INSIDE:
Fish Ecology in Pictures

FRONTIERS

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

Summer 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: *Academy fish ecologists spotted this red salamander (*Pseudotritan ruber*) in Bushkill, PA, during research for the Delaware River Watershed Initiative (more on pages 8–10). Salamanders are sensitive to water contamination, and their presence or absence can provide insights into water quality when fish are scarce. Photo by David Keller/ANS*

Academy Greetings

Katie Clark/ANS

Dear Friends,

When you think of summer camp, do you imagine cabins, canoes, and cookouts? Or do you envision wilderness exploration, leadership training, and real-life experiences that provide preparation for college and careers? Hosted by the Academy and Drexel's Department of Biodiversity, Earth & Environmental Science (BEES), our Environmental Science Leadership Academy for high school students combines all of these. It's one part adventure travel, one part leadership training, and two parts environmental science field experience. As students habitat-hop from seaside to salt marsh to maritime forest, they work alongside Academy scientists and Drexel professors who are eager to share their knowledge and research techniques. Our students understand that their futures depend on outstanding instruction in environmental science, and we are thrilled to offer a summer field experience that aligns so perfectly with their goals.

In this issue of *Academy Frontiers*, we take you on a virtual expedition alongside leaders, instructors, and students of the Academy's fish ecology team and Drexel's BEES Department. Turn to page 8 to see our scientists and students wade waist deep into streams, collect fishes of all life stages, and come face to face with stunning local aquatic wildlife. Led by Richard Horwitz, PhD, a Drexel professor and Ruth Patrick Chair of Environmental Science, the fish ecology team is a crucial part of science at the Academy, participating in multi-disciplinary environmental assessment programs including the Delaware River Watershed Initiative (more on page 10). They also are great at talking with our members and sharing their work with museum visitors. You can meet some of our fish scientists and their colleagues on September 18 at our annual Members' Night!

I couldn't be more thankful for your membership support of the Academy, which strengthens our scientific enterprise and supports our efforts to share our science with the public. To those of you who have contributed to the Academy's Annual Fund, thank you for helping to make our research, exhibits, and public programs possible. We could not do our work without 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

Academy scientists participated in the 2014 Upper Delaware BioBlitz, held at the Ten Mile River Boy Scout Camp adjacent to the Delaware River. A BioBlitz is a 24-hour marathon field study in which scientists, students, and community members work to find as many species as possible in a designated area. Here, Drexel graduate student Maria Berezin and Drexel co-op Emily Johnson help local children identify fish species. This is just one of the scientists' many outreach activities. They also conduct workshops, present research results to community groups, host a popular activity on Members' Night, and develop and participate in educational programs in conjunction with local watershed associations, secondary schools, and other groups.

David B. Soete

Jack Kelly/Animal Grossology

Animal Grossology

Special Exhibits Gallery
Open Through August 30, 2015

Animal Grossology is the slimiest, stinkiest, and downright yuckiest exhibit you will find in Philadelphia in 2015! Based on Sylvia Branzei's best-selling children's book series *Grossology*, this hands-on 3-D exhibit oozes with disgusting science and provides a slightly off-kilter view of the animal kingdom. Learn why cows chew cud and why snail and slug slime might provide scientists with more insight into treating cystic fibrosis. From poop to pellets and scales to hairballs, check out all the things you aren't allowed to discuss at the dinner table!

Joe McDonald

Reptiles: The Beautiful and the Deadly

Special Exhibits Gallery
September 28, 2015–January 10, 2016

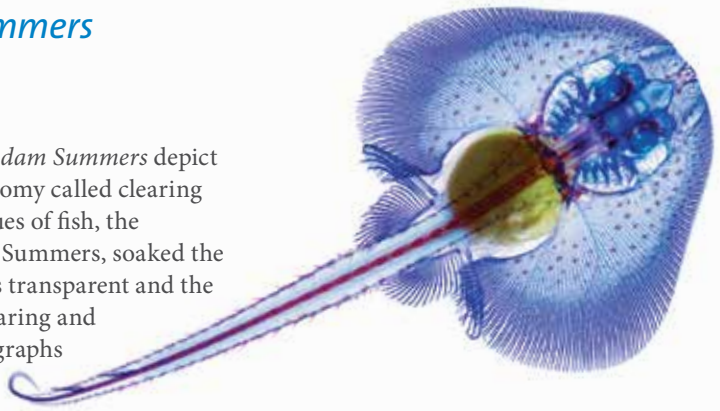
Get eyeball to eyeball with live deadly snakes, colorful lizards, bizarre turtles, and rugged crocodilians from around the world in *Reptiles: The Beautiful and the Deadly*. Nestled in naturalistic habitats, these cold-blooded animals will help dispel common myths and foster a basic understanding of 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.

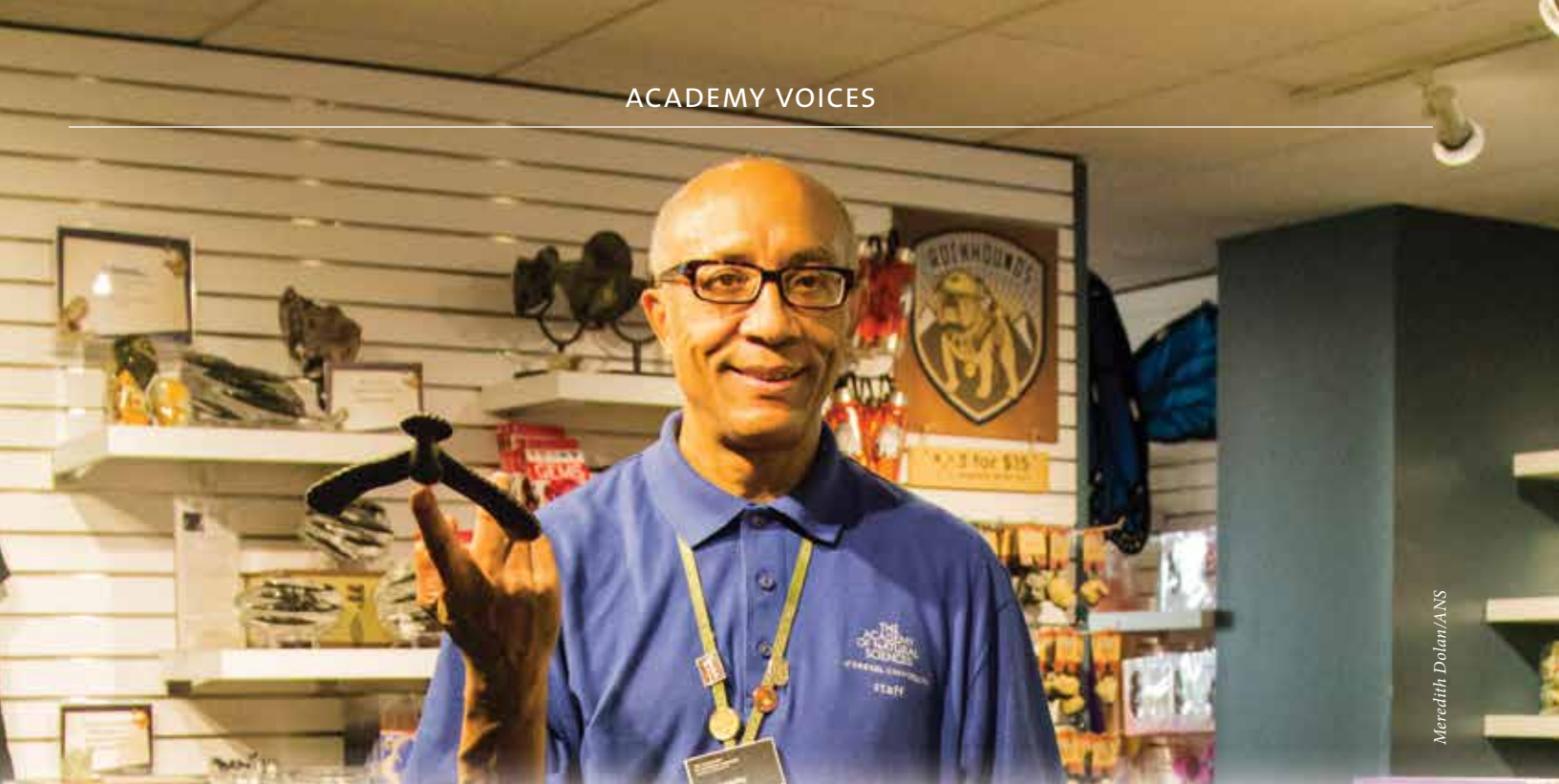
Clearly Beautiful: Photographs by Adam Summers

Art of Science Gallery
Open Through September 25, 2015

The large, revealing images of *Clearly Beautiful: Photographs by Adam Summers* depict the striking results of a common method of studying animal anatomy called clearing and staining. To reveal the beautifully detailed inner skeletal tissues of fish, the photographer, University of Washington biology professor Adam Summers, soaked the specimens in different dyes and enzymes to render the soft tissues transparent and the harder tissues deep blue and crimson. Each careful step of the clearing and staining process is described and illustrated through more photographs and fish specimens from the Academy's Ichthyology Collection.



Adam Summers



Meredith Dolan/ANS

SHOPPING WITH ISAAC LAMPLEY

By Gelsey Torres

The sound of hundreds of children permeates the high ceiling and marble walls of the Academy's lobby. Little girls in navy polos excitedly point to the map, deciding where to go next. Several little boys gawk at the giant *Elasmosaurus* hanging above their heads. And in the Academy Shop, Isaac Lampley is busy showing off one of his favorite toys.

He picks up a balancing eagle and gives it to one of the curious boys slowly crowding around him. The eagle is one of the best-selling items in the shop—Lampley sells dozens each day, and no wonder, since he always carries one in his pocket.

"Now this is a very special eagle. Watch what it does," he says. He instructs the boy to balance it on a corner of the display. The eagle wobbles precariously on the edge. "You can balance it on your nose, you can balance it on your toes, you can balance it on your head, you can even balance it on your bed!"

He laughs and points to the display where the balancing eagles are lined up neatly for sale, and one of the kids hurries to the display to grab one. Lampley smiles.

"I always try to look out for the kids. I try to treat them like I would want to be treated—whether they have $5 or $50."

Lampley has an intimate knowledge of all the items the Academy sells. He tries out anything and everything he can. That way, he says, he can give customers recommendations on which toys are the most fun.

A native of 20th and Brown Streets in Philadelphia, Lampley has wanted to work at the Academy for as long as he can remember. He used to visit every year for his school's field trip, as well as with his mother and little brother.

"I loved science," he says. "When I was little I found a book at the library about creating my own zoo. I collected spring water at the park and was surprised when my house ended up full of mosquitoes!"

As he got older, he took frequent trips to the Academy through his job as an assistant summer camp counselor. He often brought neighborhood kids to the Academy during free admission days.

Lampley finally got his wish of working at the Academy when he was hired in the Academy Shop 11 years ago. A physician's assistant for 10 years, he got tired of it and worked a variety of retail jobs. In between jobs, he stopped by the Academy to ask Sheila Knox, visitor services associate, if the Academy needed any help. She pointed him to the Shop.

"That was during the first *Chocolate* exhibit. They needed help selling all the chocolate," he says.

When *Chocolate* was over, his boss asked him to come back for the next exhibit. Two years later he was asked to work as a security guard on Saturdays and for special events. He says his past experience working retail prepared him to work at the Academy, where he interacts with a variety of people every day.

"I want their experience in the gift shop to be one of the best experiences in the museum," he says. "It makes me happy to see a child smile, because I know that they mean it."

The Academy Shop offers a wide variety of nature-inspired items for all ages, including educational toys and activity kits, a wide selection of books and field guides, real fossils and minerals, distinctive jewelry, and Academy-exclusive items. Every purchase made in our shop supports the Academy's ongoing research activities and educational efforts. Members receive at least a 10 percent discount on all Academy Shop purchases. Admission is not required to visit the Academy Shop.

EXOTIC LOCALS

By Mike Kaczmarczik

While considering how to write this article, I felt extremely conflicted. I wanted to share the excitement and joy the following adventure induced, but I felt a deep obligation to clearly and firmly express the dangers of invasive species. Please read the information below and take time to find out how you can help control and prevent invasive species.

Paul Kaczmarczik

For years I have been hearing stories about a wild population of Italian wall lizards (*Podarcis sicula*). What made this population special was its location—half a world away from its natural range, around the Mediterranean. I've always had an affinity for reptiles, especially observing them in the wild. So it was exciting news to hear that I might be able to catch a glimpse of this lizard in the wild.

The first warm, sunny Saturday in April I hopped into my car and headed about 30 minutes to a location several people claimed had an extensive population of wall lizards. After a couple of hours, the only reptile to cross my path was a male garter snake (*Thamnophis sirtalis*). A colleague had mentioned another possible location, just a few blocks away. It seemed worth a try!

Almost immediately after arriving at the second location, I spotted a decaying brick wall—the perfect habitat for a wall lizard. I tried to keep my expectations in check. I have often gone out looking for reptiles without seeing so much as a scale. Each step closer to the wall was a little slower than the last. Suddenly, a flash of green streaked across a rock and into the crevices of the brick wall.

At this point my heart was pounding. Fighting the urge to chase after the green blur, I froze. The brick wall was isolated; there was nowhere for the lizard to go. For 10 minutes I did little more than blink and breathe. My patience paid off. As quickly as the lizard had disappeared, it seemed to suddenly materialize again. Basking on a rock, just a few feet away, was an Italian wall lizard.

It is hard to express the feeling of seeing an animal for the first time, let alone in the wild. Most of the world around us seems to have already been discovered. In many ways that is true. But even though others had found this lizard, it was the first time that *I* had discovered it.

You may have noticed that there is no mention of exactly where I spotted my first-ever Italian wall lizard. This is intentional. I want you to have the same, incredible experience I did. Investigate, ask around, explore. While it is no great secret where this population is, you might have to look past the first page or two of Google to find out.

There are so many amazing aspects of nature. I can't think of a better way to take advantage of them than to get out and explore. Now it is your turn. Go find something that's new to you—Italian wall lizard or otherwise. After all, when was the last time you went on an expedition?

INVASIVE SPECIES: WHAT YOU SHOULD KNOW

Although pythons in Florida and cane toads taking over Australia are the stories that make the news, invasive species are (unfortunately) found just about everywhere. In any location, invasive species can have devastating impacts on native ecosystems and create extreme dangers to human health. For example, Asian tiger mosquitoes (*Aedes albopictus*) may be flying around your backyard. They can carry a variety of diseases that are transferable to humans, including West Nile Virus.

Italian wall lizards are native to France, Switzerland, Italy, and several other countries surrounding the Adriatic Sea. There are several well-established populations in the United States from California to New York. Until a fire likely wiped them out in the 1960s, there was even a population in West Philadelphia. These populations stem from human introduction. Wall lizards are therefore considered an invasive species within the U.S.

The population I went looking for can be traced to a single person. In the 1980s, an individual released around 200 wall lizards to help control insects in his parents' backyard. Thirty years later they are still well-established. A study in Los Angeles, California, showed that an introduced population of wall lizards competed with two other local lizards for the same food and has largely replaced native lizard species. Another study of a Long Island population concluded that the lizards eat other non-native species and may not have had a negative effect on the local ecosystem—but that doesn't mean things won't change in the future. There is still a great deal more to learn about the wall lizard's impact, both locally and throughout the country.

Invasive species cost the United States billions of dollars each year by interfering with agricultural and industrial production, and reducing property values. Many aggressively compete with native species for resources, even to the point of destroying habitats, displacing native species, and disrupting the overall health and balance of local ecosystems. Visit invasivespeciesinfo.gov for more information on understanding and identifying native species and to find out what you can do to help.

DIRE WOLVES AND DRAGONS DAY

By Mike Servedio

On April 12, the Academy hosted Dire Wolves and Dragons Day to celebrate the season premiere of the hit HBO show *Game of Thrones*. Based on the best-selling book series *A Song of Fire and Ice* by George R.R. Martin, the action takes place in the mythical Westeros but prominently features a very real extinct creature, the dire wolf.

"We have the type specimen of the dire wolf in our collections," Academy Paleontologist Ted Daeschler casually mentioned to Director of Education and Lifelong Learning Timshel Purdum at our Paleopalooza fossil festival this past February. Not quite believing her ears, the long-time fan of the book series and show did some research and confirmed that the Academy does indeed house the type specimen of the dire wolf, described in 1858 by Joseph Leidy, former Academy curator and president and father of American vertebrate paleontology.

"Type specimens are an extremely important kind of biological specimen," Purdum explained on the Academy's Blog in early April. "The scientific name of every species is typically based on the description and existence of one very important real specimen. The Academy has 18 million specimens in its collections, and 80,000 of those specimens are designated as type specimens. Discovering that my museum had the specimen of *Canis dirus* for which all other specimens are named simply blew my mind."

Fast forward two months to April 12, the date of the *Game of Thrones* season premiere and the Academy's Dire Wolves and Dragons Day. Academy educators donned their finest capes and period wear, imitating their favorite characters from *Game of Thrones*. They displayed a dire wolf skull from the Academy's Mammalogy Collection, plus a 3-D printed model of the type specimen and modern wolf artifacts.

Wolf-dog hybrids Samson and Naiche, residents of Howling Woods Farm, an animal shelter in central New Jersey that rescues domestic-bred wolves and wolf-dog hybrids, joined us for a unique live animal presentation. The animals had a chance to walk around the auditorium starting about 30 minutes before the show, and they behaved very similarly to domestic dogs. They sniffed various locations, checked out their surroundings, and after a while they relaxed onstage.

Educators from Howling Woods explained the basic evolution of wolves and canines to a packed house, and finally the animals were introduced. Samson, weighing in at about 125 pounds, walked across the stage and immediately laid down next to one of his handlers. Naiche sat calmly on the opposite end of the stage as his handler rubbed his head.

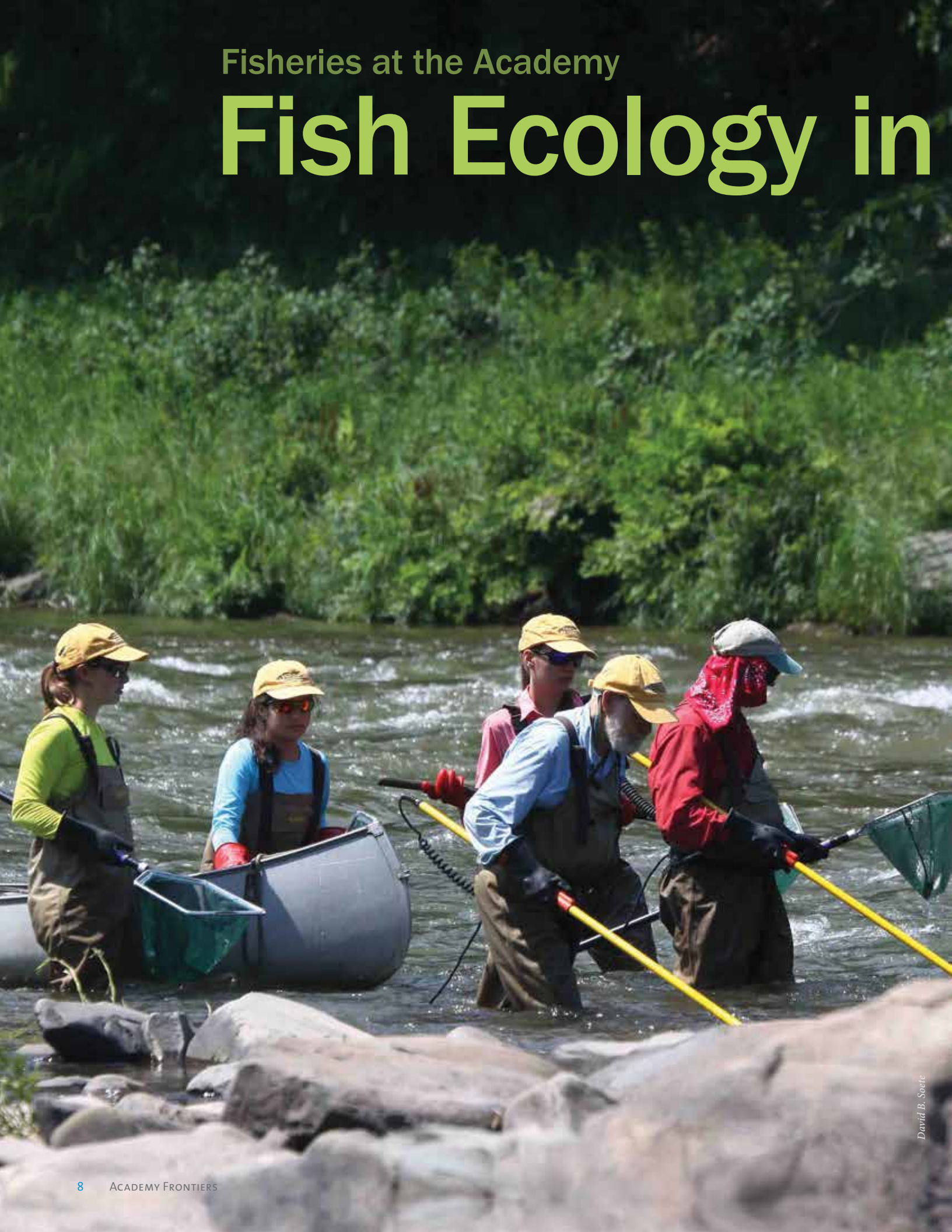
Finally it was time for questions. Curious visitors wanted to know what the animals ate and if they were more aggressive than domestic dogs. Then visitors had a chance to take pictures near the animals in the front of the auditorium. Parents snapped photos of their kids in front of Samson and Naiche while young adults grabbed selfies with the animals, who seemed all too pleased to have their photos taken.

Mike Servedio/ANS

Mike Servedio/ANS

Fisheries at the Academy

Fish Ecology in



David B. Soete

Pictures

By Mary Alice Hartsock

The staff of the "Fisheries" Section in the Academy's Patrick Center for Environmental Research can be a little sensitive about their name. They don't catch or sell fish for commercial purposes, as their label implies, and they are not responsible for managing commercial and recreational fishing.

Still, the name "Ichthyology Department" was already selected as the name for Academy fish scientists studying systematics (the study of the evolutionary relationships of living things and how they've changed over time), so "Fisheries" it was. And despite the misnomer, the team has played a role in countless projects that link fish location, diversity, and abundance to the well-being of our waters, our lands, and our future.

Rich Horwitz, PhD, a Drexel professor and Ruth Patrick Chair of Environmental Science at the Academy, refers to his team as "the fish ecologists." They work in streams, rivers, lakes, and estuaries to understand which fish are where, why they are located where they are, and how people have affected fish location, diversity, and abundance.

One important aspect of the team's job, Horwitz says, is to determine how human interventions such as habitat disturbance, urbanization, spills, dam removal, and other contamination events affect fish. Their data also can assist in watershed planning, helping to prioritize areas for preservation, assessing the effects of restoration activities, and analyzing the impacts of climate change. Often the team serves as an unbiased source of reliable data for scientific and governmental organizations, such as state environmental protection agencies.

Sometimes agencies want to know whether certain species are declining or endangered, or if invasive species are proliferating. The department maintains extensive fisheries databases that include long-term, continuous assessment data from projects that have been ongoing for over 50 years. They use these databases alongside Ichthyology Department collections and other data sources to analyze environmental trends and changes in biodiversity in rivers and other systems throughout the world.

In addition to fieldwork and publications, many Academy scientists include teaching on their resumes. A number of young scientists who have worked with our fish ecologists have pursued advanced degrees in the biological or environmental sciences, and many have obtained jobs in government, including in state environmental protection departments. For Drexel University's Department of Biodiversity, Earth & Environmental Science (BEES), our fish ecologists teach courses, host students in the Academy's classrooms and laboratories, and take students into the field for real-world application of classroom learning.

At left, Academy scientists Rich Horwitz and Paul Overbeck, with co-op students Emily Johnson and Halle Choi and Drexel graduate student Maria Berezin, net fish during the 2014 Upper Delaware BioBlitz (more on page 3).

At right, a scientist measures a blue-gill found in a small New Jersey stream before releasing it back into its habitat.

David B. Soete

ABOVE:
The Academy was granted three years of funding from the William Penn Foundation for its work on the Delaware River Watershed Initiative, a massive multi-year initiative to protect and restore critical sources of drinking water in the Delaware River Basin. The Academy is working alongside the William Penn Foundation, the Open Space Institute, the National Fish and Wildlife Foundation, and the Institute for Conservation Leadership to provide scientific oversight for the entire project, with more than 40 grantees working to restore degraded areas, protect undamaged areas, and monitor watershed health.

The Academy's work includes monitoring ecological conditions at over 100 sites across the Delaware Basin. Above, Academy staff and students from Drexel University's Department of Biodiversity, Earth & Environmental Science don 35-pound backpack electrofishing units to survey Barrett's Run, a small stream in New Jersey, in June 2014. To understand whether the initiative's stream restoration and protection activities are improving water quality, they use the units and nets to obtain a complete survey of fish in a given reach of the stream, sampling two to three times to estimate the total abundance of the stream's various species. Under the guidance of Academy scientists David Keller and Paul Overbeck, students learned to set up block nets and use the electrofishing units to obtain thorough, meaningful samples.

ANS

Shane Godshall

AT RIGHT:
Academy scientist David Keller (in orange) nets flathead catfish as Paul Overbeck steers an electrofishing boat on the Schuylkill River below Philadelphia's Fairmount Dam. An invasive species first documented in the Schuylkill in 1997, flathead catfish have spread throughout the Delaware River drainage. Academy scientists have worked to determine where these catfish are located and at what times of year they are prevalent to gather data on how they impact the local ecosystem.

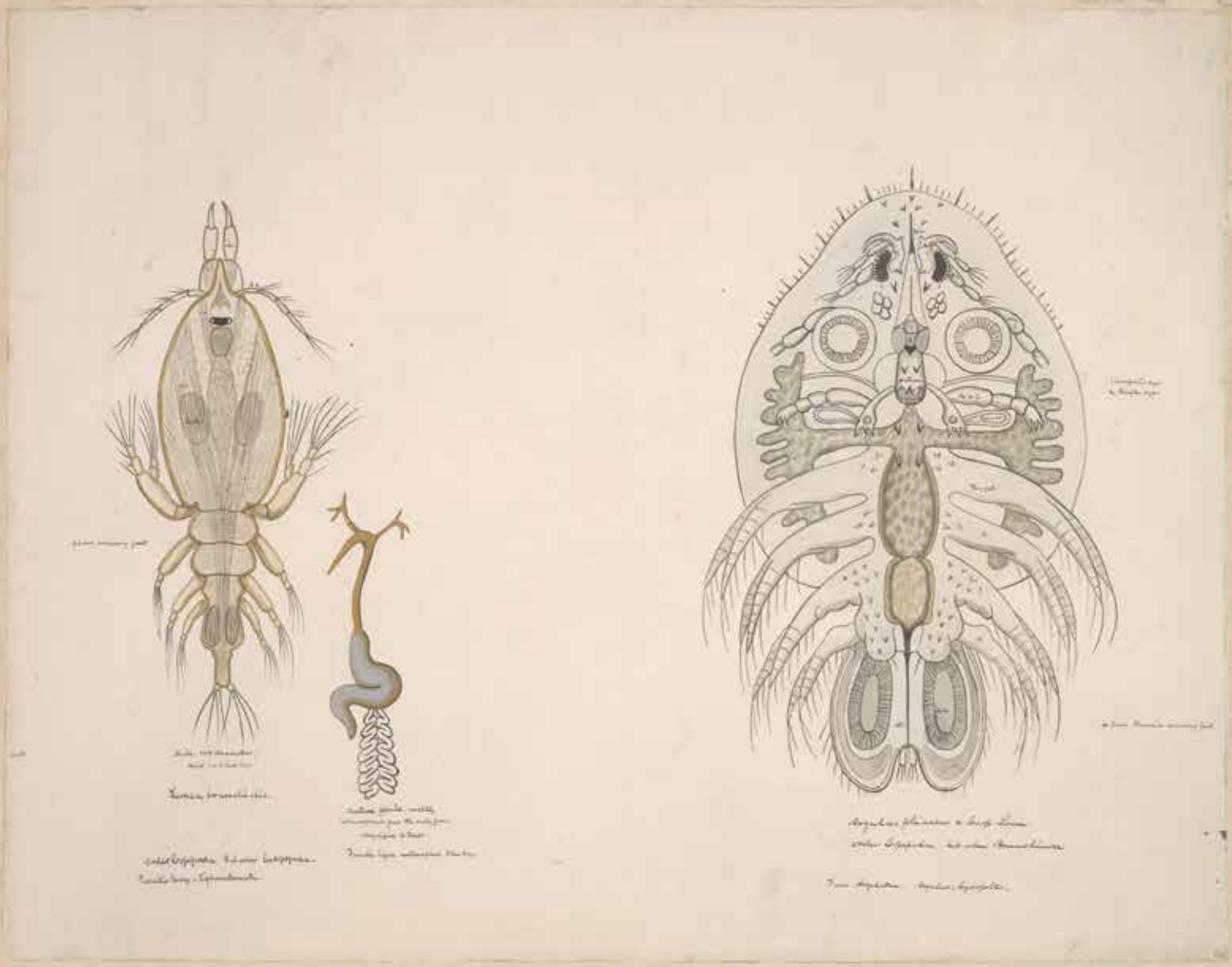
AT LEFT:
Keller, Overbeck, and other Academy fish ecologists sample fish, salamanders, and crayfish and record information about their habitats. They spotted this longtail salamander (*Eurycea longicauda*) near Limerick in Montgomery County, Pennsylvania.

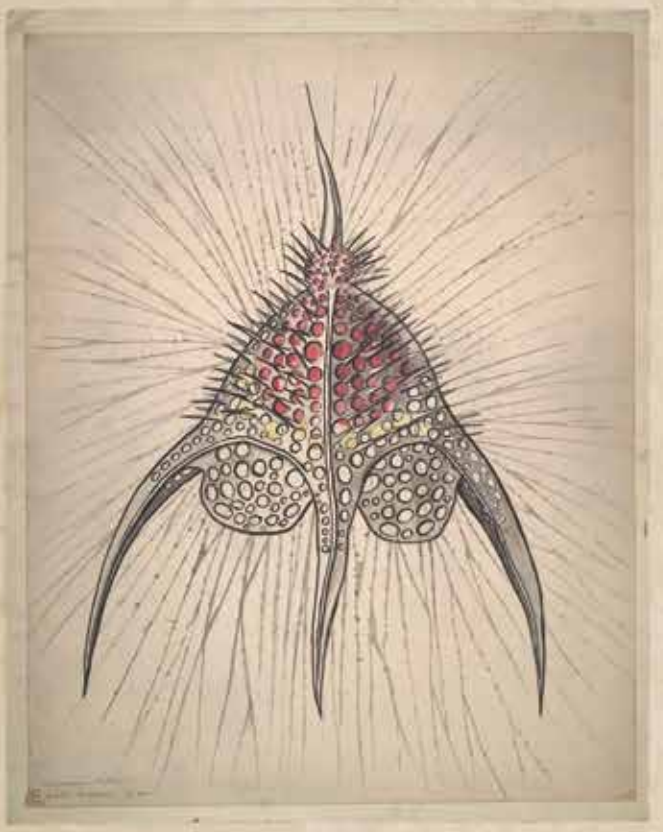
Linda Zaoudeh/ANS

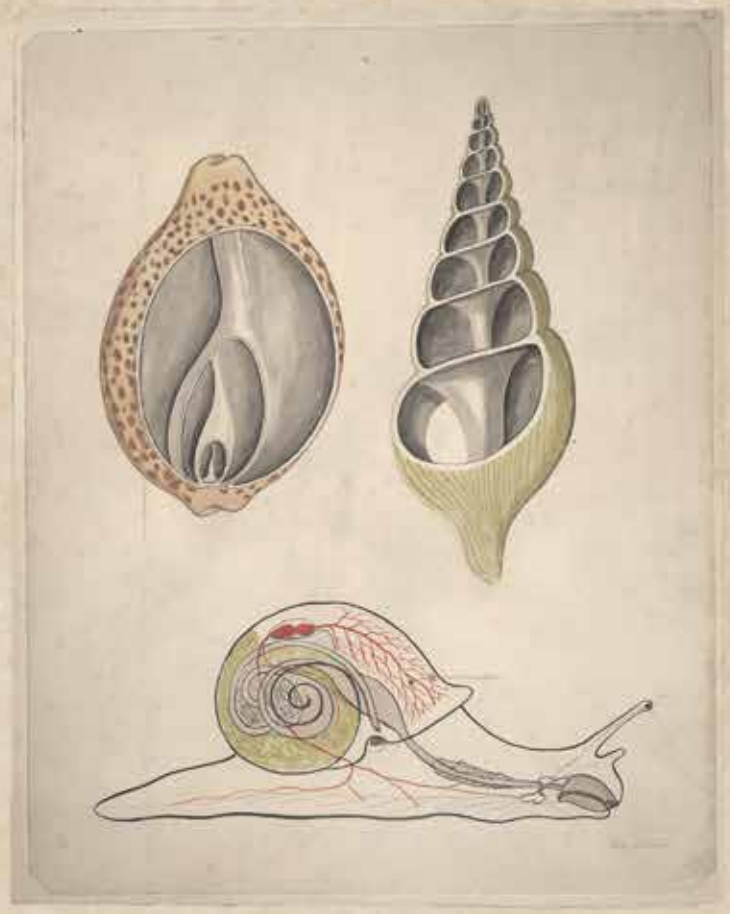
Q: WHAT KINDS OF VISUALS DID NATURAL SCIENCE TEACHERS USE BEFORE PHOTOGRAPHS WERE AVAILABLE?

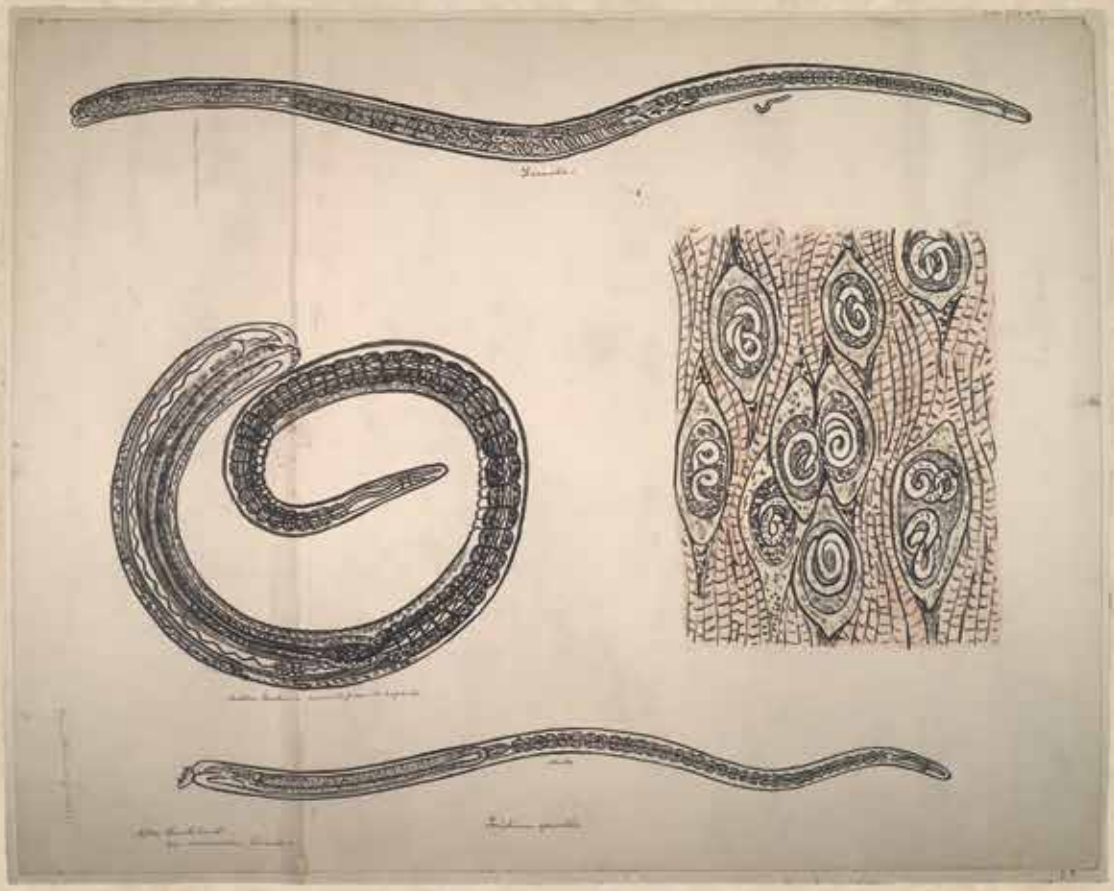
A. Visuals have always been extremely important for teaching natural science subjects. Today, in addition to specimens, scientists and professors have access to imaging technologies that include color photography, photography at the microscopic level, and scanning techniques that delve inside an animal. But during the 19th century, professors of natural sciences had to rely on other techniques, particularly if they wanted their students to see color or examine the structures of microscopic organisms without the direct use of microscopes.

The Academy has a collection (Coll. 532) of zoological teaching charts that came to us from the University of Pennsylvania in 1960. These charts were drawn by Dr. Joseph Leidy and his students. They were used not only by Leidy but also by his successors to teach zoology well into the 20th century. The charts cover a wide range of subjects from malacology to diatoms to parasites, showing the microscopic in large detail and tracing the inner workings of animal life.
~Jennifer Vess, Brooke Dolan Archivist









AT LEFT:
Chart depicting the male and female Lemea branchialis *and an* Argulus foliaceus *(fish lice)*

ABOVE, LEFT:
Hand-drawn Dictyopodium trilobum, *a type of zooplankton*

ABOVE, RIGHT:
Chart of the inner structure of a snail

AT RIGHT:
Chart of the Trichina spiralis, *probably the parasite* Trichinella spiralis, *depicting the male and female and the parasites inside a host*

THE 1812 SOCIETY

Meredith Dolan/ANS

Since 1812, our most dedicated supporters have made the Academy a part of their legacies, investing in the Academy's future by including the institution in their estate plans.

On the eve of the Academy's Bicentennial, the Board of Trustees established the 1812 Society in honor of these forward-thinking supporters. All Academy supporters who have made arrangements in their wills or estate plans are eligible for membership in the 1812 Society.

On Thursday, February 19, current members of the Academy's 1812 Society gathered in the Library for an annual luncheon hosted in recognition of their generosity. Over a dessert of lemon meringue tart, Academy Vice President for Collections and Library Ted Daeschler updated attendees on our current scientific initiatives and introduced volunteer Chris Johnson, who discovered a butterfly with both male and female characteristics after it emerged from a chrysalis in the Academy's *Butterflies!* exhibit. Attendees had the chance to view this rare specimen and ask questions about this phenomenon.

Are you considering joining these committed philanthropists who have made an investment in the future of the Academy? There are many ways to make an estate gift, and we are happy to work with you and your advisor to determine which way is right for you.

Bequests are among the most popular types of deferred gifts. You can include a gift in your original will or revocable living trust or add one later by an amendment. The gift can be for a specific amount of money, specific piece of property, or a percentage of your estate.

You can designate the Academy as the beneficiary of your IRA or other **retirement assets** such as 401(k) and 403(b) plans and the Academy will receive the funds upon your passing. You can leave just a portion to the Academy or the entire balance. By designating the Academy as a beneficiary you can potentially avoid taxes that may be owed by your heirs while supporting natural science research and discovery at the same time.

You might have a paid-up **life insurance** policy that you no longer need. You can make a gift by transferring the policy outright to the Academy or naming the Academy as a beneficiary, similar to retirement assets.

You can make a gift to the Academy and in exchange receive income for life for you and/or a loved one. Not only is a **gift annuity** easy to arrange, but your payments are fixed in amount and backed by the assets of the Academy.

A **charitable lead trust** provides annual payments to the Academy prior to the trust's assets passing to your heirs, potentially at a significantly reduced gift or estate tax cost.

With a **charitable remainder trust**, assets are transferred to a trustee under a trust agreement, and then the trustee pays you or others that you designate a fixed or variable income for life or for a set number of years. At the time of transfer, you receive a tax deduction.

If you have already arranged for a planned gift to the Academy, please let us know. In appreciation of your generosity, we would like to invite you to become a member of the 1812 Society. To learn more, or if you would like to receive a free copy of our guide to gift planning, *Leaving a Legacy*, please contact Amy Marvin, vice president of institutional advancement, at 215-299-1013 or marvin@ansp.org. Thank you for your support!

HELPING YOUR NEST EGG GO THE DISTANCE

If you are newly retired or getting very close to retiring, chances are that you are concerned about whether your savings "nest egg" will last you your entire lifetime. Here are some tips for new retirees to help alleviate these concerns:

1. Conduct a realistic assessment of your assets and liabilities. If you don't have a good picture of your total net worth and sources of income, now is the time to make that assessment. It's the not knowing that leads to stress and worry. Even if your financial picture is worse than you thought, you can still take steps to rectify that situation, like finding part-time work or moving to an area with a lower cost of living.

2. Have an emergency or "rainy day" fund outside of your retirement account. Some retirement planners say retirees should have six months to a year of living expenses outside of your retirement accounts. Project your expenses for the coming year for both best and worst case scenarios, and make a plan on how to address any shortfall.

3. Have a spending plan. Create a monthly budget for the year and stick to it. One of the biggest challenges to new retirees' nest eggs is providing financial support for adult children. If you find your income is not enough to cover your own expenses, consider analyzing your spending priorities and making small cuts where you are able.

4. Review asset allocation. The stock market in 2013 yielded returns of almost 30 percent, so if you were more aggressive with your investments, it's time to check your asset allocation and take some time to rebalance if the stock portion of your portfolio has grown too large for your risk tolerance level.

5. Plan to live longer. Modern medicine and mindfulness about taking care of our own health means more Americans are living longer, so as you plan for your retirement years, take into consideration that they may be longer than you even think.

6. Consider a charitable gift annuity. An immediate charitable gift annuity (CGA) will turn part of your savings into a guaranteed lifetime stream of income for you and your spouse, and a portion of the income (representing a return of principal) will be tax-free for a number of years. Plus, you'll have the satisfaction of knowing that you are also supporting a charity, like the Academy of Natural Sciences of Drexel University, that is important to you.

Do you have questions about how you can support the Academy while planning for your own retirement needs? Please don't hesitate to contact Amy Marvin, vice president of institutional advancement, at 215-299-1013 or marvin@ansp.org. She would be delighted to assist you. Thank you for your generous support!

Save the date for our annual Members' Night!

Mike Servedio/ANS

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

In Support of Academy Publications
W. Graham Arader III

In Support of Academy Initiatives
Cynthia and Martin Heckscher

In Support of the Adopt-a-Critter Program
Amy and Joseph Resnick

In Support of Botany
Mrs. Susan Pepper Treadway,
in memory of Mary Gibson Henry
Philadelphia Botanical Club

In Support of the Campaign for Ornithology
Dana and Neil Cohen
Marshall-Reynolds Foundation
Mr. and Mrs. James L. Van Alen
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In Support of the Cheryl Beth Silverman Memorial Endowment
Mr. and Mrs. Bruce E. Silverman,
in honor of Art Silverman for Father's Day

In Support of the Delaware River Watershed Initiative
William Penn Foundation

In Support of Education
Mr. and Mrs. Todd M. Cassidy
The Pencoyd Foundation

In Support of Exhibits
Daniel Moerman and Claudine Farrand
Michael and Jennifer Sontchi

In Support of Freshwater Mussel Research
Mr. Richard Prescott,
in memory of Ian McGain

In Support of the Hattersly Collection Care Endowment
Elana Benamy and Ray Scheinfeld

In Support of Ichthyology
Cristina and Mark Sabaj Pérez

In Support of the Library and Archives
Eileen and Lee Mathias
Mrs. Maude de Schauensee

In Support of Malacology
Francisco Borrero
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We would especially like to recognize those who have joined or renewed their support in the Academy's Leadership Circles of Giving between **March 1 and May 31, 2015**.

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You can meet the furry, feathered, and scaly residents of the museum's Live Animal Collection and explore their behaviors, adaptations, and ecosystems every day at the Academy! Many of our daily shows, occurring at 11 a.m., 11:45 a.m., and 2:30 p.m., include live animals. Outside In, *our discovery center for children, features close encounters with live mammals, reptiles, and invertebrates. Here, teacher-naturalist Kaitlyn Delduca introduces Benny the Cockatoo and Sienna the American kestrel (far left) to museum visitors.*

Mike Long for ANS

BUG FEST

Creepy, crawly, sticky, prickly, wiggly, yucky. And kinda cute. At least that is how we describe bugs at the Academy! Join us on August 8 and 9 for our annual Bug Fest, and enjoy new activities and shows on the grosser features of insects. Stretch and pose like a phasmid in a bug yoga class, and visit the bug clinic to find out how bugs might help (or hurt) your health. Plus talk with real scientists, learn about insects from all over the world, see specimens, eat bugs, get your face painted, and see live shows! More at ansp.org.

Mike Servedio/ANS

COMMUNITY APPRECIATION DAY

The Philadelphia Police Department, Fire Department, and Office of Emergency Management will be at the Academy on Thursday, August 6, from 10 a.m.–2 p.m., for special activities and presentations on this day set aside to show appreciation for their bravery and service. Meet the men and women of these forces, get fire prevention tips, learn emergency preparedness, find out what it takes to become a police officer, meet McGruff the Crime Dog, and more.

Mike Servedio/ANS

ADULT OVERNIGHT

The October 3 overnight is for adults only! Bigfoot, Chupacabra, and the Jersey Devil take center stage as you enjoy drinks and watch a sci-fi flick. Take a scavenger hunt and use your Scooby-Doo skills to solve a mystery. Navigate the underbelly of the Academy on behind-the-scenes tours, and see some of the real skeletons in our collection. Stay up late, meet live animals, and then curl up under *T. rex*! More info and tickets at ansp.org.

Joe McDonald

REPTILES MEMBER PREVIEW

On Friday, October 2, from 5:30–9 p.m., we have a special opportunity for you, our members, to explore *Reptiles: The Beautiful and the Deadly* when the museum is closed to the public! Bring the whole family to see live deadly snakes, pretty lizards, crazy turtles, and more—all up close. 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. Learn to "milk" a viper, speak croc, and play Turtle Trivia and Lizard Wizard. Do crafts, enjoy special snacks, and talk with our educators about the fascinating world of reptiles. Registration begins in August at ansp.org/membership.

Meredith Dolan/ANS

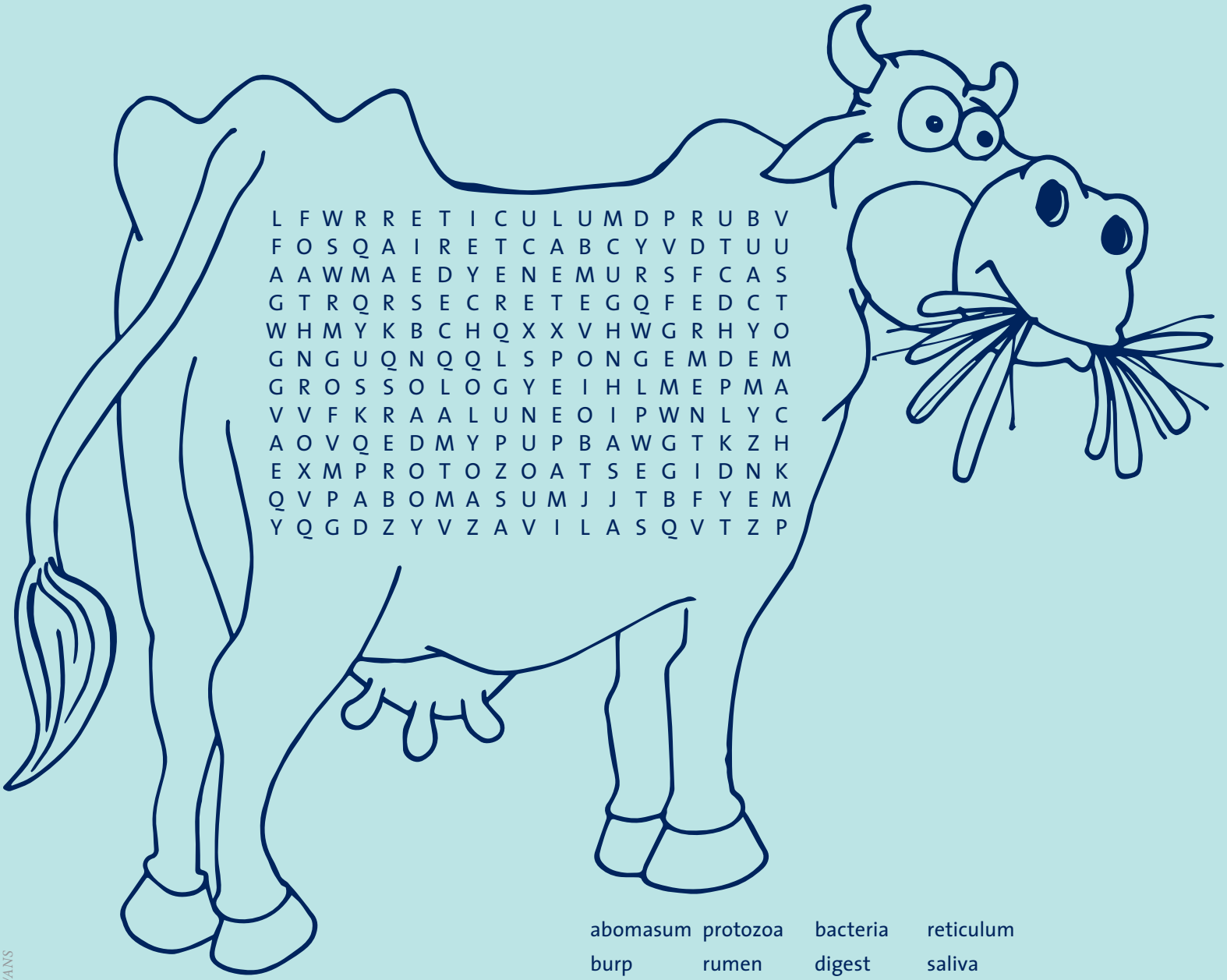
MACLURE AWARD

In April, the Academy was pleased to bestow the William Maclure Award upon Martha H. and I. Wistar Morris III in recognition of their extraordinary philanthropic support and visionary leadership. Wistar has been an Academy Trustee since 2005, and Martha is a proud graduate of Drexel University. They have made significant, generous contributions to Academy science, supporting joint projects between systematics and environmental science that have helped pave the way for our combined Center for Academy Science. They were co-chairs of the Academy's Bicentennial in 2012 and received honorary degrees from Drexel in 2014. This year, the couple made a very generous contribution to support strategic initiatives. We thank them for their philanthropy!

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!

Based on Sylvia Branzei's best-selling children's book series *Grossology*, the hands-on 3-D exhibit *Animal Grossology* (open through August 30) oozes with disgusting science, including what happens inside a cow! In the activity below, search up, down, forward, backward, and on the diagonal to find the hidden words about cow digestion. Looking for an extra challenge? Visit the exhibit to watch the cow's digestion in action, and then try to use some of the words below in a sentence!



L F W R R E T I C U L U M D P R U B V
F O S Q A I R E T C A B C Y V D T U U
A A W M A E D Y E N E M U R S F C A S
G T R Q R S E C R E T E G Q F E D C T
W H M Y K B C H Q X X V H W G R H Y O
G N G U Q N Q Q L S P O N G E M D E M
G R O S S O L O G Y E I H L M E P M A
V V F K R A A L U N E O I P W N L Y C
A O V Q E D M Y P U P B A W G T K Z H
E X M P R O T O Z O A T S E G I D N K
Q V P A B O M A S U M J J T B F Y E M
Y Q G D Z Y V Z A V I L A S Q V T Z P

abomasum	protozoa	bacteria	reticulum
burp	rumen	digest	saliva
enzyme	secrete	ferment	sponge
grossology	stew	omasum	stomach

Christine Danowsky/ANS

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CALENDAR OF EVENTS

JULY

Academy Explorers Summer Camp
Weekdays, July 6–August 28 $ 📞

Tiny Tot Explorers
Wednesdays, July 8–August 19, 11 a.m. $ 📞

Mega-bad Movie Night
Thursday, July 23, 5:30 p.m. $ 📞

AUGUST

Police and Firefighter Community Day
Thursday, August 6, 10 a.m.–2 p.m. M

Bug Fest
Saturday and Sunday, August 8–9 M

Philadelphia Geek Awards
Saturday, August 15, 6:30 p.m. $ 📞

Animal Grossology Final Day
Sunday, August 30, 10 a.m.–5 p.m. $ *

Butterflies! Closed for Renovations
Saturday, August 29–Thursday, September 10

Library Exhibit: *Clergy and the Collections* Opens
Monday, August 31, 1–4 p.m. M

Roger Thomas/ANS

Bridle Shiner, Endangered in Pennsylvania

SEPTEMBER

Mega-Bad Movie Night at Bryn Mawr Film Institute
Thursday, September 17, 7 p.m. $ 📞

Members' Night
Friday, September 18, 5–9 p.m. M 📞

Academy Explorers Camp During the World Meeting of Families
Monday–Thursday, September 21–24 $ 📞

Special Museum Hours**
Tuesday–Thursday, September 22–24, 10 a.m.–9 p.m. M

Clearly Beautiful: Photographs by Adam Summers Closes
Friday, September 25, 10 a.m.–4:30 p.m. M

BEES student Emily Johnson ANS

OCTOBER

Reptiles Member Preview
Friday, October 2, 5:30–9 p.m. M 📞

Reptiles Opening Weekend
Saturday and Sunday, October 3–4, 10 a.m.–5 p.m. $ *

Overnight for Adults
Saturday, October 3, 6:30 p.m. $ 📞

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

Pickerel Frog ANS

M Free for members $ Fee 📞 Registration required

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

Visit ansp.org for more information and to register.