



AMERICAN MUSEUM OF NATURAL HISTORY

ROTUNDA

Member Magazine
Fall 2013 Vol. 38 No. 4

DISCOVERIES IN DEEP SPACE

NEW
HAYDEN PLANETARIUM
SPACE SHOW DARK UNIVERSE
OPENS NOVEMBER 2

From the President

Ellen V. Futter



For many of us, regardless of age, fall feels like “back to school” time. And while the Museum is perhaps best known for its galleries and special exhibitions and as a field trip destination, it is also a vibrant center of adult learning—for both the general public and K–12 teachers. Museum programs extend and amplify the experience of visiting our exhibitions and Space Shows, while covering topics in science and culture that have keen relevance to our everyday lives. Fall 2013 is no exception.

As a new Hayden Planetarium Space Show, *Dark Universe*, launches Rose Center visitors on a fresh journey of discovery beginning November 2, the Museum’s Frontiers Lecture series engages prominent astrophysicists, Museum scientists, and renowned authors in discussions about this exciting and rapidly changing field, so visitors can further satisfy their curiosity about all things cosmic.

For those more inclined to matters corporeal,

The Power of Poison exhibition will be amplified by our much-in-demand Sackler Brain Bench courses. Participants will learn about the mind-altering impact of everyday “poisons” such as psychoactive medications, coffee, alcohol, and even chocolate. Another course deals with the neuroscience of sports.

Of course, on the first Wednesday of every month, the Museum is the hottest place to be, as SciCafe offers an informal, after-hours setting for inquisitive minds to engage in conversation with scientists and experts.

In our information economy, people increasingly are looking to spend their leisure time learning and expanding their understanding of the world in which they live. The Museum is the perfect place to do just that, and this fall we have a full slate of opportunities.

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ROTUNDA

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2013 Margaret Mead Film Festival Showcases Unique Collaboration



Octavius Seowtewa, who recorded voice-over for the film in April, will take part in “Setting the Record Straight.”

Nearly a century after Museum anthropologists first recorded a sacred ceremony of the Zuni tribe, a rare archival film is getting its second life in a special program presented at this year’s Margaret Mead Film Festival.

Through a groundbreaking collaboration between the Museum’s Cultural Resources Office, Museum archivists and anthropologists, and the Zuni A:shiwi A:wan Museum and Heritage Center, the 1923 silent film *The Shalako Ceremony at Zuni, New Mexico* has been updated with Zuni subtitles and narration.

The never-before-seen film will be shown in a special program called “Setting the Record Straight” on Saturday, October 19, in the Leonhardt People Center on the Museum’s second floor. The screening will be followed by a lively Mead Dialogue moderated by Jim Enote, director of A:shiwi A:wan Museum and Heritage Center, about the history of Museum anthropology, the repercussions of filming sacred ceremonies of the Zuni, and the recent collaborative effort to repurpose archival film within a contemporary context. Panelists will include Curator Peter Whiteley, Museum archivist Barbara Mathe, and Curtis Quam and Octavius Seowtewa from Zuni.

In a related event earlier that day, internationally renowned Zuni flute player, singer, and recording artist Fernando Celleron will perform a series of songs from the Zuni pueblo in the Hall of the Birds of the World. This performance is free with any 2013 Mead Film Festival ticket stub. “Setting the Record Straight” is a ticketed event.

The 2013 Mead Film Festival runs from Thursday, October 17, through Sunday, October 20, and includes film screenings, panel discussions with filmmakers and subjects, and live performances.

For a full schedule and to purchase tickets to the Mead Festival, visit amnh.org.

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LOCATION, LOCATION, LOCATION

The canoe was first hung from the ceiling beside the balcony that is now the Leonard C. Sanford Hall of North American Birds, high above a bird collection in what is today the Hall of African Peoples. Removed in 1908, the canoe was installed two years later at floor level in the Hall of Northwest Coast Indians. In 1960, it was moved about 100 feet to the 77th Street foyer, also at floor level.

GRAND RESTORATION

A meticulous restoration of the canoe, including stripping off old shellac, oils, and paint, removing decades of dirt, and repairing cracks, was completed in 2006. The 63-foot-long canoe was once again suspended from the ceiling, this time in the renovated Grand Gallery—allowing visitors an unobstructed view of this magnificent artwork for the first time since 1908.

THE HAIDA FIGURES

Life-sized figures were added in 1910 but removed to storage during the 2006 restoration, returning the canoe to its original mode of display: suspended and empty. “It calls new attention to the beauty and ethnographic value of the object in itself,” says Curator Peter Whiteley. “The canoe is also now much better lighted than before, highlighting some key features that were previously obscured.”

A PIVOTAL PARTNERSHIP

In the late 19th century, Museum Trustee Heber Bishop oversaw a large-scale acquisition of art from the coast of British Columbia and Alaska. During a business trip in 1880, he met Israel Powell, a medical doctor and the superintendent of Indian Affairs for British Columbia, and soon engaged him to secure what would come to be known as the Museum’s Bishop-Powell Collection.

A FOUNDATIONAL COLLECTION

From 1880 to 1885, Powell sent the Museum 791 pieces, including the canoe—contributing to the start of one of the most significant collections of Pacific Northwest Coast art and artifacts in the world. Items ranged from the monumental, such as totem poles and house posts, to ceremonial bowls, hats, rattles, and masks from the Tsimshian, Kwakwaka’wakw, Haida, and other coastal communities.

The Great Canoe

The special exhibition *Whales: Giants of the Deep* offers a unique opportunity to highlight a variety of whale-inspired artifacts on permanent display throughout the Museum. One of the most striking examples practically hides in plain sight: a massive killer whale painted on the prow of the Great Canoe exhibited in the Grand Gallery on the Museum’s first floor.

The stylized killer whale, as well as the raven at the stern, were likely painted by one of the most influential Haida artists of his time, Charles Edenshaw (1859–1920), according to Peter Whiteley, curator of North American Ethnology in the Division of Anthropology. The canoe itself was made from a single Western red cedar tree around 1878, and may have been used as a dowry payment. Oral traditions link it to both the Heiltsuk and Haida peoples, with stories suggesting it was at first unadorned, with the killer whale, raven, and figurehead sculpture of a sea wolf added later. Animal images figure heavily in Haida art and mythology with specific animals on Haida objects serving as crests, identifying the lineage of the owner. The killer whale is an especially popular crest.

The canoe was acquired for the Museum by Trustee Heber Bishop as part of the larger Bishop-Powell collection in 1881. Native people delivered the purchased canoe to Victoria, British Columbia, where it began a lengthy journey to New York. First, it traveled by schooner to Port Townsend, Washington, then by steamer to Panama, via San Francisco. Since the Panama Canal had not yet been built, the canoe crossed the isthmus by rail, arriving in New York City by ship in 1885. A horse-drawn dray delivered it to the Museum, where it was put on display shortly after its arrival.

Free for Members, *Whales: Giants of the Deep* is on view through January 5.



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Scrimshaw Skull

A curious confluence of history, industry, and art can be seen in the skull of a rough-toothed dolphin, *Steno bredanensis*, featured in the special exhibition *Whales: Giants of the Deep*. The 19.5-inch-long skull is nearly covered with scrimshaw—engraved and pigmented images—of flowering trees, a butterfly, flags, ships, a turret, and a harlequin pattern along the mandible. It is an especially large and unusual example of the distinctive art form that flourished along with the whaling industry in the 19th century.

The origin of this piece is unknown, but it was created sometime between 1750 and 1850, likely circa 1825 based on the flags depicted. While earlier examples have been found, the art form is primarily associated with the heyday of hunting whales for fuel—blubber oil and the cleaner-burning spermaceti oil—until these were supplanted by hydrocarbons extracted from the earth. American whaling peaked in 1853, when 8,000 whales were killed in one year.

Scrimshaw developed as a pastime for whalers who had plenty of idle moments at sea on voyages that sometimes lasted for years. Broadly defined, the term refers to any artifacts and tools made from teeth, tusks, or bones of marine animals, including whales, walruses, and, as in the example above, dolphins. But scrimshaw is usually more narrowly associated with the delicate engravings on these same materials, augmented with black and sometimes colored pigments.

This scrimshaw skull came to the Museum as part of the Warren Natural History Collection, which was purchased in 1906 by banker and Museum Trustee J. Pierpont Morgan. The collection had been put together by Dr. John Collins Warren (1778–1856) and is best known for the Warren Mastodon, a massive fossil skeleton now on display in the Paul and Irma Milstein Hall of Advanced Mammals on the fourth floor.

Free for Members, *Whales: Giants of the Deep* is on view through January 5.

TELLING ARTIFACTS

The scrimshaw skull is displayed in a case called “The Age of American Whaling from the Collection of American Museum of Natural History,” which also showcases a logbook with entries from 1830 to 1833 from the whaling ship William Rotch, which sailed out of New Bedford, Massachusetts, and two metal harpoon points, a circa-1900 glass whale-oil lamp, and an illustrated 1930 edition of Herman Melville’s 1851 classic whaling tale, *Moby-Dick*.

FITTING SUBJECTS

Naturally, nautical themes abound in scrimshaw engravings. Portraits were also a popular subject, as well as scenes inspired by historic and cultural events. Scrimshaw scholar Stuart M. Frank writes in *The Magazine Antiques* that it isn’t surprising to see allusions to the theater, music, and literature of the day. He explains, “Yankee whalers were characteristically literate and, as a class, avid readers.”

FARTHER AFIELD

Whales: Giants of the Deep also includes examples of scrimshaw as practiced by indigenous peoples in the 19th century. An exquisite polished sperm whale tooth *tabua*, or ceremonial treasure from Fiji, features an image of a woman in period dress. An elaborately engraved walrus tusk from the Inuit of western Alaska shows boats, dog sleds, land and sea animals, and hunters harpooning whales.

DEADLY UPDATE

Modern examples of scrimshaw in the *Whales* exhibition include a whale’s tooth engraved by a crew member of a Soviet whaling fleet in 1958. It depicts the mechanization of the trade: a whale-spotting helicopter hovers above a ship poised to pursue the whale with devastating exploding-head harpoons. The International Whaling Commission banned the commercial hunting of whales in 1986.

NOTED COLLECTOR

Boston physician John Collins Warren, who collected this scrimshaw skull, came from a prominent family of doctors and was one of the founders of the *New England Journal of Medicine* and first dean of Harvard Medical School. He amassed collections of paleontological and geological specimens in addition to an anatomy collection that helped establish Harvard’s Warren Anatomical Museum.

SEPARATION



UPPER ATMOSPHERE



ENTRY



CHUTE



HEAT SHIELD DROP



THE ATMOSPHERE



MISSION To JUPITER

On December 7, 1995, a crowd gathered in an auditorium at the Jet Propulsion Laboratory, in Pasadena, California, waiting for an event that had been years in the making.

At 8:04 pm PST, a stout, 4-foot (1.25 meter)-wide, wok-shaped robotic probe, which had been released from the unmanned Galileo spacecraft five months before, finally reached its destination: the atmosphere of the giant planet Jupiter.

As planned by NASA engineers, the small probe, with a mass of 750 pounds (339 kilograms) and packed with seven scientific instruments, plunged into the planet's atmosphere at the mind-boggling speed of about 106,000 miles (170,000 kilometers) per hour. "From down inside Jupiter's atmosphere," a NASA report lyrically imagined, the probe would resemble "a spectacular fireball, streaking east out of the setting sun and towards the gathering night." Before the probe melted in the intense heat and pressure of the Jovian atmosphere, scientists hoped it would take measurements

and send them back to the Galileo spacecraft, which remained in orbit around Jupiter to relay the information home to Earth via NASA's famed Deep Space Network.

The descent lasted 57 minutes. Quickly slowed by the thick layer of gases in Jupiter's atmosphere, the probe released one of its parachutes, dropped remnants of its heat shield, and, swaying beneath its main chute, established a radio link with the Galileo Orbiter. In less than an hour, the little probe managed to send home data about the planet's sunlight,

temperature, winds, and more—including measurements that would help provide more evidence supporting the Big Bang theory of the formation of the universe.

When *Dark Universe*, the new Hayden Planetarium Space Show, opens at the Museum on November 2, viewers will have a you-are-there view of the probe's breathtaking drop—one of the more dramatic episodes in the history of unmanned missions and an exhilarating story about the new age of discovery that is revealing more about our surprising universe.

MISSION BY THE NUMBERS



Miles traveled by Galileo probe through Jupiter's atmosphere:

97

Speed as the probe entered the atmosphere:

106,000
miles per hour

Minutes Galileo probe descended:

57

G's Galileo probe experienced entering Jovian atmosphere:

230

Images of Jupiter (taken from Voyager mission) "stitched" together to create a high-resolution mosaic for the Space Show:

143

PERILOUS JOURNEY

Named for the famed Florentine astronomer, the spacecraft Galileo was launched aboard Space Shuttle Atlantis in 1989. By then, a mission to Jupiter had been in the works for decades.

The most massive planet in our solar system, the gas giant Jupiter has no solid surface and boasts dozens of moons with a variety of fascinating features, from active volcanoes on Io to icy surfaces on Europa. Flybys by four other spacecraft in the 1970s suggested there was much more to learn from Jupiter, not just about the planet itself but also about the formation of the universe.

"At that point, we had tantalizing hints about the structure and composition of the Jovian atmosphere, but had no solid evidence from direct measurements," explains Mordecai-Mark Mac Low, curator in the Museum's Department of Astrophysics who curated the new Space Show. "The Galileo probe was designed to dive into the atmosphere to make those measurements."

But the Galileo mission—which included flybys of Venus, Earth, and even an asteroid en route to Jupiter—faced a big setback a year and a half into its six-year journey. The spacecraft's 15-foot (4.6 meter)-wide, umbrella-like communications antenna—called a high-gain antenna and designed to transmit data back to Earth—did not open. Without that antenna, the ability of the spacecraft to send home information about what it learned at Jupiter was in jeopardy.

For several weeks after the failure, a special team of more than 100 technical experts from the Jet Propulsion Lab and elsewhere worked to diagnose the problem. Was the issue something to do with the orbital path of the spacecraft? Or had the problem existed at the time the craft left Earth? (Ultimately, the long delay for

launch after the Challenger space shuttle explosion in 1986 was determined to have played a role: lubricant had drained out of the umbrella mechanism.) The antenna remained useless, forcing a different approach.

Finally, the team developed new software so that data could trickle back via the functional low-gain transmission antennas instead—saving the mission, but at a cost. Instead of a high-speed data link, the spacecraft was communicating at the speed of an ancient 300-baud modem.

Still, the solution kept Galileo in service—and on track to collect important data well through 2005, when the spacecraft finally ran out of power. (That year, NASA crashed the craft into Jupiter, after it had covered more than 4 billion miles.) The mission's discoveries about Jupiter were many: that meteorite impacts had created the planet's dust-grain rings, that

its moon Europa seems to have a salty ocean beneath its frozen surface, and that Jupiter's atmosphere has thunderstorms, with lightning strikes up to 1,000 times more powerful than lightning on Earth.

And then there was the data transmitted back by the probe. A mass spectrometer was on board to measure the chemical composition of Jupiter's atmosphere. At the time, NASA engineers voiced excitement about collecting information about the formation of the solar system, such as measuring the concentration of noble gases (which never freeze or liquefy) in Jupiter's atmosphere, to see whether their concentrations matched those known to be present during the formation of the solar system, about 4.5 billion years ago.

But a different measurement—one that wasn't touted much in the run-up to Galileo's arrival at Jupiter—ended up gathering evidence in support of the Big Bang theory as well.

**"WE HAD
TANTALIZING HINTS
ABOUT THE JOVIAN
ATMOSPHERE...BUT
NO SOLID EVIDENCE."**

PROOF IN COLD STORAGE

To understand how the Galileo probe could find information about the formation of the vast universe on relatively nearby Jupiter, it helps to review the Big Bang theory.

Some 13.8 billion years ago, the universe was everywhere extremely hot and dense. It expanded explosively fast, cooling as it did so, and its energy condensed into particles of matter—the protons, neutrons, and electrons that make up the atoms we know. The Big Bang theory posits that the universe remained hot enough for a short time for heavier atoms to fuse together from the protons, normal hydrogen nuclei, and neutrons, including helium, lithium, and a small amount of hydrogen with an extra neutron tacked on, called deuterium. Once the temperature had fallen too low to sustain further nuclear fusion everywhere, heavy atoms could only be produced by fusion in the centers of stars. But

**THE DATA, SAYS
DR. MAC LOW,
"AGREE[S] EXTREMELY
WELL" WITH THE BIG
BANG THEORY.**

stars cannot form deuterium, only destroy it. If the Big Bang theory holds, there should be evidence in the universe that the deuterium abundance is lower than it was predicted to be right after the Big Bang. "If you can get a measurement of deuterium someplace where it's been reasonably well preserved in the eons since the Big Bang," says Mac Low, "then you can check the prediction of the abundance formed during the initial expansion of the universe."

But there aren't that many places that retain the primordial proportions of these elements. The abundance of deuterium in stars falls over time as it is destroyed. Our own planet Earth is so small that most of its hydrogen has escaped, so there is actually more heavy deuterium relative to hydrogen here than you might expect. But since Jupiter is so massive—it comprises some two-thirds of all the mass of the planets—its gravity keeps hydrogen

and deuterium from escaping. As Mac Low explains, "Jupiter functions as a cold storage locker for deuterium."

When Galileo's probe parachuted into Jupiter's atmosphere, its mass spectrometer measured information about the hydrogen-deuterium ratio—data that researchers back on Earth were able to analyze. "It turns out," Mac Low says, "to agree extremely well with the predictions of the Big Bang theory."

Other measurements from even more ancient sites provided additional confirmation. During the same period, researchers managed to measure light from bright, distant quasars that passes through intervening, almost pristine gas clouds in space that had never formed stars and so were a relatively clean sample of the atoms produced in the Big Bang. By measuring which light-wavelengths are absorbed by these clouds, astronomers

have been able to infer that they, like the much younger Jupiter, contain the ratio of deuterium to hydrogen predicted by the Big Bang theory. While the probe's mission to Jupiter's atmosphere didn't provide the definitive proof

of the Big Bang theory by itself, it is, like many scenes in the new Space Show, an example of how researchers work to make the most of each and every foray into space, and how discoveries build on one another to confirm astonishing ideas—such as that the entire universe was once hotter than the center of a star. Each new finding adds to our knowledge of the universe beyond—and raises intriguing new questions as well.

Members are invited to exclusive evening screenings on October 30 and November 1. Please see page 14 for details.

DARK UNIVERSE
OPENS NOVEMBER 2

The spectacular new Hayden Planetarium Space Show *Dark Universe* details the pivotal discoveries that have given today's astronomers unprecedented knowledge of the universe—and uncovered great cosmic mysteries, such as dark matter and dark energy.

Narrated by astrophysicist Neil deGrasse Tyson, the Space Show is curated by Museum Curator Mordecai-Mark Mac Low, directed by Director of Astrovisualization Carter Emmart, and produced by a highly acclaimed team that includes data visualization experts and educators.

Dark Universe was created by the American Museum of Natural History, the Frederick Phineas and Sandra Priest Rose Center for Earth and Space, and the Hayden Planetarium.

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The Power of Poison

As Medicine

The common yew, *Taxus baccata*, is a familiar feature in European churchyards and cemeteries.

© Alan Watson

The yew tree, *Taxus*, has a legendary connection to death. Its seeds, leaves, and bark are highly poisonous to humans. In recent decades, however, this long-lived plant genus has earned a different reputation: as a potential preserver of life.

In the 1960s, researchers working for the U.S. National Cancer Institute discovered that the bark of *Taxus brevifolia*, the Pacific yew, contained a toxic ingredient that could be harnessed on a cellular level to inhibit the progress of some cancers. A derived compound known as paclitaxel, produced in the laboratory and available commercially since the late 1990s, has been found to be effective in the treatment of breast, lung, and other cancers, as well as AIDS-related Kaposi's sarcoma. It has also been found useful in preventing a re-narrowing of coronary arteries in stent recipients. The drug is a prime example of the use of poisons in the service of medicine, a challenge to the modern view of poison as an instrument of death, whether by accident, suicide, or murder most foul.

Of course, nature's poisons have been used for medicinal purposes for millennia. Small doses of opium, mandrake, henbane, and hemlock numbed the pain of surgery for more than 1,000 years. In William Shakespeare's time, 400 years ago, poisonous extracts were combined into cough medicine. Well into the 20th century, mercury was an ingredient in popular remedies, from purgatives to infants' teething powder.

But modern scientific techniques have allowed researchers to better understand, and then take advantage of, the underlying mechanisms by which plant toxins and animal venoms attack normal metabolic processes. For example, some neurotoxins block the release of chemical messengers called neurotransmitters; some stop neurotransmitter messages from being received; some send false signals; and still others disrupt nerve cell activity by opening channels in cell walls. If muscles in the heart or lungs fail to get the proper signal to function, the results are fatal. But applying the same effect in nonlethal doses can stem tremors or the registering of pain.

Nature’s Remedies



Cone snail shells

PAIN MANAGEMENT: CONE SNAIL
Conus

Chemist Mandë Holford, an assistant professor at City University of New York’s Hunter College and a Museum research associate, travels to tropical seas all over the world to study cone snails and their relatives. Lovely to look at but lethal, these marine mollusks paralyze prey with various unique poisons that are delivered by a harpoon-like proboscis. Compounds derived from cone snail venom, which works by disrupting nerve signals, are being studied as possible treatments for epilepsy, Alzheimer’s disease, Parkinson’s disease, and depression. A synthetic version of cone snail venom that works as a spinally injected painkiller was approved for use in the U.S. in 2004.

PREVENTING HEART ATTACK: CHILEAN ROSE TARANTULA
Grammostola rosea

This large spider, which earns its common name from its country of origin and distinctive color, produces a protein in its venom that seems to regulate heartbeat. This protein, Peptide GsMtx-4, might be used to create drugs that prevent dangerous fibrillation and heart attack. Some studies indicate it also might reduce pain and possibly be effective against muscular dystrophy. Despite its fierce appearance, this tarantula is generally harmless to humans and is even a popular pet.

TREATING CANCER: MANGROVE TUNICATE
Ecteinascidia turbinata

A filter-feeding sea squirt, *Ecteinascidia turbinata* is the source of the alkaloid ecteinascidin-743, now semi-synthesized as trabectedin, which has been shown to reduce or stabilize the growth of cancerous tumors. The saclike invertebrate is mainly found in colonies on the roots of mangrove trees in the warm waters of the Caribbean, coastal Florida, Bermuda, and the Gulf of Mexico.

“What is a poison?” asks Mark Siddall, curator in the Division of Invertebrate Zoology who is also curator of the special exhibition *The Power of Poison*, which opens November 16. “It’s a substance that interferes with normal physiological processes, that alters or stops them, or makes things happen. That is essentially what medicines are, too.”

The potential for tapping nature is staggering. By conservative estimates, some 100,000 animals, from lizards and snakes to sea anemones and jellyfish, produce venom, which in turn can contain hundreds of different toxins. So far, only about 10,000 animal toxins have been identified, and 1,000 of these have been studied in depth, with a view to developing drugs. The anticoagulants tyrofabin and hirudin were derived from animal sources, respectively, the blood-thinning venom of the African saw-scaled viper and a substance secreted by leeches. The diabetes drug Exenatide, which lowers blood sugar and increases the body’s production of insulin, is a synthetic version of a component in the saliva of Gila monsters, large venomous lizards found in the southwestern U.S. and northwestern Mexico. The development of the first oral ACE (angiotensin-converting enzyme) inhibitor, which treats hypertension, was based on an understanding of how the venom of the Brazilian pit viper, *Bothrops jararaca*, causes a drastic drop in blood pressure in its prey.

Plants are an even richer mine, with more than 400,000 identified species and many of them toxic to one degree or another. Fixed in place, plants are especially adept at producing chemical defenses against insects, larger plant-eaters, and even other plants—a process that has allowed land plants to flourish for about 450 million years. Caffeine and nicotine are both plant-based products with well-known pleasurable effects on the body until taken in excess, revealing their essentially poisonous nature. (For an upcoming course about these and other poisons’ effects on the brain, see “Pick Your Poison,” opposite.) But just as with animal toxins and venoms, plant compounds that affect the human body can be employed for medicinal purposes. Salicylic acid, the active ingredient in aspirin, for example, is found in a number of plants, including the willow tree *Salix*, from which it takes its name. Similarly, the antimalarial drug artemisinin is derived from the herb sweet wormwood, *Artemisia annua*.

“POISON IS A SUBSTANCE
THAT INTERFERES WITH
NORMAL PHYSIOLOGICAL
PROCESSES. THAT IS
ESSENTIALLY WHAT
MEDICINES ARE, TOO,”
SAYS SIDDALL.

© AMNH/C. Chesek

Pick Your Poison:
A Sackler Brain Bench Adult Course

The world is a pretty toxic place. We are surrounded by animals, plants, and chemicals that can poison us, though we usually take in our favorite toxins—coffee, chocolate, and alcohol—in non-lethal doses. What’s more, entire industries try to sell products that promise to improve or alter brain performance. But what happens to our brain chemistry when we use antidepressants, amphetamines, or caffeine? Why do we poison ourselves for pleasure, and why is it difficult to overcome substance addiction? Do animals take drugs? Participants will use a headset to measure their own brainwaves and learn how the technique is used to study the effects of mind-altering substances; gain a better understanding of which chemicals, and at what dosages, influence brain function and when we are most vulnerable to “poisoning” ourselves; discuss current scientific research on the topic; and receive resources that can inform decisions about long-term health.

This five-part course will be held on November 4, 18, 25, and December 2 and 9, from 6–8 pm. Member price is \$240. Visit [amnh.org/calendar](#) to purchase tickets.

The Museum greatly acknowledges The Mortimer D. Sackler Foundation, Inc. for its support to establish The Sackler Brain Bench, part of the Museum’s Sackler Educational Laboratory, in the Spitzer Hall of Human Origins, offering ongoing programs and resources for adults, teachers, and students to illuminate the extraordinary working of the human brain.

Member Preview: *The Power of Poison*
Thursday, November 14
4 to 8 pm

Be among the first to view this exciting new exhibition, which explores poison’s paradoxical roles in nature, human health and history, literature, and myth. Whether as a defense against predators, a source of magical strength, or a lethal weapon used as lifesaving medical treatment, the story of poison is surprising at every turn. Then, join fellow Members for a glass of wine in the Akeley Hall of African Mammals.

Please enter at Central Park West and 79th Street. Wheelchair and stroller access is available below the main steps. Free for Members; registration required. RSVP to the Membership Office at 212-769-5606 by Friday, November 8.

Member Happy Hour
Wednesday, November 20
6 to 8 pm
\$25 per person
Enjoy cocktails by the *Barosaurus* in the historic Theodore Roosevelt Rotunda and visit the new exhibition *The Power of Poison* after hours in this special evening for Members ages 21 and up. Open bar included. Limited tickets available.

“Plants and animals are doing complex biochemistry all the time, creating things we couldn’t imagine making without the temperature of the Sun and the pressure of the center of the Earth,” says Dr. Siddall. In many ways, nature is one huge laboratory, making and testing countless plant and animal substances in each species’ efforts to prevail. In what has been called an evolutionary arms race, as predators up the potency of their poisons, prey strengthen their resistance. This is especially apparent at the microscopic level, where microbes compete endlessly by developing their own antibiotics to fight off other microbes, teaching us in turn what works and what doesn’t. Bacteria, algae, and fungi, including molds, that produce toxins could all potentially yield medicines. As it turned out, *Taxus*, the yew tree, was not the original source of the toxic compound used to create the chemotherapy drug: it was a fungus living in the yew tree’s bark.

RESEARCHERS ARE IN A RACE
AGAINST TIME AS THEY SEEK
TO UNLOCK THE POTENTIAL
OF POISONS.

Other examples of small but powerful agents abound. The microbe *Clostridium botulinum*, one of the most toxic substances, is known to most of us as a deadly source of food poisoning in improperly sterilized canned foods. One-millionth of a gram can kill a person, causing fatal paralysis by blocking the release of acetylcholine, a neurotransmitter used by the nerves to signal muscles to contract. In carefully controlled doses, it is famously used as Botox to eliminate wrinkles by paralyzing muscles that, when tensed, cause folds in the face. But it can also be used selectively to treat cerebral palsy spasms, stop uncontrolled jaw clenching, correct crossed eyes, or moderate sweating or twitching.

Whether at the microscopic level or the level of plants and animals, researchers are in a race against time as they seek to unlock the potential of poisons. “Habitat loss from overpopulation, climate change, and other factors have put more species of plants and animals at risk,” says Siddall.

Consider those toxin-rich snakes: by conservative estimates, one in five reptiles are now threatened with extinction, losses that could radically diminish a promising source for healing. “If the world was populated by only pine trees and pandas,” says Siddall, “we wouldn’t have this rich diversity of resources to help us understand the physiology of diseases and find out what’s out there that might target them.”

The Power of Poison, which opens November 16, is free for Members. *The Power of Poison* was developed by the American Museum of Natural History and curated by Dr. Mark Siddall, curator in the Division of Invertebrate Zoology.

Programs and Events

For more programs and to purchase tickets, visit amnh.org/calendar.

For updates and reminders, sign up for monthly **Calendar Highlights for Members** by sending your membership number and request to subscribe to members@amnh.org. The Museum does not trade, rent, or sell this information.

Tickets

Tickets are available by phone at 212-769-5200, Monday–Friday, 9 am–5 pm, or by visiting amnh.org. Please have your Membership number ready.

Availability may be limited. Please purchase tickets in advance.

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

Double Discount Days
Get a head start on holiday shopping! The Member discount in Museum shops doubles to 20 percent from November 13–19 and December 9–16.

Member Screenings:
Dark Universe
Wednesday, October 30
Friday, November 1
6:15–6:45 pm or 7-7:30 pm
\$12 (\$8 child)
Be among the first to enjoy the new Space Show *Dark Universe*, featuring the best in space visualization and narration by **Neil deGrasse Tyson** the Frederick P. Rose Director of the Hayden Planetarium.

OCTOBER

Birding in Prospect Park
Saturday, October 12
10 am–1 pm
\$25
Join Museum ornithologist **Paul Sweet** for the fall migration through Brooklyn’s Prospect Park.

Member Highlights Tour
Sunday, October 13
10:30 am
Sunday, November 10
3 pm
Free (Registration required; call 212-769-5200)
Join an expert guide for a tour of Museum highlights, including classic dioramas and fossil skeletons.

High Moon over the Amazon
Tuesday, October 15
6:30 pm
Free for Members (Reservations required; call 212-769-5200)
Primatologist **Patricia Chapple Wright**, author of *High Moon over the Amazon: My Quest to Understand the Monkeys of the Night*, discusses her work.

Margaret Mead Film Festival
Thursday, October 17–
Sunday, October 20
\$10 (\$15 Opening and closing nights)
This year’s theme, “See for Yourself,” invites audiences to discover connections between themselves and the spectacular variety of individuals, societies, and approaches to living presented in an outstanding lineup of documentary films. For more, see amnh.org/mead.

Life at the Speed of Light
Monday, October 21
7 pm
\$12
In a special lecture, pioneering geneticist **Craig Venter** describes his current work and new book, *Life at the Speed of Light*; book signing to follow.

Behind the Scenes in Anthropology: Whales
Tuesday, October 22
6:30–7:30 pm (family-friendly tour), 7-8 pm, 7:30-8:30 pm
\$35
Explore whale-related cultural artifacts in the Museum’s rich collections with Assistant Curator for Pacific Ethnology **Jennifer Newell**.

A Night at the Museum Sleepover: Halloween
Friday, October 25
\$135 per person
Join a special costumed sleepover for children ages 6–13 and a caregiver.

The Grand Tour
Tuesday, October 29
6:30 pm
\$12
Explore planets as you “fly” through the Digital Universe Atlas in the Hayden Planetarium Space Theater.

18th Annual Halloween Party
Thursday, October 31
4-7 pm
\$10
Trick-or-treat in the Museum’s halls with arts, crafts, and more.

Exhibitions

Admission is by timed entry only.

Whales: Giants of the Deep
Free for Members
Come closer than ever to some of the mightiest, most massive, and mysterious marine mammals. *Whales: Giants of the Deep* features life-sized models, interactive exhibits, films, and more than 20 whale skulls and skeletons.

The Power of Poison
Opens Saturday, November 16
Free for Members
Explore poison’s paradoxical roles in nature, myths, and human health and history, and help solve puzzling poisoning cases in this exciting new exhibition. Live presenters in the Detecting Poisons theater will share real-world cases and highlight dramatic advances in toxicology and forensics detection.

Please check amnh.org for Member ticket prices for live-animal exhibits, IMAX films, and Space Show.

The Butterfly Conservatory
Opens Saturday, October 12
Mingle with live, free-flying tropical butterflies.

Frogs: A Chorus of Colors
Explore the diverse world of frogs.

Hayden Planetarium Space Show: Dark Universe
Opens Saturday, November 2
Narrated by **Neil deGrasse Tyson**, the new Space Show celebrates pivotal discoveries and the cosmic mysteries that remain.

LeFrak IMAX Theater
Penguins
A King Penguin and his mate raise an offspring in this giant-screen adventure narrated by **Sir David Attenborough**.

NOVEMBER

Sackler Brain Bench: Pick Your Poison
Mondays, November 4, 18, 25, and December 2 and 9
6–8 pm
\$240 for the series
See pg. 13 for details about this new course for adults.

Science Fiction Atmospheres
Monday, November 4
7:30 pm
\$12
Raymond T. Pierrehumbert discusses speculations about imagined planetary atmospheres in science fiction—and what we know about exoplanets in real life.

SciCafe: The Story of the Human Body
Wednesday, November 6
7 pm; doors open 6:30 pm
Free for 21+ with ID
Evolutionary biologist **Daniel Lieberman** discusses factors that shaped the human body since we diverged from the apes. *This SciCafe event is presented in collaboration with The Leakey Foundation.*

A:shiwi A:wan Ulohanne: The Zuni World
Opens Thursday, October 17
Free for Members
For a limited time, see modern Zuni paintings depicting ancestral sites throughout the Colorado Plateau. Reflecting a rising “indigenous mapping” movement, the paintings were created by Zuni artists advised by Zuni elders, in partnership with the A:shiwi A:wan Museum and Heritage Center in Zuni, New Mexico.

Behind the Scenes in Invertebrate Zoology: Poisonous Insects
Thursday, November 7
6:30–7:30 pm (family-friendly tour)
7–8 pm, or 7:30-8:30 pm
\$35
Curatorial Associate for Invertebrate Zoology **Christine Johnson** shares the world of poisonous insects and arachnids. For ages 10 and up.

Taste the Museum: Tea Ceremonies
Thursday, November 7
\$40
6:30 pm
Take an after-hours culinary journey through the Museum halls and learn about tea ceremonies from around the world.

Family Astronomy in the Dome: Constellations across Cultures
Saturday, November 9
6:30 pm
\$10
Learn new constellations in the night sky as you discover how people in other parts of the world view these same patterns.

Member Nature Trip to Oyster Bay
Saturday, November 9
9 am–5 pm
\$90
Journey to Oyster Bay, one of Theodore Roosevelt’s beloved bird-watching sites, for stops including the grounds of Roosevelt’s home at Sagamore Hill and the Theodore Roosevelt Sanctuary & Audubon Center for a live-raptor presentation.

The Wallace Centenary: Natural Selection and Beyond
Tuesday, November 12
9:30 am–4:30 pm
Free (Reservations required; call 212-769-5200)
In celebration of the centenary of his death, this special all-day program features a diverse roster of speakers on naturalist-explorer Alfred Russel Wallace’s life and work.

Alfred Russel Wallace and the Birds of Paradise
Tuesday, November 12
7:30 pm
\$12
To cap off the Wallace centenary celebration, internationally celebrated wildlife filmmaker **Sir David Attenborough** will give a special lecture.

Member Preview: The Power of Poison
Thursday, November 14
4–8 pm
Free for Members (Registration required by Friday, November 8; call 212-769-5606)
Please see page 13 for details.

Member Happy Hour
Wednesday, November 20
6–8 pm
\$25 for 21+ (Registration required call; 212-769-5200)
Enjoy a special night for adult Members with open bar, music, and mingling with fellow patrons, and visit the new exhibition *The Power of Poison*.

Credits
Whales: Giants of the Deep was developed and presented by the Museum of New Zealand Te Papa Tongarewa. This exhibition was made possible through the support of the New Zealand Government.

The American Museum of Natural History gratefully acknowledges the **Richard and Karen LeFrak Exhibition and Education Fund**.

Generous support for Whales has been provided by the Eileen P. Bernard Exhibition Fund.

Frogs: A Chorus of Colors is presented with appreciation to Clyde Peeling’s Reptiland.

Lord & Taylor is the proud sponsor of The Butterfly Conservatory.

Generous support for The Butterfly Conservatory has been provided by the Eileen P. Bernard Exhibition Fund.

Credits continue on page 16

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Rendezvous with ISON, Comet of the Century?
Tuesday, November 26
6:30 pm
\$12
Join **Joe Rao** in the Hayden Planetarium to discuss Comet ISON, which will come within 750,000 miles of the Sun’s surface on Thanksgiving Day.

DECEMBER

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SciCafe: How Plants Domesticated Humans
Wednesday, December 4
7 pm; doors open at **6:30 pm**
Free for 21+ with ID
Anthropologist and biologist **Fatimah Jackson** discusses the fascinating story of co-evolution between plants and humans.

.....

OrigamiFest for Members
Sunday December 8
10:30 am–2:30 pm
(30-minute sessions)
\$5
(Registration required; call 212-769-5200)
Create an assortment of ornaments with volunteers from OrigamiUSA to take home for the holidays.

.....

Neutrino Hunters
Monday, December 9
7:30 pm
\$12
Renowned astrophysicist **Ray Jayawardhana** takes a thrilling journey into the world of neutrinos and the lives of those who chase them.

.....

Behind the Scenes in Mammalogy: Weasels, Sloths, and Armadillos
Thursday, December 12
6:30–7:30 pm (family tour)
7–8 pm , 7:30–8:30 pm
\$35 (For ages 10 and up)
Explore the Museum’s extensive mammal collections with a specific focus on the Xenarthra and Mustelidae families. Collections Manager **Neil Duncan** will discuss the diverse world of weasels, and Senior Scientific Assistant **Eileen Westwig** will describe how sloths, anteaters, and armadillos are related.

Winter Solstice Party
Thursday, December 19
6:30 pm
\$12
Join Hayden astronomers and members of the Amateur Astronomers Association in the Hayden Planetarium Space Theater. Then, weather permitting, head outside to observe with telescopes.

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Kwanzaa 2013!
Saturday, December 28
Noon–5 pm
Free
Join the Museum’s 35th annual Kwanzaa celebration to experience the rich traditions of this holiday with family-friendly activities, raffles, and an international marketplace. Storyteller **Linda Humes** will host, joined by IMPACT Repertory Theatre, Ugandan poet **Emilia Ottoo**, Balance Dance Theatre, and more.

Credits:
The Margaret Mead Film Festival is made possible by the New York State Council on the Arts with the support of Governor Andrew Cuomo and the New York State Legislature.

The American Museum of Natural History gratefully acknowledges HBO, Inc. for its generous support of the Mead Films and cultural programming for New York City Public High Schools.

Additional support provided by the Consulate General of the Federal Republic of Germany and India Tourism

The Museum greatly acknowledges The Mortimer D. Sackler Foundation, Inc. for its support to establish The Sackler Brain Bench, part of the Museum’s Sackler Educational Laboratory for Comparative Genomics and Human Origins, in The Spitzer Hall of Human Origins.

Support for Hayden Planetarium Programs is provided by the Schaffner Family.

Support for Kwanzaa 2013! is provided, in part, by the Sidney, Milton and Leoma Simon Foundation, the May and Samuel Rudin Family Foundation, Inc., the family of Frederick H. Leonhardt, and the Weinig Foundation.

OCTOBER

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Birding in Prospect Park

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Member Highlights Tour

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High Moon over the Amazon with Patricia Chapple Wright

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Margaret Mead Film Festival Opening Night

The Zuni World opens

18
Friday
Margaret Mead Film Festival

19
Saturday
Margaret Mead Film Festival

Natural Histories opens

20
Sunday
Margaret Mead Film Festival Closing Night

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Life at the Speed of Light with Craig Venter

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Behind the Scenes in Anthropology: Whales

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A Night at the Museum Sleepover: Halloween

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The Grand Tour

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Wednesday
Member screening Dark Universe

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18th Annual Halloween Party

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NOVEMBER

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Member screening *Dark Universe*

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Saturday
New Hayden Planetarium Space Show *Dark Universe* opens

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Sackler Brain Bench: Pick Your Poison begins

Science Fiction Atmospheres with Ray Pierrehumbert

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SciCafe: The Story of the Human Body with Daniel Lieberman

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DECEMBER

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Wednesday
SciCafe: How Plants Domesticated Humans

8
Sunday
OrigamiFest for Members

9
Monday
Neutrino Hunters with Ray Jayawardhana

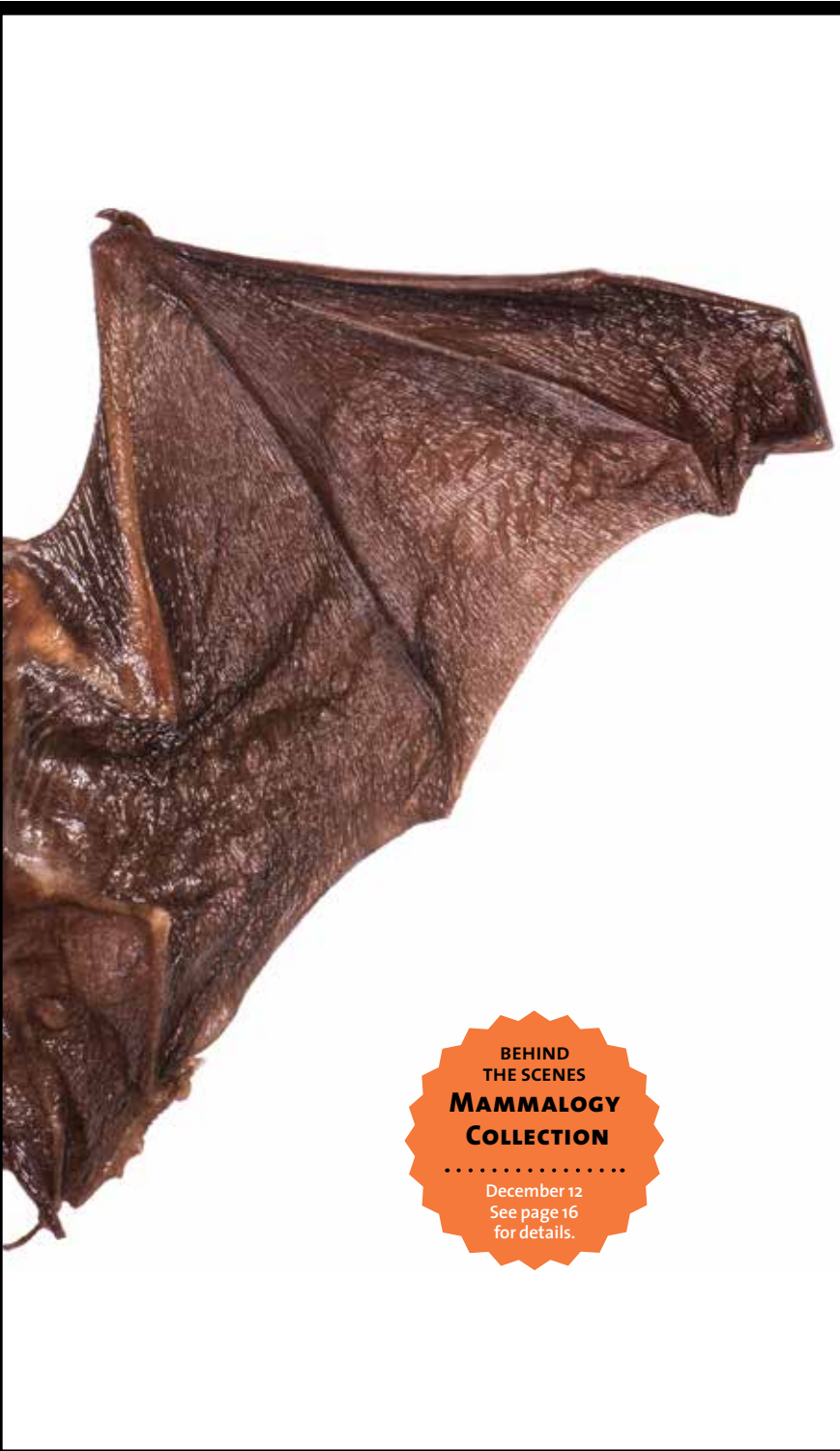
12
Thursday
Behind the Scenes in Mammalogy: Weasels, Sloths, and Armadillos

19
Thursday
Winter Solstice Party

28
Saturday
Kwanzaa 2013!

CURIOUS
COLLECTIONS

Rotunda delves deep into the Museum’s collecting and collections.



BEHIND
THE SCENES
**MAMMALOGY
COLLECTION**
.....
December 12
See page 16
for details.

New Bat Species:
Thyroptera minuta

Disk-winged bats, Thyropteridae, are rarely found by the usual method—mist nets—because their sonar is so sensitive they can detect even the fine threads of the net and fly above it. Researchers have to search carefully for males and their harems in their roosting sites of choice, large furred leaves. This is what Museum Curator Rob Voss was doing early last year in Peru when he accidentally discovered an entirely new species.

The genus name *Thyroptera* means “disk-shaped wing” and refers to suction-cup-like attachments or disks on the bat’s wrists and ankles used to cling to smooth surfaces like the insides of leaves. The most common species is *Thyroptera tricolor*, described in 1823 by Johann Baptist Ritter von Spix, a German biologist. Until now, there were only three others: *Thyroptera discifera*, *Thyroptera devivoi*, and *Thyroptera lavalii*.

Dr. Voss suspected something was unusual about the bat he had just flushed out of a curled-up, dried *Cecropia* leaf. For one thing, the bat, a male, seemed too small. Other aspects didn’t add up: color, the number of bumps of cartilage on its heel bone, and the shape of its discs. Back in the lab, more evidence came when Postdoctoral Fellow Paul Velazco studied the skull and teeth. The teeth of insect-eating mammals, like bats, mesh precisely and the structure is unique to each species. Dr. Velazco’s study of *Thyroptera* specimens at several museums confirmed that this was indeed a new, previously undiscovered species, *Thyroptera minuta*—so named for its small size.

The type specimen—against which all *Thyroptera minuta* will be measured—will eventually be returned to Peru.



Pith Paper Butterflies

Among the Museum library’s rare books is a silk-covered album containing over 100 beautiful hand-painted butterflies on a dozen plates produced sometime between 1830 and 1871. A fine example of Chinese trade art intended for Western consumption, the book is important for two reasons: for the pith paper—unique to this genre—on which its illustrations were painted and as a window on a particular period in Chinese history.

Pith paper is made from the soft fibrous material, or pith, found on the inside branches of the small tree *Tetrapanax papyriferus*, sometimes called rice-paper plant. (This is a misnomer, based on early mistaken references to pith paper as “rice paper”; actual rice paper is made from parts of the rice plant.) The pith is extracted by pushing a dowel through harvested branches that have soaked in water for days. It is dried and cut into thin slices, producing pages of soft, almost translucent paper used to fashion paper flowers or painted with watercolor and gouache. Pith paper retains color well, especially concealed from sunlight within an album. Impervious to erasure or alteration, it is also unforgiving, attesting to the skill of the artisans who mass-produced these exquisite paintings.

Watercolor souvenir books were ideal exports when trade with the West opened up after China’s defeat in the Opium War in 1842. They were inexpensive and easy to pack, especially compared to heavy oil paintings. Curiously, the butterflies depicted have no scientific value to entomologists as they are inaccurate, deliberately fanciful representations.

Robber Fly: *Wyliea mydas*

Mimicry is common in nature, allowing an animal or insect to sneak in closer to prey or to dupe and deflect predators by taking on a more dangerous species’ characteristics. A fascinating example of the latter can be seen in the robber fly *Wyliea mydas*, which mimics lethal spider wasps, *Pepsis formosa* and *Pepsis thisbe*, known as tarantula hawks.

Like *Pepsis formosa* and *Pepsis thisbe*, the robber fly has brilliant orange wings, nature’s “red flag” to other species. Bright colors—red, orange, yellow—tend to be poisonous warning colors throughout the animal world. The scientific name for this kind of warning is aposematism, which from its Latin roots means “signal from a distance.” (This phenomenon and other aspects of poison in nature are explored in the Museum’s special exhibition *The Power of Poison*, which opens November 16).

The robber fly’s deception goes even further. While it has a short proboscis for injecting toxic saliva into prey, it doesn’t sting. Nonetheless, it makes stinging motions, brandishing genitalia at the tip of its abdomen as if it had a stinger.

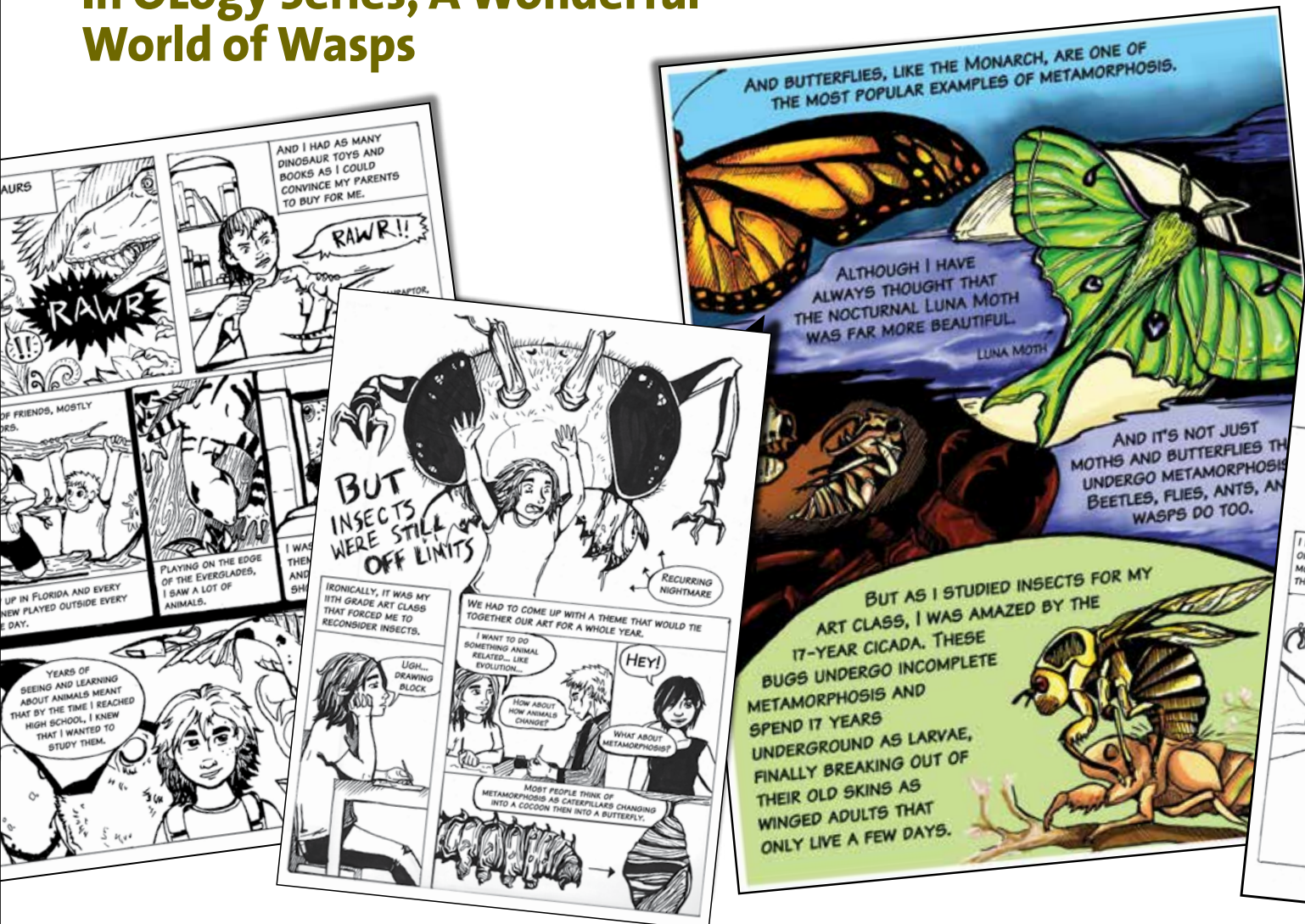
There are differences, of course, if one looks close. Flies have two wings, while wasps have four. Antennae are short on the fly and long on the wasp. But the stinging “act” and the orange wings are enough to lead many birds and lizards that might otherwise make a meal of it to bypass the fly for fear of being stung, since tarantula hawks are at the top of the list in the intensity of their sting.

Quite large—the robber fly’s wingspan is 2 inches; the tarantula hawk’s, slightly longer—both are distributed worldwide (in the U.S., mostly in the desert Southwest). Though the mimic fly does a great impersonation of the wasp, the name “robber” is not an allusion to identity theft—it’s a description of how they hunt. They are aerial predators, snatching insects out of the air.



BEHIND
THE SCENES
**POISONOUS
INSECTS**
.....
November 7
See page 15
for details.

In Ology Series, A Wonderful World of Wasps



How does a girl who hates insects grow up to be an entomologist?

The hero of a special new comic book series launched this summer on OLogy, the Museum’s award-winning website for kids, finds her inspiration while drawing 17-year cicadas for a high school art class—a moment familiar to the comic’s creator, Carly Tribull.

A second-year graduate student in the Museum’s Richard Gilder Graduate School, Tribull is the artist behind *Carly’s Adventures in Wasp Land*, an OLogy series that will feature four illustrated issues that introduce readers to wasps’ many fascinating features, from their unique anatomy to where they live and hunt. (In creating these educational comics, Tribull was also able to fulfill a teaching requirement for her Ph.D. program.)

Growing up near Florida’s Everglades, Tribull, who is 25, spent a lot of time outdoors and was always interested in both art and science. “I have always loved to draw,” says Tribull. “But I drew a lot of dragons and dinosaurs!”

Still, she adds, “I didn’t think I could do both. I’d thought I’d rather be a biologist, so I went off to go to UC-Berkeley

to major in biology.” But she also kept a hand in the art world by double majoring in fine art. It wasn’t until she accepted an internship in the entomology department of a small Texas university, however, that she had the chance to combine her scientific and drawing skills.

Even in this age of scanning electron microscopes and computed tomography (CT) scanners, the field of entomology retains a strong tradition of illustration. After all, many insects are very small, and rendering their bodies by hand allows researchers to magnify areas in drawings and to gain an almost tactile understanding of the subtle physical differences that often define a species.

Tribull’s work at the Museum, in fact, draws on her strong visual skills, as she examines hundreds of specimens of parasitic wasps—types that lay eggs in or on the bodies of beetles, caterpillars, or other insects. Using both physical characteristics and DNA evidence, Tribull is working to create a new evolutionary history of two families—the Dryinidae and Bethyridae—within the order Hymenoptera, which includes ants, bees, and wasps.

Illustration © AMNH/C. Tribull



And in producing the comics with OLogy, Tribull is also sharing her knowledge with the website’s many science-minded fans.

“Comics are a great way to teach science, even some of the more complicated concepts,” says Karen Taber, a senior project manager in the Museum’s National Center for Science Literacy, Education, and Technology, which produces OLogy. “We’re really excited about the natural appeal for kids who are interested in art or science—or both.”

Besides, who wouldn’t want to read about a girl who tastes a “fly smoothie” to learn about a solitary wasp, *Bembix americana*, in her underground home and learn about how these wasps help humans, raise their young, and more?

For more about *Carly’s Adventures*, visit amnh.org/ology.

The initial development of OLogy was made possible by a generous grant from the Louis Calder Foundation.



MORE AT THE MUSEUM FOR KIDS

Discovery Room
A gateway to the wonders of the Museum for children 5–12 with drop-in programs for preschoolers, “Meet the Scientist” Saturdays, and more.

Adventures in Science Camps and Workshops
Three-day workshops and week-long camps offer hands-on investigations on topics ranging from astrophysics to zoology for children in grades pre-K through 8.

Sackler Laboratory for Comparative Genomics and Human Origins, Spitzer Hall of Human Origins
In the Sackler Lab, families with children 8 years old and up can handle casts of hominid skulls, learn about DNA and the human brain, and ask a scientist questions during weekend afternoons.



1. The Science and Nature Program celebrated its 15th anniversary with founder and director Jane Kloecker (behind cake, right), Jean Rosenfeld, and Science and Nature Program teachers and students.

2. A mariachi band entertained guests at the Science and Nature Program's 15th Anniversary celebration on May 9.
3. Interns in the 2013 Museum Education and Employment Program (MEEP) spent their summer leading camp groups on themed tours of the Museum.



4. Members enjoyed a Summer Star Sail with astrophysicist Charles Liu on June 11.
5. Marcella Leone of the LEO Zoological Conservation Center brought a feathered friend to the Science and Nature Program 15th Anniversary Party on May 9.



Photos 1, 2, 4, and 5 © AMNH/R. Mickens; photo 3 © AMNH/D. Finnin



1. Danielle Lerner and Junior Council Co-Chairs Robin Roberts, Lori and Zach Pomerantz, and Brad Roberts enjoyed Jazz on the Terrace on June 27.
2. At the June 27 Junior Council event, Curator Michael Shara discussed stellar explosions in the Hayden Planetarium Space Theater.

3. Citi CEO Michael Corbat was honored at the 21st Annual Corporate Dinner on June 11.
4. Junior Council Steering Committee member Carla Franklin and friends during Jazz on the Terrace on June 27.

Save the Date! Upcoming Events at the Museum

OCTOBER

10/12 *The Butterfly Conservatory* returns with more than 500 live, free-flying tropical butterflies.

10/17–10/20 The annual **Margaret Mead Film Festival** features international documentaries, performances, intimate conversations with filmmakers, and more.

10/19 Enjoy a new exhibition, **Natural Histories**, featuring large-format reproductions of beautifully illustrated scientific works from the Museum Library's Rare Book Collection.

10/23 The **Twentieth Annual Family Party** features entertainment and hands-on activities, including activities in the Museum Science Center, for children of all ages. Please call 212-313-7161 for ticket information.

10/31 Trick-or-treat in the Museum's halls for the annual **Halloween celebration**.

NOVEMBER

11/2 The new Hayden Planetarium Space Show, **Dark Universe**, opens.

11/14 Members are invited to an **exclusive preview of *The Power of Poison***, an intriguing new exhibition that explores venoms and poisons in nature, myth, and human health and history.

11/16 ***The Power of Poison***, which is free for Members, opens to the public.

11/21 The dazzling **Museum Gala** helps support the Museum's scientific and educational work. For ticket information, please call 212-313-7161.

11/25 The delightfully decorated **Origami Holiday Tree** returns.

11/28 The Museum is **closed for Thanksgiving**.

DECEMBER

12/25 The Museum is **closed for Christmas**.

12/28 The Museum's 35th annual Kwanzaa celebration will feature performances, tastings, a market, and more.

JANUARY

1/8 **Walk on the Wild Side** early-morning walks begin; call 212-769-5606 to register.

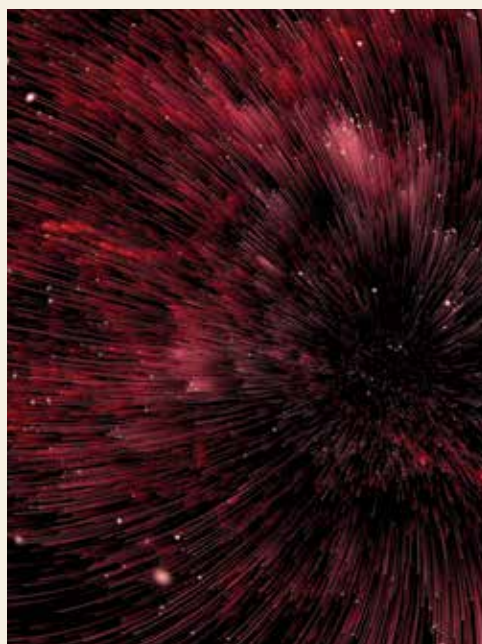
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New York, New York 10024-5192
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One of the scenes from the new Hayden Planetarium Space Show *Dark Universe* shows the phenomenon known as redshift observed from any galaxy in the universe, demonstrating how scientists measure the expansion of the universe. The farther away from the center of expansion, the redder the line, as light from galaxies that are moving away from an observer is stretched out to longer, redder wavelengths. *Dark Universe* opens on Saturday, November 2.

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,
Shop for Earth and Space,
Cosmic Shop,
Whale Shop, The Power of Poison 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:  (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 can park
for a flat fee of \$10 if entering after 4 pm.
To receive this rate, show your membership card
or event ticket when exiting the garage.