Rose Center for Earth and Space Celebrates 10 Years

Members Walk on the Wild Side

Inside the Museum’s Fossil Prep Lab
With this issue, we are pleased to launch a new, completely re-designed Rotunda, which more fully reflects the dynamic, inspiring, and cutting-edge nature of the Museum’s work in science, education, and exhibition today. We hope it will be an appealing and effective source of information about the Museum for our closest friends and most engaged audience, our Members.

The “renovation” of Rotunda is not the only change you’ll notice at the Museum this summer. Scaffolding has gone up along the Central Park West façade and inside the Roosevelt Rotunda, signaling a major restoration of the Museum’s “front door” together with a refreshed presentation of Teddy Roosevelt’s legacy. The Museum turns to its main entrance following the restoration of the 77th Street castle façade last year and the construction of the Frederick Phineas and Sandra Priest Rose Center in 2000. Fittingly, the Rose Center commemorates its 10th anniversary this year—stay tuned for information about a fall celebration of the Rose Center Anniversary!

With ongoing efforts to improve the Museum’s facilities to serve our audiences, record-breaking attendance, and research and education programs that are aligned with some of the most pressing and promising issues of our time—from climate change to the crisis in science education, from cultural understanding to human health—it seems only fitting that the new Rotunda should mirror the Museum’s expanding role in the 21st century. I hope you enjoy this first issue and accept my continued thanks for your support and involvement. You, our Members, help provide the very foundation upon which the Museum’s work is built. I hope you take pride, as I do, in being part of this great institution and sharing in the depth of learning and inspiration that it offers.
Marking 10 Years of the Rose Center for Earth and Space

Celebrations, Plus Tune-Ups For Decade’s Wear and Tear

It seems like only yesterday that the Frederick Phineas and Sandra Priest Rose Center for Earth and Space opened its doors to the public, increasing the Museum's footprint by 25 percent and establishing a premier center for learning about astronomy, astrophysics, and Earth science. The Museum is commemorating this most ambitious project in its history with a spectacular year-long celebration to mark the Rose Center’s 10th anniversary and the 75th anniversary of the opening of the original Hayden Planetarium.

More than 30 million visitors have stepped inside this “cosmic cathedral,” as the Rose Center was described by its architect, James Stewart Polshek, since it opened in February 2000. Hundreds of thousands more will participate in a whirlwind year of commemorative events that include a star-themed sleepover, screenings of four Space Shows, and lectures by Museum scientists, culminating in a day of science programs, family-friendly events, and special presentations on October 10, or 10/10/10.

Plans to usher the Rose Center for Earth and Space into its second decade also include a round of upgrades to many of the exhibits and signage on display. Many are already underway: video screens in the Dorothy and Lewis B. Cullman Hall of the Universe will be replaced with the latest liquid crystal display (LCD) technology, and interactive touch-screen kiosks in the David S. and Ruth L. Gottesman Hall of Planet Earth are being updated. Major overhauls still to come include a complete renovation of the Black Hole Theater in the Cullman Hall of the Universe, a rebuilt AstroBulletin refitted with next generation MicroTile LCDs to create a virtually seamless digital screen, and an updated Big Bang presentation in the lower half of the Hayden Sphere with new imagery and narration.

For additional details about the Rose Center and Hayden Planetarium Anniversary Year events, including 10/10/10, visit amnh.org or pick up the Museum Calendar.

President Futter Goes to Washington

Ellen V. Futter, President of the American Museum of Natural History, represented the “informal science education” sector during a Congressional hearing on March 4 in Washington, DC on science education in our nation's schools. Speaking before the U.S. House of Representatives Committee on Science and Technology, she testified that it is essential that the federal government continue to support and fund museums, zoos, botanical gardens, and other science-related cultural institutions as “powerful catalysts” and key players in reforming K-12 science, technology, engineering, and math (or STEM) education.

“Communities across the country have access to an array of science-based institutions,” said Futter. “Some large, some small, some local, some regional—nearly all housing resources and expertise to help schools improve science education while also advancing the instincts for inquiry and discovery that are precisely what drive innovation and will fuel our country’s global competitiveness.”

Futter said that effective partnerships should be fostered between schools and science-based institutions by making both eligible for federal funding and grants and by explicitly recognizing the role of museums, including in the upcoming reauthorization of the America COMPETES Act, for which the committee was hearing testimony.

She also specifically mentioned several Museum programs, including its successful leadership role in the Urban Advantage Middle School Science Initiative in New York City, as national models for public-private partnerships that boost science literacy.

To read Ellen Futter’s full written testimony, visit the House Committee on Science and Technology website science.house.gov and search for “Futter.”
A corridor on the Museum’s first floor just off the Grand Gallery celebrates a relatively unsung hero of polar exploration: the American Lincoln Ellsworth, who was also a Museum Trustee. His bust graces the back wall of the narrow hallway, while the display cases on either side contain artifacts detailing Ellsworth’s efforts to become the first man to fly across both polar continents, a feat he accomplished in 1935 when he crossed the Antarctic in his plane Polar Star.

Ten years earlier, Ellsworth’s first attempt to fly over the North Pole teamed him with Norwegian Roald Amundsen, whose earlier overland competition with British Royal Navy Captain Robert Falcon Scott to reach the South Pole is chronicled in the Museum’s new exhibition Race to the End of the Earth. Through the special relationship between Amundsen and Ellsworth, the Museum Library’s Memorabilia Collection came to possess items the Norwegian explorer carried with him on his quest to reach the South Pole, including a sledge, chronometer, binoculars, shotgun, and a tin cup from the ship Fram, which are featured in the new exhibition.

Partially underwritten by his father James, a wealthy coal mine owner and banker, Ellsworth’s 1925 attempt to fly over the North Pole failed. One year later, he and Amundsen succeeded in a dirigible, the Norge, built and piloted by Italian explorer Umberto Nobile. Ellsworth would go on to other expeditions, contributing geological and fossil specimens to the Museum’s collections in the process. He died in 1951 at age 71, but his legacy of support for the Museum and its mission continues to this day through an annual gift from The Lincoln Ellsworth Foundation.

For more information on Race to the End of the Earth, visit amnh.org/exhibitions/race.
A Bug’s Life:  
**Lethocerus cordofanus Mayr**

Anyone who has encountered a member of the giant water bug family Belostomatidae, perhaps while trying to enjoy a nice summer dip in a pool, will remember why these aquatic insects are commonly called toe-biters: they’re not shy about hunting prey, even the human kind.

The biggest insects of the order Hemiptera, a broad group that includes true bugs, cicadas, and hoppers, these aquatic predators are found in shallow streams or ponds across the world. When there’s no tasty-looking toe nearby, they generally feed on snails, tadpoles, frogs, small fish, and even small birds, but they don’t actually bite: like all true bugs, they lack chewing mouthparts. Instead, their method of dining involves grabbing prey with their forelimbs, or raptorial forelegs, and injecting it with a powerful protein-digesting enzyme, which liquefies tissue by breaking down proteins. Once the prey turns to mush, water bugs feed by sucking the liquefied remains through a proboscis. If that sounds agonizing, it is. Water bug “bites” inflict pain on a par with the top-ranked insects on the Schmidt Sting Pain Index, a four-point scale created by entomologist Justin O. Schmidt to compare the stings of the order Hymenoptera, which includes bees, wasps, and ants. But though fairly painful, this sting is not actually dangerous to humans.

The water bugs’ other nickname—electric light bugs—comes from their attraction to light. Though they are clumsy fliers, water bugs do take to the air when seeking out new streams and rely on surface light bouncing off water to find their way. When humans bring electric lights to new areas that include water bug habitats, the two species inevitably collide.

Species of Belostomatidae occur worldwide but this particular specimen from the Museum’s Department of Entomology, a male *Lethocerus cordofanus Mayr*, was collected in 1911 in Morogoro, Tanzania. Though nearly a century old, like most insects, its hard body preserves well without any special treatment. It’s one of approximately 24 million specimens housed in the Museum’s Division of Invertebrate Zoology.

For more information on this collection, visit research.amnh.org/iz.
Two decades ago, a chunk of sand containing a nearly perfect 80-million-year-old lizard fossil—just pulled loose from the red desert floor and resting on the hood of a Jeep—exploded into dust when touched by a member of the Museum’s annual summer expedition to the Gobi desert. A preparator knows why: paleontology depends on glue.

“Some of the fossils from Ukhaa Tolgod, this massive dinosaur graveyard found in 1993, survive only because they are so tightly packed in sand,” says Amy Davidson, one of the Museum’s senior fossil preparators, who happened to be on that expedition. In a cavernous room perched over several stories of meticulously labeled fossils, she darts to a beautifully fragile and nearly complete dinosaur skull.

“This fossil was also turning into crumbs,” she continues. “We need to know our adhesives. I stabilized the porous bone and sandy matrix (any material in which fossils are embedded) with just the right strength and solubility to be able to sculpt out the fossil, just like a magician pulls a tablecloth from under the table setting.”

Last year, this delicate carnivorous cousin to *Tyrannosaurus rex* was described and named *Alioramus altai*.

Fossil preparation requires an uncommon degree of adaptability and patience. Museum preparators bring to the task diverse sets of skills from such backgrounds as art, paleontology, and archaeology. They generally learn their craft on the job, drawing from related fields such as object conservation to adapt modern glues, solvents, and other archival materials to stabilize fragile areas or repair damage.

But the basic approach remains the same. Davidson, for example, removes her frameless glasses to face a fossil through her microscope, resting her wrists on a black velvet sandbag, securing a fine needle between her thumb and index finger, and using her third and fourth fingers to lightly touch the specimen. She moves almost imperceptibly, for minutes on end, carefully excavating a jaw from the soft sand. At the ready, laid out on a cutting board, are her preferred tools of the trade: brushes and droppers for dispensing glue, needles of different sizes and shapes for excavating, an air pedal for removing scraps of matrix, and glass jars of carefully labeled adhesives.

In another part of the lab, the newest preparator, Justy Alicea, sits similarly immobile. A black curve of a tattoo peeks above his crew-neck shirt, and headphones help him block out the
distraction of visitors and scientists shifting around him. Alicea’s workbench is lined with projects and paraphernalia—a detailed schematic plan for liberating a Velociraptor’s jumble of limb bones to reconstruct its skeleton, the upper jaw of a duck-billed dinosaur encased in mudstone that had been partially prepared in 1913, dental drills and glues, and an original scientific illustration from 1951 that came with his lab space. He points to his proudest achievement—a delicate Protoceratops skull with a frill the width of cardstock and internal flying buttresses built of excess matrix and glue. Although the matrix was “falling off the bone,” Alicea says he stabilized it to uncover detail like the new teeth awaiting eruption in the jaw’s resorption pits.

While some Museum paleontologists head to the Gobi each year, another group of scientists have been traversing the high Andes in search of mammals that evolved in isolation in South America’s ancient forests and on the world’s first grasslands. Now under Alicea’s microscope is what he calls “a whole class of difficult”—a Chilean mammal entombed in volcanic ash that has compacted into something that requires carbide needles on airscribes, or pneumatic drills, to remove. And while the volcanic layers make radiometric dating feasible, the removal of fossils is a painstaking process that Alicea is learning and one in which preparator Ana Balcarcel is already an expert. Under Balcarcel’s microscope is a row of high-cusped teeth no taller than a half centimeter. She is exposing the teeth out of a dark gray slab of rock where they have been entombed for more than 30 million years, working in short intervals because the amount of silica in the matrix’s dust requires removal with a steady vacuum that chills her nearly static hands. Her first step in preparing this fossil—the upper jaw of a diamond-bladed rock saw. She estimates that she has spent about two months of often intense concentration using different pneumatic drills and other tools that withstand the pressure of volcanic rock.

“The tools vary,” says Balcarcel, sitting cross-legged and zipping her yin-yang pendant along its chain. “Each specimen is different, and you have to get to know each one—how soft, how well preserved.” Even so, the inevitable break occurs. Tooth enamel is often so thin and brittle that the needle’s pressure chips it. At that point, matrix removal stops so that she can repair the break, often gluing with compounds that don’t set immediately so that she can position the minute chip perfectly.

“I used to be very stressed preparing a fossil—it took a long time to get comfortable with breakage,” Balcarcel continues. “But part of our job is learning how to put things back together, and my time under the microscope has changed from stressful to almost zen-like relaxation.”

For more information about the Division of Paleontology, visit research.amnh.org/paleontology.
Skeleton Crew

Fossil Hunting with Barnum Brown

Back in New York [after a successful expedition that unearthed the most complete specimen to date], [Museum President Henry] Osborn and [Barnum] Brown contemplated how best to mount the two most complete specimens of *Tyrannosaurus*, AMNH 973 and 5027, for exhibition. Osborn instructed a departmental artist, E. S. Christman, to sculpt a scale model of every bone in the animal’s skeleton connected with flexible joints, to facilitate the evaluation of various possible poses and postures. Raymond L. Ditmars, the Bronx Zoo’s curator of reptiles, won the contest with his proposal for the poses. Brown set the scene thus: “It is early morning along the shores of a Cretaceous lake four million years ago.” (We now know, thanks to radiotopic dating techniques unavailable in Brown’s time, that 65 million years ago is more accurate.)

A herbivorous dinosaur *Trachodon* [a duckbill] venturing from the water for a breakfast of succulent vegetation has been caught and partly devoured by a giant flesh eating *Tyrannosaurus*. As this monster crouches over the carcass, busy dismembering it, another *Tyrannosaurus* is attracted to the scene. Approaching, it rises nearly to its full height to grapple the more fortunate hunter and dispute the prey. The crouching figure reluctantly stops eating and accepts the challenge, partly rising to spring on its adversary. The psychological moment of tense inertia before the combat was chosen to best show positions of the limbs and bodies, as well as to picture an incident in the life history of these giant reptiles.

Unfortunately, the skeletons were too large to fit both in the existing exhibition hall, so in 1915 a single skeleton (AMNH 5027) was mounted in the now-famous erect or “Godzilla” posture, a portrayal that would wow visitors from around the world for the next eighty years and fire the curiosity of numerous future paleontologists.

Yet the perils surrounding these *Tyrannosaurus* specimens were not over. At the outbreak of World War II, the American Museum of Natural History sold the 902 skeleton to the Carnegie Museum in Pittsburgh for $7,000 (about $96,000 in today’s dollars). . . . Brown noted the sale in a memoir: . . . “Sold to Carnegie Museum in 194. . . .” Our crew did a spectacular job and today Brown’s skeleton stands ready to pounce on prey.


Q&A

**You write that Brown was “well-built” to become a great dinosaur collector. How so?**

**Lowell Dingus: Collecting dinosaurs requires a good deal of physical capability in terms of digging, lifting, and carrying large casts. Through his upbringing on the family farm in Kansas, he honed those physical abilities.**

**Mark Norell: He was well-adapted to harsh conditions in the field, and he was very much a resourceful pragmatist who always found a way to get the job accomplished. He was also well-organized and incredibly loyal to the institution where he worked.**

**What surprised you most during your research?**

**MN: To read his sparse accounts, you would think that his life, with a few exceptions, was fairly mundane. He seemed to downplay almost everything.**

**LD: I was struck when we renovated those halls with how many of the key specimens were his—not just *Tyrannosaurus rex*, but 66 others. And we still go back to many of the same field areas where he worked to answer the scientific questions raised by the specimens he found. So in those very real ways, his legacy still looms over all of us.**

Save the Date: See page 12 for an upcoming event with Dingus and Norell.
Programs and Events

July

Virtual Universe: The Explosive Universe with Jackie Faherty
HM070610, Tuesday, July 6 6:30 pm
$15 Members
Tour the Milky Way to observe where stars are born and die and see everything energetic in between.

Wild, Wild World: Live Penguins
EL071010A, 11 am–noon
EL071010B, 1–2 pm
Saturday, July 10
Members’ tickets are
$8 children; $10 adults
Join TV host Jarod Miller and live penguins to learn about animals that live in extreme environments.

Adventures in the Global Kitchen: Planet Barbecue
EL071410, Wednesday, July 14
6:30 pm
$25
Enter at 77th Street
“Master Griller” Steven Raichlen leads this talk and barbecue tasting.

Great Gull Island
M0077110, Thursday, July 15
8 am–6 pm
$120 (includes transportation by private coach and chartered boat)
Bring your lunch
Members only; limited to 25
Led by Museum ornithologist Helen Hays, watch hatching chicks, track nests, analyze colonies, and explore the battlements of an old fort.

Evening Bat Walks in Central Park
EW071610, Friday, July 16
9 am–5 pm
$95 (includes transportation by private coach)
Bring your lunch
Members only
Visit the Thimble Islands with Sidney Horenstein for a 45-minute narrated tour and a visit to Stony Creek Classic Granite Quarry with the foreman.

Evening Walk to the Little Red Lighthouse
MW072010, Tuesday, July 20
MW083110, Tuesday, August 31
6:30–8 pm
$30
Members only
Join Sidney Horenstein for a stroll to this Manhattan landmark through Fort Washington Park.

Geology and History of the Thimble Islands
M007210, Wednesday, July 21
9 am–5 pm
$95 (includes transportation by private coach)
Bring your lunch
Members only
Visit the Thimble Islands with Sidney Horenstein for a 45-minute narrated tour and a visit to Stony Creek Classic Granite Quarry with the foreman.

Science Sense Tour: Rose Center for Earth and Space
Saturday, July 24
10 am
Free with Museum admission
Registration required; call 212-313-7565
Explore astrophysics and geology on this program for blind or partially sighted visitors.

The Oddball Innermost Planet: Exploring Mercury with the MESSENGER Spacecraft
Monday, July 26
7 pm
Free with Museum admission
Registration required; call 212-769-5200
Join Sean Solomon, Principal Investigator of the MESSENGER mission, as he discusses this innermost planet.

Exhibitions and Attractions

Admission is by timed entry only.

Race to the End of the Earth
Through Sunday, August 15
Free for Members
This exhibition recounts one of the most stirring tales of Antarctic exploration: the race to reach the South Pole in 1911–1912.

Traveling the Silk Road: Ancient Pathway to the Modern World
Through Sunday, August 15
Free for Members
Step 1,000 years back in time to experience the sights, sounds, and stories of the greatest trading route in history.

Lizards & Snakes: Alive!
Through Monday, September 6
Members’ tickets are $12 adults; $7.50 children
Meet more than 60 live lizards and snakes from five continents and see their remarkable adaptations.

IMAX Movie
Hubble
Opens Saturday, July 3
Members’ tickets are $12 adults; $7.50 children
This film lets viewers blast off alongside the Atlantis STS-125 crew, witness challenging spacewalks, and experience Hubble’s striking images of the universe.
AUGUST

Virtual Universe: Tiny Objects in the Universe with Emily Rice

HM080310, Tuesday, August 3
6:30 pm
$13.50 Members
This program in the Hayden Planetarium Space Theater will showcase some of the most miniscule objects in the local universe.

What Dinosaurs Ate in Central Park

MW080410, Wednesday, August 4
6–7:30 pm
$10 per adult with child
Recommended for kids ages 10 and up
This walking tour in Central Park will focus on the diet of herbivore dinosaurs and the evolution of plants.

Last Look at the Silk Road

Thursday, August 5
Wednesday, August 11
6:30–8 pm
Members only
Free; reservation required
Join Museum docent Eileen Flood for a special tour of Traveling the Silk Road, which closes on August 15.

Wildflowers of Westchester

MO080710, Saturday, August 7
9 am–6 pm
$95 (includes transportation by private coach)
Members only, limited to 36
Explore an 854-acre nature preserve and take an intimate guided tour of Wildflower Island.

Evening Walk in Fort Tryon Park

MW081710, Tuesday, August 17
6:30–8 pm
$30
Members only
Join Sidney Horenstein for an evening stroll through one of the last remaining natural woodlands in Manhattan.

Fun with Fossils

MO082110, Saturday, August 21
9 am–4 pm
$85 (includes transportation by private coach)
Members only
Fossil Collections Manager, Carl Mehling leads this expedition to Big Brook, New Jersey, where plentiful fossils and diverse fauna can be found.

Science Sense Tour: Dioramas

Sunday, August 22
10 am
Free with Museum admission
Registration required; call 212-313-7565
Learn about the art of creating Museum dioramas on this program for blind or partially sighted visitors.

Geology of Inwood Hill Park

MW081910, Thursday, August 19
6:30–8 pm
$30
Members only
Join Sidney Horenstein on an evening stroll through one of the last remaining natural woodlands in Manhattan.

A Day of Geology and Beauty of Northern Manhattan: Inwood Hill and Fort Tryon

MW082510A
Wednesday, August 25
Inwood Hill Park
10:30 am–noon
MW082510B
Fort Tryon Park
1–2:30 pm
$30 each or $60 for both
Members only
Walk along the Hudson River with geologist Sidney Horenstein to discover Inwood Hill and Fort Tryon Parks.

JUNE

Journey to the Stars

Members’ tickets are $12 adults, $7.50 children
Journey to the Stars launches visitors through time and space to experience the life and death of the stars in our night sky.

Credits

Race to the End of the Earth is organized by the American Museum of Natural History, New York (www.amnh.org), in collaboration with the Museum des Confluences, Lyon, France and Royal BC Museum, Victoria, British Columbia, Canada.

Generous support for Race to the End of the Earth has been provided by the Eileen P. Bernard Exhibition Fund, Marshall P. and Rachael Levine, and Drs. Harlan B. and Natasha Levine.

Additional support has been provided by the British Consulate-General New York and the National Science Foundation under Grant No. ANT 0636639.

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 National Museum of Australia, Canberra, Australia and Musée des Confl uences, Lyon, France amnh.org), in collaboration with Azienda Speciale Palaexpo, Roma, Italy and Royal BC Museum, Victoria, Canada.

Additional support has been provided by Mary and David Solomon.

Art Exhibitions Australia; and the National Museum of Natural Science, Taichung, Taiwan and United Daily News, Taipei, Taiwan.

The Presenting Sponsor of Traveling the Silk Road is MetLife Foundation.

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Additional support has been provided by Mary and David Solomon.

The Silk Road Project residency is generously supported by Rosalind P. Walter.

Hayden Planetarium Space Show

JOURNEY TO THE STARS

Members’ tickets are $12 adults, $7.50 children
Journey to the Stars launches visitors through time and space to experience the life and death of the stars in our night sky.

Celestial Highlights:

Surfing the Galactic Plane with Ted Williams

HM080110, Tuesday, August 31
6:30 pm
$13.50 Members
Recommended for kids ages 5 and up
Learn how to visualize the galactic, ecliptic, and equatorial planes in the night sky to locate constellations.

SEPTEMBER

Behind the Scenes in Paleontology

MB090810A, 6:30
MB090810B
MB090810C
Wednesday, September 8
$35
Members only, kids ages 7 and up
Take a tour with Fossil Collections Manager Carl Mehling and other scientists to learn how fossils are prepared.

Birding in Prospect Park

MO091210, Sunday, September 12
10 am–2 pm
$35
Members only
Join ornithologist Paul Sweet to explore Prospect Park’s birding hot spots, including Lookout Hill, the Peninsula, Lullwater, Pagoda Pond, and more.
An Evening with Ross MacPhee

ML092110, Tuesday, September 21
7–8:30 pm
$12
Members only
Curator Ross MacPhee, who curated the exhibition The Race to the End of the Earth, will speak about his book Race to the End: Amundsen, Scott, and the Attainment of the South Pole and about his research in Antarctica. Book signing will follow.

Geology of Northern Central Park

Sunday, September 26
MW092610A
10 am–noon
$20
Members only
Recommended for kids ages 7 and up.
Geologist Sidney Horenstein will focus on geological features of Central Park.

Barnum Brown: The Man Who Discovered Tyrannosaurus Rex: An Evening with Mark Norell and Lowell Dingus

ML102110, Thursday, October 21
7–8:30 pm
Free for Members
Register early, limited space
Division of Paleontology Chair Mark Norell and Research Associate Lowell Dingus will discuss their new book about the famous fossil hunter. Books purchased at amnhshop.com will be available for pick-up; signing will follow.

Garlic Festival and Kaaterskill Falls

M092510, Saturday, September 25
8:30 am–6:30 pm
$90 (Includes transportation by private coach)
Bring lunch or purchase at festival
Members only
Museum scientist Paul Nascimbene leads this tour to the Hudson Valley Garlic Festival and Kaaterskill Falls, the highest waterfall in New York State.

Birding at the Barrier Beaches

M010210, Saturday, October 2
9 am–5 pm
$90 (Includes transportation by private coach)
Bring your lunch; recommended for kids ages 7 and up
Members only
Don’t forget your binoculars to spot a variety of raptors, waterbirds, and songbirds.

Birding at the Barrier Beaches

M010310, Wednesday, October 13
6–8 pm
$30 adults, $15 kids
Members only
Celebrate the 10th anniversary of the Rose Center with four Space Shows, screened in one evening.

Plan Ahead

Montauk Winter Wildlife Weekend

M0020511, Saturday, February 5–Sunday, February 6
$300 per person double occupancy; $400 single occupancy
Includes transportation by private coach, one-night stay in the Born Free Motel, and dinner on Saturday night.
Register early
Join ornithologist Paul Sweet on this two-day birding and wildlife expedition to look for sea ducks, auks, seals, and more.

Credits

Public programs are made possible, in part, by the Rita and Frits Markus Fund for the Public Understanding of Science.

Virtual Universe and Celestial Highlights programs are supported, in part, by the Schaffner Family.

The Oddball Innermost Planet is the Barringer Invitational Lecture of the 73rd Annual Meeting of the Meteoritical Society, held in New York from July 26 to July 30.

Lizards & Snakes: Alive! is organized by the American Museum of Natural History, New York (www.amnh.org), in collaboration with the Fernbank Museum of Natural History, Atlanta, and the San Diego Natural History Museum, with appreciation to Clyde Peeling’s Reptiland.

Journey to the Stars was produced by the American Museum of Natural History, the Rose Center for Earth and Space, and the Hayden Planetarium.

Journey to the Stars was developed by the American Museum of Natural History, with the major support and partnership of NASA, Science Mission Directorate, Heliophysics Division.

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And proudly sponsored by Accenture.

Supercomputing resources provided by The Texas Advanced Computing Center (TACC) at The University of Texas at Austin, through the TeraGrid, a project of the National Science Foundation.
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<td>11</td>
<td>Wednesday</td>
<td>Last Look at the Silk Road</td>
</tr>
<tr>
<td>15</td>
<td>Sunday</td>
<td>Traveling the Silk Road closes</td>
</tr>
<tr>
<td>17</td>
<td>Tuesday</td>
<td>Evening Walk in Fort Tryon Park</td>
</tr>
<tr>
<td>19</td>
<td>Thursday</td>
<td>Geology of Inwood Hill Park</td>
</tr>
<tr>
<td>20</td>
<td>Friday</td>
<td>A Night at the Museum Sleepover</td>
</tr>
<tr>
<td>22</td>
<td>Sunday</td>
<td>Science Sense Tour: Dioramas</td>
</tr>
<tr>
<td>25</td>
<td>Wednesday</td>
<td>Inwood Hill and Fort Tryon Parks</td>
</tr>
<tr>
<td>31</td>
<td>Tuesday</td>
<td>Celestial Highlights: Surfing the Galactic Plane</td>
</tr>
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### September and Beyond

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Event</th>
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<tbody>
<tr>
<td>06</td>
<td>Monday</td>
<td>Lizards &amp; Snakes: Alive! closes</td>
</tr>
<tr>
<td>08</td>
<td>Wednesday</td>
<td>Behind the Scenes in Paleontology</td>
</tr>
<tr>
<td>12</td>
<td>Sunday</td>
<td>Birding in Prospect Park</td>
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<tr>
<td>21</td>
<td>Tuesday</td>
<td>An Evening with Ross MacPhee</td>
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<tr>
<td>24</td>
<td>Friday</td>
<td>A Night at the Museum Sleepover</td>
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<tr>
<td>25</td>
<td>Saturday</td>
<td>Garlic Festival and Kaaterskill Falls</td>
</tr>
<tr>
<td>26</td>
<td>Sunday</td>
<td>Geology of Northern Central Park</td>
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### October

<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>21</td>
<td>Thursday</td>
<td>An Evening with Mark Norell and Lowell Dingus</td>
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### February

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>5–6</td>
<td>Saturday and Sunday</td>
<td>Montauk Winter Wildlife Weekend</td>
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</table>
Hayden Sphere: Out of This World

Imposing by day and luminous by night, the Hayden Sphere inside its 120-foot-high, clear glass enclosure at the Frederick Phineas and Sandra Priest Rose Center has lived up in every way to its predicted status as an architectural icon when it was unveiled 10 years ago. But equally fulfilled has been the promise of education and enchantment offered within—the Big Bang simulation, dazzling space projections in the Dome, and lastly, the ever-popular Space Shows.

Four distinct Space Shows, created by the Museum with private and public support and in collaboration with the National Aeronautics and Space Administration (NASA) and various scientific institutions around the world, have been shown since the Rose Center for Earth and Space opened in 2000: Passport to the Universe, narrated by Tom Hanks; The Search for Life: Are We Alone?, narrated by Harrison Ford; Cosmic Collisions, narrated by Robert Redford; and the latest, Journey to the Stars, narrated by Whoopi Goldberg and described by Dennis Overbye of The New York Times as “the most beautiful planetarium show I have ever seen.”

Save the date: Members can see all four Space Shows in one evening to celebrate the 10th anniversary of the opening of the Rose Center for Earth and Space. See page 12.

On the Webb

A wafer-thin titanium disk—conceived in the labs on the sixth floor of the Museum’s Rose Center for Earth and Space—will launch into space in 2014 with the James Webb Space Telescope. This disk, known as a non-redundant mask, will dramatically improve the telescope’s resolution for fainter objects by filtering light coming from very bright objects.

“This technique was invented for radio astronomy in the late 1950s and revised for ground-based astronomy in the late 1990s,” says Anand Sivaramakrishnan, chief instrumentation scientist in the Museum’s Department of Astrophysics. “But this is the first time it will be used in space.”

Sivaramakrishnan and his team designed non-redundant masks for ground-based telescopes like that used by Project 1640 on the 200-inch telescope at Palomar. On the ground, the mask enables the imaging of objects about 100 times fainter than a bright star and was recently instrumental in discovering a new star in the Big Dipper. But in space, this same tool should be able to detect objects 10,000 times fainter than the nearby bright object or star, helping the Hubble’s successor directly image extrasolar planets.

NASA Administrator Charles Bolden at the Museum

1. Director of the Hayden Planetarium Neil deGrasse Tyson toured the Rose Center for Earth and Space with NASA Administrator Charles Bolden, a former astronaut.
2. During his visit, Bolden spoke to a group of students in the Hayden Planetarium Space Theater.
3. Tyson and Bolden circled the Scales of the Universe, a 400-foot-long walkway that illustrates the vast range of size in the universe.
brought people into contact with one another, they borrowed and adapted each other’s ideas and skills. For example, as goods traveled, so did the ways they were made. Key among these technologies was silk-making, or sericulture, which had already been practiced in China for thousands of years and was a zealously guarded secret. Other technologies included glassmaking, an art developed in the Mediterranean; papermaking, a Chinese invention that spread the written word; and metalworking, which originated in the central Middle East. Many contemporary inventions, like grape winemaking and paper money, are still in use today.

Artifacts found along the Silk Road show that as they did business, travelers also exchanged music, cuisines, and beliefs. Pilgrims and merchants carried their religions (including Buddhism, Islam, Christianity, Judaism, and Zoroastrianism) to distant lands. Scientific knowledge of subjects such as astronomy and mathematics also made its way along trade routes, as did visual styles and motifs. These exchanges profoundly affected many of the civilizations that came into contact with each other. Crossing rugged mountains and scorching deserts, braving hunger, sandstorms and robbers, the camel caravans of the Silk Road were the harbingers of globalization. The first international highway, the Silk Road helped lay foundations for the modern world.

For Kids: Sounds of the Silk Road

All along the Silk Road, from desert inns to grand palaces, travelers heard music playing. It was a way to share ideas and tell stories, like “The Battle in the Water”—an ancient Chinese folktale about a snake-spirit who marries a young man. In “Sounds of the Silk Road” (amnh.org/ology/silkroadmusic), an engaging interactive on the Museum’s OLogy site for kids, you can hear the song played on six traditional instruments from Xi’an, China. Musicians from east and west gathered in this Tang Dynasty capital, where rhythms and melodies blended over the centuries.

Explore the instruments: the pipa; moon lute; the two-stringed erhu and its bamboo-and-horsehair bow; the sheng, a wind instrument made of a circle of bamboo pipes that represent the folded wings of the mythical phoenix; drums; and cymbals. Click on each to hear the sound it makes and the role each plays in the song. Then use this ancient Chinese orchestra to compose your own Silk Road song. You can make changes as you go, and save and share the composition when you’re done.

Silk Road Surprises

There was no single “Silk Road.” It was a complicated network of trade routes.

- People often traveled at night to avoid scorching desert heat.
- It takes about 2,500 silkworms to produce one pound of silk, enough for one robe. The thread was so coveted that foreigners would unravel Chinese silks and reweave new garments.
- Merchants sometimes packed melons and other fruit in lead containers filled with snow and ice from the mountains before sending them along the Silk Road.
- Both one-humped and two-humped camels hauled goods along the Silk Road. Camel humps don’t store water. They store fat, which provides energy.

Credits

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 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.

The Presenting Sponsor of Traveling the Silk Road is MetLife Foundation.

Additional support has been provided by Mary and David Solomon.

The Silk Road Project residency is generously supported by Rosalind P. Walter.
More from Your Membership

Museum Members enjoy many valuable benefits, including one that begins at the door: express entry to avoid long lines on crowded days.

With free general admission, programs such as Global Weekends or Milstein Science Series for families are complimentary. Special exhibitions—such as Traveling the Silk Road: Ancient Pathway to the Modern World and Race to the End of the Earth—are also free for Members with timed tickets from any of the membership desks.

Many popular attractions and programs have special Members-only prices. Space Shows, IMAX films, and live-animal exhibitions such as Lizards & Snakes: Alive! are discounted to $12 for adults and $7.50 for children. For a family of four seeing a special exhibition and a Space Show without a membership, the total comes to $76. With a membership, they would pay $59, or nearly 50% less.

Members pay reduced admission to public lectures and Hayden Planetarium programs, as well as to the annual Margaret Mead Film & Video Festival. A Night at the Museum Sleepovers, for ages 7 to 13, are discounted for Members to $119 per person. Recently, popular children’s programs such as Wild, Wild World and Dr. Nebula began offering Members discounted prices of $10 for adults and $8 for children.

Other advantages include 10% discounts in Museum gift shops, with a 20% discount during Member Extra Discount Days in the fall. Members also receive a 15% discount in the Museum Food Court and cafés.

To receive the latest information about Museum programs and discounts, make sure you are receiving the monthly eNotes for Members. Simply send us an email from your preferred account to members@amnh.org with your name and membership number. The Museum does not trade or rent its Member email list.

Museum Food Court Earns Green Distinction

Going green has put the American Museum of Natural History in a league of its own. In 2009, the Museum became the only cultural institution in the U.S. with a 3-Star Certified Green Restaurant designation, a distinction awarded to the Museum’s food court by the Green Restaurant Association (GRA) for environmentally-responsible practices.

The Museum Food Court is now one of only 25 foodservice establishments in the U.S. at the 5-Star level, which requires restaurants to earn a minimum of 175 points within GRA’s certification program. No restaurant has earned the 4-Star status, the highest distinction in the program.

The Museum Food Court, which is managed by Restaurant Associates, earned points in seven environmental categories including water efficiency, waste reduction and recycling, and sustainable furnishings and building materials. In addition to a full-scale recycling program, the Museum Food Court’s environmentally responsible efforts include installing compact fluorescent lighting, sourcing local and organic foods, and using non-toxic cleaning products.

Members receive a 15% discount at the Museum Food Court and cafés.

Kids’ Birthdays at the Museum!

Linda Kaye’s Partymakers will throw an unforgettable birthday bash for kids ages four and up. Choose from Dinosaur Discoveries, Safari Adventure, Underwater Treasures, and Cosmic Blast-Off, which includes an option to see Journey to the Stars. Parties are an exclusive benefit for Contributor and higher-level Members. For more information, visit partymakers.com or call 212-288-7112.

Enter at 81st Street

During the renovation of the Central Park West façade and Roosevelt Rotunda, please use the Museum entrance on 81st Street.
Members on the Move

It is hours before the Museum will open and the sun is streaming across the towering Barosaurus in the Theodore Roosevelt Rotunda. Some 30 people in sweatpants and tees are doing shoulder rolls and arm stretches while Museum docent Kathleen Kinne explains the latest research on the prehistoric megalodon, or "big-toothed" shark, they will see upstairs. So begins another Walk on the Wild Side, an hour-long combination of exercise and education made possible by Jack and Susan Rudin.

“What better or more amazing way could there be to stimulate your mind and your body,” says Susan Rudin, “than a walk through a great museum accompanied by only guards and other race walkers?”

The program, once called Jurassic Gym by The New York Times, is a benefit for Contributor-level Members and above offered every Wednesday in January, February, and March. It is led by a professional trainer and includes a bracing one- to two-mile walk with stops for conditioning exercises throughout. Elevators are available for anyone who might have difficulty with the stairs. A Museum guard follows behind to direct stragglers. “I crack a sweat every now and then,” says guard Eli Torres.

The final cool-downs in the Rotunda allow the docent to share more information about science and the Museum, followed by a healthy breakfast buffet in the Akeley Hall of African Mammals.

“What better or more amazing way could there be to stimulate your mind and your body?”

—Susan Rudin

“I go to the gym a couple of days, but this is different, very special,” says Stephen Rosen, a career-change consultant for doctors, lawyers, and other professionals who joined the group recently, inspired by the participation of his wife and business partner, Celia Paul, who adds, “It’s a wonderful use of the Museum. And it’s fun.”

“Being here when it’s not open to the public has a kind of charm,” says Anita Rich, a retired teacher who has been in the program for more than a decade. “It’s a New York experience!”

A Tribute to Special Supporters

Camille and Michael Pantuliano

Camille and Michael Pantuliano have been volunteers at the Museum for more than 10 years. They recently shared their reasons for making a gift to the Museum of the most precious commodity of all—their time: “The Museum is very important to us. We are volunteer explainers and tour guides because we are fascinated by the scientific subject matter, love meeting visitors from all over the world, and enjoy the friendship of many other volunteers. It’s also fun. And it contributes to one of the Museum’s prime missions: to educate the public about science and to get youngsters interested in science. We care deeply about this.”

The Pantulianos recently funded a charitable gift annuity with the Museum. Although they are entitled to an income-tax charitable deduction and will receive payments that are partially tax-free for the rest of their lives, the Pantulianos say that they are not motivated by the tax benefits.

Instead, they say, “With science a key foundation for the technological innovations that create jobs in today’s world, the Museum has become an agent that promotes economic growth as well as scientific knowledge. We want to be part of that effort now and in the future.”

For more information about charitable gift annuities, call Planned Giving at 212-769-5119.
1. Children enjoy the Discovery Room during the Members Open House in March.
2. Members explore the video kiosks in the fossil halls during the Open House.
3. Members mingle in the Rose Center for Earth and Space at the April Stars Party.
4. A Member checks out a telescope on the Arthur Ross Terrace during the April Stars Party.
5. Two young Members watch Alka-Seltzer rockets during the April Stars Party.
6. Ornithologist Paul Sweet answers Members’ questions during the spring Open House.

Photos 1, 2, and 6 © AMNH/R. Mickens; 3, 4, and 5 © AMNH/C. Chesek
Save the Date!
Upcoming Events at the Museum

**OCTOBER**

10/10 Celebrate the 10th anniversary of the Rose Center for Earth and Space. The full day of events on 10/10/10 will include family-friendly activities, science programs, special presentations, and more! Free.

10/19 Join us for the 17th Annual Family Party, a chance for guests to take over the Museum’s halls while enjoying activities that include a dinosaur fossil dig, simulated space travel, demonstrations with live animals, and live performances. For more information and to purchase tickets to this event, visit amnh.org/familyparty.

**NOVEMBER**

11/11-11/14 The annual Margaret Mead Film & Video Festival, the longest-running showcase for international documentaries in the U.S., returns with an exciting slate of films. Members receive a discount on festival tickets.

Late November; date forthcoming. Be the first to see the exciting new exhibition Brain: The Inside Story at this after-hours Members-only preview. A reception in the Theodore Roosevelt Memorial Rotunda will follow.

11/22 The Origami Tree, a beloved holiday tradition, returns to the Museum decked with amazing paper creations. Free.

**DECEMBER**

12/12 The annual Holiday Party for Members is back at the Milstein Hall of Ocean Life with an afternoon of activities and live entertainment. Free and open for Family and higher-level Members only.
General Information

HOURS
Museum: Open daily, 10 am–5:45 pm; closed on Thanksgiving and Christmas.

ENTRANCES
During Museum hours, Members may enter at Central Park West at 79th Street (second floor), the Rose Center/81st Street, and through the subway (lower level).

RESTAURANTS
Museum Food Court, Café on One, Starlight Café, and Café on 4 offer Members a 15% discount. Hours are subject to change.

MUSEUM SHOPS
The Museum Shop, DinoStore, The Shop for Earth & Space, Cosmic Shop, Silk Road Shop, The Antarctic Shop, and amnhshop.com offer Members a 10% discount.

PHONE NUMBERS
Central Reservations 212-769-5200
Membership Office 212-769-5606
Museum Information 212-769-5100
Development 212-769-5151

TRANSPORTATION AND PARKING
Subway: (weekdays) or to 81st Street; to 79th Street, walk east to Museum
Bus: M7, M10, M11, or M104 to 79th Street; M79 to Central Park West
Parking Garage: Open daily, 8 am–11 pm; enter from West 81st Street. Members receive a discounted rate of $10 if entering after 4 pm. To receive this rate, you must show your membership card or event ticket when exiting the garage.

To celebrate the 10th anniversary of the opening of the Frederick Phineas and Sandra Priest Rose Center for Earth and Space and the 75th anniversary of the opening of the original Hayden Planetarium, the Museum will be hosting a day of science programs, family-friendly events, and special presentations on 10/10/10.