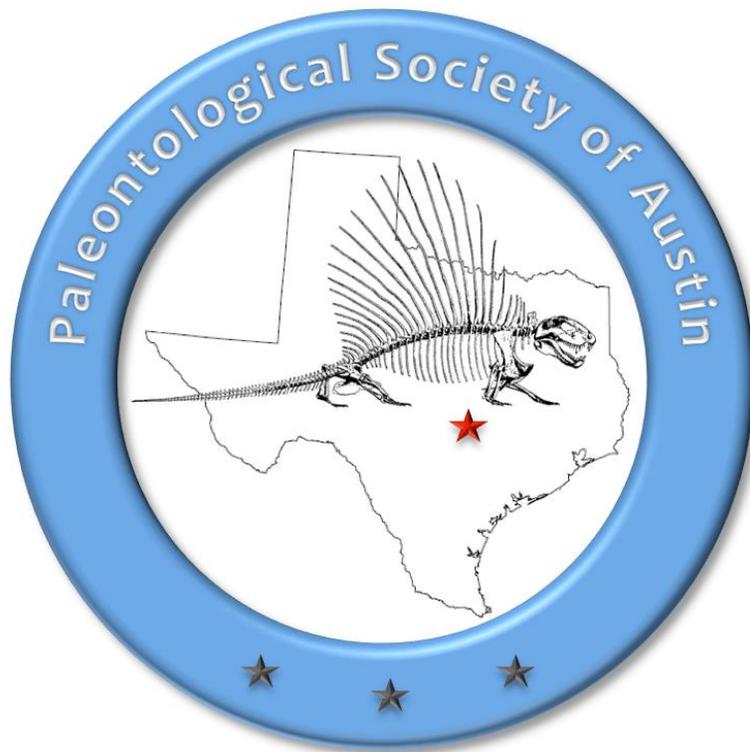


# Paleo Footnotes

Newsletter of the  
Paleontological Society of Austin

Austin and Central Texas



Volume 9, Number 10  
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## President's Note

Outreach, outreach and more outreach. We have had a busy month and it ain't over yet. I'm going to insert reports on Gem Capers and Pioneer Day by Suzanne and mention our last two events: National Fossil Day at Texas Memorial Museum as well as a presentation to Cub Scout Pack 91.

But the biggest outreach event our club puts on is the one for which we need all of our members to take part in: Fossil Fest. Please help us make this event a great success and sign up to do some volunteer hours at the show. And if the slots available do not seem to match what you think you can handle or are interested in send Suzanne an email and we can find something for you to do that fits.

**PLEASE, ALL MEMBERS OF PSA, WE NEED MORE VOLUNTEERS FOR FOSSIL FEST! Don't be shy; we know you're out there...**

See you Tuesday,

-- Erich



**Next Meeting**  
**Tuesday October 21, 2014**  
**7:00 p.m. at the Austin Gem and Mineral Society building**  
**6719 Burnet Lane, Austin, TX**

## **Rhinos and Pathology: from 50 million years to the present**

Kelsey Stilson

Arthritis is one of the most common skeletal pathologies, occurring in one-sixth of humans. Rhinocerotids provide a natural system for understanding the evolutionary underpinnings of arthritis. The severity and prevalence of arthritis in Rhinocerotidae increases substantially from 50 million years ago to the present. All five living species of rhinoceros develop arthritis before they reach maturity. Fossil rhinoceros relatives from 50 million years ago (Ma) show a dramatically different pattern of arthritic development. What changed from 50 Ma to today? Rhinos became graviportal, evolving from *Hyrachyus eximius*, which was about the size and shape of a medium-sized dog, to the one-ton, stout-limbed animals of today. Despite this order of magnitude increase in size, rhinos also consistently display cursoriality (the habit of running) through time. These competing factors of increasing size and cursoriality provide a possible driver for the prevalence of arthritis. This study traces the history of arthritic development in the rhino lineage, finding that the distribution of arthritis is related to increasing body size, but that there are also clearly evolutionary effects determining its prevalence. This study is especially important because it examines an apparent pathology that persisted and even worsened despite millions of years of evolution that should have selected against it.

This study has not only long term applications to rhino conservation and an understanding of deep time, but can also contribute to a population-level understanding of the crippling disease of arthritis in both humans and the farm animals we have come to rely on.

About our speaker:

Some of my colleagues have been obsessed with dinosaurs all their life, but I was more of a "future starfleet cadet" when I was a kid. I grew up in Portland, Oregon, and wound up going to the University of Oregon in Eugene (both cities still claim to have the "original" Saturday Market). I was a Biology major in college until a job rejection landed me with no choice but to volunteer at the Paleontology Lab. I spent a long summer measuring eye sockets and sorting fossils. These are the sort of tasks they give to weed out the non-committal undergrads from the stubbornly persistent. Before I knew it I was switching majors, going to conferences, joining field expeditions, and discovering my passion for science. I helped dig up everything from giant saber-tooth salmon to horse teeth and microfossils. UO focuses primarily on mammal fossils because Oregon didn't exist for much of the Mesozoic (and let's not even talk about the Paleozoic...). For my senior thesis I decided to collect data on rhino pathologies from four (now five) different museums and analyzed the data over 50 million years (paper pending). Paleopathology is not a normal science, which is precisely the way I like it.

Currently I am working towards a Masters at the University of Texas at Austin under Professor Bell. I am studying the osteology (bone characters) of Australian Agamid Lizards (which are neither large, mammals, nor particularly pathologic). You've probably seen video clips of these lizards running upright with a giant display frill or collecting water between their large spines. I hope to continue on to my PhD next year, either at UT or somewhere new. That part of my life is still shrouded in mystery, for now.

## **Next Field Trip**

**October 25, 2014 - Meet at 8:00AM**

## **Lake Texoma**

Meet at 8:00 am Saturday morning at the entrance to Eisenhower State Park. Unless you want to leave at three in the morning, you will need to drive up the night before. Plan to stay overnight in the Sherman area. We will be collecting Sunday morning as well.

We will be going to a variety of sites. Some of these include large ammonites, so be prepared. You will definitely want your hammers and chisels to remove specimens, and backpacks, as you will be walking a fair ways along the lake shoreline. It goes without saying you will need lots of water or equivalent, sunscreen, a good hat, food, etc.

If you need more info contact Ed Elliott ([fieldtripchair@austinpaleo.org](mailto:fieldtripchair@austinpaleo.org) or 512-657-7581)

### **Meeting Minutes of Paleo Society for 9.16.2014**

Erich rounded up everyone, many of whom were making packets for our upcoming Gem Capers booth, and called the meeting to order at 7:07 by acknowledging the packeteers. He said that Pam Owen's talk tonight was coming up. But first, with himself and his family present, we officially and personally presented Asas Husain his recent journalistic awards from The South Central Federation of Mineral Societies and The American Federation of Mineralogical Societies, both of which are First Place awards, accompanied by certificates and a badge. Then Pam Owen presented her talk for tonight on Texas Memorial Museum. She informed us that she is the new Director of Operations for TMM. Pam gave us the interesting history of the origins of TMM with many pictures, detailing the impressive original 1939 Texas Centennial science exhibits at Gregory Gym, the enthusiastic public attendance and the resulting creation of The Texas Memorial Museum. Some of the popular exhibits include the Onion Creek Mosasaur, beautiful taxidermy animal displays, mammoth and mastodon displays and dinosaur trackway exhibits. Ms Owen then announced that, after a recent tumultuous period of uncertainty, Texas Memorial Museum is open! She reviewed with us their layout of main exhibit areas, Geology/Paleontology, The Great Hall, Wildlife and Biodiversity areas. She showed slides of then and now, and explained some of the quality renovations that the Museum has undergone as well as the present features such as Dr. Ann's discovery drawers, the paleo lab, educational and student programs. Pam outlined so much of what makes TMM great also: the re-mounted mosasaur, the spectacular flying Texas pteranodon *Quetzalcoatus northropi*, the Hall of Texas wildlife exhibits, the Mustangs and saber-tooth cat bronze sculptures, the great heritage of Texas paleontology exemplified by scimitar cats from Friesenhahn Cave, and the excellent dioramas. Pam then moved on to explain the present TMM governance and programs, and the public's hours, which are Tue through Sat 9-5. TMM is planning a big event for National Fossil Day, Oct 15 and our society is invited to have its own exhibit table there as well. Pam fielded questions about what and where many of the collection are there, such as archaeology and pottery. Erich, Mike, and Melvin signed on to being there on Natl Fossil Day. Erich called for other volunteers to do likewise. After the break, Erich complemented Pam's presentation. The Treasurer's report was not given, and the previous month's meeting minutes were unable to be approved due to not being available. Visitors were welcomed, including Valerie from Fredericksberg, Christine's mom, Don and Jean from Dallas, and Christina and Grayson. Then Suzanne talked about Fossil fest

## FOSSIL FEST

WHEN: November 15 & 16, 2014 ~ Saturday & Sunday, 9 am to 5 pm

WHERE: Old Settlers Association, 3300 Palm Valley Blvd., Round Rock, TX (on Hwy. 79, next to Dell Diamond)

SHOW THEME: Discover Ice Age Texas!

GOOD NEWS: SOLD OUT! All large and small dealer/exhibitor booths are sold!

BAD NEWS: There are many volunteer slots that remain open. We need *at least one* volunteer at each activity for it to open and many require two volunteers to operate smoothly. Currently, there are 19 slots on Saturday and 27 slots on Sunday that do not have any volunteers. We will have to shut down activities if they remain unfilled.

GOOD NEWS: We still have a few weeks to fill these slots! **Sign-up online as a Fossil Fest Volunteer at [www.mysignup.com/fossilfest](http://www.mysignup.com/fossilfest)** - the passcode is paleo.

VOLUNTEERISM: Keep Calm and Fossil On! I am grateful and deeply appreciative of our Fossil Fest volunteers. It takes a village to put on one of these events. *It's a mad, mad but rewarding world!* There are many different jobs to choose from - whether you prefer manning the Admissions Desk, magnifying fossils under the microscope, helping out in the Kitchen, talking to kids about the touch table fossils, spinning the Wheel of Fossils, watching kids dig up fossils or helping with the make & take craft - there's something for everyone! You can even sign-up to donate bottled water to be sold during the show. If you can't donate your time at Fossil Fest as a volunteer, please consider these other valuable options: donate funds to the Kitchen to offset food costs, purchase bottled water as a Kitchen donation, spread the word about Fossil Fest via email or social media (friends, family, co-workers, teachers, Scout/Youth leaders), post to local nature clubs or other related online forums, print the Fossil Fest Show Flyer (on our website at [austinpaleo.org/fest](http://austinpaleo.org/fest)) and tack to community bulletin boards (at your local coffee shop, restaurant, library, office break room, book store, etc.).

GOT FOSSILS?: It's time to bring all your fossil donations to this meeting! We need lots and lots of CLEAN cast off fossils for the DIG PIT (small) and SPINNING WHEEL (bring what you would want to take home). Keep this in mind when you're out collecting: if you come across an outcrop with a lot of a particular fossil, please pick up extras for the fest! Please give thanks to David Lindberg and Dax Gonzalez! David has been diligently assembling the teacher kits this year. Dax Gonzalez is sorting all the fossil donations and ensuring that there is always a good mix of fossils on the Wheel of Fossils board at all times.

DISPLAY CASES: Please email [showchair@austinpaleo.org](mailto:showchair@austinpaleo.org) if you have Pleistocene fossils. We're looking for ice age fossils to display and flank our theme show case. Also, we still have 7 display cases to fill! We would love to see those fossils you worked so hard to collect - in searing heat, ankle deep mud, slippery slopes, capsizing canoes or finger numbing cold! So start sorting through your fossils now! Additionally, it would help us teach some key TEKS (Texas Essential Knowledge and Skills) concepts to students. If you're in need of display case ideas, please consider:

A display of how a plant or animal becomes a fossil

Examples and a brief description of changes to an organism over time

Collection of a particular organism and their structures

One organism - characteristics used to identify it with samples and diagrams

A fossil and display showing what we were able to learn about the type of climate / environment the organism would have been in while living - deep ocean/shallow ocean, cold/warm

temperature, turbid/calm environment, etc - this may be one for one of our university grad student / researcher / professor

**ADVERTISING:** I am very pleased to announce that we will be publicizing Fossil Fest in an Austin events and entertainment guide with a reach of 65,000+ monthly visits, 85,000+ page views, 37,000+ Facebook fans, 12,000+ email subscribers and 2,200+ Twitter followers. We will be monitoring our Grand Door Prize tickets to see how many attendees heard about us through this forum.

**PALEO PASSPORTS:** Melinda Falk, our in-house science educator, is revamping our educational quest, the Paleo Passport, with Ice Age Texas content. Melinda and I have been visiting museum exhibits at the Texas Memorial Museum and the Mayborn Museum in Waco as part of our Pleistocene research. I'm grateful to Frederick Falk who will be doing all the desktop publishing of the Paleo Passport.

**GRAND DOOR PRIZES:** Mike Smith is printing and cutting the gazillion Grand Door Prize tickets for this year's show. Thanks Mike! Watch our website ([www.austinpaleo.org/fest](http://www.austinpaleo.org/fest)) for updates and photos of our Grand Door Prizes.

**DIGITAL MARKETING:** A series of Fossil Fest emails has been sent out to club members, former attendees, SCFMS officers, Austin area teachers and Scout/Youth groups via our email service provider, Vertical Response. The Show Committee began this digital campaign two years ago and it has proven to be very effective and provides a significant cost savings to the club (as opposed to sending via snail mail). Please join me in thanking our webmaster, Gordon Galligher, for converting all the word documents and images into compatible formats for sending via email and monitoring the open and click through rates.

**DEALERS/EXHIBITORS:** All Fossil Fest booths are SOLD OUT and we have dealers on a waiting list! Dealers/Exhibitors include: AGMS, The Dig (Jason Petersen), Dinosaur George (George Blasing), Jack Grant, Monarch Mineral & Fossil (Marc Villarreal), Natural Selection Enterprise (Joe Bone), Nature's Treasures (Karen Richards), Don Painter (FL fossils), Red River Paleontology (Wayne Mandrell), Shu's Rocks & Minerals (Chuck Shuler) and Teredo's (Doug Vanderford),

### OUTREACH UPDATE

**PIONEER DAY:** The Heritage Circle of Dripping Springs held their annual Pioneer Day in Dripping Springs on Saturday, September 27, 2014 from 10am to 4pm. Pioneer Day is an educational experience of pioneer times held annually on the grounds of the museum. This one-day event boasts of more than 40 demonstrators of pioneer crafts and skills, such as butter churning, blacksmithing and quilting. The Paleo Society manned a booth at the event with touch table fossils, give aways and more. Kudos to the Galligher duo - Ryan and Suzanne - and to Mike Smith for braving the drizzle to discuss and share fossils with festival goers. For festival pictures and more information see the Pioneer Day website.

<http://www.drpoundhistoricalfarmstead.org/pioneer-day.html>

**PSoA BOOTH at AGMS GEM CAPERS SHOW:** Thank you to everyone who helped out with the annual stuffing of 1000 ziploc bags with Fossil Fest flyers and small fossil giveaways before last months meeting! Another year, another successful AGMS Gem Capers show! The show was held Friday through Sunday, October 3 - 5 at the Palmer Events Center. Youth Education Day brought many public, private and homeschool children together for a day of earth science

learning. The most popular activity at the Paleo Booth was fossil cleaning. Many thanks to the volunteers who helped to set-up or work the booth.

## **Florissant Fossil Beds - A Slice of History**

By Suzanne Galligher

As an amateur paleontologist and informal science learner, the prospect of joining "a paleontologist for three days of fossils, field work and discovery" at Florissant Fossil Beds National Monument in Colorado was an opportunity not to be missed. Aaron Currier, a middle school science teacher and President of the Portland, Oregon based North America Research Group and I were chosen from numerous applicants to participate in this teacher field course held July 23-26 as sponsored representatives of the FOSSIL Project. Under the guidance of Dr. Dena Smith, paleobiologist at the University of Colorado, we joined a group of middle school teachers on a project titled "Collaboration for Change: Fossil Plants and Ancient Climates." We learned about Florissant's history and fossil record from Dr. Herb Meyer, the Park Director and a paleobotanist, during a walking tour of the Monument grounds. The following days we hunted for fossils at a commercial site outside the monument and discussed classroom exercises/activities to be used in our own teaching and outreach.

Nestled in a valley to the west of Colorado Springs amid a verdant meadow 8,400 feet above sea level sets Florissant Fossil Beds National Monument, one of the richest fossil localities in the world. Today's serene backdrop of distant mountain peaks, seemingly random uplifted granite outcrops and rolling hills dotted with slender conifer trees belies a tumultuous period 34 - 35 million years ago when volcanic mudflows (lahars) surged into the valley and ash rained down from the Guffey volcanic complex. The eruption originated from a stratovolcano, similar to Mount St. Helens in the Cascades, 15+ miles southwest. The debris flow dammed a stream bed that flowed through the Florissant valley creating the first lake (lower shale unit). Ongoing eruptions filled this lake with ash and mud until only shallow stream beds remained once again (lower mudstone unit). In the late Eocene, majestic redwood trees proliferated near the stream bed banks in the valley until a subsequent cataclysmic eruption and volcanic mudflow destroyed nearly everything in its path. Most of the 500 to 750 year old redwood forest was uprooted leaving only the bases of the most colossal redwoods entombed under 15 feet of debris becoming petrified in situ. Additional eruptions generated another lahar damming the stream beds once again to form a second generation lake (middle shale unit). The middle shale unit is what most visitors observe within the Monument today. Lake Florissant flourished and teemed with life during this comparatively quiet period in its history. All good things must come to an end and so it was for Lake Florissant as a debris flow (caprock conglomerate unit) filled much of the lake. The greatly diminished lake (upper shale unit) hobbled along until a massive eruption of pumice and ash filled the lake basin once and for all (pumice conglomerate unit). The volcanic processes that led to so much destruction during the Eocene created a time capsule of exceptionally well preserved insect, plant and animal specimens that are still being unearthed today. Learn more about the Florissant stratigraphy by picking up a copy of *Paleontology of the Upper Eocene Florissant Formation, Colorado* edited by Herbert W. Meyer and Dena M. Smith. Walking along the grounds of Florissant I am awestruck by the sheer size of the petrified redwood stumps that pepper the meadow. They are colossal - the largest of which measures 41 feet in circumference. These now extinct redwoods are related to the modern coastal redwoods

of northern California and southern Oregon. By studying the growth rings of these petrified trunks, scientists discovered that the climatic conditions during Eocene Florissant were more favorable and thus enabled the redwoods to flourish in a much wider range than California redwoods of today. The mean annual temperature at Florissant during the late Eocene was about 56 degrees Fahrenheit, similar to modern day San Francisco; whereas, it is 39 degrees Fahrenheit today. Additionally, by cross dating the rings, it was revealed that the Florissant redwoods are all from a single forest. There are two generations of Lake Florissant, the lower shale unit located outside the Monument and the middle and upper shale units both within the Monument grounds. All told, there are more than 1,700 species of flora and fauna that have been identified at Florissant with 1,500 belonging to insects and spiders alone. *The Fossils of Florissant* by Herbert W. Meyer is an excellent resource for those interested in learning more about fossils found at this locality.

Florissant provides not only a treasure trove of fossils but also a wealth of history - dueling landowners, famous clients, ardent defenders and precedent setting trailblazers. Cope and Marsh of the Bone Wars infamy weren't the only competitive duo resorting to underhanded tactics. During the 1950's, dueling landowners of the future monument operated commercial tourism sites ultimately known as Pike Petrified Forest and Colorado Petrified Forest. These landowners vied ruthlessly for clients and often resorted to sabotaging the other's business. They did idiotic things like peppering their adversary's driveway with nails detouring tourists and their cash to their own property. This didn't go over well with the victimized landowner who came out with a gun and shot the instigator wounding him in the gut. This road led nowhere but to more tit for tat insanity. In July of 1956, one customer found himself on the road to Pike Petrified Forest after spying a "petrified trees for sale" advertisement. The man, who looked like any other tourist, knocked on the door of the office near closing time and requested a tour of the grounds. Even though it was getting dark, the 12 year old boy who answered the door obliged the man and pointed out some of the fossilized redwood remains. Pointing to a towering stump, the man revealed "I'd like to buy that." The boy surmised that he should introduce him to the manager and inquired as to the man's name. "I'm Walt Disney from Los Angeles." Well, ole Walt negotiated a price for that monumental stump and eventually installed it in Disneyland's Frontierland where it can still be seen today. Walt wasn't the only one interested in the petrified forest of Colorado. During the 1960's, scientists such as Estella Leopold from the US Geological Survey (USGS) in Denver recognized the scientific significance of the Florissant valley during her frequent fieldtrips there. Prospective buyers imperiled the fossil beds with their proposals to subdivide the property or bulldoze it for a new road. At the same time, the US Congress was considering plans to designate a large parcel of the fossil beds as a national monument. Once word of this spread, buyers snatched up land in hopes of flipping it back to the government for triple the price. These threats spurred Estella into action and led to the establishment of the Defenders of Florissant in order to preserve the fossil beds for future generations. One of the first accomplishments of the Defenders was hiring two prominent attorneys - Victor Yannacone of New York and future Colorado Governor, Richard Lamm. Yannacone argued that certain resources should be preserved for public use and the government is required to maintain them for such purposes. This came to be known as the "public trust doctrine" which remains a cornerstone of environmental common law and saved the fossil beds from imminent destruction. The US Congress and President Nixon granted national monument status to Florissant on August 20, 1969. Victor Yannacone is now regarded as the founder of US environmental law and even coined the term. You may read about this colorful period in Florissant's history in a book titled,

*Saved in Time: The Fight to Establish Florissant Fossil Beds National Monument, Colorado*  
written by Estella Leopold and Herbert Meyer.



Dr. Herb Meyer, Dr. Dena Smith & Suzanne Galligher



Investigating the roadside lahar



Where there once was a lake and forested valley bottom,  
a flower-filled meadow now blooms.



The Big Stump



The extraordinary fossil which inspired the Florissant logo.



Fagopsis, an extinct member of the beech family and  
*Cedrelospermum lineatum* an extinct member of the  
elm family.

The purpose of the **Paleontological Society of Austin**, a 501(c)(3) non-profit organization, is the scientific education of the public, the study and preservation of fossils and the fossil record and assistance to individual, groups and institutions interested in various aspects of paleontology.

Meetings of the **Paleontological Society of Austin** are held the third Tuesday\* of each month, 7:00 p.m. at the Austin Gem and Mineral Society building, 6719 Burnet lane, Austin, TX. The public is cordially invited to attend. See web site for April & December dates.

Annual Dues: \$18/individual, \$24/family and \$12/associate (non-voting, receiving newsletter) Send to: Treasurer, Paleontological Society of Austin, PO Box 90791, Austin, TX 78749-0791

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**PALEONTOLOGICAL SOCIETY OF AUSTIN**

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DATED MATERIAL – *Next Meeting October 21st.*

**FIRST CLASS MAIL**