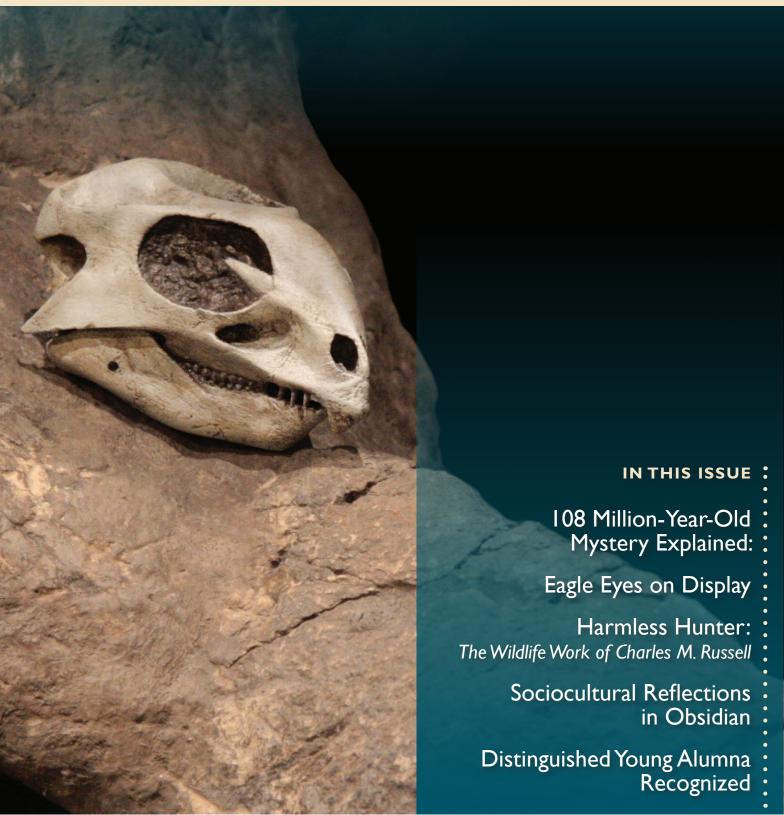
Sam Noble Museum 100 C S

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MUSEUM INFORMATION

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OUR MISSION

The Sam Noble Museum at the University of Oklahoma inspires minds to understand the world through collection-based research, interpretation and education.

OUR VISION

As one of the finest museums, we are at the heart of our community, collectively working to inspire understanding, appreciation and stewardship of the earth and its peoples.

TRACKS

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Aquilops reconstruction atop nasal horn of Pentaceratops, world's largest ceratopsian skull. Copyright Leah Vanderburg.

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Carolina Parakeet, John James Audubon, $Hand\text{-}colored\ engravings\ from\ The\ Birds$ of America, 1826-1838 Bell Museum of Natural History, University of Minnesota gift of William O. Winston and family, 1928.

From the Director



This spring, the Sam Noble Museum will mark fifteen years of serving Oklahomans in our "new" building. The few of us who remember working at the Stovall Museum still marvel at this beautiful facility, which is home to more than ten million objects gathered during our 116-year history. The building continues to meet all of our needs for research, exhibition, education, service and preservation of the collections.

Last year was exceptional. The museum received a National Medal awarded by the Institute of Museum and Library Services. The entire museum was proud to be the first organization in Oklahoma to receive this prestigious award. The medal is the highest recognition at the national level of the quality and unique nature of our educational programs. I was privileged to receive the medal from Michelle Obama at the White House. A second major honor last year was the museum's reaccreditation by the American Alliance of Museums. Accreditation is awarded to fewer than 10 percent of America's museums and is given in recognition of a museum's meeting national standards and best practices of operation, management, educational programming, collections preservation, research and service to the public.

As the accreditation committee noted: "Overall, the Visiting Committee found the museum an outstanding museum...The institution has seen beyond what many university museums have achieved by building a visitorfocused infrastructure and commitment to the community it serves. This is evident through the ample parking provided to museum visitors (unheard of on most university campuses), to the broad education and outreach programs the museum has across the state." The committee also found: "The museum has surpassed what many university museums are able to achieve...[and] a very strong team of staff work corroboratively to create an array of state of the art exhibits and programs...The exhibit experience is wonderful!"

Museum attendance was 127,818 in 2014, with 5,073 visitors during Spring Break Escape in March and a record high of 2,333 during the two-day Oklahoma Native American Youth Language Fair in April. School field trips brought 18,136 students, teachers and adult chaperones to classes and exhibits. Over 51,500 people visited the Discovery Room, and we had more than 200 volunteers donate 22,500 hours of their time in our exhibits, collections and labs.

Although we have several curator vacancies to fill, we had over \$1.8 million in grants and contracts for research and collections last year. Staff published 57 papers including a book by Marc Levine that you'll read more about in this newsletter. We had a number of new species discoveries in fossil vertebrates, trilobites, reptiles and amphibians. A new basal horned dinosaur - Aquilops americanus - discovered by Rich Cifelli's team during a 1997







Left: B. Byron Price talks about Charles M. Russell during the opening reception of "Harmless Hunter." Middle: Timothy Rowe poses with graduate students. Right: John "Jack" Horner discusses dinosaur accoutrements during a Dinosaurs, Past and Present lecture.

expedition in Montana recently went on display in the Hall of Ancient Life and has been a media star. We have included features about this 3-pound distant relative of our giant *Pentaceratops*. We hosted packed lectures in February and March in a series about dinosaurs with Jack Horner and Tim Rowe.

In January, Byron Price presented a lecture about Charles M. Russell at the members opening reception for *Harmless Hunter: The Wildlife Art of Charles M. Russell.* I encourage you to see this beautiful exhibit organized by the National Museum of Wildlife Art in Jackson, Wyoming.

To celebrate 125 years, Live On, University: The Campaign for the University of Oklahoma was recently launched. Building upon the foundation of excellence that has been created through world-class educational and cultural experiences, the museum is proud to be part of this campaign. We have targeted \$8 million as a capital projects goal to erect a Dino Walkway south of the museum and finish exhibits in the Hall of the People of Oklahoma and the Hall of Natural Wonders. If you would like to know more about these projects, please feel free to contact me.

As we mark our 15th year at this location, I know we have influenced the more than 2.3 million visitors who have had the opportunity to view the natural and cultural history of Oklahoma in new ways. The Sam Noble Museum connects science, nature and culture to people's lives.

Our collections continue to grow through the activities of curators and collections staff, as well as through donations. Collecting and maintaining specimens, cultural objects and associated data, including linguistic and ethnographic materials, for research continues to be one of the primary ways we fulfill our mission. Each year our curators teach hundreds of undergraduates and graduate students about the fascinating disciplines included within the purview of a major natural history museum, everything from genetics to geology, from languages to archeology. Our university students are provided unique opportunities to learn and study thanks to our enormous and valuable collections.

Educating the public through programs and exhibitions that increase scientific literacy for visitors of all ages is part of our mission and a mandate from the State of Oklahoma. Service to the people of Oklahoma has been, and continues to be, our primary objective.

Michael A. Mares, Ph.D. Director

108-Million-Year-Old Mystery Explained

BY JEN TREGARTHEN, LAURA WILCOX, PUBLIC RELATIONS

Tith a signature frilled skull and beaked nose, Ceratopsia are among the most recognizable and best-known dinosaurs in history. But where did these "horned dinosaurs" come from? Because of a limited fossil record, paleontologists have struggled for decades to reconstruct the early evolutionary history of Ceratopsia in North America. Now, thanks to a skull no larger than a lemon, researchers are closer than ever before to understanding the 108 million-year-old mystery.

The skull, named Aquilops americanus ("American eagle face"), represents a 3-pound relative of Triceratops, which weighed up to 4,000 times more. A 'no frills' ceratopsian, the new species Aquilops also lacks the trademark head shield and facial horns of its distant cousins. Roughly the size of a small cat, it is estimated to have been two feet long — another point of contrast with its truck-sized relatives.

For up to 108 million years, this specimen lay buried deep in the red, sandy claystone of southern Montana's Cloverly Formation. Unearthed during a 1997 expedition of paleontologists from Oklahoma and California, and funded by the National Geographic Society's Committee for Research and Exploration, Aquilops is now the oldest member of the horned dinosaur lineage named from North America.

Due to a limited fossil record, paleontologists have struggled to reconstruct the evolutionary history of the Ceratopsia in North America. Aquilops provides important new information on vertebrate history during the latter part of the age of dinosaurs.

"We were excited that it looked like a skull of a small plant-eating dinosaur, but we assumed that it belonged to a species already known," said Rich Cifelli, Sam Noble Museum curator of paleontology and head of the expedition. "It wasn't until the skull was freed from rock that we realized we had something new and significant."

Paleontologist Scott Madsen, a member of the expedition and an accomplished preparator, both discovered and prepared the fossil skull. The fossil was embedded in hard rock. Madsen spent countless hours painstakingly removing it a few sand grains at a time using a specially sharpened carbide needle.

"The 'aha' moment came when I uncovered the snout and saw a sharp, hooked bill," said Madsen. According to ceratopsian expert Andrew Farke, lead author of the scientific paper describing Aquilops, "The upper beak bone is sort of a membership card for ceratopsian dinosaurs." Farke also stated that, "Previous fossils of early ceratopsians from North America have been pretty fragmentary. This specimen is nearly 20 million years older than any other wellknown ceratopsian from our continent."

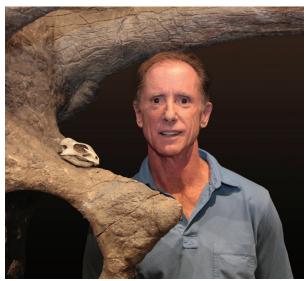
The fossil record suggests that horned dinosaurs arose in Asia and dispersed to North America near the present-day Bering Strait by about 108 million years ago, the age of *Aquilops*. Surprisingly, however, the study by Farke and colleagues places *Aquilops* near the base of the ceratopsian family tree, far removed from horn-bearing Triceratops and other North American relatives.

Relationships among these upper branches of the genealogical tree suggest that two or more immigration events happened later in the Cretaceous. "Life on land underwent profound changes during the latter part of the age of dinosaurs. This new find supports the view that migration events were fundamental in driving those changes," said Farke. "Aquilops represents just one of many groups that made the trek from Asia to North America."

"This is a special project because we only have one skull," said Matt Wedel, a co-author on the paper describing Aquilops. "I hope more come to light in the future, but for now this is it so we really want do this right the first time." The research describing Aquilops was published on Dec. 10 in the peer-reviewed journal PLOS ONE.

The skull of *Aquilops* will be stored in the vertebrate paleontology collection at the Sam Noble Museum. It will be the nucleus for development of an in-house virtual interactive to go on exhibit in the museum's Hall of Ancient Life alongside the museum's *Pentaceratops*, which holds the Guinness World Record for being the largest dinosaur skull ever found.







 $Top\ left:\ Digital\ reconstruction\ of\ early\ ceratops ian\ Aquilops,\ left\ lateral\ view.\ Top\ right:\ Cifelli\ stands\ next\ to\ early\ ceratops ian\ Aquilops\ and\ its\ distant\ relative\ Pentaceratops.\ Bottom:\ Artist's\ reconstruction\ of\ Aquilops\ in\ its\ environment\ in\ ancient\ Montana.\ Copyright\ Brian\ Engh,\ courtesy\ of\ Raymond\ M.\ Alf\ Museum\ of\ Paleontology.$

Eagle EyesNow on Display at the Museum

BY DEVON GREEN, OKLAHOMA GAZETTE



Above: Tom Luczycki examines the Aquilops skull at the museum. Photos courtesy of Mark Hancock.

Thile the writers behind Jurassic World — the fourth installment in the Jurassic Park franchise — were busy dreaming up new and creative ways to thrill audiences, paleontologists with the Sam Noble Museum in Norman have been building a display so the public can experience a real and completely new dinosaur.

Although the fossil is a skull the size of a lemon, this diminutive creature has big implications for what we know about the horned-face dinosaurs called ceratopsia. The better-known members of this family include Triceratops and Pentaceratops. The museum has one of the largest examples of Pentaceratops on permanent display.

The new specimen was formally named Aquilops americanus by Curator of Vertebrate Paleontology Richard Cifelli for the Sam Noble Museum, who, along with his team of researchers, discovered the fossil in the Cloverleaf formation outside of Billings, Montana. The name translates to American eagle face — Aqui is Latin for eagle, and ops is Greek for face.

The discovery has given us a better understanding of what we know of the beasts that once roamed the American West.

Uncovering connections

Cifelli led the team of paleontologists and researchers from Oklahoma and California. At the time of the discovery, the team had no idea they had unearthed anything remarkable, much less a fossil that changes our understanding of the ceratopsian lineage. The team that

excavated the tiny, mostly intact skull was convinced it was the fossil of a small, plant-eating dinosaur found throughout the Cloverleaf.

"It was a fist-sized piece of rock, and all we could see was a couple of teeth. We sent it back with Scott [Madsen, a paleontologist and fossil preparator] because it was a nice specimen," Cifelli said. "It wasn't until he'd had it a year or a year and a half [that] it hit him with a force of a blinding 'I know what that is!""

Cifelli, who has worked with Madsen since the '70s, explained that Madsen's task as a preparator is meticulous and slow-going. Working with needles about the size of leather sewing needles, he removed about one to three grains of rock at a time to reveal the skull's beak and a bone unique to ceratopsia called a rostral bone. These two characteristics distinguished it as a member of the same family that produced the giant Triceratops and Pentaceratops millions of years later.

American paleontologists have struggled with the lineage of horned dinosaurs, especially in North America, because of a lack of evidence in the fossil record. To be certain about the skull's potential meaning in terms of the North American ceratopsia lineage, Cifelli called on Andrew Farke.

"[Farke] is not only a specialist on horned dinosaurs but has studied all the specimens in China," Cifelli said.

China's examples of fossil ceratopsia are far more complete. In some cases, they predate North American's varieties by a few million years.



Above: Aquilops fossil and castings at the museum.



Above: The Aquilops fossil exhibit.

"[Paleontologists] all pretty much agree the group originated in Asia because the oldest and most primitive forms are there." Cifelli said.

Aquilops' age is the most compelling evidence that members of the horned-face family migrated to North America several times over the course of millions of years rather than in one single migration, most likely over the land bridge that once connected Alaska and Russia.

"There had been bits and pieces of the same era [as Aquilops] before, but nothing identifiable," Cifelli said. "This [specimen] shows us that they are really basic, they don't belong to the great groups we see later in North America."

On display

The fact that the skull is relatively intact is remarkable. Skulls are usually the first to crumble in the preservation process because of their hollow nature. For the first discovery of the dinosaur's kind to be a skull is a rarity. This can also be problematic, as some characteristics in the skull appear to be juvenile, and juvenile remains sometimes exhibit characteristics that are not found in adults. When there's only one, this can skew the evidence and the implications for a new species. Luckily, with Farke's analytical help, the group was comfortable with the skull being an older juvenile.

The team's findings were first published in PLOS ONE, an open-access, peer-reviewed publication of research, resources and materials that is free to academics and the public. Farke and Cifelli, along with two others, published A Ceratopsian Dinosaur from the

Lower Cretaceous of Western North America, and the Biogeography of Neoceratopsia in 2014. The article immediately gained attention in academic circles and popular science publications, including National Geographic and Discover.

The fossil has captured academic and public imaginations alike, especially those interested in evolution. How could something develop from such a small creature to one of the largest dinosaurs to roam the continent? The contrast is especially striking when viewed at the museum. The Hall of Ancient Life, where the specimen is on display, is arranged chronologically. The museum staff highlighted *Aquilops*' time period as well as its contrast in size to its formidable relative, *Pentaceratops*.

"It actually goes with the community where the raptors are in space and time, but it actually is a relative of the *Pentaceratops*. We're going to stick this thing right in between, at opposite extremes," Cifelli said. "So you have this teeny, tiny primitive one, which has got a beak but no frills to speak of, and then this kick-ass, gigantic descendant."

The visitors will see three versions of the skull on display: the actual skull, a cast of the skull with restoration and repair and a 3-D, interactive model. The skull is part of the museum's permanent collection and is now on display in the vertebrate paleontology collection.

This article was published in the Feb. 25 print edition of the Oklahoma Gazette and online under the title, "Aquilops skull on display at Sam Noble Museum of Natural History".

Sociocultural Reflections on Obsidian

BY JEN TREGARTHEN, LAURA WILCOX, PUBLIC RELATIONS

hether we realize it or not, objects help shape who we are and how we live. The idea that objects play an active role in our lives, called materiality, is one that many scholars—including archaeologists—have begun to examine in their work. In his most recent publication, Sam Noble Museum archaeology curator Marc Levine examines the materiality of obsidian; an important volcanic glass used by pre-Hispanic Mesoamerican societies to make stone tools and other ornamental objects.

"In Mesoamerica, obsidian is highly charged symbolically," Levine explained. "Things that we view as inanimate — mountains, rocks, trees — are full of life in Mesoamerican culture."

Although obsidian is not a new topic of study in the world of archaeology, most of the existing literature focuses on the functional aspects of this resource. For instance, how was obsidian fashioned into tools? What tasks did these tools perform? How was obsidian trade important to the broader economy? While important, these questions are not the focus of Levine's latest work. Instead, in Obsidian Reflections: Symbolic Dimensions of Obsidian in Mesoamerica, Levine and his co-editor, David Carballo, assistant professor of archaeology at Boston University, assembled nine case studies to explore the cultural value of this iridescent stone, which includes colors such as black, gray, green and red.

"The point is to explore the full spectrum of sociocultural and symbolic connotations attached to obsidian," Levine

said. "By understanding what this volcanic rock meant to Mesoamerican people, we can begin to better understand its significance and what it means in the archaeological record."

Mesoamerica, a region extending from central Mexico to Belize, Guatemala, El Salvador, and northern Honduras, is one of six areas in the world where ancient civilization arose independently. During the pre-Hispanic era, obsidian was the most important material for making stone tools in Mesoamerica and was traded across hundreds of miles. But apart from obsidian's great workability and sharpness, people admired its luminescent and reflective nature and considered these supernatural qualities.

From what archaeologists gather, obsidian has rich symbolic meaning in Mesoamerican culture. Often associated with the underworld, obsidian was used in ceremonial rituals such as bloodletting and even human sacrifice.

Obsidian's colors may have also encoded important meanings as well. For instance, green obsidian may have emphasized connections to fertility, recalling the growth of green buds and other plant life. In some areas, it appears that people preferentially selected green obsidian for use in ritual offerings, where it was deposited to sanctify and concentrate spiritual power.

"When it comes to obsidian, we see the simultaneous mass production of physical means of authority like weapons but then also the symbolic means of



Above: Obsidian artifact. Photo courtesy of David Carballo.

"Things that we view as inanimate — mountains, rocks, trees — are full of life in Mesoamerican culture."

authority, ritualized items, deposited items in offerings and pyramids," said Carballo.

When studying symbolic significance, archaeologists must consider all aspects of an artifact — color, shape, design, size, and the overall context in which it was found. Each characteristic reveals a new sociocultural dimension, offering insights into Mesoamerican world views, religion and belief systems. In fact, we know that obsidian was closely linked to a host of Mesoamerican deities. For instance, Itzpapalotl—the "Obsidian Butterfly"—is a goddess depicted with wings tipped with obsidian knives. Archaeologists excavating pre-Hispanic obsidian mines in central Mexico uncovered images of Itzpapalotl, suggesting that these intrepid miners may have revered her as the "patron saint" of obsidian production.

Objects, whether they are found in nature or made by design, play significant roles in every culture. Obsidian is only one example of deeply symbolic materiality in a particular culture. When scientists years from now study our society, what will they glean from what is left behind?

Mesoamerican enthusiasts or those interested in obsidian use in the ancient world can enjoy Obsidian Reflections. The book is available through the University Press of Colorado and can be purchased online by visiting www.upcolorado.com.

Harmless Hunter: The Wildlife Art of Charles M. Russell

Porn in St. Louis, Mo., in 1864, Charles Marion Russell's love affair with art and animals began early in life. As a child, Russell's sketches often were of his native St. Louis, hunting scenes from popular books or from animals that had been harvested from the mountains surrounding the Judith Basin.

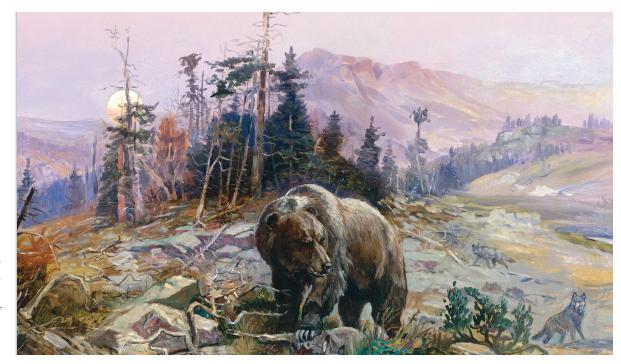
Though he's known as the "cowboy artist" for his popular artworks featuring cowboys, Native Americans and Western landscapes, Harmless Hunter: The Wildlife Work of Charles M. Russell instead features many of Russell's works of art that feature wild animals.

"Russell's wildlife art attracted avid patronage - from the publishers of books, magazines, and calendars seeking illustrations to wealthy businessmen anxious to decorate their club rooms with scenes of nature

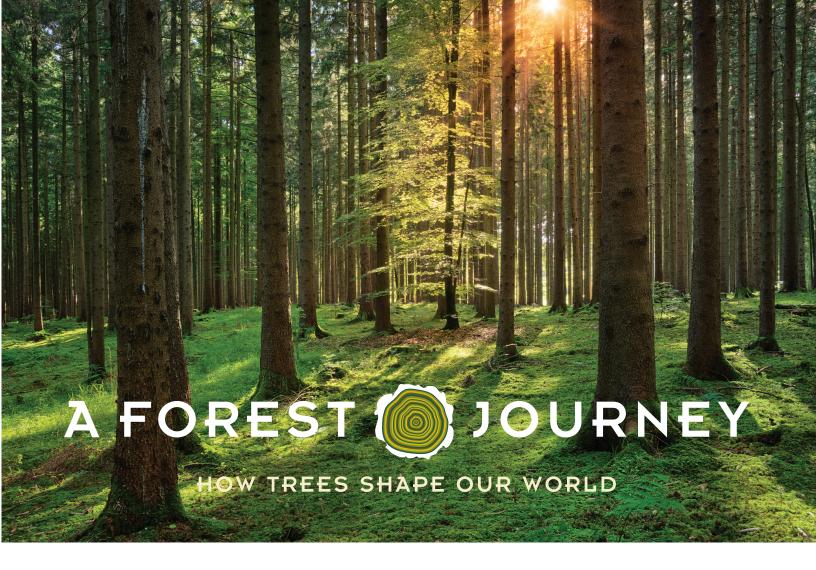
and the hunt, symbols of what President Theodore Roosevelt called the 'strenuous life,'" explains B. Byron Price, director of the Charles M. Russell Center and University of Oklahoma Press.

"Many of Russell's paintings and sculptures celebrate the majesty and harmony of nature and portray a symbiotic, if somewhat romanticized view of the relationship of Native Americans with the land," says Price. "Works featuring wildlife and human interaction, however, often address more problematic environmental themes, most of them a reflection of the rapid changes wrought by the onset of settlement, economic development, and near decimation of wild game."

Sponsored by Love's Travel Stops and Country Stores. Harmless Hunter is on display through April 26.



Right: Charles M. Russell, "To the Victor Goes The Spoils"detail, JKM Collection®, National Museum of Wildlife Art.



"A Society grows great when old men plant trees whose shade they know they shall never sit in."

- Greek Proverb

Trees have not always existed on Earth. The first trees, known as Archaeopteris emerged on about 380 million years ago, and had an astounding growth spurt during the Carboniferous "cold bearing" period.

Journey through time from modern day trees to their prehistoric counterparts in this rich and inviting interactive exhibit. Inspired by the Harvard classic A Forest Journey,: The Story of Wood and Civilization by science writer, John Perlin, A Forest Journey sheds light on the history of trees and the major role forests have played in human life.

Since the dawn of civilization, wood has been the principal fuel and building material until the ascendancy of fossil fuels. The exhibit sheds new light on the history of the use of wood throughout the world, on forest products (from paper to lifesaving pharmaceuticals) and on the benefits of trees.

From deforestation and erosion, to fuel and product uses, the exhibit illustrates the diversity of needs and effects trees have environmentally, socially, communally and economically.

Sponsored by Love's Travel Stops and Country Stores. *A Forest Journey* is on display through May 3.

Enriched! Paintings by Oklahoma City Zoo Animals



Above: Enriched! exhibit on display in the museum's education hall.



Right: Bom Bom, on display in the museum lobby.

he Sam Noble Museum recently opened Enriched! Paintings by Oklahoma City Zoo Animals, showcasing the unique artwork created by zoo animals through enrichment programs led by trained Oklahoma City Zoo staff.

Studies suggest that highly intelligent animals, such as apes and elephants, may mimic things they see in their paintings, such as a yellow school bus or a child wearing a red shirt. Careful thought is put into the tools and methods taught to each animal.

While zoos across the world agree enrichment is beneficial to their animals, not all incorporate painting. Other methods can include scents, sounds, tastes or even toys, all used with one goal in mind: to engage animals to move, hunt, interact, think and learn.

Discover the history behind zoo enrichment programs in this colorful and educational exhibit provided by the Oklahoma City Zoo. On display through April 5.



Distinguished Young Alumna Recognized

Alumni Gail P. Lapidus, Homer Paul and Brandi Coyner, from the University of Oklahoma have been recognized for their accomplishments by the university's largest college, the College of Arts and Sciences. The museum is particularly proud to acknowledge the recognition of Coyner, curatorial associate in the museum's mammalogy and genomic resources collections, for making history as the inaugural Distinguished Young Alumna.

Brandi Coyner, a native of Chandler, Oklahoma, first recognized her passion for mammals while conducting research at the Oklahoma Biological Station in 2003. Since then, she has wasted no time in making a name for herself in the field of academic mammalogy.

In the last 12 years, Coyner, armed with a Bachelor of Science in Zoology, has secured several prestigious awards, including back-to-back multi-year fellowships with the National Science Foundation. Her research received the highest awards for undergraduate research by the Texas Society of Mammalogists and the American Society of Mammalogists.

Her graduate career was equally productive, as evidenced by her recognition as a 2010 Phoenix Award Finalist, designating her as one of the top three doctoral students at Oklahoma State University that year. Also,

in 2010 she received the Albert R. and Alma Shadle Award from the American Society of Mammalogists, one of their two highest honors bestowed upon graduate students to recognize their contributions to the field of mammalogy, service to the American Society of Mammalogists, and their potential to develop a productive career in mammalogy. Coyner has published nine peer-reviewed scientific articles, secured more than \$375,000 in grant funding, and her research has led to the description of four mammal species new to science. She is currently working on *The Mammals of Argentina*, her first book co-written with her two undergraduate mentors.

"I love working at the Sam Noble Museum," said Coyner. "I especially enjoy working with student groups, offering behind-the-scenes tours for guests and explaining my research and the advanced molecular techniques that I use to high school students and the general public."

Outside of the research lab, she has been active in several professional societies and numerous outreach programs. Locally, Coyner is a member of the 2015 Class of Leadership Norman and a new member of Sooner Rotary Club.

Beyond her commitment to her community, Coyner enjoys nature and has a deep-seeded commitment to her two adopted Labrador retrievers, Jet and Riley, through numerous dog sports, including agility, barn hunting, nose work, and dock jumping.



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