Most of the land seemed to be just pasture for cattle, with a number of mega-cattle operations in business.

Once at Ruck's Pit, the first order of operations was of course to tour his shop and museum. Eddie Ruck, Jr. and his father have amassed some very nice fossils, including a whale

vertebrae, mammoth and mastodon teeth, turtle bones and other land and sea creature bones. Then he showed us what we were looking for and how to dig it. You have to use water because everything is covered in gray sand and dirt. The hunting area consists of piles of the richer material that were mined from the pit.

Right away we were finding small crystals and bits and pieces of clams with crystals inside. It took a while before finding some nicer ones. I switched to a different pile and right away found a nice clam and crystal cluster. That pile yielded a few more pieces and then also seemed to run dry. A third pile yielded my best specimens, with one being a whelk shell. I can't wait to open it on a saw and see what's inside!

So you are probably wondering what to expect if you go hunting there. It is possible to find multi-hundred dollar specimens, but remember that that is the exception. What you will find plenty of is fragments of shell with crystals and free floating crystals. A few shells will have nice crystals inside. You can see from the picture what we found. Of course every load varies in

Fort Drum *cont. on page 7*

Diamond Dan Publications
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Word Search: Mineral Names That Aren't Used Anymore

If you look through old mineral books, you will see mineral names that are not used anymore. Why don't you search for them in this word search puzzle?! The old mineral names are listed below. They can be found diagonally, left to right, right to left, top to bottom and bottom to top.

C	R	O	C	O	I	S	I	T	E	A	B	N	O	T
H	H	O	N	E	Y	S	T	O	N	E	M	O	V	I
R	A	L	L	O	C	H	R	O	I	T	E	S	C	E
I	S	C	A	L	C	S	P	A	R	O	S	E	T	E
S	A	N	D	D	E	S	M	I	N	E	O	L	U	C
T	A	L	B	I	N	T	L	C	T	T	T	I	E	N
I	H	O	L	L	Y	I	Y	I	P	I	Y	T	T	A
A	W	E	S	L	E	Y	T	I	F	T	P	E	I	L
N	H	A	N	N	A	N	F	E	R	A	E	P	X	G
I	T	R	I	S	O	P	Y	R	E	R	C	S	O	R
T	B	O	A	M	I	A	N	T	H	U	S	X	R	E
E	P	L	U	M	B	A	G	O	Y	B	K	J	O	P
D	I	A	L	O	G	I	T	E	A	S	D	F	M	P
M	E	L	K	J	H	T	U	E	T	I	G	E	N	O
B	I	T	T	E	R	S	P	A	R	D	A	N	D	C

Albin; Allochroite; Amianthus; Beaumontite; Bitterspar; Buratite; Calc Spar; Chladnite; Christianite; Copper Glance; Crocoisite; Desmine; Dialogite; Honeystone; Isopyre; Mesotype; Moroxite; Noselite; Onegite; Plumbago

Rocky Bingo

from the Journal of Ron Sharf

reprinted from *Rock Chatter*, WCIRMC, February, 2014

Every year at our Christmas party our rock club plays Rocky Bingo after our dinner and a short meeting. Rocky Bingo is played the same as Bingo, except when you get a bingo you select a bag of rocks from the table. You can't open or squeeze the bag until the end of the game. When the table is out of bags and you "BINGO" you get to take (steal) a bag from anyone at the table.

I and the wife have been asked to provide three bags so out to the garage we go. We find nothing so back in the house we go. We find none so it's back to the garage. We have thousands of rocks and can't even find three to part with. My wife finds a rock so it's back into the house because it's cold in the garage. The wife finally finds a rock I can part with, so only one more rock. I hear the voices, actually my wife, say I can part with one of my 60 slabs. We pick one of my slabs I cut when I had rock saw fever, but that's another story.

I look for our lunch bags, but find none. It's getting close to the time to go to the meeting so I make a quick run to the local grocery store for lunch bags. I go up and down the aisles and don't find any bags. I'm running out of time so I break the man code and finally ask a clerk, there in the school aisle. Back home I put the rocks in the bags, and this year I staple the bags with one vertical and one horizontal staple so I can tell my bags.

We get to the meeting early so I can watch what other members bring in as I know what they collect and can pick certain bags. We get to the meeting and there are quite a few bags already on the table, so all I can do is watch what others bring in.

One of the members has a rock his friend found where it's not suppose to be and as I am telling him about the unusual 500 pound rock I found a half mile up a creek, two people bring in bags of rocks, and I don't see where they put them. As I look over the bags they are stapled three different ways, some are folded different and some are taped.

We have our delicious Christmas dinner and a short meeting so it's time for Rocky Bingo. Round one, we don't dump our cards after a bingo so the game goes faster. I pick a card that has my lucky numbers, 13 and 26, but as the numbers are being called I am not winning any bags. I finally get a bingo and pick a bag that is heavy so I put I gently on the table but it clunks so every one will want it later. The call is made, dump your cards and I only have one bag of rocks. The guy across the table doesn't have any so I don't feel bad.

Round two, there are no bags on the table, so you have to take (steal) one from someone else. As the bingo's are called I win as many as I lose. My heavy bag is the first one I lose and a number of people take (steal) it as the game goes on. The call is made, dump your cards and I end up with one bag again.

Round three, I find myself winning more than I'm losing. I find the heavy bag and have two double bingos so I get the bag the other end of the table has been taking (stealing) from each other. As I get more bingos I take (steal) bags from everyone that took (stole) one from me. Then it happens, my card is almost full and I start losing. Is nothing sacred, even my wife takes (steals) one of my bags. I'm sitting there with no bags and the call is made, the last bingo will be when you fill your card. I'm thinking I still have a chance, but none of my last numbers are being called. Finally my wife calls bingo and she has been watching and takes (steals) the heavy bag. I look at the guy across the table and he has no bags, maybe next year will be better. Everyone had a good time and we will look forward to next Christmas.

Fort Drum *cont.*

quality, but there is enough piles around that I am sure you can find some nice material. If you are anywhere near Fort Drum, it is definitely worth the stop. I don't think it would be cost effective to plan a trip around a visit here, unless you planned on staying several days and moving a lot of material. It doesn't take too long to get your $45 hunting fee back though.

On a personal note, some of the things I enjoyed most were the company. This was Beth's first experience rock hunting, and she enjoyed it! She kept at her pile diligently until mid afternoon. And we were both amused by the chickens running around everywhere. They were accustomed to human attention, but not so much to being picked up! And in a little pen was a baby pig. Eddie said that the pig showed up on his doorstep one day, apparently having been separated from his mother. He was smaller than a cat then, and the dogs were a little hard on him, but he is way bigger than the dogs now! And very much enjoys being petted.

Contact information can be found at www.thefortdrumcrystalmine.com They are open 9 to 5 every day, but you need to call in advance to make sure he will be home.

Meteorite Impact Structures in Missouri

by Dennis Bomke

As a collector and dealer in meteorites, I have an interest in all things related to meteorite falls. In addition to the meteorites themselves, that includes various types of impact material – breccia, melts, shatter cones, tektites, etc. It is always good to add new items to your collection, but it adds context to the specimen when you can go into the field and actually look for and find them. For some time, I have been aware of several impact structures located in Missouri and actually have a specimen from one of them. Since Missouri is a short drive from central Illinois, I decided the fall would be a good time do some research for a field trip.

As I began researching the impact structures, I found that there are three of them on a roughly east-west line along the 38th parallel in south central Missouri (Figure 1). There are eight roughly circular structures that occur along this line from Illinois to Kansas. From east to west they are Hicks Dome, Avon, Furnace Creek, Crooked Creek, Hazelgreen, Decaturville, Weaubleau-Osceola and Rose Dome (Mulvany 2004). After the impact of the Shoemaker-Levy 9 comet on Jupiter in 1994, Rapino and Volk (1996) proposed that they could be the result of a serial meteorite strike in the late Mississippian or early Pennsylvanian periods. This has met with a lot of skepticism from geologists for several reasons; there are only relatively firm dates for a couple of the structures so it cannot be determined if they even occurred at the same time, Hicks Dome is most likely of volcanic origin and the much weaker gravitation field of Earth (relative to Jupiter) makes the creation of a meteor chain needed to create a string of craters very unlikely. Of the eight structures, Decaturville, Crooked Creek and Weaubleau-Osceola are the only ones currently recognized as meteorite impact craters. Significant additional research will need to be done at these sites to determine if any two or more of them may be from the same meteor.

Figure 1. Map of Missouri showing the locations of three meteorite impact structures.

Crooked Creek Impact Structure

The first stop was the Crooked Creek Structure, which is located in southwestern Crawford County, Missouri, southwest of Salem. The structure is approximately 7 km in diameter with an age of 320 (+/- 80) MYO. The probable impactor was an iron-nickel meteorite with a diameter of 250 meters and weighing 65 billion tons (Mulvany 2004). It appears to be a complex impact structure with a central uplift surrounded by a ring graben. The area is heavily eroded and there are not many exposed rock structures. The Crooked Creek structure was first determined to be the result of a meteorite impact by Hendricks (1949, 1954) and subsequently confirmed by a number of

Photo 1. Crooked Creek impact breccia.

additional researchers.

The Association of Missouri Geologists (AMG) sponsored a field trip to this structure in 2004 (Mulvany 2004). The guide for the field trip covers the geology of the structure and has a road log with descriptions of the stops. It is a very good reference if you plan to visit the area. Another good source of information on the three Missouri impact structures as well as those around the globe is the web site www.impactcraters.us

My plan was to follow the road log from the AMG field trip investigating those sites that were publicly accessible. Rock exposures along the roadways are minimal and some pieces of float can be found in the ditches. Following the notes in the road log and observing the topography gives you a good idea of how the impact structure fits into the landscape. There are a couple of exposures along State Route VV both north and south of the intersection with Beers Road. They contain cobble to boulder size pieces that consist of heavily brecciated chert and quartz sandstone. I collected a number of specimens from these locations. The material is very loosely cemented and difficult to cut into large slabs. This may be due to weathering of the exposed material or just the fact that the matrix material does not do a very good job of cementing the breccia together. Photo 1 is a representative slab of the material that can be found at the location on SR VV, south of Beers Road.

Decaturville Impact Structure

The next stop on the trip was the Decaturville Impact Structure. The Decaturville Structure is located in Camden and Laclede Counties, Missouri, near the town of Decaturville and about 15 miles south of the town of Camdenton. The crater is approximately 6 km in diameter with an age between 270 and 320 MYO. The crater consists of a central uplift and surrounding structural depression. The area is heavily eroded with rock exposures in road and ditch cuts. Although postulated to be the result of an impact as early as the mid-1930s, it was not until the 1970s when conclusive evidence was presented. Offield and Pohn, presented preliminary information in 1970 and 1971 and more detailed publications in 1977 and 1979 describing the geology of the impact structure.

An excellent reference on the impact structure is the USGS Professional Paper 1042 by Offield and Pohn, 1979. Another good reference can be found at www.impactcraters.us/decaturville_missouri

Missouri Highway 5 runs through the eastern part

Photo 2. Decaturville crater fill breccia.

Photo 3. Decaturville road cut showing folded and fractured layers.

Photo 4. Decaturville close up of brecciated material in road cut.

Photo 5. Decaturville impact breccia.

of the impact structure crossing the crater rim and into the center of the crater. I began my visit traveling Highway 5 to the north to get an overview of the site and then began working back south looking for rock exposures. The first exposure was in a ditch located between Highway 5 and Crater Hill Road north of CR 5-133. The ditch was eroding into the underlying bedrock. This was heavily brecciated and banded material that is primarily heavily fractured chert. A slab of this material can be seen in photo 2.

The next stop was farther south along Highway 5,south of the intersection with CR 5-987. The extensive road cut on the east side of Highway 5 is a cut through the southeastern rim of the crater. This road cut exhibits extensive folded and steeply dipping beds (photo 3). There are beds of heavily brecciated material with clasts that range in size from smaller than pebbles to boulder size (photo 4). I collected several specimens from this area. Photo 4 is a slice from one of those.

Weaubleau-Osceola Impact Structure

The last stop on my tour of Missouri Impact Craters was the Weaubleau-Osceola Impact structure. It is the westernmost of the three craters. The Weaubleau-Osceola structure is located in St. Clair County, Missouri, near the towns of Osceola and Collins. The crater is 19 km in diameter with an age between 320-340 MYO. At 19 km, it is one of the 50 largest craters in the world and it is one of the four largest in the United States (Evans, et. al. 2003). The Weaubleau area was identified as an area of deformed structure in the 1950s, but was not recognized as a meteorite crater until 2003 (Evans 2003). This area is heavily eroded and because of that and the relatively recent identification as a crater there are still a lot of questions about this site.

The AMG sponsored a field trip to this structure in 2003 (Evans, et. al., 2003). The guide for the field trip covers the geology of the structure and has a road log with descriptions of the stops. It is a very good reference if you plan to visit the area. Another good source for information on the three Missouri impact structures as well as those around the globe is the web site www.impactcraters.us.

Missouri Highway 13 crosses the western side of the structure. The road log from the field guide begins in Springfield, Missouri, but I began in the town of Collins. As with the Decaturville site, I started on the south end and followed Highway 13 north to the town of Osceola getting an idea of the roadsides along the way. There was one large stretch of road cuts along the west side of Highway 13 south of CR SE 400. I parked on the frontage road west of Highway 13 and then walked the road cut. The material found at this location is a polymict breccia, informally known as "Weaubleau Breccia" (photo 6). The yellow color in this material is due to weathering of iron-rich minerals (Evans, et. al., 2003). In the specimens I collected, the clasts were generally smaller than 1 cm with an abundance of small grain sized particles. The clasts consisted of various colors of chert, hematite, some siltstone and a few small pieces of crinoids.

Some interesting components found in the "Weaubleau Breccia" are round rocks called "Weaubleau Eggs". They are spherical nodules of chert that have nucleated mostly around siltstone clasts (Evans, et. al., 2003). Evans postulates that these were formed diagenetically around siltstone particles that were blast products along with the breccia matrix that later became silicified. Photo 7 shows a "Weaubleau Egg" in situ, along with some of the larger clasts weathering out of the matrix.

Summary

This trip provided the opportunity to get a good look at three meteorite impact craters and collect a variety of impact material. Reviewing the literature, both before and after the trip, provided me with a good deal of new information on

meteorite impact structures. It also pointed out how relatively recently some of these structures were confirmed as meteorite impact craters and how much is still unknown about them.

For those interested in meteorite impacts, these locations provide relatively easy access for geoscience outings. I expect I will be returning to these sites in the future to explore more of the back roads and looking for permission to explore on private property.

Photo 6. "Weaubleau Breccia"

Photo 7. "Weaubleau Breccia" in situ with "Weaubleau Egg"

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