



CATALYST

DENVER MUSEUM OF NATURE & SCIENCE MAGAZINE
WINTER 2016

INSIDE ///
MUMMIES
MICROFOSSILS
NEW TASTE STUDY

MUMMIES

NEW SECRETS FROM THE TOMBS

FINAL WEEKS IN DENVER



ANCIENT LIVES UNWRAPPED BY MODERN TECHNOLOGY

This rare look at mummies from Egypt and Peru shows how new technologies are making it possible to unravel the distant past. Limited five-city U.S. tour.

THROUGH FEBRUARY 5

 DENVER MUSEUM OF
NATURE & SCIENCE

Dear Members,

This season of thankfulness is an especially appropriate time for me to extend my deepest gratitude to metro area voters for reauthorizing the Scientific & Cultural Facilities District!

As a Museum member, you already value the ways cultural institutions enhance life in our beautiful state, so supporting the SCFD is an extension of this appreciation. SCFD funds ensure there is culture for all in our community, through a wide variety of high-quality experiences. As you do your holiday shopping, remember your dollars are at work because for every \$10 you spend in the seven counties surrounding Denver, a mere one penny will support more than 300 organizations.

There are other easy and enjoyable ways to support the Museum this season!

- Come see *Extreme Mammals* and *Mummies: New Secrets from the Tombs* before they leave in early 2017.
- Bring your holiday guests to the Museum. A visit is a relaxing way to be together, especially during the rush.
- Use your discounts in the Museum Shops and T-Rex Cafe, where your purchases support science education and research.
- Buy gift memberships! Memberships are a thoughtful gift that last year-round. It is also a wonderful way to show your enthusiasm for the Museum because you are our primary public champions.

We have much to be thankful for at the Museum, including you—our members—whose steadfast support boosts all we do. Best wishes for a safe and joyful holiday season.



George Sparks
President and CEO

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



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Be the science! The Museum received one of its largest grants ever, and you have an important role to play in the research.

FIND IT @ DMNS.ORG

- Print-at-home tickets for surcharged exhibitions, Planetarium and IMAX shows, lectures, and programs
- Reservations for members events
- Hours and showtimes
- Museum Scientists
- Museum Blog
- Today's Weather at the Museum
- Heavens Above sky information
- Membership renewals and purchases

Join Our Community:



ON THE COVER

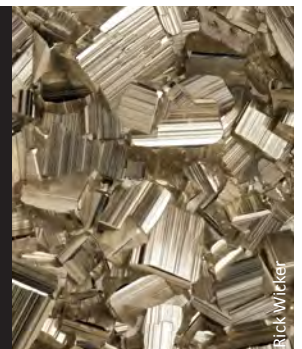
From the geology collections

Pyrite

CI-EGM.12551

Huanzala Mine, Peru
Nicknamed "fool's gold"

See this specimen on display outside
Gems and Minerals Hall.



WE'RE OPEN THROUGH THE HOLIDAYS

Just a reminder that the Museum will be open throughout winter break, except for Sunday, December 25. *Extreme Mammals* and *Mummies: New Secrets from the Tombs* are both open until early 2017. We look forward to seeing you and your holiday guests at the Museum!

GET READY FOR SUMMER DAY CAMPS

As a Museum member, you have the benefit of advance registration in January for Summer Day Camps. If you are not receiving emails from us about summer camps and other Museum insider information, please ensure you are added to the list by sending your name, member number, and email address to members@dmns.org. See the schedule at-a-glance and details about preparing for registration @ dmns.org/summercamps.

MUSEUM GIFT CARDS ARE A GREAT PRESENT

Let your friends, family, or colleagues choose their own adventure with a gift card! The cards can be redeemed across the Museum, for general admission, IMAX and Planetarium shows, programs and lectures, memberships, and in the shops operated by the Museum. Minimum amount is \$25. You may purchase a gift card onsite at the Members Lane or a print-at-home version by phone at 303.370.6000.

WARM UP AT THE COFFEE LAB

Visit the Coffee Lab in its new location, near the *Discovery Zone* on Level 2. Members receive 10% off!

SAVE THE DATE FOR GIRLS & SCIENCE

The third annual Girls & Science day, presented by the Museum and CBS4, will be held on Saturday, March 4. Girls and their families are invited to explore a variety of Science Clubhouses, where they will meet female scientists and experience the many diverse opportunities a future in science, technology, engineering, art, and math can bring. This day is all about igniting a passion for science—so try it on, test it out, and play! Free admission for members!



HEAVENS ABOVE

The Pleiades, also known as M45 or the Seven Sisters, is an open star cluster containing several hundred stars. It resides in the constellation of Taurus and resembles a smaller version of the Big Dipper. The star cluster is easily visible to the unaided eye and is visible from virtually every place that humanity inhabits Earth, from as far north as the North Pole and further south than the tip of South America.

The myth of the “lost Pleiad,” or seventh star (sister), is prevalent in many cultures around the world. In both myth and science, the Pleiades are considered to be sibling stars, born from the same cloud of gas and dust. This gravitationally bound cluster of stars looms some 430 light-years distant, drifting through space together about 25 miles per second. Many of these stars shine hundreds of times more brightly than the sun.

The Pleiades pass high overhead during the northern winter months and are easily studied with binoculars. To find it in the night sky, begin by looking for Orion. Using the three stars that mark Orion’s Belt, imagine a line drawn through the three stars to the right and continue to a V-shape pattern of stars with a bright star in its midst. This is the face of Taurus the Bull and the bright star is Aldebaran, the bull’s blood-red eye. Continue a bit past Aldebaran to the Pleiades star cluster, the bull’s shoulder. A good star chart will help locate the constellation star patterns. Find out more about the winter sky @ dmns.org/heavensabove.



© NASA/ESA/AURA-Caltech

NEW YEAR, NEW CARD

Important Notice About Your Membership Card

Effective Monday, January 9, your existing plastic membership card(s) will no longer be valid due to updates in our technology systems. Please discard or shred this card. Your membership number will remain the same.

You have a couple of choices for how to obtain your new card:

- If you’d prefer to carry one less card in your wallet and have the convenience of sharing your passes and enjoying your other benefits through your smartphone, download our free eCard app today. Find out more at dmns.org/ecard. Once you’ve downloaded the app from your app store, you will need to associate your Museum membership with your device by providing your email address and member number, located on the back of this magazine.
- If you would prefer to continue using a plastic membership card, you will receive a letter in the mail after the first of the year explaining how to obtain a new card.



Questions? Please contact us at 303.370.6306 (daily, 9–5) or stop by the Members Lane at the Ticketing Desk. Thank you for your patience as we upgrade our systems!



ADVANCED TECHNOLOGIES REVEAL NEW STORYLINES

By MICHELE KOONS, PhD

For years, the *Egyptian Mummies* gallery has been a favorite among Museum guests. They have been particularly fascinated by the “Rich Mummy” and the “Poor Mummy,” two mummies so-named based on previous research. But new findings show that their distinctions are less likely based on their economic status and more on their place in the history of Egyptian mummification.

These mummies began their journey to Colorado in 1905 when Andrew McClelland, an entrepreneur from Pueblo, visited Egypt as a tourist. It was fashionable at the time for wealthy tourists to purchase mummies to bring home, for “unwrapping parties” and to display in local museums. The mummies ended up in the Rosemount Museum in

Pueblo and are now on permanent loan to our Museum. They have been studied and scanned over the years, from which we determined both were women who died in their 30s and were classified as rich and poor because of their distinct qualities.

Technology has greatly improved since the mummies were last scanned in a hospital nearly two decades ago. We were also inspired by The Field Museum and their new findings for the current temporary exhibition *Mummies: New Secrets from the Tombs*. It was time to have our mummies reexamined.

In April, the Museum partnered with Children’s Hospital Colorado and with Egyptologists from around the country to conduct a fresh round of studies. The

minimally to noninvasive tests included CT scanning, radiocarbon dating, isotope analysis, tree ring core sampling, and portable x-ray fluorescence. Through these new analyses, we have learned a lot more about these two ancient ladies.

Egyptian mummification changed often over the 3,000 years it was practiced. New radiocarbon dating shows the Rich Mummy dates to 894–825 BCE, at the height of mummification. This was the era when bodies were prepared to look the most lifelike. The body was packed with mud, sand, resin, linen, and sawdust. The eye sockets were filled with resin, and glass or stone eyes were placed over the orbitals. Rather than placing the organs in canopic jars as in earlier periods, they were inserted



Above: Michele Koons, curator of archaeology, right, is joined by Andrew Doll, Zoology collections assistant, and Jude Southward, Museum conservator, to take samples from one of the mummies for radiocarbon dating and isotope analysis. Below: The mummies and coffins were temporarily taken off display from the *Egyptian Mummies* gallery and studied in the Museum's Avenir Conservation Center.

in the body in individual linen packets, to avoid the organs being separated from the body. Often the packets were accompanied by a wax figure of one of the Four Sons of Horus, which were previously represented on the canopic jar lids, each assigned to protect a specific organ.

The Rich Mummy has all of these features. We can even see the details on the Four Sons of Horus figures well enough to distinguish the organs. We also newly discovered that this mummy has false hair extensions, there is an amulet of an ibis in her abdomen, and the metal plate covering the abdominal incision is inscribed with the Eye of Horus. This mummy received the treatment exemplary of the time she died.

The Poor Mummy died centuries later. She dates to 398–260 BCE when mummification was on the decline. Packing the body became less common, and viscera were placed between the legs and not back inside the cavity. Sometimes the organs were not completely removed, as is the case with the Poor Mummy. Isotope analysis determined that her diet consisted of desert crops such as wheat and barley, typical for the time period and locale in which she lived. During this time, less attention was paid to internal preservation and more to the outer appearance. Unfortunately, the Poor Mummy was partially unwrapped sometime in the past, so the original condition is unknown. We cannot conclude that she was poorer than the other mummy or if she simply received techniques typical of the time. The Poor Mummy's wrappings were of a slightly lower quality than the Rich Mummy, however, she did have some jewelry placed inside.

We also learned some interesting things about the coffins, and more about these results are posted online on the Museum blog. Essentially, radiocarbon dating showed neither woman was the original occupant of her respective coffin. This confirmed what we already knew about the Rich Mummy's coffin because hieroglyphs identify the owner as a man named Mes. The Poor Mummy's coffin stylistically dates to 1077–943 BCE, 600 years before she died.

Overall, new scientific techniques have revealed new stories about these two old friends of the Museum. In the future, as technology continues to advance, we are sure to learn even more. The newest findings will be displayed in *Egyptian Mummies* later in 2017.

DISCOVER MORE

Dr. Michele Koons is curator of archaeology and led the project to re-examine the mummies and coffins. Learn more about her research and the Department of Anthropology @ dmns.org/science.

Read more about the research results for the coffins @ dmns.org/museum-blog.

The temporary exhibition *Mummies: New Secrets from the Tombs* is a fascinating way to learn about updated studies of both Peruvian and Egyptian mummies from The Field Museum. It is open through Sunday, February 5. Members receive a deep discount to this surcharged exhibition and timed tickets are required. Find out more @ dmns.org/mummies.

Special thanks to Kari Hayes and Jason Weinman and the entire team at Children's Hospital Colorado for conducting the scans and offering their equipment and time; Stephen Humphries at National Jewish Hospital for assisting with 3D visualization; Caroline Arbuckle MacLeod (UCLA), Pearce Paul Creasman and Chris Baisan (University of Arizona) for analyzing the coffins; Bonnie Clark, Keith Miller and Farrah Taylor (University of Denver) for the pigment analysis; Peggy Whitehead and Dale Zitek (DMNS Anthropology volunteers) for analysis of the linens; Andrew Doll (DMNS Zoology Department) for assistance on the isotope analysis. Updated conservation efforts were undertaken by Jude Southward and Jessica Fletcher of DMNS. The radiocarbon dating and isotope work was done at the University of California Irvine Keck lab.





TINY FOSSILS MAY YIELD BIG DISCOVERIES

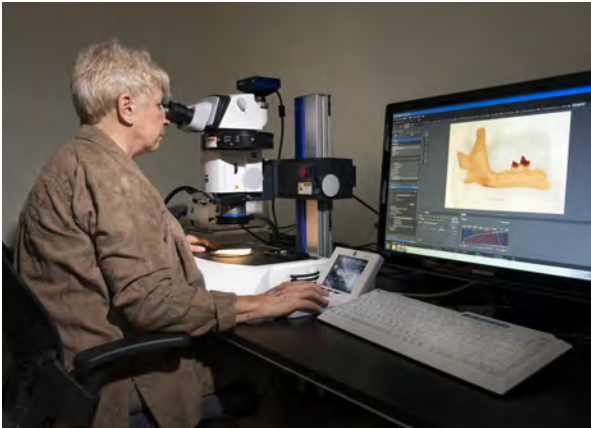
By KRISTEN MACKENZIE

Porcupine Cave, in Park County, Colorado, may ring a bell for some. In the early 1980s, fossils were unearthed in the cave. While it is not unusual to find fossils in cave deposits in Colorado, this attracted media attention because the discovery was a Pleistocene treasure trove, particularly of small animal fossils, including snakes, salamanders, birds, rodents, rabbits, hares, shrews, and weasels. For decades, the site was excavated through the ongoing joint efforts of the Carnegie Museum of Natural History, the Denver Museum of Nature & Science, and the University of California Museum of Paleontology. All three institutions hold Porcupine Cave collections. Denver's own amateur fossil club, the Western Interior Paleontological Society, also significantly aided in the excavations.

Extremely small fossils are notoriously difficult to deal with, and most institutions are hard-pressed to process such abundance. The fossil ankles, legs, jaws, and teeth of birds, shrews, and rodents are so minute that a microscope is required to identify them. Paleontologists commonly refer to these minute fossils as "microfossils." Scientists must have the patience to sort through massive quantities of dirt, pick out individual fossils as small as the size of sand grains, identify them, and finally catalog and photograph them. This type of work is extraordinarily labor intensive, generally taking years to curate individual specimens.

The effort is worth it. Many species of small animals only live a few years or in some cases only one season, but they may have dozens to hundreds (in the case of rodents) of offspring during their lifecycle. Mammoths and mastodons may have reproduced as infrequently as modern elephants, which may be six or less offspring in a lifecycle. Animals with short lifecycles of about one to three years are more likely to reflect responses to climate change and environmental pressures.

In 2004, Dr. Anthony D. Barnosky, of the University of California at Berkeley, published *Biodiversity Response to Climate Change in the Middle Pleistocene: The Porcupine Cave Fauna from Colorado*. Barnosky cautioned



Clockwise: The matrix excavated from Porcupine Cave is rinsed several times to rid of the smallest pieces of debris. In the process, tiny bones begin to emerge. Volunteers sort through the cleaned rubble to pick out bones and teeth, which are categorized by type. The microfossils are then identified, classified, photographed, and entered into the database, as shown by volunteer Sharon Wolfe. Facing page: Kristen MacKenzie (left) and Teresa Solomon examine fossils in the Avenir Collections Center.

that the research on Porcupine Cave up until that time should be viewed as a foundation to build upon, considering only a fraction of the fauna had been analyzed. Indeed, our Museum still has literally tons of dirt full of fossils left to process.

The effort to curate our microfossils, from Porcupine Cave and other non-federal localities, has recently been supported by a National Science Foundation grant. This grant has given us the resources to commit Museum staff and 48 volunteers to work almost exclusively on the microbones. The volunteers alone have dedicated 8,000 hours, picking through dirt, sorting bones, learning to identify tiny animals, and then cataloging them and photographing our specimens.

Microfossil processing is labor intensive. One half-gallon of matrix, the rock or dirt collected from localities, can take one volunteer up to 10 days to comb through. Considering the fossil density of Porcupine Cave, one half-gallon or less can produce several thousand fossils. The matrix is screened, washed thoroughly, dried, and then picked through, teaspoon by teaspoon. This process can be extremely

tedious, even to people who enjoy detailed work, but finding beautiful teeth the size of sand grains and jaws the size of a child's fingernail clipping help to spur us on!

After 14 months of intensive work, we have found shrews, weasels, bats, and birds. This is significant because in Barnosky's volume, only four shrew specimens were mentioned. Dozens of shrew specimens have emerged from the matrix and are now available for research. Shrews are an important food source for small meat eaters such as weasels. Weasels, among the smallest groups of carnivores, are also found in abundance in Porcupine Cave.

Recently, Geoffrey Flora, a Museum volunteer, has processed bones and teeth of the tiniest weasels, some of which now appear to be a new species. Geoff started out volunteering with the Museum by "picking matrix." As with so many volunteers thus far, the thrill of finding tiny perfect fossils inspires personal research about what their discoveries! Geoff has been working on a quantitative method using two-dimensional landmarks (the relative difference in dimensions between points) in weasel skulls and jaws to determine species

identity. His work was presented this fall at the Society of Vertebrate Paleontology annual conference in Salt Lake City.

The Museum now holds more than 20,000 newly found, identified, and cataloged specimens from Porcupine Cave, with likely a half a million yet to go. These specimens will contribute to future studies about the ecology of Colorado's Pleistocene, 2 million years ago.

DISCOVER MORE

Kristen MacKenzie is interim collections manager in the Earth Sciences Department. Learn more about the department's research at [@ dmns.org/science/research/earth-sciences](https://dmns.org/science/research/earth-sciences).

The Museum truly values the contributions of its volunteers. There's a place for you too at the Museum. Find out more [@ dmns.org/join/volunteering](https://dmns.org/join/volunteering).

Step right up and meet even more extraordinary animals in the temporary exhibition *Extreme Mammals*, now open through Sunday, January 8. Admission is free for members. Find out more [@ dmns.org/mammals](https://dmns.org/mammals).

COLORADO'S TRUE BLUE GEM: GLEN COVE TOPAZ

By JACK THOMPSON, KAYE THOMPSON, and JAMES HAGADORN

Pikes Peak looms large across Colorado's landscape. This world-renowned mineral collecting site formed over a billion years ago as molten rock percolated upward through our mountainous crust. Its granite also makes fine-looking countertops!

People have been picking up crystals from crumbling exposures of Pikes Peak granite for millennia, often rooting around in the geode-like cavities that dot the mountain. Such fissures are commonly lined with smoky quartz, amazonite, fluorite, and topaz. Among these, topaz is the only mineral that is commonly cut, or faceted, into gemstones for jewelry.

Topaz is a clear mineral containing aluminum and silicon ($\text{Al}_2\text{SiO}_4(\text{F},\text{OH})_2$) that forms during the last moments when underground lava, or magma, cools. As the magma solidifies into granite, hot fluorine-bearing gases work their way through crevices in the rock, catalyzing the growth of topaz along the walls of cavities and fissures.

Topaz has no industrial uses but is commonly used in jewelry because it comes in many colors and is relatively easy to cut. It is harder than quartz but not quite as hard as sapphire. For those of you born in November, topaz is one of your birthstones. Some exceptional topazes have chromium or iron impurities in them, which give them pink-red-purple colors. Topaz that has been exposed to radiation becomes yellow, brown, or blue. Most of the blue topaz sold by jewelers is "common" clear topaz that was irradiated in the laboratory. "Natural" blue topaz is very rare.

The cliffs above Glen Cove, along the northwestern flank of Pikes Peak, contain some of the best natural blue topaz in the world. Specimens more than a pound in size have been collected, and many tend to have complex crystal shapes. These crystals were first discovered by Luther McKnight in 1944 as he was photographing wildflowers near the rubble at the foot of the cliffs. Yet owing to the steep terrain, only a half-dozen mineral collectors have successfully prospected its treasures since.

One of them was John H. Alexander, son of the Alexander film and airplane manufacturing family of Colorado Springs. A geology major at Colorado College, mineral collector, and mountaineer, he hung by ropes to mine topaz from the mineral-studded cavities of the Glen Cove granite cliffs. One of his prize finds was a clear sky-blue specimen that was faceted into a brilliant 103.2 carat round gem. Alexander's widow donated it and other blue topaz specimens to the Museum in 1978, adding some of Colorado's rarest gemstones to our research collections.



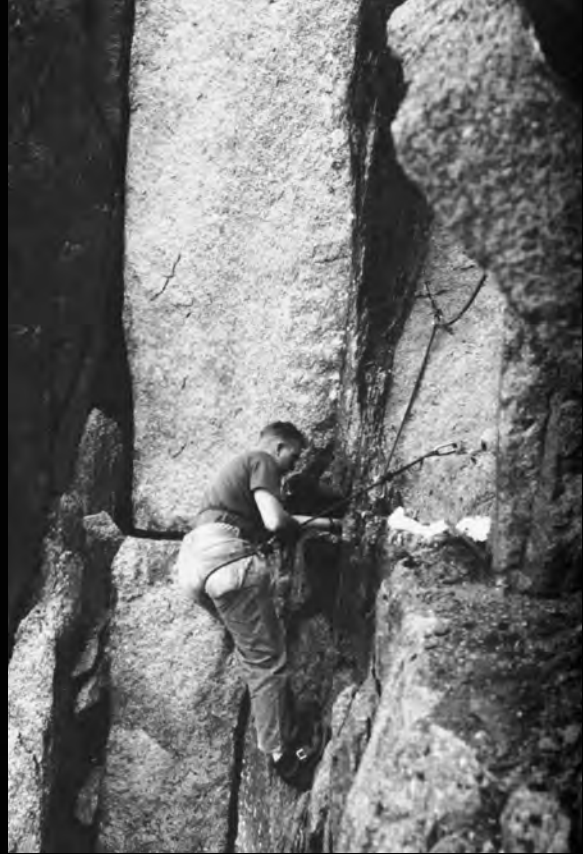
SEE IT

Blue topazes from Glen Cove are on display in Coors Gem and Minerals Hall.

DISCOVER MORE

Jack and Kaye Thompson are volunteers in the Earth Science Department, and James Hagadorn is the Tim & Kathryn Ryan Curator of Geology. Find out more about what's happening with the geology team on Facebook ([James-W-Hagadorn](#)), Twitter ([@JamesWHagadorn](#)), or Instagram ([jwhagadorn](#)).

Below from left, from the John Alexander blue topaz collection: a 31.1 carat cushion cut (DMNH 12863), a 103.2 carat round brilliant cut (DMNH 12597), a raw and uncut 100+ carat specimen (DMNH 16072). Right: John Alexander perched in a Glen Cove crevice, mining topaz in 1951.



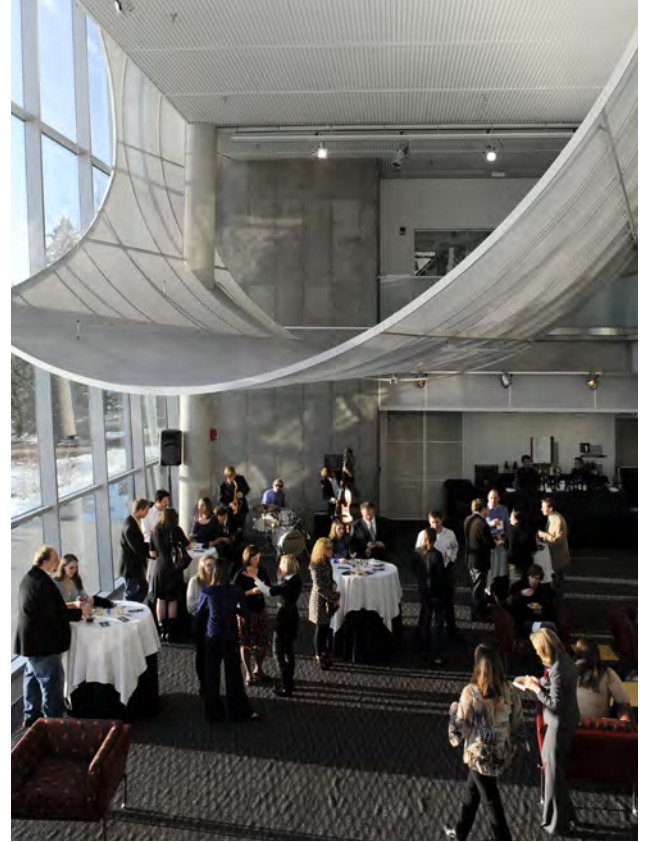
© National Geographic



A UNIQUE GIFT FOR YOUR YOUNG PROFESSIONAL

If you are looking for the perfect gift for the young professional in your life, consider a YP membership at the Museum. Young Professional (YP) members receive unlimited Museum admission year-round, discounts and exclusive invitations, opportunities for networking and volunteering, and free tickets to fun events, such as the very popular Science on Tap and After Dark Soiree.

Find out more about the benefits of a YP membership @ dmns.org/YP. The back cover of this magazine has all the details on how to purchase a gift membership. We look forward to seeing your young professional at the Museum.



COLORADO GIVES DAY 2016

Support the Museum on Colorado Gives Day, an annual statewide movement to celebrate and increase philanthropy in Colorado through online giving. On Tuesday, December 6, thousands of Coloradans will come together to support nonprofits such as ours. Last year, donors demonstrated unprecedented generosity by giving \$28.5 million to nearly 1,900 nonprofits around the state in just 24 hours! The most common donation was just \$100, showing the power of our community's commitment.

Your donation on Colorado Gives Day will go directly to the Museum's scholarship fund, which makes memorable science education experiences possible for underserved students. By contributing to the Museum through Colorado Gives, you will help excite and inspire the next generation of scientists and critical thinkers!

Giving is easy and secure through the Colorado Gives website, which for the sixth year is presented by Community First Foundation and FirstBank. When you give online any time on December 6, 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. For more information and to find out how your gift can make an impact, visit the Museum's donation page @ coloradogives.org/dmns.

MAKE A MATCH

As you consider your end-of-year giving, keep in mind that your employer may be one of 10,000 companies that match employee donations to nonprofits such as the Museum. Memberships qualify for matching too! See your employer's personnel office for more information and forms.

ENJOY THE MUSEUM EVEN MORE IN 2017

Thank you for your membership support! We invite you to upgrade your membership today and enrich your Museum experience in 2017. In addition to all the usual great members benefits, you receive many special perks as a Giving Club member:

- First access to registration for Summer Day Camps. Giving Club members enjoy 24 hours of exclusive access to sign up for the camps before they sell out.
- Free anytime tickets to all surcharged exhibitions, such as *Mummies: New Secrets From the Tombs*, now open, and *Vikings: Beyond the Legend*, which opens in March. No reservations are needed, even if it's sold out! Anytime tickets may be taken directly through the ticket taker and scanned at the exhibition entrance.
- Free IMAX and Planetarium tickets you may use for yourself or share with friends and family.
- 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 @ dmns.org/join/giving-club.

**FUEL
YOUR MUSEUM**

Donate your used car, boat, motorcycle, truck, or RV to the Museum and support your favorite cultural institution while also 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 @ dmns.org/give/vehicle-donation or 866.697.0697.

THE MUSEUM HAS GOOD TASTE

By NICOLE GARNEAU, PhD

What does it take to bring in one of the largest research grants in the Museum's history? Two years, lots of partners, more coffee than is reasonable, and a large dose of community support. The Museum's Genetics of Taste Lab leveraged all of this and more to bring home a \$1 million grant from the Science Education Partnership Award program (SEPA) at the National Institutes of Health.

The project is twofold: to conduct three studies about taste over the next four years and to conduct the first large-scale study on how to create scientific research that is designed for the people, by the people, putting the Museum at the forefront of a revolution to reconsider how science is conducted.

The Taste Lab has been home to innovative research since it opened in 2009. The newest study, called the Science of Sour, launched November 21 and is focused on testing the hypothesis that not all sour tastes are created equal.

As pickled and fermented foods and sour beer rise in popularity, we are reminded that preference for sour tastes ranges widely and many sour foods are beneficial to human health. Although sour taste is easily recognized by people of all ages, scientists do not understand exactly how it works. The Taste Lab is examining the distinctions between sour foods and the role genetics might play in how humans detect sour taste. The research itself is conducted by trained volunteers under the supervision of the Museum's science staff. The goal is to enroll 1,000 people in nine months.

Members and guests have contributed to previous studies that have changed our understanding of taste. They have helped to debunk the term "supertaster" and provided evidence that fat is the sixth taste. We recently submitted a paper showing heredity accounts for about 30 percent of the population's variability for tasting unsaturated fats, the "good" ones. In addition, we just wrapped up the Sweet-Tasting Study in August with a record 1,112 participants. We are now conducting the DNA analysis on this data set to see how the bacteria in our mouth might affect our sensitivity or preference for sweet-tasting food. Stay tuned!

Joseph Polman, PhD, of the University of Colorado School of Education, is leading the portion of the grant devoted to the learning research. "When people of all ages and from all walks of life get involved in doing real science, it can be a wonderful learning opportunity," said Polman. "We need to know more about how people get invited to participate in citizen science, how they feel supported as a participant, and if there is a long-term impact from their involvement."



The Genetics of Taste Lab in *Expedition Health* is a real working lab where research that is designed for the people, by the people is conducted by trained citizen scientists, such as Camilla Monroe.

DISCOVER MORE

Dr. Nicole Garneau is curator of human health. Find out more @ dmns.org/science or on Twitter @yoppearlscigirl.

YOU ARE INVITED TO BE THE SCIENCE

- **PARTICIPATE!** Stop by the Genetics of Taste Lab in *Expedition Health* to check on availability, or make an appointment by emailing genetics@dmns.org. The experiment is available daily, 9 a.m.–4:30 p.m. It will take about 30 minutes to rate the taste of sour solutions, answer questions about yourself, and list how everyone is related (genetically or not) in your group. Everyone will leave with a thank-you packet. We highly encourage friends and families to participate together. Children 8 and above are eligible (with a legal guardian if under 18).
- **OBSERVE!** Look inside the Taste Lab in *Expedition Health*, a real working lab that is open for observation 364 days a year.
- **JOIN THE TEAM!** This research study is being conducted for the community, by the community. The team includes staff scientists, volunteer citizen scientists, undergraduate interns, and Teen Science Scholars. To become a citizen scientist, contact Volunteer Services at 303.370.6419 or visit dmns.org/join/volunteering.

Thank you for your support, and we look forward to seeing you in the Taste Lab!

This project is made possible by the Science Education Partnership Award program at the National Institutes of Health. The Genetics of Taste Lab is located in *Expedition Health*, the Museum's very popular exhibition focused on human biology. This is the fourth study for the Genetics of Taste Lab with a focus on how very small distinctions in a person's DNA can have a huge impact on how they perceive taste and how taste relates to overall health. Access to all of the Taste Lab's scientific publications is freely available at dmns.org/genetics.

SEPA SCIENCE EDUCATION
PARTNERSHIP AWARD
Supported by the National Institutes of Health

MEMBERS-ONLY MUMMIES NIGHT Tuesday, January 31 • 6–9 p.m.

Members: \$14 adult, \$12 senior, \$10 child/junior

Enjoy an exclusive evening all about mummies! Explore the temporary exhibition *Mummies: New Secrets from the Tombs* before it leaves Denver forever. You will also see the ancient past come to spectacular life in the fascinating IMAX film *Mummies: Secrets of the Pharaohs* (presented in 2D).

Please select an IMAX screening at 6:30 or 7:30 p.m. and allow time beforehand to get your snacks and find a seat. You are welcome to enjoy the *Mummies* exhibition any time before or after your scheduled movie.

Your ticket includes admission to the exhibition and film, and a box of popcorn. Other concessions, beer, and wine will be available for purchase.

Reservations open on Monday, December 5, and are required by Tuesday, January 17. Call 303.370.6306 (daily, 9–5) or visit dmns.org/memberevents to RSVP.



GET THE MOST FROM YOUR MEMBERSHIP

- Visit anytime for free 364 days a year!
- Read the monthly eNews with members-only news, tips, and special offers. If you're not receiving eNews, email members@dmns.org.
- Keep your membership current with Auto-Renew, an easy process. Enroll at 303.370.6306 (daily, 9–5) and get a free gift. Your expiration date is printed on the mail label on the back of this magazine.
- Add another adult to your membership for just \$20; great for nannies and grandparents! Add-ons must be enrolled by name so they can visit on their own. Not valid on Individual level memberships.
- Use the ASTC Passport program (astc.org/passport) to get free admission at 330 science centers and museums outside a 90-mile radius of Denver and your residence.
- Upgrade to Family Plus level membership and higher and enjoy a special reciprocity agreement with Fort Collins Museum of Discovery. (Separate from ASTC program.)



VIKINGS: BEYOND THE LEGEND

Experience this amazing exhibition at an exclusive members-only event!

The largest collection of Viking artifacts to visit North America is coming to Denver in March! *Vikings: Beyond the Legend* lays waste to the one-dimensional stereotype of bearded barbarians with horned helmets. Marvel instead at a culture of surprising refinement, complexity, and achievement, and a supernatural world inhabited by Thor, Odin, and other gods and giants. New archaeological discoveries and 500 treasures reveal fresh insights and show why the Vikings will always capture our imagination.

MEMBERS-ONLY PREVIEW DAY

Thursday, March 9 • 9 a.m.–5 p.m.

Members: \$8.95 adult, \$7.95 senior, \$ 5.95 child/junior

See it before it opens to the public! Enjoy an extra 10% off in the T-Rex Cafe and Grab & Go Deli this day only. Entry by reserved timed ticket.

MEMBERS-ONLY EVENING (21+)

Thursday, April 6 • 6–9 p.m.

\$50 member, \$60 nonmember

In addition to an adults-only evening in the *Vikings* exhibition, enjoy hors d'oeuvres and cash bar followed by dinner. See menu at dmns.org/memberevents.

MEMBERS-ONLY EVENING

Tuesday, April 18 • 6–9 p.m.

Members: \$8.95 adult, \$7.95 senior, \$ 5.95 child/junior

An optional prepurchased dinner is available for an additional charge: \$13 adult, junior, senior member; \$8 child. See menu at dmns.org/memberevents.

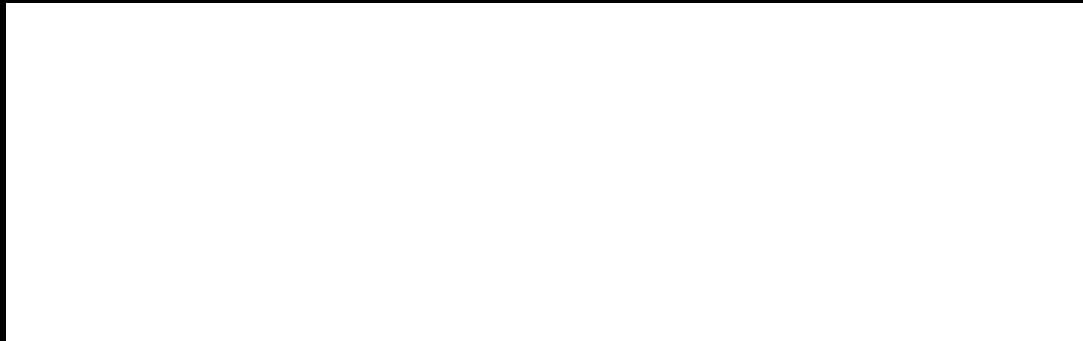
Members tickets on sale Monday, January 30. Call 303.370.6306 (daily, 9–5) or visit dmns.org/memberevents and print your tickets at home! ADVANCE RESERVATIONS REQUIRED FOR ALL EVENTS.

Space is limited; no walk-up tickets will be available. Exhibition entry by timed ticket only.

QUESTIONS?

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

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



A THOUGHTFUL GIFT

Give your family, friends, neighbors, colleagues, or staff a full year of fun and thought-provoking activities and adventure with a Museum membership!



THIS GIFT PROVIDES MANY BENEFITS:

- 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 shows, as well as in the Museum Shops and the T-Rex Cafe and Deli.
- Discounts on surcharged temporary exhibitions, such as *Mummies: New Secrets from the Tombs*, through February 5, and *Vikings: Beyond the Legend*, opening in March.
- Discounts on fun educational programs for adults, children, teens, and families, and early registration for summer camps.
- Invitations to exclusive members-only events and exhibition previews.
- Free admission to more than 330 science centers and museums worldwide.



PURCHASING A GIFT MEMBERSHIP IS EASY!

- Go online @ dmns.org/giftmemberships.
- Come in person to the Members Lane at the Ticketing Desk.
- Call 303.370.6306 (daily, 9–5).

To receive membership materials by mail prior to December 24, please complete your purchase before December 15, after which you may pick up a membership gift packet with a blank gift card at the Members Lane.

