Academy FRONTIERS

The member magazine of the Academy of Natural Sciences

Winter 2010

GREETINGS FROM THE ACADEMY

Bruce Tepper/ ANSP

When I first came to Philadelphia, I was—and still continue to be—awed by the rich history of the Academy of Natural Sciences. I am equally impressed by the people who support it. It has been an incredible honor to lead this remarkable institution and work side by side with the Academy's dedicated donors, members, staff, and volunteers.

It is with a heavy heart that I bid farewell to the Academy. I am relocating to Woods Hole, Massachusetts, where I will be the president of the Woods Hole Research Center. The center is an independent, nonprofit institute focused on environmental science, education, and public policy. Its previous president, John Holdren, left to become the science advisor to President Obama.

I have made many friendships during my years in Philadelphia with the Academy trustees and supporters, and have a bond with many of the Academy's staff. One in particular is Dr. Ted Daeschler, vice president for systematics and curator of Vertebrate Paleontology, who will serve as acting president until the search committee appoints a new leader. Ted and his colleagues impressed me from the very start with their discovery of *Tiktaalik roseae*, a fossil species illustrating the evolutionary transition of fish to limbed animals. This extraordinary find excited the scientific community and captured the public imagination. Ted works alongside a team of more than 200 talented staff that shares a genuine dedication to this institution.

I leave the Academy with comfortable certainty that Ted and the staff and board will continue to propel this institution forward—to its 200th birthday in 2012 and beyond—and to uphold the Academy's esteemed reputation. I hope to maintain a long-term affinity with the Academy and the many friends that I've made here, and come back often.

Our staff is only one part of what makes this such an incredible place. It's the support from individuals like you that enables us to continue our pioneering work in biodiversity and environmental research, and educate the public about the world around them. Your commitment is vital to our success and I want to thank you for your support of the Academy, now and in the future. If you haven't yet made your gift to our Annual Fund, I encourage you to do so. It's quick and easy to donate online at www.ansp.org/supportANS. From all of us here at the Academy—thank you.

Most sincerely,

Bill Brown

Bill Brown

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On the cover: Scientists from the Academy's Patrick Center for Environmental Research and their colleagues shoulder equipment used to collect sediment cores from wetlands fringing the Delaware Estuary. The sediment provides a window into the estuary's environmental past. Learn more about this work on page 10.

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Academy membership includes a subscription to *Academy Frontiers*, free admission to the museum, discounts in the Academy Shop and Ecology Café, invitations to special events and exhibit openings, and much more. For information about Academy membership, call 215-299-1022 or visit www.ansp.org/membership.

THE ACADEMY OF NATURAL SCIENCES

CALENDAR OF EVENTS

January

16–18 *George Washington Carver* weekend, 10 a.m.–5 p.m.

20 Photographer Richard Barnes talk and book signing, 6:30 p.m.
RSVP to 215-299-1060. For more information,
visit www.ansp.org/adult-programs/lectures.php

28 "Dinosaurs for Adults" class, 6–9 p.m.
www.ansp.org/adult-programs

Town Square, Urban Sustainability Forum, 6:30–8:30 p.m.
"Sustainability and Public Safety"

30 "Natural Dyes" workshop for families, 10:30 a.m.–noon
www.ansp.org/activities

February

4 Town Square, Urban Sustainability Forum, 6:30–8:30 p.m.
"Cities, Bicycles, and the Future of Getting Around"
Meet David Byrne, author of the acclaimed new book *Bicycle Diaries*.

6–7 Friends and Family Overnight—"Survivor"
6:30 p.m. to 9 a.m.
www. ansp.org/activities

8 Science on Tap, 6 p.m.
Dr. Phil Manning, head of the Paleontology Research Group in the School of Earth, Atmospheric and Environmental Sciences (SEAES) at the University of Manchester, presents on behalf of the Mütter Museum. National Mechanics, 22 S. 3rd Street, Philadelphia

13–14 Paleopalooza, 10 a.m.–5 p.m.

18 Town Square, Urban Sustainability Forum, 6:30–8:30 p.m.
"Institutional Approaches to Sustainability"

27 "Nature Jewelry" workshop, 1–2:30 p.m.
www.ansp.org/adult-programs

28 *George Washington Carver* exhibit closes

March

4 "Rare Prints and the Art of Printmaking" class, 6:30–8:30 p.m.
www.ansp.org/adult-programs

8 Science on Tap, 6 p.m.
National Mechanics, 22 S. 3rd Street, Philadelphia

13 *Looking at Animals* exhibit opens, through May 16
www.ansp.org/museum/future.php

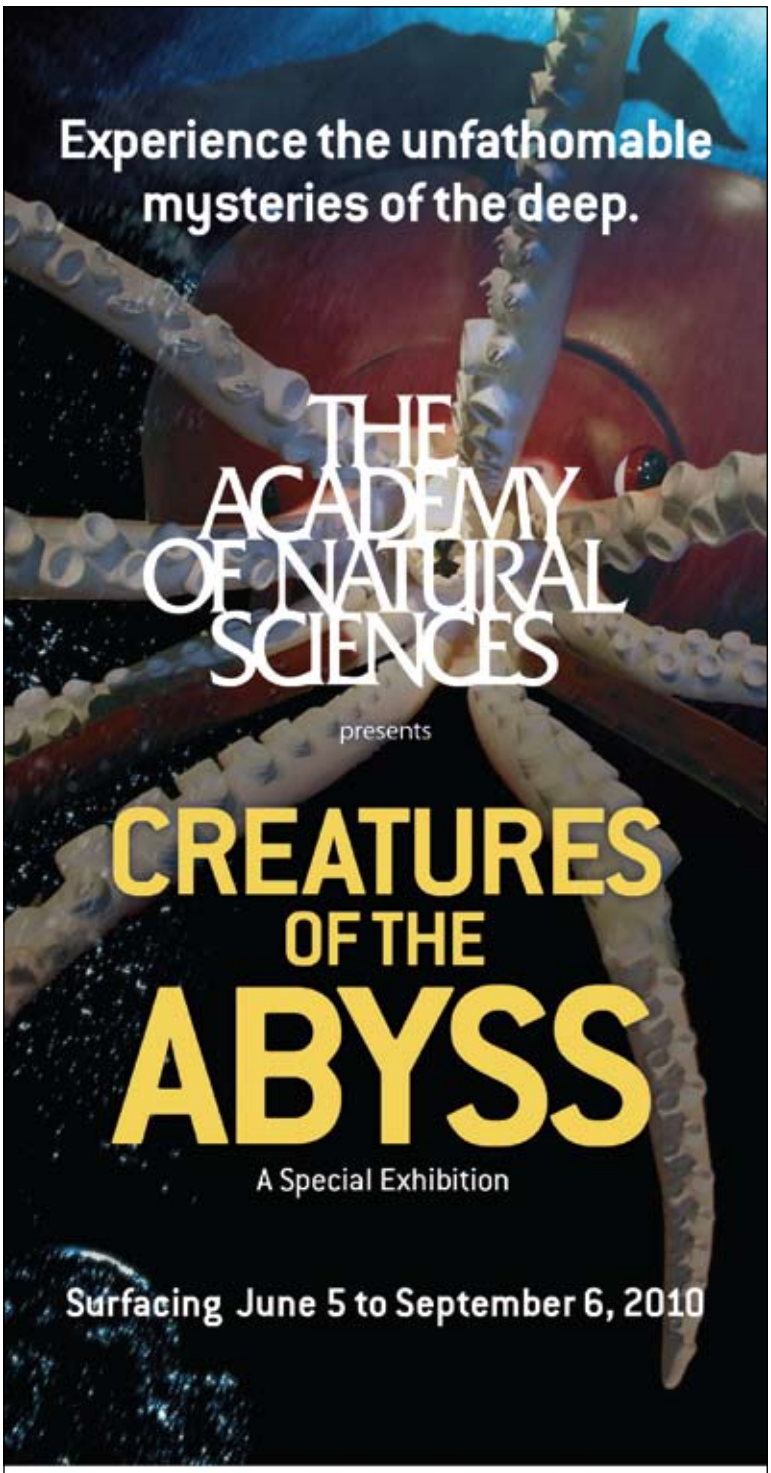
13-14 *Looking at Animals* weekend, 10 a.m.–5 p.m.

18 Town Square, Urban Sustainability Forum, 6:30–8:30 p.m.
"Sustainable Building Codes"

19–20 Friends and Family Overnight—"Survivor"
6:30 p.m. to 9 a.m.
www.ansp.org/activities

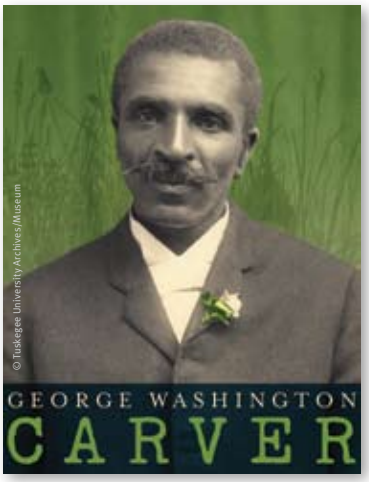
March 29–April 9

Academy Explorers Spring Break Camp
Spend your Spring Break at the Academy! (Ages 5–12)
For more info, visit www.ansp.org/activities/spring-break-camp



Creatures of the Abyss is a production of Science North, Sudbury, Ontario, Canada.

ON EXHIBIT



George Washington Carver

Now through February 28

What makes a person a legend? In the case of George Washington Carver it wasn't just peanuts. Discover the life and work of an extraordinary man, born into slavery, who used his gifts to become a groundbreaking scientist, educator, and humanitarian with a lifelong mission to bring practical knowledge to those in need. The exhibit features more than 100 artifacts, videos, interactive displays, and re-created scenes from Carver's life.

Henry Horenstein

Looking at Animals

March 13 through May 16

Looking at Animals is a collection of the best animal photographs by noted photographer Henry Horenstein. In Horenstein's unique style, the photographs make us look at animals as we have never seen them before—not as mere documents of what animals look like, but as a creative interpretation by one of the best photographers of the subject. The exhibit features 24 photographs by Henry Horenstein, accompanied by Academy specimens, and daily live animal talks that complement the exhibit.

All photographs copyright by Henry Horenstein. Exhibition organized by Harvard Museum of Natural History. This show is managed by art2art Circulating Exhibitions.

Ewell Sale Stewart Library/ ANSP

Drawn from the Deep: Fish in Science, Art, and the Imagination

In the Ewell Sale Stewart Library January through March

The literature of natural history has always been replete with illustrations—both real and fantastical. Some are careful and accurate renderings done under the critical supervision of a scientist, while others appear to be figments of the artist's imagination. The illustration of fish has always played an important role in ichthyology. Some of these illustrations, including woodcuts, hand-colored lithographs, engravings, and etchings, are presented in a new exhibit in the Library. These exquisite illustrations are drawn from the treasures of the Library and range in date from the 16th to the 19th centuries. Visit www.ansp.org/museum/digital_collections/fish to learn more.

Andrew Gillis

ACADEMY VOICES

Dr. Ted Daeschler

For Dr. Ted Daeschler, it all started with a nickname.

The "Bone Guy" is a nickname he earned in 1987 after taking his first job at the Academy as collection manager for Vertebrate Zoology. With his education in geology and paleontology and a knack for osteology, Daeschler become known as "the guy who could identify bones and teeth—the Bone Guy" and the nickname stuck.

Daeschler's passion for bones and fossils continues today through his research and collections work in paleontology. His research interests are currently centered on Late Devonian-age vertebrate fossils and the origin of limbed vertebrates. His research includes fieldwork in Devonian-age rocks in Pennsylvania and the Canadian Arctic, where in 2004 he and his colleagues discovered *Tiktaalik roseae*, a 375-million-year-old fossil animal that represents an important intermediate step in the evolutionary transition from fish to animals that walked on land.

Since his start in the 1980s as a collection manager, Daeschler has risen through the ranks to curator of paleontology in 1998 (he was the first to fill this position in nearly 100 years), to vice president of systematic biology and the Ewell Sale Stewart Library in 2008. Now, Daeschler takes on a greater role as acting president of the Academy, following president Bill Brown's departure in late January. Daeschler expects to remain in the position until a search committee appoints a new president.

Until then, Daescher knows his experience at the Academy has prepared him to succeed as a spokesperson for the institution and its breadth of research and educational programs.

"I'm someone who comes from the trenches and has seen the work that goes on here. I want to let people know that it is important work—I know that because I've been a part of it, and I've seen our talented staff first-hand," he says.

For more information on Daeschler's research, visit http://clade.ansp.org/vert_zoology/people/daeschler/.

ACADEMY ABBREVIATED

Carver Fever

If you've got an affinity for George Washington Carver, we've got a full plate for you this February at the Academy. For the past 30 years, the Academy has been host to the annual George Washington Carver Science Fair, where nearly 1,000 Philadelphia students showcase their scientific savvy. But, this year the fair coincides with the tail end of the Academy's exhibit, *George Washington Carver*, which closes on February 28, just two days after the fair.

The science fair is sponsored jointly by Temple University, the Academy, the School District of Philadelphia, and the Archdiocese of Philadelphia. The largest of its kind in the country, the fair provides opportunities for students to gain learning experiences through scientific inquiry and discovery. It is open to all students in grades four through 12 who attend Philadelphia County public, charter, parochial, and private schools, as well as home-schooled students. The competition for elementary school students and its award ceremony are held at the Academy, while grades 7–12 are now held at Temple University.

It's a special treat, then, for students and visitors to simply climb a flight of stairs in the museum to learn more about this remarkable scientist and the fair's namesake. The life and work of this African American agricultural chemist, botanist, and humanitarian is showcased in the Academy's exhibit, *George Washington Carver*, which features more than 100 artifacts, along with videos, interactive displays, and more. For more information about the exhibit, visit www.ansp.org/carver. For more information about the science fair, visit www.temple.edu/carversciencefair.

Katie O. Clark/ANSP

Academy Alligators

When members of Philadelphia's Animal Control team found two baby alligators in a box on the side of the road recently, they knew exactly who to call. The Academy of Natural Sciences is one of several local institutions contacted when a reptile is found or confiscated in Philadelphia and needs a temporary home. The two American alligators (*Alligator mississippiensis*) were likely purchased from a reptile expo or pet store, says the Academy's Manager of Living Exhibits Laura McRae. It's possible that the previous owner abandoned them after realizing how messy they are or how fast they grow, she adds.


Katie O. Clark/ANSP

"They can grow up to a foot per year," McRae says.

Within days of receiving the two abandoned gators from the side of the road, another American alligator of roughly the same age (less than two years old) was confiscated from a private home in South Philadelphia and brought to the Academy.

The three gators are being cared for in the Academy's Live Animal Center. They spent several months in quarantine until they were determined to be healthy and safe for public programs like the naturalist presentations held every afternoon at the museum. The Academy uses the alligators to help educate the public about adaptation, endangered species, reptiles, and other natural science topics.

"It's exciting for the staff to have alligators in our collection because they are such great animals for education," says McRae.

ACADEMY ABBREVIATED

Now on the Web

We're tweeting. We're Facebooking. We're uploading digital photo galleries and videos of our work in the field. We're making ourselves right at home on the Internet. And, we're inviting you to check it out. The best way to stay on top of Academy events, exhibits, and scientific research is through our Web site—www.ansp.org—where we've recently created two new specialized Web pages for our Archives and for the Center for Environmental Policy.

For scholars, artists, biographers, and other researchers, the new Academy Archives Web page provides an electronic glimpse into the holdings in our storied archives of more than 900 processed collections. These archival collections have been largely unstudied until now. See some of these treasures for yourself—including the featured bird of the week from John James Audubon's Birds of America—at www.ansp.org/library/archives/index.php.

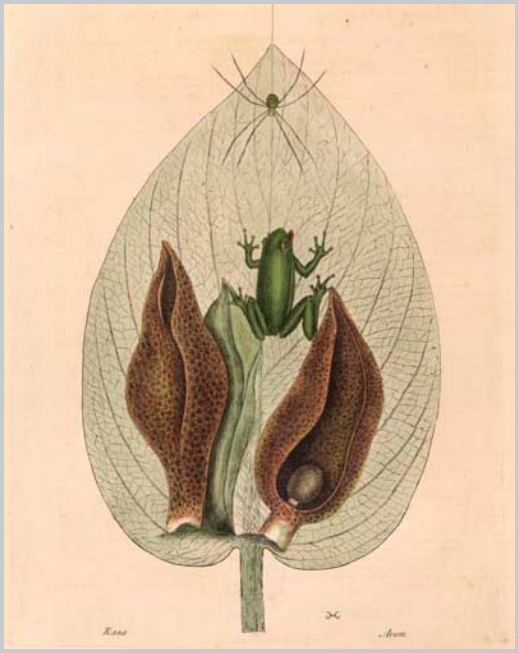
The Academy is also pleased to announce the new Web site for the Center for Environmental Policy. With its modern "blog" format, the page serves as a running update of the center's many different projects. It will provide postings of articles, images, and video on critical environmental issues, links to partner organizations and resources, and sections for discussion and comments. Like the center's Town Square program, the Web site is an ongoing dialogue, with new material added regularly. You can visit the site at www.ansp.org/environmental.

The Academy's Web site is only the beginning. For even more information about news, upcoming events, photos, and more, search for the Academy of Natural Sciences on Facebook and become one of our fans. Or, follow us on Twitter at www.twitter.com/acadnatsci for frequent updates and event information.

GET CONNECTED

Anyone can be a naturalist. In each issue of *Academy Frontiers*, our scientists and staff share their knowledge of the natural world and highlight a seasonal plant or animal that you might find right in your own backyard.

In this issue, Dr. Alfred E. Schuyler, curator emeritus of the Academy's Department of Botany, describes Eastern skunk cabbage and how its "sex life" heats up the chilly winter months.



Ewell Sale Stewart Library/ ANSP

This illustration by 17th-century artist and naturalist Mark Catesby shows a green tree frog (*Hyla cinerea*) perched on a single leaf of skunk cabbage, waiting for its next meal. The spathe is the brown leaf on the left and the spadix is the round-tipped spike seen inside the brown leaf on the right. (*The Natural History of Carolina, Florida, and the Bahama Islands*, vol. 2:71, 1738)

Eastern Skunk cabbage (*Symplocarpus foetidus*) is an amazing plant that generates heat and becomes sexually active during the middle of winter. This low-growing plant melts the snow as it comes out of the ground and gets even warmer inside its showy spathe, a hood-like leaf that surrounds the club-shaped spadix. Skunk cabbage can heat up as much as 60–85 degrees above the surrounding ambient air. This self-produced heat is what gains the plant the name "skunk," as it releases fetid odors attractive to flies and other insects that are searching for food and a warm place on a cold winter day. These insects serve as pollinators, along with wind. The asymmetrical structure of the spathe deflects air flow into a "cyclonic vortex" around the spadix. This plays a part in the dispersal of pollen and the release of the skunk smell.

Another amazing feature of skunk cabbage is that it has "muscles"—its underground roots pull it deeper into the ground as it matures, making it difficult to uproot. This is most likely an adaptation for survival in soft-shifting ground and for protection against frost heave—the deformation of moist soil when it freezes.

In early spring, the plant produces large heart-shaped leaves that persist throughout the spring and summer. But be careful—if you break or injure one of the leaves, prepare to be skunked!

Education, All Grown Up

The Academy established its education department in 1936 and soon began to present exhibits like this one titled the *Hall of Early Man*. The exhibit, located in what is now Dinosaur Hall, presented specimens, models, and diagrams of the time of early man and mammoths.

By Katie O. Clark

The Academy of Natural Sciences has spent the last 200 years building up a reputation—as a world-class natural history research institution and museum with one of the largest and oldest collections in the Americas. The Academy is also proud to have earned a reputation as a wonderful museum for children and families, as well. But, with a brand new lineup of programs and workshops designed for adults, we are spreading the word that the Academy is not just for kids.

A Little History

The Academy was founded in 1812 by a group of like-minded men of science. For the first 100 years of the Academy's existence, the dissemination of scientific knowledge among adults was one of the institution's primary goals. It wasn't until the 1930s that the Academy began to see the influx of Philadelphia schoolchildren that still continues today. Nevertheless, the Academy's mission of "the encouragement and cultivation of the sciences" has never had an age limit.

In 1936, the Academy established the Education Department as a way of disseminating information to the public about our research and collections. Since its beginning, the department has catered to learners of all ages, with classroom lessons and museum visits for students, and expeditions and lectures for adults.

Today, the Academy retains that same leave-your-age-at-the-door outlook as we continue to present exhibits and programs designed with interactive, hands-on learning for all curious minds, young and old alike.

Real Science for Adults

Last fall the Academy kicked off a series of new programs and workshops for adults. Jill Sybesma, who coordinates the adult programming for the Academy, chooses programs that reflect ongoing science and research activities in the museum. She also ensures that many of the programs offer a hands-on experience.

"Many people look to museum programs to learn new skills; in these programs you're actually learning to do something," says Sybesma.

The programs, which are offered monthly (except for December), range in focus from nature jewelry design and natural printmaking to a dinosaur refresher course or trips out in the field to study insects and fish, to name a few. Most of the programs are led by an Academy staff member who specializes in a particular science or topic.

"In these programs, you can learn from an expert, someone who does this for a living," Sybesma says. "No one else has the collections and the expertise that we have here at the Academy."

Dee Daly, a member of the Academy, attended the "Birds of Prey" workshop in November. The workshop offered information about the anatomy and behavior of birds of prey like hawks, owls, and vultures, and guests were invited to explore the anatomy of live birds and specimens from the Academy's collection. "This is fabulous—to be able to get up close and touch something—it's what all of us who love birds would like to do," says Daly.

Get Involved

In addition to these new classes and workshops, the Academy has a longstanding mission to enhance public awareness of scientific concepts and how they affect our society. One of the ways we do this is through a series of programs called Town Square, established in 2004. Some of the Town Square programs are co-hosted by partner organizations and take place once a month as part of our Urban Sustainability Forum series.

Town Square is intended to promote learning, dialogue, and thoughtful exchanges on important issues that relate to science, sustainability, and the environment. Using a variety of formats—lectures, debates, workshops, and forums—the Academy provides a venue for discussions that brings together experts, stakeholders, and the public. The next Town Square program, on January 28, explores sustainability's effect on public health and safety, and quality of life.

Adults 21 and over are also invited to the monthly Science on Tap lecture series. Science on Tap is a monthly science café in Philadelphia for anyone who is interested in getting together with other people to discuss a range of engaging science topics. Visit www.ansp.org/adult-programs/science-on-tap.php for more information.

To learn more about any or all of the Academy's adult programs, visit www.ansp.org/adult-programs.

Upcoming Adult Programs at the Academy

January 11	Science on Tap
January 28	Dinosaurs for Adults
January 28	Town Square "Sustainability and Public Safety"
February 4	Town Square "Cities, Bicycles and the Future of Getting Around"
February 8	Science on Tap
February 18	Town Square "Institutional Approaches to Sustainability"
February 27	Nature Jewelry
March 4	Rare Prints and the Art of Printmaking
March 8	Science on Tap
March 18	Town Square "Sustainable Building Codes"
April 10	Conserving Native Bees Workshop
May 8	Insect Field Study
June 26	Electrofishing Field Study

Register today at 215-299-1060
For more information visit www.ansp.org/adult-programs


Jason Farris

The adult programs include workshops, classes, and lectures and book signings with authors and artists such as Walton Ford (above), a New York-based artist who gave a talk recently about his latest book and the inspiration behind his work.


Katie O. Clark/ ANSP

A recent hands-on workshop for adults invited participants to learn about the anatomy and the behavior of birds of prey such as hawks, eagles, and vultures.

Down to the Core

The Academy's environmental research digs deep into the history of the Delaware Estuary.

Patrick Center for Environmental Research/ANSP

By David Velinsky, Roland Wall, and Katie O. Clark

It's almost like gazing into a crystal ball—only muddier. Scientists from the Academy's Patrick Center for Environmental Research have been examining slabs of sludgy mud collected from tidal marshes along the Delaware Estuary. The muck is a window into the past 150 years of the estuary's environmental health. The better scientists understand a waterway's past, the better they can manage and protect its future.

All of us are connected to the Delaware Estuary, whether we live in Philadelphia, upstream in New York, New Jersey, or Wilmington, Delaware. Because it plays a critical role in the ecology and economy of the region, it is important to know how it has been affected by natural changes in the environment and by humans.

Over time, the Delaware River and Bay have undergone physical, biological, and chemical changes. Many have been the result of two centuries of human actions, like forest clearing, land development, and pollution. One key to understanding ecological change is found in the accumulated sediments that make up the Delaware's freshwater and estuarine tidal marshes. These sediments are carried as fine particles by tides and currents, trapping chemical and biological information, and are continuously deposited in the wetlands fringing the estuary.

For scientists, the information in these sediments provides a kind of "tape recorder" of a waterway's condition at any given time.

"In the sediment, you might see if it was once a productive environment, how it changed over time, what really big chang-

es may have happened—it's remarkably powerful," says David Velinsky, Ph.D., vice president for the Patrick Center and lead scientist for an ongoing project that has led researchers from the Academy's Patrick Center, along with researchers from the College of Earth, Ocean, and Environment at the University of Delaware, to 16 sites along the Delaware Estuary.

Extracting the sediment cores is no easy feat. It takes the strength of several individuals to pull the 3-foot-long cores from the earth.

The first step in this project took scientists far from their offices and labs and into the mire. They extracted three-to-five-foot cylindrical samples of earth called "cores," a task that requires boats (and muddy boots) to bring heavy sampling equipment into marshes along the Delaware and its tributaries. Once there, the researchers drove heavy PVC pipes vertically into the ground and extracted the cores, which were returned to the lab for analysis.

Back in the lab, scientists started with determining the "age" of the cores. Fortunately, past human activities have provided precise reference points for this—for example, the testing of atomic weapons in the early 1960s released cesium-137, a radioactive isotope, into the atmosphere. Since it is known precisely when these activities began and ended, it is possible to date those sections containing cesium-137.

Scientists use this aging process to study the rate at which the sediments accumulate—an indicator of how the Delaware's wetlands might respond to the sea level rise expected from climate change. They determined that sediment in the marshes along the Delaware Bay builds between a half and one centimeter a year—about the same rate as current sea level rise.

Scientists also looked at a core's level of chemicals, including plant nutrients like nitrogen and phosphorus. One pollutant of interest is polychlorinated biphenyls, or PCBs, a set of industrial contaminants first produced in the early 1930s. These compounds were used in electrical equipment for cooling and insulating industrial transformers and capacitors. PCBs are very persistent—they do not break up easily—and can accumulate in fish, like striped bass, American eels, and catfish. They have been shown to be harmful to humans at high levels in the body. The core levels of PCBs showed that the production and use levels peaked in the 1970s but began to decrease following the national ban in 1976. The decrease demonstrates the effectiveness of the national ban and how fast levels decreased once the ban took place.

In addition to chemical analysis, scientists can use the remains of microscopic organisms to assess the change in an ecosystem. These single-celled algae—called diatoms—leave behind glass-like shells that remain intact for hundreds of years. Since each species thrives in specific conditions, Velinsky notes that the presence of certain species of diatoms enables scientists to reconstruct past environmental and water quality conditions.

While all of these techniques are useful in determining the estuary's past, they also tell a story of how it may change in years to come—important information for officials who craft environmental regulations. Data from this particular study will be used for a number of purposes, including assistance in setting standards for PCBs and in guiding the recovery of contaminated sites.

"An important aspect of this study is to determine how fast the estuary can respond to clean-up actions and what we can predict for the future," Velinsky says. "Sediment core data can help answer these questions." For more information about the Patrick Center's coring work, visit www.ansp.org/research/pcer/projects/delaware_bay/index.php.

Funding for this research was provided by the Delaware River Basin Commission, Delaware Department of Natural Resources and Environmental Control, the Environmental Associates of the Academy of Natural Sciences, and the Patrick Center for Environmental Research Endowment Fund.

To protect and conserve

By Danianne Mizzy, Library Director

The Academy's Ewell Sale Stewart Library is renowned for its exceptional collections—a record of the history of the natural world, penned by celebrated naturalists and artists of the past five centuries. Such collections require careful stewardship and conservation. This care is vital to ensure a document or book from centuries past may be enjoyed by researchers and learners for centuries to come.

In 2004, the Academy Library's Conserve-a-Book program was born. At the spring meeting of the Friends of the Library, rare book conservation was a key theme of a presentation given by invited speaker Ingrid Bogel, executive director of Philadelphia's Conservation Center for Art and Historic Artifacts. Her talk inspired the founding of the program, through which some of our most important, beautiful, and historic volumes have been conserved. These treatments repair the ravages of time—broken bindings, acidification, staining—making it safe for scholars to consult the volumes and for the Library to exhibit them.

Pierre Joseph Redouté's magnificent monograph on lilies, *Les Liliacées* (1802–1816), and John Cassin's report on the zoological findings of the U.S. Exploring Expedition of 1838–42, illustrated by Titian Ramsey Peale, are just two of the Library's treasures that have been restored to their former glory thanks to the generosity of Academy donors.

Currently undergoing treatment is John James Audubon's three-volume *Viviparous Quadrupeds of North America* (published from 1845–1848). Although not as well known as the magnificent *Birds of America*, it is an equally ambitious publication. In it, Audubon and fellow Academy member Rev. John Bachman attempted the first comprehensive illustrated treatise on the mammals of North America. It contains 150 color plates, drawn by Audubon and his sons, many modeled on specimens held here in the Academy.

More than a dozen historic volumes have been put on our priority list for conservation. We're happy to show them to anyone interested in helping conserve these treasures for the delight and edification of current and future visitors to the Library. For more information on how you can help, contact Bob Peck, senior fellow of the Academy, at 215-299-1138 or peck@ansp.org.

AFTER

BEFORE

Photos courtesy of The Conservation Center for Arts & Historic Artifacts

Katie O. Clark/ ANSP

Behind the scenes

Manager of Exhibits Projects Jennifer Sontchi assesses an original artifact during the installation of *George Washington Carver*, on exhibit at the Academy through February 28. The condition of each and every artifact is carefully recorded in a condition report when the exhibit is installed, and also when the exhibit closes. That way, if any damage comes to the artifact, the source and cause of the damage can be determined and possibly corrected.

In the field

For a Canadian Broadcasting Corporation documentary on oceans, a film crew recently interviewed the Academy's Dr. Ted Daeschler about his research on the transition of life from water to land. Part of the filming was done in the muddy tidal marsh along the Manumuskin River in Cumberland County, N.J.

Roger Thomas/ ANSP

Photos Courtesy of Barbara Stedman

Joan Lieberthal Summerfield

Just about everyone called her "Ma Nature." In Dinosaur Hall, she wore a nametag that read, "Joanasaurus: carnivore." Friends, family, and Academy staff will not soon forget the energy, the dry wit, and the jokes of Joan Lieberthal Summerfield.

Joan, a science teacher who volunteered at the Academy from 1984 to 2004, passed away on September 21, 2009 at the age of 81 after battling Alzheimer's disease. Those who worked with her at the Academy say that Joan was, and will continue to be, a remarkable role model for staff and volunteers.

"I think she put a human face on science—she taught you without you realizing you were being taught," says Anthony Paino, manager of public programs for the Academy who worked alongside Joan for nine years.

Joan taught science at Philadelphia's Logan Elementary School for 21 years. She retired in 1993 as the school's science coordinator.

"She was retired but she couldn't give up teaching so she came to the Academy," says Jason Poole, coordinator for Dinosaur Hall and the paleontology lab, and a fan of Joan for more than 15 years.

Joan was devoted to Dinosaur Hall, and served as a dinosaur docent for most of her 20 years at the Academy. She also served as an informal guide in a number of the Academy's traveling exhibits and taught at Safari Overnight sleepovers in the museum. In all, Joan contributed nearly 3,000 hours of service to the Academy.

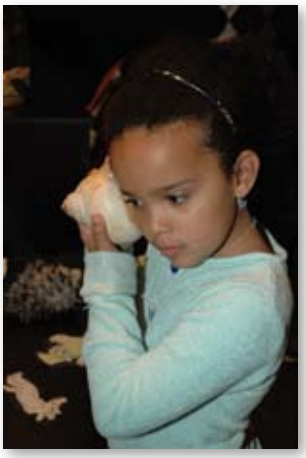
> "The legacy she leaves behind can be found in any one of the volunteers who walk the halls of this museum."
>
> -Jason Poole, Academy staff

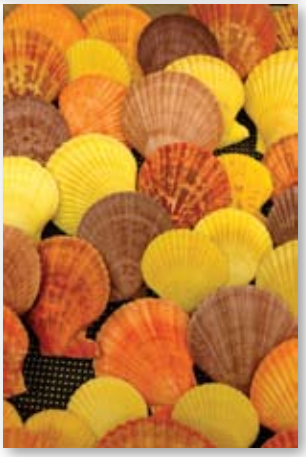
"She was a wonderful person who gave a whole lot to the world," says Joan's daughter, Barbara Stedman. Joan is also survived by children Julie Summerfield and Robert Summerfield, and two grandchildren, Nina and Wendy Stedman.

In her honor, the Academy established the Joan Summerfield Award for Excellence in Teaching in 2005, awarded to volunteers who demonstrate excellence in teaching. In late 2009, Joan's family established the Joanasaurus Fund in her memory to support the Academy's education and volunteer programs and continue Joan's legacy of volunteerism.

"The legacy she leaves behind can be found in any one of the volunteers who walk the halls of this museum," Poole says.
For more information on giving to the Joanasaurus Fund, contact the Office of Institutional Advancement at 215-299-1122 or friends@ansp.org.

ACADEMY SUPPORT





Katie O. Clark/ ANSP

The 27th annual Philadelphia Shell Show, held October 10 and 11, was a huge success for the Academy. More than 275 people attended the Shell Show preview party on October 9, which raised more than $25,000. Proceeds from the preview party benefit the Academy's Department of Malacology. Nearly 1,500 visitors enjoyed the weekend's juried shell show, stunning Sailor's Valentines displays, behind-the-scenes tours, and games and crafts for kids.

The Academy would like to thank our generous sponsors.

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* A complete list of contributors can be found on page 18.

HONOR and MEMORIAL GIFTS

A wonderful way to honor a friend or family member and support the Academy of Natural Sciences at the same time is through a memorial or honor gift. Just as Joan Summerfield's family has chosen to honor her memory and dedication to the Academy through establishing the Joanasaurus Fund, you can memorialize a loved one or celebrate a special moment in the life of a friend or family member through an honor or memorial gift to the Academy of Natural Sciences.

A memorial or honor gift may take many forms—from a gift to the Academy's Annual Fund in honor of a loved one to establishing a restricted fund, endowment, or chair in the name of a family member. It's easy to make an honor or memorial gift to the Annual Fund either online at www.ansp.org, by phone, or by mail—simply indicate that your gift is in honor or memory of a special person when you make your gift. If you're interested in learning how to establish a restricted or endowment fund, please contact the Academy's Office of Institutional Advancement at 215-299-1122 or friends@ansp.org. Opportunities for permanent recognition in one of the Academy's public galleries or collections are also available.

Jason Farris

ACADEMY SUPPORT

On behalf of the Academy's Board of Trustees, we wish to recognize and thank those supporters who have contributed to the Academy between September 1 and November 30, 2009. Your generosity helps to fund the Academy's many programs of research and education, and we are tremendously grateful for your support.

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Opposite Page: Some of the treasures of the Academy's collections are on display in the newly renovated lobby. Stop in and see for yourself.

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Katie O. Clark/ ANSP

Members were invited to a special preview of the Academy's exhibit *George Washington Carver*, running through February 28.

The Academy would like to especially recognize those who have joined or renewed their support through the Academy's Leadership Circles of Giving between September 1 and November 30, 2009.

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Judith Soltz and Richard Belas

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ACADEMY SUPPORT

In Support of the 2009 Shell Show Preview Party, to benefit the Department of Malacology

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Michael Long Fotografffic

Guests at the Shell Show Preview Party in October were the first to browse some of the entries in the juried competition, just one of the many activities during the Shell Show weekend.

FLASHBACK

Ewell Sale Stewart Library/ ANSP

In this photo, dated 1940, Dr. Ruth Patrick was unaware that the President of the United States would one day place the National Medal of Science around her neck. She didn't yet know that she would receive honorary degrees from more than two dozen prestigious universities and institutions that recognize the importance of her work. And there was no way to know that, after a long and successful career in watershed science and freshwater ecology, she would be inducted into the National Women's Hall of Fame.

Looking through the barrels of a microscope is one of two typical situations in which you'd find Dr. Patrick during the earlier years of her career—the other is out in the field, donning waders and collecting water samples for later study. Throughout her career, Dr. Patrick has been devoted to the study of life in freshwater ecosystems and, in 1947, established the Department of Limnology at the Academy. Now renamed the Patrick Center for Environmental Research, this multidisciplinary group of scientists continues Dr. Patrick's work today.

Dr. Patrick now adds her recent induction into the National Women's Hall of Fame this past October to her long list of achievements. Concurrently, the governor of the state of Kansas, Dr. Patrick's birthplace, officially declared October 11 "Ruth Patrick Day" in her honor. These latest honors came just a few months before her 102nd birthday.

SUSTAINABILITY MATTERS

By Roland Wall

Welcome to the new Sustainability Matters column, a regular feature of the Academy's Center for Environmental Policy. The center is the Academy's bridge between science, policy, and the public. We work to produce useful information, raise public awareness, and support public action on important environmental issues. In 2009 alone, the center's Town Square series presented more than 40 programs to bring together experts, advocates, and the public to learn about and discuss timely environmental topics.

We hope to help our readers understand that "the environment" isn't some faraway topic or "special" interest. The environment affects us all, and we're all a part of it. In the coming months, we will show how the health of our planet is the foundation for the health of our families, communities, society, and ourselves.
In this issue of Academy Frontiers, we feature some of the work happening in the Academy's Patrick Center for Environmental Research investigating the effects of sea level rise on the wetlands of the Delaware River and Bay.

One of the problems associated with sea level rise—one of the most significant effects of global warming—is an increase in the amount of salt in the river at points further upstream. This could cause wide-ranging problems, not only for natural systems such as wetlands that have evolved to function with certain levels of salt, but also for the people who draw their water supply from sources that will become saltier and saltier.

Sea level rise as a result of global warming is observed around much of the world, including the Delaware River and Bay. It is not the result of melting ice caps in the Arctic (although that could certainly be a problem in the future). Rather, the sea level rise we are experiencing today is a result of the simple fact that heated water expands—think of a boiling teapot. In the case of the oceans, every degree of temperature rise leads to a substantial increase in the volume of the ocean and change in elevation of what we call "sea level."

Sea level rise is only one of the many impacts of global climate change that are studied by scientists at the Patrick Center. The Center for Environmental Policy's Town Square series has had a variety of programs on global climate change, and more will be coming this year. To find out about Town Square programs, check our Web site at www.ansp.org/environmental.

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Looking at Animals: Photographs by Henry Horenstein

March 13 through May 16

The snout of a pig. The feet of a poodle. The eye of a komodo dragon.

These are some of the intriguing physical characteristics featured in *Looking at Animals*, a collection of the 24 best photographs taken by noted photographer Henry Horenstein.

Abstract, haunting, and provocative, Horenstein's unique style of photography invites keen observers to take a closer look at animals and see them in a way they may never have before.

Animal specimens from the Academy's world-renowned research collection and animals from our Live Animal Center will accompany the exhibit for a full nature experience.

THE ACADEMY OF NATURAL SCIENCES