ACADEMY

FRONTIERS

INSIDE:
Birds, BEES, and Bloodsuckers

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of Drexel University

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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: *Jason D. Weckstein encountered this royal flycatcher during a 2013 expedition to Brazil. The royal flycatcher can be found from southern Mexico all the way to southeast Brazil. Read more about Weckstein on pages 8–11. Photo by Jason D. Weckstein*

Academy Greetings

Katie Clark/ANS

Dear Friends,

Bird-watching is among the outdoor activities I enjoy the most, and it is no surprise that one of my favorite places to visit behind the scenes at the Academy is our Ornithology Collection. The Academy's Ornithology Collection is widely recognized as one of the largest, most complete, and best-curated ornithology collections in the world. It includes more than 210,000 specimens and 20,000 tissue samples, representing over 90 percent of the world's bird diversity. Our collection holds priceless information about the world around us and how it has changed over the past two centuries.

In this issue of *Academy Frontiers*, we introduce you to a new scientist who is already playing a very important role in ornithology at the Academy and in Drexel University's Department of Biodiversity, Earth & Environmental Science (BEES). Jason Weckstein, PhD, featured on pages 8–11, is our new curator of ornithology. Jason specializes in avian parasites and pathogens—research more critical than ever as we track the paths of emerging diseases like avian influenza and tick-borne illnesses. With his addition to the active bird research programs at the Academy and Drexel, we are poised for rapid growth in ornithology in the years to come.

Jason joins the many Academy scientists who are teaching and mentoring Drexel University students in the BEES Department. BEES students are thriving through access to the Academy's collections, fieldwork, and research facilities. This year, we made national news when Kenneth Lacovara, PhD, and a team of researchers including Academy Fossil Prep Lab Manager Jason Poole (page 18) unveiled a new supermassive dinosaur, *Dreadnoughtus schrani*, one of the most complete titanosaurs ever discovered. We cannot wait to see what our scientists and students accomplish next.

As we begin 2015, it is an excellent time to renew or continue your support of the Academy and particularly our research in ornithology. Please consider donating to our Annual Fund to enable us to continue our active research and education programs, which are preparing the next generation of scientists, including BEES students, to face the challenges of our changing world. Our work wouldn't be possible without your support.

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.

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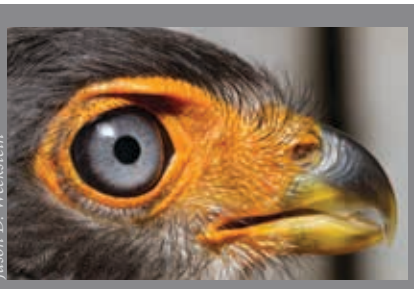

Jason D. Weckstein

Cryptic forest-falcon

FEATURE

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AT THE MUSEUM

Jason D. Weckstein

The black-capped donocobius (right) and the cryptic forest-falcon (above) were photographed during ornithologist Jason D. Weckstein's 2013 expedition to Reserva Biológica do Gurupi with colleagues from the Museu Paraense Emílio Goeldi in Belém, Brazil, and the University of North Dakota. The team spent several days studying birds in a swamp, and they caught this conspicuous and vocal swamp-nesting bird in their mist nets. Read more about their fieldwork on pages 8–11.

Caryn Babaian: Nature in Chalk

Art of Science Gallery
January 17–May 31, 2015

Caryn Babaian's exhibition of large-scale "nature mandalas" in colorful chalk focuses on the complexity and beauty of living systems within the natural world. Babaian, a biology professor and accomplished artist, uses circular compositions to reference traditional Hindu and Buddhist mandalas, spiritual and ritual symbols representing the universe in those religions. In doing so, she hopes visitors will be encouraged to contemplate the natural world and establish a connection to their place within it. Art-making is a key component of her Bucks County Community College science classes. By actively observing and drawing, she believes that her students will more deeply observe and relate to the details within nature.

Caryn Babaian

Smithsonian

Titanoboa: Monster Snake

Special Exhibits Gallery
February 14–April 19, 2015

Deep underground in a Colombian coal mine, scientists have uncovered remains of the largest snake in the world, *Titanoboa cerrejonensis*. *Titanoboa* haunted the rain forest during the Paleocene, the lost world that followed the demise of the dinosaurs. Stand eye-to-eye with a full-scale model of this massive predator, which at 48 feet long and 2,500 pounds could crush and devour a crocodile. Crawl the length of *Titanoboa* in the *Titanoboa* Challenge, see live snakes, and check out authentic snake specimens from the depths of the Academy's collections. This fearfully fun exhibition delves into *Titanoboa*'s discovery and reconstruction, as well as what scientists have learned from this enormous reptile.

This exhibition is organized by the Smithsonian Institution Traveling Exhibition Service in collaboration with the Smithsonian Tropical Research Institute, Smithsonian Channel, the Florida Museum of Natural History, and the University of Nebraska-Lincoln.

Animal Grossology

Special Exhibits Gallery
May 16–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!

Animal Grossology

Meredith Dolan/ANS

WHO YA GONNA CALL?: JOE RESNICK

By Mary Alice Hartsock

Joe Resnick's mission is to keep you safe, yet he wants you to be unaware that he exists. The latter goal might be a challenge, because he seems to be everywhere at all times, scurrying through the Academy's corridors to meetings, responding to staff reports of building problems, and helping visitors find nearby exhibits or presentations.

As Senior Director of Technology and Infrastructure, Resnick arrives at the Academy before 7 a.m. to make sure that the day begins smoothly for staff and visitors. On his checklist are issues ranging from the air-handling systems and elevators to the Academy's network, phone system, electricity, and sidewalk safety. By 8 a.m. he is making his rounds, checking in with exhibits staff and mobilizing contractors, mailroom workers, information technology staff, and building operations crews to address expected and unexpected issues in the museum and behind the scenes.

"From my point of view, everything in the building is the same as a computer," he says. "It has a maintenance cycle, a lifetime, maintenance requirements, and inputs and outputs. You have to understand how things work together and the impact of one thing on another."

After 16 years at the Academy, Resnick knows every single nook and cranny of the museum, and he understands how a problem in one part of the building can affect the operation of the Academy as a whole. He was originally hired as the Academy's "Y2K guy," and he visited every computer in the building with a floppy disk to prepare the staff for any potential disasters that could occur when the clock struck 2000. He made the Academy's first technology inventory database and soon was hired by the Phycology Department as a database administrator.

By the early 2000s, Resnick was running the Academy's Information Technology Department, helping staff to integrate quickly evolving technology into their jobs. Several years after he received his master's degree in engineering from the University of Pennsylvania in technology management, he was promoted to additionally oversee the Academy's building operations and public safety teams.

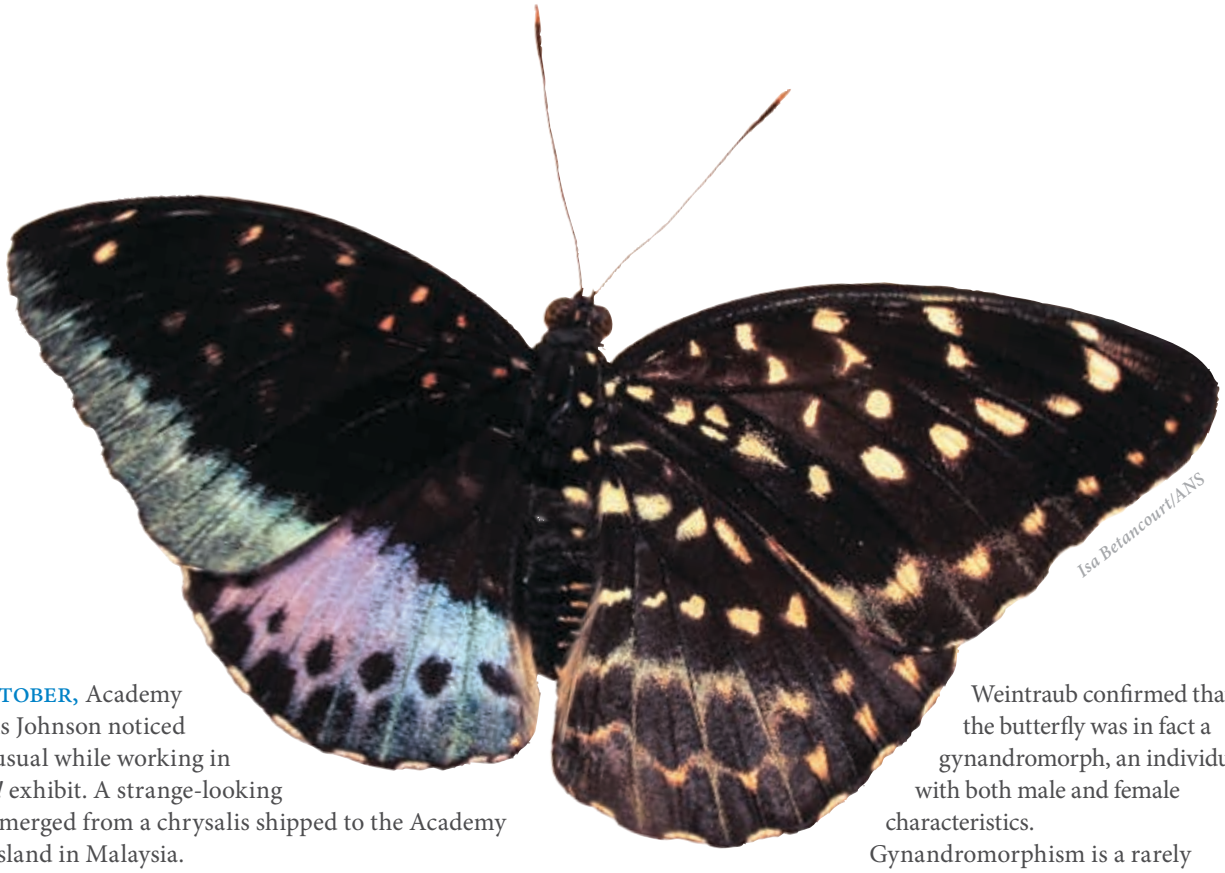
Resnick brings a systematic perspective, common sense, and charismatic leadership skills to the Academy's interdepartmental teams. He is involved in the Academy's Experience Planning Committee, which works to create a positive experience for museum visitors. He works closely with Academy and Drexel staff to prepare for potential disaster and emergency situations and to coordinate with Information Resources and Technology teams across both campuses. He is also part of an Academy committee focusing on making the institution and visitor experience more sustainable.

All of this makes Resnick practically an expert at customer service, and among his most important duties are listening to staff members' concerns about building safety and security and setting priorities for addressing them. He has a rapport going with just about every Academy employee, and he talks with visitors regularly to gauge their impressions of the building and exhibits.

"I want you to enjoy the education and experience without being distracted by the building," Resnick says. "And I'd want you to think that there must be 30 of me."

A RARE AND UNUSUAL BUTTERFLY

By Mike Servedio and Jason Weintraub



Isa Betancourt/ANS

In early October, Academy volunteer Chris Johnson noticed something unusual while working in our *Butterflies!* exhibit. A strange-looking butterfly had emerged from a chrysalis shipped to the Academy from Penang Island in Malaysia.

This butterfly, *Lexias pardalis*, is a species found in tropical rain forests of Southeast Asia. Males of this species feature iridescent black, greenish-blue wings, while females are larger and have brown wings with yellow and white spots. This size and color difference between the sexes is an example of sexual dimorphism, in which the males and females of the same species have clear differences in coloration and wing shape.

In *Lexias* and many other butterflies, differences in coloration and wing shape are the result of what Charles Darwin termed sexual selection. Over thousands of generations, "choosey" females selected mates based upon males' color and wing patterns, then passed the selected males' traits on to the next generations.

When Johnson examined the unusual butterfly closely, he noticed it had two wings exhibiting male color pattern and shape and two wings exhibiting female characteristics. With *Butterflies!* Coordinator David Schloss, Johnson brought the butterfly to Jason Weintraub, the Academy's entomology collection manager and resident lepidopterist.

Weintraub confirmed that the butterfly was in fact a gynandromorph, an individual with both male and female characteristics.

Gynandromorphism is a rarely detected phenomenon. It is hard to know how frequently this type of developmental error occurs in nature because it is usually overlooked in insect and vertebrate species that lack obvious differences between males and females. Gynandromorphism is most frequently noticed in bird and butterfly species where the two sexes have very different coloration. It can result from non-disjunction, when sex chromosomes do not separate properly at a very early stage of development.

You can clearly see the gynandromorphism looking at this particular specimen of *Lexias*. The right wings have the features of the female of the species, brown with yellowish spots. The left wings are darker, with green, blue, and pink, all of which represent the male characteristics. With obvious wing shape differences as well as variations in the coloration of the body on each side, the specimen can be classified as a bilateral gynandromorph.

The specimen will be on display in the museum from January 17 through February 15, 2015, in the Academy's Independence Foundation Gallery. This specimen and a gynandromorph oriole from our Ornithology Collection will be displayed beside a typical male and female of both species for comparison. You can also see this species throughout the year in our *Butterflies!* exhibit.


Dave Fitzpatrick

GET TO KNOW YOUR LOCAL SNAKES

Opening in the Academy's Special Exhibits Gallery on Saturday, February 14, *Titanoboa: Monster Snake* takes us back to the Paleocene, the lost world that followed the demise of the dinosaurs. You can check out a life-size model of this massive 60-million-year-old predator, crawl through a snake-sized tunnel, and get nose to nose with live snakes.

Special Exhibits Educator Mary Bailey wants us to understand that, while *Titanoboa* could perhaps take on a creature as massive as *T. rex*, most snakes are harmless and even afraid of us. Below, she helps us answer some common questions about what to do if you happen to meet a snake in your backyard, local park, or nearby campground.

BE A SCIENTIST

When you visit *Titanoboa*, examine the live snakes to find out more about their lives and habits. Try to answer the following questions, and then tell a staff person what you learned:

1. What does the snakes' skin look like?
2. How are their pupils shaped?
3. Are they sleeping?
4. What are they eating?
5. What do they have in common with the model of *Titanoboa*, and how are they different?

Q: What do I do if I find a snake in the wild?
A: The best thing you can do is leave it alone. Most snakes will be scared and quickly slither away. If they are unable to escape, they will notify you of their presence by wiggling their tails, making fake "strikes" in your direction, or another method. Most snakes do not view humans as food, so it is unlikely that a snake will bite you if you do not try to pick up or handle it.
Q: What are some common snake species we might see around the Philadelphia area?
A: The Northern brown snake (*Storeria dekayi*), pictured above, is thin like a pencil and ranges from 3 to 10 inches long. It has two rows of small dark spots down its back. Believe it or not, it loves to hang out in cities like Philadelphia! The Northern brown snake likes to hide under rocks, logs, or other items that get warm and cozy in the sun. If you're a gardener in Philadelphia, you've probably spotted one from time to time. The snake can bite, but it is not venomous. It may puff up if it feels threatened. It likes to eat slugs, so it may be beneficial to your garden!

In Philadelphia, you may spot a garter snake hiding in leaf litter or even in your basement. This snake tends to be black and tan or yellowish with a light stripe or checkerboard pattern running down its back. Unlike the Northern brown snake, the garter snake is active during the day as it hunts for worms and slugs. You might see it slither across a forest path, especially near the external limits of Philadelphia where there are fewer busy streets. Do not pick one up, or you may risk a bite.

Q: Are there venomous snakes nearby?
A: There are just two species of venomous snakes in the areas around Philadelphia: the Northern copperhead and the timber rattlesnake. The Northern copperhead has a thick, heavy body, a large and triangular head, and reddish-brown "saddles" shaped like hourglasses on its back. The timber rattlesnake, which reaches about 3 to 5 feet when full grown, has a large head and dark, zig-zag bands across its body on a yellowish, grayish, or dark background. Some are almost completely black, and all have a distinctive rattle on the ends of their tails.

Like other venomous snakes, the Northern copperhead and timber rattlesnake have indentations on the side of the head between the eye and nostril and pupils that look like vertical slits (like those of a cat). These vertical slits can help you distinguish the Northern copperhead from two snakes commonly confused with it, the Eastern milk snake and the Northern water snake, both of which have round pupils.

Q: Do snakes carry rabies?
A: Rabies only affects mammals. Reptiles, amphibians, fish, birds, and insects do not get or carry rabies.

BIRDS, BEES, AND BLOODSUCKERS:

Welcoming Jason Weckstein to the Ornithology Department

By Mary Alice Hartsock

Jason D. Weckstein

His laboratory is empty save for a few boxes and bins stacked in a corner. His countertops are clean and shiny, with barely a trace of dust. There's even a bit of an echo as the ornithologist opens a cabinet to reveal the one collection he couldn't stand to leave at his old office—slides upon slides of parasites.

Meet Jason Weckstein, PhD, the Academy's new associate curator of ornithology and associate professor in Drexel University's Department of Biodiversity, Earth & Environmental Science. Although his containers of books and research materials are trickling in slowly, he has already made quite a splash at the museum. His arrival in fall 2014 marks a tipping point in the Academy's quest to situate our ornithology research program among the top programs in the country. *(continued on page 10)*

Above: *Jason D. Weckstein, PhD, found this toucan chewing louse (*Austrophilopterus cancellosus*) on the feathers of a red-billed toucan (*Ramphastos tucanus*).*

Jason Weckstein poses with a wattled jacana, a nesting bird often found in swamps and marshes that uses its long toes to walk on lily pads, during a 2013 expedition to Reserva Biológica do Gurupi. The expedition was part of a National Science Foundation grant-funded project entitled "Southern Amazonian birds and their symbionts: Biodiversity and endemicity of parasites from the most diverse avifauna on Earth," with colleagues from the Museu Paraense Emílio Goeldi in Belém, Brazil, and the University of North Dakota. Photo by Vasyl V. Tkach

(continued from page 8)

THE BIRDS: The Irreplaceable Collections

The Academy's 2011 affiliation with Drexel University has already raised the stature of our Ornithology Collection, which is now the second largest university-based bird collection in the world. In some cases, collections like ours contain the only existing historical data for scientists studying evolutionary history. Weckstein will use data from our Ornithology Collection to reconstruct the family histories of birds and their parasites and trace species diversity across time and geography.

Our collections also hold information that is crucial to conservation efforts. In areas like southern Amazonian Brazil where Weckstein does research, habitat destruction is threatening geographically isolated areas with species that may be found nowhere else on Earth. He and his colleagues have been racing to collect bird and associated parasite specimens before it is too late. The hope is that data collected for the Amazonian bird and parasite project will help conservationists prioritize areas important for conservation. Also, by creating a unique historical record, Weckstein, his colleagues, and future researchers can answer questions about population genetics, evolutionary history, or other fields we cannot yet even imagine.

Weckstein is using the Academy's collections for his current research on Neotropical migrant birds and their parasites and emerging pathogens. He is interested in whether and why some parasites move between hosts throughout their lifetimes and others do not—questions that become even more interesting when we consider conditions such as Lyme disease, in which a human can become a host. The more we know about parasites and their relationships with their hosts, he says, the better prepared we are to understand how parasite diversity is generated and maintained and how diseases travel between birds, parasites, and humans.

The black-legged deer tick, for example, can travel on migrant birds, potentially infecting those animals with the bacterium that causes Lyme disease. Weckstein's research group will test thousands of tissue samples collected during the preparation of museum specimens of migratory birds for this bacterium to assess whether birds may be an important vector for the disease. Studying patterns in parasite transmission and evolution is helping scientists trace similar patterns in the evolution of pathogens such as malaria and Ebola.

BEES: Guiding Future Researchers

Weckstein is excited to work with students of all levels—from high school interns and Drexel co-ops to graduate and postdoctoral researchers—who will bring the collections to life by assisting with Academy research and conducting their own research projects. Formed as a result of the Academy's affiliation with Drexel University, the rapidly developing BEES (Biodiversity, Earth & Environmental Science) Department provides Drexel students extraordinary access to the Academy's scientific collections, as well as countless opportunities for hands-on training and research.

"We gain a great deal from having the vitality of undergraduate and graduate students conducting research in our labs," he says. "Students keep the research programs moving at the forefront."

Jason D. Weckstein

A DAY IN THE FIELD

In 2015, Weckstein will travel to the Brazilian Amazon Basin, the largest and most intact lowland tropical forest wilderness on the planet, to study the diversity of birds and their parasites as part of a National Science Foundation-funded project. There, he and his collaborators will find plenty of birds and many undescribed hitchhiking parasites that he can add to the Academy's collection and collaborating Brazilian collections.

4:30 A.M.

Weckstein and his collaborators are awake and alert. They rise before the first note of the dawn chorus to search for nocturnal birds.

5 A.M.

Part of the team heads out to the forest to open mist nets to catch birds. Other crew members begin to make sound recordings and visual observations and collect additional specimens.

NOON

The team returns to camp to sample birds for parasites. First, the scientists photograph live birds, take blood samples, and make microscope slides to study blood parasites such as avian malarial parasites.

1–8 P.M.

Scientists fumigate bird specimens with ethyl acetate to kill ectoparasites that live on the outsides of the birds. Then the scientists "ruffle" the birds' feather tracts to remove the parasites, place the parasites in vials, and preserve or freeze them.

Throughout the process, the team takes critical notes on the prevalence and intensity of the parasite infections, documenting how many hosts carry the parasites and the degree to which these hosts are infected. Then they swab the birds' mouths for viruses and bacteria.

Because a bird's soft parts, such as its eyes and internal organs, change when it dies, a preparator on the team takes notes to record the characteristics of the soft parts and adds the notes to a tag that will remain with the specimen for eternity. After collecting these data, the scientists take tissue samples, which they will later screen for pathogens and use for DNA work on the birds themselves.

"In much of the Amazon, roads are nonexistent. Instead we use the rivers as roads and use a boat to travel to our field sites. One of the nice things about a boat like this one is that it acts as a movable laboratory. Instead of moving camp and setting up tents, we just move the boat to any new site where we want to work." –*Jason Weckstein*

Weckstein is bringing on Alan Fecchio, PhD, who is joining the Academy in January 2015 for a yearlong postdoctoral fellowship position sponsored by the Brazilian National Science Foundation. Fecchio specializes in studying avian malarial parasites—a research focus of Weckstein's—and the two have already collaborated on several projects. Postdoctoral positions are an essential feature of the most prestigious ornithology programs in the country, and one of Weckstein's goals is to make these positions a permanent part of the Academy's research program.

In addition to working with graduate students, over the next few years Weckstein will be teaching ornithology courses to undergraduate students at Drexel, the first time the university will offer this course. He plans to bring his lessons to life with specimens and hands-on research experiences in the Academy's labs and in the field. He hopes that these efforts further establish the Academy's ornithology program as one of the most attractive to the next generation of researchers interested in ornithology and evolutionary biology.

The Bloodsuckers (and Feather Feeders): Why Weckstein Collects Parasites

Years ago, as a PhD student in the Ornithology Department at Louisiana State University, Weckstein was studying toucans—"the big-bodied Froot Loops guys"—as he fondly refers to them. While preparing toucan research study skins, he was delighted to find a bunch of chewing lice that had hitched a ride on these bird specimens from the tropics.

"I thought, 'Hmm, I should save these in a vial, and maybe one day I'll do something with them,'" he says.

Fast forward to 2015, and his career revolves around the evolutionary histories of birds and their parasites. As the lead principal investigator on a project funded by the National Science Foundation, he conducts collaborative biodiversity surveys to collect, preserve, and study avian parasites. The main focus of the project is parasites that are associated with birds that inhabit several geographically isolated areas of southern Amazonian Brazil.

Weckstein works closely with colleague Alexandre Aleixo, curator of birds at the Museu Paraense Emílio Goeldi in Belém, Brazil, to collect bird specimens for their collaborative research projects. Specimens collected during the project will add to both the Academy's collections and to the Museu Goeldi collections. The project team, which also includes colleagues at the University of North Dakota and The Field Museum, will analyze genetic data for these birds and their parasites to reconstruct their evolutionary histories.

In fact, Weckstein sees parasites and their hosts as microcosms for studying evolutionary history.

"The host acts as a habitat for the parasite," he says. "As an evolutionary biologist, I see it as a simpler system than free-living organisms for understanding evolution."

To understand the evolution of a free-living organism such as a bird, Weckstein collects information on how the surrounding environment shaped the bird's development. This process involves gathering information on geology, climatic events, human interference, and a variety of other factors.

To understand the evolution of a parasite such as the chewing louse, he must simply collect the parasite with its avian host, and he can use reconstructions of the host's evolutionary history from DNA data to help understand the evolutionary history of the parasite. The bird acts as the parasite's habitat, and any additional data on the parasite's environment comes directly from the bird. He can also screen the host's blood, liver, and skin for evidence of viruses and bacteria deposited by the parasite.

Weckstein ultimately will deposit all of these data into publicly available databases and both the Academy's collection and collaborating Brazilian collections such as the Museu Goeldi. There, both the specimens and their data will be perfectly preserved and available to future researchers.

Jason D. Weckstein

Blue-crowned motmot

SUPPORT ORNITHOLOGY

The Academy's Ornithology Collection is widely recognized as one of the largest and most historically important ornithology collections in the world. It includes over 210,000 specimens and 20,000 tissue samples, representing more than 90 percent of the world's bird diversity.

The Academy's goal is to become one of the world's leading ornithology centers by providing the endowment support necessary for future growth in the department. We hope to secure the work of the department, allowing our ornithologists to:

- broaden the breadth and scope of our research footprint
- provide the highest level of education and student training
- expand the ornithology curatorial and research staff to meet the needs of this rapidly growing collection

For more information or to make a gift, please contact Amy Marvin, vice president of Institutional Advancement, at 215-299-1013 or marvin@ansp.org, or Meg Clifton, director of major gifts, at 215-299-3790 or mac322@drexel.edu.

Q: CAN YOU EXPLAIN THE PURPOSE OF COPPER PLATES LIKE THE ONE WE SEE DISPLAYED WITH THE ACADEMY'S *THE BIRDS OF AMERICA*?

A. Have you been to a historic site and watched a costumed interpreter in an ink-stained apron use a wooden, hand-operated press? Even if you haven't seen it for yourself, you are probably familiar with how books used to be printed—the time-consuming, labor-intensive way. But what about the pictures in books? How were the beautiful, colorful, detailed drawings of animals and plants in rare books like John James Audubon's *The Birds of America* produced? One way was through the use of etched copper plates.

Unlike type, drawings of nature were not standardized. Artists and scientists (sometimes one and the same) depicted their studies with pencil, ink, watercolor, and oil on paper or canvas. Somehow those drawings and paintings had to be reproduced over and over again for publications.

ANS Archives Coll. 69

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The artist would take those drawings to an engraver who would etch a copy of the artwork onto a copper plate, reproducing the fluidity and detail of the original. Ink was applied to the copper plate to fill in the grooves, and then the plate and paper were pressed together to create a black and white image. Some publications stopped there, but those that wanted a little extra vibrancy relied on hired help to hand color each plate. Some artists learned to engrave copper plates so that they could ensure the accuracy of the copies of their originals.

The Academy Archives has four collections containing rare copper plates used for publications from the 19th century. Copper has always been a precious metal, and once printing was finished, many plates were melted down for other uses. We are very lucky to have these plates, and what is even more amazing is that we have the books that were produced from these plates. Researchers can see copper plates and the finished products side by side. One of our oldest sets is for the book *Histoire Naturelle et Generale des Colibris, Oiseaux-Mouches, Jacamars et Peomerops*, by J.B. Audebert and L.P. Vieillot, Paris, 1802. The book and the copper plates were recently on display during the Academy's *Birds of Paradise* exhibition.

The copper plates for the *Histoire Naturelle* seem to have come to the Academy with the library of William Maclure. Maclure became president of the Academy in 1817 and in 1835 donated his library of scientific books to the institution. We know that in 1832 a visitor of Maclure's noted that he possessed the complete set of copper plates for Audebert and Vieillot's *Histoire Naturelle*. Unfortunately we do not have every plate, as Maclure may have only donated a few to the Academy. But the ones we do have are beautiful examples of etching as well as natural history art. Aside from being rare artifacts, these plates are a wonderful resource for those studying the history of art, the history of printing, and the history of the natural sciences. *~Jennifer Vess, Brooke Dolan Archivist*

What have you always wondered about the Academy's history?

Please send your questions to ans_editor@drexel.edu, and we in the Academy Library and Archives will comb through our collections and respond to an intriguing question in the next issue.

SUSTAINABLE TIPS FOR FRIGID WEATHER

If you spent last winter in or around Philadelphia, you probably haven't forgotten the freezing temperatures! You may have removed ice and snow from your sidewalks, or you may have wondered how to warm up your car and home quickly and efficiently.

In this issue of *Academy Frontiers*, Kylie Ford, an associate with the strategic sustainability management firm Sustrana (formerly Resonate) helps us think about how to behave sustainably during the coldest winter months. By making small adjustments to our daily routines, we can make a big difference for the environment and the health of our families, pets, and homes.

ICE PREVENTION AND REMOVAL

The use of rock salt and other ice-melting products is incredibly common, but many are harmful to the environment and can even make your pets and garden sick, Ford says. When the snow melts, these products seep into the ground and storm drains, eventually turning up in groundwater and surface water. The sodium and chloride that make up rock salt can affect the salinity and nutrient concentrations of our soil and streams, threatening the livelihoods of plants and animals that depend upon them.

For a safe, environmentally friendly alternative, find an organic, sodium chloride-free de-icer. Many people are surprised to learn that sugar beet juice lowers the melting point of ice and snow, and it's safe for people, animals, and our environment. The U.S. Environmental Protection Agency maintains a list of environmentally friendly de-icers at epa.gov.

SNOW REMOVAL

If you have a bad back or a busy schedule, you might have considered turning to a snowblower for help with snow removal. But snowblowers powered by gasoline can emit high levels of carbon monoxide. Ford suggests considering battery-powered and hybrid snowblowers, or even hiring some neighborhood kids to help shovel your sidewalks. Shoveling is the cheapest, most environmentally friendly alternative and can be a source of exercise when a snowstorm keeps us indoors. For a moderate sum, invest in a wheeled shovel!

CLEANING OFF YOUR CAR

Imagine that it's 7:30 a.m. and temperatures are below freezing. Your car is veiled in a thin layer of ice and snow, and you have only a few minutes to clean it and get to work. Do you turn on your car and let it warm up and defrost? Or do you reach for your ice scraper?

While it may be tempting to slip into a cozy car, idling cars release carbon dioxide, a major cause of global warming. In fact, driving your car slowly at first is an effective way to warm it up. To preserve air quality and improve your car's fuel economy, get up five minutes earlier to scrape your windshield. If you must warm up the car, turn it on when you are ready to start brushing snow from the roof and doors. The defroster will begin to work by the time you're ready to scrape the windshield.

HEATING YOUR HOME

Are you traveling this winter? Ford says that though we often are tempted to stop heating our homes when we are away, blasting gas heat to quickly increase the temperature upon our return burns more fuel and may actually cost us money. Instead, consider setting your heat at about 55 degrees Fahrenheit when you travel.

Throughout the winter, think about your house's average temperature, and consider whether you and your family could be comfortable at a lower temperature. To make the transition, try reducing your heat a degree each week or month. Invest in fuzzy slippers and robes to stay warm!

MINTURN T. WRIGHT, III, ESQ.
FROM BOYHOOD TO BOARD OF TRUSTEES

Michael Long Fotografffic for ANS

Emeritus Trustee Minturn Wright has been on the Academy's Board since 1958. His history with the Academy spans much of the institution's second century, beginning in the 1930s when he visited the Academy as a young boy. His parents, who were Academy members, sparked his interest in nature and birding by providing bird-related toys, games, and outdoor walks.

Though his interest in avian species waned as he attended boarding school, served in World War II, and built a law career, his curiosity returned during a trip to Florida in his late 20s. He was fascinated by the multitude of birds in the Everglades, and he spent much of his trip bird-watching instead of visiting with his hosts.

Back in Pennsylvania, Wright immersed himself in nature and the Academy, where he was recruited to the Board in 1958 at age 33. Though he is comforted by the fact that the Academy's beloved dioramas have not changed since his childhood, he is quick to point out the many ways the Academy has grown during his 57 years on the Board.

"In those early years, the Academy was far away from being a modern organization," he says. Most of the scientists either funded their work through specific patrons or used their own money to bolster their research.

In the early 1960s, when the Trustees decided it was time for a change, they hired a consultant to assess the potential for a successful capital campaign.

"I will never forget their report," Wright says. "Essentially, it said, 'You don't have a prayer to raise a nickel!'"

When the consultant reported that the Academy lacked local name recognition, Wright and the Trustees were shocked. They began to think more critically about the future of the institution, their goals for the Academy, and their leadership model. Over the next two decades, the Academy's growing pains were evident, with the institution's temporary move to a new address, shifting leadership structures, struggling capital campaign, and eventual financial crisis.

In 1976 the Trustees approached Wright with an offer to turn things around as the new board chair. Wright immediately consulted his wife, Nonya R. Stevens (pictured above in 1995), who fully supported this step just as she had supported his birding over the years.

"The next year was one of the most momentous years of my life," he says. In the following years he and newly hired President Peter Bennett led a successful capital campaign, which supported the construction of a new research tower alongside the Academy's building at 19th Street and the Benjamin Franklin Parkway.

With the Academy strongly positioned for an auspicious future, Wright stepped down from his position as chair in 1981 to become Chairman of his law firm, Dechert Price & Rhoads, now Dechert LLP. To this day he has remained an active Trustee, serving on nearly every committee, including personnel, governance, finance, science, and search committees. Throughout the decades he has been an active campaigner and fundraiser for the Academy. In 2008 the Academy marked his 50 years of Board service through the institution's Maclure Award for vision, leadership, and philanthropy.

Fast forward to 2015, and Wright, 89, is guiding the Academy forward through his leadership of a new campaign to raise funds to support the growth of the Academy's Ornithology Department. His enthusiasm about the new affiliation with Drexel University makes him feel "young again," he says. He believes the Academy is positioned to become one of the premier education institutions in the United States for ornithology and that the Academy's current ornithology staff, including new Curator of Ornithology Jason Weckstein, PhD (pages 8–11), will be a magnet to researchers and students throughout the world.

A member of the Academy's Sustainers' Society of donors who have maintained their support for 10 years or more, he reminds potential supporters of why nature—and the Academy—matter.

"Surrounding yourself in the natural world, and knowing we are all part of it, just gives you a sense of joy," he says. "I am happiest when I am outside." *~Mary Alice Hartsock*

WHAT IS YOUR CHARITABLE GIVING STRATEGY?

Like most people, you probably make a number of charitable gifts each year to causes and institutions you care about, like the Academy of Natural Sciences of Drexel University. But have you stopped to consider whether your charitable giving accomplishes your goals?

There are numerous ways to use your charitable giving as a tool to fulfill both your personal and philanthropic goals. Here are four simple questions you may want to ask your CPA or financial advisor as you consider your charitable giving this year:

1. Which assets should I use to make a charitable gift—cash or appreciated securities (stocks, bonds, or mutual funds)?

Charities are glad to receive cash, but if you own appreciated securities and want to make an outright gift to a charity, the charity still benefits from the gift and you benefit from two types of tax advantages: You'll avoid the capital gain taxes you would incur if you personally sold the asset, and you'll also receive an income tax deduction for the full "fair market value" of the securities, which will offset your federal, state, and local income taxes (just like a cash gift).

2. What's my limit for charitable deductions in a given year?

Cash donations generally have a ceiling of 50 percent of your adjusted gross income. For example, if your adjusted gross income for the tax year was $80,000, then your maximum cash donation deduction for the year would be $40,000 (50 percent of your $80,000 adjusted gross income). For capital gain property donations (property held long term or for more than one year), the deduction limit is generally 30 percent of your adjusted gross income. If you make a large gift and have excess charitable deduction, you may carry the excess over the next five years.

3. Are there ways to incorporate my personal financial security into my long-term charitable goals?

There are many charitable gift options that are flexible enough to allow you to meet both your personal and philanthropic goals. Several types of life income gifts, such as charitable gift annuities or charitable remainder trusts, can be structured to pay income to you or to you and another person or persons. These types of gifts can pay a fixed or variable income, or they may include income that may be partially tax-free. Arrangements for income payments can be scheduled to begin right away or at some future date, such as a projected retirement date. You may make a life income gift as part of your overall estate planning, which may also include making a charitable bequest.

4. Which of my assets are best to leave a legacy gift to charity?

The answer to this may surprise you. Over the past several decades, the highest value asset owned by the average American was his or her home (and a company pension provided retirement income). Today, the highest value asset owned by the average American is an IRA, 401(k), or other qualified retirement account.

Retirement assets are heavily taxed when passed to individuals other than a spouse. Because of this, charitable gifts of retirement plan and IRA proceeds have become a popular tax-planning strategy. You can name a charity as a primary or contingent beneficiary of all or part of your account and 100 percent of the gift can bypass probate costs, estate taxes, and income taxes that would otherwise apply to the IRA or retirement plan.

If you think any of the above options may work for you, we'd be glad to meet with you personally to discuss your questions, interests, and options. 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 work with you to achieve your philanthropic goals. Thank you for your support!

On behalf of the Academy's Board of Trustees, we wish to recognize and thank those who have contributed to the Academy between **September 1 and November 30, 2014**. Your generosity helps to fund our many programs of research and education, and we are tremendously grateful for your support.

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WELCOMING A NEW TRUSTEE

The Academy is pleased to appoint a new trustee to our governing board.

James D. Herbert, PhD, currently serves as the interim provost and interim senior vice president for Academic Affairs at Drexel University. He is a clinical psychologist specializing in cognitive behavior therapy (including newer mindfulness and acceptance-based models of behavior therapy), mood and anxiety disorders, remote Internet-based treatment, and the promotion of evidence-based practice in mental health. He is a professor in the Department of Psychology and Director of the Anxiety Treatment and Research Program at Drexel University. He previously served as associate dean of the College of Arts and Sciences, as director of Clinical Training of Drexel's PhD Program in Clinical Psychology, and as interim head of the Department of Biology.

Jason Poole/ANS

DREADNOUGHTUS

Researchers from Drexel University and the Academy have discovered and described a new supermassive dinosaur species. At 85 feet long and about 65 tons in life, *Dreadnoughtus schrani* is the largest land animal for which a body mass can be accurately calculated. Its skeleton is exceptionally complete, with over 70 percent of the bones, excluding the head, represented. Kenneth Lacovara, PhD, Academy research associate and an associate professor in Drexel University's College of Arts and Sciences, discovered the fossil skeleton in Southern Patagonia in Argentina. The Academy's Fossil Prep Lab Manager, Jason Poole, was part of the research team. If you stopped by the lab in the past few years, you probably saw the team working on these fossils!

SEPOS

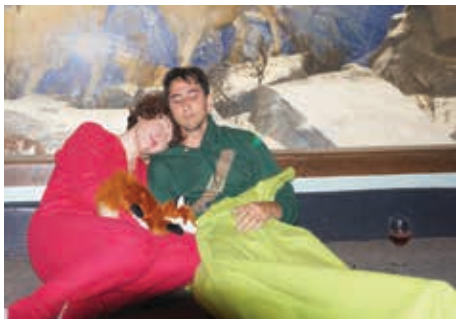
ORCHID SHOW

On April 24–26, see thousands of orchids and purchase plants from across the globe at the International Orchid Show & Sale. The show is presented in collaboration with the Southeastern Pennsylvania Orchid Society (sepos.org). Learn more at 215-299-1167 or ansp.org/orchidshow.

Will Klein for ANS

PALEOPALOOZA

Join us on Saturday and Sunday, February 14 and 15, for Paleopalooza, a two-day fossil festival of gigantic proportions. See real fossils from the world-famous collection of the Academy of Natural Sciences, meet expert paleontologists, and take guided tours of Dinosaur Hall. Plus enjoy hands-on activities, crafts, and dinosaur-themed fun for the whole family. This weekend also is the opening of *Titanoboa: Monster Snake*, running through April 19 in the Academy's Special Exhibits Gallery!



Mike Servedio/ANS

ADULT OVERNIGHT

On March 7, pack a sleeping bag, put on your pj's, and leave the kids at home—the Academy is hosting an overnight for adults only! Start your evening with a beer or glass of wine, listen to true stories about our creepy collections, navigate the underbelly of the Academy, and see some of the real skeletons in our closet. Meet some of the Academy's live animals up close, and hope for a chance at an owl selfie! This experience will include dinner and breakfast. You must be 21+ to attend this event. Visit ansp.org to purchase tickets.

HEMINGWAY AND THE ACADEMY

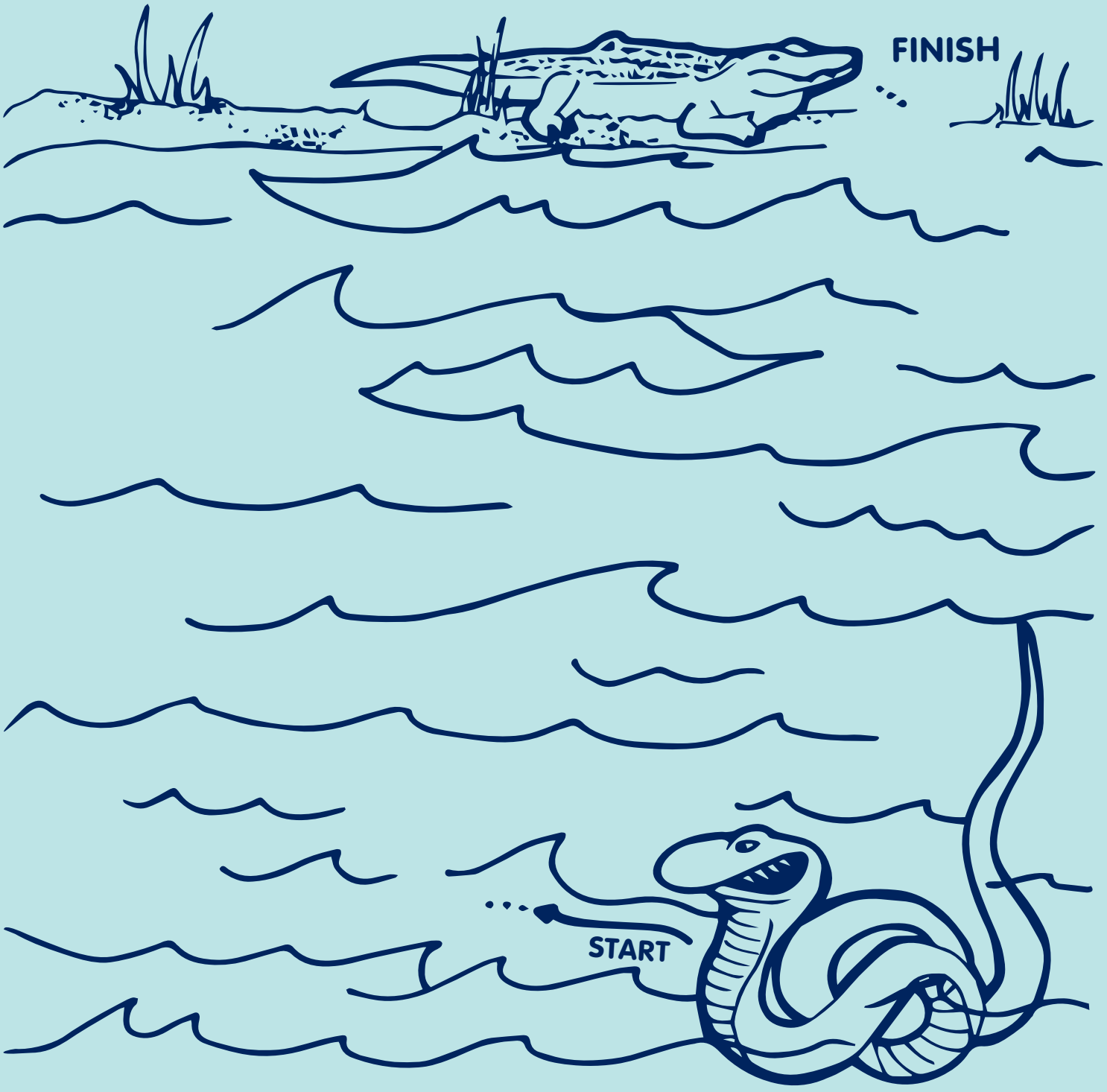
In September, Academy Senior Fellow Robert Peck joined a team of marine biologists, naturalists, historic preservationists, and descendants of Ernest Hemingway to visit the sights that inspired the author during the writing of *The Old Man and the Sea* and to commemorate the 60th anniversary of his receiving the Nobel Prize in Literature. The group was there to pay homage to Hemingway's love of fishing and his observations on the big game fish of the Atlantic. In 1934, Hemingway hosted Academy President Charles Cadwalader and Curator of Fish Henry Weed Fowler for a six-week research and fishing trip off the coast of Cuba. In return for the information and specimens he received, Fowler helped Hemingway understand more about the sea life they encountered and that Hemingway would later write about in *The Old Man and the Sea*. In 1935, Fowler named a spinycheek scorpionfish, *Neomerinthe hemingway*, in honor of the author. The type specimen of that fish is still in the Academy's Ichthyology Collection, along with a small tuna collected by Hemingway himself.

ANS Archives Coll. 707

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!

Titanoboa has spotted a meal just above the water's surface.
Can you help her make her way through the water to find her prehistoric prey?



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CALENDAR OF EVENTS

JANUARY

Beer and Chocolate Tasting
Thursday, January 15, 7–9 p.m.

Nature in Chalk Opens in Art of Science Gallery
Saturday, January 17, 10 a.m.–5 p.m. M

Animal Mythology Weekend
Saturday through Monday, January 17–19
10 a.m.–5 p.m. M

Last Day to See *Chocolate: The Exhibition*
Saturday, January 24, 10 a.m.–5 p.m. $*

Mega-Bad Movie Night at Bryn Mawr Film Institute
Thursday, January 29, 7–10 p.m.

John M. Bates

Channel-billed toucan

Joshua I. Engel

FEBRUARY

Titanoboa: Monster Snake Opens
Saturday, February 14, 10 a.m.–5 p.m. M

Paleopalooza
Saturday and Sunday, February 14–15
10 a.m.–5 p.m. M

Family Safari Overnight
Saturday, February 21, 6:30 p.m.

Mega-bad Movie Night: *Anaconda*
Thursday, February 26, 5:30–9 p.m.

MARCH

Overnight for Adults
Saturday, March 7, 6:30 p.m.

Founders' Day: Pay as you Wish
Monday, March 23, 10 a.m.–4:30 p.m. M

APRIL

Academy Explorers Spring Camp
Wednesday through Friday, April 1–3

Mega-bad Movie Night at PhilaMOCA
Thursday, April 16, 7–10 p.m.

Family Safari Overnight
Saturday, April 18, 6:30 p.m.

Last Day to See *Titanoboa: Monster Snake*
Sunday, April 19, 10 a.m.–5 p.m. M

Museum Closed for Orchid Show Setup
Thursday, April 23–Friday, April 24 at noon

SEPOS International Orchid Show & Sale
Friday, April 24, noon–6 p.m.
Saturday and Sunday,
April 25–26, 10 a.m.–5 p.m. M

Jason D. Weckstein

Ruddy spinetail

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 *Chocolate: The Exhibition*. Family Plus level members and above receive free admission. Purchase or renew your membership today at ansp.org/membership.

Visit ansp.org for more information and to register.

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