

ACADEMY

FRONTIERS

INSIDE:

Academy scientist discovers
new—yet threatened—fish species



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

SPRING 2014

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Academy Frontiers is a quarterly publication of the Academy of Natural Sciences of Drexel University, 1900 Benjamin Franklin Parkway, Philadelphia, PA 19103.

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ON THE COVER: *Tail of Leporellus vittatus*, a colorful species of headstander (Family Anostomidae) common to the swift waters and rocky habitats of the lower Xingu River. More on page 8. Photo by Mark Sabaj Pérez/ANS.



Dear Friends,

Nature played a central role in my youth. My father often led my brothers and me on “expeditions” through our backyard and woods, looking for box turtles, salamanders, and other plants and animals that would fascinate young children. A bird feeder was a permanent fixture outside our kitchen window, and with each passing year, I became more and more captivated by the beauty and behavior of our winged visitors.

Fast forward several decades to the 1980s, when my wife and I found ourselves at a bird-watching site in Pike County, Pennsylvania. Our dear friend, Sarita van Vleck, an avid birder and author, drove us into a clearing, opened all the car doors, and began playing a cassette tape of songbirds pestering a screech-owl. Within five minutes, more than 15 different species of birds were next to and even dive-bombing the car, seemingly driven mad by the racket. This experience opened my eyes to the remarkable diversity and behavior of bird species and made me aware that hearing and identifying birdsongs exponentially enhances the bird-watching experience.

Today I continue to enjoy bird-watching, especially when I can be aware of what species are near me at a single moment in time. On a day when fly-fishing becomes slow, the birding might just be spectacular. I’m truly passionate about birds, and that’s why I’m so excited about our upcoming special exhibit, *Birds of Paradise: Amazing Avian Evolution*. The birds featured in this exhibit are like none you have seen in Philadelphia. They reside in the remote rainforest of New Guinea, where the male birds initiate courtship through dances, wild calls, and outrageous displays.

I hope you will make it into the museum to see this stunning exhibit, which is perfectly suited to families and bird enthusiasts alike. Exhibits like this one would not be possible without the support of generous contributors like you. I extend my sincerest thanks to those who have supported the Academy through the 2014 annual fund. If you have not yet donated, you still have plenty of time before our June 30 deadline by visiting ansp.org/support or by using the enclosed postage-paid envelope. Whether you give financially, as a member and visitor, or through volunteering, we are tremendously grateful for your support of the Academy’s mission.

All the best,

A handwritten signature in black ink, appearing to be 'Gephart'.

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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Flowing for more than 1,200 miles through Brazil, the Rio Xingu (Xingu River) is the third-largest tributary of the Amazon and drains an area roughly the size of France. Turn to page 8 to read more about threats to species that inhabit the Xingu. Photo by Mark Sabaj Pérez/ANS



Lori Nix

Unnatural History: The Odd and Remarkable Dioramas of Lori Nix

ART OF SCIENCE GALLERY

APRIL 19–AUGUST 2

Unnatural History is a playful poke at what goes on behind the dioramas at a natural history museum. In Nix’s imaginative images, science, facts, and animals are a bit askew and sometimes hilarious. This exhibit plays on the expectations people have for museums like the Academy as places of serious research and authority. Free for members or with museum admission.

Birds of Paradise: Amazing Avian Evolution

SPECIAL EXHIBITS GALLERY

MAY 3–SEPTEMBER 1

Lace up your dancing shoes for a journey to the remote rainforests of New Guinea, land of the exotic birds-of-paradise. An elegant example of extreme evolution, birds-of-paradise show off their feathery flair during elaborate mating rituals. In this special exhibit based on the groundbreaking research of photographer Tim Laman and Cornell ornithologist Edwin Scholes, visitors will behold the birds’ cinematic courtship dances, puffed-out plumage, wild calls, and wacky behaviors through video, photography, soundscapes, and displays on research and conservation. Specimens, illustrations, and the chance to learn signature bird moves in a unique dance-off make this attraction fun for the whole family. Free for members or with museum admission.



Rebecca Hale

Birds of Paradise has been codeveloped by:  NATIONAL GEOGRAPHIC  The Cornell Lab of Ornithology

Chocolate: The Exhibition

SPECIAL EXHIBITS GALLERY

OCTOBER 11, 2014–JANUARY 24, 2015

Indulge yourself in the sumptuous world of chocolate! Making its East Coast premiere, *Chocolate: The Exhibition* traces the intriguing story of this “food of the gods” from its origin as a unique rainforest tree to the sensuous sweet millions of people crave today. Explore chocolate’s impact on tropical ecosystems, human cultures, and the global economy through a range of fun, hands-on activities for all ages. Stand under a life-size cacao tree, touch pods and seeds, and learn about the steps in chocolate production. Whether you are a novice or a connoisseur, *Chocolate* will engage your senses and share an enticing tale of the world’s favorite treat. Individual and Family Level Members: \$3 (40% discount); Family Plus Level Members and above see it free!



© 2002 Photodisc

In Spanish and English. *Chocolate* and its national tour were developed by The Field Museum, Chicago. This project was supported, in part, by the National Science Foundation.



JENNIFER VESS: KEEPER OF STORIES

IT'S THE STUFF THAT INTERESTS HER. The peculiar gadget that comes to life through a yellowed photograph. The brittle handwritten letter bearing the signature of a historical icon she has long admired. With a plethora of long-forgotten documents and artifacts at her white-gloved fingertips, the Academy's new Brooke Dolan Archivist, Jennifer Vess, is the guardian of facts and fables, portraits and pursuits. For her, archives are evidence of the past—the beginnings of the stories we tell.

Vess always has been passionate about sharing narratives from the past. Formally trained as a historian, she began her career volunteering and working as a docent at various museums and historical sites. Eventually she decided to enroll in a graduate program in museum studies and history. She believed this program would provide the perfect training for a career as a tour guide and museum educator.

Then there was a class in collections care and internships in collections management and archives, and her focus dramatically shifted to the items stored behind the scenes.

“Working with objects—I get to touch the stuff,” she says. “I often do it with gloves, but still. I get to hold and encounter the things that are history.”

Handling age-old clothing, instruments, illustrations, letters, specimens, and other artifacts stored in the Academy Archives transforms Vess from organization-obsessed records manager to enthralling educator. When she's not preparing materials for a library exhibit case, sharing her work with members, or guiding contributors through the maze of boxes she maintains behind the scenes, she's helping scientists find materials essential to their research.

Some Archives visitors know exactly what they're looking for, while others are hoping to identify new archival materials that will enhance their research. With her wide-ranging interests in history, science, and technology, Vess is more than willing to dig for information. Her effort saves time for researchers and often enriches their work.

While scanning through an index during one intense search, Vess stumbled upon a familiar name—but one that seemed to have no business being in the archives of the oldest natural history museum in the Western Hemisphere. At age 8 Vess had become fascinated with the American Civil War, and through the next decade her interests narrowed to women's involvement in Civil War medicine. Imagine her surprise when she spotted the name of Dorothea Dix, a 19th-century American activist and superintendent of nurses during the Civil War.

Most archivists are not satisfied with unanswered questions, and Vess is no different. She set out to find a letter Dix wrote so that she could figure out why correspondence from this famous nurse and reformer was part of the Academy's collection.

The letter in hand, Vess felt a “visceral connection to the past.” On page 12 of this issue of *Academy Frontiers*, Vess draws out Dix's relationship with science at the Academy and describes how a fascination with botany merged with Dix's notable career.

~Mary Alice Hartsock



THE NEW YORK TIMES, THE WASHINGTON POST, THE BOSTON GLOBE, BBC NEWS, AND COUNTLESS OTHER NEWSPAPERS AND NETWORKS JUST COULDN'T SAY ENOUGH ABOUT FISH HIPS. Academy paleontologist and Drexel professor Ted Daeschler had 10 years of research behind this coverage, and he watched as the world reacted to this scientific breakthrough.

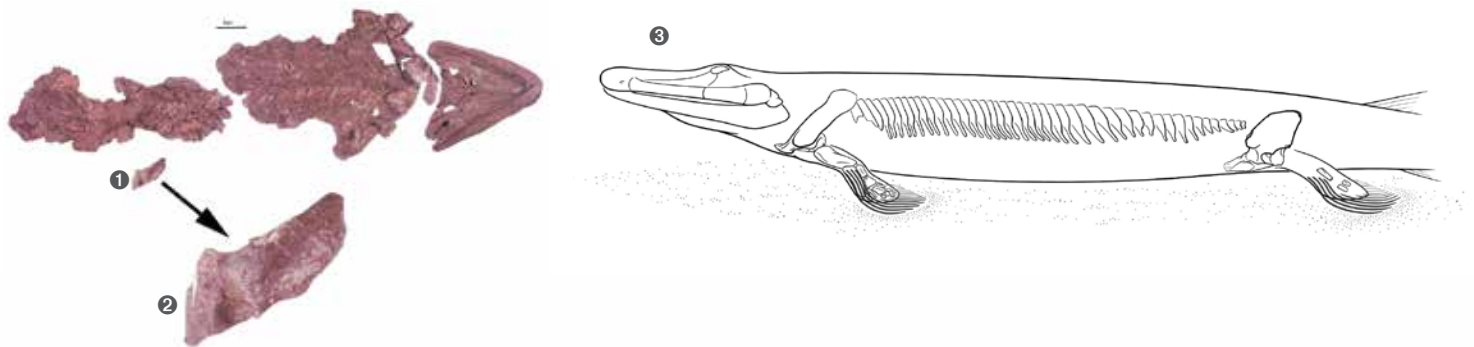
It wasn't the first time that he and his research partner and coauthor Dr. Neil Shubin (The University of Chicago) had their work broadcasted across major news outlets. The recent announcement focused on new fossil material of the internationally famous 375-million-year-old species *Tiktaalik roseae*, discovered a decade ago by Daeschler, Shubin, and the late Farish A. Jenkins, Jr., of Harvard University.

Offering a textbook example of the evolutionary transition between finned and limbed animals, *Tiktaalik roseae* was a lobe-finned fish with many features only seen in tetrapods (limbed animals). The new findings, published in the *Proceedings of the National Academy of Sciences* in January, reveal a well-preserved

pelvis and partial pelvic fin that demonstrate that the evolution of robust pelvic appendages happened before the origin of limbs—not after, as scientists originally thought. Daeschler explains that these rear appendages enabled a shift from “front-wheel drive” to “four-wheel drive” movement in fish, rather than in limbed animals.

In the past two years, Daeschler and the team closely examined material from the back end of *Tiktaalik*, which they had gathered during multiple expeditions to Canada's Nunavut Territory. *Tiktaalik*'s “fish hips” quickly drew attention as the researchers noticed that, although the basic architecture of the pelvis was primitive, there were also distinct similarities to tetrapods. Like tetrapods, *Tiktaalik* had similarly sized front and rear appendages, plus a ball-and-socket hip joint that allowed the pelvic fin a greater range of motion, including beneath the body.

According to Daeschler, *Tiktaalik* used the fin similarly to the way tetrapods used their limbs, but mostly in aquatic settings. Daeschler and Shubin's significant discovery fills yet another gap in our knowledge of evolution from creatures of water to those of land. 🌀



Underside of the *Tiktaalik roseae* type specimen with pelvis in place (1) and enlarged (2). *Tiktaalik* illustration (3) by Kalliopi Monoyios.



FROM LEFT: Josh Miller (University of Cincinnati), Marcus Davis (Kennesaw State University), Neil Shubin (University of Chicago), and Ted Daeschler stand in the quarry where scientists found *Tiktaalik roseae* in 2004.

COURTSHIP RITUALS: FROM NEW GUINEA TO PHILADELPHIA

OPENING IN THE ACADEMY'S SPECIAL EXHIBITS GALLERY ON MAY 3, *BIRDS OF PARADISE: AMAZING AVIAN EVOLUTION* TELLS THE EXTRAORDINARY STORY OF THE EXTREME EVOLUTION OF NEW GUINEA'S BIRDS-OF-PARADISE. Male birds-of-paradise show off with their wild calls and wacky dances during elaborate mating rituals—and female birds select mates with the most impressive acts. Vying to become the best and brightest, young male birds even practice their dances when females aren't around.

Though we can't see live birds-of-paradise outdoors in Philadelphia, our local creatures have their own special ways of attracting mates. Below, Special Exhibits Educator Mary Bailey explains how you can observe the courtship displays of frogs and birds in our area.



Ned Gilmore/ANS



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SPRING PEEPER

The spring peeper (*Pseudacris crucifer*) is a small (1–1.5 inch), brownish-tan frog with a dark “X” on its back. It is common in the eastern United States and Canada, where it can be found in wooded areas and grassy marshes near ponds and swamps. Its high-pitched call, recognizable by its sleigh-bell-like sound, is among the first frog calls heard in spring.

At dusk, a male spring peeper hides in grasses or shrubs near the water's edge and begins his mating calls. Often listening from low vegetation nearby, the female joins the male at the water to mate and lay her eggs.

The spring peeper is likely to evade your glance, but if you travel to a moist or swampy area such as the John Heinz National Wildlife Refuge between March and June, you may hear its call, says Bailey. Visit aza.org to find out about FrogWatch USA, a citizen science program in which individuals and families can learn about the wetlands and help conserve amphibians by reporting the calls of local frogs and toads.

EASTERN BLUEBIRD

Growing up to 21 cm, the adult male eastern bluebird (*Sialia sialis*) has royal blue feathers on its back and head, white on its belly and under the tail, and a chestnut throat, neck, and breast. The female is gray, accented with bluish tints. This bluebird prefers to build its nest in cavities of trees or posts, and it also is attracted to human-built nest boxes in open woodlands, fields, parks, and backyards.

Attempting to attract a female to his territory, a male bluebird sings a low, warbling song from a high perch or while in flight. When a female enters his territory, he displays his feathers while perching or dancing at the nest. He also may move in and out of the nest hole, sometimes appearing to carry nest-building material. The female may visit the nest several times before settling down permanently to build her nest.

If your yard is large and open, you may consider building a nest box to attract eastern bluebirds. The North American Bluebird Society (nabluebirdsociety.org) offers detailed online instructions. Bailey loves to observe these birds at the John James Audubon Center at Mill Grove, a 175-acre bird sanctuary hosting a large variety of different bird species. Visit johnjamesaudubon.org for more information and best times to visit.



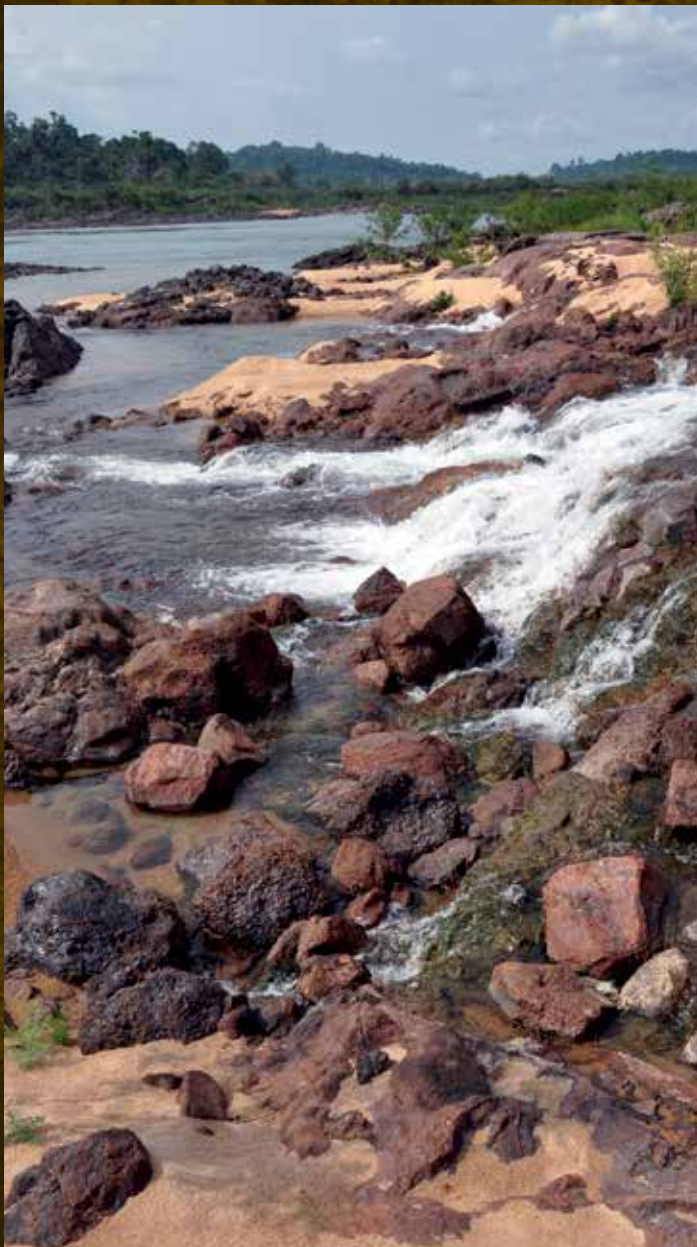


WINNERS AND LOSERS

By Mary Alice Hartsock, Editor
Photographs by Mark Sabaj Pérez

It was the number of thorns that gave it away. At first glance, the creature appeared to be just another giant Raphael catfish, a common species known as *Megalodoras uranoscopus* that is found throughout the Amazon lowlands. But when Mark Sabaj Pérez took a closer look during a 2013 expedition to Brazil's Xingu River, he just couldn't shake the feeling that this seemingly familiar fish might be something new and important.

Scientists explore Brazil's Xingu River by boat to record the vast diversity, abundance, distribution, and habitats of species of the lower Xingu.



LEFT: Downstream of the new Pimental dam, small cataracts run along a main stem waterfall. This turn in the Xingu, known as Volta Grande, or big bend, will be altered when the dam begins to operate later this year.

BELOW: Sabaj Pérez discovered a new species of thorny catfish in the genus *Megalodoras* during his October 2013 expedition to Brazil's Xingu River.



continued from page 9

Sabaj Pérez collected a few of these catfishes upstream of Cachoeira do Jericoá, a beautiful series of small waterfalls and powerful rapids. As the expedition moved downstream, closer to the Xingu's junction with the Amazon, the *Megalodoras* became more like the giant thorny catfishes Sabaj Pérez had studied throughout the lowlands. Comparing specimens side by side, the differences were striking, at least to a thorny catfish expert.

Scrutinizing everything from the shapes of the fishes' heads to the number of bony scutes and thorns along the sides of their bodies, Sabaj Pérez realized he was looking at two distinct species. The new species—found upstream of the rapids—currently is known only from the lower Xingu River. And though the physical differences between species may seem trivial to the naked eye, they reveal significant information about how

physical barriers such as the Cachoeira do Jericoá may impact the evolution of aquatic biodiversity.

Besides curiosity, why would a Philadelphia ichthyologist be interested in the differences between species inhabiting a Brazilian river? Supported by the National Science Foundation, Sabaj Pérez and an international team of experts and students are recording the vast diversity, abundance, distribution, and habitats of fishes, crustaceans, and mollusks inhabiting the lower Xingu. Massive changes are coming to the area, and the team is recording as much information as possible before the transformation destroys the natural quality of this river.

In 2014 the Belo Monte Dam Complex will begin its operations as the third-largest hydroelectric dam on the planet. To divert water to power Belo Monte's turbines, a second dam will be constructed across the entire breadth of



BACKGROUND IMAGE: Beds of river weed (Podostemaceae) are exposed and dry during the low-water season.

LEFT: Piranhas are often perceived as the most dangerous fishes in the Amazon, yet movies and media often overstate their threat to humans. The toxic tail spines of stingrays are far more dangerous. During the 2013 expedition, Sabaj Pérez mishandled a small stingray that promptly impaled his hand. The result was a day's worth of pain. He now emphasizes the importance of using a boat paddle to safely handle stingrays, as demonstrated by Andreza Oliveira.

BELOW: The international expedition team led by Mark Sabaj Pérez (front, center) and Brazilian ichthyologist Leandro Sousa (far left) pauses for a break after completing its first outing on the Xingu River.



the Xingu's channel. This second dam, called Pimental, will create an artificial barrier that may disrupt fish movement, similar to the Cachoeira do Jericoá, and will produce a reservoir, flooding a portion of the Xingu's islands and rapids. Downstream of the Pimental dam, the mighty bend in the Xingu may lose valuable water to fill its extensive network of channels. Aquatic organisms of the lower Xingu are adapted to the seasonal changes in water levels, a delicate balance that may turn on its head.

"There will be winners and losers with the construction of the dam," Sabaj Pérez says. "The winners are likely to be fishes that inhabit larger bodies of slow-moving water, and

the losers are likely to be the ones that inhabit deep, swift-flowing channels."

Sabaj Pérez and the team are racing against time to gather a complete picture of the lower Xingu's biodiversity. After the dam is in operation, they will use this data to evaluate the changing habitat. This information is critical, as the Xingu's lower reaches are home to at least 26 species of fishes that live nowhere else on Earth—and scientists do not yet understand how all of these species will be impacted. The data will enable future scientists to address questions about how human interference has shaped the biodiversity of the Xingu River, perhaps guiding a larger discussion on the risks and benefits of dam building.

Q.

WHAT HAVE YOU FOUND IN THE ARCHIVES THAT HAS SURPRISED YOU?

A: The majority of the collections in the Academy Archives fit together perfectly. Rarely do we look at something and wonder, “Why is this here?” But it does happen, and the collection of letters to Dr. John Torrey (Coll. 364) offers a good example.

Torrey (1796–1873) was a medical doctor and botanist who helped found the New York Lyceum of Natural History and acted as first president of the Torrey Botanical Club (now the Torrey Botanical Society). He became a member of the Academy in 1822, and decades later (exact date unknown), a man named John Redfield donated hundreds of Torrey’s letters to the Academy. The letters were written by fellow scientists and enthusiasts, but also by a most unexpected correspondent—Dorothea Dix.

Often mentioned alongside Clara Barton, Dix (1802–1887) is probably best known today for her work as superintendent of nurses during the Civil War. Those few years of war were a small part of her life, much of which she spent in pursuit of reform for prisons and asylums. For this cause she traveled throughout the United States and around the world, meeting heads of state and petitioning governments. So what brought Dorothea Dix and John Torrey together in correspondence? Plants.

Except for a single mention of her “Cause,” Dix might be mistaken for a botanist, so fully does her letter focus on flora. She writes about the plants she is sending to Torrey, and her words suggest more than a passing knowledge. The entire first page is consumed by a bean plant from Georgia and includes its scientific name (difficult to decipher) and its common name “Jack’s Bean.” The second plant mentioned, from the Delaware marshes near Philadelphia, is referred to only by a scientific name, *Nelumbia*.

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NO. 364

Monte, New Jersey, July 24th.
J. D. Torrey

My dear Sir, I send you
a beautiful tree fruit, which I
brought last month from Massachusetts.
The which was produced in the
garden of my friend Joseph S. Day Esq. it
attained a size and height in 40 weeks
which served to authorize the idea
that it was of that family of Bean
Plants - to which class it was ordered
in the Jurine Class - to which
most of us have been familiar, and
which is sometimes "Jack's Bean!"

ANS Archives Coll. 364

Dix laments near the end of the letter that she is “too much an invalid at present either to perform my duties in the Cause I advocate or to gather flowers by the ‘way-side.” A letter like this one can add new depths to our understanding of historical figures. Dix was a world-renowned reformer, but she also had an avid interest in plants, and she seems to have set aside time to cultivate that interest even as she dedicated herself to reform work. Unexpected correspondence and manuscripts—which many archives have—are rare for researchers to find, but they do make the search exciting. ~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.



BATHROOM BLUES

© kistdesign

THE SUN HASN'T EVEN COME UP YET, BUT YOUR ALARM IS PERSISTENT. You stumble to the bathroom, turn on the shower, stare into the mirror, head back to your bedroom to find your towel, turn on your iPod, undress, grab your products, and finally jump into the steaming water.

As you wake up in the shower you're probably thinking about your to-do list. Before you even leave home, you might take out the recycling, fill your water bottle, and pack your lunch in a reusable container—all great ways to protect the environment. But even before you started your mental to-do list, you've made a big mistake. Do you recognize it now that you're awake?

That's right. Gallons of water went down the drain before you even stepped into the shower. The water was nice and hot, which means a chunk of energy went into warming it. Don't get us wrong—we love toasty showers, and mornings can be rough even for the greenest of environmental advocates. We constantly have to remind ourselves that what we do in our homes—

and especially in our bathrooms—has a significant impact on the environment. It's extremely important to educate ourselves and our families on how we can better conserve the earth's natural resources.

Consider the shower, for example. One way to save water is by taking showers instead of baths. While a bath can use up to 70 gallons of water, a 10-minute shower under the average low-flow showerhead—which uses 2.5 or fewer gallons of water per minute—will require about 20 gallons of water. You can buy a low-flow showerhead at any home improvement store for less than \$20.

The average person uses nearly 20 gallons of water a day—about 7,300 gallons a year—just by flushing the toilet. If your toilet was installed after 1992, you likely have a low-flow toilet that saves water. Many toilets display the manufacturing date right on the inside of the tank. If your household has a standard toilet, fill a plastic bottle with sand or rocks and put it into your tank. The bottle will take

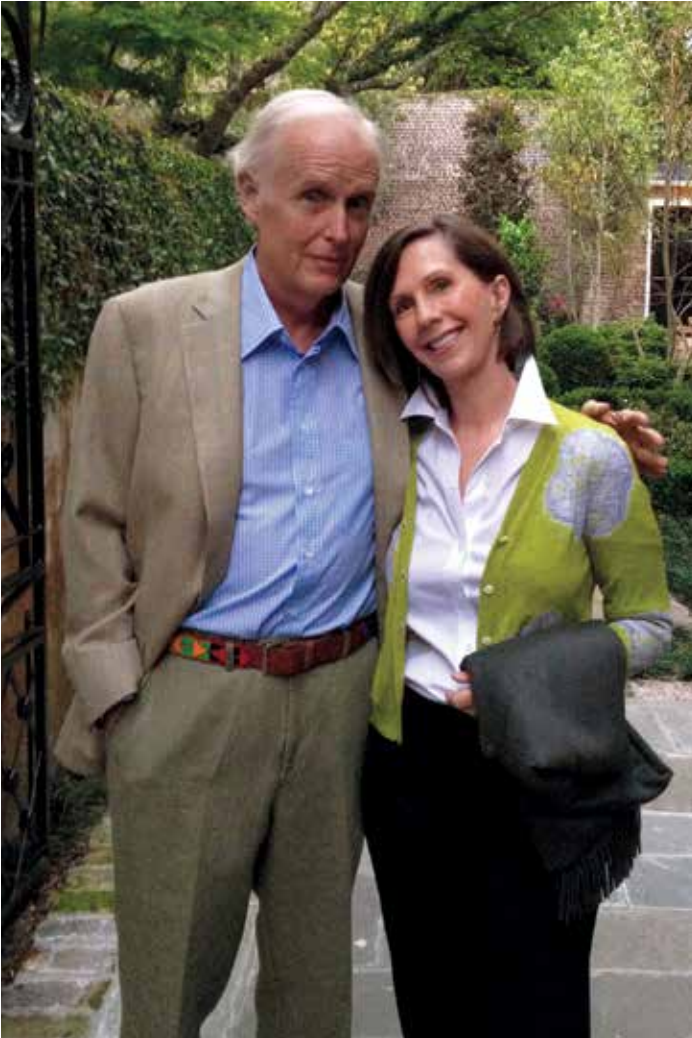
up space and trick your toilet into filling with less water.

Have you ever considered whether you use more toilet paper than you really need? Trees help fight climate change by absorbing carbon dioxide, yet every day, we cut down about 27,000 trees worldwide to make toilet paper. Think about the difference you could make by using less or switching to single-ply toilet paper!

Then there's the sink. Turning off the water when you're brushing your teeth is essential, but did you know there are ways to make a smaller impact when you do run the water? For less than \$10, you can add an attachment called an aerator to your faucet at home. You'll save about 700 gallons of water each year. That's enough water for about 40 showers.

We hope these suggestions will give you a place to start when talking with your family about saving water and energy. Making these changes can be hard at first, but just starting a conversation can lead to important changes down the road. ~MAH

DOUG WALKER (1948–2013): REMEMBERING A TIRELESS ENVIRONMENTAL ADVOCATE



IF YOU ARE INVOLVED WITH CONSERVATION IN AND AROUND PHILADELPHIA, YOU PROBABLY KNEW DOUG WALKER.

Though much of his career at financial services firm Brown Brothers Harriman kept him indoors, Walker was an avid outdoorsman with keen interests in fishing and bird-watching. His passion for nature, along with his superior strategic thinking, creativity, and knack for alliance building, carried through into his volunteer work.

Walker served as a trustee on the boards of many organizations, including the Natural Lands Trust, the Stroud Water Research Center, the Brandywine Conservancy, the Willistown Conservation Trust, the Nature Conservancy's Pennsylvania chapter, and the Academy of Natural Sciences. He was passionate about scientific research, as well as furthering conservation education in underserved communities. His talents and interests made him a perfect match for the Academy—and thanks to Academy Senior Fellow Robert Peck, the Academy and Walker began a partnership that lasted more than 25 years.

Introduced by a mutual friend from their alma mater, Princeton University, Peck and Walker developed a comradeship over their shared passions for philanthropy, travel, nature, and conservation. In the early 1980s, Peck guided Walker through the Academy's collections and introduced him to the scientists, who helped him become familiar with their research on biodiversity and the environment.

"He immediately grasped the importance of the Academy's research and realized how crucial it was in supporting conservation policies," Peck says.

Soon elected to the Academy's board, Walker became a champion of connecting Academy scientists with conservation groups. His priority was to ensure that those organizations made decisions based on sound science. The Academy's active ecological research and long history of successful environmental research helped him build essential alliances that supported all involved parties.

Walker introduced countless future supporters and trustees to the Academy. He hosted events that convened potential contributors with current staff and trustees, raising awareness and interest for the Academy's research and public programming. Walker's strategic thinking and creative problem-solving empowered his work on the finance and development committees. He did all of this work behind the scenes, giving freely of his time and talents with a quiet humility that will not soon be forgotten.

A member of the Academy's Jefferson Circle, Walker made generous yearly contributions to the institution. Many of his gifts were unrestricted or directed to the president's fund, which is dedicated to jump-starting new initiatives. He devoured information on scientific breakthroughs and searched for ways that he could support innovation.

"I have never met anyone who was better read and more insatiably curious," Peck says. "His limitless intellectual curiosity was linked with his humility, as he was forever inspired by scientific discoveries being made at the Academy and elsewhere and wanted to do his part to support them."

Walker's passion for innovative educational approaches extended far beyond Philadelphia. In Kenya, he assisted local schools in purchasing books and paying teacher salaries, providing such significant contributions to girls' education that he was named as an elder of the nomadic Samburu tribe.

Walker passed away in November 2013 after a three-year illness, survived by his wife, Jane Walker (above), and her three children, Olivia, Colin, and Madeline. Even as he struggled through his illness, he volunteered to support medical research, receiving experimental treatments that he hoped would one day help others in his position.

Walker's dedication to science left a tremendous mark on more than 20 nonprofits, most of which focused on land preservation and natural history research. He will be forever remembered at the Academy for his selfless support of our research, education, and public engagement initiatives. ~Mary Alice Hartsock

WHAT DO I NEED TO DRAFT MY WILL?

FEW THINGS IN LIFE ARE MORE PERSONAL THAN PREPARING YOUR LAST WILL AND TESTAMENT. Drafting a will gives you the assurance that your voice will be heard regarding how you want your children to be cared for and how you want your property to be distributed.

To ensure that your will meets your unique needs, you'll need to provide your attorney with some important information:

PERSONAL INFORMATION, such as your name, address, date of birth, marital status (past and present), residency, previous will, and marriage contract.

FAMILY AND DEPENDENT INFORMATION, including names, addresses, and dates of birth of spouse(s), children, and dependents.

PROFESSIONAL ADVISORS, specifically the names and addresses of your lawyer, accountant, investment advisor, and life insurance agent.

INCOME INFORMATION, including the amount of annual income from all sources, such as employment, business, rent, royalties, and more.

ASSETS, such as bank accounts, safety deposit boxes, real estate, life insurance, annuities, Registered Retirement Savings Plans, Registered Retirement Income Funds, pensions, investments, business interests, debts owing from third parties, cars, boats, machinery/tools/equipment, household goods, and furniture.

LIABILITIES, specifically mortgages, loans, credit card balances, and other relevant information.

NEXT STEPS

Once you have gathered these details, you can begin to outline the instructions for your will, including how you would like your assets

to be distributed, who you would like to serve as your Estate Trustee, and more. Your attorney can walk you through this process.

As part of the estate planning process, many people choose to leave a bequest to one or more of their favorite charities, such as the Academy of Natural Sciences. When you have provided for your family, friends, and other loved ones, you may decide that you'd like to further the mission of the Academy as part of your life's legacy. A bequest can be for a specific amount of money, a piece of property, or a percentage of your estate. You may wish to share the following sample bequest language with your attorney:

I, [name], of [city, state ZIP], give, devise, and bequeath to the Academy of Natural Sciences of Philadelphia [written amount or percentage of the estate or description of property] for its unrestricted use and purpose.

You may also wish to support a specific program within the Academy, or you may consider creating a permanent endowment that will continue to support the Academy for generations to come. By designating the Academy as a beneficiary, you will also become a member of the Academy's 1812 Society, which honors those supporters who have made arrangements to support the Academy through their estates. Please let us know if you have any questions about these kinds of gifts or if you have already remembered the Academy in your will.

Estate and tax planning is complex, so please be sure to seek professional advice when making your estate plans. To receive a free estate information organizer to help with the task of compiling information to draft your will, please contact Amy Marvin, vice president of Institutional Advancement, at 215-299-1013 or marvin@ansp.org, and she will be happy to assist you. Thank you for your support of the Academy. 🌊

WELCOMING NEW TRUSTEES

The Academy is pleased to appoint two new trustees to our governing board.



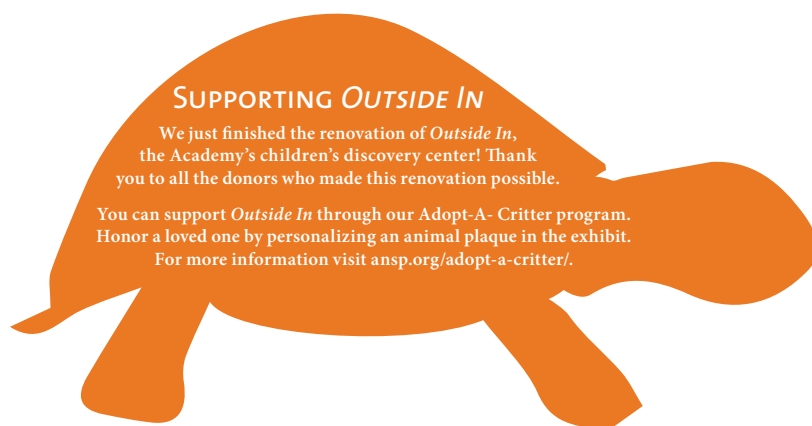
Robert Drury is a partner of Laurel Capital Partners, a Radnor private equity firm focused on growth equity and buyout investments in small companies. Drury has more than 30 years of experience in mergers and acquisitions, corporate development, financings, and general management. Prior to joining Laurel, Drury was president of RED Associates, where he advised small and mid-market companies on strategies for profitable growth, provided financial management services, and sourced financing for developing companies. He also was founder and chief financial officer of GCA Services, Inc.; chief financial officer of Sodexo, U.S.; and chief financial officer of Aramark's International and Leisure Services sectors.



Jun Huangpu, Ph.D. is the owner of Cobbs Creek Healthcare, a consultancy that provides business analytics including healthcare market research and information technology services. He also is a partner with Healogix, a global health care market research and consulting firm in Horsham. He is a member of the Physician Advisory Board of MedTera and is executive director for the Wynnewood-based Main Line Chinese Culture Center, which he co-founded with his wife, Xia Li. Previously, Huangpu was a market research and business development manager with AstraZeneca and Prism Pharmaceuticals and a consultant with IMS and Verispan.

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ON BEHALF OF THE ACADEMY'S BOARD OF TRUSTEES, we wish to recognize and thank those who have contributed to the Academy between December 1, 2013, and February 28, 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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ALL ABOUT BIRDS WEEKEND

On June 7 and 8, meet the squawking, talking, live birds of the Academy during a wild weekend suitable for bird enthusiasts of all kinds. View the elegant examples of extreme evolution in our *Birds of Paradise* exhibit. Learn about the anatomy of our feathered friends and investigate what it means to be a bird-of-paradise, all through fun hands-on activities, experiments, crafts, and more. More at ansp.org.

Mike Servecio/ANS



PHILADELPHIA SCIENCE FESTIVAL

On Saturday, May 3, Academy staff will engage you with interactive bird activities during the Science Carnival of the Philadelphia Science Festival. We're joining 100 other exhibitors for this free carnival on the Benjamin Franklin Parkway, which includes family-friendly experiments, activities, games, and a packed lineup of live entertainment. While you're on the Parkway, stop in for the opening day of *Birds of Paradise*. More at ansp.org.

MEMORIAL SYMPOSIUM

On Tuesday, April 22, the Academy will host a memorial symposium to honor Dr. Ruth Patrick, whose pioneering environmental research at the Academy set the stage for generations of scientists interested in aquatic ecology and conservation. Thomas Lovejoy, the first person to use the term "biological diversity" in 1980, will be joined by other experts in aquatic ecology and environmental science. Explore the critical environmental issues Dr. Patrick first investigated many years ago. Register at ansp.org.

LIBRARY OPEN TO PUBLIC

The Academy's Library Reading Room is now open to the public from 1–4 p.m. every weekday. Check out display cases of treasures from the Academy's collections, stare into the eyes of former Academy presidents, and measure your height against the massive Irish elk who calls the Library home. You also can examine an incredibly rare and historic masterpiece—John James Audubon's *The Birds of America*. Weekdays at 3:15 p.m. we turn the page to reveal another stunning image from this work, arguably the most influential book on birds ever created.

Paul Overbeck/ANS



MAJOR WATERSHED RESEARCH GRANT

The Academy has been granted three years of funding from the William Penn Foundation for its work on the Delaware Watershed Conservation Program, a multi-year initiative to protect and restore critical sources of drinking water for 15 million people in the Delaware River Basin. While coordinating the work with the William Penn Foundation, the National Fish and Wildlife Foundation, and the Open Space Foundation, the Academy will provide scientific oversight for the entire project, with more than 40 grantees working to restore degraded areas, protect undamaged areas, and monitor watershed health. Among the Academy's primary responsibilities are assessing the short-term impacts of restoration projects and organizing and analyzing all existing data. Using a variety of sampling methods, our scientists also will report general conditions of the clusters of sub-watersheds so that new projects can be identified. The scientific evidence that they collect will be used to help guide watershed health management decisions over time.



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!

Color this beautiful bird-of-paradise, and be sure to check out the new special exhibit at our Member Preview on May 2 from 5:30–9 p.m. Register by calling 215-299-1022.



Christine Danowsky/ANS

POETRY CONTEST

ATTENTION KIDS AGES 7–12!

Do you have a favorite animal, plant, or science topic? Write a poem about it, and your work could be published in the next issue of *Academy Frontiers*. The winner will receive a free membership renewal for your household!

Please include your name, age, and contact information with your poem, and mail to Academy Membership Office, 1900 Benjamin Franklin Parkway, Philadelphia, PA 19103, or drop off your poem at either of our admissions desks during your next visit.

Be sure to address it to Academy Membership Office.

Contest deadline is May 15, 2014.

ACADEMY PRINTING PARTNER



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CALENDAR OF EVENTS

APRIL

- ACADEMY EXPLORERS SPRING CAMP**
Weekdays, April 14–18, 9 a.m.–4 p.m.
- PRE-K SCIENCE DAY**
Saturday, April 19, 10 a.m.–5 p.m.
- UNNATURAL HISTORY EXHIBIT OPENS**
Saturday, April 19, 10 a.m.–5 p.m.
- RUTH PATRICK MEMORIAL SYMPOSIUM**
Tuesday, April 22, 8 a.m.–12:30 p.m.
- SILVERMAN MEMORIAL LECTURE
FEATURING CARL SAFINA**
Wednesday, April 30, 6:30 p.m.

MAY

- BIRDS OF PARADISE :
AMAZING AVIAN EVOLUTION
MEMBER PREVIEW**
Friday, May 2, 5:30–9 p.m.
- BIRDS OF PARADISE EXHIBIT OPENS**
Saturday, May 3, 10 a.m.–5 p.m.
- SCIENCE CARNIVAL AT THE
PHILADELPHIA SCIENCE FESTIVAL**
Saturday, May 3, 10 a.m.–4 p.m.
- MEGA-BAD MOVIE NIGHT: GODZILLA**
Thursday, May 8, 6:30 p.m.
- MOTHER OF ALL BABY SHOWERS**
Friday, May 16, 6:30 p.m.
- BOTANY COLLECTION ADULT CLASS**
Wednesday, May 28, 6–9 p.m.

JUNE

- ALL ABOUT BIRDS WEEKEND**
Saturday and Sunday, June 7–8,
10 a.m.–5 p.m.
- OPENING DOORS TO AUTISM**
Sunday, June 8, 9–11 a.m.
- FOSSIL FIELD STUDY FOR ADULTS**
Saturday, June 28, 10 a.m.–3 p.m.

JULY

- ACADEMY EXPLORERS SUMMER CAMP**
Monday, July 7–Friday, August 22
- TINY TOT EXPLORERS**
Wednesdays, July 9–August 20, 10–11 a.m.
- MEGA-BAD MOVIE NIGHT**
Thursday, July 10, 6:30 p.m.



Mark Sabaj Pérez/ANS

Free for members Fee Registration required

Unless otherwise noted, all events held at the Academy are free with museum admission.

Visit ansp.org for more information and to register.