ROTUNDA

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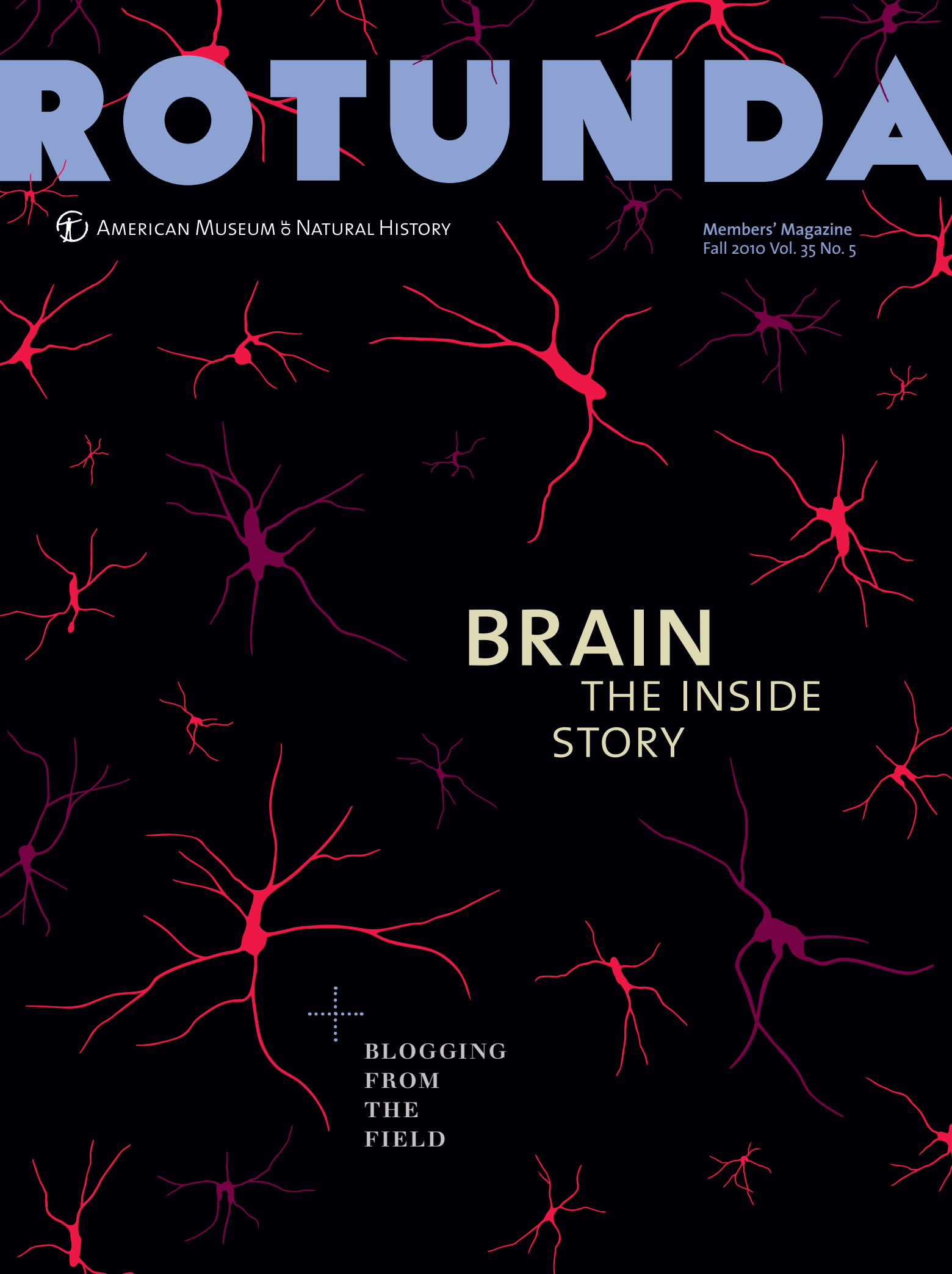

BRAIN
THE INSIDE STORY

BLOGGING FROM THE FIELD

From the President

Ellen V. Futter

Time marches on, and so do we. In fact, we're leading the way!

This year, the American Museum of Natural History commemorates the 10th anniversary of the Rose Center for Earth and Space, which remains the most cutting-edge public facility devoted to education about astrophysics and earth and planetary sciences in the world, with its state-of-the-art exhibits and Hayden Planetarium. But technology and science have changed a great deal since 2000, and so this year, the Rose Center is receiving a series of upgrades, including a spectacular new AstroBulletin and a new presentation of the Big Bang Theater. The Rose Center will be fully refreshed and ready for a spectacular 10th anniversary celebration on 10/10/10, when visitors will enjoy an extended day of events, programs, and celebrations.

And when you visit the Museum, you'll be able to participate in a truly unprecedented use of technology in a museum with the AMNH Explorer, an interactive, personal navigation system which assists visitors in the most basic yet often vexing aspect of visiting our Museum—finding your way around! Using an iPhone or iPod touch, Explorer will give you step-by-step directions to everything from the Blue Whale to the nearest restroom and allow you to create personalized tours and access information on exhibits. Visitors can bring their own device or borrow a Museum iPod touch to take advantage of this pioneering technology, which is the first such application of its kind in any museum.

I hope you will join us as the Rose Center marks a moment in its history even as we continue to advance the frontiers of science and improve the public understanding of science and culture through our many programs, including *Brain: The Inside Story*, which opens this fall.

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Through a Glass, Clearly

Before there were apps, PowerPoint presentations, or 35-mm slides, there were lantern slides. These photographic images–captured on glass and projected, magnified, and often hand-painted for color, onto a large screen–were used by curators, teachers, and other educators of the late 19th and early 20th century to illustrate their lectures.

This fall, the **34th Annual Margaret Mead Film & Video Festival**, which runs from Thursday, November 11 through Sunday, November 14, will include a rare treat: a special show of lantern slides from the Museum's collection and a panel discussion on the history of their use.

The American Museum of Natural History was once a major source of these educational visual aids, at one point housing a lending library of over 140,000 slides that were boxed into portable lectures and circulated to New York City schools with such titles as "Traveling in Eskimo Land," "Our Atlantic Coast Fisheries," "Birds That Hunt," "Pond Insects," and "The Lion, Tiger, and Elephant at Home."

"If you look at the titles on the boxes, you immediately get a picture of how they were used," says Museum Archivist Barbara Mathé, who will present a slide show and lead a discussion with fellow panelists Constance Areson Clark, a professor of the history of science, and media historian Alison Griffiths.

About 40,000 lantern slides remain in the Museum Library's Special Collections, including about 20,000 slides recently recovered from a Staten Island farmhouse where a former Museum employee had stored them for safekeeping.

Also this year, the Mead Festival will present a special series, in conjunction with the Museum's new exhibition *Brain: The Inside Story*, that includes the premiere of the documentary film *Plug and Pray*, an exploration of cutting-edge robot technology and the quest for artificial intelligence. In another special feature, documentarian, photographer, and musician John Cohen will offer a retrospective of his films, along with live musical performances and previously unseen archival footage from the Country Music Hall of Fame.

The Mead Festival is made possible with public funds from the New York State Council on the Arts, a state agency.

For more details and a full schedule, visit **amnh.org/mead**.

Archival photo © AMNH

The Museum at Your Fingertips

Have you downloaded AMNH Explorer—the groundbreaking free app for iPhone and iPod touch from the American Museum of Natural History—yet?

For more on AMNH Explorer, see page 18.

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Hope (Links) Dashed

The Wittelsbach-Graff Diamond and the Hope Diamond were long rumored to be two cuts from the extraordinary "French Blue" stone purchased by France's Sun King, Louis XIV. The blue gem, which disappeared after the French Revolution, eventually re-emerged in London as the property of Henry Philip Hope. Subsequent owners included Pierre Cartier and Harry Winston, who donated the gem to the Smithsonian in 1958. The link was finally disproved this year when the Smithsonian confirmed the two blue diamonds are distinct.

Tiffany Treasure Trove

Two decades after the institution opened to the public, Trustee J.P. Morgan helped the Museum purchase a collection of 382 American gems that gemologist George F. Kunz had selected for an exhibition by Tiffany & Co. at the 1889 Exposition Universelle in Paris. The first Tiffany-Morgan Collection of Gems was followed by another generous gift when Morgan supplied Kunz with the funds to assemble an even more impressive exhibit for the 1900 Exposition Universelle, which was then given to the Museum as the second Tiffany-Morgan Collection.

Morgan's Minerals

In 1901, Morgan saw an opportunity to scoop up a remarkable collection of minerals from Philadelphia manufacturer Clarence S. Bement for $100,000. More than than 12,000 specimens were transported to New York for the Museum via two railroad boxcars and formed the core of the Museum's mineral collection.

Don't-Miss Diamonds

The largest diamond in the Museum's collection is the 14-carat colorless Armstrong diamond, though visitors can also spot a bigger stone on display in the Morgan Hall of Gems. The 82.06-carat black diamond, known as the Isabelle W.A., has been on loan to the Museum and exhibited for the last 15 years.

A Glittering Gala

Is there a more natural pairing than diamonds and black-tie affairs? This year, Graff Diamonds is proud to sponsor the Museum Gala, an annual benefit that supports the Museum's scientific and educational initiatives. The Museum Gala, a sensational evening featuring live entertainment and an auction of priceless Museum experiences, will be held on November 18.

Storied Sparkler: The Wittelsbach-Graff Diamond

From its journey through the royal houses of Europe to a mysterious three-decade disappearance from the public eye, the Wittelsbach-Graff Diamond–an extraordinary 31.06-carat blue gem that goes on display in the Museum's Harry Frank Guggenheim Hall of Minerals this fall courtesy of Laurence Graff–has led a very colorful existence.

Mined in India, which also yielded the Hope Diamond, the Wittelsbach-Graff Diamond was once part of the dowry of the Spanish Infanta Margarita Téresa, the young princess famously depicted in Diego Velázquez's masterpiece Las Meninas. The blue diamond then passed through subsequent marriages the Wittlesbachs of the House of Bavaria in the 18th century. A century later, in the aftermath of the first World War, it was confiscated from the displaced royal family, landing on the auction block in London in 1931. Recorded as unsold, the stone seemingly vanished, resurfacing three decades later when Belgian jeweler Joseph Komkommer received a request to re-cut a large stone and recognized it as the historic blue diamond. By the time it came up for auction again in 2008 and was purchased by Laurence Graff, the gem had sustained significant damage that required repair to return it to its status as a flawless, fancy deep blue diamond. The re-cutting did not alter the gem's distinctive shape but did merit a new name, the Wittelsbach-Graff Diamond, to signal both its history and its 21st-century renaissance.

The Wittelsbach-Graff Diamond is in very rare company. Based on its distinctive composition–specifically the absence of nitrogen and the presence of boron, which gives the gem its distinctive color–it is classified as a Type IIb diamond. Such stones are believed to make up less than half of one percent of all diamonds found in nature. Type IIb diamonds also share another unusual characteristic: they are semiconductors. Other famous examples of this unique group of gems include the 70.21-carat Idol's Eye, believed to be in private hands, and the celebrated 45.52-carat Hope Diamond, which is on permanent display at the Smithsonian's Natural History Museum in Washington, D.C.

For more about the Museum's world-class gem collection, visit research.amnh.org/eps/collections.

OCTOBER 28

The Wittelsbach-Graff Diamond goes on display in the Guggenheim Hall of Minerals.

The Wittelsbach-Graff Diamond

Courtesy of Graff Diamonds

Storage vials from the Ambrose Monell Cryo Collection

Cold Storage: The Frozen Tissue Lab

As oil from the spill in the Gulf of Mexico drifted toward Florida's coastline last May, officials at the Everglades National Park sprang into action, requesting specimen collection kits from the Museum's Ambrose Monell Collection for Molecular and Microbial Research in anticipation of spill-related fatalities of such endangered species as the American crocodile (*Crocodylus acutus*), the West Indian manatee (*Trichechus manatus*), and a variety of turtles that inhabit the unique ecosystems of the Everglades.

Responding to such a request–in accord with an historic five-year agreement between the American Museum of Natural History and the National Park Service, which was signed last year–is just one of the many ways in which the Monell Collection fulfills its central mission: collecting and preserving a record of biodiversity in stored DNA and making it accessible to researchers from the Museum and the world over.

Now in its 11th year, like the pacesetting Sackler Institute for Comparative Genomics of which it is a part, the Monell Collection currently holds about 70,000 specimens representing 6,731 species. Recent additions include spiny lobsters, land crabs, conch, and bonefish from the Caribbean; plum curculio weevils and pine scale insects from North America; bats afflicted with white nose syndrome from caves in the northeastern United States; nautilus from Vanuatu and New Caledonia; deer from New York and New Jersey; insects from New York City apartments; more than 6,000 butterflies and moths from Costa Rica; and more than 1,000 bird tissues as the transfer of the Museum's Ornithology Department collection, one of the largest in the world, continues.

Each specimen, whether blood, tissue, or other matter, is stowed in small bar-coded vials in stacked trays within vats cooled to temperatures below -160° Celsius (-256° Fahrenheit) by liquid nitrogen that maintains its super-chill for five weeks in the event of a power failure–a far cry from jars of formaldehyde, pins on corkboard, or wooden trays in a Victorian naturalist's cabinet.

For more information, visit research.amnh.org/genomics/facilities/amcc.

Photo © AMNH/D. Finnin

By the Numbers

Since 2001, the Ambrose Monell Cryo Collection has made loans of 8,939 samples to scientists for genetic analysis, including 1,722 samples loaned over the past year to scientists within the Museum and at institutions in the United States, Australia, Ireland, England, and Mexico. The AMCC also prepared and supplied more than 6,000 vials in collecting kits to researchers worldwide. The lab hosted 40 tours this year for school classes, media representatives, and visiting researchers.

Sample vs. Specimen

Species, specimens, and samples are three different ways to quantify a collection. The AMCC may have many specimens or individuals of a particular species and, generally, a few samples from each specimen. For example, there might be three vials of muscle tissue, a vial with a hair sample, a vial of previously extracted DNA, and a bone chip, all from one specimen.

Specimen Spotlight: Harlequin Duck

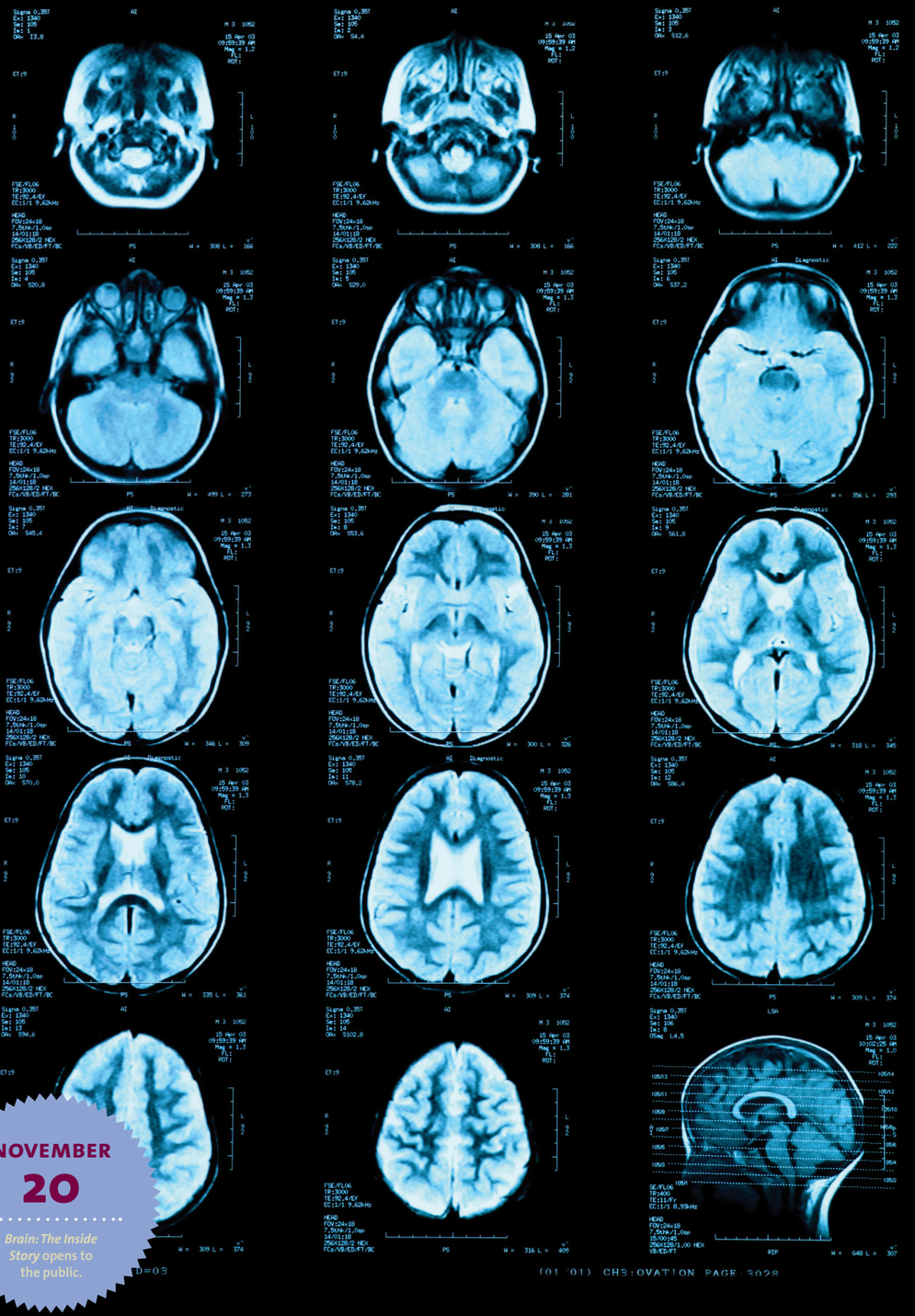
The Harlequin Duck *(Histrionicus histrionicus)* tissue stored in the AMCC was collected on Chugidanack Island, Alaska, in 1990 by former Museum ornithologist Jay Pitocchelli, now chair of the Biology Department at Saint Anselm College in Manchester, N.H. Once on the wane in the east, this colorful species is now plentiful in the East and West. Dr. Pitocchelli collected the western specimen to "round out the [Museum] Ornithology Department's growing collection of skeletons and tissues."

Specimen Spotlight: Bony-headed Toad

AMCC's *Ingerophrynus galeatus* specimen was collected in Vietnam in 1999 by Nguyen Quang Truong, a curator at the Institute for Ecology and Biological Resources (IEBR) in Hanoi. While this toad is very familiar to the people of southern Laos, Cambodia, and Vietnam—especially to snake farmers, who feed toads to their snakes—very little is known about the natural history of the species. Its tadpole was only described in 2009.

Specimen Spotlight: *Atteva pustulella* Moth

A caterpillar for the *Atteva pustulella* moth was found in Costa Rica in 2005 by Elda Araya for Dan Janzen, a biodiversity specialist at the University of Pennsylvania who has contributed more than 18,000 specimens to AMCC. DNA barcoding resolved confusion between this moth and another, *Atteva aurea*, from the Area de Conservación Guanacaste, a habitat restoration project in Costa Rica.



Finding Our Voice

Technology and evolutionary insights help scientists track language in the brain

Deep in a warren of windowless offices vibrating with fluorescent lights, computers, and high-powered imaging equipment, Ben (not his real name) lies down to be engulfed by the magnetic resonance machine. *Clank, clank, clank.* Ben silently recites a series of line drawings that flash before his eyes. *Saguaro, igloo, harp. Seahorse, dart, harmonica.* After several rounds, an auditory portion of the test starts and the strains of a Mozart sonata try to compete with the machine's knocking. Ben would have preferred jazz.

Ben–a saxophonist who crops his brown hair short–has untreatable epilepsy and is being prepped for potential brain surgery. Every four seconds that he's in the machine, the computers obtain 25 brain scans that will be compiled into an accurate map of functional areas that his surgeon needs to avoid, namely the areas activated by music and language.

Functional magnetic resonance imagery, or fMRI, has revolutionized neuroscience since it was developed two decades ago–drawing medicine and evolutionary science into an increasingly fruitful collaboration. (Recent research that draws on fMRI technology is just one of many fascinating topics explored in the new exhibition *Brain: The Inside Story*, which opens on November 20.)

It was once thought that certain areas of the brain had specific functions, based on the work of Parisian physician Paul Broca who, over 100 years ago, noticed the link between a patient's localized brain damage and language impairment. Now fMRI, which allows researchers to see brain activity in living soft tissue, has moved research away from guesswork. When a person speaks, or thinks of speaking, oxygenated blood floods the brain's language centers to fuel neural activity. This localized change in the relative amounts of oxygen in the blood creates variation that fMRI machines exploit to show the brain at work. Speech fires up three areas of the brain that are connected by highways of nerve fiber bundles, all mainly on the left side of the head: Wernicke's area, located on the temporal lobe and associated with understanding context or meaning of speech; the motor function area, located on the frontal lobe; and Broca's area, also located on the frontal lobe and associated with the ability to speak. Broca's area also lights up with music–thought by some scientists to have preceded speech in humans–but on the right side of the brain. Though specialized, these areas aren't rigid: children with damage to their speech centers on the left can co-opt the right side for language because their brains are more malleable or plastic, a key characteristic that is also explored in the new exhibition.

Paleoanthropologists estimate that human speech probably emerged between 100 and 50 thousand years ago, about the same time humans began to develop complex symbolic behaviors.

"Each community of neurons in the brain has a specific function that is unique. We call this functional specificity," says Joy Hirsch, director of the Program for Imaging and Cognitive Science at Columbia University, where Ben's brain was scanned. Hirsch, who is consulting on *Brain: The Inside Story*, has been incorporating fMRI into her research for over 15 years and has found, among other things, that second languages learned later in life use a different part of the brain than languages learned in childhood. "Speech is one of the most fundamental functions," says Hirsch. "We are looking at the neural correlates of behavior to guide the development of new treatments for many neurological, developmental, and psychiatric disorders."

While all animals, and even bacteria, communicate, speech is uniquely human. There is little evidence that other species can combine making sounds with a system of meaning (semantics) and rules of organization (syntax). Only humans use nouns and verbs that allow them to communicate quickly and efficiently a large number of commands, thoughts, and experiences, flexibility that is made possible by the computing power of bigger brains.

"Size matters," says Drew Rendall, professor of psychology at the University of Lethbridge. "Our brains were remodeled–increased in size by a factor of four–in a short time after the split with chimpanzees. The additional cortical expansion gives us more top-down, voluntary control over sounds."

The evolutionary development of speech is difficult to investigate because specific areas of the brain–like Broca's area–are not preserved in the fossil record. But forensic tools can reconstruct the mouths and throats of early anatomically modern humans, such as Skhul V, the 90,000-year-old-male buried in a cave in Israel, and Neanderthal fossils. Evidence shows that these individuals probably didn't speak: their voice boxes were positioned high in their throats, limiting the range of sounds they could physically produce. But at some point in evolutionary history, the larynx went south, pulling the tongue with it. This development allowed adult humans to form a wider range of vowels and other sounds which were impossible for our close relatives and are still difficult for young children to master, in part because their voice boxes don't drop until later. Some anthropologists think that speech was a pre-condition for maintaining extensive, even distant social bonds and for cooperative behaviors like hunting.

"We don't know why the modern vocal tract developed, but we know that it must have been in place before it could be exploited for speech production," says Ian Tattersall, curator emeritus in the Museum's Division of Anthropology. Tattersall and other paleoanthropologists estimate that human speech emerged at some time between 100 and 50 thousand years ago, at about the same time cultural evidence shows that humans began to develop complex symbolic behaviors. "Speech is the ultimate symbolic behavior," says Tattersall. "The first anatomically modern humans had not yet acquired the unprecedented cognitive style that makes us unique today, and the leap to modern symbolic consciousness was achieved…in a creature that was exapted to make that leap rather than by biological innovation." That is to say, no new physical features developed to make speech possible; humans already had all the hardware in place.

Another piece of hardware that needed to be in place for humans to develop into speaking animals is a gene named FOXP2, one of the numerous genes that regulate speech. The FOXP2 gene in humans differs from that in chimpanzees, with which *Homo sapiens* share 98 to 99% of their genetic material, and people who have a nonfunctioning form of this gene lack the fine motor control necessary for speech. Studies from the Mac-Planck Institute for Evolutionary Anthropology show that the modern human form of FOXP2 "dates" to about 100,000 years ago. In experiments, mice–a species that has FOXP2 like that in chimps–who were given the human version of the gene developed lower pitch and ultrasonic whistles along with changes to their brain circuitry. It may be that FOXP2 improves motor control needed for speech.

Back in Hirsch's lab, cross-sections of Ben's brain flash on a computer in shades of gray. The left side lights up when he identifies a drawing, the right when he hears music. But music is not confined to Broca's area on the right: as recent fMRI studies have shown, there is overlap in how music and language are processed. At Harvard Medical School, neurologist Gottfried Schlaug is using this connectivity to help patients with severe damage to the left side of their brains. These stroke victims cannot speak, but after hours of patient training in so-called Melodic Intonation Therapy, they can learn to sing for the basics, requesting water and communicating what was once impossible–their address. This therapy offers hope to the 200,000 stroke patients in the U.S. each year who have difficulty speaking–just another example of how evolutionary insights and new technology play essential roles in the development of treatments that can safeguard or even restore this uniquely human faculty.

Brain: The Inside Story Opens November 20

Step into the amazing, changing brain! This special exhibition explores how the brain—a product of millions of years of evolution—produces and processes our thoughts, senses, and feelings. The journey begins in a tangled forest of 100 billion interconnected neurons, or specialized cells that make up the central nervous system. Find out how the highly developed neocortex allows humans to make plans and predictions, as well as engage in symbolic thought. Discover how advances in brain imaging and biochemistry are deepening the understanding of the emotional brain. Learn about the brain's plasticity, its continual transformation through different stages of life, and how new knowledge about the brain's inner workings may help scientists repair and improve brain function. Stop along the way to challenge your brain with interactive puzzles and games that probe your neural connections and pathways.

The exhibition is curated by the American Museum of Natural History's Rob DeSalle, curator in the Division of Invertebrate Zoology who conducts research at the Museum's Sackler Institute for Comparative Genomics. Joy Hirsch, director of the Program for Imaging and Cognitive Sciences at Columbia University, and Margaret Zellner, behavioral neuroscientist, psychoanalyst, and postdoctoral fellow at The Rockefeller University served as consultants.

Members-Only Preview November 17

Members are invited to preview the new exhibition *Brain: The Inside Story* on Wednesday, November 17, beginning at 4 pm. See the show, then stay for a wine reception from 6 to 8 pm. Don't forget to RSVP by calling the Membership Office at 212-769-5606 by November 3.

Credits

Brain: The Inside Story *is organized by the American Museum of Natural History, New York,* ***www.amnh.org****, in collaboration with the Guangdong Science Center, Guangzhou, China, and Parque de las Ciencias, Granada, Spain.*

Generous support for Brain: The Inside Story *has been provided by the Eileen P. Bernard Exhibition Fund, Virginia Hearst Randt and Dana Randt, and Mary and David Solomon.*

Devorah Sperber's installation of a familiar Andy Warhol image

Courtesy of Devorah Sperber

Driven to Abstraction

The Art of Brain: The Inside Story

Nearly all animals have brains. Most communicate with each other. Still others use tools. And many build homes after a fashion. But only humans compose symphonies, write plays, paint masterpieces–not to mention design the concert halls, theaters, and museums in which to showcase them. It is, in fact, this ability to conceptualize, to plan ahead, convey ideas with symbols, that most sets us apart from other animals.

Who better to turn to than creative visual artists–for whom manipulating symbols is a way of life–to illustrate the complicated workings of the human brain in the Museum's new exhibition *Brain: The Inside Story*, which opens November 20. Early in the planning stage, the Exhibition Department tapped two artists, Daniel Canogar of Madrid and Devorah Sperber of Manhattan and Woodstock, N.Y., to represent various brain functions in tangible works of art.

"Artists' works appeal directly–and powerfully–to our senses, and stimulate our curiosity about our world and about ourselves," says David Harvey, senior vice president for Exhibition.

Sperber's installation, for example, harnesses the mechanics of human sight and something scientists call "neurobiological priming"–the tendency of the brain to recognize certain images through repetition. At first, viewers see a large panel, 68 inches by 47 inches, composed of colorful spools of thread strung on aluminum-ball chains, each spool acting like a chip of tile in an attractive, if amorphous, mosaic. Then, seen through a clear acrylic ball set on a pedestal 6 feet in front of the "canvas," the abstract image is reduced in size and reversed, just as the brain inverts the upside-down images captured by the retina, and it becomes instantly recognizable as a familiar work of fine art.

"At that point there's a real jolt when your brain has to make an adjustment from what you thought was there to what is there, and the word associated with that jolt is 'Wow!'" Sperber explains by phone from her studio in Woodstock. "The idea is to directly engage the viewer so they are having an experience of their own brain in action."

Canogar has found an uncanny way to evoke the human brain's 100 billion or so neurons–specialized cells that allow us to think, feel, and move–that connect through long, spidery arms and communicate with each other through electrochemical signals at speeds up to 250 miles an hour. On entering the exhibition, visitors will walk through a massive work in which recycled electrical cables, illuminated by racing beads of lights, mimic electrochemical activity in the brain. Further on, a similar Canogar sculpture will explore how the neurons themselves develop.

"Artists' works appeal directly—and powerfully—to our senses."

— David Harvey
Senior Vice President for Exhibition

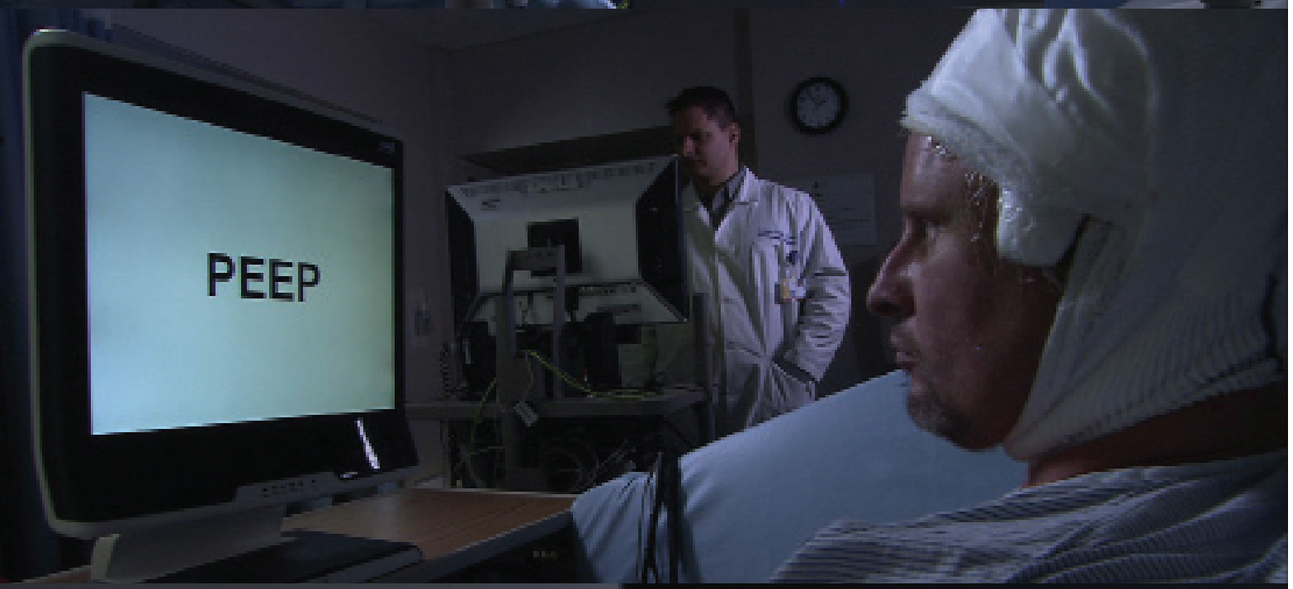
Both artists have been deeply influenced by modern technology. In Sperber's case, she was struck by the translation of images into pixels, or small bits of color akin to her spools of thread, for easy transport across the internet. Canogar says he started out photographing junk yards and dumps and was drawn to what he calls e-waste–discarded circuit boards, computer screens, and cables made obsolete by newer technologies. This e-waste had, for him, a poignant resonance with the neural circuitry of the human brain –as well as the larger "brain" of a networked society–recalling all the dreams, hopes, and disappointments it has channeled.

Daniel Canogar at work on one of his pieces

Photo © E. Palazuelos

"In a world of excessive consumption," Canogar writes in an email, "it is important for me to try to rescue these materials, give them a new life, and above all, try to release the memories contained within, the energy that once circulated through them."

This fall, visit amnh.org to watch a video of Daniel Canogar collecting materials at a New Jersey dump-site and installing the finished piece in the major new exhibition *Brain: The Inside Story*.



Dr. Gerwin Schalk observes brain activity transmitted from an implant beneath a test subject's skull. By reading these patterns as the brain concentrates on various words or sounds, Schalk's team hopes to develop a system that will let people communicate without speaking.

Photos © AMNH

Cutting Edge

A Bold Brain-Computer Experiment Goes On Camera

As Dr. Anthony Ritaccio enters the operating room, the procedure is already in progress: two neurosurgeons have retracted a portion of the patient's scalp and removed a section of skull about the size of a playing card. "We're getting close," says Ritaccio, leaning over the exposed, visibly pulsing brain. In minutes, the team will carefully slip a sheet of 64 electrodes onto the tissue, draw the attached wires out of the incision, and connect them to an experimental computer system. It's the first step of an attempt to use computers to directly read the intention of the human brain—in a way, to read minds.

Science Bulletins, the Museum's multimedia program covering current science, sent cameras into the operating room in May to record this unique attempt at building what's called a brain-computer interface, or BCI. (The footage will appear in a two-minute film in the new exhibition *Brain: The Inside Story*. A seven-minute film will also be displayed in the Museum's Spitzer Hall of Human Origins and online at **amnh.org/sciencebulletins**.) To find this project, a collaboration between physicians at Albany Medical Center and scientists from Albany's Wadsworth Center at the New York State Department of Health, Science Bulletins producer Sandya Viswanathan interviewed several experts in the field. Like all BCI projects, the Albany project is built on the idea that brains and computers have fundamental similarities.

"The brain itself is an electrical organ," says Ritaccio, a neurologist at Albany Medical Center. "Brain cells communicate through electricity." Each brain cell, or neuron, transmits electrical pulses to other neurons, like wires in a computer chip. This transmission generates complex patterns across the neuronal network that change from second to second. For decades, it seemed logical that scientists could tap these electrical signals to communicate directly with the brain. But initial attempts encountered a major problem.

"In the 1930s…electrodes [were] glued to the outside of the scalp," says Ritaccio. "But brain electrical activity is very weak and has to sift through many layers," including scalp, bone, and the meningeal membranes. "By the time this weak electrical activity bubbles up to the surface, much of it has been lost," says Ritaccio. Scientists realized they must get closer to the neurons, but implanting electrodes deep inside a human brain would be too risky. A new approach that read electrical activity directly from the brain surface, called electrocorticography or ECoG, finally emerged in the 1950s.

"ECoG recordings have been used in humans to locate the source of seizures in people with epilepsy or brain tumors," explains Dr. Gerwin Schalk, a collaborator from the Wadsworth Center. The BCI team—which is composed of electrical engineers, computer scientists, clinicians and other experts—is developing the technology to use ECoG arrays in a new way: to decode the activity patterns the brain generates to execute specific tasks such as speaking or gesturing.

When Science Bulletins videotaped a surgery in May, an epileptic patient, John (not his real name) was receiving the ECoG electrode array in an attempt to locate the cause of his severe seizures. Fewer than a dozen implantation surgeries like John's are performed each year at Albany Medical Center, and patients participate in the study during their one-week post-operative stay.

Four days after implantation, the Science Bulletins film crew returned to the hospital to capture some experiments on videotape. "The brain produces different types of activity for different types of behavior," Dr. Schalk explained as he connected the wires from John's electrode array into a computer. The computer processed the electrical activity sensed by each of the array's 64 electrodes, and plotted that information onto a map of John's brain. The activity emerged on the monitor as a pattern of red dots: the bigger the dot, the more active the area. As cameras rolled, the pattern continually changed, allowing the film crew to watch John's brain in action.

"If we can tell from the brain what words a person wants to communicate to their loved ones, that will be a boon for people who are disabled and otherwise cannot communicate."

— Dr. Gerwin Schalk

The ECoG-based system already has far greater resolution and speed than fMRI or EEG, common indirect measures of brain activity. But as Schalk explains, this experiment is just the beginning. "At the most basic level, we can differentiate [some] behaviors simply by judging where activity changes in the brain," he says. "For example, moving my hand will produce activity changes in [one area], whereas speaking different types of words will produce changes in different areas." Now the Albany team is going a step further: using these activity patterns to identify specific words a person is thinking.

As John thought of a word, the ECoG-based system recorded the activity. The computer then employed a complex algorithm to analyze the pattern to guess the word. In some cases, the system can even tell apart words as similar as "set" and "sat." The number of words this BCI recognizes now is limited, but there's no doubt where the technology is headed. "If we can tell from the brain what words a person wants to communicate to their loved ones, that will be a boon for people who are disabled and otherwise cannot communicate," says Schalk. "And as the technology gets better and better, these techniques may actually be useful for people who are less disabled or aren't even disabled at all."

From pilots controlling airplanes with their thoughts to soldiers communicating telepathically behind enemy lines, researchers recognize that the possibilities for a "mind-reading" BCI are almost limitless. "Certainly, this type of research requires some ethical scrutiny," says Ritaccio. "But these are the kind of things that are not too far out in the distant future."

For more Science Bulletins, visit amnh.org/sciencebulletins.

Programs and Events

October

Rose Center for Earth and Space Anniversary Celebration: 10.10.10
Sunday, October 10
Free with Museum admission
An extended day of family–friendly programs and special presentations to commemorate the 10th anniversary of the Rose Center for Earth and Space, featuring:

Science Talks and Tables
Presentations and specimen exhibits by Museum scientists

Native American Sky Stories
Storytelling, music, and dance from Grammy Award winner Joanne Shenandoah and historian Doug George

AstroCappella
Songs about the universe from The Chromatics

Space Panorama
The Apollo 11 moon landing recreated by Andrew Dawson

One World, One Sky: Big Bird's Adventure
Sesame Street feature about the sun, moon, and stars

For more information, visit **amnh.org**.

Dr. Nebula's Laboratory: Planetary Vacation
Saturday, October 2
2 pm
Members' tickets are **$8** children, **$10** adults
Learn about the planets and moons of our solar system.

Meet the Scientist
Saturday, October 2
Free with Museum Admission
Visitors ages 7 and up can meet a scientist in the Discovery Room. Call 212–313–7105 for details.

Birding the Barrier Beaches
Saturday, October 2
9 am–4 pm
$90 (includes transportation by private coach)
Bring your lunch; recommended for children ages 7 and up
Members only
Come with binoculars to spot a variety of birds.

Members–Only Highlights Tour
Sunday, October 3
Saturday, November 6
3–4:30 pm
Free (registration required)
Join a Museum docent for an insider's introduction to all the Museum has to offer.

Behind the Scenes in Ichthyology
Tuesday, October 5
6:30 pm, 7 pm, 7:30 pm
$35
Curator **Melanie L. J. Stiassny** offers a rare peek into the collections of the Department of Ichthyology.

Adventures in the Global Kitchen: The Astronaut's Cookbook
Tuesday, October 5
6:30 pm
$25
Cookbook authors **Charles T. Bourland** and **Gregory L. Vogt** talk shuttle cuisine.

SciCafe
Wednesday, October 6
Doors open at **7 pm**
Free admission, cash bar
21+ with ID
Science, cocktails, and conversation return this month. Visit **amnh.org/scicafe** for details.

A Night at the Museum Sleepover: Stellar Sleepover
Friday, October 8
Members' price **$119** per person
A special space–themed sleepover will thrill children ages 7 to 13. Visit **amnh.org/sleepovers** for details.

Ten Years of Space Shows
Tuesday, October 12
6:30-9 pm
Wednesday, October 13
6-8:30 pm
Members' tickets are **$12** adults, **$7.50** kids
Celebrate the Rose Center for Earth and Space anniversary at this special screening of all four Space Shows.

The Modern Shaman with Laurel Kendall
Wednesday, October 13
6:30 pm
$13.50 Members
Curator **Laurel Kendall** leads a discussion about female shamans in Korea.

Autumn At Kykuit
Saturday, October 16
8 am-5:30 pm
$95
Members only; register by October 1
Tour the Rockefeller estate and Hudson Valley landmark.

Wild, Wild World: Bats
Saturday, October 16
11 am–noon, 1–2 pm
Members' tickets are **$8** children, **$10** adults
Get ready for Halloween with a live–animal program about bats.

The Rose Center for Earth and Space Tour
Sunday, October 17
3–4:30 pm
Thursday, October 28
6:30–8:30 pm
Free (registration required)
Recommended for kids ages 10 and up.
Guide **Peter Dunne** leads a tour about the Rose Center for Earth and Space.

A Tear at the Edge of Creation with Marcelo Gleiser
Monday, October 18
7:30 pm
Members' tickets are **$13.50**
Dartmouth professor **Marcelo Gleiser**, author of *A Tear at the Edge of Creation*, will speak about his book.

Family Party
Tuesday, October 19
5-7:30 pm
Call 212-313-7161 to purchase tickets
A favorite tradition, the Museum's Family Party features fascinating activities and spectacular entertainment for children of all ages.

***Barnum Brown: The Man Who Discovered* Tyrannosaurus Rex: An Evening with Mark Norell and Lowell Dingus**
Thursday, October 21
7 pm
Free for Members (registration required; space is limited)
Paleontologists **Mark Norell** and **Lowell Dingus** will discuss their new book about the famous fossil hunter.

A Night at the Museum Sleepover: A Fright at the Museum
Saturday, October 23
Members' price **$119** per person
This special Halloween–themed sleepover will thrill kids ages 7 to 13. Visit **amnh.org/sleepovers** for more.

Exploring Connecticut's Natural Treasures
Sunday, October 24
9 am–5 pm
$95 (includes transportation by private coach and lunch)
Geologist **Sidney Horenstein** leads this tour of scenic Washington, Connecticut.

Ten Years of Digital Universe with Carter Emmart and Brian Abbott
Tuesday, October 26
6:30–8 pm
$13.50 Members
Join **Carter Emmart** and **Brian Abbott** to learn about the 3D atlas of the universe.

15th Annual Halloween Celebration
Sunday, October 31
2–5 pm
Members' tickets are **$9**
Trick–or–treat at the Museum and enjoy live performances, arts and crafts, and more.

November

34th Annual Margaret Mead Film & Video Festival
Thursday, November 11– Sunday, November 14
Members' tickets are **$10** except for opening and closing night
The Margaret Mead Film & Video Festival returns with the best in documentary filmmaking, animation, experimental nonfiction, and archival works. Visit **amnh.org/mead** for the schedule and details.

After School Program
Monday, November 1–Friday, December 17
The After School Program offers courses to New York City high school students interested in the sciences. For more information or to request an application, email **hsprograms@amnh.org**.

Behind the Scenes in Anthropology
Tuesday, November 2
6:30 pm, 7 pm, 7:30 pm
$30
Members only
Join anthropologist **Gary Sawyer** and the Fossil Hominid Reconstruction & Research Team for a fascinating look at the process of rebuilding an ancient skeleton.

SciCafe
Wednesday, November 3
Doors open at **7 pm**
Free admission, cash bar
21+ with ID
Science, cocktails, and conversation. Visit **amnh.org/scicafe** for details.

Tickets

Tickets are available by phone at 212-769-5200, Monday–Friday, or by visiting **amnh.org**. Please have your Membership number ready.

Please be aware that ticket sales are final for all Members' programs. All programs go ahead rain or shine. There are no refunds unless the program is cancelled by the Museum.

Exhibitions and Attractions

Admission is by timed entry only.

Brain: The Inside Story
Opens **Saturday, November 20**
Free for Members
Step into the amazing, changing brain! This exhibition explores how the brain—a product of millions of years of evolution—produces and processes thoughts, senses, and feelings.

Race to the End of the Earth
Through Sunday, **January 2**
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.

The Butterfly Conservatory: Tropical Butterflies Alive in Winter!
Opens **Saturday, October 16**
Members' tickets are **$12** adults, **$7.50** children
This annual favorite returns with up to 500 live, free–flying tropical butterflies housed in a vivarium that approximates their natural habitat.

Wittelsbach–Graff Diamond
On display starting
Thursday, October 28
Free with Museum admission
The Wittelsbach-Graff Diamond will be on display in the Harry Frank Guggenheim Hall of Minerals.

IMAX Movie
HUBBLE
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.

Hayden Planetarium Space Show
JOURNEY TO THE STARS
Members' tickets are **$12** adults, **$7.50** children
Journey to the Stars launches viewers through time and space to experience the life and death of the stars in our night sky.

Credits
Brain: The Inside Story *is organized by the American Museum of Natural History, New York (www.amnh.org), in collaboration with the Guangdong Science Center, Guangzhou, China; and Parque de las Ciencias, Granada, Spain.*

Generous support for Brain: The Inside Story *has been provided by the Eileen P. Bernard Exhibition Fund, Virginia Hearst Randt and Dana Randt, and Mary and David Solomon.*

Franklin and Wagner Free Institutes in Philadelphia
Saturday, November 6
8:30 am–7 pm
$120
Members only
Tour the Wagner Free Institute and visit the Franklin Institute to see *Cleopatra: The Search for the Last Queen of Egypt.*

Wild, Wild World: Animals in Winter
Saturday, November 6
11 am–noon, 1–2 pm
Members' tickets are **$8** children, **$10** adults
Join TV host **Jarod Miller**.

Adventures in the Global Kitchen: Wild Mushroom Harvest
Tuesday, November 9
6:30 pm
$25
Learn about tasty, locally available mushrooms.

Geology and History of Yankee Stadium
Saturday, November 13
10 am–noon, 1–2 pm
$30
Members only
Join geologist **Sidney Horenstein** to explore this Bronx neighborhood.

The Road to Stardom in the Milky Way with Paul Goldsmith
Monday, November 15
7:30 pm
Members' tickets are **$13.50**
NASA scientist **Paul Goldsmith** will discuss star formation and more.

Members–Only Preview of *Brain: The Inside Story*
Wednesday, November 17
4–8 pm
Free (registration required)
Get a sneak peek at the new exhibition and enjoy a wine reception from 6 to 8 pm. RSVP to the Membership Office at 212–769–5606 before November 3.

Twinkling Stars: Mythic Creatures in the Sky
Tuesday, November 30
Tuesday, December 7
4:30–6 pm
For pre–K and kindergarten–age children
$60 for a child with one adult
This introduction to the night sky was developed for budding astronomers.

The Grand Tour of the Universe with Brian Abbott
Tuesday, November 30
6:30–8 pm
$13.50 Members
Fly through the universe with **Brian Abbott**.

December

Organic Ornaments
Saturday, December 4
3–4:40 pm
Free
Members only (registration required)
Tour guide **Judith Cubbon** will discuss the myths surrounding pearls, coral, amber, and other organic beauties.

Behind the Scenes in Invertebrate Paleontology
Wednesday, December 8
6:30 pm, 7 pm, 7:30 pm
$35
Curator **Neil Landman** will lead a tour and discuss extinct invertebrates and evidence of an asteroid impact at the end of the Cretaceous Period.

Holiday Party for Members
Sunday, December 12
1-4 pm
Free for Family and higher-level Members only
Registration required
Join us in the Milstein Hall of Ocean Life for activities and entertainment by award-winning band Grover's Gang, featuring David Grover.

Winter Wildlife Weekend
Saturday, February 5–Sunday, February 6
$350 per person, double occupancy
$400 single occupancy
Ornithologist **Paul Sweet** leads this birding and wildlife expedition to Long Island's Montauk Point, a spot renowned for winter birding.

Credits

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

SciCafe is proudly sponsored by Judy and Josh Weston.

The Museum's Youth Initiatives programming is generously supported by the leadership contribution of **New York Life**.

Race to the End of the Earth is organized by the American Museum of Natural History, New York (www.amnh.org), in collaboration with Musée 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.

The Wittelsbach-Graff Diamond is presented by Laurence Graff.

Journey to the Stars *is 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, New York (www.amnh.org), in collaboration with the California Academy of Sciences, San Francisco; GOTO, Inc., Tokyo, Japan; Papalote • Museo del Niño, Mexico City, Mexico; and Smithsonian National Air and Space Museum, Washington, D.C.* Journey to the Stars *was created by the American Museum of Natural History, with the major support and partnership of* ***NASA****, Science Mission Directorate, Heliophysics Division.*

Made possible through the generous sponsorship of ***Lockheed MartinCorporation****.*

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.

October

02 Saturday
Dr. Nebula's Laboratory
Meet the Scientist
Birding the Barrier Beaches

03 Sunday
Members–Only Highlights Tour

05 Tuesday
Behind the Scenes in Ichthyology
Adventures in the Global Kitchen

06 Wednesday
SciCafe

08 Friday
Stellar Sleepover

10 Sunday
Rose Center for Earth and Space Anniversary Celebration: 10.10.10

12 Tuesday
Ten Years of Space Shows

13 Wednesday
Ten Years of Space Shows
The Modern Shaman with Laurel Kendall

16 Saturday
***The Butterfly Conservatory* opens**
Autumn at Kykuit
Wild, Wild World

17 Sunday
The Rose Center for Earth and Space Tour

18 Monday
Tear at the Edge of Creation

19 Tuesday
Family Party

21 Thursday
Barnum Brown with Mark Norell and Lowell Dingus

23 Saturday
A Fright at the Museum Sleepover

24 Sunday
Exploring Connecticut's Natural Treasures

26 Tuesday
Ten Years of Digital Universe

28 Thursday
The Rose Center for Earth and Space Tour
Wittelsbach-Graff Diamond

31 Sunday
15th Annual Halloween Celebration

November

01 Monday
After School Program: Session 2

02 Tuesday
Behind the Scenes in Anthropology

03 Wednesday
SciCafe

06 Saturday
Franklin and Wagner Free Institutes in Philadelphia
Members-Only Highlights Tour
Wild, Wild World

09 Tuesday
Adventures in the Global Kitchen

11 Thursday
34th Annual Margaret Mead Film & Video Festival opens

13 Saturday
Geology and History of Yankee Stadium

14 Sunday
Margaret Mead Film & Video Festival closes

15 Monday
Road to Stardom in the Milky Way

17 Wednesday
Members–Only Preview of *Brain: The Inside Story*

18 Thursday
Museum Gala

20 Saturday
***Brain: The Inside Story* opens**

22 Monday
Origami Tree returns

30 Tuesday
Twinkling Stars workshop
Grand Tour of the Universe

December and Beyond

04 Saturday
Organic Ornaments

08 Wednesday
Behind the Scenes in Invertebrate Paleontology

12 Sunday
Holiday Party for Members

17 Friday
A Night at the Museum Sleepover

January

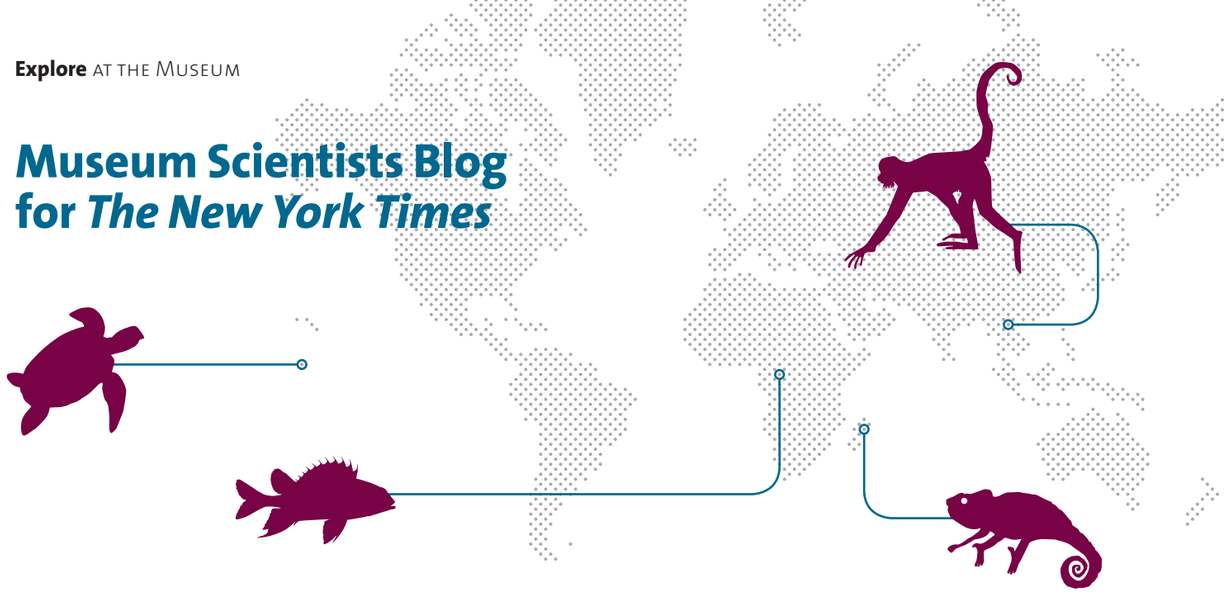
02 Sunday
***Race to the End of the Earth* closes**

05 Wednesday
After School Program: Session 3 begins

February

5–6 Saturday–Sunday
Winter Wildlife Weekend

Museum Scientists Blog for *The New York Times*



Imagine reading daily dispatches from Charles Darwin as he made his way around the Galápagos Islands on the H.M.S. Beagle. In something akin to that, scientists have begun blogging from the field in an exciting collaboration between *The New York Times* and the American Museum of Natural History and other scientific institutions.

So far, three Museum researchers have contributed to "Scientist At Work: Notes from the Field" –available on *The New York Times*'s website–including Christopher Raxworthy, curator in the Department of Herpetology, who inaugurated the feature in April by filing daily accounts and photos as he made his way to the summit of Mount Marojejy in Madagascar in search of chameleons, frogs, and lizards.

Eleanor Sterling, director of the Museum's Center for Biodiversity and Conservation, reported from the rainforests of Vietnam, where she was part of a team surveying one of the last remaining populations of the gray-shanked douc langurs in the wild. She blogged for a second time from the Palmyra Atoll National Wildlife Refuge in the Pacific, where endangered sea turtles can be observed in a unique environment relatively free from human influence.

Ichthyologist Melanie Stiassny filed dispatches from the Upper Congo River as she explored evolutionary links between species there and the extraordinary biodiversity she has previously catalogued in the Lower Congo. Stay tuned for more blogs ahead!

Join Christopher Raxworthy in the field when he leads an AMNH Expedition to Madagascar this winter. Visit amnhexpeditions.org to learn more about this exciting trip.

Find Your Way With New AMNH Explorer App

Call it a personal GPS–the state-of-the-art wayfinding system called the American Museum of Natural History Explorer, which launched this summer as a downloadable app for use on the iPhone or iPod touch. Operating on wireless access points throughout the Museum, the Explorer is designed to sense where you are in real time and then give you turn-by-turn directions by the quickest route possible to destinations throughout the Museum's more than 500,000 square feet of public space. As a side benefit, the new system allows all visitors free wireless access to the internet.

The Explorer also offers an interactive fossil treasure hunt, the capacity to create customized tours of your own, and pre-set tours of Museum highlights, the dinosaur halls, the Rose Center for Earth and Space, and items featured in the film *Night at the Museum*. The Explorer also contains general Museum information and text explaining 140 different exhibits, which in turn can be bookmarked to receive an email with a link to additional information from the Museum website. Finally, Explorer can be used to share your Museum experience with others through email, Facebook, or Twitter.

Bloomberg *is the founding sponsor of the AMNH Exploration System.*

You can download Explorer for free to your iPhone or iPod touch from amnh.org/apps or borrow one of more than 300 devices preloaded with the app from the Museum at no charge.

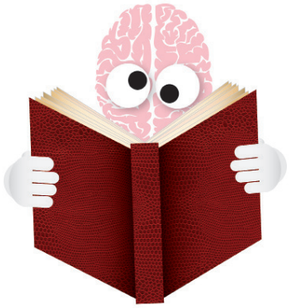
OLogy: A Polar Scrapbook for Kids

What was polar exploration like 100 years ago? A new interactive "scrapbook" on the Museum's website offers kids some clues. Ross MacPhee, curator of the *Race to the End of the Earth* exhibition, describes the legendary race to the South Pole with a selection of vintage photographs and snippets from historic letters. MacPhee, a polar explorer himself who has always been inspired by the heroic tales of the first Antarctic explorers, introduces kids to the British and Norwegian teams and the decisions their leaders faced-Camp on land or on ice shelf? Use dogs or horses? Wear fur or wool?–as they competed to be the first to reach the South Pole.

The expeditions unfold in compelling historic photographs. The British journey comes to life in snapshots of ponies aboard the ship Terra Nova, team members studying at base camp, and cooks making a stew called "hoosh." Photographs of the Norwegian explorers include images of the mustached crew of the Norwegian Fram, an "underground village" dug in the ice, and men sewing reindeer skins into sleeping bags. The trek itself, a race against time and weather, is recorded through photos of experiments with motorized sleds, the tremendous effort of "man-hauling," and the tent pitched at the Pole itself–as well as the haggard faces of the British, who arrived there second. The race to the South Pole is a great adventure story, and OLogy's scrapbook tells it wonderfully.

Complete with maps that show the explorers' routes, a chart that compares the teams' strategies, and detailed captions, the scrapbook is rounded out by modern-day photos. Through these contemporary images, it's easy to see that these expeditions paved the way for the thousands of researchers, like MacPhee, who travel to the "Continent of Science" today to search for answers under conditions unlike those at any other place on Earth.

Visit amnh.org/ology/index.php#features/racetothepole to see the scrapbook, and don't forget to catch *Race to the End of the Earth*, open through January 2, 2011 and free for Members.



More Fun For Kids: Two Books On the Brain

Curious kids can look forward to not one but two books from Museum Curator Rob DeSalle this fall.

DeSalle, who is the curator of the new exhibition *Brain: The Inside Story*, has tackled the subject before. In 2007, he co-wrote the children's book *Bones, Brains, and DNA: The Human Genome and Human Evolution* with Ian Tattersall, now curator emeritus in the Division of Anthropology.

This year's offerings include two different takes. The first, *Your 21st Century Brain: Amazing Science Games to Play With Your Mind*, co-written with Michael A. DiSpezio, is packed with puzzles and activities. The second, *Brain: A 21st Century Look at a 400 Million Year Old Organ*, follows two Museum mice—Wallace and Darwin—on a scientific tour of the brain. It's also co-authored and illustrated by Patricia Wynne, a scientist in the Museum's Department of Mammology, who also provided the drawings for *Bones, Brains, and DNA*.

Credits

Major support for OLogy *has been provided by the* Verizon Foundation. *The initial development of* OLogy *was made possible by a generous grant from* The Louis Calder Foundation.

Have You Shared Your Story Yet?

This summer, the Museum asked Members, friends, and visitors to send in their favorite memories of their adventures here—and hundreds responded. Here is a sampling of their stories:

I recall visiting the Hayden Planetarium, leaning back in my seat, and seeing the whole galaxy appear... what a great influence this has had on my curiosity regarding the natural world.

GARY *Wappingers Falls, NY*

My son learned to walk, at 8 months, in the hall of human evolution. At 12 months, he informed tourists that they were looking at a giant sloth... we're still Members.

GABRIELLA *Croton-on-Hudson, NY*

My second child fell in love with the Museum as a toddler and is now heading off to the University of Pennsylvania to study geology and evolutionary biology.

DONNA *Hastings-on-Hudson, NY*

I [once] briefly lost sight of my daughter in the dinosaur hall. I found her standing in front of the Triceratops, delivering a lecture on dinosaurs to passers-by!

JUDITH *Stamford, CT*

My favorite room is the hall of minerals and gems. There is nothing more serene than the low lighting, carpeted stairs, and hundreds of amazing specimens.

LINDSEY *New York, NY*

One of my earliest memories is going to see "Bluey," the name I gave to the Blue Whale in the Milstein Hall... I now bring my son, age 7, to share the same wonderful experiences I had.

DAWN *New York, NY*

My first visit was in the 1940s, and the dioramas made a lasting impression. Now I have a Family Membership, and my grandchildren love going to the Museum.

MARY ANN *Flushing, NY*

For me, the adventure never ends. For my son, who wants to be a paleontologist when he grows up, it's a glimpse into the future.

WINIFRED *Brooklyn, NY*

I became a Member... even though I live in Canada. I visit whenever I can, even though I have to cross an international border.

ROSEMARY *Scarborough, Ontario*

Tell us about your adventures at the American Museum of Natural History by visiting amnh.org/shareyourstory.

Reminders for Members

November 19-21
December 10-12
Get a head start on holiday shopping! Visit the shops or **amnhshop.com** during Double Discount Days for Museum Members and receive 20% off.

November 22
The Origami Tree kicks off the holidays at the Museum.

December 12
Don't miss the annual Holiday Party for Members, free and open to Family and higher-level Members.

Enter at 81st Street
During the renovation of the Central Park West façade and Theodore Roosevelt Memorial Rotunda, please use the Museum entrance on 81st Street.

A Gift for All Seasons

Give the benefits of Membership to friends and family! From complimentary general admission and exclusive sneak-previews of major exhibitions to discounts on Space Show tickets and in restaurants and shops—not to mention a year's subscription to the all-new *Rotunda* magazine—a membership is a wonderful way to discover all the Museum has to offer.

For more information on all levels of Membership, email the Membership Department at members@amnh.org or call 212-769-5606.

Museum Welcomes Two New Board Members

They're the Museum's top stewards: members of the Board of Trustees, which as a whole is responsible for overseeing the Museum's management, from the collections and programs to its financial health and physical facilities, so that all the pieces that make this institution work are used effectively to support its mission. This spring, the Museum welcomed two new members to the Board.

Virginia Hearst Randt, who holds a degree in finance magna cum laude from New York University, has worked for the National Magazine Company Limited in the United Kingdom, the Los Angeles Herald Examiner, and at Hearst Magazines. She has a deep interest in education and is particularly impressed by the important role the Museum plays in conveying vital and timely information about science and human culture to the public through its exhibitions.

"The Museum's educational programs and exhibitions provide an invaluable service by making complex scientific and cultural issues of the day accessible to the public," says Randt. "I'm excited to support that vital mission as a Trustee." Randt is also a member of the board of directors at the Hearst Corporation and served as a director of Hearst-Argyle Television until 2005. She and her husband, Dana, divide their time between Los Angeles and New York.

Theodore Mathas, who also joins the Board, is the chairman, president, and chief executive officer of New York Life Insurance Company, the nation's largest mutual life insurer. He chairs the board of the New York Life Foundation, which is a strong supporter of organizations involved with education, mentoring, and youth development. Mindful of the challenges facing our country, he recognizes and values the Museum's efforts to improve science education both in New York City and throughout our country.

"The Museum is a priceless resource for the young people in all of our communities. It educates, inspires, and helps bring history and science to life. I'm excited to be a member of the board, and I'm looking forward to working to help sustain and enhance the Museum's commitment to children of all ages," says Mathas.

Mathas graduated from Stanford University with distinction and received a J.D. from the University of Virginia, where he was a member of the Virginia Law Review. He joined New York Life in 1995. He also serves on the boards of the American Council of Life Insurers, and the U.S. Chamber of Commerce. He and his wife, Keryn, live in Armonk, NY, with their three children.

Virginia Hearst Randt and Theodore Mathas

Photo of Trustees © AMNH/R. Mickens; photo of Eric Zeidler courtesy of Erik Zeidler.

Bronx Student Snaps Up Award

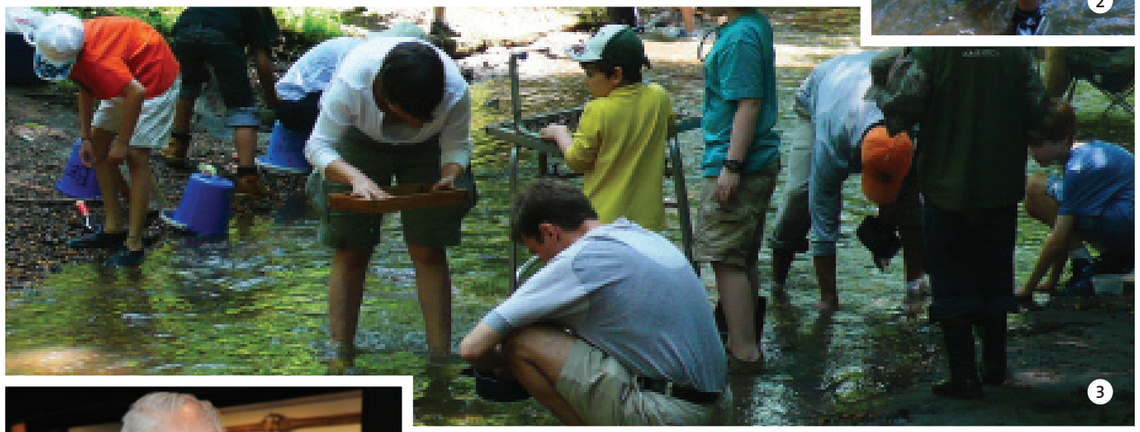
Zeidler in the field

This summer, Erik Zeidler, a recent graduate of New York's Bronx High School of Science, was among 13 students to receive a 2010 Young Naturalist Award. His project, *Investigating the Ecology of* Chelydra s. Serpentina, *the Common Snapping Turtle, in a Highly Urban Setting*, was of such caliber that Christopher Raxworthy, associate curator in the Museum's Department of Herpetology, said of Erik's essay, "With a little extra work, this could be published in a scientific journal."

Erik, who entered the renowned herpetology program at the University of Kansas this fall, has always been fascinated by reptiles. Intrigued by snapping turtles, he wondered "how such a large and magnificent reptile manages to survive right here in New York City? And do these populations differ from those in more natural settings?" To find out, he captured and collected data from 225 snapping turtles at four locations in the Bronx and learned that each population was quite distinct, just as they are in the wild, and that the sex ratio differed widely among locations. To find out why, and to read about this year's other 12 winners, **visit amnh.org/yna**.

The Young Naturalist Awards is a nationwide, science-based research contest for students in grades 7 through 12 presented by the Museum. Since 2006, the program has been made possible through the exceptional generosity of Alcoa Foundation as part of its commitment to supporting student achievement in the science, technology, engineering, and mathematics disciplines.

To learn more about the Young Naturalist Awards, visit amnh.org/yna.



1. Visitors check out activities during the Museum's NYC International Polar Festival on May 29.
2. A young Museum Member shares her find during a June fossil-collecting trip to Big Brook, New Jersey.
3. Members enjoyed digging through Late Cretaceous sediments during the June expedition to Big Brook.
4. On May 28, Members got a sneak peek at the special exhibition *Race to the End of the Earth*.
5. In June, more than 700 students brought 310 science projects to the Milstein Hall of Ocean Life for the 2010 Urban Advantage Science Expo.

Photos 1, 4, and 5 © AMNH/R. Mickens; photos 2 and 3, B. DePaul

1. Kira Kohrherr enjoys cocktails and live jazz with Junior Council Steering Committee Members Sam Saegh and Luca Mihaly on June 24.
2. Scott Twibell and Bree Sheahan during the June Junior Council event.
3. Junior Council Co-Chair Christy Corgan with Steering Committee Member Mark Robilotti, Lydia Walsh, Jordan Kugler, and Nikola Holmes.
4. Accenture Chairman and CEO William D. Green was honored with a Distinguished Service to Science and Education Award at the Museum's 18th Annual Corporate Dinner, held on June 17.

Photos 1, 2, and 3 © AMNH/R. Mickens; Photo 4 © AMNH/D. Finnin

Save the Date!
Upcoming Events at the Museum

December

12/7 Junior Council Members and guests are invited to view the special exhibition *Brain: The Inside Story* and attend a discussion and cocktail reception. For more information about the Junior Council, please call 212-769-5256 or visit **amnh.org/join/junior_council**.

12/12 The annual **Holiday Party for Members** will be held in the Milstein Hall of Ocean Life with an afternoon of activities and entertainment. Free and open to Family and higher-level Members.

February

The annual **Members' Open House** is a wonderful chance to explore the Museum, see the latest exhibitions, and learn about the benefits of membership. Free for Members at the Contributor level and above.

March

The annual **Star Party** for Members includes a cocktail reception in the Rose Center for Earth and Space, star-gazing on the Arthur Ross Terrace, activities for children, Space Show screening, and more. Free for Members at the Supporter level and above.

April

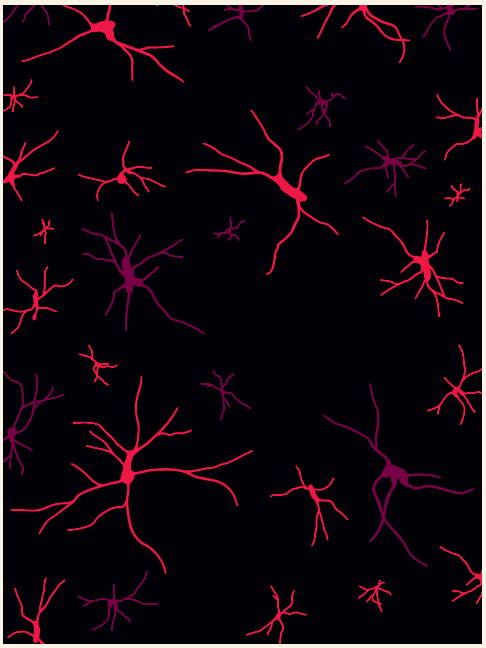
4/12 Join us for the **21st Annual Environmental Lecture and Luncheon**.

4/15 Members will have the first chance to see the exciting new exhibition ***The World's Largest Dinosaurs*** at this exclusive preview. Free for Members.

4/16 ***The World's Largest Dinosaurs*** opens to the public.

American Museum of Natural History
Membership

Central Park West at 79th Street
New York, New York 10024-5192
amnh.org



Brain: The Inside Story opens November 20. This cover illustration was designed to echo visitors' initial experience of the new exhibition: an immersion in Daniel Canogar's art installation, which evokes the human brain's billions of neurons. It was created by Hinterland for *Rotunda* using a "neurons" font designed by Joyce Li Yan Lee.

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, Brain Shop, Antarctic Shop and Online Shop (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: B (weekdays) or C to 81st Street; 1 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.