

CATALYST

DENVER MUSEUM OF NATURE & SCIENCE MAGAZINE

DECEMBER 2014/JANUARY 2015

INSIDE ///

TRAVELING THE SILK ROAD
WHALES: GIANTS OF THE DEEP
ANNUAL HOLIDAY SHOP SALE



MEMBERS APPRECIATION WEEKEND AND MUSEUM SHOP HOLIDAY SALE

FRIDAY–SUNDAY, DECEMBER 5–7

With great appreciation for your membership support, we invite you to kick-start your holiday shopping with us and enjoy special rewards just for you, all weekend long!

- **Save 25%** in the main Museum Shop as well as in the Silk Road and Whales retail shops on all items except DVDs, CDs, and books.*
- **Get a FREE** reusable holiday tote when you spend \$50 or more in the shops, while supplies last.
- **Save 20%** in T-Rex Cafe—an extra 10% off for lunch.
- **Save 10%** on gift memberships for your family and friends.
- **Buy one get one free** tickets for Phipps IMAX Theater and Gates Planetarium.

**YOUR PURCHASES SUPPORT THE MUSEUM'S SCIENCE EDUCATION
AND RESEARCH. THANK YOU FOR BEING A MEMBER!**

*Everyday 10% discount applies to DVDs, CDs, and books. These special offers are valid in person only December 5–7, 2014, and cannot be redeemed over the phone or online.

Dear Members,

Four years ago, the Museum received a phone call that changed history. A bulldozer operator digging near Snowmass Village uncovered what would later be identified as the bones of a juvenile Columbian mammoth. The Museum immediately mobilized one of the largest fossil excavation efforts ever, recruiting 230 people to move 8,000 tons of dirt and pull 5,000 large bones and 20,000 tiny bones from 50 different species from the ground in just 69 days.



This monumental effort culminated this fall with the publication of the Snowmastodon Project Science Volume in the international journal *Quaternary Research*. Together, 47 scientists have documented a new benchmark for understanding climate change in the American West, including an unprecedented record of alpine ecosystems during the last interglacial period between 130,000 and 110,000 years ago. Read more about this new science on page 12.

Another exciting milestone occurred in late October when we dedicated the magnificent new bronze sculpture *Snowmastodon*. Next time you visit the Museum, make a point to see it at the northwest corner of the building. As Governor Hickenlooper noted at the dedication, the sculpture is an enduring marker that not only recognizes the Snowmastodon Project for its scientific contribution but also acknowledges the community for its enthusiastic support. We once again thank the Dea Family Foundation for their generous gift and commend sculptor Kent Ullberg for his beautiful work.

Although the dig is complete, the specimens cataloged, the science published, and the sculpture installed, our work continues. As a member, your support not only empowers visitors to discover, experiment, ask questions, and play—all in the name of science—but it also allows our team of 14 curators and more than 70 research associates to make significant discoveries that forever contribute to our understanding of the natural world.

Thank you for being a part of another memorable year at the Museum. We look forward to seeing you and your family this holiday season and send best wishes for 2015.

George Sparks
President and CEO

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

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The Snowmastodon Project is indeed the treasure trove of new science that Museum researchers predicted it would be.

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Join Our Community:



ON THE COVER

FROM THE IMAGE ARCHIVES COLLECTION

Ming Tombs,
north of Peking (Beijing), China
Sculpture of mythical xiezhi
#0085-257, ca. 1890–1911
Contact print from glass negative



WHALES: GIANTS OF THE DEEP

This exhibition is free for members, and open daily in Phipps Gallery, Level 3. Please be prepared to present your membership card at the entrance to the exhibition. The complimentary guest tickets that came with your membership are valid for general admission and entry into Whales. Find out more about the exhibition @ www.dmns.org/whales.

TOP 10 THINGS TO DO

1. Come face-to-face with the skeleton of a 58-foot-long sperm whale.
2. See more than 20 whale skulls and skeletons.
3. Crawl through a life-size replica of the heart of the humongous blue whale.
4. Touch real and replica whale teeth, try catching food like whales do, and take a whale personality quiz.
5. Examine rare historic cultural objects—from impressive weapons made from large whale bones to delicate ornaments fashioned from whale teeth.
6. See the model of a southern right whale featured in the acclaimed film *Whale Rider*.
7. Enter an immersive sound chamber to hear the “songs” whales use to navigate, find food, and communicate.
8. Learn about strange whale anatomy, such as “monkey lips.”
9. Pose as a scuba diver and take your photo with a beautiful humpback whale.
10. Do some holiday shopping in the Whales gift shop at the end of the exhibition where members save 10% every day.



HEAVENS ABOVE

In December and January, the dog days of summer have long slipped away with the waning days of autumn, but the dog stars of winter are just beginning to howl! Sirius (Alpha Canis Majoris) is known as the “dog star” due to its prominence in the constellation Canis Major (Greater Dog). Located 8.6 light years away, Sirius is the brightest star in the sky. It is usually seen as a brilliantly flashing gem low in the southern sky from winter to mid-spring. Although white to blue-white in color, it often flickers with many colors as a result of variations in Earth’s atmosphere.

Sirius isn’t the only dog star in our sky; the other one is Procyon (Alpha Canis Minoris), the brightest star in the constellation Canis Minor (Lesser Dog). Its name means “before the dog,” referring to the fact it rises above the horizon earlier than Sirius in most northerly latitudes. Procyon is 11.4 light-years away and about 1.4 times as massive as our sun.

In mythology, Sirius and Procyon are the companion hunting dogs of Orion the Hunter. To find Sirius and Procyon in the night sky, start by locating the constellation Orion in the east-southeastern sky. Follow the line of stars in Orion’s belt down to the left, pointing toward the star Sirius. Procyon is above Sirius and to the left. Procyon, Sirius, and Orion’s famous orange-red star Betelgeuse form a triangle often called the “winter triangle.” Orion and his faithful dogs are located near the celestial equator and can be seen throughout much of the world.

Find sky information for December and January @ www.dmns.org/heavensabove.



GET READY FOR SPRING BREAK AND SUMMER DAY CAMPS

Registration is now open for Spring Break Camps! The Museum is offering camps for two weeks; see the listing on p. 11 in the insert.

As a Museum member, you have the benefit of advance notification and registration for Summer Day Camps. If you’d like to be the first to know when registration opens in January, please send your name, member number, and e-mail address to members@dmns.org. See the schedule at-a-glance @ www.dmns.org/summercamps.

Our Spring Break Camps and Summer Day Camps are more than just something to do during school vacations. The wonders never cease at the Museum, so our camps are an engaging way for your children to explore in a hands-on, dynamic way that helps them realize that science is an everyday part of their lives.

SNOWMASTODON ARRIVES AT THE MUSEUM

The new sculpture *Snowmastodon* was officially dedicated in its new home on the northwest corner of the Museum in late October. The life-size bronze of an American mastodon was made possible by the Dea Family Foundation and created by world-renowned sculptor Kent Ullberg. It commemorates the historic Ice Age site in Snowmass Village, one of the most significant scientific discoveries in Colorado's natural history.

Ullberg worked with scientists to create a physiologically accurate mastodon, and the sculpture has been placed in new landscaping that reflects the mastodon's natural surroundings. Ullberg also placed some "surprises" in the base of the bronze that will be especially fun for little kids to discover.

Pictured in the photo from left, back row, are Austin, Drake, and Cort Carpenter; from left, front row, Peter and Cathy Dea, George Sparks, and Kent Ullberg.

See a slide show about the creation of Snowmastodon @ www.dmns.org/science/the-snowmastodon-project/snowmastodon-sculpture.



TOTEM POLE MOVES OUT TO THE PARK

The new landscaping on the south side of the Museum presented an opportunity to place a 24-foot-high totem pole sculpture from our collections in City Park, just south of Boettcher Plaza.

The totem pole was created by artist Don "Lelooska" Smith, who was known for his unique blending of artistic styles. He was of Cherokee descent but his art reflects Northwest tribes. This isn't the first time our totems have been outside. Two Tsimshian memorial poles from Alaska stood out in the park until 1968, when they moved into the new Crane North American Indian Cultures Hall.

NEW DADDY LONGLEGS DISCOVERED

David Steinmann, a research associate in the Zoology Department, has discovered two new species of daddy longlegs inside Colorado caves.

Sclerobunus steinmanni, named after Steinmann, was found in a rocky cave on City of Boulder Open Space and Mountain Parks land. DNA studies show this species evolved for millions of years while slowly adapting to the underground environment. It is orange and yellow, and very different looking from the daddy longlegs most familiar to people.

Steinmann identified a second new species in the Cave of the Winds in Manitou Springs, living deep underground in total darkness. This species was named *Sclerobunus speoventus*, derived from the Latin words for cave and wind, and lives in parts of the cave seldom visited by people.

With assistance from Zoology Department curators Dr. Frank Krell and Dr. Paula Cushing, Steinmann has found more than 100 new invertebrate species in Colorado caves. The type specimens for these new species now reside in the Museum's arachnid collection. San Diego State University scientists Shahan Derkarabetian and Dr. Marshal Hedin recently named the new species of daddy longlegs in the journal *PLOS ONE*.





—◆ TRAVELING THE ◆— SILK ROAD



TRAVELING THE SILK ROAD MEMBERS RECEIVE DISCOUNTS ON TICKETS!

Spend an exotic day along the most legendary trade route in history! Long before wireless communications and overnight deliveries, the Silk Road connected humanity. Under vast starry skies and across some of the most treacherous landscapes, the route stretched 5,700 miles from China through Central Asia to the Middle East and the Roman Empire. Along the way were the world's most progressive cities, teeming with the lively exchange of exotic goods and new ideas.



In the new exhibition *Traveling the Silk Road*, you will take a journey accented by the spectacular sight of camel caravans, the pungent scent of spices, the luster of exquisite silks, and the energy of creative thinking. You will visit five cities that flourished from AD 600 to 1200 during the route's golden age: Xi'an, ancient capital of China; Turfan, a fertile oasis; Samarkand, a grand city of commerce; Baghdad, the scholarly center of the Islamic world; and Constantinople, eastern capital of the Roman Empire.

Along the way, you will experience an array of wonders: a vivid full-scale re-creation of a night market in Turfan, a display of live silkworms and a massive replica of a Tang-era loom from China, astronomy tools that helped mariners navigate the seas, historical enactors who set the stage and bring this era to life, and a 41-foot-long replica of an Arabian sailing ship carrying priceless cargo. Digital animation brings ancient tales to life, interactive maps and activities illustrate the incredible diversity of the route's landscape and cultures, and spectacular objects from museum collections around the globe, including our Museum, show why the routes were so successful.

In reality the Silk Road wasn't a road at all but a complex network of routes that moved goods from the Far East to Eastern Europe and back, as well as along north-south corridors. The Silk Road helped spread the math, astronomy, and precision tools that made naval navigation reliable—and thus indirectly aided its own demise. However, there's little question that ultimately it was the ancient pathway that led to the modern world.

MEMBERS TIPS

Traveling the Silk Road is open daily in Anschutz Gallery, Level 3. Members receive a deep discount to this surcharged exhibition and timed tickets are required. Book your print-at-home tickets for Silk Road @ www.dmns.org and avoid a handling fee.

Reservations for Silk Road are also available at 303.370.6000 (daily, 9–5). There is a \$2 fee per ticket by phone. Afternoon is the best time to call.

Giving Club members may redeem their Silk Road “anytime” tickets by heading straight to the exhibition for quick and easy access, even if it's sold out.

Weekday late afternoons and weekend early mornings tend to be less busy in our temporary exhibitions. School groups generally visit during weekday mornings. The Museum will be closed on December 25.

Complimentary guest tickets that came with your membership may be upgraded for admission to Silk Road.

Enjoy some holiday shopping in the Silk Road retail shop where members save 10% every day!

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

Traveling the Silk Road is organized by the American Museum of Natural History, New York (www.amnh.org), in collaboration with Azienda Speciale Palaexpo, Roma, Italy and Codice; Idee per la cultura srl, Torino, Italy; the Museum at Marina Bay Sands, Singapore; the National Museum of Australia, Canberra, Australia and Art Exhibitions Australia; and the National Museum of Natural Science, Taichung, Taiwan and United Daily News, Taipei, Taiwan.





COLLECTIONS ON THE MOVE

“Building this facility is the most important thing this Museum has done in its 114-year history!”

After more than 25 years in the business, Jeff Stephenson knows a thing or two about caring for precious artifacts and specimens. He is the Zoology Department collections manager and also managed the education collections for several years. So, as you can imagine, he is very enthusiastic about the new Rocky Mountain Science Collections Center, which is located in two underground levels of the new wing on the south side of the Museum.

Zoology began moving into the new collections center earlier this fall. While it will take about two years to completely be at home, the department is already well on its way, having relocated 2,220 drawers of insects and all of the small mammals.

Stephenson says Zoology's previous storage area on Level 1 of the Museum—under the IMAX Theater—and the new facility are as different as night and day. "It's a world of difference," he said. "Our area was dank, cramped, and not climate controlled. Now we have a facility that is not only brightly and properly lit but was created to specifically protect the specimens from the most threatening agents of deterioration. Because of the way the mechanicals are designed, I don't have to spend time worrying about water and fire."

The Research and Collections Division (RCD), which includes collections managers, curators, conservators, archivists, and registrars, was heavily involved in the development of the building, right down to determining the color of the floor (white, so that pests can be easily seen). The team traveled to comparable facilities at The Field Museum, Yale Peabody Museum of Natural History, and the Smithsonian's Museum Support Center, and studied many examples of cabinets and other storage and preservation equipment.

After assessing the possibilities, the RCD team customized their storage cabinets, requesting modifications such as drawer stops to prevent drops, door handles that are larger and easier to manipulate, and shorter lips on inside doors so that both doors don't have to be open at once yet a strong protective seal remains. The cabinets are placed on carriage systems that greatly improve access and capacity. No longer will specimens, such as butterflies, be shingled and crowded in cabinet drawers. The entire facility is climate controlled, regulating temperatures and humidity appropriate to each collection.

One of the most significant elements of the relocation has been inventorying the specimens, many of which have been at the Museum for decades. In general, inventory control has been significantly improved with a new electronic database system that allows for greater accessibility to the Museum's collections for users around the world. While most of the specimens have some sort of documentation, there are mysteries to be solved. For example, Stephenson had some wallabies that had never been catalogued. He had a hunch they had been collected during a Museum expedition to Australia in the 1950s. He headed to another Museum collection—the archives—and after

some digging, found a citation about the wallabies in the expedition notes of former Museum director Alfred Bailey.

In the coming months, the Zoology team will move the large mammals, 54,000 specimens in the ornithology collection, and 60,000 vials of arachnids that must be stored in special fluid control rooms that were constructed into the new facility.

Stephenson said one of first visitors to Zoology's new digs was Ed Wiseman, who famously encountered and managed to slay Colorado's last grizzly bear, as recounted in the June/July 2014 edition of *Catalyst*. Wiseman brought his family to the Museum to see the grizzly specimen. Stephenson said, "Mr. Wiseman and his guests expressed their appreciation for the Museum's efforts to care for all of these natural treasures. This new facility places the Museum at the top of the game when it comes to state-of-the-art collections preservation."

SEE IT

The Rocky Mountain Science Collections Center will be open during the Members Open House on Wednesday, January 14. See the inside back cover for more information about this event.

FUN FACTS

- Together, B1 and B2 of the Rocky Mountain Science Collections Center (RMSCC) total 63,000 square feet, larger than an NFL football field.
- The movable storage cabinets will ride on a total 4,756 feet of rail.
- There are 16 different styles of customized cabinets to achieve efficient collection storage.
- The center was built to accommodate 20 years' worth of collections growth.
- The collections facility is supported by many generous donors and more than \$1.6 million in federal grants.

Facing page: These butterflies were donated by John T. Mason, one of the Museum's founders. The insects are carefully pinned in protective boxes and placed in climate-controlled cabinets. This page, left: To prepare for moving into the new facility, Jeff Stephenson and Meghan Truckey relocated all the small mammals into new cabinets funded by the National Science Foundation. This page, right: Truckey moves a cabinet of insects into the zoology collections area.



GROUND HOG WIRE GOLD

By Larry Havens and James Hagadorn, PhD

The Museum's most astounding gold specimen is tough to find. It isn't in the safe. Nor is it among the brilliant leaves of Campion gold. Rather, it lies humbly in a velvety corner of Coors Hall. The specimen is bizarre. Unlike gold that comes in veins or as nuggets, this gold is long and wiry. It is curled like an arch or miniature ram's horn. As if squeezed from a baker's icing bag, long parallel gouges adorn its sides, features known as striations. Wiry structure and striations are common in silver, gypsum, and minerals composed of multiple elements, but not in gold, whose usual mode of crystal growth makes wires a rarity.





This unusual specimen (pictured on facing page) is nicknamed the “Ground Hog” because it was mined in the late 1880s from the Ground Hog Mine near Red Cliff, Colorado. It was donated to the Museum in 1910 by Alice F. Cheesman, in memory of her husband, Walter. Although it has been known for over a century, its science and narrative have only begun to be told.

The Ground Hog’s story starts in 1887, near what today is the ghost town of Gilman, located midway between Minturn and Leadville. Prospectors discovered gold, silver, pyrite, and zinc in rusting iron-bearing exposures of rock. The rock was the Sawatch Formation, a thickly layered stack of sandstones that are best known as the looming cliffs one sees while winding through Glenwood Canyon.

More than half a billion years ago, Sawatch strata were laid down in ancient rivers, deltas, and beaches that bordered a vast ocean. As the seas rose, these sands were gradually buried by muds and limy reefs that eventually solidified into sandstones, shales, and limestones. Later these rocks were thrust upward in a mountain-building event, and over the millennia rainwater and groundwater etched sinkholes, caves, and fissures in the exposed rock.

Hundreds of millions of years later, lava welled up from below, bringing a steaming soup of metal-rich fluids with it. These fluids oozed upward into the Sawatch’s cavities and pipes, where it reacted with the perfect geologic catalysts of rusted muds and spongy, iron-rich limes. This was an optimal venue for the precipitation of gold. Oodles of it precipitated. Thanks to these conditions, Ground Hog gold not only lined these cavities but was sometimes piled up loose at the bottom of the cavities. To extract the gold, miners crawled on their bellies through these pipes, scraping the ore out with trowels, tiny picks, and even breadknives.

Unfortunately, the majority of this gold was destined for the smelter, and most of the mine’s accessible ore bodies were exhausted by 1925. As a result, natural specimens of Ground Hog gold are

extremely rare. Only four intact wire-gold specimens are known to have survived. One was owned by a former mayor of Leadville and is now in Los Angeles County Natural History Museum. One was owned by a part-owner of the mine, and now resides at the Harvard Mineralogical and Geological Museum. The other two are here at our Museum—the Ground Hog and one that evokes comparisons to TV rabbit-ears or alien antennae (pictured above). The unusual form and extreme rarity of wire gold makes them some of the most prized mineral specimens in the world.

Yet despite nearly a century of study on gold-bearing deposits, Ground Hog specimens still raise questions for scientists. For example, we don’t know how striated gold wires form or how they survived intact in ever-changing, subsurface conditions.

With the mines in the Battle Mountain Mining District closed, answers to these and other questions won’t come from onsite studies. Fortunately, the Museum has the only two known specimens that are still attached to their rock matrix, and unlike most mineralized gold specimens, our gold wires haven’t been chemically cleaned. Through modern geochemical and mineralogical analyses, there may still be secrets to reveal. Stay tuned!

SEE IT

The “Ground Hog” is on display in the Colorado gold room and the “TV Rabbit Ears” is in the Native Elements display in Gems and Minerals Hall on Level 1.

FIND IT @ DMNS.ORG

Larry Havens is a longtime volunteer in the Department of Earth Sciences and James Hagadorn is the Tim & Kathryn Ryan Curator of Geology. Find out more about Museum research in earth sciences at www.dmns.org/science/research/earth-sciences.

COLORADO GIVES DAY 2014

Support the Denver Museum of Nature & Science on Colorado Gives Day, Colorado's largest one-day online giving event. On Tuesday, December 9, thousands of Coloradans will come together to support nonprofits like ours. Last year, a record-breaking \$20.9 million was distributed around the state!

Giving is easy and secure through the Colorado Gives website, which is presented by Community First Foundation and FirstBank. When you give online any time on December 9, the value of your donation will receive a boost from the \$1 Million Incentive Fund. You may also schedule your donation in advance beginning November 1.

Your support will help the Museum provide fun, engaging science experiences for the entire community, advance scientific research, preserve and share rare artifacts and specimens in our collections, and present world-class temporary and permanent exhibitions. Find out more on the Museum's donation page @ www.coloradogives.org/dmns.



YOUNG PROFESSIONALS GIVE BACK

The Museum's Young Professional (YP) members receive unlimited Museum admission year-round, invitations to opening events for new exhibitions, free tickets to fun events, and unique opportunities for networking. They now have another way to give their support to the Museum: YP Volunteer Day! On September 28, 15 YP members spent the day greeting Museum guests and assisting with "Eight-Legged Encounters" activity tables during SCFD Free Day.

"I volunteered because it was a chance for me to actively participate in educating our community about the natural world," said James Knowles, a member of the YP Committee, pictured below right with Museum guests. "Appreciation of nature starts at a young age, and I feel like I truly helped ignite a lifelong passion and appreciation for nature and science."

If you want to roll up your sleeves and connect with the community with other young professionals, find out more @ www.dmns.org/join/young-professional-membership.



ENRICH YOUR MUSEUM EXPERIENCE IN 2015

Thank you for your membership support! We invite you to upgrade your membership today and increase your opportunities to enjoy the Museum in 2015.

In addition to all the usual great members benefits, you receive many special perks as a Giving Club member:

- Free “anytime” tickets to all surcharged exhibitions, such as Traveling the Silk Road. No reservations are needed, even if it’s sold out! Anytime tickets may be taken directly through the ticket takers and scanned at the exhibition entrance.
- Free IMAX and Planetarium tickets you may use for yourself or share with friends and family. You could use them to see two new IMAX films opening in December, Deep Sea Challenge 3D or Tiny Giants 3D.
- Invitations to popular annual events, such as IMAX Family Night and Behind-the-Scenes Night, and advance access to popular lectures.

Memberships in the Giving Club also make great holiday gifts. It is easier and more affordable than ever to become a Giving Club member with monthly installments starting at just \$25 per month! Find out more @ www.dmns.org/join/giving-club.



DID YOU KNOW?

There are many ways to support the Museum! Donate your used car, boat, motorcycle, truck, or RV to the Museum and support your favorite cultural institution while receiving a tax deduction. The Museum is partnering with Cars Helping Charities to give you the opportunity to quickly and easily donate a vehicle in any condition. Find out more or schedule a pickup @ 866.697.0697 or www.dmns.org/give/vehicle-donation. Thank you for your support!



GO EXPLORING WITH MUSEUM CURATORS

A dozen Museum members enjoyed a canoe trip on the Colorado River with Dr. Ian Miller in September. Miller led a trip that examined how rivers have changed the American West. This exclusive opportunity was one of the 2014 KT Challenge events, a program created in 2006 by Tim and Kathryn Ryan to more deeply engage donors who support the Museum through the highest membership levels. Find out how to participate in these unique experiences at the Naturalist level and above @ www.dmns.org/join/giving-club.



NEW VOLUME DOCUMENTS SNOWMASTODON SCIENCE

Four years ago this past October, a bulldozer operator turned over some bones during construction at Ziegler Reservoir near Snowmass Village, Colorado. Scientists from the Museum were called to the scene and confirmed the bones were those of a juvenile Columbian mammoth, setting off a frenzy of excavation, scientific analysis, and international media attention. This dramatic and unexpected discovery culminated in November 2014 with the publication of the Snowmastodon Project Science Volume in the international journal *Quaternary Research*.

Fourteen papers by 47 authors from the United States and abroad collectively represent “a new benchmark for understanding climate change in the American West,” said paleontologist Dr. Ian Miller, leader of the Snowmastodon Project and chair of the Museum’s Earth Sciences Department. The Snowmastodon site was an ancient lake that filled with sediment between 140,000 and 55,000 years ago preserving a series of Ice Age fossil ecosystems. Particularly fortuitous is the high-elevation locale, providing first-time documentation of alpine ecosystems during the last interglacial period between about 130,000 and 110,000 years ago. Because scientists were able to collect and study such a wide range of fauna and flora—from tiny specks of pollen to the bones of giant mastodons—the site emerged as a trove of information that Miller said will inspire future research for years to come.

“Usually fossil sites preserve only snapshots in time. We investigate lots of them and piece together what we learn from them to understand different time periods in the past,” said Miller. “By contrast, the Snowmastodon site captures a nearly continuous 85,000-year time span. As a result, the site provides the best-known record of life and climate at high elevation anywhere in North America.”

The site’s ecosystems—plants, insects, and animals combined—varied dramatically in response to climate change. “In other words, turn the climate dial a little and the ecosystems change considerably. We were also surprised to find that certain periods in the record that seem to be cool elsewhere in North America were quite warm in the central Rockies,” said Miller. “The opposite was true as well. Other periods that seem only to be cool elsewhere were extremely cold in the central Rockies. The implication is that alpine ecosystems respond differently to climate change than other, lower elevation ecosystems. These new results have huge implications for predicting present-day climate change in Colorado and beyond.”

During a total of 69 days in 2010 and 2011, the Museum mobilized one of the largest fossil excavation efforts ever, pulling 5,000 large bones and more than 20,000 tiny bones representing 50 different species. The site is notable for portions of more than 35 American mastodons that were recovered, representing both genders as well as a variety of ages, from calves to full-grown adults. “We had no idea that the high Rockies were filled with American mastodons during the last interglacial period,” Miller noted.

Initially, scientists proposed a hypothesis that many of the mastodons had been trapped in lake sediments that transformed into quicksand during an earthquake or series of quakes. This “shake-kill-shake-bury” theory was covered in a NOVA-National Geographic program about the project, broadcast in early 2012. “The initial idea that earthquakes killed all the animals was too simple,” said Miller. “As we learned more and studied the bones themselves, some of the mastodons do appear to have died en masse; the cause remains unclear, although a catastrophe is still possible. Other animals seem to have died sporadically. In those cases, we think the animals were simply visiting a favorite watering hole, died of various causes, and then were scavenged.”

Scientists were also perplexed by a well-articulated mammoth skeleton surrounded by large rocks, dubbed the “Clay Mammoth.” Studies of mammoth kill sites in the upper Midwest show that early human hunters often stored their mammoth meat in the bottom of ponds surrounded by rocks or sand to hold down or mark the cache. The arrangement seemed similar; however, the mammoth was in clay more than 50,000 years old, and the only firm evidence for early human occupation in North America is 13,800 years ago. After painstaking excavation, examination, and documentation at the Museum, the Clay Mammoth articulation is unresolved but appears likely to be a result of nonhuman natural factors.

FIND IT @ DMNS.ORG

Meet some of the Snowmastodon scientists and see some of the Ice Age specimens during the After Hours program Science Revealed: The Snowmastodon Project on Wednesday, February 4. Find out more on p.6 in the insert or @ www.dmns.org/afterhours.

Find a link to the Science Volume and more information about this historic project @ www.dmns.org/snowmastodon-project.



WE'RE OPEN THROUGH THE HOLIDAYS

Just a reminder that the Museum will be open throughout the holiday season, except for December 25. Whales: Giants of the Deep and Traveling the Silk Road will be open late for several evenings around Thanksgiving and Christmas. Find out the latest schedules @ www.dmns.org. We look forward to seeing you and your holiday visitors at the Museum!

WE LOVE OUR MEMBERS AND VALUE YOUR OPINION!

We look forward to receiving your feedback from our 2015 members survey. Be on the lookout in February for a survey requesting your honest assessment about your membership experience with the Museum. Your input will enhance the members experience and inform the future of the membership program and benefits.

PACK YOUR MEMBERSHIP CARD

Use your members benefits at 330 museums and science centers nationwide, through the ASTC Passport Program. Typically you will need a photo ID and your Denver Museum of Nature & Science membership card or eCard, as well as proof of your expiration date (printed on back of *Catalyst*). Find out more @ www.astc.org/members/passlist.htm.

QUESTIONS?

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

SAVE THE DATE FOR UPCOMING MEMBERS-ONLY EVENTS

MEMBERS-ONLY OPEN HOUSE

Wednesday, January 14 • 6–9 p.m.

Enjoy a FREE exclusive evening for families and adults to explore the Museum! Optional dinner available. Reservations open on Monday, December 8.

MEMBERS-ONLY NIGHT IN SILK ROAD AND WHALES

Friday, January 30 • 6–9 p.m.

See both of these immersive exhibitions in one evening! Optional dinner available for \$10 adult, \$7 child. \$7 adult, \$6 senior, \$4 child/junior members. Reservations open on Monday, December 8.

MEMBERS-ONLY IMAX NIGHT

Thursday, February 5 • 6–9 p.m.

Experience the world from the comfort of your theater seat! Two films will be available. \$7 adult, \$6 child, junior, senior member (per film). Concession items will be available for purchase. Reservations open on Monday, January 5.



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GIVE THE GIFT THAT LASTS ALL YEAR

Give your family, friends, neighbors, colleagues, or staff a full year of activities and adventure with a Museum membership! They will enjoy

- Free admission to the Museum 364 days a year. Members may drop by for an hour or stay all day, as often as they wish.
- Discounts on IMAX and Planetarium shows, as well as in the Museum Shop and T-Rex Cafe.
- Discounts on specially ticketed exhibitions, such as the immersive new exhibition Traveling the Silk Road.
- Discounts on fun educational programs for adults, children, teens, and families.
- Invitations to exclusive members-only events and exhibition previews.
- Admission to more than 330 science centers and museums worldwide.

Purchasing a gift membership is easy!

- Go online @ www.dmns.org/members.
- Come in person to the Members Express Lane at the Museum.
- Call 303.370.6306 (daily, 9–5).
- Purchase onsite December 5–7 and receive 10% off.

To receive membership materials by mail prior to December 24, please complete your purchase before December 17. After December 17, you may pick up a membership gift packet with a blank gift card at the Members Express Lane.