

Fall 2015 Newsletter Vol. 27, No. 3

#### IN THIS ISSUE

First Folio! The Book That Gave Us Shakespeare

Science Matters

Mysterious Mixtec Molds From Ancient Mexico

From Barns and Stables to Best in Heritage

### Holiday Giving!

Museum members play a vital role in the museum's future. Your membership dues benefit the ongoing schedule of exhibits, programs and events. Your donations grow and preserve collections, support research and expand the important educational and cultural contributions that the museum makes to the community.

Please consider giving a museum membership as a holiday gift or make a tax deductible, end-of-the-year gift to exhibits, education or a collection of your choice.

> To purchase a gift membership or to make a donation, visit SamNobleMuseum.ou.edu or call Pam McIntosh at (405) 325-5020.



#### TRACKS, FALL 2015: VOLUME 27 NO. 3

#### MUSEUM INFORMATION

#### Address

Sam Noble Museum The University of Oklahoma 2401 Chautauqua Ave. Norman, OK 73072-7029

Telephone: (405) 325-4712 Email: pr@snomnh.ou.edu Web: SamNobleMuseum.ou.edu

#### 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

*Editor-in-Chief:* Michael A. Mares *Managing Editor:* Pam McIntosh *Associate Editor:* Jen Tregarthen *Layout:* Jen Tregarthen



This publication is printed on paper containing 30 percent post consumer recycled fiber. Please recycle.

This publication, printed by the Sam Noble Museum, is issued by the University of Oklahoma. 1,500 copies have been prepared and distributed at a cost of \$2,381 to the taxpayers of the state of Oklahoma.

The University of Oklahoma in compliance with all applicable federal and state laws and regulations does not discriminate on the basis of race, color, national origin, sexual orientation, genetic information, sex, age, religion, disability, political beliefs, or status as a veteran in any of its policies, practices or procedures. This includes but is not limited to admissions, employment, financial aid and educational services. For questions regarding discrimination, sexual assault, sexual misconduct or sexual harassment, please contact the Office(s) of Institutional Equity as may be applicable – Norman campus at (405) 325-3546/3549, the Health Sciences Center at (405) 271-2110 or the OU-Tulsa Title IX Office at (918) 660-3107. Please see www.ou.edu/eoo. For accommodations on the basis of disability, call (405) 325-4712.





#### FEATURES AND DEPARTMENTS

- 02 FROM THE DIRECTOR
- 04 EXHIBITIONS From Beginning to End: The Creation of an Exhibit
- 06 EXHIBITIONS First Folio! The Book That Gave Us Shakespeare
- 07 COLLECTIONS Growing Collection Receives Grant
- 08 COLLECTIONS A Day in the Life of a Field Biologist

- 10 FEATURE Science Matters
- 14 RESEARCH Mysterious Mixtec Molds From Ancient Mexico
- I6 FEATURE From Barns and Stables to Best in Heritage

.....

ON THE FRONT COVER: Woven palm leaf, felt, yarn and chicken feather hat, Huichol, 1965. Purchased from Mr. Jose R. Huno O., Arte Popular Mexicano.

ON THE BACK COVER: Ulysses Aldrovandi, "Serpentarvm et draconvm historiae" (Bologna, 1640).

Thanks to our 2015 Corporate Sponsors: Love's Travel Stops and Country Stores, Sonic, America's Drive In, OKGazette, OK Bride, Arvest Bank, Republic Bank & Trust, 2GreenChicks, VisitNorman and Banc*First*.





## From the Director



As 2015 draws to a close, we look back on another year of remarkable exhibits, amazing objects on display, exciting research, informative educational programs and special community events. We marked our 15-year anniversary in our "new" facility on May 1. This facility and the significant collections it brought together under one

roof for preservation, protection and use in research worldwide, as well as the unique programs that have been developed, has made it possible for Oklahoma to shine on the world stage.

The Sam Noble Oklahoma Museum of Natural History has long been recognized as one of the finest university-based natural history museums in the country and last year it joined a celebrated group of US museums by receiving the National Medal for Museums. This honor led to new audiences hearing our story. Last May I gave a presentation about the museum in Sydney, Australia. Recently, we became one of only two American museums invited to the Best in Heritage conference in Dubrovnik, Croatia. I was one of 28 laureates, which included directors and museum professionals from 25 nations honored for their outstanding efforts in developing museums and programs. It was great to have the Sam Noble Museum included with such exceptional museums as London's Victoria and Albert Museum or China's Nanjing Museum. Overall, the conference was a celebration of remarkable museum stories from throughout the world. You will read more about the celebration in this issue.

Summer attendance was 35,347 including over 5,000 military and their family members visiting for free as part of the national Blue Star Museum Program. ExplorOlogy® programs such as Paleo Expedition, Oklahoma Science Adventure and Science Institute, made possible in 2015 by the Oklahoma Energy Resources Board (OERB), provided 36 students and educators the opportunity to work with scientists and education staff conducting research and field science investigations in one to two-week long programs.

Our curators continue to receive grants, publish in journals, give lectures, mentor graduate and undergraduate, students, teach classes across the OU campus and travel the globe for their research.



Above: Dubrovnik, Croatia, including (top right) photo from a welcome ceremony at the Sponza Palace.

Through their research and service, they help people become more informed citizens. Museum staff members work hard to provide information to people of all ages so that all of us can better understand the state of our state and the state of our world. Our programs contribute to a citizenry that has a stronger foundation in science — people more able to understand the complexities of their community, country and world.

By supporting the Sam Noble Museum, you also contribute to the development of informed opinions on a host of issues that challenge the planet today and life in the future, from climate change to the loss of thousands of species and habitats across the globe.

As always, we are grateful to you — our members, our Board of Visitors, our donors and corporate sponsors. You make it possible for us to serve the people of Oklahoma and for visitors from around the world to be impressed by Oklahoma's museum and its stories of natural and cultural heritage. We are truly an exceptional place and I know we will continue to grow our research, collections, exhibits and programs with your support.

We wish you and your family a happy holiday period and a peaceful New Year.

aver

Michael A. Mares, Ph.D. Director

### From Beginning to End: The Creation of an Exhibit

BY ELYSSA MANN, PUBLIC RELATIONS

Many people have now had the opportunity to view our newest exhibit, Collision & Creation: Indigenous Arts of America, 1890-2015, which is on display at the museum through Feb. 21, 2016. And, some have asked how an exhibit like this is developed, what does it take to create this type of exhibit and get the artifacts from the collection displayed on the walls and in the cases.

"What's the big idea here? What's the one big thing you want the public to take away from this exhibition experience?" That's the question Dan Swan, curator of ethnology, asks himself each time he plans a new exhibit.

Swan created the concept for *Collision & Creation* by envisioning an exhibit that explores the exchange and transformation of the indigenous people upon the arrival of colonists and explorers in the Americas.

The subject, while often discussed in schools, is a heavy one. It explores both the ethnocide and genocide of the indigenous people after contact. While the topics can be difficult to talk about, Swan stressed the importance of tackling the subject head-on for the exhibit.

Selecting the objects and preparing them for display — picking which ones that most embody the theme and then ensuring they're safe to put on display — is one of the most time-consuming and important steps in creating an exhibit. Utilizing the museum's extensive ethnology collection, more than 200 objects were evaluated that expressed both traditional stability



Above: Shipibo mineral paint on clay jar, Peru 1950s. Gift of the Summer Institute of Linguistics, on display in Collision & Creation.

and the result from the colonial exchange between Native peoples of the Americas and foreign nations.

After careful consideration, ethnology collection manager, Stephanie Allen, assisted Swan in selecting 175 objects for the exhibit based on how they fit the theme, design of the exhibit, space available in each case (or, in some cases, on the wall and hanging from the ceiling), as well as the durability of the object.

"You have to go through and look at the condition of the object," she said. "We determined that some objects are too fragile, sensitive to light or could not be safely mounted to be placed on display."

As the objects were chosen and finalized, two more aspects of exhibit preparation began — the development of the "creative" and the plans for how the artifacts will be displayed.

The creative, as it is collectively called, can encompass many different mediums, including banners, logos, images, informational text, decals, ad templates, tag lines and more.

Leah Vanderburg, the museum's graphic designer, constructed each of these creative elements, based upon a central look she created for the exhibit.



Above: Items from Collision & Creation on display through Feb. 21.

"The main theme that I used for the visual aspects of this exhibit was all about the simplified, monoline patterns pulled from the artwork," she said.

This pattern was inspired by a piece of Shipibo pottery, on display in the exhibit. Vanderburg also pulled part of her design from one of several Navajo blankets in the exhibit as well. It was important to her to use multiple patterns from multiple nations to represent the diversity of the exhibit.

While Vanderburg designed the creative, Tom Luczycki, head of the exhibits department, constructed the layout of the exhibit space. After the artifacts were grouped, Luczycki worked with Swan to create a 3-D model of the exhibit space.

"We want to instill a sense of wonder in the visitor upon entrance," Luczycki said. "We also want to showcase the artifacts in the best possible way."

Everyone's goal is the same: to present the artifacts in a way that tells the exhibit's story.

"They're [the artifacts] a testament to the endurance and creativity and ingenuity of the indigenous people, but that's only half the story," Swan said. "The full history is predicated on this disastrous colonial encounter. We thought this [exhibit] would be a good one to challenge ourselves and take on a weighty issue."

While the exhibit doesn't show a representation of the physical clash between the indigenous people and the Europeans, it does have objects that are tied to it in many ways through artistic form. The harsh realities of European conquest fostered new forms of artistic expression and brought together a unique mixture of people, materials and ideas that influenced the history and future of indigenous arts.

"We tried to look at the ways in which indigenous people took European materials and invented new art forms," Swan said. "That's what the show is all about."

The Sam Noble Museum's *Collision & Creation* is an exhibit in celebration of the University of Oklahoma's 125th anniversary showcasing 125 years of ethnographic arts created by Native peoples of the Americas and is sponsored in part by the Norman Arts Council and Loves Travel Stops and Country Stores.



the book that gave us SHAKESPEARE on tour from the

Folger SHAKESPEARE LIBRARY

### First Folio! The Book that Gave Us Shakespeare

BY ELYSSA MANN, PUBLIC RELATIONS

he Sam Noble Museum has been selected as Oklahoma's host for the national tour of First Folio! The Book that Gave Us Shakespeare, Jan. 4 through Jan. 29, 2016.

The "First Folio" is the first complete collection of Shakespeare's plays, published in 1623, seven years after his death. Compiled by two of Shakespeare's fellow actors, it preserves 36 of Shakespeare's plays. Without it, we would not have 18 of those plays, including *Macbeth, Julius Caesar, Twelfth Night, The Tempest* and *Antony and Cleopatra*.

"This exhibit is a rare opportunity for people in Oklahoma to experience one of the most influential books in history," said Jen Tregarthen, spokesperson for the museum.

First Folio!, organized by the Folger Shakespeare Library, the Cincinnati Museum Center and the American

Right: Title page with Droeshout engraving of Shakespeare. Shakespeare First Folio, 1623. Folger Shakespeare Library.



Library Association, will be on display opened to the page with the most quoted line from Shakespeare and one of the most quoted lines in the world: "To be or not to be," from *Hamlet*.

Accompanying the rare book will be several panels exploring the significance of Shakespeare, then and now, with additional digital content and interactive activities.

During the exhibition, the University of Oklahoma, with the cooperation of the university's medieval and early modern faculty, will present numerous public programs, which can be found on the College of Arts and Sciences website, cas.ou.edu/first-folio.

Also on display in complement to *First Folio!* will be Shakespeare's "Second Folio" (1632), held in the John and Mary Nichols Special Collections at Bizzell Memorial Library, as a part of the *Galileo's World* exhibition celebrating the University of Oklahoma's 125th anniversary.

First Folio! The Book that Gave Us Shakespeare has been made possible in part by a major grant from the National Endowment for the Humanities: Exploring the Human Endeavor, and by the generous support of Google.org and Vinton and Sigrid Cerf.



Monarch butterflies in the recent invertebrates collections.

Invertebrates comprise an overwhelmingly large portion of the Earth's biodiversity. With more than half a million invertebrate specimens and limited housing space, the recent invertebrate collection at the Sam Noble Museum needed a new storage system to accommodate its growth. Thanks to a National Science Foundation (NSF) grant of over \$360,000, curator Katrina Menard and collection manager Andy Boring will be completing a long-term plan to revitalize storage of the specimens.

Recent invertebrates include arthropods, mollusks, annelids and other animals lacking a backbone. By some estimates, they constitute more than 95 percent of the world's animals, accounting for many millions of species.

The grant will allow for the installation of compactors — a special kind of storage system that provides ample storage space for smaller spaces. Rather than maintaining a traditional static system of shelving that takes up a fixed amount of space, compactors sit on

### Growing Collection Receives Grant

BY ELYSSA MANN, PUBLIC RELATIONS

rails, allowing them to be moved close together to maximize space. Construction for the compactors began Oct. I, and will continue over the next two years.

"We have an expanding collection," said curator Katrina Menard. "We were at capacity and couldn't continue to grow the collection with our current storage system."

According to Menard, the collection documents more than 100 years of Oklahoma's (and the world's) invertebrate natural history. The collection conservatively is estimated to contain over 10,000 species from Oklahoma, the United States and the world. It also houses one of the largest and most comprehensive collections of riffle beetles in the world donated by Harley Brown, the former curator who died in 2008. As the state repository for recent invertebrates, new specimens collected in the state of Oklahoma by researchers are put into the collection for safekeeping and research.

"We have some cabinets that may be at least 50 years old and do not meet current standards for storage of collections," Menard said. "This will allow us to organize everything the way it should be and we'll be able to do more research because we'll have more space."

### A Day in the Life of a Field Biologist

BY ELYSSA MANN, PUBLIC RELATIONS

H ead curator and mammalogist, Janet Braun, is known around the museum as a fieldwork pro. She's been all over the world and has lists for everything — camping gear, food, equipment for collecting and preparing specimens — you name it. She is generally prepared for just about anything — and with good reason.

When a scientist is in the field in Oklahoma, they're likely to find a Wal-Mart within driving distance, and even possibly a hotel. But when they're in the Andes of Argentina, options are pretty slim, so they bring everything they might need for a three-month field trip. When Braun conducted fieldwork in Argentina, her team typically spent 10 to 14 days in the field and then would locate a town with a hostel or hotel to stay at for a few days to recharge, sleep on a bed and shower.

On those long trips, she said they'd often pack as many as 15 to 20 bags of supplies. Supplies included absolutely everything — not just food, shelter and clothing. They often had to bring along bagged filtered water (or a water filtration system), toilet paper, medicine and anything else necessary to live life day-to-day in the field and away from civilization.



Above: Braun and her team at field site in Argentina.

Finally, and most important, the team is responsible for hauling all of the equipment to conduct research. Traps and nets for catching specimens were only two of the multitude of supplies they had to pack and lug up the mountains.

"Going into the field for a long time teaches you a lot of life skills," Braun said. "How to get along with people — you learn to be self-reliant."

Braun and her team had to ensure they could survive on their own without the crutch that civilization offered. That self-reliance got her through one of her scariest field experiences when nearly every team member came down with altitude sickness. Braun, who, luckily did not get sick, had to make two trips down from the field camp in the mountains to the nearest medical clinic in order to get the sick team members to oxygen supplies.

"It was the middle of the night," she said. "We had two vehicles, but I was the only one who could drive because everyone else was sick." Despite the occasional harrowing experience like the one above, Braun says fieldwork is one of the best parts of being a scientist.

"For me it's just the thrill of finding something in a particular area or discovering something new to science," she said. "Based on the knowledge of the country [Argentina], the geography and the animals we already knew about in the area, we made predictions about what we might find. It's exciting when it actually happens and you find a mammal new to science."

Going out into the field usually means gaining a lot of information about mammals and their natural history and distribution in their native environment. According to Braun, the only way to get the data is by doing the work — the field work that is.

We appreciate our curators like Braun, who persevere in the most extreme conditions and tirelessly exhaust all possible options in the quest for discovering new organisms and answers to the most complex questions.



Above: Braun and team documenting specimens in a makeshift field station.



Above: Argentina, the Andes and surrounding landscape.

## **Science Matters**

BY MICHAEL MARES, DIRECTOR

The heavy rains earlier this year reminded me of a storm two years ago, a real frog strangler. I went for a walk afterward around a small lake in east Norman and noticed a long, thin creature wriggling across the wet sidewalk. Being a biologist, I picked up the horsehair worm (Phylum: Nematophora). It was the second one I had collected near the same spot. Both are now in our recent invertebrate collection. Curiously, the only two specimens the museum has are the two that I collected.

Horsehair worms are fascinating. People once believed that living creatures could appear from non-living things. Horses would drink water, their hairs would fall in the water and, later, horsehair worms would crawl out. Flies appeared in meat and mice showed up in vegetables left in open jars for a few weeks.

In 1859, the great French scientist, Louis Pasteur, demonstrated that milk fermented because of the action of unseen organisms. In demonstrating that life comes from life, or biogenesis, he invented Pasteurization, a process where high heat kills the microorganisms and allows milk or beer to remain fresher longer. Your glass of milk is a testament to one of the greatest scientists and to the explanatory power of science.

As we have come to understand science, myths and non-scientific gobbledygook have been relegated to the realm of fantasy. However, as late as the 20th century some people still believed horsehair worms came from horsehairs. Adult horsehair worms live in ponds, where they mate and lay millions of eggs. The parasitic microscopic larvae attach to plants and are eaten by such insects as crickets and grasshoppers. The larvae burrow into the body cavity of the cricket and grow into worms.

As the worms develop, they have two worries: making sure the cricket does not get eaten (they somehow stop the cricket from chirping) and getting crickets, which are mortally afraid of water, to jump into a pond. Sure enough, when the footlong worms are ready to burrow out of the cricket, they somehow take over the cricket's brain and impel the animal, zombie-like, to leap into water. Almost immediately, the worms emerge and are free-living adults once again.

It took a long time for scientists to figure this out and the exact mechanisms are still not clear, but biologists are studying this remarkable strategy that has evolved in such a way that the host's behavior is manipulated by a parasite.

Scientists have always had to confront myths, pseudoscience and dogma. The Sam Noble Museum is presenting two exhibits about Galileo, perhaps the most famous scientist who suffered for his research. In 1600 CE, Church dogma and the ideas of Ptolemy suggested that all celestial bodies circled the earth. Then Galileo invented a simple telescope, through which he discovered four large moons of Jupiter and determined that these revolved around that planet. This was heresy. People died for these kinds of radical ideas. Galileo wrote to the great mathematician, Kepler, "My dear Kepler, I wish that we might laugh at the remarkable stupidity of the common herd.What do you have to say about the principal philosophers of this academy who ... do not want to look at either the planets, the moon or the telescope...? Truly [they] shut their eyes to the light of truth."

These academicians shut their eyes. They would not look because to admit that moons orbited a planet other than earth was forbidden. Galileo's work was one of science's great turning points, for people learned that dogma is not always correct and science that is repeatedly proven correct through experiments and observations by other scientists reflects reality.

No one is more skeptical than a scientist. We question all findings, especially our own. We do not publish a paper until we have tried to disprove it. We discuss weaknesses in the work. We ask colleagues to review the manuscript and search for errors. Then we send the manuscript to a scientific journal that asks other experts to search for errors in the manuscript. After another revision, the paper is published. Then other scientists begin looking for flaws in the work, the methods used, the experimental protocol, the results, and how the results were interpreted. If scientists find that someone's published work is incorrect, they immediately publish the findings that correct it. That is why science is so powerful. It is self-correcting and rigorously criticized by experts. Only findings that withstand this crucible of criticism will be accepted by others and become part of the tapestry of knowledge that is science.

Galileo's observation of moons circling another planet had to be confirmed by others to be accepted. It took courage to speak truth to power. A friend of Galileo's had suggested the universe was infinite — something we think may be true today — and was burned alive for his hypothesis.

Thankfully, there were scientists who did not refuse to look at the moons of Jupiter, who were willing to risk their lives for the truth revealed by science. Galileo's findings changed our views of the world. Sometimes the acceptance of truth "What do you have to say about the principal philosophers of this academy who ... do not want to look at either the planets, the moon or the telescope...?"

comes slowly. The Vatican admitted that Galileo's views of the heavens were correct and apologized for punishing him — in 1992, 350 years after his death!

The Church had an opinion about the Universe, but no scientific facts. The opinion was based on speculations (guesses) that were thousands of years old and which, over time, had become dogma, which is not science or even truth, hence the word, dogmatic. Today, thanks to the 24-hour news cycle and the need to attract viewers, all opinions are given equal weight.

Opinions from people having no science training in complex subjects carry as much weight as scientific expertise by people who have dedicated their lives to study difficult topics. How often have you heard someone on TV say, "I'm not a scientist, but...."? If they then follow that phrase with a critique of science about which they know nothing, pay no attention. All opinions are not equal.

As a society, we are losing our grip on the reality of science and the truth it reveals.We frequently confuse pseudoscience, ...Continued



Global Land-Ocean Temperature Index

Above: By NASA Goddard Institute for Space Studies (http://data.giss.nasa.gov/gistemp/graphs/) [Public domain], via Wikimedia Commonsdomain], via Wikimedia Commons.

political ideology or religious dogma with actual scientific expertise and think that our uninformed opinions have validity just because they are shared with others.

The Internet permits us to find comfort in numbers and the illusion of informed consensus. Such opinions have no validity unless they are supported by science. It's no surprise that people are confused. How else could a minor TV actress with no expertise in anything, except perhaps acting and modeling, be able to convince millions of people that vaccinations are bad for children? She disagreed with scientists who actually study vaccinations and, because of her celebrity status and the Internet, found a group of noisy followers who influenced the public health of the nation for the worse.

Diseases that had been beaten began to reappear since children were no longer being vaccinated. The great Louis Pasteur had developed vaccines 130 years ago and vaccines are considered the greatest medical advance of medical science.

Recently, a member of the U.S. House of Representatives Science Committee, Paul Broun, said "All that stuff I was taught about evolution and embryology and the Big Bang Theory, all that is lies straight from the pit of Hell. ... I don't believe that the Earth's but 9,000 years old. I believe it was created in six days as we know them."

So much for paleontology, geology, physics, chemistry, biology, mathematics, astronomy, astrophysics and all other scientific disciplines that are being cast aside by denying the fact of evolution.

All of science has to be wrong if evolution is incorrect. I believe this is why people are so emotionally committed to not believing the scientific facts of evolution. If they accept evolution, they will have to accept other scientific concepts that may make them uncomfortable and challenge their fundamental beliefs.

Once you begin denying the facts of science, there's no reason to accept any conclusions you do not like; all you need is an uninformed opinion. Non-scientists and a very few marginalized scientists, are vociferous in their denunciation of the scientists who support the idea that the climate is changing and people are causing it.

The science is clear on global climate change. Of 2,000 scientific articles published on climate change between 2012 and 2013, 1,999 supported climate change being caused by human activities, and only one article by a single scientist was on the other side of the argument. To a scientist this means climate change is a fact. To ideologues, the jury is still out, since nothing will make them believe.

Here are some of the groups that know that the climate is changing and that humans are causing it: The American Association for the Advancement of Science (I am a Fellow of the AAAS), the American Chemical Society, the American Geophysical Union, the American Medical Association, the American Physical Society, the Geological Society of America, the U.S. National Academy of Sciences, the Joint Chiefs of Staff, the Department of Defense, the Vatican and the White House. How could any rational person think that all these people and organizations are making it up? To what end?

Global climate change data are scientific facts and some with political or economic motives for denying such data are contributing to the problem.

For example, Exxon knew about climate change and rising carbon dioxide rates as early as 1979, but spent more than \$30 million (plus as much as a billion more from other companies and political foundations) to fund climate denier groups and sew doubt in the American public about the reality of climate change. The massive disinformation campaign worked: Americans now doubt the unarguable science of climate change. In 2015, ExxonMobil reported that it no longer funds climate deniers and admits the great risks of climate change. Recently, BP and Shell, two of the largest oil companies, said that something has to be done about climate change and the increasing carbon dioxide levels. They asked the UN to act on the matter. ExxonMobil's recent statement on the longterm risks from climate change now includes strategies that should "promote fundamental shifts toward energy-efficient technologies and practices across the economy, and the more prominent use of fuels with lower carbon intensity — such as natural gas, nuclear energy and renewable fuels — within the overall energy mix."

BP now believes "that climate change is an important longterm issue that justifies global action."

The very companies that funded a national campaign to undercut the science of climate change now realize that rising seas, increasingly severe storms, droughts, floods and other disasters resulting from a changing climate are going to affect them.

Most of the countries around the world accept the imminent danger of a changing climate, but not so in the U.S., where many citizens swallowed the PR campaign hook, line and sinker. Now the climate deniers have woven their personal views and opinion into their politics and their fundamental beliefs. It does not matter that all major scientific organizations and essentially all climate scientists agree that humans caused climate change. Deniers cannot and will not change their fundamental beliefs.

The Sam Noble Museum is committed to accuracy in science. We cannot deny the truth and reality of science, evolution or climate change just because these views conflict with the illinformed opinions of some people. Science is knowledge.

The earth is not 9,000 years old. Dinosaurs and people did not coexist. Horsehairs do not turn into horsehair worms. Humans are affecting the changing climate. The moons of Jupiter do not circle the Earth. The Earth is not the center of the universe. These are not opinions. They are scientific facts. To deny them as a citizen or society is, as Galileo lamented, shutting our eyes to the truth.

### Mysterious Mixtec Molds from Ancient Mexico

BY ELYSSA MANN, PUBLIC RELATIONS

When most of us think about archaeological discovery, we imagine ancient artifacts unearthed through meticulous excavations in exotic locales. Yet, some discoveries do not emerge until much later. It can take months or years for archaeologists to examine artifacts in greater detail and determine their likely function and meaning to people in the past.

Marc Levine, curator of the archaeology collection, recently analyzed a set of ceramic molds that is changing our understanding of metallurgical technology in ancient Mexico.

Levine has been studying a unique group of small ceramic molds that were initially discovered by a villager in the town of Tututepec — located on the Pacific coast of Oaxaca, Mexico. Prior to the arrival of the Spanish in the early 16th century, Tututepec was a regional capital associated with the Mixtec people — who remain one of the largest indigenous groups in Mexico today. The molds were donated to the local community museum, and Levine had the opportunity to examine the unusual artifacts in 2014.

Levine's first examination of the molds included taking precise measurements and detailed photographs. Several of the molds closely resembled finished gold beads, bells and other ornaments. He then analyzed dozens of Oaxacan gold artifacts present in other museum collections, including those in the American Museum of Natural History in New York City. His research show that the molds, which he named Mixtec molds, date to the Postclassic Period (1100-1522 C.E.) and were an integral part of the larger process of lost-wax casting.

The lost-wax casting technique was developed independently in the New World (the Americas) and the Old World (Europe, Africa and Asia), This metallurgical process allowed for craftsmen to create elaborate metal objects using relatively small amounts of gold, silver or copper.

"The advantage of the molds is that they allowed the metalworkers to create highly uniform artifacts," Levine said. "This was especially important when making beads for a necklace, for instance, where you would want a series of perfect spheres of a similar size."

Lost-wax casting involves multiple steps. To illustrate, Levine used the example of the spherical bead. The craftsman would first use molds like the ones found in Tututepec to create a casting core of a ceramic ball. The sphere was then painted with a thin layer of beeswax before a few strawlike tubes were inserted into the wax. Next, a thin layer of slurry (clay mixed with water) would be painted over the beeswax. A thicker layer of clay mixed with charcoal would next be layered over the first layers. The craftsmen would heat the entire sphere, and the beeswax would melt, pouring out



nique. Center: ceramic mold for a frog bead from Tututepec's Community Museum (REG 1161 PJ 144 13/40) used to make an object similar to the finished gold frog (AMNH Cat. No. 30/10745) below, from the American Museum of Natural History, courtesy of the division of anthropology.

of the inner chamber through the tubes inserted into that beeswax layer. Molten gold would then be poured back through the tubes, taking the place of the beeswax.

When the metal cooled, the outer ceramic layer was broken away, leaving a gold bead with a solid clay core. The added weight and support of the casting core protected the thin-walled bead, which was made from pure gold and was therefore rather soft. Finally, the metalworker would use an awl or drill to perforate the bead so it could be strung with others.

Levine reported his discovery of the Mixtec molds at the 2014 Society for American Archaeology Annual Meeting in San Francisco. These molds are the first of this type to be reported from anywhere in Mesoamerica - an area covering modern-day Mexico, Guatemala, Belize, Honduras and El Salvador. Prior to this discovery, researchers assumed that metalworkers made casting cores by hand, without the use of ceramic molds.

If these molds are indeed part of the lost-wax casting technique, they will be the first ones reported, and may give further insight as to the importance of the town of Tututepec.

"In terms of quality, Mixtec lost-wax gold artifacts are considered among the finest ever made in Prehispanic Mesoamerica," Levine said. "But there's almost no evidence for production sites in Oaxaca. Since over 40 lost-wax casting molds were found at Tututepec, such a high density indicates this may have been a major gold production center in Mesoamerica."

Future excavations at Tututepec may reveal more insights about metallurgical traditions in ancient Mexico.

### From Barns and Stables to Best in Heritage

BY JEN TREGARTHEN, PUBLIC RELATIONS

We own do museums worldwide stay relevant in a cultural environment growing more and more competitive? The Best in Heritage Conference offers an opportunity each year to meet, collaborate and discuss topics in response to a changing audience.

At this year's conference, held in Dubrovnik, Croatia, Sam Noble Oklahoma Museum of Natural History director Michael Mares was named a Best in Heritage Laureate. As a presenter, Mares shared the story and subsequent success of what is today the Sam Noble Oklahoma Museum of Natural History.

"Museums from all around the world were represented at this conference — the best of the best — and all had remarkable stories," said Mares, who has served as director of the Sam Noble Museum from 1983-2003 and again 2008 to present "Our struggles were the same in many ways, and it was wonderful to share stories and understanding."

The Sam Noble Museum was one of only two museums in the United States to be selected to present at the 2015 Best in Heritage Conference Sept. 24 through 26.

Organized in 2002 by the European Heritage Association, Best in Heritage is an international, annual conference of award-winning museum, heritage and conservation projects hosted every year in Dubrovnik, the UNESCO World heritage site. Presenters included 28 laureates from 22 countries, proclaimed the best in 2014 on national or international levels.

The Sam Noble Museum was selected for its 2014 National Medal for Museum and Library Services. National medalists were chosen because of their significant and exceptional contributions to their communities demonstrated through innovative approaches to public service, exceeding the expected levels of community outreach.

"We've made great progress as an institution since the time we were housed in barns and stables," Mares said. "The presentation was about the remarkable story of a museum that has developed into a leading museum in the world and on two of our programs, ExplorOlogy<sup>®</sup> and Native American Languages."

Upon becoming director of the Sam Noble Museum in 1983, one of his chief efforts was to launch a campaign to build a proper facility to house the world-class collections. With support from the city of Norman, the people of Oklahoma, private donors, the Oklahoma Legislature and the University of Oklahoma, his 17-year effort culminated in one of the finest university-based natural history museums in the world.

As a result of presenting at the Best in Heritage, the Sam Noble Museum was inducted into the Excellence Club, an opportunity only granted to a few organizations a year. The Excellence Club consists of projects that have been presented in Dubrovnik over the past thirteen years. "What we've done to preserve our heritage gives hope to museums around the world," Mares said. As an institute of excellence, the museum will continue to represent Oklahoma and the nation by offering exceptional exhibitions, engaging in cuttingedge research and providing compelling educational programs and events. This recognition further supports our efforts to offer a quality learning institution to Oklahomans and life-long learners worldwide.





Above: Mares stands beside the Sam Noble Museum exhibit poster in Best in Heritage exhibition, showcasing the 28 laureate institutions. *Top: Mares presenting his lecture*, From Horse Barns to the White House: A Prairie Museum Wins the National Medal, *in the Theatre "Marin Držie"*  Bottom: A view of the Theatre "Marin Držie." Photo by Filip Beusan courtesy of Best in Heritage.

.....



The University of Oklahoma 2401 Chautauqua Ave. Norman, OK 73072-7029 Nonprofit Organization U.S. Postage **PAID** Norman, OK Permit No. 88

ADDRESS SERVICE REQUESTED

# Schem DOCCIV Н uuch avoid H ming soon! Through the Eyes of the Lynx: Galileo and the Microscope Feb. 6 through Aug. 31, 2016