

CATALYST

DENVER MUSEUM OF NATURE & SCIENCE MAGAZINE

AUGUST | SEPTEMBER 2013

INSIDE /// NEW LOOK IN BEARS AND SEA MAMMALS HALL
CURIOSITY ROVER UPDATE
GREAT WHITE SHARK 3D



A BREATHTAKING ENCOUNTER WITH
THE PREDATOR WE LOVE TO FEAR



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MEMBERS SAVE 30% ON TICKETS EVERY DAY

Dear Members,

Not long ago I asked my 10-year-old daughter, Jade, "When you're as old as your grandmother, will the world be better, worse, or the same as today?" "Of course it'll be worse, Daddy," she replied. "Whaaaaat?," I stammered, stunned by her negative assessment. She continued calmly, "Everyone knows the planet is getting hotter and won't be a good place for people to live."



We live at a singular moment, arguably the most pivotal in human history. Humanity's actions in the coming generation will have a disproportionate impact on the future of our kind and the millions of other species with which we share this world. Climate change, species extinctions, habitat loss—the litany of dangers is well-known. In some cases, too well-known, judging by Jade's reaction!

It turns out that most of us today possess a negative, often post-apocalyptic view of the future. Yet any sustainable pathway demands that we must move beyond the doom-and-gloom message, empowering people of all ages with a thriving future vision and the tools to get us there. I firmly believe that nature and science museums have a crucial role to play in this pressing endeavor. This is why I recently joined the Museum's staff.

At first blush, the notion that museums of natural history might concern themselves with the future seems oxymoronic. But consider this: It's unlikely that we'll figure out where we need to go unless we have a solid understanding of where we've been. In other words, history matters. Nature museums are unique in being keepers of real objects and compelling stories spanning the entire 14 billion-year cosmic journey, from the big bang to the present day.

Among its many assets, the Museum has strong leadership, an exceptionally talented staff, enthusiastic support from Trustees and donors, and record-breaking numbers of volunteers and members. Big enough to make a difference, yet small enough to be nimble and dynamic, we are exceptionally well-positioned to help re-envision the 21st-century natural history museum, shedding the Victorian "cabinet of curiosities" identity to become a forward-looking institution that uses lessons from the past to inspire and inform decisions about the future. I am honored and thrilled to take part in this great work of our time.

Scott Sampson, PhD
Chief Curator and Vice President, Research and Collections Division

Find out more about Dr. Sampson and his research
@ www.dmns.org/science/museum-scientists/scott-sampson.

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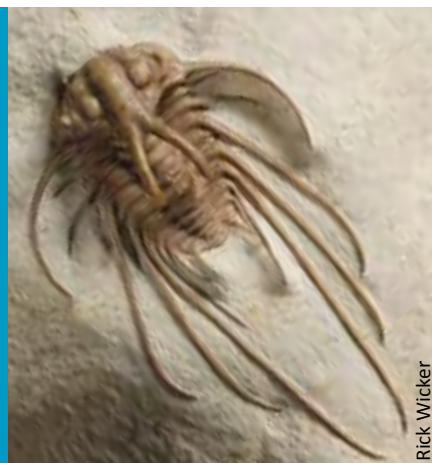
FIND IT @ DMNS.ORG

- Tickets for Planetarium and IMAX shows, lectures, and programs
- Reservations for members events
- Hours and showtimes
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- Heavens Above sky information
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ON THE COVER

From the paleontology collections

Spiny trilobite
(*Dicranurus hamatus*)
DMNH 6251
Early Devonian
390 million years ago
Haragan Formation,
Oklahoma
Actual size: 3.7 inches long



Rick Wicker



The Morgridge Family Exploration Center is taking shape in preparation for a February 2014 opening. Left: Level 2, just outside the entrance to the future home of the new Discovery Zone. This area will be glassed in, providing a lovely view out onto City Park. Above: Level 2, looking into the multilevel Science Atrium, which will feature a stunning new Science and Art Imagination Screen. Find out more about this exciting project @ www.dmns.org/futureplans.

PLEASE NOTE THIS CLOSURE

The entrance to City Park at Montview and Colorado Boulevards will be closed until early fall 2013, with the exact reopening date still to be determined. The Museum will be open every day during this time. From Colorado Boulevard, please access the Museum at 22nd or 23rd Avenues.

The City and County of Denver is constructing a new road in the southeast part of City Park. The road will be a loop, so there will no longer be pass-through traffic in the park between Colorado Boulevard and 17th Avenue. The loop will improve access and safety for park users and provide a drop-off/pickup area for school buses visiting the Museum. A traffic circle will be constructed at the Montview and Colorado entrance, necessitating the temporary closure.

We appreciate your patience and look forward to welcoming you and your summer guests to the Museum. Find directions to the Museum @ www.dmns.org/plan-your-visit/directions-and-parking/.

NEW! FREE WI-FI AT THE MUSEUM

You can now enjoy free Wi-Fi throughout the Museum! No password is required—simply select DMNS-Guest from the list of available networks, accept the terms and conditions, and you're ready to go. As a member, this means you can pull up a chair anytime in the Leprino Family Atrium to enjoy the view or grab a cup of coffee in T-Rex Cafe while you catch up on the latest news or get some work done on the run.

HELP US BUST SOME MYTHS THIS FALL

Have you ever wanted to be a MythBuster? Now is your chance! The Museum needs active volunteers this fall for MythBusters: The Explosive Exhibition. You will help visitors try a dozen hands-on experiments—like Tablecloth Chaos, which tests if you can pull a tablecloth out from underneath a table setting without disturbing any of the items! All experiments are based on those seen on the popular Discovery Channel television series *MythBusters*. Volunteers must be able to complete a five-hour shift that includes a great deal of physical activity. Shifts are available seven days a week and some evenings. Comprehensive training is provided to all Museum volunteers.

Find out more at shelley.knepley@dmns.org or 303.370.6419 by Friday, September 6.

MUSEUM HONORED FOR DISTANCE LEARNING

Colorado Distance Learning Association honored Mark Widdifield, the Museum's distance learning assistant coordinator, with the 2013 Teacher of the Year Award, and the Virtual Heart program with the 2013 Program of the Year Award.

Distance learning at the Museum started nearly 10 years ago with Scientists in Action (SIA), a program that uses video conferencing gear to connect scientists in labs, the field, or collections areas with schools around the country. This technology evolved into the Museum's virtual classes.

In the Virtual Heart class, students have the opportunity to explore heart anatomy as they observe a sheep heart dissection. An elementary school from New York nominated the class for the Program of the Year Award.

Today, distance learning programs are broadcast at the Museum and to schools in 28 states, reaching 10,000 students a year.

Find out more about distance learning opportunities for your favorite student @ www.dmns.org/teachers/distance-learning.



© European South Observatory (ESO)/S. Guisard

HEAVENS ABOVE

The Perseid meteor shower is one of the best known of all meteor showers and never fails to present an impressive show. The shower is named Perseid because the meteors appear to radiate from the Perseus constellation. The meteors are dusty debris ejected from the comet Swift-Tuttle as it travels along its 130-year orbit. Every year Earth, in its orbit, passes through this dusty trail left by the comet and night-sky observers are treated to an enthralling display of “shooting stars.”

An observer in the northern hemisphere may see Perseid meteors as early as July 23, when one meteor every hour could be visible. A slow buildup occurs for the next three weeks, culminating at 60 to 100 meteors per hour. The Perseids peak at 11:59 a.m. (MDT) on August 12, then rapidly decline to about 10 per hour by August 15. They are generally fast and bright, and frequently leave persistent light trails in their path. This year the Perseids will streak across the short summer nights from late night until dawn, typically producing the most meteors in the early morning hours before dawn, with little interference from the waxing crescent moon. Look for the moon in the west near Saturn in the evening hours, giving a colorful prelude to a late-night Perseid show.

Find sky information for August and September @ www.dmns.org/heavensabove.



MEMBERS SPECIAL OFFER

Current Museum members receive a 20% discount on new room bookings for events hosted in 2013. A variety of spaces are available at the Museum for special events—weddings, retirement parties, graduation celebrations—for 15 to 3,500 guests! Enjoy spectacular views of City Park, Denver’s skyline, and the majestic Rocky Mountains. We also offer state-of-the-art audiovisual services. (Offer does not apply to currently booked events or birthday parties.)

Find out how the Museum’s catering staff can help you inspire, surprise, and entertain your guests and create an event to remember @ 303.370.6400 or cateringandevents@dmns.org.



John Demboski

A FRESH LOOK IN BEARS AND SEA MAMMALS HALL

BY JOHN DEMBOSKI, PhD

In October 2012 on the shore of Hudson Bay, I found myself being assessed up close and personal by a 700-pound male polar bear, one of the largest and most iconic predators on the planet. Was I in danger? Hardly, as I was comfortably taking photos and drinking hot chocolate, along with 12 other travelers from the Museum, about 10 feet off the ground inside the warmth of a tundra bus.



We were just outside of Churchill, Manitoba, observing polar bears waiting onshore for the bay to freeze over so they could take to the ice to hunt seals. The bears spend late fall into early summer out on the pack ice before its breakup forces them onto shore once again. During their time on shore they fast, and their survival is dependent upon the fat reserves they have built up feasting on seals during the previous eight months.

I've been lucky to see all three species of North American bears in the wild numerous times over the last 20 years, but on this trip I couldn't help but be a bit more reflective. Polar bears are often held up as "poster animals" for climate change. Global warming is directly impacting the extent of pack ice in the Arctic, on which the bears are dependent for their livelihood. Some of the more dire predictions by bear biologists suggest the species will be close to extinction within 100 years. In the Hudson Bay region, the pack ice is melting three weeks earlier than it did just a few decades ago, meaning less time for bears to hunt on the ice and build up the crucial energy needed to survive on shore. As I looked out the window of the bus, parked on the edge of the continental tree line, I found myself wondering what this landscape will look like for the bears and other wildlife in 20, 50, or 100 years.

If a trip to the far north is not on your calendar, opportunities to see these magnificent bears are available in museums and zoos. Bears and Sea Mammals Hall at the Museum is a favorite destination for our visitors. The hall features 10 beautiful dioramas, seven of which are dedicated to bears, including polar bears, with the remaining three highlighting walruses, sea lions, and seals from across North America. These dioramas, depicting actual places, were installed in the 1940s and '50s. Many of the animals on display were collected by the Museum during a 1921–22 expedition to Alaska. A young Alfred M. Bailey was hired to lead the expedition, years before he returned in 1936 as director of the Museum.

In spring 2012, a team led by Exhibits—with staff from Research and Collections, Education, and Digital Media—was formed to reinvigorate and update the content in Bears and Sea Mammals. The dioramas themselves are not involved in this refresh. The team is creating new ways for visitors to engage with these exquisite wildlife scenes using up-to-date scientific information about the animals and facts about the diorama's locales, with images and

maps set against more visually striking backgrounds. Now instead of just contemplating the pair of spirit bears from coastal British Columbia, odd black bears that are actually white, you will learn why they are not albino. Or you will find out why the tranquil scene of a polar bear family enjoying a seal meal is highly unlikely to happen in the wild.

By the end of the summer, there will be some particularly exciting additions to the hall. Gary Staab, an internationally known natural history sculptor and artist, has been commissioned by the Museum to create original works for the hall. Staab also created the model of "Lucy" in Prehistoric Journey and the two huge dinosaur sculptures in the Museum's parking garage. In this new work, Staab is sculpting bronzes of black bear cubs climbing a ponderosa pine tree and a northern fur seal pup basking on a beach on St. Paul Island, Alaska. The sculptures will be displayed in such a way that visitors will be able to touch them and interact with them.

Additional plans in the coming months include displaying skulls from the zoology collections, such as the one from Colorado's last known grizzly bear, as well as installing touchable items and media enhancements, such as bear vocalizations.

The renovation of the Bears and Sea Mammals Hall has really brought new life to an already popular diorama hall. This project follows on the heels of upgrading 16 dioramas and exhibit cases in North American Wildlife Hall just two years ago. So if meeting bears in the wild is not your cup of tea or chartering a boat to see walruses on Little Diomed Island in the Bering Sea is beyond the scope of your budget, visit Bears and Sea Mammals to come face-to-face with some of Earth's most beloved animals.

SEE IT

Bears and Sea Mammals Hall is on Level 2 of the Museum. The new upgrades are being installed in phases over the coming months, so we hope you enjoy the ongoing changes.

Facing page: A male polar bear stands near a tundra bus in Manitoba as a tour group looks on. Above: Sculptor Gary Staab crafts new bronze statues for Bears and Sea Mammals Hall.



FIND IT @ DMNS.ORG

John Demboski, PhD, is curator of vertebrate zoology and chair of the Zoology Department. Learn more about his research @ www.dmns.org/dembo-lab.

See photos from Dr. Demboski's trip to Manitoba on the digital version of the August/September 2013 *Catalyst* @ www.dmns.org/catalyst.

ROCKY MOUNTAIN SCIENCE COLLECTIONS CENTER

BY KELLY TOMAJKO

Just about everyone has moved sometime in their life, and many among us have built a new house from the ground up. The amount of detail involved in these pursuits can be overwhelming. Imagine planning a new home for nearly 1.5 million precious artifacts and specimens that need to be protected and preserved for generations to come!

The Museum has been designing and constructing a new wing since the successful Better Denver bond election in 2007. Part of this expansion includes the Rocky Mountain Science Collections Center, which will maximize preservation and security conditions for treasures that reflect the richness and diversity of the natural world. This two-level, underground center will also include workspaces and laboratories where collections can be safely and comfortably studied. Currently the collections are scattered in 49 locations behind the scenes around the Museum. For the first time in the Museum's 112-year history, the collections will be consolidated in one state-of-the-art collections facility.

Our preparation for this project has been considerable. The Museum's professional staff have an extensive amount of

expertise and experience in collections preservation. To ensure we incorporated best practices, we learned from colleagues who had recently built collections facilities at their own institutions, including The Field Museum, Yale Peabody Museum of Natural History, the Smithsonian's Museum Support Center, and the Canadian Museum of Nature's Natural Heritage Building. And finally we added to our team some of the best architects and consultants in the business.

Our primary goal was to ensure the preservation of collections in perpetuity by protecting them from a variety of threats. Our film and images collections must be stored at just the right temperature and humidity level to prevent them from deteriorating, ultraviolet light fades textiles in the anthropology collections, and insects are a threat to all of the collections.



Photos: Rick Wicker



We used a variety of strategies to protect collections against these and other threats to preservation. Filtered lenses and LED fixtures will eliminate damaging ultraviolet light. Early detection and a water-based sprinkler system will protect against fire. Water will run through a set of double pipes with leak detectors. Floor and other finishes will be light in color without textures or patterns in order to easily detect insects and other pests.

The Museum's collections vastly range in size, from an insect the size of a pinhead to the 1,500-pound *Stegosaurus*, the most complete skeleton of its species ever found. The freight elevator and floors of the facility must be able to accommodate the weights of the heaviest collection—archives and manuscripts. The corridors and aisles must have enough room to maneuver 24-foot-tall totem poles and various wide loads, such as large mounted skeletons in the zoology and paleontology collections.

In addition to addressing collections preservation, we were charged with meeting very aggressive energy use and sustainability goals for the new wing. We accomplished this in two key ways. One was to build only as much space as we really need. We completed a space analysis of our existing collections, and then, based on a long-term collections planning exercise, made careful estimates of collections growth over the next 20 years. From this, we designed a high-efficiency storage system. This included developing specialized cabinets to efficiently house everything from dinosaurs to dung beetles. The cabinets will be placed on a carriage system that will allow us to open aisles between rows of cabinets.

The other was to define special zones of temperature and relative humidity that maximize collection preservation while minimizing energy use. Preservation spaces will be separate from workspaces to achieve ideal conditions both for safeguarding

collections and for achieving human comfort. We then established summer and winter set points for both temperature and relative humidity that are less costly to achieve in the Denver climate. And because the center occupies two levels below-ground, indoor environmental conditions will be buffered from the weather and will naturally require less energy to maintain.

For decades, the Museum has dreamed of creating a consolidated home to care for its treasures. Thanks to Better Denver voters and many other generous supporters, this will soon be a reality, beginning a new chapter in the Museum's long history of sharing the "real things" from our collections and advancing science through the study of our artifacts and specimens.

Facing page: A view of the new Zoology Collections Workshop under construction from inside the collections manager's office. Above: Jeff Stephenson, zoology collections manager, and Meghan Truckey, mammal collections technician, place specimens in new cabinets in preparation for moving to the Rocky Mountain Science Collections Center beginning in 2014.



FIND IT @ DMNS.ORG

Kelly Tomajko is director of preservation and documentary resources in the Research and Collections Division. Find out more about Museum collections @ www.dmns.org/science/collections.

The new wing is on schedule to open on February 14, 2014. It will be home to the Rocky Mountain Science Collections Center and the Morgridge Family Exploration Center. Find out more @ www.dmns.org/futureplans.

CARACOL STELA 3

BY MARC LEVINE, PhD

One artifact in the Museum's anthropology collections stands above all the rest, literally and figuratively. Caracol Stela 3 is a 1,300-year-old carved stone monument measuring more than 11 feet tall and weighing roughly 8,000 pounds. Found at the ancient Maya capital of Caracol in British Honduras (Belize today), Stela 3's iconography and hieroglyphic inscriptions retell an important chapter in Caracol's history. How archaeologists discovered the stone and how it ended up at the Museum also provides a fascinating tale.



Photos: Rick Wicker

In 1950 a team of archaeologists led by Linton Satterthwaite of the University of Pennsylvania (UPenn) excavated the abandoned Caracol site. Among their many finds was part of a stone monument later dubbed “Stela 3,” which they shipped back to Philadelphia. A stela (pronounced “steel-ah”) is a free-standing tabular stone monument. During the Maya Classic Period (AD 250–900), kings and queens commissioned master artists to carve these monuments to proclaim their power as semidivine rulers. Stone stelae (plural, pronounced “steel-ay”) from Caracol and other Maya capitals represent the best record we have of these royal dynasties.

Meanwhile in Denver, Marie Wormington, the Museum’s first curator of archaeology, was busy building and diversifying the anthropology collections. In late January 1953, Wormington arranged for our Museum to purchase the Stela 3 fragment and eight casts of other Maya monuments from UPenn for \$1,500.

Three months later, archaeologists made another fortuitous discovery. Alfred Kidder of UPenn wrote to Wormington in April 1953: “I have just heard from Linton that he has found the missing lower half of Caracol Stela 3. He is very enthusiastic about it... .” The basal piece was discovered a quarter of a mile from where the first two fragments were found. How this very heavy lower portion ended up so far from the others remains a mystery.

The UPenn archaeologists presumably convinced British Honduras officials that Stela 3’s fragments should be reunited for scholarly study, and they generously gifted Stela 3’s lower portion to our Museum. Satterthwaite trucked the stone fragment to the Caribbean coast, where it was shipped on a United Fruit Company freighter to New Orleans. From there, the stone continued its journey by rail to Denver, where Wormington rejoiced, writing to Satterthwaite in August 1953: “The piece from British Honduras came through in fine shape and is really superb. I’ve never been so excited by any acquisition.”

Stela 3 is the most important monument dedicated to Caracol’s greatest ruler, Lord K’an II. This fearsome warrior-king is depicted on the front of the monument bedecked in ceremonial regalia: a netted kilt and cape, jade jewelry, and a plumed headdress. Unfortunately, when the stela was broken in antiquity, the carvings of the head and neck were destroyed. Yet the all-important inscriptions preserve his name: Lord K’an II or “Lord Storm-water Moon.” During his 40-year reign from AD 618 to 658, the city expanded, its population grew to more than 150,000 people, and Caracol became a dominant political force in the Maya lowlands. More than a hundred glyphs grace Stela 3, mostly attesting to K’an II’s royal

pedigree. For example, at age 5, he and his father engaged in a ritual bloodletting rite that further cemented his right to the throne.

Stela 3 was deliberately broken in half at some point after Lord K’an II’s rule, cracked precisely at the neck in what could be considered a symbolic act of decapitation. For the Maya, decapitation and death were the precursor to life and rebirth. Maya legends tell of how the Maize God was beheaded and his head became the seed for new growth and life on Earth. Similarly, traditional Maya liken the act of harvesting an ear of corn to decapitation, where this ear also carries the seeds of new life. Though Stela 3’s destruction may appear to be an act of desecration, perhaps it was instead a reverential act seeking to “complete” the essence of the deceased king.



COMING IN 2014

Maya: Hidden Worlds Revealed, the largest exhibition about the ancient Maya ever to be displayed in the United States, will open at the Museum on February 14, 2014. The Museum collaborated with three other museums to develop the exhibition. It will debut in Denver in conjunction with the grand opening of the new Morgridge Family Exploration Center. Members will receive first access to the exhibition and deep discounts on tickets.

Facing page: Detail of Caracol Stela 3 shows where the two pieces were broken apart, although it remains a mystery how or when the two sections were separated. Above: The Stela 3 on display in the former Hall of Ancient Peoples.

FIND IT @ DMNS.ORG

Dr. Marc Levine is former assistant curator of archaeology in the Anthropology Department, and is now assistant professor and assistant curator of archaeology at the Sam Noble Oklahoma Museum of Natural History. He is the co-curator of the new exhibition Maya: Hidden Worlds Revealed. Find out more @ www.dmns.org/maya.



Become a lasting part of the new Morgridge Family Exploration Center and help excite and inspire generations to come. Compose a special message to honor family or cherished friends ... remember a loved one ... celebrate your children or grandchildren ... recognize your business or an important milestone.

YOUR LASTING TRIBUTE.

For \$500 or \$1,000 we invite you to personalize a leaf that will be displayed on a new Nature Art Wall on the second-floor entryway to the new wing, home to a brand-new Discovery Zone for young children, a second temporary exhibition gallery, and engaging science studios for 21st-century learners.

BE AN INSPIRATION. GIVE TODAY.

Give online at www.dmns.org/InspireCuriosity.

Your support will help ensure that generations of Coloradans will view the world with a sense of awe, renewed respect for science, and fully energized curiosity.

For more information, e-mail InspireCuriosity@dmns.org or call 303.370.6373.





ENJOY AN EXCLUSIVE EVENING FOR GIVING CLUB MEMBERS

Giving Club members at the Curator level (\$300) or higher are invited to an exclusive Behind-the-Scenes Night at the Museum on Wednesday, October 23. This special free event is just one benefit we offer our Giving Club members.

Behind-the-Scenes Night will offer many unique opportunities to explore the Museum. This is just a sampling:

- Meet Museum scientists.
- Explore fossils in the “Big Bone Room” not on public display.
- See rare specimens in the Zoology Department.
- Get the scoop on the brand new wing, scheduled to open in February 2014, adding five levels of discovery to the Museum.
- Enjoy a delicious buffet dinner and cash bar.

Invitations to Behind-the-Scenes Night will be sent in September. Find out more about Giving Club events and benefits @ www.dmns.org/join/giving-club.

VOLUNTEERS HONORED

Volunteers are an integral part of our Museum family, and their tireless commitment has helped the Museum become one of the renowned science museums in the country and a vibrant part of Denver’s cultural community. In 2012, more than 1,747 volunteers contributed 218,666 hours!

Who were our volunteers in 2012?

- The youngest was 5 and the eldest was 97.
- 218 teens and 21 children under the age of 12 volunteered their time.
- 58 percent were female and 42 percent were male.
- 423 applications were received and 367 new volunteers came on board.

Last spring, the Museum held its annual recognition events to celebrate the volunteers and their dedication. Ann O’Donnell was recognized for 40 years of service. (She is pictured above with President and CEO George Sparks.) When Ann cofounded the membership program in the early ‘70s, all the records fit into two shoeboxes. Today, the Museum has more than 65,000 member households. Over the years, Ann had organized hundreds of field trips and lectures for members and volunteers, sharing her lifelong passion for learning.

Jane Quinette was recognized for 35 years of service. She has volunteered for the Museum’s publications for years, beginning with the first official newsletter, Bear Pause. Her passion for the Museum extends beyond her volunteer time: the Quinette Family Foundation is funding the new Archives Collections Workshop in the new wing.

Mona Hart received her 30-year award. Mona has served all around the Museum, in Zoology, temporary exhibitions, Expedition Health, and particularly at the Information Desk. She enjoys welcoming visitors from around the world, and says that it’s still surprising that there is always something new to learn after all these years.

The Museum’s volunteers are truly valued, and there’s a place for you too. Find out more @ www.dmns.org/join/volunteering.

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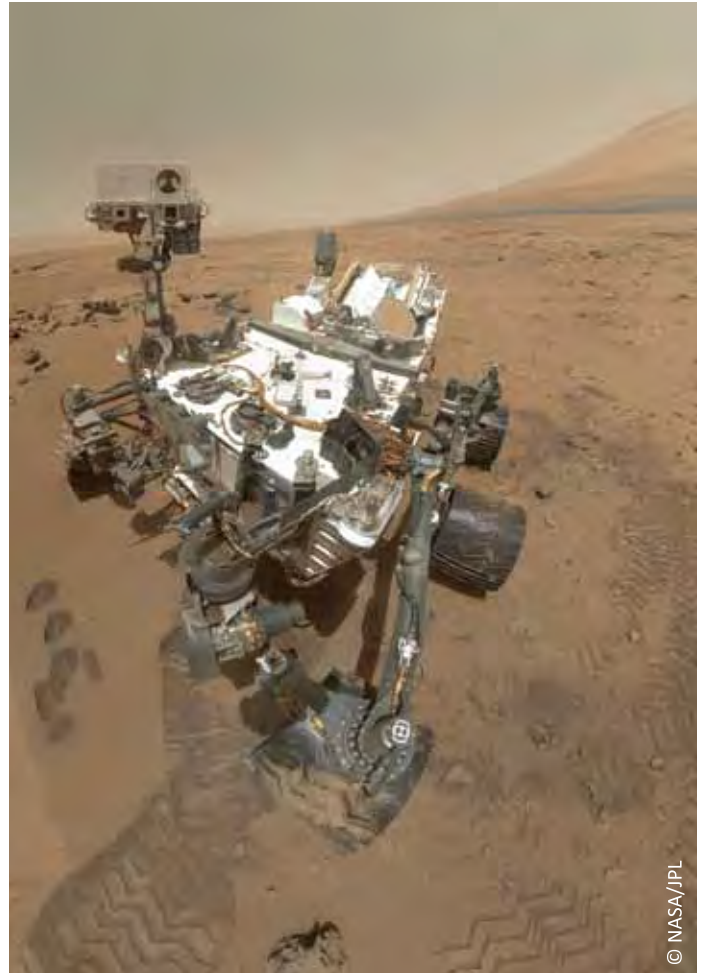
CURIOSITY ON MARS

By STEVEN LEE, PhD

On August 5, 2012, nearly 1,500 people gathered at the Museum to watch as the Mars Science Laboratory prepared to land the largest mobile laboratory ever to operate on the surface another planet, the “mega-rover” named *Curiosity*. As we held our collective breath, NASA’s mission control counted down every step of the “Seven Minutes of Terror” leading to *Curiosity*’s successful touchdown. Every aspect of the landing had been executed perfectly, positioning another robot explorer to delve into the mysteries of Mars. During its two-year mission, *Curiosity* will analyze dozens of samples drilled from rocks or scooped from the ground as it explores with greater range and capabilities than any previous Mars rover. *Curiosity*’s assignment: assess whether the landing area has ever had or still has environmental conditions favorable to microbial life and for preserving clues in the rocks about past habitable conditions.

In the months since landing, the scientists and engineers operating the spacecraft and planning its mission have thoroughly checked out all of *Curiosity*’s instruments and capabilities. Among the highlights:

- All 17 of the onboard cameras are working perfectly! These have already returned nearly 60,000 images, including many full-color panoramic views of the surrounding terrain. One very tantalizing view is toward Mount Sharp, the 18,000-foot-high mountain of layered sedimentary rocks that will soon become *Curiosity*’s primary target. The microscope camera, perched on the end of the robotic arm, has captured many close-up views of the surface, as well as spectacular “self portraits” of the rover itself. It also appears that the rover has discovered an ancient streambed near its landing site, leading to the conclusion that liquid water once flowed across this region of Mars.
- The ChemCam has already “zapped” the surface thousands of times with its high-powered laser, vaporizing the target spots and allowing the instrument to remotely determine the sample’s composition without ever touching the surface.
- Using a “percussion drill” on its robotic arm, *Curiosity* has drilled into several rocks, and retrieved and analyzed several “powdered” samples. The initial results are very promising. The chemical signatures of an early “habitable” environment appear to have been detected!
- The Radiation Assessment Detector has determined that future human crews to Mars will need to be shielded from solar and cosmic radiation. This will have major implications for the possibility of human exploration of Mars.



Curiosity recently began its trek toward the base of Mount Sharp, and will stop to examine many “targets of opportunity” along the way. Once at Mount Sharp, the rover will slowly begin driving up the lower slopes, sampling layer upon layer of rocks as it ascends the mountain. Much like paging through a book, *Curiosity* will allow us to “read” about past epochs on Mars, and slowly piece together the history of the Red Planet.



FIND IT @ DMNS.ORG

Dr. Steve Lee is curator of planetary science. Find out more about his research @ www.dmns.org/science/museum-scientists/steven-lee.

Dr. Lee will present an anniversary update on *Curiosity* on Monday, August 5. Find out more @ www.dmns.org/afterhours.

Find an interactive “gigapixel” view of *Curiosity* @ www.360cities.net/image/mars-gigapixel-panorama-curiosity-solar-days-136-149, and a rover’s-eye view of *Curiosity*’s landing @ <http://mars.jpl.nasa.gov/msl/multimedia/videos/index.cfm?v=81>.

SAMPLING OF EVENTS AUGUST–DECEMBER 2013

AUGUST

- 5 After Hours: Curiosity Rover Update
- 8 New Members Night
- 11 SCFD Community Free Day
- 15 Science Lounge: Science on the Rocks
- 18 Members Appreciation Day
- 19 SCFD Community Free Day
- 20 After Hours: Film From the Archives: Hawaiian Album
- 22 After Hours: Life After the Dodo: Discovering Mauritius

SEPTEMBER

- 8 SCFD Community Free Day
- 10 After Hours: De-extinction!
- 12 Bird Walk: Chico Basin Ranch
- 15 Members Appreciation Day
- 17 After Hours: A Conversation with Buzz Aldrin
- 19 Science Lounge: Where in the World
- 24 After Hours: Africa Revisited
- 26 After Hours: Bring Back the Pollinators
- 28 Travel Opportunity: Natural Wonders of the Colorado Plateau

OCTOBER

- 3 After Hours: North American Grassland Grouse
- 3 Field Trip: Elk Bugling
- 6 SCFD Community Free Day
- 10 Members-Only Preview: MythBusters
- 12 Astronomy Day
- 15 After Hours: Live from Peru
- 16 Members-Only Premiere: MythBusters
- 17 Science Lounge: Unnatural History
- 22 After Hours: Get to Know the Crow
- 23 Giving Club Members: Behind-the-Scenes Night*
- 24 Members-Only Premiere: MythBusters (ages 21+)
- 25 After Hours: Live Bats! (ages 21+)
- 26 Family Program: Live Bats!
- 29 After Hours: Who Owns the Past?

NOVEMBER

- 8 Young Professionals: After Dark Soiree*
- 15-17 Members Appreciation Holiday Weekend
- 19 New Members Night
- 20 After Hours: Living Dinosaurs
- 21 Science Lounge

DECEMBER

- 9 SCFD Community Free Day
- 25 Museum closed

Dates are subject to change. Confirm dates at www.dmns.org or 303.370.6000 (daily, 9–5).

*Join the Giving Club, which includes Young Professionals levels, and gain even more VIP access to the Museum. For information, call Membership at 303.370.6306 (daily, 9–5).

EXCLUSIVE BENEFITS FOR MEMBERS!

NEW! MEMBERS EXPRESS LANE

On your next visit to the Museum, look for a new and improved Members Express Lane just for members! Quickly renew your membership, purchase tickets, and take care of all of your membership needs. Enter through the doors marked Members Entrance and the express lane will be just to your right. We look forward to seeing you!

MEMBERS APPRECIATION DAYS

Sunday, August 18

Sunday, September 15

Members, we appreciate your support!

Please enjoy these special rewards just for you.*

- Save 20% in the Museum Shop
- Save 20% in the T-Rex Cafe
- Save 50% on IMAX 3D and Planetarium tickets
- Save 10% on gift memberships

PACK YOUR MEMBERSHIP CARD

Use your members benefits at 290 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. Find out more @ www.astc.org/members/passlist.htm.

Questions about membership or to share your e-mail address: 303.370.6306 (daily, 9–5)
members@dmns.org
www.dmns.org/members

THANK YOU FOR YOUR MEMBERSHIP SUPPORT!

*Special offers valid in person only on August 18 and September 15, 2013. Cannot be redeemed over the phone or online. Extra 10% discount in shop does not apply to DVDs, CDs, and books.

A CONVERSATION WITH BUZZ ALDRIN

**Members tickets on sale beginning July 31,
two weeks before the general public!**

Legendary astronaut Buzz Aldrin was the second person to set foot on the moon during the infamous Apollo 11 landing. Aldrin's passion for space exploration has never waned, and today he's making a thoughtful case for sending humans to the Red Planet by 2035. During this special evening, in conversation with space journalist Leonard David, Aldrin will share his uniquely personal vision for future exploration. The two men are coauthors of *Mission to Mars: My Vision for Space Exploration*. Following the presentation, Aldrin will sign copies of his new book.

Tuesday, September 17
4:30 p.m., Ricketson Auditorium
7 p.m., Phipps IMAX Theater
\$15 member, \$18 nonmember
book sale & signing

Please note: Mr. Aldrin will only autograph the book *Mission to Mars*; no personal inscriptions and no memorabilia. He will not be available to pose for photographs.

Reservations required beginning July 31 @ 303.370.6000 (daily, 9–5) or www.dmns.org/afterhours. Tickets go on sale to the general public on August 14.



Buzz Aldrin on the moon on July 21, 1969.