This month’s feature is about a group of fossils instead of just one. On July 24 we took a trip to an Eocene site called The Fence Line Locality in the Shirley Basin between Casper and Medicine Bow with five museum volunteers. A University of Wyoming graduate student doing geology research out there discovered the site years ago. As it is on Bureau of Land Management land, we used our BLM surface collection permit to collect about 200 specimens. This site, along with a few others, is helping us develop our Eocene collection. A large number of smaller bones and teeth accumulated there about 50 million years ago when the area was much wetter and more tropical than it is now.

Among the largest bones we found are a nondescript piece of leg bone about eight inches long and numerous large chunks of turtle shell. It is the smaller bones that are interesting here. These include crocodile, turtle, fish, and mammal remains. Most bones are isolated, but on our visit some associated fossils were also found. Two of these are shown in the first photo to the left. These are the frontal and the parietal bones from a small crocodile skull. Compare these with the illustration of a crocodile skull above to see where they fit. Austin Lawrence found these two bones close to each other and they fit together very nicely. They probably came from the same animal, but the rest of the skull was not found. Other crocodilian bones we found include scutes, teeth, more skull pieces, and vertebrae. Top right is a tooth and a couple of scutes. Scutes are bones that are inside the animal’s skin. Armored protection. (The scale lines in all these photos are in millimeters).

We also found a number of mammal bones and teeth. The bottom photo shows a small jaw with two molars in it. I am not sure what animal this is from but it seems to me to be from a condylarth. Condylarths were a group of nonspecialized mammals that were fairly common in the Paleocene and Eocene, identified by fairly simple teeth. The latest mammal classifications do not even consider the group valid and have found homes in other groups for animals previously called condylarths. But I am calling this one a condylarth. Detailed identification of these types of fossils can be a genuine challenge.
Lee Rex Rocks was a success!

One hundred museum supporters attended the “Lee Rex Rocks” celebration on Saturday night, September 20, 2014 at the Petroleum Club. What’s better than good food, good wine (and other spirits!) and lots of laughter. Bob Montgomery led the crowd in good-natured bidding and we were successful in raising close to $17,000 for museum expenses. Thank you to all of the donors who bought tables, donated items for the auctions, or just sent us donations. See the list of donors below left. I also want to thank the planning committee who spent numerous hours over the last year making sure everything went smoothly: Anne Carlsen, Rosa Goolsby, Lynne Swank, Mary England, Nancy Doelger, and Barbara Bentzin. In addition to being on the committee, Lynne Swank once again was able to find unique mineral specimens for our auction as she traveled through the southwestern part of the U.S. The museum staff did a fantastic job of taking care of all the little odds and ends needed for the success of such an endeavor.

Pictures of the event appear below.

Save the Date: December 13, 2014

Our Annual Holiday Open House will again be the second weekend of December. I can’t believe the holidays are approaching so quickly. Santasaurus will be here from 10 a.m. to 4 p.m. along with our usual attractions. Kent Sundell will once again furnish a huge Christmas tree and your kids can make origami ornaments with Russell Hawley to put on the tree or take home. We’ll have fun activities for the whole family and special discounts in the gift shop for Christmas shopping. As usual we’ll have tours of the back rooms and the Lee Rex Barn.

The Tate Geological Museum Advisory Board and Staff would like to thank the following sponsors:

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This year’s National Fossil Day Open House was by far the most interesting and diverse we have ever had. In addition to our regular tours, treats, and activities we added a lapidary tour (to show folks how to cut and polish stones) and we brought back the inflatable Sinclair dinosaurs. The geology club’s bake sale was a huge success, as was the Casper College Earth Science Department’s new water table. The kids learned about stream evolution AND had a fun time doing it! I would like to thank all of our volunteers, who made this event possible. Thank you Steve Pfaff, Liane Herring, Arnold Woods, Dwaine Wagoner, Rene Edwards, Renee Hardy, Deb Webb, Becky Rothenberg, Don Stagg, Kathy Barrett, Con Trumbull, and the Geology Club members. Also, thank you to our work-study students Monica Fowlkes and MacKenzie Alyea. Finally, I would like to send out a big thank you to Tanya Lewis and Sutton Robeson, with Sinclair Oil, for bringing and inflating all of those green Sinclair dinosaurs!
We have had a very busy collecting season this year. We decided to try to do a weekly field trip during the nicer months, but it started well before that.

In April I got a call from Daniel Bennett. He and his coworkers were digging a drainage trench in a yard less than a mile from the museum. They had found some vertebrae ... could we come have a look? We went to look at it and sure enough, they had dug up some large fish vertebrae. We explored and found the source ... a concretion in the bottom of the trench. We organized with Daniel’s outfit, Wyoming Grass Clippers, and the landowner, Vickie Galles, to collect it as fast as possible so they could continue their project. Steve Pfaff, Lianne Herring, Jason Finkle, and I spent three hours on it on a Saturday in beautiful weather. Then it rained and snowed so we could only come back on Sunday afternoon. The neighbor’s son, Michael Harshman, joined me in the wet and cold and we worked until 8 p.m. to get a plaster jacket on the concretion. Michael’s mom fed us lasagna onsite, which was delicious and greatly appreciated. Monday morning we went out to collect the jacket just before the snow started again. There is likely more of the fish in the yard, but we started running into things like PVC pipes and some sort of buried cable so we collected what was easily collectable and ran away. Over the summer, Michael came in and spent some time prepping the thing. As it stands now we know the size of the concretion (about three feet long) and there are vertebrae sticking out of it all along its length.

In May the Bureau of Land Management called us and asked if we would like to collect half of a hadrosaur on BLM land in northern Wyoming. We said sure. We went up in June to see the site with Gretchen Hurley and Lisa Marks of the Cody BLM Office and Brent Breithaupt, the BLM paleontologist for the state of Wyoming. The site had been started a few years ago and has since been abandoned. The bones collected then are in the Museum of the Rockies in Bozeman, Montana. The MOR has arm bones, some skull bones, and skin impressions from this beast.

Brent made this project a bit more interesting to us by being able to support it financially, and by organizing with the MOR to have the other bones brought to the Tate. Wanting to avoid the oppressive heat of the Bighorn Basin in the summer, we spent a few days up there in September, and got chased out by snow on the last day. In two days Dwaine Wagoner, Helen Hoff, Jodie Atherton, and I exposed a nice articulated arm, some vertebral material and a maxilla. The site is almost a mile from where we can park a vehicle. We found that the sturdy garden cart that the BLM bought us worked very well for hauling things in and out of the site, although it is still a lot of work.

On our pay-to-dig trip in June we worked the NASA site in the Morrison Formation at Como Bluff. This was one of Bob Bakker’s sites from years ago. He and his crew had left a few jackets there and we collected one of them and expanded the quarry a bit. The NASA site has a *Camptosaurus* and a sauropod. We found many pieces of the sauropod, including maybe the neck (articulated but with no skull at the end ... typical sauropod), and more bones likely...
from the camptosaur. The most exciting find was a small turtle we found among the camptosaur bones. Dinosaur bones are common in the Morrison Formation, and turtle bits are as well, but this one is a complete carapace and a possibly complete plastron ... rare in the Morrison. It is about 5 inches long and should be an excellent addition to our Morrison collections.

Herring. It turned out to be rather crushed. Other finds from these outings include an oreodont skull, a camel skull with articulated neck bones, a partial rodent skeleton, another turtle, and an articulated turtle foot.

We did a quick trip to the Haystacks, which is a series of rugged outcrops of Eocene Washakie Formation south of I-80 in eastern Sweetwater County. Ben Shoup had reported some bones down there a few years ago, and we finally got a chance to go get them. Ben’s job is to look for fossils in places where a road, pipeline, uranium mine, or oil well is going to go. His job is not so much to collect them, but to report what is there. With Ben’s GPS coordinates and photos we quickly found our main target, the lower jaws of a large carnivore called *Patriofelis*. It had eroded a bit more than what we saw in Ben’s photos but was still worth collecting. We also found a few other sites with scattered bones and teeth. And then the rain came so we beat a hasty retreat back to the paved roads, with a stop in Rawlins for Thai food.

Ben also found a big turtle last year. This year we collected it. It took us seven days. It is a large soft-shelled turtle he found while doing a survey for an upcoming uranium mine east of Kaycee, Wyoming. The turtle was buried almost vertically in sandstone and seems to have all four legs including three articulated feet, and a head and neck. Its claws are 2 ½ inches long. This should be a great addition to our displays. There are also articulated remains of 22 gars in the area. We hope that one of them will be a complete skeleton; we have collected a couple of nice gar skulls so far.

We also had a one-year collecting contract with rancher Jeb Hanson in Niobrara County to collect White River fossils on his ranch. The small turtle featured on our last newsletter came from there. We spent a few days out there, including camping out on the place one night. The highlight of camping was watching a bull elk pass on yonder hillside in the early hours of the morning. Helen Hoff managed to find a rare cat skull out there. It has been prepared by Liane Herring. It turned out to be rather crushed. Other finds from these outings include an oreodont skull, a camel skull with articulated neck bones, a partial rodent skeleton, another turtle, and an articulated turtle foot.

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(cont. on page 6)
Busy Summer: continued

Last year Kent Sundell and Casper College student Louis Hein found some nice sauropod toe bones on a steep hillside in the area of Alcova on BLM land. This year, with BLM excavation permit in hand a small handful of Taters went out to explore it. It took us a while to re-find the site, but indeed, there was a somewhat articulated foot. We quickly found more bones, including a few vertebrae and ribs and some leg bones. We collected the foot bones and Sam Ryan has nicely cleaned them here in the lab.

The site is a heckuva climb from the nearest place to bring a vehicle below the hill, so I got permission from the local landowner to cross some of his land to access the site from above, which affords much easier foot access, but a bit more challenging vehicle access. We did a few trips to the site and now have a total of about 45 bones exposed at this site. Many of them seem to be complete. This is a potentially nice site. Kent named the sauropod Henry, after his first grandkid.

Many of these sites are already on the list of places to return to next summer. Last year we got a grant from the David B. Jones Foundation for doing fieldwork.

Fossil of the Month: continued

To the right is a stereo picture of an upper molar we found. Again I cannot identify this one. If you know how, you can see this in eye-popping 3D. We are looking onto the chewing surface of a noncarnivore, and into the hole where the root of the neighboring tooth would have been.

The bottom right photos are a few mammalian bones. The first photo is a complete metapodial, i.e. a hand or foot bone (as opposed to fingers or toes). The next is more typical of many of the bones – broken. This one is the proximal end of the ulna, or the elbow joint. The broken end of the bone is on the left edge. The saddle-like curved surface is where the humerus would have joined in life, making the elbow joint.

The portion to the right of that is known as the olecranon process, or the funny bone.

This is a small sampling of the Eocene fossils we collected in the Shirley Basin. We thank the BLM for granting the Tate Geological Museum a surface-collecting permit (number PA10-WY-191). And I thank, Steve Pfaff, Liane Herring, Helen Hoff, Savannah Sawyer, and Austin Lawrence for joining me out in the field.
From the gift shop

Great Holiday Ideas and upcoming sales events!

The holidays are quickly approaching so the Tate Gift Shop would like to give all of our guests a head start with great deals on gifts for family and friends!

Coffee, Tea and Dee:
- **November 12:** All jewelry will be 10 percent off*
- **December 10:** All t-shirts and plush animals will be 10 percent off*

**Annual Holiday Open House:** December 13, 2014
- Save 10 percent off the entire store*

1. An avid reader could use another book in their collection, no matter what reading level.
   - *If you are a member of the museum, you will also receive your 10 percent off in addition to these sales.
2. A child with a curious mind might not oppose gifts that grow.
3. The rock collector in your family can never have too many specimens to display.
4. We have plenty of little items perfect for stocking stuffers too!
Remembering Julien

By J.P. Cavigelli, Tate Geological Museum Collections Specialist

We at the Tate were deeply saddened by the death of one of our friends recently. Fifteen-year-old Julien Fujita committed suicide on August 18. She had been a volunteer here years ago for a short spell, working on fossils in the lab, and a regular at Saturday Club for a while. Even though her volunteer time here at the Tate was short, she became more than a good friend ... almost family. I have many great memories of Julien and it is with great sadness that I write this. She is missed.

Julien never did catch the paleo bug even though she and her brother Sam spent many days (with their mother) helping at the Dee Dig. She was much more fascinated by languages and animals, including recently teaching herself Korean and Japanese from the Internet, writing poetry, and winning some local poetry reading competitions (she was incredible), and volunteering at the Casper Humane Society.

Julien was a very special kid and young woman, but she was also haunted by depression, which beat her in the end. Dammit. Memorial contributions may be made to the Humane Society of Casper or Reach 4A Star Riding Academy.

J.P. showing Julien something fossilly many years ago.

Julien and Sam exploring for mammoth bones in 2007.

Annual Tate Conference 2015

Hoof it to the Tate on June 5-7 for our conference tentatively entitled: “Artiodactyls, Perissodactyls, and Whales, Oh my!” Look for more information in our next newsletter.
We are having way too much fun at the Werner these days. Lots of new mammals to get to know!

Haley Tolbert, an independent work-study student, has begun the onerous task of checking the taxonomical nomenclature for each and every animal in the museum in order to bring the names up to date. She is also working on a presentation about eagles for the November 20 Raptor Rap program.

Mitch Johnston signed on as a volunteer a couple of weeks ago and has already been a great addition to the museum. Upon learning that the October Animal House program was devoted to spiders and rattlesnakes, he gathered a few arachnids from his household collection and brought them down to share with us. The kids were fascinated and asked questions that ranged from, “What do they eat?” to “What does it feel like to get bitten by a spider?”

When Mitch finished his presentation, I got to talk about my favorite wildlife topic: rattlesnakes, specifically *Crotalus viridis*. We had such a good time that we were all late for dinner that evening.

Join us at 4 p.m. on Thursday November 14 when the Animal House program will be “Is it a Lynx or a Bobcat?” starring our very own Melanie Nelson Lynx of Facebook fame.

The newest mammal in the museum is international student Viola Foderler from Germany. She arrived at the Werner right in the middle of me writing this article. She will be cleaning the animals, adding new information to the Past Perfect cataloging program, and covering the desk during busy times. Right now she’s majoring in athletic training but maybe a semester in the Werner will convince her that science is the truest calling.

Last, but certainly not least, our newest mammals prepared by a taxidermist are twin fetal antelope fawns who are residing now in the diorama. After their mother was killed in a car accident, Wyoming Game and Fish offered the unborn but fully formed fawns to the Werner. After a sojourn in the freezer, the fawns were mounted at a Cody taxidermy shop and delivered to the Werner in September. Do not miss this unique exhibit; the fawns are exquisite. A contest to name the fawns is currently underway on the Werner’s Facebook page. Be sure to drop in there and submit your idea for names for these little creatures.

The other big news at the Werner is the upcoming Something Wild Art Show and Open House scheduled for November 14 from 3-6 p.m. All current Casper College students, faculty, and employees are invited to submit one or two pieces of artwork inspired by the wild: no people, buildings, or Campbell soup cans in this one. Guidelines and entry forms are available at the Werner Wildlife Museum or via email from indiahayford@caspercollege.edu. The deadline for entry is 4:30 p.m. on November 10, 2014.

Along those same artistic lines, start planning for the wearable art contest and show in the spring of 2015. Official rules and dates will be available in early December but just a hint for now: entries shall consist of wearable art inspired by one or more of the exhibits in the Werner. If you ever wanted to make a feathered vest, a quilted antelope jacket, or a grizzly bear-inspired prom dress, now is your chance.

The Holiday Open House is the perfect time to purchase ideal gifts for your family and friends. Your children or grandchildren will be too busy with exciting festivities to notice you scurried away to the gift shop. We will have 10 percent off all items in the store and free gift-wrapping that is sure to make the holiday rush worthwhile. If you are a museum member, you will receive an even better deal of 20 percent off the entire store. The gift shop has a variety of products, so it shouldn’t be hard to shop for everyone in one place.

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Holiday SHOPPING FUN

December 13, 2014

The Holiday Open House is the perfect time to purchase ideal gifts for your family and friends. Your children or grandchildren will be too busy with exciting festivities to notice you scurried away to the gift shop. We will have 10 percent off all items in the store and free gift-wrapping that is sure to make the holiday rush worthwhile. If you are a museum member, you will receive an even better deal of 20 percent off the entire store. The gift shop has a variety of products, so it shouldn’t be hard to shop for everyone in one place.
Michelle Blake’s Class Project

By Russell J. Hawley, Tate Geological Museum Education Specialist

This semester the Tate has been working with Michelle Blake, who works in the Student Support Long-term Suspension Room at Natrona County School District No. 1, on a research project not too dissimilar from the “Take over the Museum” project from last year. Her students (all of them considered ‘at risk’) are each researching a topic and then, at the end of the semester, they will take turns giving presentations in the museum to share what they have learned.

Michelle composed a list of topics: Either time periods such as, Oligocene, Cretaceous, Palaeozoic, etc.; or taxonomic groups such as, Trilobites, theropods, elephants, etc. The lists were cut up into pieces and each student selected a topic at random. Over the course of a few weeks, the students will visit the museum at intervals, researching their topics and bringing me questions that have come up during the course of their reading (they’ve already thrown me some real curves!).

During the course of this project Michelle and I hope to spark an interest within these students in the rich fossil and geological heritage in this great state of ours – and show them there are sources of information other than Wikipedia!

Please come to the museum for their presentation on Wednesday, Nov. 19 from 10-11 a.m. It is free and open to the public.

Kids Expedition:

On September 6, in conjunction with Saturday Club, we had 38 people attend the last kid’s expedition of the season.

Baculites, ammonites, and clams were found. Near Mike Lansing Field in Casper.
Q: Hey, I thought that *Liopleurodon ferox* was bigger than a sperm whale? Same size?

– Jennifer ‘J-4’ Wagner (Englewood, Colorado)

A: Ever since “Walking with Dinosaurs” aired back in 2000 there has been a common misconception that *Liopleurodon* grew to a length of 25 meters. But this figure is greatly exaggerated.

The most complete *Liopleurodon* skeleton on display is the specimen in the Tubingen Museum in Germany. It is 4½ meters long and gives us a good idea of the animal’s body proportions. There are larger *Liopleurodon* specimens known only from isolated skulls (it seems Peter Dodson’s law applies to marine reptiles as well as dinosaurs); the largest of these is 154 centimeters long. Scaling the rest of the animal to this skull gives us a length of just under 6½ meters.

The real terror of Europe’s Jurassic seas seems to have been the mysterious stretosaur, *Pliosaurus macromerus*. One stretosaur specimen consists of a partial mandible 287 cm. long; reconstructing the missing portions brings that figure up to an even 3 meters. Assuming the stretosaur was built to the same proportions as *Liopleurodon* (and indeed, the two animals are so similar that the stretosaur was originally classified as a species of *Liopleurodon*) then the animal would have been 12 meters long overall, with a mouth large enough to effortlessly swallow a man whole.

The Tate Geological Museum’s own pliosaur, ‘Riptide,’ makes a pretty decent showing in this lineup. Known only from a single flipper found in 1895 and a few other fragments, Riptide is placed in his own species, *Megalneusaurus rex*. Again assuming *Liopleurodon* proportions, Riptide would have been 11 meters long, with 2½ meter-long jaws – definitely at the top of the food chain in the Sundance Sea.

These are certainly formidable creatures, and reason enough for Jurassic time travelers to think twice before taking a swim, but the largest predator that ever lived is still with us today – the great sperm whale *Physeter catodon*. Large males can reach a length of almost 20 meters – and one third of that is the head! Fortunately, the sperm whale prefers to eat squid rather than people.
Tate Museum Event Calendar

November 2014
1 Saturday Club, “Mineral Geometry,” 10:30-11:30 a.m. FREE
12 Coffee, Tea and Dee, 7:30-11:30 a.m.
14 Werner Wildlife Museum Art Show “Something Wild,” opening, 3-6 p.m.
19 Michelle Blake class presentations 10-11 a.m.
27 Thanksgiving Day – Tate and Werner museums closed

December 2014
10 Coffee, Tea and Dee, 7:30-11:30 a.m.
13 Annual Holiday Open House and Saturday Club craft, 10 a.m.-4 p.m.
25 Christmas Day – Tate and Werner museums closed
31 New Years Eve – Tate and Werner museums closed

January 2015
1 New Years Day – Tate and Werner museums closed

March 2015
27 Tate Art Show

May 2015
20-22 Geological Society of America Conference in Casper

June 2015
5-7 Tate Conference

Scan to find out more about the Tate Geological Museum!