

CATALYST

DENVER MUSEUM OF NATURE & SCIENCE MAGAZINE

APRIL | MAY 2015

INSIDE ///

MYTHIC CREATURES
FINAL WEEKS FOR SILK ROAD
PREHISTORIC TURTLES





THE IDEAS THEY TRADED
WERE AS IMPORTANT AS THE SILK.

—◆ TRAVELING THE ◆—
SILK ROAD
CLOSES MAY 3

Long before the Internet, the Silk Road connected humanity. Experience the 5,700 miles from China to Constantinople complete with the scent of spices, exquisite silks, and the exchange of radical ideas that were the foundation of the modern world.

Dear Members,

To say that the new collections facility is a dream come true is not a stretch. A 1974 facility master plan called for a consolidated storage area for the burgeoning science collections. This proposal didn't come to be, but the vision stayed top of mind for Museum leaders for many years. In 2007, voters approved the Better Denver bond, which, much to our gratitude, positioned the Museum to make this long-held dream a reality. Since then, community leaders and philanthropists, government partners, corporations, and foundations all provided vital support for the state-of-the-art science collections center.



We are particularly grateful to the Avenir Foundation, whose gifts totaling \$4.85 million have helped build and equip the new center, move collections, and endow their long-term conservation. In recognition of their transformational support, the Museum has named the facility the Avenir Collections Center.

The Lakewood-based Avenir Foundation supports arts and culture through education and preservation, truly living up to its name, which was inspired by the French word *l'avenir*, "future or time to come." Their support helps the Museum ensure that the stories, science, and wonder inherent in our nearly 1.5 million natural and cultural objects will endure for generations.

Since opening in 2014, the Avenir Collections Center has been buzzing with activity. The entire insect collection has been moved into its new home, as has nearly all of the mammal collection. One-hundred percent of the Museum archives (formerly housed in multiple sites around the building) are now in one location. Moving will continue throughout 2015, with 70 percent of the collections relocated by the end of the year. It takes time to move such precious items!

The 63,000-square-foot Avenir Collections Center provides the highest standards in climate control and stable storage conditions. It also features workspaces, labs, and a conservation center where collections can be safely, efficiently, and comfortably studied and preserved by our own scientists and researchers from around the globe. The generous support of the Avenir Foundation and other community partners—like you, our members—ensures that the Museum can sustain its commitment to igniting our community's passion for nature and science.

George Sparks
President and CEO

You may contact George Sparks by e-mail at president@dmns.org.

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Join Our Community:



ON THE COVER FROM THE ANTHROPOLOGY COLLECTIONS

Shell anklet
AC.9205A
Huastec, Precolumbian Mesoamerica
ca. AD 1000–1521
Depicts Quetzalcoatl,
the feathered serpent



Rick Wicker

FINAL WEEKS TO TRAVEL THE SILK ROAD!

Did you know that it takes about 2,500 silkworms to produce one pound of silk, enough for one robe? In the exhibition *Traveling the Silk Road*, you will see live silkworms and examine a massive replica of a Tang-era loom from China as you explore the once carefully guarded secrets of sericulture, the process for raising worms to make silk. Now open through Sunday, May 3! Get tickets @ www.dmns.org/silkroad.



EXTRA FUN ON SCFD COMMUNITY FREE DAYS

The Museum is planning some fun themes to enhance SCFD Community Free Days in April and May.

Sunday, April 12: Celebrate Earth Day with special activities devoted to exploring our amazing planet! Dive into a live interactive science and music theater program where you'll wiggle like a honeybee and sing with the trees. Explore natural resources and learn about local wildlife with the National Park Service. Meet Museum scientists from the Zoology and Earth Sciences Departments and get up close to collections from behind the scenes.

Sunday, April 25: The Museum is partnering with the Mexican Cultural Center and the Consulate General of Mexico in Denver to present the second annual Día del Niño celebration. Enjoy music and dance performances by local community groups as well as special crafts and other science and nature activities. Get your photo taken with mascots from local sports teams, and have fun with balloon animals and face painting. Enjoy bilingual programming at various stops across the Museum.

Sunday, May 31: Focus on space exploration throughout the day. Make your own rocket and launch it with RocketWorks. Catch presentations by space scientists, space educators, and space explorers. Safely view the sun through solar telescopes (weather permitting) and find out how to get involved in astronomy. Join Youth One Book One Denver for a scavenger hunt to get this year's read for teens.

SCFD Community Free Days are made possible by the Scientific & Cultural Facilities District, a unique funding source serving hundreds of metro Denver arts, culture, and scientific organizations. Find out more @ www.scfcd.org.



LEGENDS ON LARIMER

Dragons, unicorns, and mermaids have descended upon Larimer Square in downtown Denver! Sixteen local artists created legendary creatures to celebrate the new exhibition *Mythic Creatures*, now open at the Museum. Find out more @ www.dmns.org/legendsonlarimer.

HEAVENS ABOVE

NASA's tractor trailer-size Dawn spacecraft was pulled into the orbit of Ceres, a dwarf planet, in early March. Dawn is the first probe to orbit a dwarf planet. It was about 38,000 miles away when it was pulled into Ceres's gravity. Dawn has been slowly working its way into orbit-capture since arriving at Ceres in January and is set to begin dedicated mapping operations in late April.

Ceres was discovered in 1801 as the first object found in our solar system's main asteroid belt between Mars and Jupiter, known as the Asteroid Belt. (The most famous dwarf planet, Pluto, wasn't found until 1930 and is in the Kuiper Belt.) Ceres is about 310 million miles from Earth. It was initially classified as a planet, later demoted to an asteroid, and then reclassified again as a dwarf planet. Ceres is the largest body in the main asteroid belt with a diameter of 590 miles. The Dawn spacecraft will study this intriguing world in great detail.

Meanwhile, 3 billion miles from Earth, NASA's New Horizons spacecraft has begun its long-awaited, historic encounter with Pluto. The spacecraft is on the homestretch of a 10-year flight, which launched in January 2006. The spacecraft's closest approach occurs on July 14, 2015, but by May, images of the distant icy world will be better than those taken by the Hubble telescope.

During the encounter with Pluto and its moon Charon, New Horizons will map the geology and topography of these unexplored worlds, determine their surface composition and temperature, and measure Pluto's atmosphere. New Horizons will study Pluto's smaller moons and search for new moons and planetary rings. From there, it is expected to head further into the Kuiper Belt to examine other icy mini worlds.

Find sky information for April and May @ www.dmns.org/heavensabove.



NEW AT THE MUSEUM

Chase a salmon! The upgrades in Bears and Sea Mammals Hall on Level 2 are complete, and one of the new features is a virtual salmon streambed projected onto the floor of the gallery. Try channeling your inner bear and see if you can catch a salmon. The projection also includes a new elf drawn just for this project by artist Kent Pendleton, who painted many of the other diorama elves as his personal signature. If you'd like to find all the hidden elves, stop by the Information Desk for a handout on how to find them and some other Museum secrets.

On Level 1, near the Science Atrium, is a new interactive exhibit showing how our Museum is the first commercial-scale building to use recycled water and an innovative, high-efficiency system to heat and cool the new wing. The heating and cooling plant integrates geothermal heat pump technology and recycled water from Denver Water to reduce energy consumption by up to 60 percent. The technology was funded by the U.S. Department of Energy and was just one feature that led to the Museum receiving LEED Platinum certification for the new wing after it opened last year.



FUN PROGRAMS FOR FAMILIES AND TEENS

The Museum's summer camps and weekend workshops for children have been popular with our members for years; however, did you know we now regularly schedule programs for families and teens?

The family programs are usually planned in conjunction with one of our temporary exhibitions or IMAX films, with special activities that enhance those experiences. A sleepover for families is currently in the works for this summer.

Teen programs are designed by teens for teens and are offered about once a month. They cost only \$10 per teen for a fun evening of activities and making new friends who share a mutual passion for the Museum.

Find out more about these programs @ www.dmns.org/learn or in the magazine insert.

MYTHIC CREATURES

Dragons, Unicorns & Mermaids

NOW OPEN! FREE ADMISSION FOR MEMBERS

Dragons, bigfoot, chupacabras, unicorns, and mermaids. These legends have captured imaginations, inspired art and culture, and spurred wild speculation. In the whimsical exhibition *Mythic Creatures: Dragons, Unicorns, and Mermaids* the world's most enduring fantastical beings come to life through dazzling statues and models—such as a unicorn and 17-foot-long dragon—and are examined more critically through real fossils and cultural objects that have created generations of lore.

Throughout history, humans have caught “glimpses” of mythic creatures—sliding beneath the waves, running silently through the trees, and soaring above the clouds. The creatures take shape through human imagination and belief, and many are celebrated symbols of the cultural landscape. From a jade dragon to carvings of Inuit spirits, from voodoo banners to a shaman's coat and Japanese armor, the exhibition illustrates how humans gravitate toward the mythical for spiritual and creative expression.

The exhibition also reveals how science evolves. There was a time when respected intellectuals pointed to ancient elephant skulls as evidence of Cyclops or to a narwhal tusk from the North Sea to lend credence to the existence of unicorns. Others produced mythical creatures for sensation, such as the “Feejee mermaid,” a monkey's torso sewn to a fish tail. This hoax was made famous by showman P.T. Barnum.

In addition to the dragon and unicorn, guests will encounter statues and models of a 10-foot-tall kraken, with its head and tentacles rising from the floor; a griffin; *Gigantopithecus*, a real, now-extinct ape whose fossils inspired stories of ape-men in Asia; and an 11-foot Roc, the mythic bird large enough to carry an elephant into the sky, which is compared to a model of *Aepyornis*, an extinct “elephant bird” from Madagascar that laid the largest

eggs in the world. A very rare *Aepyornis* egg from the Museum's collection—which happens to be the first one to reach America—is displayed in the exhibition.

Guests of all ages will also enjoy activities such as drawing your own mythic creatures, storytelling, puppets for little ones, touchable casts of real and unusual animals, a green screen for a fun photo op with a unicorn or dragon, and an exploration of Colorado myths and legends, such as the jackalope, the fur-bearing trout, and the Colorado Howler.

“Human curiosity is insatiable when it comes to the creatures that have captured imaginations for thousands of years, so this is a different type of exhibition,” said George Sparks, President and CEO. “We will not only take a fun look at how science and ingenuity have solved many mysteries surrounding these beings but we will also have guests creating their own mythical animals and sharing personal experiences related to the realms between the real and the imaginary.”

Mythic Creatures: Dragons, Unicorns, and Mermaids is organized by the American Museum of Natural History, New York (www.amnh.org), in collaboration with The Field Museum, Chicago; Canadian Museum of Civilization, Gatineau-Ottawa; Australian National Maritime Museum, Sydney; and Fernbank Museum of Natural History, Atlanta.



MEMBERS TIPS

Mythic Creatures: Dragons, Unicorns, and Mermaids is now open through Monday, September 7, in Phipps Gallery, Level 3. Admission is free for members. Please be prepared to present your membership card at the entrance to the exhibition.

Weekday late afternoons and weekend early mornings tend to be less busy in these exhibitions. School groups generally visit during weekday mornings. Spring Break 2015 for most metro Denver school districts is scheduled to occur from March 23 to April 3.

Complimentary guest tickets that came with your membership are valid for general Museum admission and may be used for entry into Mythic Creatures.

Find out more about the exhibition and related programs @ www.dmns.org/mythiccreatures.

HOW THE TURTLE GOT ITS SHELL

By Tyler Lyson, PhD

There is a clear reason the saying “come out of your shell” was inspired by the turtle. They have one of the most distinctive and unusual body plans in the animal kingdom because of the bony shell that covers their backs and bellies. Most turtles can pull their head and limbs into the shell for protection from predators and other threats. Turtle shells are readily preserved in the fossil record, but there have been debates for centuries about how and when the turtle actually got its shell and how a turtle breathes when its ribs are locked into its shell.





While fully shelled turtles have a record extending back 210 million years, the fossil record for earlier partially shelled “proto-turtles” has been poor. Turtles are thought to have diverged from other reptiles at least 260 million years ago, leaving a 50-million-year gap in their fossil record.

The recent discovery in China of a 220-million-year-old turtle with half a shell has shed some light. The fossil has a fully developed belly shell and distinctively broadened ribs, but lacks a fully developed top shell and bony ossicles. The fossil suggests that turtle shells did not develop as ossicles were added to the skin—as in other vertebrates such as armadillos or ankylosaur dinosaurs—but rather formed by the gradual broadening of the ribs and vertebrae and the subsequent integration of ossicles and shoulder bones along the perimeter of the shell. While this fossil partially answered how and when the turtle got its shell, a 40-million-year gap in the turtle fossil record remained.

The Chinese turtle inspired me to turn to a long-forgotten 260-million-year-old fossil from South Africa named *Eunotosaurus africanus*. It was first described in 1892 as a presumed turtle ancestor but was subsequently ignored by scientists who thought turtle shells formed like those of other vertebrates. A detailed study of *Eunotosaurus* showed it was at the early stage of forming a shell. It has nine broadened ribs and lacks muscles between the ribs, features found only in turtles. More importantly, the broadened overlapping ribs expanded through the outgrowth of bone from the rib itself, a unique feature in turtles. *Eunotosaurus* has a combination of turtle features and primitive reptile characteristics that nicely bridge the gap between the early reptile body plan and the highly modified body plan of living turtles.

Because the ribs play a central role in ventilating the lungs in mammals, lizards, snakes, crocodiles, and birds, the broadening of ribs in turtles does not come without consequences. If your ribs are incorporated into a protective shell, then you have to find a new way to breathe—and turtles have done just that with a novel muscular sling that wraps around their lungs and organs to help them breathe. While it was clear to scientists that this lung ventilation mechanism evolved in tandem with the origin of the shell, it was not clear when and how it had evolved.

To address this question, colleagues and I compared the *Eunotosaurus* ribs to those of modern turtles, lizards, and mammals and found that the muscular breathing apparatus was already in place in *Eunotosaurus*. This suggests that early in the turtle body’s evolution a gradual increase in the body wall’s rigidity divided the function of the ribs and the abdominal respiratory muscles. As the ribs broadened and stiffened the torso, they became less effective for breathing, causing the abdominal muscles to become specialized for breathing and freeing up the ribs to eventually—approximately 50 million years later—become fully integrated into the characteristic turtle shell.

My colleagues and I published this research last fall in *Nature Communications*. It has led to a new understanding of how turtles developed their unique respiratory anatomy. Unlike other vertebrates that use a combination of muscle and bone to compress and expand the lungs, turtles rely on musculature alone. Future questions will address why turtle ribs broadened in the first place.

The Museum has collected numerous extraordinary fossil turtle skeletons that once lived in western North America. Last summer a Museum team collected several large land-dwelling tortoise-like turtles with bony protective spikes covering the neck, legs, and tail. One of these well-preserved individuals has a belly full of golf ball-size eggs. These discoveries help scientists answer other questions about the natural history of these beloved animals who have inspired human culture and scientific speculation for centuries.

Facing page: Volunteer Rick Millerick prepares a spectacular fossil shell of a *Basilemys*, collected in Utah during the 2014 field season. Above: These fossil shells belonged to *Echinemys*, one of the most common turtles in North America living 56 to 34 million years ago. Turtle “graveyards” are not uncommon for these aquatic reptiles.

FIND IT @ DMNS.ORG

Dr. Tyler Lyson, curator of vertebrate paleontology, joined the Museum’s science team last fall. Find out more about him @ www.dmns.org/science/museum-scientists/tyler-lyson.



ARAPAHO DOLLS

Two beautiful dolls in the Museum's hands-on education collection represent one of the Colorado's First Nations, the Arapaho. Donna Shakespeare-Cummings, a member of the northern Arapaho tribe, was born and raised on the Wind River Reservation in Wyoming. She made these dolls especially for the Museum so Coloradans of all ages can learn about one of our state's First Nations.

Historically, the Arapaho called themselves *Hinono'eino*, "our people." It is not clear where the term originated. Arapaho may have been derived from the Crow word *Alappaho*, "people of many tattoos," or may have originated with the Pawnee word for "trader." In modern history, most tribe members call themselves Arapaho. One thing is certain: The Arapaho people were among the original inhabitants of Colorado.

The northern Arapaho lived along the South Platte River, and the southern bands lived along the Arkansas River. There are no Arapaho reservations today in Colorado. The northern bands have the Wind River Reservation, and the southern Arapaho live in Oklahoma.

Donna created the dolls in the images of her great grandparents. Her great grandfather's name was Red Turtle, but he was given the name William Shakespeare when he was enrolled on the reservation. Donna's great grandmother's name was Cut Nose. Donna's grandfather was Tom Shakespeare, who along with his son Tom Jr. wrote *The Sky People* about the Arapaho. Donna used her family history and her knowledge of the Arapaho tradition to craft these dolls and record the heritage of the Arapaho people.

The Red Turtle doll stands 19 inches tall in traditional formal men's leggings dusted on the bottom with red ochre. He wears a breechcloth and shirt made of fringed, beaded, tanned, and smoked buckskin. From head to foot, he is dressed in his finest. He wears a headdress of many feathers, a great honor. These feathers are made of small duck feathers, trimmed and dyed to represent eagle feathers. They are attached with red flannel and a small plume. Beading, small ermine tails, and shell buttons in the shape of disks complete the bonnet.

He carries a rawhide shield painted with his name. He also carries a lance and a pipe-tomahawk in a bag. Red Turtle wears a breastplate of pipe bone made with real miniature bones, a collar of fur and mirrors, and a shell-based necklace.

The Cut Nose doll—measuring just under 15 inches tall—wears a shawl and dress made of beaded leather. She too is very well dressed. Note the jewelry on her wrists and fingers, and her belt of trade-silver conchas. She carries a baby in a finely beaded cradleboard. The baby is playing with a beaded ball. Cut Nose's shawl is adorned with many elk bugle teeth, another high honor. These teeth are miniatures carved from other animal teeth.

The beading on both dolls is significant too. The symbols of Whirlwind Woman, one of the spirits of creation, can be seen on the man's pipe bag and on top of the baby's cradleboard. Star images and buffalo hooves adorn the man's moccasins. The Morning Star is beaded on the woman's bag.

While these dolls are made to show people in their finest dress, they are also made in the same way that Arapaho youngsters' toys would have been made 150 years ago in Colorado. The dolls' skin is made of leather, the man wears red face paint, and the woman has red paint in the part of her hair. The beadwork representing eyes, nose, and mouth is very traditional.

The dolls are among the authentic artifacts and specimens in the education collection that are specially reserved for our guests to interact with on a more intimate level than normally allowed with our research collections. The objects are used in classes and workshops, gallery programs, and exploration stations around the Museum. People of all ages are encouraged to explore and discover the natural sciences through these tangible experiences.



SEE IT

Look for the Arapaho dolls during the Members Open House on Thursday, June 11. Mark your calendars!



LEAVING A LEGACY: CHARITABLE BEQUESTS

Interested in boosting the Museum's commitment to being a catalyst in the community but feel overwhelmed by giving up your assets today? A simple, flexible, and versatile way to ensure the Museum can continue to ignite our community's passion for nature and science for years to come is a gift in your will or living trust, known as a charitable bequest.

A charitable bequest is a simple statement in your will or living trust that names the Museum or the DMNS Foundation as a beneficiary of specific property, a specific dollar amount, or a percentage of your estate. Leaving a legacy in this way offers flexibility, versatility, and tax relief. It also allows you to make a meaningful impact after your passing while maintaining control over your assets during your lifetime.

For sample bequest language that best suits the intent of your gift, please contact Mary Pat Rooney, manager of planned giving, at 303.370.8251 or marypat.rooney@dmns.org. Find out more @ www.dmns.org/give/individual-giving.

MAGNIFY YOUR MUSEUM EXPERIENCE: JOIN THE GIVING CLUB

Thank you for supporting the Museum as a member! Your membership not only offers you great benefits but it also helps the Museum inspire and serve our community.

We invite you to upgrade your membership today and expand your relationship with the Museum. Joining the Giving Club at \$300 or above will bring you unique access to the Museum, with new opportunities for discovery and learning.

These are some of the benefits available to Giving Club members, based on level:

IMAX Family Nights, Tuesday and Wednesday, June 16 and 17: Go to the movies, IMAX style with complimentary snacks.

Behind-the-Scenes Night, Tuesday, October 13: An evening planned just for you and your family as you meet Museum scientists, explore treasures not on public display, and enjoy fun snacks and cash bar.

Free IMAX and Planetarium tickets: Although members receive a discount on tickets to our theaters every day, members of the Giving Club receive free tickets to these venues. You may use the tickets for yourself or share them with friends and family.

"Anytime" Tickets: All Giving Club members receive free "anytime" tickets to all surcharged exhibitions guaranteeing quick and easy access to temporary exhibitions.

It is easier and more affordable than ever to become a Giving Club member with monthly installments of as little as \$25 per month! Find out more about Giving Club levels and benefits @ www.dmns.org/join/giving-club.



YOUNG PROFESSIONALS INVITE YOU TO PARTY WITH A PURPOSE

The Museum's Young Professionals (YP) group connects metro-area leaders who share a passion for science and want to help the Museum inspire and serve the Colorado community. In addition to the basic benefits of a Museum membership, the YPs enjoy other opportunities created especially for them. Mark your calendars now for key events coming in 2015.

Science on Tap, Thursday, July 23: Mix and mingle with other YPs at one of the hottest venues in town. Enjoy specialty drinks, snack on local fare, and marvel at the latest scientific research from one of the Museum's scientists.

After Dark Soiree, Friday, November 13: Sip, dance, bid! Party at the Museum's annual gala while enjoying cocktails, dessert, dancing, and a silent auction.

Also coming this year, another volunteer day for YPs to engage with Museum guests and the wonders of nature. Stay tuned for details!

FIND OUT HOW YOU CAN JOIN THIS FUN GROUP @ WWW.DMNS.ORG/YP



© Jen Rowsell

DESERT MONSTERS

By Paula E. Cushing, PhD

I stood watching as the beast came quickly toward me. Its sharp, toothy jaws gaped, its body arched, it held what looked like a pair of legs high in the air. If I was the size of an insect, I would have been terrified. Fortunately, I was thousands of times bigger than this particular monster. The animal approaching was an arachnid called a camel spider in the class Arachnida and the order Solifugae. The common name is a misnomer since it is not, in fact, a spider (which are in the arachnid order Araneae). Camel spiders are found all over the world in desert and semi-desert habitats. Like most other arachnids, camel spiders are predators—primarily of insects.

Little is known about the biology of these arachnids and myths abound regarding these pugnacious predators. In South Africa, camel spiders are known as *haarskeeders*, or “hair shavers,” because it is believed that they sneak into the bed at night and cut a person’s hair with their powerful jaws. In Afrikaans, they are called *vetvreter*s, “fat eaters,” and in some parts of the world they are known as wind scorpions because of their amazing speed. One of my colleagues, Yael Lubin, followed a camel spider as it ran across the Negev Desert in Israel. She followed it for over an hour and the animal never stopped moving!

No one really knows how they got the common name “camel spider” since they are neither camels nor spiders. However, in some parts of the Middle East, locals and visiting U.S. military personnel are convinced that camel spiders grow up to 61 cm (two feet) in length and can jump up and bring down a large mammal like a horse or a camel using their powerful jaws. They then, so it is said, burrow into the guts of the mammal. Although they are formidable predators, their prowess does not extend quite so far.

Just like spiders and scorpions, camel spiders have eight legs, two body parts, jaws called chelicerae, front leglike structures called pedipalps, and a predatory lifestyle. They range in length from about 1 cm (the size of a bean) to 10 cm (or the length of your hand!). Camel spiders have two eyes at the very top of the head, called the propeltidium. Their two huge jaws, or chelicerae, take up half the propeltidium. These powerful jaws are hinged and the camel spider uses them to tear prey apart. The rear body part is called the abdomen and is divided into many segments.

My lab is one of the few in the world studying these arachnids. We have discovered and described new species of camel spiders; we recently completed the first phylogenetic analysis—or examination of the evolutionary relationships—among different species in the North American family Eremobatidae; and we have published several papers on various anatomical features whose function was previously unknown.

For example, we studied the suctorial organs, which are eversible balloon-like structures that camel spiders can pop out of the tips of their leg-like pedipalps. We used different methods to determine how camel spiders pop these organs out (they increase blood pressure into the pedipalps) and how they pull them back in (muscle contractions). These suctorial organs allow camel spiders to climb up smooth surfaces, sort of like the pads on a gecko’s feet. We hypothesized that in the wild the camel spiders probably use these suctorial organs to capture prey. Another colleague, Roderigo Willemart, published behavioral observations that supported this hypothesis. And a graduate student, Jen Rowsell, found that males use suctorial organs to hold onto females during copulation.

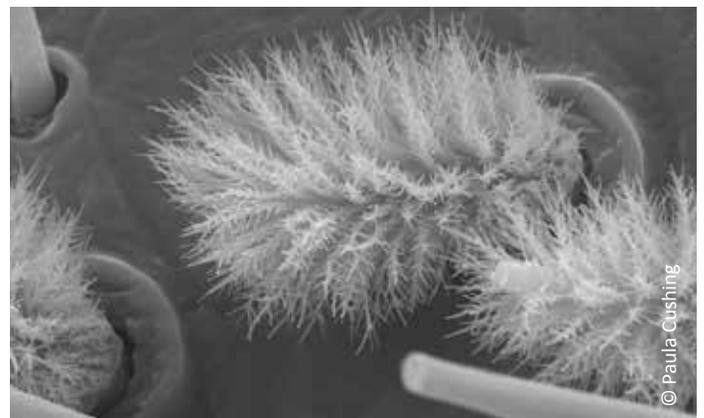
Our lab also studied beautiful hair-like structures called setae on the pedipalps of some male camel spiders. These specialized setae are called papillae, and under the scanning electron microscope they look like miniature Christmas trees (an example is pictured below). Last year my lab published a paper examining the microscopic structure of these papillae, trying to figure out their function. We determined that each papilla has dendrites (nerves) that extend into the shaft. They also have other features that led us to hypothesize that these structures function as chemoreceptors that allow the males to pick up chemical signals in the environment (probably from females).

We are only beginning to understand the biology of these bizarre arachnid monsters of the desert. But through our research we are able to say that they are no more monstrous than any other arachnid, they do not grow to gigantic proportions, they cannot eat horses and camels, and it is incredibly unlikely that a barber shop will ever hire camel spiders to cut hair.

FIND IT @ DMNS.ORG

Dr. Paula Cushing, curator of invertebrate zoology, will present Modern Myth: The Truth about Camel Spiders on Tuesday, April 7. Find it @ www.dmns.org/afterhours.

Above: Female *Eremobates pallipes*. Below: Scanning electron micrograph of a single papilla of *Chanbria rectus*.



© Paula Cushing



MEMBERS TIP

Spring Break 2015 for most metro Denver school districts is scheduled to occur from March 23 to April 3. Please anticipate increased attendance at the Museum during this time. During the peak times we find that weekday early mornings and late afternoons on weekends are often less crowded.

MEMBERS APPRECIATION DAY

SUNDAY, MAY 17

Enjoy these special discounts just for you!

- 20% off* on select items in all Museum Shops
- 20% off in the T-Rex Cafe and Deli
- 10% off gift memberships
- 50% off IMAX and Planetarium tickets
- Loyalty Lounge for our 10+ year members

*Extra 10% discount does not apply to DVDs, CDs, and books. Special offers are valid in person only on May 17, 2015, and are not redeemable over the phone or online.

GET THE MOST FROM YOUR MEMBERSHIP

- Visit anytime for free 364 days a year!
- Read the monthly Members eNews with members-only news, tips, and special offers. By sharing your e-mail address, you can also take advantage of advance registration for popular programs such as Summer Day Camps and receive other insider updates. Not getting the eNews or advance notifications? Send your e-mail address to members@dmns.org.
- Go electronic and keep your membership card on your smart phone by downloading the free eCard app from your device's app store. Find out how @ www.dmns.org/membercard.
- Keep your membership current with Auto-Renew, an easy automatic renewal process. Enroll in Auto-Renew @ 303.370.6306 (daily, 9–5) and get a free gift. Your expiration date is printed on the mail label on the back of this magazine and under "Your Membership At-a-Glance" in your Members eNews.

- Add another adult to your membership for just \$20. The Add-on option is great for nannies and grandparents! Add-on members must be enrolled by name in case they want to visit on their own. Not valid on Individual level memberships.
- Visit 330 science centers and museums using your free admission through the ASTC Passport Program. Free admission begins outside a 90-mile radius of Denver and your residence. Find out more @ www.astc.org/passport.
- Upgrade to Family Plus level membership and higher and enjoy a special reciprocity agreement with Fort Collins Museum of Discovery. (This agreement is separate from ASTC Passport program.)
- Find yourself frequently bringing the grandkids to the Museum? Check out the Grandparent membership level! It covers two adults living at the same address plus four of their own grandchildren, ages 3–18 years.

DON'T WAIT IN LINE—PRINT AT HOME!

Save time at the Museum and use print-at-home tickets for surcharged exhibitions, IMAX and Planetarium shows, and lectures and programs. Print-at-home allows you to print your tickets as soon as you finish making your purchase online—with no handling fee! When you arrive, proceed directly to the Ticket Taker booth with your printed tickets and begin enjoying the Museum.

QUESTIONS?

- 303.370.6306 (daily, 9–5)
- members@dmns.org
- www.dmns.org/members
- Stop by the Members Lane at the Ticketing Desk

THANK YOU FOR YOUR SUPPORT! Your membership helps us provide outstanding science education programs, exhibitions, and research.

Denver Mini Maker Faire[®]

SAVE THE DATE

Mini Maker Faire Is Coming to the Museum!

The Museum is pleased to host the 2015 Denver Mini Maker Faire, a multigenerational festival to make, create, learn, invent, craft, hack, recycle, build, think, play, and be inspired. These gatherings are sweeping the country.

Saturday & Sunday, June 13 & 14
9 a.m.–5 p.m.

**The Maker Faire is a ticketed event
for all members and guests.**

Tickets are \$5 per day and go on sale on Wednesday, April 1.

The Mini Maker Faire will be held inside and outside the Museum, rain or shine, with many activities for all ages. More than 50 makers from Colorado have already registered for a space at the event.

Find out more @ www.dmns.org/denvermakerfaire.

