This Fossil of the Month features an ammonite from Niobrara County, Wyoming. The specimen was found by Tate Geological Museum volunteer Dwaine Wagoner on a non-museum collecting trip last summer. Dwaine prepared the ammonite and donated it to the Tate. The site in a rancher’s field in eastern Wyoming has produced many ammonites in concretions; most of which are small specimens of several species, probably young animals. This is one of the few complete adult specimens found there, and it is fairly large: five inches (12.5 cm) high. This ammonite is from the late Cretaceous Pierre Shale. More specifically, it is from the lower Maastrichtian Stage, about 71 million years ago, when eastern Wyoming, and much of the surrounding area, was underwater for the last time.

I have identified this specimen as *Jeletzkytes crassus*. Others may disagree.

The genus *Jeletzkytes*, named after Jurij Alexeyevich Jeletzky (1915-1988), a Russian-born Canadian geologist who did a lot of work on Canadian Cretaceous ammonites. There are several species of *Jeletzkytes* found in the Western Interior Seaway, spanning a couple million years. Having said this, ammonite specialists Neil Landman, American Museum of Natural History; Bill Cobban, U.S. Geological Survey; and Neal Larson, Black Hills Institute of Geological Research, recently published a paper in which they show that *Jeletzkytes* is actually not distinguishable from its close relative *Hoploscaphites*, so all *Jeletzkytes* ammonites should be called *Hoploscaphites*. This ammonite should be called *Hoploscaphites crassus*, but since I have not seen that name in print, I will use the old name of *Jeletzkytes* … for now.

This specimen is a macroconch, commonly believed to be the female of a species. The bulge in the shell (shown by the arrow in the photo to the left) is thought to be a brood chamber, where the young or the eggs would develop. This bulge is seen in all macroconchs of the Scaphitid family. Russell Hawley’s drawing shows a wounded *Jeletzkytes*. Notice the same bulge in the shell.

The stereophoto to the right shows the ammonite head-on (sort of). Now I know not everyone can see these stereophotos in three dimensions, but for those who can, enjoy. Raise your hand if you need help. All of you with your hands up, I found this fellow’s instructions on the internet for cross-eyed viewing to be useful: www.davidmleephotography.com/viewing-stereo-photos.html

We plan to put this specimen on display soon. The Tate Geological Museum would like to thank Dwaine for his donation. I thank Bob Johnson for allowing us to collect on his place, and budding ammonitologist Josh Slattery for discussing ammonites with me.
Guess the Weight of Lee Rex – We Have a Winner!

The actual weight of Lee Rex as it came across the port of entry scales in Lusk, Wyo. was 25,340 pounds. Congratulations to Megan Schafer from the Casper College Accounting and Financial Management Office who had the closest guess of 26,260 pounds. Megan has won a $100 gift certificate to the Tate Geological Museum Gift Shop.

Museum Consortium Date Night

Need something to do with your Valentine this year? Consider buying a ticket for the Casper Museum Consortium’s Date Night, which will be held Friday, February 10, 2012. Tickets are $50 per couple. Get your tickets early, as the event is limited to 30 couples. You and your date will begin by meeting at The Science Zone for light hors d’oeuvres, punch, and a cash bar. Transportation will then be provided to the Tate Geological Museum where you will enjoy heavy hors d’oeuvres, punch, coffee, and a special tour of the Lee Rex barn. From the Tate you will go on to the Wyoming Veterans’ Memorial Museum for light snacks and a cash bar. Finally your last stop will be at the Werner Wildlife Museum for dessert, coffee, and tea. Tickets will be available online at www.caspermuseums.org or you may choose to purchase them at the Werner Wildlife Museum using either a check or cash.

Biennial Auction and Dance

“Follow the Fossil Trail” is the theme for our biennial auction and dance on Saturday, February 25, 2012. Our guest of honor will be Paul Hallock, who retired as the Casper College Foundation Director in June 2011. Make plans to join us at the Petroleum Club. Invitations will go out at the end of January. If you have not previously received an invitation and are interested, please e-mail Deanna Schaff at dschaff@caspercollege.edu and your name will be added to the mailing list. Space is limited, so reply early.

Summer Digs

J.P. Cavigelli has announced the dates for our week-long digs during the summer of 2012. The first dig will take place July 9 through 13 and the second from Sept. 10 through 15. The fee to participate in these digs includes transportation to and from the dig site, meals, and a motel room for the week. Plan now to join us. More information will follow in future newsletters. If you have questions contact J.P. at 307-268-3008.

Annual Tate Conference

The theme for our 2012 conference is “Invertebrates: Spineless Wonders.” We are looking for people to present sessions and would ask that you forward your name or the name and contact information of any speakers you’d like to see at the conference to dschaff@caspercollege.edu. We currently have two members who will be presenting sessions: Neal Larson from the Black Hills Institute of Geological Research whose specialty is Ammonites, Bruce Thiel from Portland, Ore. who works with fossil crabs, and, we are working on getting a world-reknown trilobite expert as Keynote speaker. More information will follow in future newsletters.

Casper College Ranked in the Top 25 Among More Than 1,100 U.S. Community Colleges

Casper College is the 25th best community college in the nation and the best in Wyoming, according to the third annual college rankings from StateUniversity.com.
**A Geological View of Winter** By Annette Hein

As you battle the weather this winter, keep some perspective by turning it into part of your education. Many of the biggest annoyances of Wyoming wintertime are actually demonstrations of geology.

Potholes growing in the roads are not just a hazard to your car; they are compact examples of freeze-thaw cycles, a form of surface weathering. When snowmelt runs into a tiny crack in the asphalt and freezes, the ice exerts a force of 30,000 pounds per square inch, pressing the crack open and making it grow longer. Other cracks grow nearby, and soon loose pieces of asphalt can be flipped out of the pavement surface. This same process is important in breaking Wyoming’s rocks apart and starting soil formation.

The transformation of a new snowfall into a dangerous icy coating on roads and sidewalks has parallels with the metamorphism of rocks. The snow begins as separate flakes, then packs down and re-crystallizes into slick ice under the wheels of moving cars without completely melting. In the same way, sandstone begins as little quartz grains loosely cemented together, but when it reaches a depth of six miles, it metamorphoses into the much harder quartzite. Pressure and heat make both ice and the silica in sandstone melt slightly and reform in spaces between grains. No one has ever observed actual metamorphism of rocks, but everyone in Wyoming has access to icy roads.

Blowing snow, which can make roads impassable, also demonstrates wind transport of sediments. Geologically, wind is responsible for sand dunes (loose sand blown into piles and pushed before the wind). Snowdrifts don’t migrate in the same way, but they are also wind-formed. When a ground blizzard follows a snowstorm, wind is eroding the loose cover of new snow. As the wind passes over an obstruction—a sagebrush, snow fence, or bank of the highway—it tends to drop some snow and form a tapered mound on the lee side. Ripples form on the surface of snowdrifts just as they do under any other current. Both sand dunes and ripples are preserved in sedimentary rocks at Alcova, Wyo., showing the work of wind and currents millions of years ago.

The last lesson suggested by geology is that things could be much worse. No matter how nasty winter seems, it’s not comparable to the last glacial period when the Wyoming plains froze to a depth of several feet. Plenty of snow fell but the wind swept it away, allowing freeze-thaw cycles to form wedges of ice the size of a person, thrust into cracks of the ground. (These gaps, now filled with sand, are still found around Casper.) Summer temperatures could not thaw the permafrost, which meant that today’s prairie was tundra. This ecosystem supported Columbian mammoths like the Tate’s “Dee.” Incidentally, mammoths would have been much more dangerous to cars than moose or bison are today.

Winter weather definitely isn’t fun, but it’s not as bad as it might be; and there’s always a way to turn it into science instead of just a headache. That’s the benefit of a geological point of view.

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**Lee Rex Progress Report** By J.P. Cavigelli, Tate Geological Museum Field Operations Specialist

This past semester we have done a fair amount of work on Lee Rex. Students Annette Hein and Steve Bennett (a.k.a. “Fluffy”), along with volunteers Al Fraser and Dennis Stotts have done most of the work. With the creature’s remains upside down from how we found it, they have disassembled the bulk of the metal frame, the wood and foam supports, and the bottom (now top) of the plastic jacket. Then they started digging through the foot or so of mudstone at what used to be the bottom of the rock in hopes of finding more bones. Nothing yet.

In the shale they have discovered many carbonized plant remains. Most are flattened stick-like things that are likely not terribly identifiable. The interesting thing is that some of them are sitting at unusual angles, that is, they are not along the expected bedding planes. Geology instructor Kent Sundell, Ph.D., sees this as evidence that the whole pile – mudstone, plants and dinosaur remains – was deposited in a single event, as opposed to several smaller events laying down individual mud layers. We will not preserve most of the plant remains; they are too fragmentary and nondescript, but we will map them.

Recently a few of us attended a talk at the Wyoming Geological Association lunch by Bureau of Land Management paleontologist Brent Breithaupt, in which he talked of his work with photogrammetry. Brent later came to the Tate Geological Museum and we got to talking and he thought our dinosaur would be a great specimen to do similar things with.

Photogrammetry is the production of a computer based 3D model based on slightly overlapping photos of the subject. Fluffy did a little research and started taking the pictures to create a photogrammetry image. As he was taking pictures, I got an email from a guy with WLC Engineering, Surveying, and Planning here in town. He has a 3D laser scanner and is looking for fun things to do with it. In short these guys will be doing a 3D laser scan of Lee Rex as it sits (and Dee as well). With both of these techniques we will have a digital record of where the carbonized plant remains all lie, and we can do all sorts of measurements with the data.

Annette has gotten deep enough on one end of the jacket, which was relatively plant-free, and has exposed the start of three caudal vertebrae. And in a few other spots we have also dug down to the concretion itself. As of this writing, the work is on hold until we digitally document the accumulation of plant matter.

The work study students have also spent some time preparing some of the bones we found outside of the concretion. The two cervical vertebrae, which are both only partial bones (possibly two parts of the same bone), have been prepared on one side. Some of the ribs are completed and the students are just starting on the scapula.
Exhibits Update  
By Patti Wood Finkle, Museum Exhibits Specialist

Everyone at both museums has been incredibly busy for the past two months. We have had two open houses, (one at each museum), and have been preoccupied with all of the planning and work that goes into such events.

We (our intern Stevie and I) have installed or updated four exhibits since the last newsletter. We installed the Dino Egg exhibit at the Casper Area Convention and Visitors Bureau. Stevie also worked closely with Russell Hawley to develop an exhibit on the evolution of the horse.

This small in-house exhibit demonstrates the concept of evolution based on examining specific features of the horse family, in this case the teeth and feet. This exhibit has been long coming and will be useful in tours and educational development.

Meanwhile I was working on the Carboniferous Period in the Walk Through Geologic Time. Both the Mississippian and the Pennsylvanian sections have been finished (well, almost). The sheer amount of research that goes into even the simplest exhibit is astounding, but well worth it. Both of these sections feature plants and animals from the Tate Geological Museum Collection that exemplify life during this period.

Another project that I have been working on with Dwaine Wagoner, Tate volunteer, since the Werner Wildlife Museum Open House, is a book about the butterflies of Natrona County. Dwaine was asked by the Werner Wildlife Museum Board to provide information and photos for a small exhibit on butterflies and moths. He took this request to heart and developed an amazing and detailed book that introduces butterfly species found in Natrona County. A prototype of the book was available for review at the open house, and we are now in the final stages of the book’s development. We hope to install the butterfly portion of the exhibit in the Werner at the beginning of January.

In the meantime, Dwaine has been very patient with all of my reviewing and re-reviewing, writing and re-writing. Thank you for all of your hard work and understanding Dwaine!

In other news, Stevie’s internship with us has come to an end (sad day). We will miss her and wish her the best in her next endeavor!

Werner Open House: “Wyoming Birds that Bite Back”

What a way to bring in the holiday season! On Friday, Nov. 18, the Werner had an open house that was planned and executed in conjunction with students from the Casper College Museum Studies class. (I have to admit, they did the lion’s share of the planning.) “Wyoming Birds that Bite Back” was a huge success with almost 300 people in attendance. The students developed educational activities for both K-12 classes visiting the museum and individuals/families visiting on their own. The students also worked hard to coordinate and install a temporary, animal-inspired exhibit of art created by Casper College art students.

Included in the exhibit are ceramics, multimedia, 2D art, jewelry, wire 3D sculpture, and more. The pieces are sprinkled around the museum and will remain at the Werner through January, so stop in to see a new facet of the museum. I would like to extend a HUGE thank you on behalf of the museum to Valerie Innella, Ph.D., and her museum studies class for all of their hard work and dedication to this project. Thank you!!

The headlining event at the open house was the presentation of the first annual Fred Eiserman Volunteer of the Year Award. The first award went to Fred himself and was presented by Tom Clifford in a ceremony during the open house. The award was presented in recognition of Fred’s hard work and dedication to the museum. Congratulations Fred!!
Tate Open House

The Tate Geological Museum hosted its Annual Holiday Open House on December 3. We had a fantastic turn out! We offered prep lab tours, Lee Rex barn tours, cookies, punch, and coffee and tea from P. Hawk Coffee Roasters. We also had our ever-popular ornament workshop, face painting – always fun, thank you Maryanne Budenski – and best of all Santasaurus was here for photos with the kids – thank you Lisa Fujita! We gave away some fabulous fossil door prizes and had a raffle for one of our limited edition prints. The lucky winner was Ty Vollmar. He chose the “Paleo Rendezvous on the Platte” print by Mike Kopriva.

The Tate Geological Museum Advisory Board was on hand to show their support and help out at the gift-wrapping table. We also debuted the newest item for sale in the gift shop, handmade Dee the Mammoth ornaments. These ornaments are created by one of our work study students, Tom Stanford, in his metal working class. Over all, it was a successful day with almost 300 in attendance, which made for a great open house!
Caribou at the Werner Wildlife Museum

Did you know that caribou communicate by grunting and snorting, like pigs? Listen to them at www.canadiangeographic.ca/magazine/nd07/indepth/. Now continue reading more about the caribou displayed at the Werner Wildlife Museum.

Caribou, scientific name *Rangifer tarandus*, is a prominent part of the Dick Ullery Collection at the Werner Wildlife Museum. This collection displays three caribou subspecies: Alaska/Yukon barren ground, Quebec-Labrador (or Labrador), and woodland caribou (mountain and northern woodland herds). However, the number of accepted subspecies differs greatly.

The Alaska-Yukon barren ground subspecies populates the U.S. Fish and Wildlife Service’s Arctic National Wildlife Refuge and the surrounding Yukon and Northwest Territories. The refuge is quite large, measuring 40,000 square miles. This sizable refuge easily supports the migratory caribou population.

The Central Arctic caribou winter in the refuge’s southern boundary, offering an important subsistence resource for the villagers living there. These migratory caribou that populate the Arctic are “always on the move.”

In the spring, the Porcupine herd migrates hundreds of miles to their calving grounds. After the calving season they return to the herd, migrating in a group to the coastal plains of the refuge for forage. According to the U.S. Fish and Wildlife Service, because of the hordes of mosquitoes that hatch, the herd numbering in the tens of thousands, migrate to the coastal ice fields.

In mid-July, the caribou travel back toward their wintering grounds. Amazingly, they may travel 3000 miles annually. After the U.S. Fish and Wildlife Service observed the Porcupine and Central Arctic herds for several years, it was determined that the barren ground caribou do not annually migrate the same distance. This is because they often winter in different areas of their range, and use different migratory routes.

Labrador caribou are comprised of two very distinctive herds: a sedentary herd and a migratory herd. According to the Department of Environment and Conservation of Newfoundland and Labrador, the migratory caribou winter below tree line where food is plentiful. During calving season they migrate “thousands of kilometers” above tree line where predators are rare.

Sedentary caribou, as their name implies, do not move far from their wintering grounds for calving. They have a different method for protecting the calves’ life from predators. They disperse from each other within their normal range to a spot with ample water. Since caribou are excellent swimmers, the mother and calf may retreat into the water, offering protection from predators.

Solitary and sedentary also describes the woodland caribou. Although they live in small groups, this is the largest caribou subspecies in Canada. They are divided into two herds, or ecotypes: mountain woodland caribou and northern woodland caribou. Scientists distinguish between these two ecotypes by examining their differences in habitat use and behavior. The mountain woodland migrates to high alpine peaks in the winter, while very few of the northern woodland caribou migrate. Because of this, they are very sensitive to forest loss and human disturbance.

INTERESTING FACTS

• Both sexes of caribou have antlers. Males shed their antlers after the fall rut. Pregnant females shed their antlers after their calves are born in the spring. Nonpregnant females shed during the winter.

• Caribou and reindeer are the same species. Reindeer are a domesticated variety of caribou that are herded by humans and used for pulling sleds.

• Caribou are well equipped to survive in the cold. Their winter hair is about three inches long and hollow inside to trap air, providing warmth. The hollow hair also helps the caribou to cross rivers and lakes by helping them to float. They are excellent swimmers.

• Caribou hoofs are concave and spread out, acting like snowshoes in the deep snow and spongy tundra.

• Female caribou will not adopt orphaned calves. If the calf is separated from its mother or the mother dies, the calf will not survive.

• “Caribou have scent glands, 2nd, on the back of their legs near their hoofs. They will rise up on their back legs to release the scent, alerting other caribou of impending danger.

WORK CITED


What Color Were Dinosaurs?

Up until last year the only honest answer to this question was ‘Nobody knows.’ But recent discoveries and new techniques have opened an unexpected window into the world of dinosaur color. The first clues came from the province of Liaoning, China, in the 1990’s. Small theropods (two-legged meat-eating dinosaurs) were discovered with remains of their integument skin preserved. These confirmed that many small theropods were covered either with feathers or else fuzzy ‘protofeathers’ in life.

In 2010 Jakob Vinther and his colleagues at Yale University examined some of these Liaoning specimens under the microscope and discovered that their fossil feathers included melanosomes – tiny packets of pigment that give modern bird feathers many of their colors. Vinther and his team found that there is a correlation between the shape of a melanosome and the color of pigment it contains. Round melanosomes, for example, contain red and brown pigments, while sausage-shaped melanosomes contain black. By carefully examining the distribution of the different shapes of melanosomes on the fossils, they were able to map out the color pattern of two different dinosaurs, *Anchiornis* and *Sinosauropteryx* – and more will undoubtedly follow.

The body of tiny *Anchiornis* was covered with grey protofeathers – even the toes. Long feathers with bold patterns of black and white lined the arms and legs. On top of the head was a crest of red, and there was a greyish-red patch on each cheek.

The other dinosaur the Yale team examined was *Sinosauropteryx*. This one-kilogram predator was a fox-like reddish brown color. Its long tail was decorated with alternating stripes of reddish brown and white.

There are limitations to this technique. The colors of blue and green feathers, for example, are not due to melanosomes, but instead are created by the microstructure of the feathers themselves, something that we are unable to detect in the fossils (yet!). And, of course, there are still hundreds of other dinosaur species that are known only from their bones. So don’t worry, young artists – there’s still plenty of room for creativity!
2012 Tate Museum Event Calendar:

January 18
Coffee, Tea and Dee,
7:30 – 11:30 a.m.

February 10
Museum Consortium Date Night

February 15
Coffee, Tea and Dee,
7:30 – 11:30 a.m.

February 25
“Follow the Fossil Trail”
Biennial Tate Geological Museum
Auction and Dance

March 14
Coffee, Tea and Dee,
7:30 – 11:30 a.m.

April 18
Coffee, Tea and Dee,
7:30 – 11:30 a.m.

May 2
Coffee, Tea and Dee,
7:30 – 11:30 a.m.

June 1-3
“Invertebrates: Spineless Wonders”
Annual Tate Conference

July 9-13
Field Dig #1

Sept. 10-15
Field Dig #2

Scan to find out more about the Tate Geological Museum!