ACADEMY

FRONTIERS

INSIDE:
Nature's Mechanics

The member magazine of the
Academy of Natural Sciences
of Drexel University

Fall 2015

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Please send questions or comments about *Academy Frontiers* to ans_editor@drexel.edu.

Academy membership includes a subscription to *Academy Frontiers*, free general admission to the museum, discounts in the Academy Shop and Academy Café, invitations to special events and exhibit openings, and much more.

For information about Academy membership, call 215-299-1022 or visit ansp.org/membership.

On the cover: *The snake's lower jaw is attached in the center by muscle rather than bone, allowing the sides to move independently of one another to accommodate large prey.*

Academy Greetings

Katie Clark/ANS

Dear Friends,

From the creation of a new academic department focused on biodiversity and environmental science to science education programs in West Philadelphia, the affiliation between the Academy and Drexel University has generated tremendous results. This fall, Drexel students in the new Department of Biodiversity, Earth & Environmental Science can choose from majors in geoscience, environmental studies, sustainability, and environmental science, as well as minors in ecology and environmental studies. Students at the University's Westphal College of Media Arts & Design can enroll in a multi-disciplinary program that prepares them to successfully lead museums in our changing world. Academy educators are working together with their Drexel colleagues to establish a new K-8 STEM-focused school complex in the Powelton and West Powelton neighborhoods of West Philadelphia.

The newest outcome of the affiliation is a unique partnership between Academy educators and the Drexel Mechanical Engineering Department (more on pages 8–11). Our educators are advising teams of students who are creating natural science-related educational tools for our museum. The course encourages students to apply their theoretical knowledge to the invention of a product for a museum client, and the students must complete extensive research on the needs of museums and their visitors. Several teams have carried over this required coursework into independent studies, and we are excited to see their final hands-on learning tools this fall.

As the holidays approach, please consider including the Academy on your holiday gift list. You can purchase a gift membership to the Academy for a friend or family member so they too can enjoy all the museum has to offer. You can also make a difference by making a gift to the Academy's Annual Fund in your friend or family member's honor. The Annual Fund provides support for research, collections care, education, and exhibits, and your contributions are critical to the Academy's continued success. Thank you for your generosity.

All the best,

George W. Gephart, Jr.
President and CEO

FOUNDED IN 1812, the Academy of Natural Sciences of Drexel University is a leading natural history museum dedicated to advancing research, education, and public engagement in biodiversity and environmental science.

Contents

Photos by Dave Fitzpatrick

Reptiles: The Beautiful and the Deadly

Special Exhibits Gallery
September 30, 2015–January 10, 2016

Get eyeball to eyeball with live deadly snakes, colorful lizards, bizarre turtles, and rugged crocodilians from around the world in *Reptiles: The Beautiful and the Deadly*. Nestled in naturalistic habitats, these cold-blooded animals will help dispel common myths and foster a basic understanding of how reptiles fit into the animal kingdom and their native environments. Engaging, interactive components let visitors "milk" a viper, learn to speak croc in less than five minutes, and test their knowledge with Turtle Trivia and Lizard Wizard.

Reptiles: The Beautiful and the Deadly was created by Peeling Productions at Clyde Peeling's REPTILAND.

Drawn to Dinosaurs Returns

Art of Science Gallery
Open November 1, 2015

Drawn to Dinosaurs delves into the science and art of visualizing a living animal based on fragmentary fossils. This intimate exhibit illustrates what scientists can deduce from the fossil record when creating a reconstruction of a skeleton or model and what they must look to artists to interpret. The centerpiece is a full cast of the plant-eating dinosaur *Hadrosaurus foulkii*, discovered in 1858 in Haddonfield, NJ. The Academy created a full cast of this duck-billed dinosaur and put it on display in 1868, becoming the first place in the world where the public could go to see a dinosaur. Now it's back!

Bruce Tepper/ANS

Tarantulas: Alive and Up Close

Special Exhibits Gallery
January 30–May 30, 2016

Tarantulas have a reputation that precedes them—terrifying, fast, hairy, scary—the biggest, baddest, and most fearsome of all spiders. In the Academy's newest hands-on exhibit, *Tarantulas: Alive and Up Close*, you will come face-to-face with a stunning array of live tarantulas—fangs and all. Play a guessing game to learn about speedy tarantulas that dwell in the highest treetops and others that live underground, only emerging under cover of darkness to ambush their prey. Find out why certain species prefer the desert and the rainforest, and learn how tarantulas may play an important role in human medicine. Get the facts on why tarantulas are so hairy as you venture through an air current that simulates the sensitivities of a hairy spider. Explore a tarantula burrow and get your picture taken with these eight-legged beasts!

Q&A With LOIS KUTER

By Carolyn Belardo

Lois Kuter makes her living by helping people help other people. She is president of the American Association for Museum Volunteers and manager of volunteer services at the Academy.

Mary Alice Hartsock/ANS

Volunteers are an essential part of tourism, whether they are imparting information to out-of-towners at a visitor center, giving directions at a sporting mega-event, or greeting passengers as airport ambassadors. And volunteers are indispensable to running a museum.

At the Academy, Lois Kuter coordinates a dedicated group of nearly 300 volunteers who put in 35,000 hours of their time each year. They range in age from 14 to 80 and come from all walks of life.

We asked Lois about her job and trends in the industry.

Q. What does your job entail?

A. My job is to get the volunteers on board. I don't actually see them that much once they become active here. I keep them in the information loop and make sure they get recognition. I serve as the point person to help them solve any problems, to answer their questions. I support the staff by helping them find the right volunteer for the job.

Q. Has the profile of Academy volunteers changed over the last decade?

A. There are a lot more teenagers volunteering. We've strengthened their training and are offering them expanded opportunities. Now high school students can volunteer throughout the museum, whereas before their opportunities were limited to just a few options. We've also done better in terms of expanding diversity, both economic and ethnic, especially among the younger set.

Q. Why are young people drawn to the Academy?

A. They want to learn, and they like science and tend to be passionate about it. Also, a lot of them are looking for career skills that help them when they go looking for a job.

Q. How does Philly rank in terms of museum volunteerism?

A. With so many types of museums, there's something for everyone. I think all museums love having volunteers. We compete a little with each other, but not a lot because volunteers choose to do what they're interested in, whether it's art or science or something else.

Q. Where is Academy volunteerism headed?

A. There's always more quality you can build into the program in terms of standards of excellence we can reach for. We're seeking out more enrichment programs to inspire our volunteers and keep them happy. We're increasing the use of volunteers in new and different exhibit spaces, such as the Science Now station and the gallery carts. There are endless places where we can expand; it's just a matter of staff time to work with the volunteers.

Q. What are some challenges facing museums across the country?

A. Turnover is one. Baby boomers are said to be project-based, not staying long-term in one place. There's a lot more competition for their spare time now. Retirees are the busiest of them all. Also, young people aren't going to stay beyond high school. Another is opening doors to a demographic that might not be able to afford the time, nor the travel and parking expenses, to volunteer.

Q. What are the top reasons people should volunteer at the Academy?

A. Because they have the opportunity to contribute directly to the Academy's mission and to enhance what the Academy does both behind the scenes and in the museum exhibits. It's fun and interesting work, and the learning opportunities are endless. The staff is truly appreciative of the contributions volunteers make, and they show it.

Q. Do you volunteer?

A. I volunteer with the International Committee for the Defense of the Breton Language and with a group that provides small grants for Native American initiatives.

Q. Your 25th anniversary at the Academy is this year. How does it feel?

A. It never gets old. There are new challenges every day. There's always more to do.

To learn more about volunteering for us, visit ansp.org/get-involved/volunteer.

Photos by Mike Servedio/ANS

BUG FEST

By Mike Servedio

On August 8–9, the Academy hosted its 8th Annual Bug Fest, our annual celebration of all things buggy. The festival includes hundreds of live bugs as well as a host of bug-related activities.

Bug Fest requires months of planning, but the pre-festival happenings pick up when many of the live bugs begin to arrive at the Academy, a week before the actual event. The bugs generally arrive in two shipments, with one from the American Southwest and another from Asia. Academy staff have compared the arrival of these bugs with Christmas more than a few times. But instead of opening presents, Academy staff open boxes and boxes of carefully packaged live bugs that eventually take up residence on every floor of the Academy.

During the festival, the bugs immediately greeted visitors entering Dinosaur Hall. Visitors saw a Hercules beetle, one of the largest beetles in the world. Next to the Hercules beetle, desert millipedes slithered in and out of the dirt in their temporary enclosure, grossing out and awing visitors at the same time.

Other exotic bugs found temporary homes in other museum galleries. A redknee tarantula and a zebra tarantula welcomed visitors as they climbed the stairs to Africa and Asia Halls. Their neighbors for the day, in separate enclosures of course, included a scorpion and a Texas centipede.

Farther down the hall, an orchid mantis caught the eyes of many passersby. A small, nearly all-white insect, the mantis has almost the perfect camouflage when it sits on the flower of its namesake, mimicking parts of the orchid to avoid predators. A few feet away from the mantis, a giant long-legged katydid impressed visitors with not only its sheer size but also its ability to blend into its leafy habitat.

Well-known author and Bug Chef David George Gordon prepared tasty cuisine made with bugs, including a dish of tarantula legs as well as a kabob dish with grasshoppers. While some attendees were grossed out by the buggy food, many more lined up for a taste and quite a few even enjoyed their samples.

In Serengeti Classroom, maggots and roaches proved to be skilled painters, creating their own art by marching through blobs of colorful paint. On the third level, attendees were able to stretch out with yoga poses inspired by insects. Just a few feet away from the cooking demonstration, the younger attendees of Bug Fest got their faces painted like butterflies and stuck temporary tattoos to their arms.

Bug Fest happens at the Academy every August, and you can see fascinating live bugs in our children's discovery center, *Outside In*, throughout the year. Plus, in December, we dedicate a full day of All-Star Week to our creepy crawly friends. In late January, *Tarantulas: Alive and Up Close* will bring you face-to-face with a stunning array of live tarantulas—fangs and all. Your membership gives you access to free general admission and discounts on special exhibits, and you are always the first to hear about these opportunities. We can't wait to see you in the museum soon!

HAWK WATCH IN CAPE MAY

By Mary Alice Hartsock

Anyone can be a naturalist. In this issue of *Academy Frontiers*, we guide you to a nearby state park where you'll find some of the best fall birding in North America. You will learn to tell the difference between the Cooper's Hawk and its look-alike, the Sharp-shinned Hawk.

Though beach towns on the south Jersey Shore are packed during the warmest months, fall offers quieter opportunities for exploring nature. Located between the Delaware Bay and the Atlantic Ocean, Cape May is on the Atlantic Flyway, a route traveled by millions of birds each year. Cape May's location makes it a destination for people interested in spotting a variety of migrating birds.

October is an especially busy month for hawk migration and is a perfect time to check out the bird-watching scene from the Hawk Watch platform at Cape May Point State Park. From the platform, you will likely spot Cooper's Hawks and Sharp-shinned Hawks, two similar-looking birds of prey that will challenge your eyes and your identification skills!

Cooper's Hawks (above, left) are medium-sized birds often spotted flying rapidly through treetops or along forest edges, though you may find them harassing your feeder birds or hanging out in suburban backyards. Adult Cooper's Hawks have blue-gray feathers with reddish bars underneath, while juveniles are brown and have distinct vertical streaks on their upper breasts. Their wings beat in a flap-flap-glide pattern, and their long tails have thick dark bands and are rounded at the ends.

Also a slate blue color with thin, reddish streaks on their breasts, Sharp-shinned Hawks (above, right) often fly rapidly through the woods to catch songbirds and mice. They have long legs, short and rounded wings, and long, square-tipped tails that are notched at the tip. Juveniles are brown overall with vertically streaked white underparts. Their wings beat in a flap and glide pattern.

One of the best strategies for telling the difference between Cooper's and Sharp-shinned Hawks is to examine their proportions. Sharp-shinned Hawks have smaller heads and shorter "necks" than Cooper's Hawks, which have larger heads that project further ahead of the "shoulder" of their wings in flight.

Although Cooper's Hawks are often larger than Sharp-shinned Hawks, males of both species are smaller than females, which can create identification complications! If you're not sure, check out their tails and markings. The tails of Cooper's Hawks are rounded, compared with the square, notched tails of Sharp-shinned Hawks. While the Cooper's Hawk has a lighter nape and a darker cap, the Sharp-shinned Hawk features both a dark nape and cap. In juvenile Cooper's Hawks, you will see brown chest streaks that are neat, defined, and less dense—unlike the less distinct, dense chest and belly streaks of juvenile Sharp-shinned Hawks.

You'll be most likely to spot the hawks on a gray day, one to two days after a cold front passes through the area. If you arrive early in the morning, you may witness hawks hunting for and capturing prey. Write down the characteristics of the hawks and other birds you see, and look them up in a field guide. Contribute your data to eBird.org, a real-time online checklist of birds launched in 2002 by the National Audubon Society and the Cornell Lab of Ornithology.

NATURE'S MECHANICS

By Mary Alice Hartsock

It's Monday morning, and Peter Taddeo and Jon Bry have been waiting patiently for my call. In their fourth year of mechanical engineering studies at Drexel University, Taddeo and Bry are pros at answering my questions; I get the feeling that they've done this a hundred times before, even though I know that can't be true. They are polished, professional, and enthusiastic. They know they have a good idea, and they are running with it.

Deeksha Seth

Drexel mechanical engineering students (left to right) Jon Bry, Peter Taddeo, Ray Seibert, and Cameron Dye show off their very first prototype of a snake skull model designed to teach museum visitors about reptile adaptations.

Biology evolved for millions of years, and if a specific mechanism worked in nature, it can serve as a great inspiration to improve engineered products. By merging the common principles in biology and engineering, the educational tools for K to 12 kids can become more engaging and hands-on.

Deeksha Seth, Drexel Graduate Instructor

That's exactly the point of MEM435, the required mechanical engineering design course that matches upper-level students like Taddeo, Bry, and their colleagues, Cameron Dye and Raymond Seibert, with clients from science museums. The students are assigned to use formal engineering design methodology to create a product that will teach biology and engineering to kids. Academy educators Mike Kaczmarczik and Mariah Romaninsky are their clients.

As representatives of the Academy, Kaczmarczik and Romaninsky requested an educational tool that would demonstrate the adaptations of reptiles. The students responded with a model of a snake jaw, which visitors can handle as they learn about the coordination required for a snake to take a bite.

"The vision is to apply knowledge of engineering and biological systems to the creation of the product," says Deeksha Seth, Drexel graduate student and instructor for the engineering design course. "Biology evolved for millions of years, and if a specific mechanism worked in nature, it can serve as a great inspiration to improve engineered products. By merging the common principles in biology and engineering, the educational tools for K to 12 kids can become more engaging and hands-on."

THE COURSEWORK

At first, the jump from nature to computer may seem like a leap, and this way of thinking certainly takes students out of their comfort zones. The course has forced Taddeo, Bry, and their colleagues to think about engineering in an entirely different way. Never before have they been asked to work so closely with a client—especially not one in the biological sciences. "A lot of work at Drexel is very theoretical," Bry says, "and this class gives us a chance to apply what we've learned."

When Seth's advisor, Associate Professor of Mechanical Engineering and Mechanics James Tangorra, PhD, designed the course, his goal was for the class to fill these gaps. He based the coursework on his own research, which focuses on applying system-level engineering techniques to biological systems. He then decided to match students with science-based organizations to create custom bio-inspired designs.

"The students get exposure to someone [in this case, the museum client] who

Mike Kaczmarczik/ANS

Composed of wood, string, and a sophisticated 3-D printed replica of the Academy's python skull, this prototype helped the students test the function and connections of the moveable jaw.

doesn't speak their language," says Seth, who took over as instructor when Tangorra went on sabbatical. "They are encouraged to take a step back and focus on the purpose of their work."

At the start of the academic quarter, the students meet with their clients to learn about their needs. The pupils conduct in-depth research and present their initial designs, and their museum mentors provide feedback and assistance to help the students develop physical prototypes.

Some students choose to continue their work in an independent study, and that's exactly what Taddeo, Bry, Dye, and Seibert have done, with limited funding support from the Academy. When they are finished, the Academy will receive instructions for building their snake jaw, as well as a list of all parts needed. The students are building a hands-on model for display, which could be installed in one of the Academy's galleries if funding becomes available.

Mike Kaczmarczik/ANS

The 3-D printed python skull on the right is an enlarged copy of a smaller skull (left) from the Academy's education collection. Drexel students scanned the smaller skull, doubling its size and adding appropriate connections to the back of the skull before printing the model for use in the museum.

THE JAW

When you think about their assignment, you realize why some fourth-year and even fifth-year students are nervous as they begin the course. For the snake jaw project, Taddeo, Bry, Dye, and Seibert were asked to create a tool to explain reptile feeding, and the rest was up to them. They talked with Academy staff about their needs, inquired about what images kids associate with the word "reptile," and educated themselves about reptile movement.

Their original design showed the delicate process in which snakes walk their bodies over food using skeletal and muscular systems in their necks and jaws. They used balloons to demonstrate the muscle movements that prompt a snake to open its jaw.

This was cool, but it was complicated, says Kaczmarczik. He helped the students reel in their original design by explaining exactly how kids might play with the product. They assessed how to make the model safe (Should teeth be included?) and effective (How would it be positioned so that kids could play with it while other visitors could see it working?).

Now it's a streamlined skeletal system made up of wires and knobs, which shows how the jaw opens, closes, and moves from side to side. It fits perfectly on the

Drexel student Ray Seibert created this virtual snake jaw model before the team designed a hands-on tool for use in the museum. Alongside other computer programs, the computer-generated image helped the students to assess the jaw's functionality and make adjustments before they began building their physical product.

Academy's Carts of Curiosity, so it should be fairly simple to install and share with museum visitors.

MAKING IT HAPPEN

The snake jaw team wasn't the only group to go above and beyond to create a product for use in the Academy. Another group of students has been working on Hungry, Hungry Finches, in which birds with interchangeable beaks work to move different foods from troughs into their "stomachs." The game, which could potentially fit in a space such as *Outside In*, the Academy's discovery center for children, displays the concept of adaptation by natural selection in action.

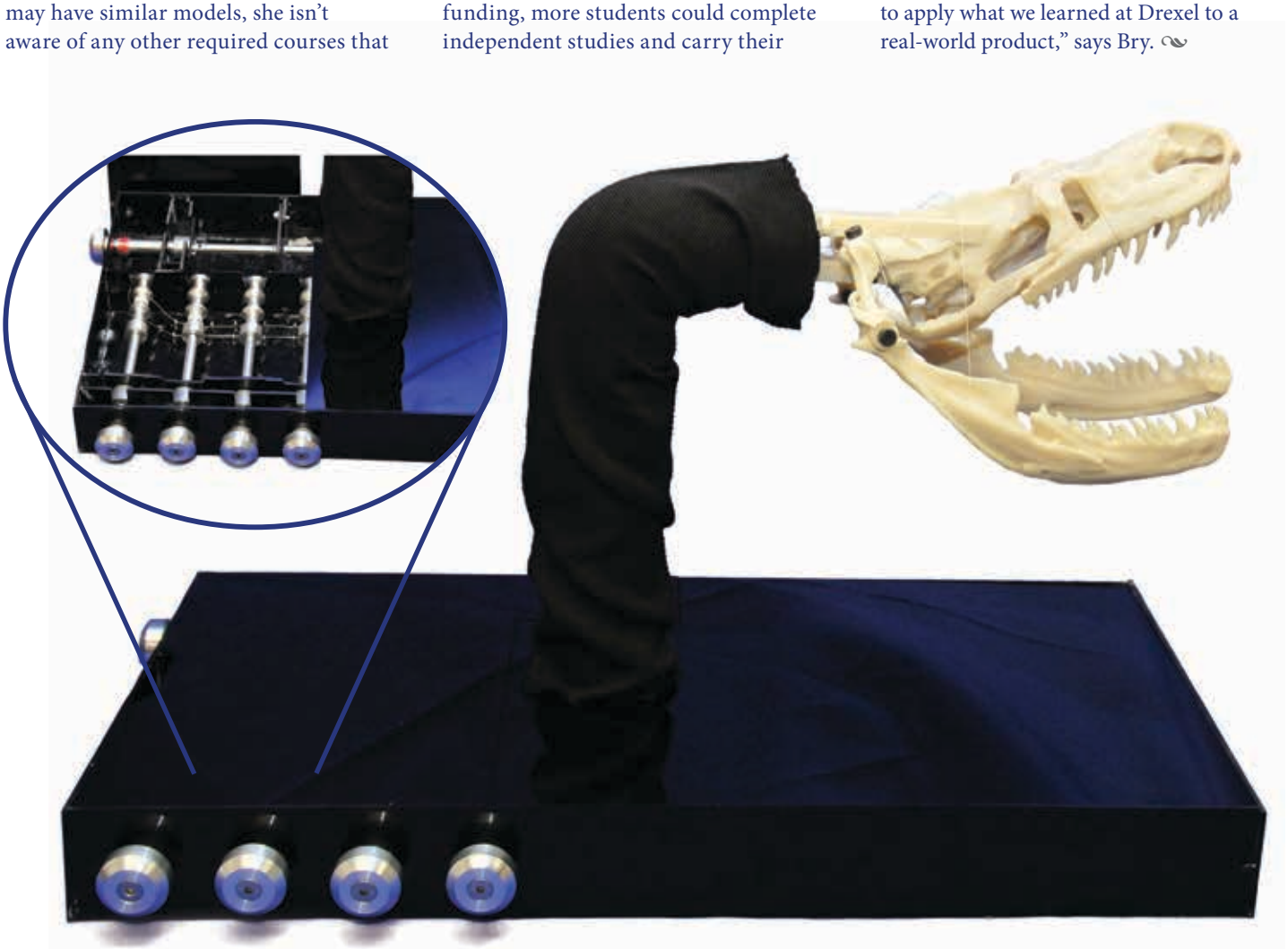

Mike Kaczmarczik/ANS

Jon Bry and Ray Seibert assemble and test an unfinished version of the model that will help museum visitors understand how snakes eat.

Seth notes that while other universities may have similar models, she isn't aware of any other required courses that position museums as "customers" for undergraduate engineers. With additional funding, more students could complete independent studies and carry their projects into their senior research, and they could build and install the custom-made products in their clients' museums.

Despite the commitment and effort required to succeed in this challenging engineering design course, Seth and the students don't see interest dying down anytime soon. The work that comes out of the course gives the students something to put on their resumes, and they say the potential that they might obtain a patent for their work is enticing. Aware of the potential benefits of having a museum partner, the snake jaw group decided to "double down" rather than coast through the required coursework.

"We're really grateful for the opportunity to apply what we learned at Drexel to a real-world product," says Bry.


Mike Kaczmarczik/ANS

Equipped for display in the museum, this model features silver knobs that control the movement of each side of the lower jaw. A fifth knob in the rear allows side-to-side movement of the entire skull. To enable jaw movement, spools of line inside the base connect to the knobs, run through the "neck," and connect to anchor points at the back of the skull.

Q: WHAT ARE ARCHIVES GOOD FOR?

By Scott McConnell
Author, *Witmer Stone: The Fascination of Nature*

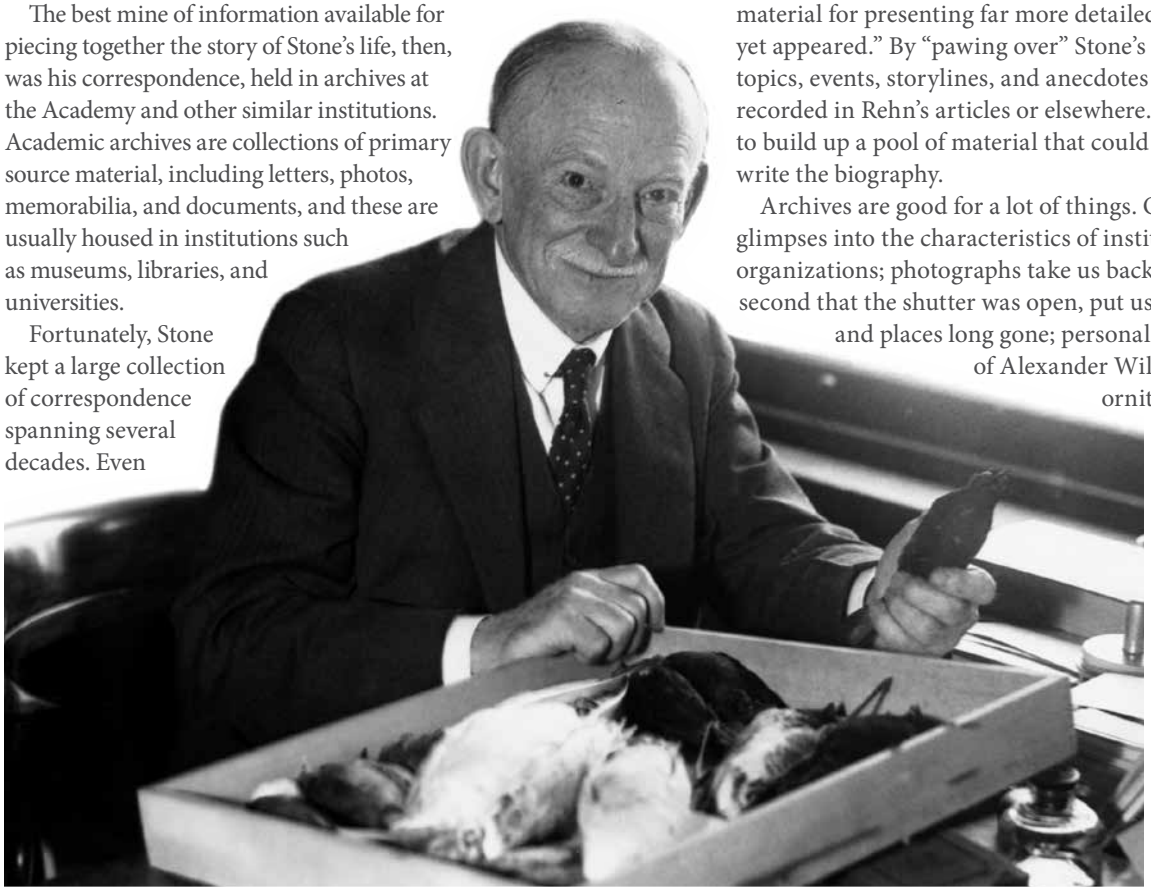
A: Witmer Stone (1866–1939) was a world-renowned ornithologist and botanist who worked at the Academy of Natural Sciences for 51 years. He is remembered today as the author of *The Plants of Southern New Jersey* and the classic *Bird Studies at Old Cape May*.

For my writing of the biography *Witmer Stone: The Fascination of Nature*, two of the most important sources of information to a biographer—personal recollections of others, and previous publications about my subject—were not available to me. The only people still alive who knew Stone personally were very young at that time, and memories of events, places, and people from 70 years ago can be understandably hazy.

Late in his life, Stone wrote two short autobiographical pieces in *Frontiers*. In 1941, Academy colleague James Rehn published two memorials in *The Auk* and *Cassinia*, which provide an excellent framework for Stone's life. Almost nothing else has been written about him since then.

The best mine of information available for piecing together the story of Stone's life, then, was his correspondence, held in archives at the Academy and other similar institutions. Academic archives are collections of primary source material, including letters, photos, memorabilia, and documents, and these are usually housed in institutions such as museums, libraries, and universities.

Fortunately, Stone kept a large collection of correspondence spanning several decades. Even more fortuitously, shortly after Stone's death, Academy president and managing director Charles M.B. Cadwalader bought the collection with his own funds and donated it to the Academy. The Academy Archives also contain a collection of Witmer Stone personal items that provide insights into his life. Archives at other museums and libraries hold large collections of Stone correspondence. To reconstruct a life from letters is akin to trying to recreate the storyline of a movie by only being able to examine a haphazard assortment of some of the film frames, but it was the only option for this particular story.



ANS Archives Coll. 457

WITMER STONE (1866–1939) was a prominent scientist who served as assistant curator, curator, director, and vice president of the Academy in the early 20th century. Known best for his classic *Bird Studies at Old Cape May* (1937), he is the namesake for a wildlife sanctuary at Cape May Point, New Jersey, a prime site for spotting migratory birds (more on page 7). He was president of the American Ornithologists' Union, the American Society of Mammalogists, and the Pennsylvania Audubon Society, and he was a founding member of the Delaware Valley Ornithological Club. He was associated with the Academy for more than 50 years.

Fifty years before I published *The Fascination of Nature*, Francis Harper, a researcher of the lives of early American naturalists, anticipated this and similar books when he said, "I have become convinced, from pawing over thousands of old naturalists' letters in the archives of Philadelphia, that therein lies abundant material for presenting far more detailed biographies than have yet appeared." By "pawing over" Stone's letters, I found additional topics, events, storylines, and anecdotes that had not been recorded in Rehn's articles or elsewhere. It was therefore possible to build up a pool of material that could then be drawn upon to write the biography.

Archives are good for a lot of things. Old documents offer glimpses into the characteristics of institutional and political organizations; photographs take us back in time and, for the split second that the shutter was open, put us into a world of people and places long gone; personal items such as the gun of Alexander Wilson, father of American ornithology, in the Academy's collection can serve as little portals into past lives. And someone's archived correspondence, if it is extensive enough, can be used not just to gain a few insights into their life and personality, but also as the basis for an entire biography. Information about *Witmer Stone: The Fascination of Nature*, and a blog about Stone, is at witmerstone.com.

INVASION OF THE KNOTWEED

By Alissa Falcone

The Delaware River Basin is under attack from a foreign enemy: Japanese knotweed (*Fallopia japonica*), a non-native invasive species, has been covering a lot of ground, and water, and it's wreaking havoc on its environment.

Though the bamboo-like plant seems harmless with its heart-shaped leaves and small white flowers, Japanese knotweed is known as the "Attila the Hun" of the plant world because once it invades, it's capable of much damage. The plant grows quickly and densely, crowding out native streamside vegetation and worsening erosion and sedimentation. It's incredibly hard for humans to limit its growth, let alone get rid of the plant altogether.

"A lot of money is spent on stream bank restoration, which often includes removal of invasive plant species, but Japanese knotweed is very difficult to eradicate. It reproduces quickly from seeds or roots, and only a small root fragment is enough to regrow a population or travel downstream and colonize a new area," says Kathryn Christopher, an Academy staff scientist researching the invasive plant.

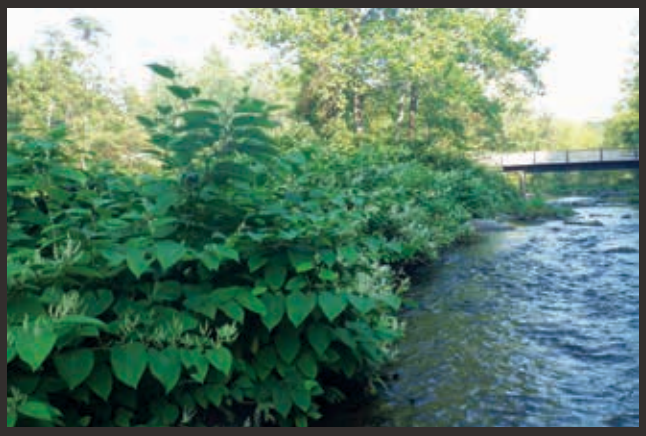
Christopher and her research partner, Derron LaBrake of Wetlands & Ecology Inc., have created a pilot study to research the effect the plant has on insects in the water and how insects interact with it versus native plant species. She hopes to start a framework for other, more intricate questions regarding knotweed and stream conditions.

In January, the team deployed leaf packs, or mesh bags stuffed with leaves, into several area streams. The packs were collected over several weeks through February and early March for the researchers to examine the insect communities that have colonized the leaves.

"We are looking to see if the insects show a difference in preference between native leaves and knotweed," Christopher says. "We are trying to better understand the effects of knotweed on stream ecosystems so that management plans can be better tailored for specific sites, with hopefully better results."

~ This article originally appeared in Drexel University's 2015 Exel magazine.

This project is part of a massive conservation initiative to ensure that the Delaware River remains a vibrant natural habitat and safe source of drinking water for millions. To learn more about the Delaware River Watershed Initiative, visit ansp.org/drwi.



MORE ON INVASIVE SPECIES

Invasive species are found just about everywhere. They can have devastating impacts on native ecosystems and create extreme dangers to human health. Invasive species cost the United States billions of dollars each year by interfering with agricultural and industrial production and reducing property values. Many displace or compete with native species for resources, destroy habitats, and disrupt the overall health and balance of local ecosystems. Visit invasivespeciesinfo.gov to find out what you can do to help.

Photos by Kathryn Christopher/ANS

DANA AND NEIL COHEN: SUPPORTING ORNITHOLOGY AT THE ACADEMY

Academy volunteer Dana Cohen has been living and breathing ornithology for 20 years. Lately, the air up there is changing.

From the early days of her tenure at the Academy, when she taught kids to observe and draw birds in the Young Ornithologists Program, to her more recent years as a trainee turned mentor in the bird skinning lab, she has seen a lot. Staffing changes, collection acquisitions, specimen rehousing, and expeditions have kept things lively, but Cohen's days have been especially exciting since the Academy's affiliation with Drexel University.

"The association with Drexel has breathed new life into our work," she says. "There has been an influx of students, and you can feel it. There's a whole new energy, even in the laughter you hear in the halls."

For many years, as Cohen honed her bird-skinning skills, she and Collection Manager Nate Rice worked side by side in a quiet lab. Today, there are so many students, staff, and volunteers that Cohen and Rice have to call dibs on their seats.

"The students are very smart! Many are naturally good at skinning," she says. "And now, new Curator of Ornithology Jason Weckstein's postdocs from Brazil bring different skills to the skinning table."

Cohen has learned techniques from these postdoctoral researchers and from Weckstein. As a scientist who studies avian parasites, Weckstein has taught Cohen how to remove lice from birds' feathers, record their data, and preserve the parasite specimens in ethanol. She believes that Weckstein's research on avian parasites and his teaching talents add even more momentum to the advancement of science at the institution.

Cohen has been donating her time to the Academy for two decades, and with the revitalization of the Ornithology Department, she looks forward to the future.

"I feel like the department will continue to build its collections, and continue with outreach on many levels. Everything we're doing—from our interactions with the students to Jason and Nate being in the media, supports the Academy's mission," Cohen says.

Cohen and her husband, Neil Cohen, have been supporting the Academy through donations for nearly 15 years. Neil, a physician, is a familiar face at Academy events and an ardent backer of his wife's volunteering. He loves to hear Dana's stories when she returns home from her days at the Academy. Dana says there's never a dull moment, whether she's preparing bird study skins, talking to visitors, or helping the ornithologists unpack specimens from an expedition.

This spring, the couple made an extremely generous personal contribution to the Academy's Ornithology Campaign, which is positioning the Academy to join the ranks of the world's leading ornithology centers in terms of its collection, research scope, and educational training programs. Dana Cohen is on the Ornithology Campaign Committee, and she has offered to donate the use of her home for a committee event. She often shares stories of the rejuvenated Ornithology Department with her friends, but she believes that their happy memories of visiting the Academy as kids make it simple for her to encourage their renewed support.

As for why she's still sticking around?

"Even though my degree is in Fine Art, Nate and Jason have been very supportive," she says. "They've given me an opportunity to learn as an artist and as someone who is interested in birds and the environment.

"The institution itself is kinda quirky—in a good way," she says. "I feel extremely proud to be here." *~ Mary Alice Hartsock*

GIVING THROUGH LIFE INSURANCE

Life insurance can be a simple and flexible tool for making a significant contribution to research and programs at the Academy of Natural Sciences of Drexel University. Not only does it allow you to make a substantial donation to the Academy at no cost to you, but you may also benefit from tax rules that apply to gifts of life insurance. Here are some helpful tips on giving through your life insurance policy.

1. You can make the Academy a beneficiary of an existing life insurance policy. Upon your passing, the full face value amount of the policy will go to the Academy. Although the proceeds from the policy will be included in your gross estate, the full amount received by the Academy may be eligible for a charitable deduction. To make the Academy a beneficiary of an existing life insurance policy, you can simply request a beneficiary designation form from your employer or insurance company.
2. You can make the Academy the owner and beneficiary of an existing paid-up life insurance policy. By doing so, you may be able to deduct an amount equal to the fair market value of the policy, or your cost basis, whichever is less. Since the Academy becomes the owner of the policy, the proceeds will not be included in your estate for tax purposes.
3. You can make the Academy the owner and beneficiary of a policy on which you are still paying premiums. You may be able to deduct an amount equal to the approximate cash value of the policy or the policy's cost basis, whichever is less, in the year in which you give the gift. You may also be able to deduct any future premium payments, and the proceeds will not be included in your estate for tax purposes.
4. You can purchase a new policy and make the Academy the owner and beneficiary. With the Academy as the owner, you may be able to deduct premium payments as charitable contributions for as long as the premiums are paid, subject to state limitations. In addition, the proceeds will not be included in your estate for tax purposes.

A gift of life insurance can enable you to make a much greater gift than may have been possible during your lifetime. We can help you explore the possibilities for using this effective financial planning tool to make a meaningful gift to the Academy. For more information, please contact Amy Marvin, vice president for Institutional Advancement, at 215-299-1013 or marvin@ansp.org.

On behalf of the Academy's Board of Trustees, we wish to recognize and thank those who have contributed to the Academy between **June 1 and August 31, 2015**. Your generosity helps to fund our many programs of research and education, and we are tremendously grateful for your support.

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ACADEMY WELCOMES NEW TRUSTEES

M. Brian Blake is provost and executive vice president for Academic Affairs at Drexel University. Prior to joining Drexel, Blake served as vice provost for academic affairs and dean of the Graduate School at the University of Miami. As vice provost, he was the primary advocate for research on the Coral Gables campus, including research administration, infrastructure, policies, training, and regulatory needs. Blake's research interests include investigating software engineering approaches for the integration of Web-based systems. He is an ACM Distinguished Scientist and a senior member of the Institute of Electrical and Electronics Engineers.

Robert Delany is the chief financial officer of Public Financial Management, the leading financial services firm providing advisory services to government and nonprofit entities in the United States. For the last 20 years, he has built and grown businesses for large, small, public, and private organizations. He is on the Board of the Kimmel Center for the Performing Arts in Philadelphia and serves on Drexel University's President's Leadership Council, along with the Finance Advisory Board for the LeBow School. He is also a member of the Greater Philadelphia Senior Executive Group.

Dave Griffith is the executive director of Episcopal Community Services of Philadelphia, a faith-based social services agency focused on children, families, and older individuals in poverty. In addition to serving as chairman of Modern Group Ltd, an industrial holding company in Bristol, PA, he is chairman of Delaware Valley Floral Group of Sewell, NJ; director of JJ Haines Company of Baltimore; director of Mountain Laurel Spirits, LLC; vice chairman of the Philadelphia World Affairs Council; and a member of IBM's Mid-Market Advisory Council. He is the chairman of the McEwen Family Foundation and a director of the Griffith Family Foundation.

Page Leidy is a co-founder and managing principal of SL Development, a real estate development company focused on residential, mixed-use, urban infill, and adaptive reuse properties in New York City. He serves on the Academy's Development and Marketing and Public Experience Committees and has served as a committee member for numerous charity events for foundations, including the Bone Marrow Foundation and Parkinson's Disease Foundation. He is a descendant of Joseph Leidy (d. 1891), an early American supporter of Darwin's theory of evolution who named the holotype specimen of *Hadrosaurus foulkii*, the first nearly complete fossilized skeleton of a dinosaur ever found.

Robert S. Victor is senior vice president of Finance and Business Operations for Comcast Business. Comcast Business serves the data and communications needs for small, mid-size, and large enterprises nationwide. Victor and his team oversee financial performance and controls, capital deployment and network buildout, new growth opportunities, and business processes and operations. From 2008–2013, he served as senior vice president and head of strategic and financial planning for Comcast Corporation, and in that role led the integration of NBCUniversal. He also chairs the Board of Mastery Charter Schools.

PHILADELPHIA SHELL SHOW

Join us for the annual Philadelphia Shell Show and Festival on October 17 and 18 for a memorable day of mollusks. The largest of its kind in the Northeast, the show features beautiful shell displays by collectors and amateur scientists, as well as chances to participate in mollusk dissections, make crafts, shop for shells, jewelry, and books at an international shell market, and go behind the scenes to see some of the 10 million specimens in the Academy's Malacology Collection, the third largest in the world.

Mike Servedio/ANS

Meredith Dolan/ANS

SCHEDULE YOUR FIELD TRIP

Take your students on an exciting exploration of the natural world. Our three floors of exhibits, ranging from dinosaurs and dioramas to hands-on interactive stations, are sure to make your field trip to the Academy the highlight of the school year. Stop in for our live animal presentations, and visit our Carts of Curiosity to talk to real Academy experts, touch specimens, meet live invertebrates, and play games. Your class can also sign up ahead of time for fun, in-depth discovery lessons with our experienced Academy educators on topics like bugs, dinosaurs, fossil forensics, arthropods, and more. Visit ansp.org/education/field-trips for more information, or call our Reservations Office at 215-299-1060 to book your trip.

Mike Long Photography for ANS

CUISINE FROM THE COLLECTIONS

Join us on November 7 for a museum-themed cocktail party! Sample cocktails and gourmet food pairings, all inspired by the Academy's 18 million scientific specimens. Enjoy live music and learn the science behind the treats on your plate. For information on the event or sponsorship opportunities, call 215-299-3790 or email cuisine@ansp.org. Purchase tickets at ansp.org/cuisine.

Mike Long Photography for ANS

DINOSAUR DAYS

Save the date for a weekend featuring your favorite Academy ambassadors! Dinosaur Days, November 27–29, will be packed with live animal shows starring our own living dinosaurs, fossil presentations in Dinosaur Hall, and a chance to see our Art of Science exhibit centered on our famous *Hadrosaurus foulkii*. Fun games and crafts are guaranteed to enlighten even the wisest (and youngest) dinosaur experts in your family. Free with museum admission!

Lauren Duguid/ANS

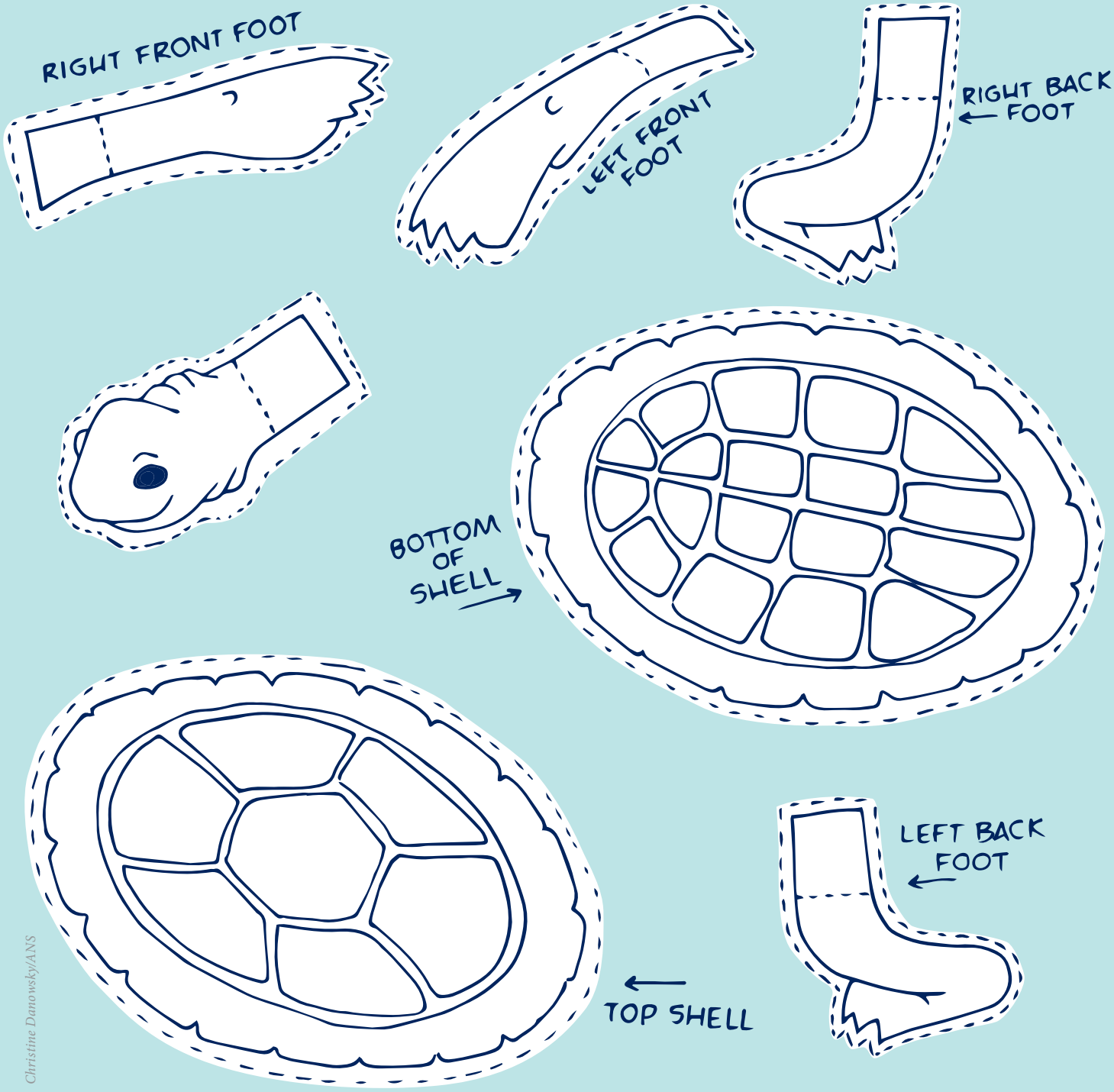
ACADEMY CAFÉ

Have you stopped in lately for a Weckerly's ice cream sandwich or a mouth-watering hot special? If you answered yes, you've probably noticed that the Academy Café has a fresh new look. We've brightened the Café with splashy colors, trendy chalkboard signs, rustic wood paneling, and gorgeous plants to make your dining experience even more enjoyable. Plus, we're offering the delicious salads, soups, and comfort foods that you and your kids love! We're even open for breakfast. Check it out today!

JUST FOR KIDS

Welcome to the *Academy Frontiers* page for kids, one of the many great ways you can participate in the Academy's Kids Club!

Did you know that all turtles, tortoises, and terrapins are reptiles? In the Academy's newest exhibit, *Reptiles: The Beautiful and the Deadly*, you can get eyeball to eyeball with bizarre turtles, live deadly snakes, colorful lizards, and rugged crocodilians from around the world. Color the turtle below, cut along the dotted lines, and use glue to assemble the turtle. Bring it when you visit *Reptiles*, and show a staff member what you made!



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CALENDAR OF EVENTS

OCTOBER

Reptiles Open in the Special Exhibits Gallery
September 30–January 10 $ *

Philadelphia Shell Show & Festival
Saturday and Sunday, October 17–18, 10 a.m.–5 p.m. M

NOVEMBER

Drawn to Dinosaurs: The Return of Hadrosaurus Foulkii Opening Event
Sunday, November 1, 10 a.m.–5 p.m. M

The Eternal Frontier with Tim Flannery
Tuesday, November 3, Time TBD

Museum Closes at 3 p.m.
Saturday, November 7

Cuisine from the Collections
Saturday, November 7, 7–10 p.m. $ R

Kids Club Dinos and Donuts Event
Saturday, November 14, 9–10 a.m. M R

Dinosaur Days
Friday through Sunday, November 27–29, 10 a.m.–5 p.m. M

DECEMBER

All-Star Days
Saturday through Wednesday, December 26–30, 10 a.m.–5 p.m. M

Dinosaur Day
Saturday, December 26

Bug Day
Sunday, December 27

Reptiles Day
Monday, December 28

Fur, Feathers, and Scales Day
Tuesday, December 29

Weird-Things-in-Jars Day
Wednesday, December 30

JANUARY

Reptiles: The Beautiful and the Deadly Final Day
Sunday, January 10, 10 a.m.–5 p.m. $ *

Animal Mythology Weekend
Saturday–Monday, January 16–18, 10 a.m.–5 p.m. M

Tarantulas Member Opening
Friday, January 29, 5:30–9 p.m. M R

Tarantulas Opens in Special Exhibits Gallery
Saturday, January 30, 10 a.m.–5 p.m. $ *

On Saturday, November 7, join co-chairs Anna and Todd Cassidy (pictured at right), Dr. Elizabeth Bales and Michael Dell'Angelo, and Beth Overley Adamson and Terry Adamson at **Cuisine from the Collections: Cocktail Edition**! Purchase tickets at ansp.org/cuisine.

Mike Long Photography for ANS

M Free for members $ Fee R Registration required

Unless otherwise noted, all events held at the Academy are free with museum admission. *$3 Individual and Family level member fee for *Reptiles* and *Tarantulas*. Family Plus level members and above receive free admission. Purchase, renew, or upgrade your membership today at ansp.org/membership. Please check ansp.org for updates.

Visit ansp.org for more information and to register.

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